

TRANSNET SOC LTD

[Registration Number 1990/000900/30]

REQUEST FOR PROPOSAL (RFP)

THE DESIGN, MANUFACTURE, DELIVERY, ERECTION, TESTING AND COMMISSIONING OF ONE (1)65 TON TWIN-LIFT SHIP-TO-SHORE (STS) AT PORT ELIZABETH CONTAINER TERMINAL FOR TRANSNET SOC LTD (REG.NO.1990/000900/30) OPERATING AS TRANSNET PORT TERMINALS HEREINAFTER REFERRED TO AS "TPT" AS A ONCE OFF SUPPLY

RFP NUMBER	: TPT/2022/06/0297/5745/RFP
ISSUE DATE	: 15 SEPTEMBER 2022
CLOSING DATE	: 14 OCTOBER 2022
CLOSING TIME	: 12h00
TENDER VALIDITY PERIOD	: 12 Weeks from Closing Date

The Tender

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Part T1: Tendering Procedures

T1.1 Tender Notice and Invitation

T1.1 TENDER NOTICE AND INVITATION TO TENDER

SECTION 1: NOTICE TO TENDERERS

1. INVITATION TO TENDER

Responses to this Tender [hereinafter referred to as a **Tender**] are requested from persons, companies, close corporations or enterprises [hereinafter referred to as a Tenderer].

DESCRIPTION	THE DESIGN, MANUFACTURE, DELIVERY, ERECTION, TESTING AND COMMISSIONING OF ONE (1)65 TON TWIN-LIFT SHIP-TO-SHORE (STS) AT PORT ELIZABETH CONTAINER TERMINAL FOR TRANSNET SOC LTD (REG.NO.1990/000900/30) OPERATING AS TRANSNET PORT TERMINALS HEREINAFTER REFERRED TO AS "TPT" AS A ONCE OFF SUPPLY
TENDER DOWNLOADING	This Tender may be downloaded directly from the National Treasury eTender Publication Portal at www.etenders.gov.za and the Transnet website at https://transnetetenders.azurewebsites.net (please use Google Chrome to access Transnet link) FREE OF CHARGE.

NON - COMPULSORY TENDER CLARIFICATION MEETING	<p>A Non- Compulsory Tender Clarification Meeting will be conducted on Microsoft Teams on the 27th September 2022, at 11:00am [10 O'clock].</p> <p>The Clarification Meeting will start punctually, and information will not be repeated for the benefit of Tenderers arriving late.</p> <p>Tenderers who wish to participate in the briefing session must send request via email to Rochelle.isaacs@transnet.net before end of business on Monday, 26th September 2022.</p> <p>Tenderers are advised to download Microsoft Teams App to their PC or Mobile to be able to participate.</p>
CLOSING DATE	<p>12:00pm on Friday 14th October 2022</p> <p>Tenderers must ensure that tenders are uploaded timeously onto the system. If a tender is late, it will not be accepted for consideration.</p>

2. TENDER SUBMISSION

Transnet has implemented a new electronic tender submission system, the e-Tender Submission Portal, in line with the overall Transnet digitalization strategy where suppliers can view advertised

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tenders, register their information, log their intent to respond to bids and upload their bid proposals/responses on to the system.

a) The Transnet e-Tender Submission Portal can be accessed as follows:

Log on to the Transnet eTenders management platform website (<https://transnetetenders.azurewebsites.net>);

- Click on "ADVERTISED TENDERS" to view advertised tenders;
- Click on "SIGN IN/REGISTER – for bidder to register their information (must fill in all mandatory information);
- Click on "SIGN IN/REGISTER" - to sign in if already registered;
- Toggle (click to switch) the "Log an Intent" button to submit a bid;
- Submit bid documents by uploading them into the system against each tender selected.
- **Tenderers are required to ensure that electronic bid submissions are done at least a day before the closing date to prevent issues which they may encounter due to their internet speed, bandwidth or the size of the number of uploads they are submitting. Transnet will not be held liable for any challenges experienced by bidders as a result of the technical challenges. Please do not wait for the last hour to submit. A Tenderer can upload 30mb per upload and multiple uploads are permitted.**

b) The tender offers to this tender will be opened as soon as possible after the closing date and time. Transnet shall not, at the opening of tenders, disclose to any other company any confidential details pertaining to the Tender Offers / information received, i.e. pricing, delivery, etc. The names and locations of the Tenderers will be divulged to other Tenderers upon request.

c) Submissions must not contain documents relating to any Tender other than that shown on the submission.

3. CONFIDENTIALITY

All information related to this RFP is to be treated with strict confidentiality. In this regard Tenderers are required to certify that they have acquainted themselves with the Non-Disclosure Agreement. All information related to a subsequent contract, both during and after completion thereof, will be treated with strict confidence. Should the need however arise to divulge any information gleaned from provision of the Works, which is either directly or indirectly related to Transnet's business, written approval to divulge such information must be obtained from Transnet.

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Tenderers are hereby advised that Transnet is not committed to any course of action as a result of its issuance of this Tender and/or its receipt of a tender offer. In particular, please note that Transnet reserves the right to:

- 4.1. Award the business to the highest scoring Tenderer/s unless objective criteria justify the award to another tenderer.
- 4.2. Not necessarily accept the lowest priced tender or an alternative Tender;
- 4.3. Go to the open market if the quoted rates (for award of work) are deemed unreasonable;
- 4.4. Should the Tenderers be awarded business on strength of information furnished by the Tenderer, which after conclusion of the contract is proved to have been incorrect, Transnet reserves the right to terminate the contract;
- 4.5. Request audited financial statements or other documentation for the purposes of a due diligence exercise;
- 4.6. Not accept any changes or purported changes by the Tenderer to the tender rates after the closing date;
- 4.7. Verify any information supplied by a Tenderer by submitting a tender, the Tenderer/s hereby irrevocably grant the necessary consent to the Transnet to do so;
- 4.8. Conduct the evaluation process in parallel. The evaluation of Tenderers at any given stage must therefore not be interpreted to mean that Tenderers have necessarily passed any previous stage(s);
- 4.9. Unless otherwise expressly stated, each tender lodged in response to the invitation to tender shall be deemed to be an offer by the Tenderer. The Employer has the right in its sole and unfettered discretion not to accept any offer.
- 4.10. Not be held liable if tenderers do not provide the correct contact details during the clarification session and do not receive the latest information regarding this RFP with the possible consequence of being disadvantaged or disqualified as a result thereof.
- 4.11. Transnet reserves the right to exclude any Tenderers from the tender process who has been convicted of a serious breach of law during the preceding 5 [five] years including but not limited to breaches of the Competition Act 89 of 1998, as amended. Tenderers are required to indicate in tender returnable [clause 12 on T2.2-18], [**Breach of Law**]

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whether or not they have been found guilty of a serious breach of law during the past 5 [five] years.

4.12. Transnet reserves the right to perform a risk analysis on the preferred tenderer to ascertain if any of the following might present an unacceptable commercial risk to the employer:

- *unduly high or unduly low tendered rates or amounts in the tender offer;*
- *contract data of contract provided by the tenderer; or*
- *the contents of the tender returnables which are to be included in the contract.*

5. Transnet will not reimburse any Tenderer for any preparatory costs or other work performed in connection with this Tender, whether or not the Tenderer is awarded a contract.

6. NATIONAL TREASURY'S CENTRAL SUPPLIER DATABASE

Tenderer are required to self-register on National Treasury's Central Supplier Database (CSD) which has been established to centrally administer supplier information for all organs of state and facilitate the verification of certain key supplier information. The CSD can be accessed at <https://secure.csd.gov.za/>. Tenderer are required to provide the following to Transnet in order to enable it to verify information on the CSD:

Supplier Number.....

and

Unique registration reference number..... (Tender Data)

**Transnet urges its clients, suppliers and the general public
to report any fraud or corruption to
TIP-OFFS ANONYMOUS: 0800 003 056 OR Transnet@tip-offs.com**

T1.2 Tender Data

T1.2 TENDER DATA

The conditions of tender are the Standard Conditions of Tender as contained in Annex C of the CIDB Standard for Uniformity in Engineering and Construction Works Contracts. The Standard for Uniformity in Construction Procurement was first published in Board Notice 62 of 2004 in Government Gazette No 26427 of 9 June 2004. It was subsequently amended in Board Notice 67 of 2005 in Government Gazette No 28127 of 14 October 2005, Board Notice 93 of 2006 in Government Gazette No 29138 of 18 August 2006, Board Notice No 9 of 2008 in Government Gazette No 31823 of 30 January 2009, Board Notice 86 of 2010 in Government Gazette No 33239 of 28 May 2010, Board Notice 136 of 2015 in Government Gazette 38960 of 10 July 2015 and Board Notice 423 of 2019 in Government Gazette No 42622 of 8 August 2019.

This edition incorporates the amendments made in Board Notice 423 of 2019 in Government Gazette 42622 of 8 August 2019. (see www.cidb.org.za).

The Standard Conditions of Tender make several references to Tender data for detail that apply specifically to this tender. The Tender Data shall have precedence in the interpretation of any ambiguity or inconsistency between it and the Standard Conditions of Tender.

Each item of data given below is cross-referenced in the left-hand column to the clause in the Standard Conditions of Tender to which it mainly applies.

Clause	Data
C.1.1 The <i>Employer</i> is	Transnet SOC Ltd (Reg No. 1990/000900/30)
C.1.2 The tender documents issued by the <i>Employer</i> comprise:	
Part T: The Tender	
Part T1: Tendering procedures	T1.1 Tender notice and invitation to tender T1.2 Tender data
Part T2 : Returnable documents	T2.1 List of returnable documents T2.2 Returnable schedules
Part C: The contract	
Part C1: Agreements and contract data	C1.1 Form of offer and acceptance C1.2 Contract data (Part 1 & 2) C1.3 Form of Securities
Part C2: Pricing data	C2.1 Pricing instructions C2.2 Activity Schedule
Part C3: Scope of work	C3.1 Works Information
Part C4: Site information	C4.1 Site information

C.1.4	The Employer's agent is:	Procurement Officer /Procurement Manager
	Name:	Rochelle Isaacs / Sibongile Dlamini
	Address:	202 Anton Lembede Street Durban 4000
	E – mail	Rochelle.isaacs@transnet.net
C.2.1	Only those tenderers who satisfy the following eligibility criteria are eligible to submit tenders:	
	<p>1. Stage Five - Functionality:</p> <p>Only those tenderers who obtain the minimum qualifying score for functionality will be evaluated further in terms of price and the applicable preference point system. The minimum qualifying for score for functionality is 80 points.</p> <p>The evaluation criteria for measuring functionality and the points for each criteria and, if any, each sub-criterion are as stated in C.3.11 below.</p> <p><i>Any tenderer that fails to meet the stipulated pre-qualifying criteria will be regarded as an unacceptable tender.</i></p>	
C.2.7	The arrangements for a non-compulsory clarification meeting are as stated in the Tender Notice and Invitation to Tender.	
C.2.12	No alternative tender offers will be considered.	
C.2.13.3	Each tender offer shall be in the English Language .	
C.2.13.5	The <i>Employer's</i> details and identification details that are to be shown on each tender offer are as follows:	
C.2.15.1	Identification details:	<p>The tender documents must be uploaded with:</p> <ul style="list-style-type: none"> Name of Tenderer: (insert company name) Contact person and details: (insert details) The Tender Number: TPT/2022/06/0297/5745/RFP The Tender Description: THE DESIGN, MANUFACTURE, DELIVERY, ERECTION, TESTING AND COMMISSIONING OF ONE (1) 65 TON TWIN-LIFT SHIP-TO-SHORE (STS) AT PORT ELIZABETH CONTAINER TERMINAL FOR TRANSNET SOC LTD (REG. NO. 1990/ 000900/ 30) OPERATING AS TRANSNET PORT TERMINALS HEREINAFTER REFERRED TO AS "TPT" AS A ONCE OFF SUPPLY

- Documents must be marked for the attention of:
Employer's Agent: Rochelle Isaacs

C.2.13.9 Telephonic, telegraphic, facsimile or e-mailed tender offers will not be accepted.

C.2.15 The closing time for submission of tender offers is:

Time: **12:00pm** on the **14 October 2022**

Location: The Transnet e-Tender Submission Portal: www.transnet.net

NO LATE TENDERS WILL BE ACCEPTED

C.2.16 The tender offer validity period is **12 weeks** after the closing date. Tenderers are to note that they may be requested to extend the validity period of their tender, on the same terms and conditions, if Transnet's internal evaluation and governance approval processes has not been finalised within the validity period.

C.2.23 The tenderer is required to submit with his tender:

1. A valid Tax Clearance Certificate issued by the South African Revenue Services.
Tenderers also to provide Transnet with a TCS PIN to verify Tenderers compliance status.
2. A **valid B-BBEE Certificate** from a Verification Agency accredited by the South African Accreditation System [**SANAS**], or a **sworn affidavit** confirming annual turnover and level of black ownership in case of all EMEs and QSEs with 51% black ownership or more together with the tender;
3. A valid CIDB certificate in the correct designated grading;
4. Proof of registration on the Central Supplier Database;
5. Letter of Good Standing with the Workmen's compensation fund by the tendering entity or separate Letters of Good Standing from all members of a newly constituted JV.

Note: Refer to Section T2.1 for List of Returnable Documents

C3.11 The minimum number of evaluation points for functionality is: **80**

The procedure for the evaluation of responsive tenders is Functionality and Price:

Only those tenderers who attain the minimum number of evaluation points for Functionality will be eligible for further evaluation, failure to meet the minimum threshold will result in the tender being disqualified and removed from any further consideration.

Technical Eligibility Criteria

<p>The Tenderer is an original equipment manufacturer (OEM) of STS cranes</p> <ul style="list-style-type: none"> Confirmation is required on the company Letter Head from OEM declaring that they will be supplying TPT directly. <p style="text-align: center;">OR</p> <p>The Tenderer is an approved agent of the original equipment manufacturer (OEM) of STS cranes</p> <ul style="list-style-type: none"> Confirmation is required on a Letter Head from the OEM declaring the agreement and contract that the OEM Agent will be authorized on behalf of the OEM to supply TPT directly. A copy of the Agency Agreement is to be supplied 	Yes/No
Design Compliance to F.E.M.	Yes/No
Minimum Twin Lift Hoisting Capability of 65 ton	Yes/No
Minimum Spreader Outreach from center-line seaside rail to center of spreader of 52m	Yes/No
Minimum Spreader Hoisting Height from top of seaside rail to bottom of spreader of 37m	Yes/No
Rail Gauge of 20m	Yes/No
Crane designed to receive Main Power Supply of 11,000 Volts	Yes/No
All motors and drives are AC	Yes/No
Minimum In-Service wind Speed of 90 km/hr	Yes/No
Hoist Speed with 65-ton Load: Minimum 90 m/min	Yes/No
Trolley Speed with 65-ton Load: Min 210 m/min	Yes/No
Corrosion Protection Guarantee on crane structure: > or = 10 years	Yes/No
Walkway stringers, staircase stringers, support brackets, kickplates, handrails, knee rails and stanchions to be hot dip galvanised and painted. Stair treads and walkway grating to be hot dip galvanised.	Yes/No
Number of paint coats including primer: Minimum of 3 coats	Yes/No
Maximum Wheel Load on Waterside and Landside Rails (in-service and out of service) of 63,5 tons	Yes/No
Maximum distributed crane rail loading of 490 kN/m per corner comprising 8 wheels	Yes/No
Access from ground to the top of the A-frame is via staircase	Yes/No
Compliance to clauses 4.1.1.1 to 4.1.1.17 of Technical Specification 'TPT_TS_TwinLift_AC_STSCrane Rev. no. 13', i.e. all 17 of these clauses	Yes/No

Note: Any tender not complying with the above-mentioned requirements, will be regarded as non-responsive and will therefore not be considered for further evaluation.

The functionality criteria and maximum score in respect of each of the criteria are as follows:

Functionality criteria	Sub-criteria	Sub-criteria points	Maximum number of points
T2.2-02 Guarantees and Warranties	The extent of guarantees and warranties in excess of the standard 12 months that can be offered by the Tenderer on electrical, mechanical and electronic Plant will play an important role in the evaluation of the tenders, as well as an extended guarantee on the structure in excess of 20 years.		20
	Guarantees and Warranties (electrical, mechanical and electronic plant)	16	
	Guarantees and Warranties (Structure)	4	
T2.2-03 Track Record	Tenderers as an original equipment manufacturer (OEM) of STS cranes, or an approved agent of an OEM of STS cranes, are required to demonstrate their experience, i.e. as OEM/Approved OEM Agent, in the design and supply of twin lift ship-to-shore cranes with a capacity of at least 60 tons under the spreader, over the last 5 years by the tenderer and / or OEM, and to this end shall supply a sufficient detailed reference list with Ship-to-Shore Crane's details and contact details of existing customers. TPT will contact references to confirm track record.		25
T2.2-04 Compliance to Employer's Technical Specifications	Employer's Technical Specification		25
T2.2-05 Delivery Lead Time	<ul style="list-style-type: none"> Order placement to completion of designs Order placement to completion of Manufacture Order placement to Cold Commissioning Order placement to Hot Commissioning, 		20

	Endurance test and Handover	
T2.2-06 Response time to call outs for technical support	Technical Support is required for onsite support on standby for a period of at least 12 months from Completion of the Works. Call outs are to be responded to within a minimum time of 12 hours. Preference points will be awarded for a shorter response time committed to by the bidder. The Tenderer must clearly indicate the response time (after request from Employer) for technical support to be on site when required.	5
T2.2-07 Width of Access Way	The Tenderer must clearly indicate the width of access way (stairs and walkways) from floor level to operator's cabin.	5
Maximum possible score for Functionality		100

Functionality shall be scored independently by not less than 3 (three) evaluators and averaged in accordance with the following schedules:

- T2.2-02 Guarantees and Warranties
- T2.2-03 Track Record
- T2.2-04 Compliance to Employer's Technical Specifications
- T2.2-05 Delivery Lead Time
- T2.2-06 Response time to call outs for technical support
- T2.2-07 Width of Access Way

Each evaluation criteria will be assessed in terms of scores of 0, 20, 40, 60, 80 or 100. The scores of each of the evaluators will be averaged, weighted and then totalled to obtain the final score for functionality, unless scored collectively. (See CIDB Inform Practice Note #9).

Note: Any tender not complying with the above-mentioned requirements, will be regarded as non-responsive and will therefore not be considered for further evaluation. This note must be read in conjunction with Clause C.2.1.

- C.3.11 Only tenders that achieve the minimum qualifying score for functionality will be evaluated further in accordance with the 90/10 preference points systems

90 where the financial value of one or more responsive tenders received have a value equal to or above R50 million, inclusive of all applicable taxes.

Up to 100 minus W_1 tender evaluation points will be awarded to tenderers who complete the preferencing schedule and who are found to be eligible for the preference claimed. **Should the BBBEE rating not be provided, tenderers with no verification will score zero points for preferencing.**

Note: Transnet reserves the right to carry out an independent audit of the tenderers scorecard components at any stage from the date of close of the tenders until completion of the contract.

- C.3.13 Tender offers will only be accepted if:

1. The tenderer or any of its directors/shareholders is not listed on the Register of Tender Defaulters in terms of the Prevention and Combating of Corrupt Activities Act of 2004 as a person prohibited from doing business with the public sector;
2. the tenderer does not appear on Transnet's list for restricted tenderers and National Treasury's list of Tender Defaulters;
3. the tenderer has fully and properly completed the Compulsory Enterprise Questionnaire and there are no conflicts of interest which may impact on the tenderer's ability to perform the contract in the best interests of the Employer or potentially compromise the tender process and persons in the employ of the state.
4. Transnet reserves the right to award the tender to the tenderer who scores the highest number of points overall, unless there are **objective criteria** which will justify the award of the tender to another tenderer. Objective criteria include but are not limited to the outcome of a due diligence exercise to be conducted. The due diligence exercise may take the following factors into account inter alia;

the tenderer:

- a) is not under restrictions, or has principals who are under restrictions, preventing participating in the employer's procurement,
- b) can, as necessary and in relation to the proposed contract, demonstrate that he or she possesses the professional and technical qualifications, professional and technical competence, financial resources, equipment and other physical facilities, managerial capability, reliability, experience and reputation, expertise and the personnel, to perform the contract,

c) has the legal capacity to enter into the contract,

d) is not insolvent, in receivership, under Business Rescue as provided for in chapter 6 of the Companies Act, 2008, bankrupt or being wound up, has his affairs administered by a court or a judicial officer, has suspended his business activities, or is subject to legal proceedings in respect of any of the foregoing,

e) complies with the legal requirements, if any, stated in the tender data and

f) is able, in the option of the employer to perform the contract free of conflicts of interest.

C.3.17 The number of paper copies of the signed contract to be provided by the Employer is 1 (one).

Part T2: Returnable Documents

T2.1: List of Returnable Documents

T2.1 List of Returnable Documents

2.1.1 Stage One as per CIDB: these schedules will be utilised for Functionality evaluation purposes:

Technical Eligibility Criteria

T2.2-01 **Evaluation Schedule:** Compliance to Eligibility Criteria

Functionality evaluation

T2.2-02 **Evaluation Schedule:** Guarantees and Warranties

T2.2-03 **Evaluation Schedule:** Track Record

T2.2-04 **Evaluation Schedule:** Compliance to Employer's Technical Specifications

T2.2-05 **Evaluation Schedule:** Delivery Lead Time

T2.2-06 **Evaluation Schedule:** Response time to call outs for technical support

T2.2-07 **Evaluation Schedule:** Width of Access Way

2.1.2 Returnable Schedules:

General:

T2.2-08 Authority to submit tender

T2.2-09 Record of addenda to tender documents

T2.2-10 Letter of Good Standing

T2.2-11 Risk Elements

T2.2-12 Availability of equipment and other resources

T2.2-13 Site Establishment Requirements

T2.2-14 Capacity and ability to meet delivery schedule

Agreement and Commitment by Tenderer:

T2.2-15 CIDB SFU ANNEX G Compulsory Enterprise Questionnaire

T2.2-16 Non-Disclosure Agreement

T2.2-17 RFP Declaration Form

T2.2-18 RFP – Breach of Law

T2.2-19 Certificate of Acquaintance with Tender Document

T2.2-20 Service Provider Integrity Pact

T2.2-21 Supplier Code of Conduct

T2.2-22 Agreement in terms of Protection of Personal Information Act, 4 of 2013 ("POPIA")

T2.2-23 SBD 5 NIPP Obligations

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- T2.2-25 Mandatory Critical Spares
- T2.2-26 Supplier's Preliminary Design
- T2.2-27 Supplier's Components
- T2.2-28 Recommended Maintenance Spares
- T2.2-29 Recommended Critical Spares
- T2.2-30 Site Establishment Requirements

Bonds/Guarantees/Financial/Insurance:

- T2.2-31 Insurance provided by the Contractor
- T2.2-32 Form of Intent to provide a Performance Guarantee
- T2.2-33 Forecast Rate of Invoicing
- T2.2-34 Three (3) years audited financial statements

Transnet Vendor Registration Form:

- T2.2-35 Transnet Vendor Registration Form

2.2 C1.1 Offer portion of Form of Offer & Acceptance**2.3 C1.2 Contract Data****2.4 C1.3 Forms of Securities****2.5 C2.1 Pricing Instructions (Activity Schedule)****2.6 C2.2 Activity Schedule**

T2.2: Returnable Schedules

**These Schedules will be utilised for
Functionality Evaluation Purposes**

T2.2-01: Compliance to Eligibility Criteria

Tenderers are to list in this schedule compliance to the below Eligibility Criteria of the Ship-to-Shore Crane.

In as far as possible Tenderers are to provide brochures, specifications, etc. to substantiate their compliance to the eligibility criteria. The Tenderer's sign-off at the bottom of the returnable is deemed as confirmation that the Tenderer commits that they will comply to the listed eligibility criteria.

Parameter for Ship-to-Shore Crane	Comply (Yes/No)
<p>Tenderer is an original equipment manufacturer (OEM) of STS cranes</p> <ul style="list-style-type: none"> Confirmation is required on the company Letter Head from OEM declaring that they will be supplying TPT directly. <p>Tenderer is an approved agent of the original equipment manufacturer (OEM) of STS cranes</p> <ul style="list-style-type: none"> Confirmation is required on a Letter Head from the OEM declaring the agreement and contract that the OEM Agent will be authorized on behalf of the OEM to supply TPT directly. A copy of the Agency Agreement is to be supplied confirming that the OEM Agent will be authorized on behalf of the OEM to supply TPT directly. 	
Design Compliance to F.E.M.	
Minimum Twin Lift Hoisting Capability of 65 ton	
Minimum Spreader Outreach from center-line seaside rail to center of spreader of 52m	
Minimum Spreader Hoisting Height from top of seaside rail to bottom of spreader of 37m	
Rail Gauge of 20m	
Crane designed to receive Main Power Supply of 11,000 Volts	
All motors and drives are AC	
Minimum In-Service wind Speed of 90 km/hr	
Hoist Speed with 65 ton Load: Minimum 90 m/min	
Trolley Speed with 65 ton Load: Min 210 m/min	
Corrosion Protection Guarantee on crane structure: > or = 10 years	
Walkway stringers, staircase stringers, support brackets, kickplates, handrails, knee rails and stanchions to be hot dip galvanised and painted. Stair treads and walkway grating to be hot dip galvanised	
Number of paint coats including primer: Minimum of 3 coats	

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Maximum Wheel Load on Waterside and Landside Rails (in-service and out of service) of 63,5 tons	
Maximum distributed crane rail loading of 490 kN/m per corner comprising 8 wheels	
Access from ground to the top of the A-frame is via staircase.	
Compliance to clause 4.1.1.1 of Technical Specification 'TPT_TS_TwinLift_AC_STSCrane Rev. no. 13'	
Compliance to clause 4.1.1.2 of Technical Specification 'TPT_TS_TwinLift_AC_STSCrane Rev. no. 13'	
Compliance to clause 4.1.1.3 of Technical Specification 'TPT_TS_TwinLift_AC_STSCrane Rev. no. 13'	
Compliance to clause 4.1.1.4 of Technical Specification 'TPT_TS_TwinLift_AC_STSCrane Rev. no. 13'	
Compliance to clause 4.1.1.5 of Technical Specification 'TPT_TS_TwinLift_AC_STSCrane Rev. no. 13'	
Compliance to clause 4.1.1.6 of Technical Specification 'TPT_TS_TwinLift_AC_STSCrane Rev. no. 13'	
Compliance to clause 4.1.1.7 of Technical Specification 'TPT_TS_TwinLift_AC_STSCrane Rev. no. 13'	
Compliance to clause 4.1.1.8 of Technical Specification 'TPT_TS_TwinLift_AC_STSCrane Rev. no. 13'	
Compliance to clause 4.1.1.9 of Technical Specification 'TPT_TS_TwinLift_AC_STSCrane Rev. no. 13'	
Compliance to clause 4.1.1.10 of Technical Specification 'TPT_TS_TwinLift_AC_STSCrane Rev. no. 13'	
Compliance to clause 4.1.1.11 of Technical Specification 'TPT_TS_TwinLift_AC_STSCrane Rev. no. 13'	
Compliance to clause 4.1.1.12 of Technical Specification 'TPT_TS_TwinLift_AC_STSCrane Rev. no. 13'	
Compliance to clause 4.1.1.13 of Technical Specification 'TPT_TS_TwinLift_AC_STSCrane Rev. no. 13'	
Compliance to clause 4.1.1.14 of Technical Specification 'TPT_TS_TwinLift_AC_STSCrane Rev. no. 13'	
Compliance to clause 4.1.1.15 of Technical Specification 'TPT_TS_TwinLift_AC_STSCrane Rev. no. 13'	
Compliance to clause 4.1.1.16 of Technical Specification 'TPT_TS_TwinLift_AC_STSCrane Rev. no. 13'	
Compliance to clause 4.1.1.17 of Technical Specification 'TPT_TS_TwinLift_AC_STSCrane Rev. no. 13'	

Note: Any tender not complying with the above-mentioned requirements, will be regarded as non-responsive and will therefore not be considered for further evaluation.

Signed _____ Date _____

Name _____ Position _____

Tenderer _____

T2.2-02: Guarantees and Warranties = 20 POINTS

Note to tenderers:

The extent of guarantees and warranties in excess of the standard 12 months that can be offered by the Tenderer on electrical, mechanical and electronic Plant will play an important role in the evaluation of the tenders, as well as an extended guarantee on the structure in excess of 20 years.

The Tenderer is required to indicate on the below schedule what guarantee or warranty period is offered for each of the items listed, as well as much detail as possible on the extent of the guarantee or warranty.

Item	Guarantees and Warranties offered	Description of guarantees or warranties
Structure		
Spreader		
Energy chain		
Electrical Drives		
Gearboxes		
Hoist Brakes		
PLC's		
Electrical Motors		
Wire Ropes		

The scoring of the Guarantees and Warranties on electrical, mechanical and electronic plant will be as follows:

Score	Guarantees and Warranties (electrical, mechanical and electronic plant) = 16 POINTS
100	For all of the following components having a guarantee of > or = 2 years, then 100 % of point allocation: spreader, energy chain, electrical drives, gearboxes, hoist brakes, PLC's, electric motors and wire ropes
80	For at least 6 of the following components having a guarantee of > or = 2 years, and the remaining 2 having a guarantee of at least > or = 1 year, then 80 % of point allocation: spreader, energy chain, electrical drives, gearboxes, hoist brakes, PLC's, electric motors and wire ropes
60	For at least 4 of the following components having a guarantee of > or = 2 years, and the remaining 4 having a guarantee of at least > or = 1 year, then 60 % of point allocation: spreader, energy chain, electrical drives, gearboxes, hoist brakes, PLC's, electric motors and wire ropes
40	For all of the following components having a guarantee of at least > or = 1 year, then 40 % of point allocation: spreader, energy chain, electrical drives, gearboxes, hoist brakes, PLC's, electric motors and wire ropes
20	For at least 4 of the following components having a guarantee of > or = 1 year, and the remaining 4 having a guarantee of < 1 year, then 20 % of point allocation: spreader, energy chain, electrical drives, gearboxes, hoist brakes, PLC's, electric motors and wire ropes
0	For the following components having a guarantee of < 1 year or less than prescribed above, then 0 % of point allocation: spreader, energy chain, electrical drives, gearboxes, hoist brakes, PLC's, electric motors and wire ropes

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The scoring of the Guarantees and Warranties on the structure will be as follows:

Score	Guarantees and Warranties (Structure) = 4 POINTS
100	For a guarantee on the structure > or = to 20 years = 100 % of point allocation
80	For a guarantee on the structure > or = to 18 years but less than 20 years = 80 % of point allocation
60	For a guarantee on the structure > or = to 15 years but less than 18 years = 60 % of point allocation
40	For a guarantee on the structure > or = to 12 years but less than 15 years = 40 % of point allocation
20	For a guarantee on the structure > or = to 10 years but less than 12 years = 20 % of point allocation
0	For a guarantee on the structure < 10 years = 0 % of point allocation

Signed _____

Date _____

Name _____

Position _____

Tenderer _____

DESCRIPTION OF THE WORKS: THE DESIGN, MANUFACTURE, DELIVERY, ERECTION, TESTING AND COMMISSIONING OF ONE (1) 65 TON TWIN-LIFT SHIP-TO-SHORE (STS) AT PORT ELIZABETH CONTAINER TERMINAL FOR TRANSNET SOC LTD (REG.NO.1990/000900/30) OPERATING AS TRANSNET PORT TERMINALS HEREINAFTER REFERRED TO AS "TPT" AS A ONCE OFF SUPPLY

T2.2-03: Evaluation Schedule: Track Record = 25 POINTS

Note to tenderers:

Tenderers as an original equipment manufacturer (OEM) of STS cranes, or an approved agent of an OEM of STS cranes, are required to demonstrate their experience, i.e. as OEM/Approved OEM Agent, in the design, manufacture, delivery, erection, testing and commissioning of twin lift ship-to-shore cranes with a capacity of at least 60 tons under the spreader, over the last 5 years by the tenderer and / or OEM, and to this end shall supply a sufficient detailed reference list with Ship-to-Shore Crane's details and contact details of existing customers. TPT will contact references to confirm track record.

NOTE:

- If a respondent is bidding in its capacity as an Approved OEM Agent they must utilise their own track record and not their OEM's track record.

#	Name of Previous Customer	Contact Details	Capacity (ton)	No. of Units	Year
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					

Additional pages to be added as required to provide a comprehensive list.

DESCRIPTION OF THE WORKS: THE DESIGN, MANUFACTURE, DELIVERY, ERECTION, TESTING AND COMMISSIONING OF ONE (1) 65 TON TWIN-LIFT SHIP-TO-SHORE (STS) AT PORT ELIZABETH CONTAINER TERMINAL FOR TRANSNET SOC LTD (REG.NO.1990/000900/30) OPERATING AS TRANSNET PORT TERMINALS HEREINAFTER REFERRED TO AS "TPT" AS A ONCE OFF SUPPLY

The scoring of the Track Record will be as follows:

Score	Track Record = 25 POINTS
100	> or = 20 units score 100 %
80	> or = 16 but < 20 units score 80 %
60	> or = 12 but < 16 units score 60 %
40	> or = 8 but < 12 units score 40 %
20	> or = 4 but < 8 units score 20 %
0	< 4 units score 0 %

Signed _____

Date _____

Name _____

Position _____

Tenderer _____

DESCRIPTION OF THE WORKS: THE DESIGN, MANUFACTURE, DELIVERY, ERECTION, TESTING AND COMMISSIONING OF ONE (1) 65 TON TWIN-LIFT SHIP-TO-SHORE (STS) AT PORT ELIZABETH CONTAINER TERMINAL FOR TRANSNET SOC LTD (REG.NO.1990/000900/30) OPERATING AS TRANSNET PORT TERMINALS HEREINAFTER REFERRED TO AS "TPT" AS A ONCE OFF SUPPLY

T2.2-04: Compliance to Employer's Technical Specifications = 25 POINTS

Tenderers are to complete this schedule with regards to Compliance to the Employer's Technical Specification.

Note that this schedule is cross-referenced and must be read in conjunction with the Technical Specification "TPT_TS_TwinLift_AC_STSCrane Rev No. 13". Elements of this document not completed will be deemed as non-compliance to that particular clause.

In as far as possible Tenderers are to provide brochures, specifications, etc. to substantiate their compliance to the clauses in the Technical Specifications. The Tenderer's sign-off at the bottom of the returnable is deemed as confirmation that the Tenderer commits that they will comply to the clauses where they indicate compliance.

Note: Items greyed out will not be used in scoring the Compliance to Employer's Technical Specifications as they are already accounted for in the Technical Evaluation Scorecard.

<u>Technical Spec. Clause</u>	<u>Comply (Y/N)</u>	<u>Comment (mandatory if non-compliant) and reference to returnable schedule</u>
1. Scope		
1		
2.1 Equipment Functionality		
2.1.1		
2.1.2		
2.1.3		
2.1.4		
2.1.5		
2.1.6		
2.2 Main Crane design parameters		
2.2		
2.3 Ergonomics		
2.3.1 Operator's Cab		
2.3.1.1		
2.3.1.2		
2.3.1.3		
2.3.1.4		
2.3.1.5		
2.3.1.6		
2.3.1.7		
2.3.1.8		

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2.3.1.9		
2.3.1.10		
2.3.1.11		
2.3.1.12		
2.3.1.13		
2.3.1.14		
2.3.1.15		
2.3.1.16		
2.3.1.17		
2.3.1.18		
2.3.1.19		
2.3.1.20		
2.3.1.21		
2.3.1.22		
2.3.1.23		
2.3.1.24		
2.3.1.25		
2.3.1.26		
2.3.1.27		
2.3.1.28		
2.3.1.29		
2.3.1.30		
2.3.1.31		
2.3.2 Operator's Controls		
2.3.2.1		
2.3.2.2		
2.3.2.3		
2.3.2.4		
2.3.2.5		
2.3.2.6		
2.3.2.7		
2.3.2.8		
2.3.2.9		
2.3.2.10		
2.3.2.11		
2.3.2.12.1.1		
2.3.2.12.1.2		
2.3.2.12.2.1		
2.3.2.12.3.1		
2.3.2.12.3.2		

DESCRIPTION OF THE WORKS: THE DESIGN, MANUFACTURE, DELIVERY, ERECTION, TESTING AND COMMISSIONING OF ONE (1) 65 TON TWIN-LIFT SHIP-TO-SHORE (STS) AT PORT ELIZABETH CONTAINER TERMINAL FOR TRANSNET SOC LTD (REG.NO.1990/000900/30) OPERATING AS TRANSNET PORT TERMINALS HEREINAFTER REFERRED TO AS "TPT" AS A ONCE OFF SUPPLY

2.3.2.12.3.3		
2.3.3 Crane Operational Aids		
2.3.3.1		
2.3.3.2		
2.3.3.3		
2.3.3.3.1		
2.3.3.3.2		
2.3.3.3.3		
2.3.3.3.4		
2.3.3.3.5		
2.3.3.4		
2.3.3.5		
2.3.3.6.1		
2.3.3.6.2		
2.3.3.6.3		
2.3.3.6.4		
2.3.3.7		
2.3.3.8		
2.3.3.9		
2.4 Terminal Specific Requirements		
2.4.1		
3. Technical Requirements		
3.1 Design Requirements		
3.1.1.1		
3.1.1.2		
3.1.1.3		
3.1.1.4		
3.1.1.5		
3.1.1.6		
3.1.1.7		
3.1.1.8		
3.1.1.9		
3.1.1.10		
3.1.1.11		
3.1.1.12		
3.1.1.13		
3.1.2.1		
3.2 Long Travel Structure		
3.2.1		
3.2.2		

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3.2.3		
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3.2.18		
3.2.19		
3.2.20		
3.2.21		
3.2.22		
3.2.23		
3.2.24		
3.2.25		
3.2.26		
3.3 Superstructure		
3.3.1		
3.3.2		
3.3.3		
3.3.4		
3.4 Boom and Boom Operation		
3.4.1		
3.4.2		
3.4.3		
3.4.4		
3.4.5		
3.4.6		
3.4.7		
3.4.8		
3.4.9		
3.4.10		

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3.4.11		
3.4.12		
3.4.13		
3.4.14		
3.4.15		
3.4.16		
3.4.17		
3.5 Cross Travel Trolley		
3.5.1		
3.5.2		
3.5.3		
3.5.4		
3.5.5		
3.5.6		
3.5.7		
3.5.8		
3.5.9		
3.5.10		
3.5.11		
3.5.12		
3.5.13		
3.5.14		
3.5.15		
3.5.16		
3.5.17		
3.5.18		
3.5.19		
3.5.20		
3.6 Catenary Trolleys		
3.6.1		
3.6.2		
3.6.3		
3.6.4		
3.7 Main Hoist		
3.7.1		
3.7.2		
3.7.3		
3.7.4		
3.7.5		
3.7.6		

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3.7.7		
3.7.8		
3.8 Headblock		
3.8.1		
3.8.2		
3.8.3		
3.8.4		
3.8.5		
3.8.6		
3.8.7		
3.8.8		
3.9 Spreaders		
3.9.1		
3.9.2		
3.9.3		
3.9.4		
3.9.5		
3.9.6.1		
3.9.6.2		
3.9.6.3		
3.9.7		
3.9.8		
3.9.9		
3.10 Heavy Lift Beam		
3.10.1		
3.10.2		
3.10.3		
3.10.4		
3.11 Trim, List and Skew Devices		
3.11.1		
3.11.2		
3.11.3		
3.11.4.1		
3.11.4.2		
3.11.4.3		
3.11.5		
3.12 Machinery and Electrical House		
3.12.1		
3.12.2		
3.12.3		

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3.12.4		
3.12.5		
3.12.6		
3.12.7		
3.12.8		
3.12.9		
3.12.10		
3.12.11		
3.12.12		
3.12.13		
3.12.14		
3.12.15		
3.12.16		
3.13 Gearboxes		
3.13.1		
3.13.2		
3.13.3		
3.13.4		
3.13.5		
3.14 Stairs, Walkways, Platforms, Ladders and Anchor Points		
3.14.1		
3.14.2		
3.14.3		
3.14.4		
3.14.5		
3.14.6		
3.14.7		
3.14.8		
3.14.9		
3.14.10		
3.15 Goods / Personnel Lift		
3.15.1		
3.15.2		
3.15.3		
3.15.4		
3.15.5		
3.15.6		
3.15.7		
3.15.8		
3.15.9		

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3.16 Electrical Power Reticulation		
3.16.1		
3.16.2		
3.16.3		
3.16.4		
3.16.5		
3.16.6		
3.16.7		
3.16.8		
3.16.9		
3.16.10		
3.16.11		
3.16.12		
3.16.13		
3.16.14.1		
3.16.14.2		
3.16.14.3		
3.16.14.4		
3.16.14.5		
3.16.14.6		
3.16.14.7		
3.16.14.8		
3.16.15		
3.16.16		
3.16.17		
3.16.18		
3.16.19		
3.16.20		
3.16.21		
3.17 Lighting, Heating, Air-conditioning and Power Points		
3.17.1		
3.17.2		
3.17.3		
3.17.4		
3.17.5		
3.17.6		
3.17.7		
3.17.8.1		
3.17.8.2		
3.17.8.3		

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3.17.8.4		
3.17.8.5		
3.18 Local Crane Management System		
3.18.1		
3.18.2		
3.18.3		
3.18.3.1		
3.18.3.2		
3.18.4		
3.18.5		
3.18.6		
3.18.7		
3.18.8		
3.18.9		
3.18.10		
3.18.10.1		
3.18.11		
3.18.12		
3.19 Computer Systems		
3.19.1		
3.19.1.1		
3.19.1.2		
3.19.1.3		
3.19.1.4		
3.19.1.5.1		
3.19.1.5.2		
3.19.1.5.3		
3.19.1.5.4		
3.19.1.5.5		
3.19.1.5.6		
3.19.1.5.7		
3.19.2.1		
3.19.2.2		
3.19.2.3		
3.19.2.4		
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3.19.2.6		
3.19.2.7		
3.19.2.8		
3.19.3		

DESCRIPTION OF THE WORKS: THE DESIGN, MANUFACTURE, DELIVERY, ERECTION, TESTING AND COMMISSIONING OF ONE (1) 65 TON TWIN-LIFT SHIP-TO-SHORE (STS) AT PORT ELIZABETH CONTAINER TERMINAL FOR TRANSNET SOC LTD (REG.NO.1990/000900/30) OPERATING AS TRANSNET PORT TERMINALS HEREINAFTER REFERRED TO AS "TPT" AS A ONCE OFF SUPPLY

3.19.4		
3.19.5		
3.19.6		
3.19.7		
3.19.8		
3.19.9		
3.19.10		
3.20 Main Drive Systems (Latest Technology to be supplied)		
3.20.1		
3.20.2.1		
3.20.2.2		
3.20.2.3		
3.20.2.4		
3.20.3		
3.20.4		
3.20.5		
3.20.6		
3.20.7		
3.20.8		
3.21 Electrical Enclosures and Mounting panels		
3.21.1		
3.21.2		
3.21.3		
3.21.4		
3.21.5		
3.21.6		
3.21.7		
3.21.8		
3.21.9		
3.21.10		
3.22 Signage, Marking and Colour Scheme		
3.22.1		
3.22.2		
3.22.3		
3.22.4		
3.22.5		
3.22.6		
3.23 Corrosion Protection		
3.23.1		

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3.23.2		
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5.3.1		
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7. General		
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7.7		
7.8		
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7.10		
7.11		
7.12		
7.13		
8. Referenced Specifications		
8.1 Standard Specifications		
8.2 Employer Specifications		

The scoring of the Compliance to Employer's Technical Specification will be as follows:

Score	Employer's Technical Specification = 25 POINTS
100	>=405 compliant clauses = 100 %
80	<405 but >=385 compliant clauses = 80 %
60	<385 but >=365 compliant clauses = 60 %
40	<365 but >=345 compliant clauses = 40 %
20	<345 but >=325 compliant clauses = 20 %
0	< 325 compliant clauses = 0 %

Signed _____

Date _____

Name _____

Position _____

Tenderer _____

T2.2-05: Delivery Lead Time = 20 POINTS

Note to tenderers:

The Tenderer must submit a holistic programme for the delivery of the Ship-to-Shore Crane, showing the duration and location of each major related activity e.g. assembly of modules and/or the complete Ship-to-Shore Crane, testing of each module and/or the complete Ship-to-Shore Crane, disassembly (if applicable), cold commissioning, shipping of parts / modules or complete Ship-to-Shore Crane, site erection stages (if applicable), final testing, commissioning, training, endurance test and handover. (Tenderers are reminded that handover is inclusive of operator training and technical training.)

The programme must be in the form of a Gantt or Bar chart, clearly indicating key dates for progress measurements and/or payments due.

Further to the programme, the Tenderer must complete the required information below.

Activity	Duration (months)
1. Order placement to completion of designs	_____
2. Order placement to completion of Manufacture	_____
3. Order placement to Cold Commissioning	_____
4. Order placement to Hot Commissioning, Endurance test and Handover	_____

Note: The Delivery Lead Time to be evaluated will be the Delivery Lead Time from order placement to completion of Hot Commissioning, Endurance test and Handover.

The scoring of the Delivery Lead Time from order placement to completion of Hot Commissioning, Endurance test and Handover will be as follows:

Score	Delivery Lead Time
100	< or = 16 months = 100 %
80	> 16 months & < or = 17 months = 80 %
60	> 17 months & < or = 18 months = 60 %
40	> 18 months & < or = 19 months = 40 %
20	> 19 months & < or = 20 months = 20 %
0	> 20 months = 0 %

Signed _____

Date _____

Name _____

Position _____

Tenderer _____

T2.2-06: Response time to call outs for technical support = 5 POINTS

Note to tenderers:

Technical Support is required for onsite support on standby for a period of at least 12 months from Completion of the Works. Call outs are to be responded to within a minimum time of 12 hours. Preference points will be awarded for a shorter response time committed to by the bidder. The Tenderer must clearly indicate the response time (after request from Employer) for technical support to be on site when required.

Response time to call outs for technical support _____ hours

Details of Technical Support after completion:

- 1.
- 2.
- 3.
- 4.

The scoring of the Response time to call outs for technical support will be as follows:

Score	Response time to call outs for technical support
100	< or = 8 hours = 100 %
80	> 8 hours & < or = 12 hours = 80 %
60	> 12 hours & < or = 18 hours = 60 %
40	> 18 hours & < or = 24 hours = 40 %
20	> 24 hours & < or = 36 hours = 20 %
0	> 36 hours = 0 %

Signed _____ Date _____

Name _____ Position _____

Tenderer _____

T2.2-07: Width of Access Way = 5 POINTS

Note to tenderers:

The Tenderer must clearly indicate the width of access way (stairs and walkways) from floor level to operator's cabin.

Width of the access stairs _____ mm

The scoring of the width of the access way will be as follows:

Score	Width of the Access Way
100	> or = 700mm scores 100 %
80	> or = 650mm but <700mm scores 80 %
60	> or = 600mm but <650mm scores 60 %
40	> or = 550mm but <600mm scores 40 %
20	> or = 500mm but <550mm scores 20 %
0	< 500mm scores 0 %

Signed _____ Date _____

Name _____ Position _____

Tenderer _____

Returnable Schedules

General Returnable Documents

T2.2-08: Authority to submit a Tender

Indicate the status of the tenderer by ticking the appropriate box hereunder. The tenderer must complete the certificate set out below for his category of organisation or alternatively attach a certified copy of a company / organisation document which provides the same information for the relevant category as requested here.

A - COMPANY	B - PARTNERSHIP	C - SOLE PROPRIETOR

A. Certificate for Company

I, _____ chairperson of the board of directors _____
 _____, hereby confirm that by resolution of the
 board taken on _____ (date), Mr/Ms _____,
 acting in the capacity of _____, was authorised to sign all
 documents in connection with this tender offer and any contract resulting from it on behalf of
 the company.

Signed

Date

Name

Position

Chairman of the Board of Directors

B. Certificate for Partnership

We, the undersigned, being the **key partners** in the business trading as _____

_____ hereby authorise Mr/Ms _____

acting in the capacity of _____, to sign all documents in

connection with the tender offer for Contract _____ and any

contract resulting from it on our behalf.

Name	Address	Signature	Date

NOTE: This certificate is to be completed and signed by the full number of Partners necessary to commit the Partnership. Attach additional pages if more space is required.

C. Certificate for Sole Proprietor

I, _____, hereby confirm that I am the sole owner of the

business trading as _____.

Signed

Date

Name

Position

Sole Proprietor

T2.2-09: Record of Addenda to Tender Documents

This schedule as submitted confirms that the following communications received from the *Employer* before the submission of this tender offer, amending the tender documents, have been taken into account in this specific tender offer:

	Date	Title or Details
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		

Attach additional pages if more space is required.

T2.2-10 Letter/s of Good Standing with the Workmen's Compensation Fund

Attached to this schedule is the Letter/s of Good Standing.

- 1.
- 2.
- 3.
- 4.

Name of Company/Members of Joint Venture:

.....
.....
.....
.....
.....
.....
.....
.....
.....
.....

Tenderers to indicate their Site establishment area requirements:

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and extend across the width of the page. There is no handwriting or other markings on the paper.

T2.2-14: Capacity and Ability to meet Delivery Schedule

Note to tenderers:

The Tenderer is required to demonstrate to the *Employer* that the tenderer has sufficient current and future capacity to carry out the work as detailed in the Works Information and that the tenderer has the capacity and plans in place to meet the required delivery schedule as required. To this end, the following must be provided by the Tenderer:

A schedule detailing the following:

- Maximum quantity of work concurrently performed by the Tenderer in the recent past in order to illustrate his potential capacity to design, fabricate and/or construct work of a similar nature;
- Current and future work on his order book, showing quantity and type of equipment;
- Quantity of work for which the Tenderer has tenders in the market or is currently tendering on;
- The work as covered in this Works Information, planned and scheduled as per the Tenderer's capacities and methods but meeting the required delivery schedule.

Index of documentation attached to this schedule:

.....
.....
.....
.....
.....
.....
.....
.....

Agreement and Commitment Returnable Documents

T2.2-15: ANNEX G Compulsory Enterprise Questionnaire

The following particulars hereunder must be furnished.

In the case of a Joint Venture, separate enterprise questionnaires in respect of each partner/member must be completed and submitted.

Section 1: Name of enterprise: _____

Section 2: VAT registration number, if any: _____

Section 3: CIDB registration number, if any: _____

Section 4: CSD number: _____

Section 5: Particulars of sole proprietors and partners in partnerships

Name	Identity number	Personal income tax number

* Complete only if sole proprietor or partnership and attach separate page if more than 3 partners

Section 6: Particulars of companies and close corporations

Company registration number _____

Close corporation number _____

Tax reference number: _____

Section 7: The attached SBD4 must be completed for each tender and be attached as a tender requirement.

Section 8: The attached SBD 6 must be completed for each tender and be attached as a requirement.

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The undersigned, who warrants that he / she is duly authorised to do so on behalf of the enterprise:

- i) authorizes the Employer to obtain a tax clearance certificate from the South African Revenue Services that my / our tax matters are in order;
- ii) confirms that the neither the name of the enterprise or the name of any partner, manager, director or other person, who wholly or partly exercises, or may exercise, control over the enterprise appears on the Register of Tender Defaulters established in terms of the Prevention and Combating of Corrupt Activities Act of 2004;
- iii) confirms that no partner, member, director or other person, who wholly or partly exercises, or may exercise, control over the enterprise appears, has within the last five years been convicted of fraud or corruption;
- iv) confirms that I / we are not associated, linked or involved with any other tendering entities submitting tender offers and have no other relationship with any of the tenderers or those responsible for compiling the scope of work that could cause or be interpreted as a conflict of interest; and
- v) confirms that the contents of this questionnaire are within my personal knowledge and are to the best of my belief both true and correct.

Signed

Date

Name

Position

Enterprise
name

SBD 6.1**PREFERENCE POINTS CLAIM FORM**

This preference form must form part of all bids invited. It contains general information and serves as a claim for preference points for Broad-Based Black Economic Empowerment [**B-BBEE**] Status Level of Contribution.

Transnet will award preference points to companies who provide valid proof of their B-BBEE status using either the latest version of the generic Codes of Good Practice or Sector Specific Codes (if applicable).

1. GENERAL CONDITIONS

1.1 The following preference point systems are applicable to all bids:

- the 80/20 system for requirements with a Rand value of up to R50 000 000 (all applicable taxes included); and
- the 90/10 system for requirements with a Rand value above R50 000 000 (all applicable taxes included).

1.2 The value of this bid is estimated to exceed R50 000 000 (all applicable taxes included) and therefore the 90/10 preference point system shall be applicable. Despite the stipulated preference point system, Transnet shall use the lowest acceptable bid to determine the applicable preference point system in a situation where all received acceptable bids are received outside the stated preference point system.

1.3 Preference points for this bid shall be awarded for:

- (a) Price; and
- (b) B-BBEE Status Level of Contribution.

1.4 The maximum points for this bid are allocated as follows:

	POINTS
PRICE	90
B-BBEE STATUS LEVEL OF CONTRIBUTION	10
Total points for Price and B-BBEE must not exceed	100

1.5 Failure on the part of a bidder to submit proof of B-BBEE status level of contributor together with the bid will be interpreted to mean that preference points for B-BBEE status level of contribution are not claimed.

1.6 The purchaser reserves the right to require of a bidder, either before a bid is adjudicated or at any time subsequently, to substantiate any claim in regard to preferences, in any manner required by the purchaser.

2. DEFINITIONS

- (a) **"all applicable taxes"** includes value-added tax, pay as you earn, income tax, unemployment insurance fund contributions and skills development levies;
- (b) **"B-BBEE"** means broad-based black economic empowerment as defined in section 1 of the Broad-Based Black Economic Empowerment Act;
- (c) **"B-BBEE status level of contributor"** means the B-BBEE status received by a measured entity based on its overall performance using the relevant scorecard contained in the Codes of Good Practice on Black Economic Empowerment, issued in terms of section 9(1) of the Broad-Based Black Economic Empowerment Act;
- (d) **"bid"** means a written offer in a prescribed or stipulated form in response to an invitation by an organ of state for the supply/provision of services, works or goods, through price quotations, advertised competitive bidding processes or proposals;
- (e) **"Broad-Based Black Economic Empowerment Act"** means the Broad-Based Black Economic Empowerment Act, 2003 (Act No. 53 of 2003);
- (f) **"EME"** means an Exempted Micro Enterprise as defines by Codes of Good Practice under section 9 (1) of the Broad-Based Black Economic Empowerment Act, 2003 (Act No. 53 of 2003);
- (g) **"functionality"** means the ability of a bidder to provide goods or services in accordance with specification as set out in the bid documents
- (h) **"Price"** includes all applicable taxes less all unconditional discounts.
- (i) **"Proof of B-BBEE Status Level of Contributor"**
 - i) the B-BBEE status level certificate issued by an authorised body or person;
 - ii) a sworn affidavit as prescribed by the B-BBEE Codes of Good Practice; or
 - iii) any other requirement prescribed in terms of the B-BBEE Act.
- (j) **"QSE"** means a Qualifying Small Enterprise as defines by Codes of Good Practice under section 9 (1) of the Broad-Based Black Economic Empowerment Act, 2003 (Act No. 53 of 2003);
- (k) **"rand value"** means the total estimated value of a contract in South African currency, calculated at the time of bid invitations, and includes all applicable taxes and excise duties.

3. POINTS AWARDED FOR PRICE

3.1 THE 90/10 PREFERENCE POINT SYSTEMS

A maximum of 90 points is allocated for price on the following basis:

90/10

$$P_s = 90 \left(1 - \frac{P_t - P_{\min}}{P_{\min}} \right)$$

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Where

Ps = Points scored for comparative price of bid under consideration

Pt = Comparative price of bid under consideration

Pmin = Comparative price of lowest acceptable bid

4. POINTS AWARDED FOR B-BBEE STATUS LEVEL OF CONTRIBUTION

- 4.1 preference points must be awarded to a bidder for attaining the B-BBEE status level of contribution in accordance with the table below:

B-BBEE Status Level of Contributor	Number of points (90/10 system)
1	10
2	9
3	6
4	5
5	4
6	3
7	2
8	1
Non-compliant contributor	0

- 4.2 The table below indicates the required proof of B-BBEE status depending on the category of enterprises:

Enterprise	B-BBEE Certificate & Sworn Affidavit
Large	Certificate issued by SANAS accredited verification agency
QSE	Certificate issued by SANAS accredited verification agency Sworn Affidavit signed by the authorised QSE representative and attested by a Commissioner of Oaths confirming annual turnover and black ownership (only black-owned QSEs - 51% to 100% Black owned) [Sworn affidavits must substantially comply with the format that can be obtained on the DTI's website at www.dti.gov.za/economic_empowerment/bee_codes.jsp .]
EME¹	Sworn Affidavit signed by the authorised EME representative and attested by a Commissioner of Oaths confirming annual turnover and black ownership Certificate issued by CIPC (formerly CIPRO) confirming annual turnover and black ownership Certificate issued by SANAS accredited verification agency only if the EME is being measured on the QSE scorecard

¹ In terms of the Implementation Guide: Preferential Procurement Regulations, 2017, Version 2, paragraph 11.11 provides that in the Transport Sector, EMEs can provide a letter from accounting officer or get verified and be issued with a B-BBEE certificate by SANAS accredited professional or agency as the Transport Sector Code has not been aligned to the generic Codes. EMEs in the Transport Sector are not allowed to provide a sworn affidavit as the generic codes are not applicable to them.

- 4.3 A trust, consortium or joint venture (including unincorporated consortia and joint ventures) must submit a consolidated B-BBEE Status Level verification certificate for every separate bid.
- 4.4 Tertiary Institutions and Public Entities will be required to submit their B-BBEE status level certificates in terms of the specialized scorecard contained in the B-BBEE Codes of Good Practice.
- 4.5 A person will not be awarded points for B-BBEE status level if it is indicated in the bid documents that such a bidder intends sub-contracting more than 25% of the value of the contract to any other enterprise that does not qualify for at least the points that such a bidder qualifies for, unless the intended sub-contractor is an EME that has the capability and ability to execute the sub-contract.
- 4.6 A person awarded a contract may not sub-contract more than 25% of the value of the contract to any other enterprise that does not have an equal or higher B-BBEE status level than the person concerned, unless the contract is sub-contracted to an EME that has the capability and ability to execute the sub-contract.
- 4.7 Bidders are to note that the rules pertaining to B-BBEE verification and other B-BBEE requirements may be changed from time to time by regulatory bodies such as National Treasury or the DTI. It is the Bidder's responsibility to ensure that his/her bid complies fully with all B-BBEE requirements at the time of the submission of the bid.

5. BID DECLARATION

- 5.1 Bidders who claim points in respect of B-BBEE Status Level of Contribution must complete the following:

6. B-BBEE STATUS LEVEL OF CONTRIBUTION CLAIMED IN TERMS OF PARAGRAPHS 1.4 AND 6.1

- 6.1 B-BBEE Status Level of Contribution: . =(maximum of 10 points)
- (Points claimed in respect of paragraph 6.1 must be in accordance with the table reflected in paragraph 4.1 and must be substantiated by relevant proof of B-BBEE status level of contributor.

7. SUB-CONTRACTING

- 7.1 Will any portion of the contract be sub-contracted?

(***Tick applicable box***)

YES		NO	
-----	--	----	--

- 7.1.1 If yes, indicate:

- i) What percentage of the contract will be subcontracted.....%
- ii) The name of the sub-contractor.....
- iii) The B-BBEE status level of the sub-contractor.....
- iv) Whether the sub-contractor is an EME or QSE.

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(Tick applicable box)

YES		NO	
-----	--	----	--

8. DECLARATION WITH REGARD TO COMPANY/FIRM

8.1 Name of company/firm:.....

8.2 VAT registration number:.....

8.3 Company registration number:.....

8.4 TYPE OF COMPANY/ FIRM

- ☐ Partnership/Joint Venture / Consortium
- ☐ One person business/sole propriety
- ☐ Close corporation
- ☐ Company
- ☐ (Pty) Limited

[TICK APPLICABLE BOX]

8.5 DESCRIBE PRINCIPAL BUSINESS ACTIVITIES

.....

8.6 COMPANY CLASSIFICATION

- ☐ Manufacturer
- ☐ Supplier
- ☐ Professional Supplier
- ☐ Other Suppliers, e.g. transporter, etc.

[TICK APPLICABLE BOX]

8.7 Total number of years the company/firm has been in business:.....

8.8 I/we, the undersigned, who is / are duly authorised to do so on behalf of the company/firm, certify that the points claimed, based on the B-BBE status level of

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contribution indicated in paragraphs 1.4 and 6.1 of the foregoing certificate, qualifies the company/ firm for the preference(s) shown and I / we acknowledge that:

- i) The information furnished is true and correct;
- ii) The preference points claimed are in accordance with the General Conditions as indicated in paragraph 1 of this form;
- iii) In the event of a contract being awarded as a result of points claimed as shown in paragraph 1.4 and 6.1, the contractor may be required to furnish documentary proof to the satisfaction of the purchaser that the claims are correct;
- iv) If a bidder submitted false information regarding its B-BBEE status level of contributor,, which will affect or has affected the evaluation of a bid, or where a bidder has failed to declare any subcontracting arrangements or any of the conditions of contract have not been fulfilled, the purchaser may, in addition to any other remedy it may have
 - (a) disqualify the person from the bidding process;
 - (b) recover costs, losses or damages it has incurred or suffered as a result of that person's conduct;
 - (c) cancel the contract and claim any damages which it has suffered as a result of having to make less favourable arrangements due to such cancellation;
 - (d) if the successful bidder subcontracted a portion of the bid to another person without disclosing it, Transnet reserves the right to penalise the bidder up to 10 percent of the value of the contract;
 - (e) recommend that the bidder or contractor, its shareholders and directors, or only the shareholders and directors who acted on a fraudulent basis, be restricted by the National Treasury from obtaining business from any organ of state for a period not exceeding 10 years, after the audi alteram partem (hear the other side) rule has been applied; and
 - (f) forward the matter for criminal prosecution.

WITNESSES

1.
2.

.....

SIGNATURE(S) OF BIDDERS(S)

DATE:

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BIDDER'S DISCLOSURE

1. PURPOSE OF THE FORM

Any person (natural or juristic) may make an offer or offers in terms of this invitation to bid. In line with the principles of transparency, accountability, impartiality, and ethics as enshrined in the Constitution of the Republic of South Africa and further expressed in various pieces of legislation, it is required for the bidder to make this declaration in respect of the details required hereunder.

Where a person/s are listed in the Register for Tender Defaulters and / or the List of Restricted Suppliers, that person will automatically be disqualified from the bid process.

2. Bidder's declaration

2.1 Is the bidder, or any of its directors / trustees / shareholders / members / partners or any person having a controlling interest² in the enterprise, employed by the state? **YES/NO**

2.1.1 If so, furnish particulars of the names, individual identity numbers, and, if applicable, state employee numbers of sole proprietor/ directors / trustees / shareholders / members/ partners or any person having a controlling interest in the enterprise, in table below.

Full Name	Identity Number	Name of State institution

2.2 Do you, or any person connected with the bidder, have a relationship with any person who is employed by the procuring institution? **YES/NO**

2.2.1 If so, furnish particulars:

² the power, by one person or a group of persons holding the majority of the equity of an enterprise, alternatively, the person/s having the deciding vote or power to influence or to direct the course and decisions of the enterprise.

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-

 2.3 Does the bidder or any of its directors / trustees / shareholders / members / partners or any person having a controlling interest in the enterprise have any interest in any other related enterprise whether or not they are bidding for this contract?
YES/NO

- 2.3.1 If so, furnish particulars:

3 DECLARATION

I, _____ the _____ undersigned,
 (name)..... in submitting
 the accompanying bid, do hereby make the following statements that I certify to
 be true and complete in every respect:

- 3.1 I have read and I understand the contents of this disclosure;
 3.2 I understand that the accompanying bid will be disqualified if this disclosure is found not to be true and complete in every respect;
 3.3 The bidder has arrived at the accompanying bid independently from, and without consultation, communication, agreement or arrangement with any competitor. However, communication between partners in a joint venture or consortium³ will not be construed as collusive bidding.
 3.4 In addition, there have been no consultations, communications, agreements or arrangements with any competitor regarding the quality, quantity, specifications, prices, including methods, factors or formulas used to calculate prices, market allocation, the intention or decision to submit or not to submit the bid, bidding with the intention not to win the bid and conditions or delivery particulars of the products or services to which this bid invitation relates.
 3.4 The terms of the accompanying bid have not been, and will not be, disclosed by the bidder, directly or indirectly, to any competitor, prior to the date and time of the official bid opening or of the awarding of the contract.
 3.5 There have been no consultations, communications, agreements or arrangements made by the bidder with any official of the procuring institution in relation to this procurement process prior to and during the bidding process except to provide clarification on the bid submitted where so required by the institution; and the bidder was not involved in the drafting of the specifications or terms of reference for this bid.
 3.6 I am aware that, in addition and without prejudice to any other remedy provided to combat any restrictive practices related to bids and contracts, bids that are suspicious will be reported to the Competition Commission for investigation and

³ Joint venture or Consortium means an association of persons for the purpose of combining their expertise, property, capital, efforts, skill and knowledge in an activity for the execution of a contract.

DESCRIPTION OF THE WORKS: THE DESIGN, MANUFACTURE, DELIVERY, ERECTION, TESTING AND COMMISSIONING OF ONE (1) 65 TON TWIN-LIFT SHIP-TO-SHORE (STS) AT PORT ELIZABETH CONTAINER TERMINAL FOR TRANSNET SOC LTD (REG.NO.1990/000900/30) OPERATING AS TRANSNET PORT TERMINALS HEREINAFTER REFERRED TO AS "TPT" AS A ONCE OFF SUPPLY

possible imposition of administrative penalties in terms of section 59 of the Competition Act No 89 of 1998 and or may be reported to the National Prosecuting Authority (NPA) for criminal investigation and or may be restricted from conducting business with the public sector for a period not exceeding ten (10) years in terms of the Prevention and Combating of Corrupt Activities Act No 12 of 2004 or any other applicable legislation.

I CERTIFY THAT THE INFORMATION FURNISHED IN PARAGRAPHS 1, 2 and 3 ABOVE IS CORRECT.

I ACCEPT THAT THE STATE MAY REJECT THE BID OR ACT AGAINST ME IN TERMS OF PARAGRAPH 6 OF PFMA SCM INSTRUCTION 03 OF 2021/22 ON PREVENTING AND COMBATING ABUSE IN THE SUPPLY CHAIN MANAGEMENT SYSTEM SHOULD THIS DECLARATION PROVE TO BE FALSE.

.....
Signature	Date
.....
Position	Name of bidder

**TRANSNET PORT TERMINALS****TENDER NUMBER:** TPT/2022/06/0297/5745/RFP**DESCRIPTION OF THE WORKS:** THE DESIGN, MANUFACTURE, DELIVERY, ERECTION, TESTING AND COMMISSIONING OF ONE (1) 65 TON TWIN-LIFT SHIP-TO-SHORE (STS) AT PORT ELIZABETH CONTAINER TERMINAL FOR TRANSNET SOC LTD (REG.NO.1990/000900/30) OPERATING AS TRANSNET PORT TERMINALS HEREINAFTER REFERRED TO AS "TPT" AS A ONCE OFF SUPPLY

T2.2-16 NON-DISCLOSURE AGREEMENT

Note to tenderers: This Non-Disclosure Agreement is to be completed and signed by an authorised signatory:

THIS AGREEMENT is made effective as of day of 20..... by and between:

TRANSNET SOC LTD

(Registration No. 1990/000900/30), a company incorporated and existing under the laws of South Africa, having its principal place of business at Transnet Corporate Centre 138 Eloff Street , Braamfontein , Johannesburg 2000

and

.....
(Registration No.), a private company incorporated and existing under the laws of South Africa having its principal place of business at
.....
.....

WHEREAS

Transnet and the Company wish to exchange Information [as defined below] and it is envisaged that each party may from time to time receive Information relating to the other in respect thereof. In consideration of each party making available to the other such Information, the parties jointly agree that any dealings between them shall be subject to the terms and conditions of this Agreement which themselves will be subject to the parameters of the Tender Document.

IT IS HEREBY AGREED

1. INTERPRETATION

In this Agreement:

- 1.1 **Agents** mean directors, officers, employees, agents, professional advisers, contractors or sub-contractors, or any Group member;
- 1.2 **Bid or Bid Document** (hereinafter Tender) means Transnet's Request for Information [**RFI**] Request for Proposal [**RFP**] or Request for Quotation [**RFQ**], as the case may be;
- 1.3 **Confidential Information** means any information or other data relating to one party [the **Disclosing Party**] and/or the business carried on or proposed or intended to be carried on by that party and which is made available for the purposes of the Bid to the other party [the **Receiving Party**] or its Agents by the Disclosing Party or its Agents or recorded in agreed minutes following oral disclosure and any other information otherwise made available by the Disclosing Party or its Agents to the Receiving Party or its Agents, whether before, on or after the date of this Agreement, and whether in writing or otherwise,

including any information, analysis or specifications derived from, containing or reflecting such information but excluding information which:

- 1.3.1 is publicly available at the time of its disclosure or becomes publicly available [other than as a result of disclosure by the Receiving Party or any of its Agents contrary to the terms of this Agreement]; or
- 1.3.2 was lawfully in the possession of the Receiving Party or its Agents [as can be demonstrated by its written records or other reasonable evidence] free of any restriction as to its use or disclosure prior to its being so disclosed; or
- 1.3.3 following such disclosure, becomes available to the Receiving Party or its Agents [as can be demonstrated by its written records or other reasonable evidence] from a source other than the Disclosing Party or its Agents, which source is not bound by any duty of confidentiality owed, directly or indirectly, to the Disclosing Party in relation to such information;
- 1.4 **Group** means any subsidiary, any holding company and any subsidiary of any holding company of either party; and
- 1.5 **Information** means all information in whatever form including, without limitation, any information relating to systems, operations, plans, intentions, market opportunities, know-how, trade secrets and business affairs whether in writing, conveyed orally or by machine-readable medium.

2. CONFIDENTIAL INFORMATION

- 2.1 All Confidential Information given by one party to this Agreement [the **Disclosing Party**] to the other party [the **Receiving Party**] will be treated by the Receiving Party as secret and confidential and will not, without the Disclosing Party's written consent, directly or indirectly communicate or disclose [whether in writing or orally or in any other manner] Confidential Information to any other person other than in accordance with the terms of this Agreement.
- 2.2 The Receiving Party will only use the Confidential Information for the sole purpose of technical and commercial discussions between the parties in relation to the Tender or for the subsequent performance of any contract between the parties in relation to the Tender.
- 2.3 Notwithstanding clause 2.1 above, the Receiving Party may disclose Confidential Information:
 - 2.3.1 to those of its Agents who strictly need to know the Confidential Information for the sole purpose set out in clause 2.2 above, provided that the Receiving Party shall ensure that such Agents are made aware prior to the disclosure of any part of the Confidential Information that the same is confidential and that they owe a duty of confidence to the Disclosing Party. The Receiving Party shall at all times remain liable for any actions of such Agents that would constitute a breach of this Agreement; or
 - 2.3.2 to the extent required by law or the rules of any applicable regulatory authority, subject to clause 2.4 below.
- 2.4 In the event that the Receiving Party is required to disclose any Confidential Information in accordance with clause 2.3.2 above, it shall promptly notify the Disclosing Party and cooperate with the Disclosing

**TRANSNET PORT TERMINALS****TENDER NUMBER:** TPT/2022/06/0297/5745/RFP**DESCRIPTION OF THE WORKS:** THE DESIGN, MANUFACTURE, DELIVERY, ERECTION, TESTING AND COMMISSIONING OF ONE (1) 65 TON TWIN-LIFT SHIP-TO-SHORE (STS) AT PORT ELIZABETH CONTAINER TERMINAL FOR TRANSNET SOC LTD (REG.NO.1990/000900/30) OPERATING AS TRANSNET PORT TERMINALS HEREINAFTER REFERRED TO AS "TPT" AS A ONCE OFF SUPPLY

Party regarding the form, nature, content and purpose of such disclosure or any action which the Disclosing Party may reasonably take to challenge the validity of such requirement.

- 2.5 In the event that any Confidential Information shall be copied, disclosed or used otherwise than as permitted under this Agreement then, upon becoming aware of the same, without prejudice to any rights or remedies of the Disclosing Party, the Receiving Party shall as soon as practicable notify the Disclosing Party of such event and if requested take such steps [including the institution of legal proceedings] as shall be necessary to remedy [if capable of remedy] the default and/or to prevent further unauthorised copying, disclosure or use.
- 2.6 All Confidential Information shall remain the property of the Disclosing Party and its disclosure shall not confer on the Receiving Party any rights, including intellectual property rights over the Confidential Information whatsoever, beyond those contained in this Agreement.

3. RECORDS AND RETURN OF INFORMATION

- 3.1 The Receiving Party agrees to ensure proper and secure storage of all Information and any copies thereof.
- 3.2 The Receiving Party shall keep a written record, to be supplied to the Disclosing Party upon request, of the Confidential Information provided and any copies made thereof and, so far as is reasonably practicable, of the location of such Confidential Information and any copies thereof.
- 3.3 The Company shall, within 7 [seven] days of receipt of a written demand from Transnet:
- 3.3.1 return all written Confidential Information [including all copies]; and
- 3.3.2 expunge or destroy any Confidential Information from any computer, word processor or other device whatsoever into which it was copied, read or programmed by the Company or on its behalf.
- 3.4 The Company shall on request supply a certificate signed by a director as to its full compliance with the requirements of clause 3.3.2 above.

4. ANNOUNCEMENTS

- 4.1 Neither party will make or permit to be made any announcement or disclosure of its prospective interest in the Tender without the prior written consent of the other party.
- 4.2 Neither party shall make use of the other party's name or any information acquired through its dealings with the other party for publicity or marketing purposes without the prior written consent of the other party.

5. DURATION

The obligations of each party and its Agents under this Agreement shall survive the termination of any discussions or negotiations between the parties regarding the Tender and continue thereafter for a period of 5 [five] years.

6. PRINCIPAL

Each party confirms that it is acting as principal and not as nominee, agent or broker for any other person and that it will be responsible for any costs incurred by it or its advisers in considering or pursuing the Tender and in complying with the terms of this Agreement.

7. ADEQUACY OF DAMAGES

Nothing contained in this Agreement shall be construed as prohibiting the Disclosing Party from pursuing any other remedies available to it, either at law or in equity, for any such threatened or actual breach of this Agreement, including specific performance, recovery of damages or otherwise.

8. PRIVACY AND DATA PROTECTION

- 8.1 The Receiving Party undertakes to comply with South Africa's general privacy protection in terms Section 14 of the Bill of Rights in connection with this Tender and shall procure that its personnel shall observe the provisions of such Act [as applicable] or any amendments and re-enactments thereof and any regulations made pursuant thereto.
- 8.2 The Receiving Party warrants that it and its Agents have the appropriate technical and organisational measures in place against unauthorised or unlawful processing of data relating to the Tender and against accidental loss or destruction of, or damage to such data held or processed by them.

9. GENERAL

- 9.1 Neither party may assign the benefit of this Agreement, or any interest hereunder, except with the prior written consent of the other, save that Transnet may assign this Agreement at any time to any member of the Transnet Group.
- 9.2 No failure or delay in exercising any right, power or privilege under this Agreement will operate as a waiver of it, nor will any single or partial exercise of it preclude any further exercise or the exercise of any right, power or privilege under this Agreement or otherwise.
- 9.3 The provisions of this Agreement shall be severable in the event that any of its provisions are held by a court of competent jurisdiction or other applicable authority to be invalid, void or otherwise unenforceable, and the remaining provisions shall remain enforceable to the fullest extent permitted by law.
- 9.4 This Agreement may only be modified by a written agreement duly signed by persons authorised on behalf of each party.
- 9.5 Nothing in this Agreement shall constitute the creation of a partnership, joint venture or agency between the parties.
- 9.6 This Agreement will be governed by and construed in accordance with South African law and the parties irrevocably submit to the exclusive jurisdiction of the South African courts.

Signed

Date

Name

Position

Tenderer

T2.2-17: RFP DECLARATION FORM

NAME OF COMPANY: _____

We _____ do hereby certify that:

1. Transnet has supplied and we have received appropriate tender offers to any/all questions (as applicable) which were submitted by ourselves for tender clarification purposes;
2. we have received all information we deemed necessary for the completion of this Tender;
3. at no stage have we received additional information relating to the subject matter of this tender from Transnet sources, other than information formally received from the designated Transnet contact(s) as nominated in the tender documents;
4. we are satisfied, insofar as our company is concerned, that the processes and procedures adopted by Transnet in issuing this tender and the requirements requested from tenderers in responding to this tender have been conducted in a fair and transparent manner; and
5. furthermore, we acknowledge that a direct relationship exists between a family member and/or an owner / member / director / partner / shareholder (unlisted companies) of our company and an employee or board member of the Transnet Group as indicated below:

[Respondent to indicate if this section is not applicable]

FULL NAME OF OWNER/MEMBER/DIRECTOR/

PARTNER/SHAREHOLDER:

ADDRESS:

Indicate nature of relationship with Transnet:

[Failure to furnish complete and accurate information in this regard may lead to the disqualification of your response and may preclude a Respondent from doing future business with Transnet]

We declare, to the extent that we are aware or become aware of any relationship between ourselves and Transnet (other than any existing and appropriate business relationship with

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Transnet) which could unfairly advantage our company in the forthcoming adjudication process, we shall notify Transnet immediately in writing of such circumstances.

6. We accept that any dispute pertaining to this tender will be resolved through the Ombudsman process and will be subject to the Terms of Reference of the Ombudsman. The Ombudsman process must first be exhausted before judicial review of a decision is sought. (Refer "Important Notice to respondents" below).
7. We further accept that Transnet reserves the right to reverse a tender award or decision based on the recommendations of the Ombudsman without having to follow a formal court process to have such award or decision set aside.
8. We have acquainted ourselves and agree with the content of T2.2-20 "Service Provider Integrity Pact".

For and on behalf of duly authorised thereto
Name:
Signature:
Date:

IMPORTANT NOTICE TO TENDERERS

- Transnet has appointed a Procurement Ombudsman to investigate any material complaint in respect of tenders exceeding R5,000,000.00 (five million S.A. Rand) in value. Should a Tenderer have any material concern regarding an tender process which meets this value threshold, a complaint may be lodged with Transnet's Procurement Ombudsman for further investigation.
- It is incumbent on the Tenderer to familiarise himself/herself with the Terms of Reference for the Transnet Procurement Ombudsman, details of which are available for review at Transnet's website www.transnet.net.
- An official complaint form may be downloaded from this website and submitted, together with any supporting documentation, within the prescribed period, to procurement.ombud@transnet.net

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- For transactions below the R5,000,000.00 (five million S.A. Rand) threshold, a complaint may be lodged with the Chief Procurement Officer of the relevant Transnet Operating Division.
 - All Tenderers should note that a complaint must be made in good faith. If a complaint is made in bad faith, Transnet reserves the right to place such a tenderer on its List of Excluded Bidders.

T2.2-18: REQUEST FOR PROPOSAL – BREACH OF LAW

NAME OF COMPANY: _____

I / We _____ do hereby certify that ***I/we have/have not been*** found guilty during the preceding 5 (five) years of a serious breach of law, including but not limited to a breach of the Competition Act, 89 of 1998, by a court of law, tribunal or other administrative body. The type of breach that the Tenderer is required to disclose excludes relatively minor offences or misdemeanours, e.g. traffic offences.

Where found guilty of such a serious breach, please disclose:

NATURE OF BREACH:

DATE OF BREACH:

Furthermore, I/we acknowledge that Transnet SOC Ltd reserves the right to exclude any Tenderer from the tendering process, should that person or company have been found guilty of a serious breach of law, tribunal or regulatory obligation.

Signed on this _____ day of _____ 20____

SIGNATURE OF TENDER

T2.2-19 Certificate of Acquaintance with Tender Documents

NAME OF TENDERING ENTITY:

1. By signing this certificate I/we acknowledge that I/we have made myself/ourselves thoroughly familiar with, and agree with all the conditions governing this RFP. This includes those terms and conditions of the Contract, the Supplier Integrity Pact, Non-Disclosure Agreement etc. contained in any printed form stated to form part of the documents thereof, but not limited to those listed in this clause.
2. I/we furthermore agree that Transnet SOC Ltd shall recognise no claim from me/us for relief based on an allegation that I/we overlooked any tender/contract condition or failed to take it into account for the purpose of calculating my/our offered prices or otherwise.
3. I/we understand that the accompanying Tender will be disqualified if this Certificate is found not to be true and complete in every respect.
4. For the purposes of this Certificate and the accompanying Tender, I/we understand that the word "competitor" shall include any individual or organisation, other than the Tenderer, whether or not affiliated with the Tenderer, who:
 - a) has been requested to submit a Tender in response to this Tender invitation;
 - b) could potentially submit a Tender in response to this Tender invitation, based on their qualifications, abilities or experience; and
 - c) provides the same Services as the Tenderer and/or is in the same line of business as the Tenderer
5. The Tenderer has arrived at the accompanying Tender independently from, and without consultation, communication, agreement or arrangement with any competitor. However communication between partners in a joint venture or consortium will not be construed as collusive Tendering.
6. In particular, without limiting the generality of paragraph 5 above, there has been no consultation, communication, agreement or arrangement with any competitor regarding:
 - a) prices;

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- b) geographical area where Services will be rendered [market allocation]
 - c) methods, factors or formulas used to calculate prices;
 - d) the intention or decision to submit or not to submit, a Tender;
 - e) the submission of a tender which does not meet the specifications and conditions of the tender; or
 - f) Tendering with the intention not winning the tender.
7. In addition, there have been no consultations, communications, agreements or arrangements with any competitor regarding the quality, quantity, specifications and conditions or delivery particulars of the Services to which this tender relates.
8. The terms of the accompanying tender have not been, and will not be, disclosed by the Tenderer, directly or indirectly, to any competitor, prior to the date and time of the official tender opening or of the awarding of the contract.
9. I/We am/are aware that, in addition and without prejudice to any other remedy provided to combat any restrictive practices related to tenders and contracts, tenders that are suspicious will be reported to the Competition Commission for investigation and possible imposition of administrative penalties in terms of section 59 of the Competition Act No 89 of 1998 and/or may be reported to the National Prosecuting Authority [NPA] for criminal investigation. In addition, Tenderers that submit suspicious tenders may be restricted from conducting business with the public sector for a period not exceeding 10 [ten] years in terms of the Prevention and Combating of Corrupt Activities Act No 12 of 2004 or any other applicable legislation.

Signed on this _____ day of _____ 20____

SIGNATURE OF TENDERER

T2.2-20 Service Provider Integrity Pact

Important Note: All potential tenderers must read this document and certify in the RFP Declaration Form that that have acquainted themselves with, and agree with the content.

The contract with the successful tenderer will automatically incorporate this Integrity Pact and shall be deemed as part of the final concluded contract.

INTEGRITY PACT

Between

TRANSNET SOC LTD

Registration Number: 1990/000900/30

("Transnet")

and

The Contractor (hereinafter referred to as the "Tenderer/Service Providers/Contractor")

PREAMBLE

Transnet values full compliance with all relevant laws and regulations, ethical standards and the principles of economical use of resources, fairness and transparency in its relations with its Tenderers/Service Providers/Contractors.

In order to achieve these goals, Transnet and the Tenderer/Service Provider/Contractor hereby enter into this agreement hereinafter referred to as the "Integrity Pact" which will form part of the Tenderer's/Service Provider's/Contractor's application for registration with Transnet as a vendor.

The general purpose of this Integrity Pact is to agree on avoiding all forms of dishonesty, fraud and corruption by following a system that is fair, transparent and free from any undue influence prior to, during and subsequent to the currency of any procurement and/or reverse logistics event and any further contract to be entered into between the Parties, relating to such event.

All Tenderers/Service Providers/Contractor's will be required to sign and comply with undertakings contained in this Integrity Pact, should they want to be registered as a Transnet vendor.

1 OBJECTIVES

- 1.1 Transnet and the Tenderer/Service Provider/Contractor agree to enter into this Integrity Pact, to avoid all forms of dishonesty, fraud and corruption including practices that are anti-competitive in nature, negotiations made in bad faith and under-pricing by following a system that is fair, transparent and free from any influence/unprejudiced dealings prior to, during and subsequent to the currency of the contract to be entered into with a view to:
- a) Enable Transnet to obtain the desired contract at a reasonable and competitive price in conformity to the defined specifications of the works, goods and services; and
 - b) Enable Tenderers/Service Providers/Contractors to abstain from bribing or participating in any corrupt practice in order to secure the contract.

2 COMMITMENTS OF TRANSNET

Transnet commits to take all measures necessary to prevent dishonesty, fraud and corruption and to observe the following principles:

- 2.1 Transnet hereby undertakes that no employee of Transnet connected directly or indirectly with the sourcing event and ensuing contract, will demand, take a promise for or accept directly or through intermediaries any bribe, consideration, gift, reward, favour or any material or immaterial benefit or any other advantage from the Tenderer, either for themselves or for any person, organisation or third party related to the contract in exchange for an advantage in the tendering

process, Tender evaluation, contracting or implementation process related to any contract.

- 2.2 Transnet will, during the registration and tendering process treat all Tenderers/ Service Providers/Contractor with equity, transparency and fairness. Transnet will in particular, before and during the registration process, provide to all Tenderers/ Service Providers/Contractors the same information and will not provide to any Tenderers/Service Providers/Contractors confidential/additional information through which the Tenderers/Service Providers/Contractors could obtain an advantage in relation to any tendering process.
- 2.3 Transnet further confirms that its employees will not favour any prospective Tenderers/Service Providers/Contractors in any form that could afford an undue advantage to a particular Tenderer during the tendering stage, and will further treat all Tenderers/Service Providers/Contractors participating in the tendering process in a fair manner.
- 2.4 Transnet will exclude from the tender process such employees who have any personal interest in the Tenderers/Service Providers/Contractors participating in the tendering process.

3 OBLIGATIONS OF THE TENDERER / SERVICE PROVIDER

- 3.1 Transnet has a '**Zero Gifts**' Policy. No employee is allowed to accept gifts, favours or benefits.
 - a) Transnet officials and employees **shall not** solicit, give or accept, or from agreeing to solicit, give, accept or receive directly or indirectly, any gift, gratuity, favour, entertainment, loan, or anything of monetary value, from any person or juridical entities in the course of official duties or in connection with any operation being managed by, or any transaction which may be affected by the functions of their office.
 - b) Transnet officials and employees **shall not** solicit or accept gifts of any kind, from vendors, suppliers, customers, potential employees, potential vendors, and suppliers, or any other individual or organisation irrespective of the value.
 - c) Under **no circumstances** should gifts, business courtesies or hospitality packages be accepted from or given to prospective suppliers participating in a tender process at the respective employee's Operating Division, regardless of retail value.
 - d) Gratuities, bribes or kickbacks of any kind must never be solicited, accepted or offered, either directly or indirectly. This includes money, loans, equity, special privileges, personal favours, benefit or services. Such favours will be considered to constitute corruption.

- 3.2 The Tenderer/Service Provider/Contractor commits itself to take all measures necessary to prevent corrupt practices, unfair means and illegal activities during any stage of its Tender or during any ensuing contract stage in order to secure the contract or in furtherance to secure it and in particular the Tenderer/Service Provider/Contractor commits to the following:
- a) The Tenderer/Service Provider/Contractor will not, directly or through any other person or firm, offer, promise or give to Transnet or to any of Transnet's employees involved in the tendering process or to any third person any material or other benefit or payment, in order to obtain in exchange an advantage during the tendering process; and
 - b) The Tenderer/Service Provider/Contractor will not offer, directly or through intermediaries, any bribe, gift, consideration, reward, favour, any material or immaterial benefit or other advantage, commission, fees, brokerage or inducement to any employee of Transnet, connected directly or indirectly with the tendering process, or to any person, organisation or third party related to the contract in exchange for any advantage in the tendering, evaluation, contracting and implementation of the contract.
- 3.3 The Tenderer/Service Provider/Contractor will not collude with other parties interested in the contract to preclude a competitive Tender price, impair the transparency, fairness and progress of the tendering process, Tender evaluation, contracting and implementation of the contract. The Tenderer / Service Provider further commits itself to delivering against all agreed upon conditions as stipulated within the contract.
- 3.4 The Tenderer/Service Provider/Contractor will not enter into any illegal or dishonest agreement or understanding, whether formal or informal with other Tenderers/Service Providers/Contractors. This applies in particular to certifications, submissions or non-submission of documents or actions that are restrictive or to introduce cartels into the tendering process.
- 3.5 The Tenderer/Service Provider/Contractor will not commit any criminal offence under the relevant anti-corruption laws of South Africa or any other country. Furthermore, the Tenderer/Service Provider/Contractor will not use for illegitimate purposes or for restrictive purposes or personal gain, or pass on to others, any information provided by Transnet as part of the business relationship, regarding plans, technical proposals and business details, including information contained or transmitted electronically.
- 3.6 A Tenderer/Service Provider/Contractor of foreign origin shall disclose the name and address of its agents or representatives in South Africa, if any, involved directly or indirectly in the registration or tendering process. Similarly, the Tenderer / Service Provider / Contractor of South African nationality shall furnish

the name and address of the foreign principals, if any, involved directly or indirectly in the registration or tendering process.

- 3.7 The Tenderer/Service Provider/Contractor will not misrepresent facts or furnish false or forged documents or information in order to influence the tendering process to the advantage of the Tenderer/Service Provider/Contractor or detriment of Transnet or other competitors.
- 3.8 Transnet may require the Tenderer/Service Provider/Contractor to furnish Transnet with a copy of its code of conduct. Such code of conduct must address the compliance programme for the implementation of the code of conduct and reject the use of bribes and other dishonest and unethical conduct.
- 3.9 The Tenderer/Service Provider/Contractor will not instigate third persons to commit offences outlined above or be an accessory to such offences.
- 3.10 The Tenderer/Service Provider/Contractor confirms that they will uphold the ten principles of the United Nations Global Compact (UNGC) in the fields of Human Rights, Labour, Anti-Corruption and the Environment when undertaking business with Transnet as follows:

a) Human Rights

- Principle 1: Businesses should support and respect the protection of internationally proclaimed human rights; and
- Principle 2: make sure that they are not complicit in human rights abuses.

b) Labour

- Principle 3: Businesses should uphold the freedom of association and the effective recognition of the right to collective bargaining;
- Principle 4: the elimination of all forms of forced and compulsory labour;
- Principle 5: the effective abolition of child labour; and
- Principle 6: the elimination of discrimination in respect of employment and occupation.

c) Environment

- Principle 7: Businesses should support a precautionary approach to environmental challenges;
- Principle 8: undertake initiatives to promote greater environmental responsibility; and

- Principle 9: encourage the development and diffusion of environmentally friendly technologies.

d) Anti-Corruption

- Principle 10: Businesses should work against corruption in all its forms, including extortion and bribery.

4 INDEPENDENT TENDERING

- 4.1 For the purposes of that Certificate in relation to any submitted Tender, the Tenderer declares to fully understand that the word "competitor" shall include any individual or organisation, other than the Tenderer, whether or not affiliated with the Tenderer, who:
- a) has been requested to submit a Tender in response to this Tender invitation;
 - b) could potentially submit a Tender in response to this Tender invitation, based on their qualifications, abilities or experience; and
 - c) provides the same Goods and Services as the Tenderer and/or is in the same line of business as the Tenderer.
- 4.2 The Tenderer has arrived at his submitted Tender independently from, and without consultation, communication, agreement or arrangement with any competitor. However communication between partners in a joint venture or consortium will not be construed as collusive tendering.
- 4.3 In particular, without limiting the generality of paragraph 5 above, there has been no consultation, communication, agreement or arrangement with any competitor regarding:
- a) prices;
 - b) geographical area where Goods or Services will be rendered [market allocation];
 - c) methods, factors or formulas used to calculate prices;
 - d) the intention or decision to submit or not to submit, a Tender;
 - e) the submission of a Tender which does not meet the specifications and conditions of the RFP; or
 - f) tendering with the intention of not winning the Tender.
- 4.4 In addition, there have been no consultations, communications, agreements or arrangements with any competitor regarding the quality, quantity, specifications and conditions or delivery particulars of the Goods or Services to which his/her tender relates.

- 4.5 The terms of the Tender as submitted have not been, and will not be, disclosed by the Tenderer, directly or indirectly, to any competitor, prior to the date and time of the official Tender opening or of the awarding of the contract.
- 4.6 Tenderers are aware that, in addition and without prejudice to any other remedy provided to combat any restrictive practices related to Tenders and contracts, Tenders that are suspicious will be reported to the Competition Commission for investigation and possible imposition of administrative penalties in terms of section 59 of the Competition Act No 89 of 1998 and/or may be reported to the National Prosecuting Authority [**NPA**] for criminal investigation and/or may be restricted from conducting business with the public sector for a period not exceeding 10 [ten] years in terms of the Prevention and Combating of Corrupt Activities Act No 12 of 2004 or any other applicable legislation.
- 4.7 Should the Tenderer find any terms or conditions stipulated in any of the relevant documents quoted in the Tender unacceptable, it should indicate which conditions are unacceptable and offer alternatives by written submission on its company letterhead, attached to its submitted Tender. Any such submission shall be subject to review by Transnet's Legal Counsel who shall determine whether the proposed alternative(s) are acceptable or otherwise, as the case may be.

5 DISQUALIFICATION FROM TENDERING PROCESS

- 5.1 If the Tenderer/Service Provider/Contractor has committed a transgression through a violation of section 3 of this Integrity Pact or in any other form such as to put its reliability or credibility as a Tenderer/Service Provider/Contractor into question, Transnet may reject the Tenderer's / Service Provider's / Contractor's application from the registration or tendering process and remove the Tenderer/Service Provider/Contractor from its database, if already registered.
- 5.2 If the Tenderer/Service Provider/Contractor has committed a transgression through a violation of section 3, or any material violation, such as to put its reliability or credibility into question. Transnet may after following due procedures and at its own discretion also exclude the Tenderer/Service Provider/Contractor from future tendering processes. The imposition and duration of the exclusion will be determined by the severity of the transgression. The severity will be determined by the circumstances of the case, which will include amongst others the number of transgressions, the position of the transgressors within the company hierarchy of the Tenderer/Service Provider/Contractor and the amount of the damage. The exclusion will be imposed for up to a maximum of 10 (ten) years. However, Transnet reserves the right to impose a longer period of exclusion, depending on the gravity of the misconduct.

- 5.3 If the Tenderer/Service Provider/Contractor can prove that it has restored the damage caused by it and has installed a suitable corruption prevention system, or taken other remedial measures as the circumstances of the case may require, Transnet may at its own discretion revoke the exclusion or suspend the imposed penalty.

6 TRANSNET'S LIST OF EXCLUDED TENDERERS (BLACKLIST)

- 6.1 The process of restriction is used to exclude a company/person from conducting future business with Transnet and other organs of state for a specified period. No Tender shall be awarded to a Tenderer whose name (or any of its members, directors, partners or trustees) appear on the Register of Tender Defaulters kept by National Treasury, or who have been placed on National Treasury's List of Restricted Suppliers. Transnet reserves the right to withdraw an award, or cancel a contract concluded with a Tenderer should it be established, at any time, that a tenderer has been restricted with National Treasury by another government institution.
- 6.2 All the stipulations on Transnet's restriction process as laid down in Transnet's Supply Chain Policy and Procurement Procedures Manual (CPM included) are included herein by way of reference. Below follows a condensed summary of this restriction procedure.
- 6.3 On completion of the restriction procedure, Transnet will submit the restricted entity's details (including the identity number of the individuals and registration number of the entity) to National Treasury for placement on National Treasury's Database of Restricted Suppliers for the specified period of exclusion. National Treasury will make the final decision on whether to restrict an entity from doing business with any organ of state for a period not exceeding 10 years and place the entity concerned on the Database of Restricted Suppliers published on its official website.
- 6.4 The decision to restrict is based on one of the grounds for restriction. The standard of proof to commence the restriction process is whether a "*prima facie*" (i.e. on the face of it) case has been established.
- 6.5 Depending on the seriousness of the misconduct and the strategic importance of the Goods/Services, in addition to restricting a company/person from future business, Transnet may decide to terminate some or all existing contracts with the company/person as well.
- 6.6 A Service Provider or Contractor to Transnet may not subcontract any portion of the contract to a blacklisted company.

- 6.7 Grounds for blacklisting include: If any person/Enterprise which has submitted a Tender, concluded a contract, or, in the capacity of agent or subcontractor, has been associated with such Tender or contract:
- a) Has, in bad faith, withdrawn such Tender after the advertised closing date and time for the receipt of Tenders;
 - b) has, after being notified of the acceptance of his Tender, failed or refused to sign a contract when called upon to do so in terms of any condition forming part of the Tender documents;
 - c) has carried out any contract resulting from such Tender in an unsatisfactory manner or has breached any condition of the contract;
 - d) has offered, promised or given a bribe in relation to the obtaining or execution of the contract;
 - e) has acted in a fraudulent or improper manner or in bad faith towards Transnet or any Government Department or towards any public body, Enterprise or person;
 - f) has made any incorrect statement in a certificate or other communication with regard to the Local Content of his Goods or his B-BBEE status and is unable to prove to the satisfaction of Transnet that:
 - (i) he made the statement in good faith honestly believing it to be correct; and
 - (ii) before making such statement he took all reasonable steps to satisfy himself of its correctness;
 - g) caused Transnet damage, or to incur costs in order to meet the contractor's requirements and which could not be recovered from the contractor;
 - h) has litigated against Transnet in bad faith.
- 6.8 Grounds for blacklisting include a company/person recorded as being a company or person prohibited from doing business with the public sector on National Treasury's database of Restricted Service Providers or Register of Tender Defaulters.
- 6.9 Companies associated with the person/s guilty of misconduct (i.e. entities owned, controlled or managed by such persons), any companies subsequently formed by the person(s) guilty of the misconduct and/or an existing company where such person(s) acquires a controlling stake may be considered for blacklisting. The decision to extend the blacklist to associated companies will be at the sole discretion of Transnet.

7 PREVIOUS TRANSGRESSIONS

- 7.1 The Tenderer/Service Provider/Contractor hereby declares that no previous transgressions resulting in a serious breach of any law, including but not limited to, corruption, fraud, theft, extortion and contraventions of the Competition Act 89 of 1998, which occurred in the last 5 (five) years with any other public sector undertaking, government department or private sector company that could justify its exclusion from its registration on the Tenderer's/Service Provider's/Contractor's database or any tendering process.
- 7.2 If it is found to be that the Tenderer/Service Provider/Contractor made an incorrect statement on this subject, the Tenderer/Service Provider/Contractor can be rejected from the registration process or removed from the Tenderer/Service Provider/Contractor database, if already registered, for such reason (refer to the Breach of Law Returnable Form contained in the document.)

8 SANCTIONS FOR VIOLATIONS

- 8.1 Transnet shall also take all or any one of the following actions, wherever required to:
- a) Immediately exclude the Tenderer/Service Provider/Contractor from the tendering process or call off the pre-contract negotiations without giving any compensation the Tenderer/Service Provider/Contractor. However, the proceedings with the other Tenderer/Service Provider/Contractor may continue;
 - b) Immediately cancel the contract, if already awarded or signed, without giving any compensation to the Tenderer/Service Provider/Contractor;
 - c) Recover all sums already paid by Transnet;
 - d) Encash the advance bank guarantee and performance bond or warranty bond, if furnished by the Tenderer/Service Provider/Contractor, in order to recover the payments, already made by Transnet, along with interest;
 - e) Cancel all or any other contracts with the Tenderer/Service Provider/Contractor; and
 - f) Exclude the Tenderer/Service Provider/Contractor from entering into any Tender with Transnet in future.

9 CONFLICTS OF INTEREST

- 9.1 A conflict of interest includes, inter alia, a situation in which:
- a) A Transnet employee has a personal financial interest in a tendering / supplying entity; and
 - b) A Transnet employee has private interests or personal considerations or has an affiliation or a relationship which affects, or may affect, or may be perceived to affect his / her judgment in action in the best interest of Transnet, or could affect the employee's motivations for acting in a particular manner, or which could result in, or be perceived as favouritism or nepotism.

9.2 A Transnet employee uses his / her position, or privileges or information obtained while acting in the capacity as an employee for:

- a) Private gain or advancement; or
- b) The expectation of private gain, or advancement, or any other advantage accruing to the employee must be declared in a prescribed form.

Thus, conflicts of interest of any Tender committee member or any person involved in the sourcing process must be declared in a prescribed form.

9.3 If a Tenderer/Service Provider/Contractor has or becomes aware of a conflict of interest i.e. a family, business and / or social relationship between its owner(s)/ member(s)/director(s)/partner(s)/shareholder(s) and a Transnet employee/ member of Transnet's Board of Directors in respect of a Tender which will be considered for the Tender process, the Tenderer/Service Provider/ Contractor:

- a) must disclose the interest and its general nature, in the Request for Proposal ("RFX") declaration form; or
- b) must notify Transnet immediately in writing once the circumstances has arisen.

9.4 The Tenderer/Service Provider/Contractor shall not lend to or borrow any money from or enter into any monetary dealings or transactions, directly or indirectly, with any committee member or any person involved in the sourcing process, where this is done, Transnet shall be entitled forthwith to rescind the contract and all other contracts with the Tenderer/Service Provider/Contractor.

10 DISPUTE RESOLUTION

10.1 Transnet recognises that trust and good faith are pivotal to its relationship with its Tenderer / Service Provider / Contractor. When a dispute arises between Transnet and its Tenderer / Service Provider / Contractor, the parties should use their best endeavours to resolve the dispute in an amicable manner, whenever possible. Litigation in bad faith negates the principles of trust and good faith on which commercial relationships are based. Accordingly, following a blacklisting process as mentioned in paragraph 6 above, Transnet will not do business with a company that litigates against it in bad faith or is involved in any action that reflects bad faith on its part. Litigation in bad faith includes, but is not limited to the following instances:

- a) **Vexatious proceedings:** these are frivolous proceedings which have been instituted without proper grounds;
- b) **Perjury:** where a Tenderer / Service Provider / Contractor make a false statement either in giving evidence or on an affidavit;
- c) **Scurrilous allegations:** where a Tenderer / Service Provider / Contractor makes allegations regarding a senior Transnet employee which are without proper foundation, scandalous, abusive or defamatory; and

- d) **Abuse of court process:** when a Tenderer / Service Provider / Contractor abuses the court process in order to gain a competitive advantage during a Tender process.

11 GENERAL

- 11.1 This Integrity Pact is governed by and interpreted in accordance with the laws of the Republic of South Africa.
- 11.2 The actions stipulated in this Integrity Pact are without prejudice to any other legal action that may follow in accordance with the provisions of the law relating to any civil or criminal proceedings.
- 11.3 The validity of this Integrity Pact shall cover all the tendering processes and will be valid for an indefinite period unless cancelled by either Party.
- 11.4 Should one or several provisions of this Integrity Pact turn out to be invalid the remainder of this Integrity Pact remains valid.
- 11.5 Should a Tenderer/Service Provider/Contractor be confronted with dishonest, fraudulent or corruptive behaviour of one or more Transnet employees, Transnet expects its Tenderer/Service Provider/Contractor to report this behaviour directly to a senior Transnet official/employee or alternatively by using Transnet's "Tip-Off Anonymous" hotline number 0800 003 056, whereby your confidentiality is guaranteed.

The Parties hereby declare that each of them has read and understood the clauses of this Integrity Pact and shall abide by it. To the best of the Parties' knowledge and belief, the information provided in this Integrity Pact is true and correct.

I duly authorised by the tendering entity, hereby certify that the tendering entity are **fully acquainted** with the contents of the Integrity Pact and further **agree to abide by it** in full.

Signature

Date

T2.2-21 : Supplier Code of Conduct

Transnet SOC Limited aims to achieve the best value for money when buying or selling goods and obtaining services. This however must be done in an open and fair manner that supports and drives a competitive economy. Underpinning our process are several acts and policies that any supplier dealing with Transnet must understand and support. These are:

- The Transnet Procurement Policy – A guide for Tenderers.
- Section 217 of the Constitution - the five pillars of Public PSCM (Procurement and Supply Chain Management): fair, equitable, transparent, competitive and cost effective;
- The Public Finance Management Act (PFMA);
- The Broad Based Black Economic Empowerment Act (BBBEE)
- The Prevention and Combating of Corrupt Activities Act (PRECCA); and
- The Construction Industry Development Board Act (CIDB Act).

This code of conduct has been included in this contract to formally appraise Transnet Suppliers of Transnet's expectations regarding behaviour and conduct of its Suppliers.

Prohibition of Bribes, Kickbacks, Unlawful Payments, and Other Corrupt Practices

Transnet is in the process of transforming itself into a self-sustaining State Owned Enterprise, actively competing in the logistics industry. Our aim is to become a world class, profitable, logistics organisation. As such, our transformation is focused on adopting a performance culture and to adopt behaviours that will enable this transformation.

1. Transnet SOC Limited will not participate in corrupt practices. Therefore, it expects its suppliers to act in a similar manner.

- Transnet and its employees will follow the laws of this country and keep accurate business records that reflect actual transactions with, and payments to, our suppliers.
- Employees must not accept or request money or anything of value, directly or indirectly, from suppliers.
- Employees may not receive anything that is calculated to:
 - Illegally influence their judgement or conduct or to ensure the desired outcome of a sourcing activity;

- Win or retain business or to influence any act or decision of any person involved in sourcing decisions; or
- Gain an improper advantage.
- There may be times when a supplier is confronted with fraudulent or corrupt behaviour of Transnet employees. We expect our Suppliers to use our "Tip-offs Anonymous" Hot line to report these acts. (0800 003 056).

2. *Transnet SOC Limited is firmly committed to the ideas of free and competitive enterprise.*

- Suppliers are expected to comply with all applicable laws and regulations regarding fair competition and antitrust practices.
- Transnet does not engage with non-value adding agents or representatives solely for the purpose of increasing BBBEE spend (fronting).

3. *Transnet's relationship with suppliers requires us to clearly define requirements, to exchange information and share mutual benefits.*

- Generally, suppliers have their own business standards and regulations. Although Transnet cannot control the actions of our suppliers, we will not tolerate any illegal activities. These include, but are not limited to:
 - Misrepresentation of their product (origin of manufacture, specifications, intellectual property rights, etc);
 - Collusion;
 - Failure to disclose accurate information required during the sourcing activity (ownership, financial situation, BBBEE status, etc.);
 - Corrupt activities listed above; and
 - Harassment, intimidation or other aggressive actions towards Transnet employees.
- Suppliers must be evaluated and approved before any materials, components, products or services are purchased from them. Rigorous due diligence is conducted and the supplier is expected to participate in an honest and straight forward manner.
- Suppliers must record and report facts accurately, honestly and objectively. Financial records must be accurate in all material respects.

Conflicts of Interest

A conflict of interest arises when personal interests or activities influence (or appear to influence) the ability to act in the best interests of Transnet SOC Limited.

- Doing business with family members.
- Having a financial interest in another company in our industry

Where possible, contracts will be negotiated to include the above in the terms of such contracts. To the extent such terms are not included in contractual obligations and any of the above code is breached, then Transnet reserves its right to review doing business with these suppliers.

I, _____ of _____
(insert name of Director or as per Authority Resolution from Board of Directors) *(insert name of Company)*

hereby acknowledge having read, understood and agree to the terms and conditions set out in the "Transnet Supplier Code of Conduct."

Signed this on day _____ at _____

 Signature

T2.2-22 Agreement in terms of Protection of Personal Information Act, 4 of 2013 ("POPIA")

1. PREAMBLE AND INTRODUCTION

- 1.1. The rights and obligation of the Parties in terms of the Protection of Personal Information Act, 4 of 2013 ("POPIA") are included as forming part of the terms and conditions of this contract.

2. PROTECTION OF PERSONAL INFORMATION

- 2.1. The following terms shall bear the same meaning as contemplated in Section 1 of the Protection of Person information act, No. of 2013 "(POPIA)":
- consent; data subject; electronic communication; information officer; operator; person; personal information; processing; record; Regulator; responsible party; special information; as well as any terms derived from these terms.
- 2.2. The Operator will process all information by the Transnet in terms of the requirements contemplated in Section 4(1) of the POPIA:
- Accountability; Processing limitation; Purpose specification; Further processing limitation; Information quality; Openness; Security safeguards and Data subject participation.
- 2.3. The Parties acknowledge and agree that, in relation to personal information of Transnet and the information of a third party that will be processed pursuant to this Agreement , the Operator is (_____) hereinafter Operator and the Data subject is "Transnet". Operator will process personal information only with the knowledge and authorisation of Transnet and will treat personal information and the information of a third party which comes to its knowledge as confidential and will not disclose it, unless so required by law or subject to the exceptions contained in the POPIA.
- 2.4. Transnet reserves all the rights afforded to it by the POPIA in the processing of any of its information as contained in this Agreement and the Operator is required to comply with all prescripts as detailed in the POPIA relating to all information concerning Transnet.
- 2.5. In terms of this Agreement, the Operator acknowledges that it will obtain and have access to personal information of Transnet and the information of a third party and agrees that it shall only process the information disclosed by Transnet in terms of this Agreement and only for the purposes as detailed in this Agreement and in accordance with any applicable law.
- 2.6. Should there be a need for the Operator to process the personal information and the information of a third party in a way that is not agreed to in this Agreement, the Operator must request consent

from Transnet to the processing of its personal information or and the information of a third party in a manner other than that it was collected for, which consent cannot be unreasonably withheld.

- 2.7. Furthermore, the Operator will not otherwise modify, amend or alter any personal information and the information of a third party submitted by Transnet or disclose or permit the disclosure of any personal information and the information of a third party to any third party without prior written consent from Transnet.
- 2.8. The Operator shall, at all times, ensure compliance with any applicable laws put in place and maintain sufficient measures, policies and systems to manage and secure against all forms of risks to any information that may be shared or accessed pursuant to the services offered to Transnet in terms of this Agreement (physically, through a computer or any other form of electronic communication).
- 2.9. The Operator shall notify Transnet in writing of any unauthorised access to personal information and the information of a third party , cybercrimes or suspected cybercrimes, in its knowledge and report such crimes or suspected crimes to the relevant authorities in accordance with applicable laws, after becoming aware of such crimes or suspected crime. The Operator must inform Transnet of the breach as soon as it has occurred to allow Transnet to take all necessary remedial steps to mitigate the extent of the loss or compromise of personal information and the information of a third party and to restore the integrity of the affected personal information as quickly as is possible.
- 2.10. Transnet may, in writing, request the Operator to confirm and/or make available any personal information and the information of a third party in its possession in relation to Transnet and if such personal information has been accessed by third parties and the identity thereof in terms of the POPIA.
- 2.11. Transnet may further request that the Operator correct, delete, destroy, withdraw consent or object to the processing of any personal information and the information of a third party relating to the Transnet or a third party in the Operator's possession in terms of the provision of the POPIA and utilizing Form 2 of the POPIA Regulations .
- 2.12. In signing this addendum that is in terms of the POPIA, the Operator hereby agrees that it has adequate measures in place to provide protection of the personal information and the information of a third party given to it by Transnet in line with the 8 conditions of the POPIA and that it will provide to Transnet satisfactory evidence of these measures whenever called upon to do so by Transnet.

The Operator is required to provide confirmation that all measures in terms of the POPIA are in place when processing personal information and the information of a third party received from Transnet:

YES	
------------	--

NO	
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2.13. Further, the Operator acknowledges that it will be held liable by Transnet should it fail to process personal information in line with the requirements of the POPIA. The Operator will be subject to any civil or criminal action, administrative fines or other penalty or loss that may arise as a result of the processing of any personal information that Transnet submitted to it.

2.14. Should a Tenderer have any complaints or objections to processing of its personal information, by Transnet, the Tenderer can submit a complaint to the Information Regulator on <https://www.justice.gov.za/inforeg/>, click on contact us, click on complaints.IR@justice.gov.za

3. SOLE AGREEMENT

3.1. The Agreement, constitute the sole agreement between the parties relating to the subject matter referred to in paragraph 1.1 of this and no amendment/variation/change shall be of any force and effect unless reduced to writing and signed by or on behalf of both parties.

Signed at _____ on this _____ day of _____ 2021

Name: _____

Title: _____

Signature: _____

(Operator)

Authorised signatory for and on behalf of _____ who warrants that he/she is duly authorised to sign this Agreement.

AS WITNESSES:

1. Name: _____ Signature: _____

2. Name: _____ Signature: _____

T2.2-23 SBD 5

THE NATIONAL INDUSTRIAL PARTICIPATION PROGRAMME

INTRODUCTION

The National Industrial Participation Programme (NIPP), which is applicable to all government procurement contracts that have an imported content, became effective on the 1 September 1996. The NIP policy and guidelines were fully endorsed by Cabinet on 30 April 1997. In terms of the Cabinet decision, all state and parastatal purchases / lease contracts (for goods, works and services) entered into after this date, are subject to the NIPP requirements. NIPP is obligatory and therefore must be complied with. The Industrial Participation Secretariat (IPS) of the Department of Trade and Industry (DTI) is charged with the responsibility of administering the programme.

1. PILLARS OF THE PROGRAMME

- 1.1 The NIPP obligation is benchmarked on the imported content of the contract. Any contract having an imported content equal to or exceeding US\$5 million or other currency equivalent to US\$5 million will have a NIP obligation. This threshold of US\$5 million can be reached as follows:
 - (a) Any single contract with imported content exceeding US\$5 million.
 - or
 - (b) Multiple contracts for the same goods, works or services each with imported content exceeding US\$3 million awarded to one seller over a 2 year period which in total exceeds US\$5 million.
 - or
 - (c) A contract with a renewable option clause, where should the option be exercised the total value of the imported content will exceed US\$5 million.
 - or
 - (d) Multiple suppliers of the same goods, works or services under the same contract, where the value of the imported content of each allocation is equal to or exceeds US\$ 3 million worth of goods, works or services to the same government institution, which in total over a two (2) year period exceeds US\$5 million.
- 1.2 The NIP obligation applicable to suppliers in respect of sub-paragraphs 1.1 (a) to 1.1 (c) above will amount to 30% of the imported content whilst suppliers in respect of paragraph 1.1 (d) shall incur 30% of the total NIPP obligation on a *pro-rata* basis.
- 1.3 To satisfy the NIPP obligation, the DTI would negotiate and conclude agreements such as investments, joint ventures, sub-contracting, licensee production, export promotion, sourcing arrangements and research and development (R&D) with partners or suppliers.
- 1.4 A period of seven years has been identified as the time frame within which to discharge the obligation.

2. REQUIREMENTS OF THE DEPARTMENT OF TRADE AND INDUSTRY

- 2.1 In order to ensure effective implementation of the programme, successful bidders (contractors) are required to, immediately after the award of a contract that is in excess of **R10 million** (ten million Rands), submit details of such a contract to the DTI for reporting purposes.
- 2.2 The purpose for reporting details of contracts in excess of the amount of R10 million (ten million Rands) is to cater for multiple contracts for the same goods, works or services; renewable contracts and multiple suppliers for the same goods, works or services under the same contract as provided for in paragraphs 1.1.(b) to 1.1. (d) above.

3. BID SUBMISSION AND CONTRACT REPORTING REQUIREMENTS OF BIDDERS AND SUCCESSFUL BIDDERS (CONTRACTORS)

- 3.1 Bidders are required to sign and submit this Standard Bidding Document (SBD 5) together with their bid documentation at the closing date and time of the bid.
- 3.2 In order to accommodate multiple contracts for the same goods, works or services; renewable contracts and multiple suppliers for the same goods, works or services under the same contract as indicated in sub-paragraphs 1.1 (b) to 1.1 (d) above and to enable the DTI in determining the NIPP obligation, successful bidders (contractors) are required, immediately after being officially notified about any successful bid with a value in excess of R10 million (ten million Rands), to contact and furnish the DTI with the following information:
 - Bid number;
 - Description of the goods or services;
 - Date on which the contract was awarded;
 - Name, address and contact details of the contractor;
 - Value of the contract; and
 - Imported content of the contract, if possible.
- 3.3 The information required in paragraph 3.2 above must be sent to the Department of Trade and Industry, Private Bag X 84, Pretoria, 0001 for the attention of Mr Elias Malapane within five (5) working days after award of the contract. Mr Malapane may be contacted on telephone (012) 394 1401, facsimile (012) 394 2401 or e-mail at Elias@thedti.gov.za for further details about the programme.

4. PROCESS TO SATISFY THE NIPP OBLIGATION

- 4.1 Once the successful tenderer (Contractor) has made contact with and furnished the DTI with the information required, the following steps will be followed:
 - a. the Contractor and the DTI will determine the NIPP obligation;
 - b. the Contractor and the DTI will sign the NIPP obligation agreement;
 - c. the Contractor will submit a performance guarantee to the DTI;
 - d. the Contractor will submit a business concept for consideration and approval by the DTI;
 - e. upon approval of the business concept by the DTI, the Contractor will submit detailed business plans outlining the business concepts;
 - f. the Contractor will implement the business plans; and
 - g. the Contractor will submit bi-annual progress reports on approved plans to the DTI.

- 4.2 The NIPP obligation agreement is between the DTI and the successful bidder (contractor) and, therefore, does not involve the Employer.

Bid number	Closing date:
Name of bidder.....	
Postal address	
Signature.....	Name (in print).....
Date.....	

T2.2-25: Mandatory Critical Spares

Tenderers are to complete this returnable for the critical spares identified by Employer below, for the crane required for Port Elizabeth Container Terminal (PECT).

Tenderers are reminded that as per the Works Information clause 1.2.1.5, the spares listed below are required as part of the Main Offer.

Item #	Description	Supplier	No Required	Cost per unit	Total Cost
1	Hoist gearbox		1		
2	Hoist motor		1		
3	Hoist coupling		2		
4	Hoist service brake with pads		1		
5	Hoist E-brake with pads		1		
6	Hoist sheave and pin		1		
7	Trolley sheave and pin		1		
8	Headblock sheave and pin		1		
9	Boom service brake with pads		1		
10	Boom E-brake with pads		1		
11	Trolley motor		2		
12	Trolley gearbox		2		
13	Trolley brake		2		
14	Trolley wheel and shaft		2		
15	Gantry gearbox		1		
16	Gantry motor		2		
17	Gantry bogie		1		
18	Gantry brake		2		
19	Storm brake		1		
20	Storm brake hydraulic unit		1		
21	TLS electro-valves		1		
22	TLS cylinder		1		
23	PLC CPU		1		

24	PLC power supply				
25	PLC input card		3		
26	PLC output card		3		
27	PLC analogue output		3		
28	PLC analogue output		3		
29	Trolley joystick		1		
30	Hoist/gantry joystick		1		
31	TLS joystick		1		
32	Loadcell +monitoring unit		2		
33	Anemometer		1		
34	HMI for operation cabin		1		
35	Backup harddrive with software for main PLC and SCADA		1		
36	HT cable		1		
37	Cable reel motor +brake + coupling		1		
38	Cable reel VSD		1		
39	Hoist wire rope RHL		1		
40	Hoist wire rope LHL		1		
41	Spreader centre cable +plugs		2		
42	Aux trolley rope wire front		2		
43	Aux trolley rope wire rear		2		
44	Aux trolley wheel		2		
45	PLC Inputs (Active Front End)		1		
46	PLC Output (Active Front End)		1		
47	Income supply unit complete		1		
48	Hoist Drives		1		
49	Trolley Drive		1		
50	Gantry Drive		1		
51	Boom Drive		1		
52	Long travel buffer		2		

TRANSNET PORT TERMINALS**TENDER NUMBER:** TPT/2022/06/0297/5745/RFP**DESCRIPTION OF THE WORKS:** THE DESIGN, MANUFACTURE, DELIVERY, ERECTION, TESTING AND COMMISSIONING OF ONE (1) 65 TON TWIN-LIFT SHIP-TO-SHORE (STS) AT PORT ELIZABETH CONTAINER TERMINAL FOR TRANSNET SOC LTD (REG.NO.1990/000900/30) OPERATING AS TRANSNET PORT TERMINALS HEREINAFTER REFERRED TO AS "TPT" AS A ONCE OFF SUPPLY

53	Trolley buffer		2		
54	Boom main contractor		1		
55	Trolley main contractor		1		
56	Hoist main contractor		1		
57	Gantry main contractor		1		
58	Energy chain (select parts)		1		

Signed _____

Date _____

Name _____

Position _____

Tenderer _____

T2.2-26: Supplier's Preliminary Design

Tenderers are to list in this schedule all principle design criteria and design standards applicable to the Ship-to-Shore Crane offered. The safety against drifting (due to wind and inclination) during operation in the limiting service wind shall at least comply with FEM 1.001. The Tenderer must state for each mechanism the class of utilization, spectrum class and group classification on which the proposed design will be based and supply a full motivation if this differs from those specified.

Parameter for Ship-to-Shore Crane	Value / Detail	Design Criteria and/or Applicable Standard	Comments
Classification of the structure (group classification, state of loading, class of utilization)			
Classification of the following mechanisms (group classification, state of loading, class of utilization): <ul style="list-style-type: none"> • Hoisting • Trolley • Gantry long travel • Boom 			
Speeds of the following motions: (m/min) <ul style="list-style-type: none"> • Hoisting / lowering (full load) • Hoisting / lowering (no load) • Trolley cross travel (full load) • Trolley cross travel (no load) • Gantry long travel (full Load) 			
Boom up (time in minutes) Boom down (time in minutes)			

Angle (degrees) to which a suspended container can be: Trimmed Listed Skewed			
Hoisting Capability (SWL) for crane – under spreader (ton)			
Length across uncompressed buffers, measured along rails (m)			
Overall (outside) width of crane, measured across the rails (m)			
Rail gauge (m)			
Acknowledge crane rail width (crown) is 100 mm (Yes / No)			
Spreader vertical travel distance below seaside rail level to lowest point of spreader (m)			
Spreader vertical travel distance above seaside rail level to underneath of spreader (m)			
Total number of long travel wheels			
Total number of long travel wheels driven and braked			
Total mass of STS Crane (ton)			
Maximum in-service load per wheel (ton)			
Maximum out-of-service load per wheel (ton)			
Maximum load distribution on rail			

DESCRIPTION OF THE WORKS: THE DESIGN, MANUFACTURE, DELIVERY, ERECTION, TESTING AND COMMISSIONING OF ONE (1) 65 TON TWIN-LIFT SHIP-TO-SHORE (STS) AT PORT ELIZABETH CONTAINER TERMINAL FOR TRANSNET SOC LTD (REG.NO.1990/000900/30) OPERATING AS TRANSNET PORT TERMINALS HEREINAFTER REFERRED TO AS "TPT" AS A ONCE OFF SUPPLY

Wheel spacing, in same bogie (m)			
Wheel spacing, between bogies (m)			
Wheel diameter (mm)			
Type of wheel			
Confirm trailing cable reel off-set shall be 1240 mm to the water side (outside) of water side rail			
Confirm the storm pins shall be 450 mm off-set to the inside of both crane rails			
Maximum in-service wind speed (km/hr)			
Minimum in-service stability factor			
Maximum out-of-service stability factor without anchoring devices			
Load eccentricity between left and right side hoist wire ropes (as a percentage of total load lifted), before crane trips out on eccentricity			
Cabin Dust & Noise Mitigation			
Width of access way (stairs and walkways) from floor level to operator's cabin			
Height of long travel buffers above rail (m)			
Acknowledge cable on cable reel is 400m long (Yes / No)			
<u>Corrosion Protection:</u> Number of Coats of Paint Minimum overall Paint Thickness			

TRANSNET PORT TERMINALS**TENDER NUMBER:** TPT/2022/06/0297/5745/RFP**DESCRIPTION OF THE WORKS:** THE DESIGN, MANUFACTURE, DELIVERY, ERECTION, TESTING AND COMMISSIONING OF ONE (1) 65 TON TWIN-LIFT SHIP-TO-SHORE (STS) AT PORT ELIZABETH CONTAINER TERMINAL FOR TRANSNET SOC LTD (REG.NO.1990/000900/30) OPERATING AS TRANSNET PORT TERMINALS HEREINAFTER REFERRED TO AS "TPT" AS A ONCE OFF SUPPLY

Other "Value-add" systems; designs; innovations			
1.			
2.			
3.			

Signed _____ Date _____

Name _____ Position _____

Tenderer _____

T2.2-27: Supplier's Components

Tenderers are to indicate the brand of their suppliers of components for the STS crane as per the below schedule:

Electrical Motors

Function	Numbers of	Motor Type	Manufacturer	Rating kW	Duty Type
Hoist					
Trolley					
Long Travel					
Boom					

Motor Drives

Function	Numbers of	Drive Type	Manufacturer	Rating kW	Control Method
Hoist					
Trolley					
Long Travel					
Boom					

PLC

Brief description	Manufacturer of PLC (OEM)	Communication bus system used. Description and make	Manufacturer of Slave stations (OEM)

Spreader

Brief description	Manufacturer of Spreader (OEM)	Communication / control (intelligent) system used
Spreader		

DESCRIPTION OF THE WORKS: THE DESIGN, MANUFACTURE, DELIVERY, ERECTION, TESTING AND COMMISSIONING OF ONE (1) 65 TON TWIN-LIFT SHIP-TO-SHORE (STS) AT PORT ELIZABETH CONTAINER TERMINAL FOR TRANSNET SOC LTD (REG.NO.1990/000900/30) OPERATING AS TRANSNET PORT TERMINALS HEREINAFTER REFERRED TO AS "TPT" AS A ONCE OFF SUPPLY

Electrical Equipment

Function	Numbers of	Type	Manufacturer	Rating	Control Method
Switchgear					
Isolators / circuit breakers					
Control voltage DC power supply					
Main transformer					
Main transformer circuit breaker / isolator					
Cam switches					
Encoders					
Trailing cable					
Energy chain					

Mechanical Equipment

Brief Description	Number of	Point of Application	Type	Manufacturer
Brakes				
Bearings				
Slew bearing				
Buffers				
Wire ropes				

DESCRIPTION OF THE WORKS: THE DESIGN, MANUFACTURE, DELIVERY, ERECTION, TESTING AND COMMISSIONING OF ONE (1) 65 TON TWIN-LIFT SHIP-TO-SHORE (STS) AT PORT ELIZABETH CONTAINER TERMINAL FOR TRANSNET SOC LTD (REG.NO.1990/000900/30) OPERATING AS TRANSNET PORT TERMINALS HEREINAFTER REFERRED TO AS "TPT" AS A ONCE OFF SUPPLY

Gearboxes				
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Crane Computer Diagnostic System

Function	On board Computer specification	On board Computer Manufacture	Software Manufacture	Configuring Software inclusive? Y/N
SCADA				

Signed _____

Date _____

Name _____

Position _____

Tenderer _____

T2.2-28: Recommended Maintenance Spares

Note to Tenderer:

Tenderers are to complete this schedule with regards to recommended maintenance spares, not included in the 'Mandatory Critical Spares' list (T2.2-25), required for the first year of operation. Tenderers to indicate those spares that will be available in South Africa (i.e. locally available) and provide a method statement detailing procedure/action plan on how stock will be made available in South Africa.

Prices for the spares to be valid for one year (12 months).

#	Description	Supplier	Locally Avail (Yes/No)	Delivery Lead Time	Price
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
Etc.	Additional page/s to be added to supply comprehensive list				

Signed

Date

Name

Position

Tenderer

T2.2-29: Recommended Critical Spares

Note to Tenderer:

Tenderers are to complete this schedule with regards to recommended critical spares required to support the Ship-to-Shore crane for the first 5 years of operation, excluding the 'Mandatory Critical Spares' (T2.2-25) and 'Recommended Maintenance Spares' (T2.2-28) listed separately.

Tenderers to indicate those spares that will be available in South Africa (i.e. locally available) and provide a method statement detailing procedure/action plan on how stock will be made available in South Africa.

Prices to be fixed for a period of 12 months.

#	Description	Supplier	Locally Avail (Yes/No)	Delivery Lead Time	Price
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
Etc.	Additional page/s to be added to supply comprehensive list				

Signed _____ Date _____

Name _____ Position _____

Tenderer _____

T2.2-30: Site Establishment

Tenderers are to indicate their site establishment requirements for the supply of the Ship-to-shore Crane, including the following:

- Erection site area required (m²).
- Site lay-down area required (m²) and preferred proximity to the erection site.
- Estimated electricity usage per month including average usage and peak demand.
- Estimated water consumption per month including average usage and peak demand.
- Special requirements on site e.g. hard standing or concrete beams, access etc.

Site Establishment Requirements

Signed

Date

Name

Position

Tenderer

Bonds/ Guarantees/ Financial/ Insurance:

T2.2-31: Insurance provided by the *Contractor*

Clause 84.1 in NEC3 Engineering & Construction Contract (June 2005)(amended June 2006 and April 2013) requires that the *Contractor* provides the insurance stated in the insurance table except any insurance which the *Employer* is to provide as stated in the Contract Data.

Please provide the following details for insurance which the *Contractor* is still to provide. Notwithstanding this information all costs related to insurance are deemed included in the tenderer's rates and prices.

Insurance against (See clause 84.2 of the ECC)	Name of Insurance Company	Cover	Premium
Liability for death of or bodily injury to employees of the <i>Contractor</i> arising out of and in the course of their employment in connection with this contract			
Motor Vehicle Liability Insurance comprising (as a minimum) "Balance of Third Party" Risks including Passenger and Unauthorised Passenger Liability indemnity with a minimum indemnity limit of R10 000 000.			
Insurance in respect of loss of or damage to own property and equipment.			
Professional Indemnity Insurance with a minimum indemnity limit of R5 000 000.00			
(Other)			

T2.2-32: Form of Intent to Provide a Performance Guarantee

It is hereby agreed by the Tenderer that a Performance Guarantee drafted **exactly** as provided in the tender documents will be provided by the Guarantor named below, which is a **bank or insurer registered in South Africa**:

Name of Guarantor
(Bank/Insurer)

Address

The Performance Guarantee shall be provided within **2 (Two)** weeks after the Contract Date defined in the contract unless otherwise agreed to by the parties.

Signed

Name

Capacity

On behalf of (name of
tenderer)

Date

Confirmed by Guarantor's Authorised Representative

Signature(s)

Name (print)

Capacity

On behalf of Guarantor
(Bank/insurer)

Date

T2.2-33: Forecast Rate of Invoicing

Tenderer to submit the forecast rate of invoicing (cash-flow) based on the Tender Price and Tender Programme.

Index of documentation attached to this schedule:

.....
.....
.....
.....
.....
.....
.....
.....
.....

T2.2-34: Three (3) years audited financial statements

Attached to this schedule is the last three (3) years audited financial statements of the single tenderer/members of the Joint Venture.

NAME OF COMPANY/IES and INDEX OF ATTACHMENTS:

.....

.....

.....

.....

.....

.....

.....

Transnet Vendor Registration Form

T2.2-35 VENDOR REGISTRATION FORM

Transnet Vendor Management has received a request to load / change your company details onto the Transnet vendor master database. Please return the completed Supplier Declaration Form (SDF) together with the required supporting documents as per Appendix A to the Transnet Official who is intending to procure your company's services / products, to enable us to process this request. Please only submit the documentation relevant to your request.

Please Note: all organisations, institutions and individuals who wish to provide goods and/or services to organs of the State must be registered on the National Treasury's Central Supplier Database (CSD). This needs to be done via their portal at <https://secure.csd.gov.za/> **before applying to Transnet.**

General Terms and Conditions:

Please Note: Failure to submit the relevant documentation will delay the vendor creation / change process.

Where applicable, the respective Transnet Operating Division processing your application may request further or additional information from your company.

The Service Provider warrants that the details of its bank account ("the nominated account") provided herein, are correct and acknowledges that payments due to the Supplier will be made into the nominated account. If details of the nominated account should change, the Service Provider must notify Transnet in writing of such change, failing which any payments made by Transnet into the nominated account will constitute a full discharge of the indebtedness of Transnet to the Supplier in respect of the payment so made. Transnet will incur no liability for any payments made to the incorrect account or any costs associated therewith. In such an event, the Service Provider indemnifies and holds Transnet harmless in respect of any payments made to an incorrect bank account and will, on demand, pay Transnet any costs associated herewith.

Transnet expects its suppliers to timeously renew their Tax Clearance and B-BBEE certificates (Large Enterprises and QSEs less than 51% black owned) as well as sworn affidavits in the case of EMEs and QSEs with more than 51% black ownership as per Appendices C and D.

In addition, please note of the following very important information:

1. If your annual turnover is R10 million or less, then in terms of the DTI Generic Codes of Good Practice, you are classified as an Exempted Micro Enterprise (EME). If your company is classified as an EME, please include in your submission a sworn affidavit confirming your company's most recent annual turnover is less than R10 million and percentage of black ownership and black female ownership in the company (Appendix C) OR B-BBEE certificate issued by a verification agency accredited by SANAS in terms of the EME scorecard should you feel you will be able to attain a better B-BBEE score. It is only in this context that an EME may submit a B-BBEE verification certificate.

2. If your annual turnover is between R10 million and R50 million, then in terms of the DTI codes, you are classified as a Qualifying Small Enterprise (QSE). A QSE which is at least 51% black owned, is required to submit a sworn affidavit confirming their annual total revenue of between R10 million and R50 million and level of black ownership (Appendix D). QSE that does not qualify for 51% of black ownership, are required to submit a B-BBEE verification certificate issued by a verification agency accredited by SANAS their QSEs are required to submit a B-BBEE verification certificate issued by a verification agency accredited by SANAS.

Please Note: B-BBEE certificate and detailed scorecard should be obtained from an accredited rating agency (e.g. SANAS Member).

3. **If your annual turnover exceeds R50 million**, then in terms of the DTI codes, you are classified as a Large Enterprise. Large Enterprises are required to submit a B-BBEE level verification certificate issued by a verification agency accredited by SANAS.

Please Note: B-BBEE certificate and detailed scorecard should be obtained from an accredited rating agency (e.g. SANAS Member).

4. **The supplier to furnish proof to the procurement department as required in the Fourth Schedule of the Income Tax Act. 58 of 1962** whether a supplier of service is to be classified as an "employee", "personal service provider" or "labour broker". Failure to do so will result in the supplier being subject to employee's tax.

5. **No payments can be made to a vendor until the** vendor has been registered / updated, and no vendor can be registered / updated until the vendor application form, together with its supporting documentation, has been received and processed. No payments can be made to a vendor until the vendor has met / comply with the procurement requirements.

6. It is in line with PPPFA Regulations, only valid B-BBEE status level certificate issued by an unauthorised body or person OR a sworn affidavit as prescribed by the B-BBEE Codes of Good Practice, OR any other requirement prescribed in terms of the Broad-Based Black Economic Empowerment Act.

7. As per the communique dated 04 March 2016 addressed to the **Members of the IRBA**, as of **30 September 2016**, the IRBA will no longer be the 'Approved Regulatory Body' as per Code Series 000, Statement 005 of the Codes of Good Practice. Any entity that seeks to apply for B-BBEE Accreditation to issue B-BBEE Verification Certificates post 30 September 2016 or wishes to participate in the B-BBEE Verification Industry must thus follow the Code Series 000, Statement 005, Section 5 of the Codes of Good Practice application process to the Accreditation Body (SANAS).'

APPENDIX A

Supplier Declaration Form

Important Notice: all organisations, institutions and individuals who wish to provide goods and/or services to organs of the State must be registered on the National Treasury Central Supplier Database (CSD). This needs to be done via their portal at <https://secure.csd.gov.za/> before applying to Transnet.

CSD Number (MAAA xxxxxxxx):

Company Trading Name						
Company Registered Name						
Company Registration No Or ID No If a Sole Proprietor						
Company Income Tax Number						
Form of Entity	CC	Trust	Pty Ltd	Limited	Partnership	Sole Proprietor
	Non-profit (NPO's or NPC)	Personal Liability Co	State Owned Co	National Govt	Provincial Govt	Local Govt
	Educational Institution	Specialised Profession	Financial Institution	Joint Venture	Foreign International	Foreign Branch Office

Did your company previously operate under another name? ☐ Yes ☐ No

If **YES** state the previous details below:

Trading Name						
Registered Name						
Company Registration No Or ID No If a Sole Proprietor						
Form of Entity	CC	Trust	Pty Ltd	Limited	Partnership	Sole Proprietor
	Non-profit (NPO's or NPC)	Personal Liability Co	State Owned Co	National Govt	Provincial Govt	Local Govt
	Educational Institution	Specialised Profession	Financial Institution	Joint Venture	Foreign International	Foreign Branch Office

Your Current Company's VAT Registration Status

VAT Registration Number						
If Exempted from VAT registration , state reason and submit proof from SARS in confirming the exemption status						
If your business entity is not VAT Registered, please submit a current original sworn affidavit (see example in Appendix I). Your Non VAT Registration must be confirmed annually.						

Company Banking Details		Bank Name	
Universal Branch Code		Bank Account Number	

Company Physical Address		
	Code	
Company Postal Address		
	Code	
Company Telephone number		
Company Fax Number		
Company E-Mail Address		
Company Website Address		

Company Contact Person Name	
Designation	
Telephone	
Email	

TRANSNET PORT TERMINALS
TENDER NUMBER: TPT/2022/06/0297/5745/RFP

DESCRIPTION OF THE WORKS: THE DESIGN, MANUFACTURE, DELIVERY, ERECTION, TESTING AND COMMISSIONING OF ONE (1) 65 TON TWIN-LIFT SHIP-TO-SHORE (STS) AT PORT ELIZABETH CONTAINER TERMINAL FOR TRANSNET SOC LTD (REG.NO.1990/000900/30) OPERATING AS TRANSNET PORT TERMINALS HEREINAFTER REFERRED TO AS "TPT" AS A ONCE OFF SUPPLY


Is your company a Labour Broker?		Yes		No	
Main Product / Service Supplied e.g. Stationery / Consulting / Labour etc.					
How many personnel does the business employ?		Full Time		Part Time	
Please Note: Should your business employ more than 2 full time employees who are not connected persons as defined in the Income Tax Act, please submit a sworn affidavit, as per Appendix II.					
Most recent Financial Year's Annual Turnover		<R10Million		>R10Million <R50Million	
				>R50Million	
Does your company have a valid B-BBEE certificate?				Yes	
				No	
Please indicate your Broad Based BEE status (Level 1 to 9)		1	2	3	4
		5	6	7	8
		9			
Majority Race of Ownership					
% Black Ownership		% Black Women Ownership		% Black Disabled person(s) Ownership	
% White Ownership		% Indian Ownership		% Coloured Ownership	
Please Note: Please provide proof of B-BBEE status as per Appendix C. If you qualify as an EME or QSE then provide an affidavit following the templates provided in Appendix C and D respectively. If you have indicated Black Disabled person(s) ownership, then provide a certified letter signed by a physician, on the physician's letterhead, confirming the disability. A certified South African Identification Document will be required for all Black Youth Ownership.					

Supplier Development Information Required			
EMPOWERING SUPPLIER	YES	<input type="radio"/>	NO <input type="radio"/>
FIRST TIME SUPPLIER	YES	<input type="radio"/>	NO <input type="radio"/>
SUPPLIER DEVELOPMENT PLAN	YES	<input type="radio"/>	NO <input type="radio"/>
DEVELOPMENT PLAN DOCUMENT	* If Yes- Attach supporting documents		
ENTERPRISE DEVELOPMENT BENEFICIARY	YES	<input type="radio"/>	NO <input type="radio"/>
SUPPLIER DEVELOPMENT BENEFICIARY	YES	<input type="radio"/>	NO <input type="radio"/>
GRADUATION FROM ED TO SD BENEFICIARY	YES	<input type="radio"/>	NO <input type="radio"/>
ENTERPRISE DEVELOPMENT RECIPIENT	YES	<input type="radio"/>	NO <input type="radio"/>

By signing below, I hereby verify that I am duly authorised to sign for and on behalf of firm / organisation and that all information contained herein and attached herewith are true and correct			
Name and Surname		Designation	
Signature		Date	

APPENDIX B**Affidavit or Solemn Declaration as to VAT registration status****Affidavit or Solemn Declaration**

I, _____ solemnly swear/declare
that _____ is not a registered VAT
vendor and is not required to register as a VAT vendor because the combined value of taxable
supplies made by the provider in any 12 month period has not exceeded or is not expected to exceed
R1million threshold, as required in terms of the Value Added Tax Act.

Signature: _____

Designation: _____

Date: _____

Commissioner of Oaths

Thus signed and sworn to before me at _____ on this the _____
day of _____ 20____,

the Deponent having knowledge that he/she knows and understands the contents of this Affidavit,
and that he/she has no objection to taking the prescribed oath, which he/she regards binding on
his/her conscience and that the allegations herein contained are all true and correct.

Commissioner of Oaths

APPENDIX C

SWORN AFFIDAVIT – B-BBEE EXEMPTED MICRO ENTERPRISE

I, the undersigned, _____

Full name & Surname	
Identity number	

Hereby declare under oath as follows:

1. The contents of this statement are to the best of my knowledge a true reflection of the facts.
2. I am a Member / Director / Owner of the following enterprise and am duly authorised to act on its behalf:

Enterprise Name:	
Trading Name (If Applicable):	
Registration Number:	
Enterprise Physical Address:	
Type of Entity (CC, (Pty) Ltd, Sole Prop etc.):	
Nature of Business:	
Definition of "Black People"	<p>As per the Broad-Based Black Economic Empowerment Act 53 of 2003 as Amended by Act No 46 of 2013 "Black People" is a generic term which means Africans, Coloureds and Indians –</p> <p>(a) who are citizens of the Republic of South Africa by birth or descent; or</p> <p>(b) who became citizens of the Republic of South Africa by naturalisations -</p> <p>i. before 27 April 1994; or</p> <p>ii. on or after 27 April 1994 and who would have been entitled to acquire citizenship by naturalization prior to that date;"</p>
Definition of "Black Designated Groups"	<p>"Black Designated Groups means:</p> <p>a) unemployed black people not attending and not required by law to attend an educational institution and not awaiting admission to an educational institution;</p> <p>b) Black people who are youth as defined in the National Youth Commission Act of 1996;</p>

	<p>c) Black people who are persons with disabilities as defined in the Code of Good Practice on employment of people with disabilities issued under the Employment Equity Act;</p> <p>d) Black people living in rural and under developed areas;</p> <p>e) Black military veterans who qualifies to be called a military veteran in terms of the Military Veterans Act 18 of 2011;"</p>
--	---

3. I hereby declare under Oath that:

- The Enterprise is _____% Black Owned as per Amended Code Series 100 of the Amended Codes of Good Practice issued under section 9 (1) of B-BBEE Act No 53 of 2003 as Amended by Act No 46 of 2013,
- The Enterprise is _____% Black Female Owned as per Amended Code Series 100 of the Amended Codes of Good Practice issued under section 9 (1) of B-BBEE Act No 53 of 2003 as Amended by Act No 46 of 2013,
- The Enterprise is _____% Black Designated Group Owned as per Amended Code Series 100 of the Amended Codes of Good Practice issued under section 9 (1) of B-BBEE Act No 53 of 2003 as Amended by Act No 46 of 2013,
- Black Designated Group Owned % Breakdown as per the definition stated above:
 - Black Youth % = _____%
 - Black Disabled % = _____%
 - Black Unemployed % = _____%
 - Black People living in Rural areas % = _____%
 - Black Military Veterans % = _____%
- Based on the Financial Statements/Management Accounts and other information available on the latest financial year-end of _____, the annual Total Revenue was R10,000,000.00 (Ten Million Rands) or less
- Please Confirm on the below table the B-BBEE Level Contributor, **by ticking the applicable box.**

100% Black Owned	Level One (135% B-BBEE procurement recognition level)	
At least 51% Black Owned	Level Two (125% B-BBEE procurement recognition level)	
Less than 51% Black Owned	Level Four (100% B-BBEE procurement recognition level)	

4. I know and understand the contents of this affidavit and I have no objection to take the prescribed oath and consider the oath binding on my conscience and on the Owners of the Enterprise which I represent in this matter.
5. The sworn affidavit will be valid for a period of 12 months from the date signed by commissioner.

Deponent Signature

.....

Date

.....

Commissioner of Oaths

Signature & stamp

APPENDIX D

SWORN AFFIDAVIT – QUALIFYING SMALL ENTERPRISE – GENERAL

I, the undersigned, _____

Full name & Surname	
Identity number	

Hereby declare under oath as follows:

1. The contents of this statement are to the best of my knowledge a true reflection of the facts.
2. I am a Member / Director / Owner of the following enterprise and am duly authorised to act on its behalf:

Enterprise Name:	
Trading Name (If Applicable):	
Registration Number:	
Enterprise Physical Address:	
Type of Entity (CC, (Pty) Ltd, Sole Prop etc.):	
Nature of Business:	
Definition of "Black People"	<p>As per the Broad-Based Black Economic Empowerment Act 53 of 2003 as Amended by Act No 46 of 2013 "Black People" is a generic term which means Africans, Coloureds and Indians –</p> <ol style="list-style-type: none"> a) who are citizens of the Republic of South Africa by birth or descent; or b) who became citizens of the Republic of South Africa by naturalisation. <ol style="list-style-type: none"> i. before 27 April 1994; or ii. on or after 27 April 1994 and who would have been entitled to acquire citizenship by naturalization prior to that date;"
Definition of "Black Designated Groups"	<p>"Black Designated Groups means:</p> <ol style="list-style-type: none"> a) unemployed black people not attending and not required by law to attend an educational institution and not awaiting admission to an educational institution; b) Black people who are youth as defined in the National Youth Commission Act of 1996; c) Black people who are persons with disabilities as defined in the Code of Good Practice on employment of people with disabilities issued under the Employment Equity Act; d) Black people living in rural and under developed areas; e) (e) Black military veterans who qualifies to be called a military veteran in terms of the Military Veterans Act 18 of 2011;" f) veteran in terms of the Military Veterans Act 18 of 2011;"

3. I hereby declare under Oath that:

TRANSNET PORT TERMINALS**TENDER NUMBER:** TPT/2022/06/0297/5745/RFP**DESCRIPTION OF THE WORKS:** THE DESIGN, MANUFACTURE, DELIVERY, ERECTION, TESTING AND COMMISSIONING OF ONE (1) 65 TON TWIN-LIFT SHIP-TO-SHORE (STS) AT PORT ELIZABETH CONTAINER TERMINAL FOR TRANSNET SOC LTD (REG.NO.1990/000900/30) OPERATING AS TRANSNET PORT TERMINALS HEREINAFTER REFERRED TO AS "TPT" AS A ONCE OFF SUPPLY

- The Enterprise is _____% Black Owned as per Amended Code Series 100 of the Amended Codes of Good Practice issued under section 9 (1) of B-BBEE Act No 53 of 2003 as Amended by Act No 46 of 2013,
- The Enterprise is _____% Black Female Owned as per Amended Code Series 100 of the Amended Codes of Good Practice issued under section 9 (1) of B-BBEE Act No 53 of 2003 as Amended by Act No 46 of 2013,
- The Enterprise is _____% Black Designated Group Owned as per Amended Code Series 100 of the Amended Codes of Good Practice issued under section 9 (1) of B-BBEE Act No 53 of 2003 as Amended by Act No 46 of 2013,
- Black Designated Group Owned % Breakdown as per the definition stated above:
 - Black Youth % = _____%
 - Black Disabled % = _____%
 - Black Unemployed % = _____%
 - Black People living in Rural areas % = _____%
 - Black Military Veterans % = _____%
- Based on the Financial Statements/Management Accounts and other information available on the latest financial year-end of _____, the annual Total Revenue was between R10,000,000.00 (Ten Million Rands) and R50,000,000.00 (Fifty Million Rands),
- Please confirm on the table below the B-BBEE level contributor, **by ticking the applicable box.**

100% Black Owned	Level One (135% B-BBEE procurement recognition level)	
At Least 51% black owned	Level Two (125% B-BBEE procurement recognition level)	

4. I know and understand the contents of this affidavit and I have no objection to take the prescribed oath and consider the oath binding on my conscience and on the owners of the enterprise which I represent in this matter.
5. The sworn affidavit will be valid for a period of 12 months from the date signed by commissioner.

Deponent Signature

.....

Date

.....

Commissioner of Oaths

Signature & stamp

VENDOR REGISTRATION DOCUMENTS CHECKLIST

TRANSNET PORT TERMINALS**TENDER NUMBER:** TPT/2022/06/0297/5745/RFP**DESCRIPTION OF THE WORKS:** THE DESIGN, MANUFACTURE, DELIVERY, ERECTION, TESTING AND COMMISSIONING OF ONE (1) 65 TON TWIN-LIFT SHIP-TO-SHORE (STS) AT PORT ELIZABETH CONTAINER TERMINAL FOR TRANSNET SOC LTD (REG.NO.1990/000900/30) OPERATING AS TRANSNET PORT TERMINALS HEREINAFTER REFERRED TO AS "TPT" AS A ONCE OFF SUPPLY

Please note that you will have to provide the first two documents on the list and the rest will be provided by the supplier:

	Yes	No
1. Complete the "Supplier Declaration Form" (SDF) (commissioned). See attachment.		
2. Complete the "Supplier Code of Conduct" (SCC). See attachment.		
3. Copy of cancelled cheque OR letter from the bank verifying banking details (with bank stamp not older than 3 Months & sign by Bank Teller).		
4. Certified (Not Older than 3 Months) copy of Identity document of Shareholders/Directors/Members (where applicable).		
5. Certified copy of certificate of incorporation, CM29 / CM9 (name change).		
6. Certified copy of share Certificates of Shareholders, CK1 / CK2 (if CC).		
7. A letter with the company's letterhead confirming both Physical and Postal address.		
8. Original or certified copy of SARS Tax Clearance certificate and Vat registration certificate.		
9. BBBEE certificate and detailed scorecard from a SANAS Accredited Verification Agency and/or Sworn Certified Affidavit.		
10. Central Supplier Database (CSD) Summary Registration Report.		

The Contract

Part C1: Agreements and Contract Data

C1.1: Form of Offer and Acceptance

C1.1: Form of Offer & Acceptance

Offer

The Employer, identified in the Acceptance signature block, has solicited offers to enter into a contract for the procurement of:

THE DESIGN, MANUFACTURE, DELIVERY, ERECTION, TESTING AND COMMISSIONING OF ONE (1) 65 TON TWIN-LIFT SHIP-TO-SHORE (STS) AT PORT ELIZABETH CONTAINER TERMINAL FOR TRANSNET SOC LTD (REG.NO.1990/000900/30) OPERATING AS TRANSNET PORT TERMINALS HEREINAFTER REFERRED TO AS "TPT" AS A ONCE OFF SUPPLY

The tenderer, identified in the Offer signature block, has examined the documents listed in the Tender Data and addenda thereto as listed in the Returnable Schedules, and by submitting this Offer has accepted the Conditions of Tender.

By the representative of the tenderer, deemed to be duly authorised, signing this part of this Form of Offer and Acceptance the tenderer offers to perform all of the obligations and liabilities of the *Contractor* under the contract including compliance with all its terms and conditions according to their true intent and meaning for an amount to be determined in accordance with the *conditions of contract* identified in the Contract Data.

The offered total of the Prices exclusive of VAT is	R
Value Added Tax @ 15% is	R
The offered total of the Prices inclusive of VAT is	R
(in words)	

This Offer may be accepted by the Employer by signing the Acceptance part of this Form of Offer and Acceptance and returning one copy of this document including the Schedule of Deviations (if any) to the tenderer before the end of the period of validity stated in the Tender Data, or other period as agreed, whereupon the tenderer becomes the party named as the *Contractor* in the *conditions of contract* identified in the Contract Data.

Signature(s)

Name(s)

Capacity

**For the
tenderer:**

(Insert name and address of organisation)

Name &
signature of
witness

Date

Tenderer's CIDB registration number:

N/A

Acceptance

By signing this part of this Form of Offer and Acceptance, the *Employer* identified below accepts the tenderer's Offer. In consideration thereof, the *Employer* shall pay the *Contractor* the amount due in accordance with the *conditions of contract* identified in the Contract Data. Acceptance of the tenderer's Offer shall form an agreement between the *Employer* and the tenderer upon the terms and conditions contained in this agreement and in the contract that is the subject of this agreement.

The terms of the contract, are contained in:

Part C1	Agreements and Contract Data, (which includes this Form of Offer and Acceptance)
Part C2	Pricing Data
Part C3	Scope of Work: Works Information
Part C4	Site Information

and drawings and documents (or parts thereof), which may be incorporated by reference into the above listed Parts.

Deviations from and amendments to the documents listed in the Tender Data and any addenda thereto listed in the Returnable Schedules as well as any changes to the terms of the Offer agreed by the tenderer and the Employer during this process of offer and acceptance, are contained in the Schedule of Deviations attached to and forming part of this Form of Offer and Acceptance. No amendments to or deviations from said documents are valid unless contained in this Schedule.

The tenderer shall within two weeks of receiving a completed copy of this agreement, including the Schedule of Deviations (if any), contact the Employer's agent (whose details are given in the Contract Data) to arrange the delivery of any securities, bonds, guarantees, proof of insurance and any other documentation to be provided in terms of the *conditions of contract* identified in the Contract Data at, or just after, the date this agreement comes into effect. Failure to fulfil any of these obligations in accordance with those terms shall constitute a repudiation of this agreement.

Notwithstanding anything contained herein, this agreement comes into effect on the date when the tenderer receives one fully completed original copy of this document, including the Schedule of Deviations (if any).

TRANSNET PORT TERMINALS**TENDER NUMBER:** TPT/2022/06/0297/5745/RFP**DESCRIPTION OF THE WORKS:** THE DESIGN, MANUFACTURE, DELIVERY, ERECTION, TESTING AND COMMISSIONING OF ONE (1) 65 TON TWIN-LIFT SHIP-TO-SHORE (STS) AT PORT ELIZABETH CONTAINER TERMINAL FOR TRANSNET SOC LTD (REG.NO.1990/000900/30) OPERATING AS TRANSNET PORT TERMINALS HEREINAFTER REFERRED TO AS "TPT" AS A ONCE OFF SUPPLY

Unless the tenderer (now *Contractor*) within five working days of the date of such receipt notifies the Employer in writing of any reason why he cannot accept the contents of this agreement, this agreement shall constitute a binding contract between the Parties.

Signature(s)

Name(s)

Capacity

**for the
Employer**

Transnet SOC Ltd

*(Insert name and address of organisation)*Name &
signature of
witness

Date

Schedule of Deviations

Note:

1. To be completed by the Employer prior to award of contract. This part of the Offer & Acceptance would not be required if the contract has been developed by negotiation between the Parties and is not the result of a process of competitive tendering.
2. The extent of deviations from the tender documents issued by the Employer prior to the tender closing date is limited to those permitted in terms of the Conditions of Tender.
3. A tenderer's covering letter must not be included in the final contract document. Should any matter in such letter, which constitutes a deviation as aforesaid be the subject of agreement reached during the process of Offer and Acceptance, the outcome of such agreement shall be recorded here and the final draft of the contract documents shall be revised to incorporate the effect of it.

No.	Subject	Details
1		
2		
3		
4		
5		

By the duly authorised representatives signing this Schedule of Deviations below, the Employer and the tenderer agree to and accept this Schedule of Deviations as the only deviations from and amendments to the documents listed in the Tender Data and any addenda thereto listed in the Tender Schedules, as well as any confirmation, clarification or changes to the terms of the Offer agreed by the tenderer and the Employer during this process of Offer and Acceptance.

It is expressly agreed that no other matter whether in writing, oral communication or implied during the period between the issue of the tender documents and the receipt by the tenderer of a completed signed copy of this Form shall have any meaning or effect in the contract between the parties arising from this Agreement.

	For the tenderer:	For the Employer
Signature	_____	_____
Name	_____	_____
Capacity	_____	_____
On behalf of	<i>(Insert name and address of organisation)</i>	Transnet SOC Ltd
Name & signature of witness	_____	_____
Date	_____	_____

C1.2: Contract Data Part 1 and 2

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C1.2 Contract Data

Part one - Data provided by the *Employer*

Clause	Statement	Data
1	General	
	The <i>conditions of contract</i> are the core clauses and the clauses for main Option	A: Priced contract with activity schedule
	dispute resolution Option	W1: Dispute resolution procedure
	and secondary Options	X7: Delay damages X13: Performance Bond X18: Limitation of liability Z: Additional conditions of contract
	of the NEC3 Engineering and Construction Contract June 2005 (amended June 2006 and April 2013)	Z1: Intellectual property Z2: Assignment and Waiver Z3: Obligations in respect of the South African Government's National Industrial Participation Program (NIPP) Z4: Defects Correction Guarantee Z5: Additional clause relating to Performance Bonds and/or Guarantees Z6: Contract Hedging Z7: Anti-Corruption Warranty Z8: Right Reserved by the Employer to Conduct Vetting through SSA Z9: Protection of Personal Information Act Z10: Additional obligations in respect of Termination
10.1	The <i>Employer</i> is:	Transnet SOC Ltd (Registration No. 1990/000900/30)

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	Address	Registered address: Transnet Corporate Centre 138 Eloff Street Braamfontein Johannesburg 2000
	Having elected its Contractual Address for the purposes of this contract as:	Transnet Port Terminals 202 Anton Lembede Street Durban 4000
10.1	The <i>Project Manager</i> is: (Name)	Benjamin Blom
	Address	Transnet Port Terminals 202 Anton Lembede Street Durban 4000
	Tel	083 288 5783
	e-mail	benjamin.blom@transnet.net
10.1	The <i>Supervisor</i> is: (Name)	TBC
	Address	Transnet Port Terminals 202 Anton Lembede Street Durban 4000
	Tel No.	TBC
	e-mail	TBC
11.2(13)	The <i>works</i> are	The Design, Manufacture, Delivery, Erection, Testing and Commissioning of one (1) 65 ton twin-lift ship-to-shore (STS) at Port Elizabeth Container Terminal for Transnet SOC LTD (REG.NO.1990/000900/30) Operating as Transnet Port Terminals Hereinafter referred to as "TPT" as a once off supply.
11.2(14)	The following matters will be included in the Risk Register	No Risks Identified at this time
11.2(15)	The <i>boundaries of the site</i> are	Port Elizabeth Container Terminal
11.2(16)	The Site Information is in	Part C4

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11.2(19)	The Works Information is in	Part C3	
12.2	The <i>law of the contract</i> is the law of	the Republic of South Africa subject to the jurisdiction of the Courts of South Africa.	
13.1	The <i>language of this contract</i> is	English	
13.3	The <i>period for reply</i> is	4 weeks	
2	The Contractor's main responsibilities	No additional data is required for this section of the conditions of contract.	
3	Time		
11.2(3)	The <i>completion date</i> for the whole of the <i>works</i> is	TBC	
11.2(9)	The <i>key dates</i> and the <i>conditions</i> to be met are:	Condition to be met	key date
		1 Design Approval	TBC
		2 Factory Acceptance Testing at factory	TBC
		3 Bill of Lading	TBC
		4 Handover	TBC
30.1	The <i>access dates</i> are	Part of the Site	Date
		1 Berth for Delivery	TBC
		2 Erection Site	TBC
		3 Final position on berth	TBC
31.1	The <i>Contractor</i> is to submit a first programme for acceptance within	2 weeks of the Contract Date.	
31.2	The <i>starting date</i> is	TBC	
32.2	The <i>Contractor</i> submits revised programmes at intervals no longer than	4 weeks.	
4	Testing and Defects		

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42.2	The <i>defects date</i> is	104 (One Hundred and Four) weeks after Completion of the whole of the <i>works</i>.
43.2	The <i>defect correction period</i> is	2 weeks However, if the machine is rendered unsafe or only 50% operable the defects correction period is 5 days.
5	Payment	
50.1	The <i>assessment interval</i> is monthly on the	25th (twenty fifth) day of each successive month.
51.1	The <i>currency of this contract</i> is the	South African Rand.
51.2	The period within which payments are made is	Payment will be effected on or before the last day of the month following the month during which a valid Tax Invoice and Statement were received.
51.4	The <i>interest rate</i> is	the prime lending rate of Standard Bank of South Africa.
6	Compensation events	
60.1(13)	The <i>weather measurements</i> to be recorded for each calendar month are as per core clauses,	the cumulative rainfall (mm) the number of days with rainfall more than 10 mm the number of days with minimum air temperature less than 0 degrees Celsius the number of days with snow lying at 08:00 hours South African Time
	The place where weather is to be recorded (on the Site) is:	Port Elizabeth Container Terminal
	The <i>weather data</i> are the records of past <i>weather measurements</i> for each calendar month which were recorded at:	Port Elizabeth Weather Station

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and which are available **South African Weather Service 012 367 6023 or**
 from: info3@weathersa.co.za.

7	Title	No additional data is required for this section of the conditions of contract.
8	Risks and insurance	
80.1	These are additional <i>Employer's</i> risks	No additional risks are accepted by the Employer other than those which are provided for in this contract.
84.1	The <i>Employer</i> provides these insurances from the Insurance Table	
	1 Insurance against:	Loss of or damage to the <i>works</i>, Plant and Materials is as stated in the Insurance policy for Contract Works/ Public Liability.
	Cover / indemnity:	to the extent as stated in the insurance policy for Contract Works / Public Liability
	The deductibles are:	as stated in the insurance policy for Contract Works / Public Liability
	The Contractor provides these insurances from the Insurance Table	
	2 Insurance against:	Loss of or damage to property (except the <i>works</i>, Plant and Materials & Equipment) and liability for bodily injury to or death of a person (not an employee of the <i>Contractor</i>) arising out of or in connection with the performance of the Contract as stated in the insurance policy for Contract Works / Public Liability
	Cover / indemnity	Is to the extent as stated in the insurance policy for Contract Works / Public Liability
	The deductibles are	as stated in the insurance policy for Contract Works / Public Liability
	3 Insurance against:	Loss of or damage to Equipment (Temporary Works only) as stated in the insurance policy for contract Works and Public Liability

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Cover / indemnity	Is to the extent as stated in the insurance policy for Contract Works / Public Liability
The deductibles are:	As stated in the insurance policy for Contract Works / Public Liability
4 Insurance against:	Contract Works SASRIA insurance subject to the terms, exceptions and conditions of the SASRIA coupon
Cover / indemnity	Cover / indemnity is to the extent provided by the SASRIA coupon
The deductibles are	The deductibles are, in respect of each and every theft claim, 0,1% of the contract value subject to a minimum of R2,500 and a maximum of R25,000.
Note:	The deductibles for the insurance as stated above are listed in the document titled "Certificate of Insurance: Transnet (SOC) Limited Professional Indemnity Insurance."
84.1 The minimum limit of indemnity for insurance in respect of death of or bodily injury to employees of the <i>Contractor</i> arising out of and in the course of their employment in connection with this contract for any one event is	The <i>Contractor</i> must comply at a minimum with the provisions of the Compensation for Occupational Injuries and Diseases Act No. 130 of 1993 as amended.
The <i>Contractor</i> provides these additional Insurances	<ol style="list-style-type: none"> 1 Where the contract requires that the design of any part of the <i>works</i> shall be provided by the <i>Contractor</i> the <i>Contractor</i> shall satisfy the <i>Employer</i> that professional indemnity insurance cover in connection therewith has been affected 2 Where the contract involves manufacture, and/or fabrication of Plant & Materials, components or other goods to be incorporated into the <i>works</i> at premises other than the site, the <i>Contractor</i> shall satisfy the <i>Employer</i> that such plant & materials, components or other goods for incorporation in the <i>works</i> are adequately insured during manufacture and/or fabrication and transportation to the site.

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- 3 Should the *Employer* have an insurable interest in such items during manufacture, and/or fabrication, such interest shall be noted by endorsement to the *Contractor's* policies of insurance as well as those of any sub-contractor**
- 4 Motor Vehicle Liability Insurance comprising (as a minimum) "Balance of Third Party" Risks including Passenger and Unauthorised Passenger Liability indemnity with a minimum indemnity limit of R10 000 000.**
- 5 Marine Craft Hull insurance in respect of all marine craft or vessels utilised in performance of the Works for a sum sufficient to provide for their replacement**
- 6 Protection and Indemnity Insurance in respect of all marine craft or vessels utilised in performance of the Works extended for Specialist Operations with a minimum indemnity limit of R 20,000,000**
- 7 The insurance coverage referred to in 1, 2, 3, 4, 5 and 6 above shall be obtained from an insurer(s) in terms of an insurance policy approved by the *Employer*. The *Contractor* shall arrange with the insurer to submit to the *Project Manager* the original and the duplicate original of the policy or policies of insurance and the receipts for payment of current premiums, together with a certificate from the insurer or insurance broker concerned, confirming that the policy or policies provide the full coverage as required. The original policy will be returned to the *Contractor*.**

84.2 The minimum limit of indemnity for insurance in respect of loss of or damage to property (except the works, Plant, Materials and Equipment) and liability for bodily injury to or death of a person (not an employee of the *Contractor*) caused by activity in connection with this contract for any one event is

Whatever the *Contractor* requires in addition to the amount of insurance taken out by the *Employer* for the same risk.

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84.2	The insurance against loss of or damage to the works, Plant and Materials as stated in the insurance policy for contract works and public liability selected from:	Principal Controlled Insurance policy for Contract
9	Termination	There is no additional Contract Data required for this section of the <i>conditions of contract</i>.
10	Data for main Option clause	
A	Priced contract with Activity Schedule	No additional data is required for this Option.
11	Data for Option W1	
W1.1	The <i>Adjudicator</i> is	Both parties will agree as and when a dispute arises. If the parties cannot reach an agreement on the <i>Adjudicator</i>, the Chairman of the Association of Arbitrators will appoint an <i>Adjudicator</i>.
W1.2(3)	The <i>Adjudicator nominating body</i> is: If no <i>Adjudicator nominating body</i> is entered, it is:	The Chairman of the Association of Arbitrators (Southern Africa) the Association of Arbitrators (Southern Africa)
W1.4(2)	The <i>tribunal</i> is:	Arbitration
W1.4(5)	The <i>arbitration procedure</i> is	The Rules for the Conduct of Arbitrations of the Association of Arbitrators (Southern Africa)
	The place where arbitration is to be held is	Durban, South Africa
	The person or organisation who will choose an arbitrator - if the Parties cannot agree a choice or - if the arbitration procedure does not state who selects an arbitrator, is	The Chairman of the Association of Arbitrators (Southern Africa)
12	Data for secondary Option clauses	

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X7	Delay damages	
X7.1	Delay damages for Completion of the whole of the <i>works</i> are	0,1% of the total contract value per day
X13	Performance bond	
X13.1	The amount of the performance bond is	20% of the total of the Prices
X18	Limitation of liability	
X18.1	The <i>Contractor's</i> liability to the <i>Employer</i> for indirect or consequential loss is limited to:	Nil
X18.2	For any one event, the <i>Contractor's</i> liability to the <i>Employer</i> for loss of or damage to the <i>Employer's</i> property is limited to:	The amount of the deductible payable in terms of the Employer's insurance policy or an amount being equal to the total Contract Value inclusive of VAT whichever is applicable
X18.3	The <i>Contractor's</i> liability for Defects due to his design which are not listed on the Defects Certificate is limited to:	The cost of correcting the Defect inclusive of VAT.
X18.4	The <i>Contractor's</i> total liability to the <i>Employer</i> for all matters arising under or in connection with this contract, other than excluded matters, is limited to:	An amount being equal to the total Contract Value inclusive of VAT.
X18.5	The <i>end of liability date</i> is	A period being 24 (Twenty Four) consecutive months after the completion by the Contractor of the whole of the works to the Employer in terms of the Contract 10 years after Completion of the whole of the works for latent defects
Z	Additional conditions of contract are:	

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Z1	Intellectual property	Intellectual property rights (including patents, copyright, trademarks etc.) rest with the party owning them and the Parties shall indemnify each other against any liability arising from infringement of such IP Rights or the infringement of any third party IP or any liability arising from infringement of such intellectual property rights. [See Clauses 80.1, 83.1 and 83.2]
Z2	Assignment and Waiver	
Z2.1		Neither the Employer nor the Contractor may, without the written consent of the other, assign the Contract or any part thereof or any obligation under the Contract or cede any right or benefit thereunder
Z2.2		No grant by the Contractor or the Employer to the other of any concession, waiver, condonation or allowance is, in respect of any specific event or circumstance other than that in respect of which the grant was made to constitute a waiver of the rights of the grantor in terms of the Contract or an estoppel of the grantor's right to enforce the provisions of the Contract.
Z3	Obligations in respect of the South African Government's National Industrial Participation Program (NIPP)	
Z3.1		The Contractor has agreed to participate in the National Industrial Participation Program established by the Department of Trade and Industry (DTI) and has agreed that it has incurred a NIPP obligation on award of this contract.
Z3.2		The parties agree that the Contractor is committed to participate in the NIPP program to the value of thirty percent (30%) of the imported content of the main purchase contract.

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Z3.3

The parties further agree that the Contractor shall furnish a performance guarantee within ninety days (90 days) of signature of the Obligation Agreement. The performance guarantee shall be equal to five percent (5%) of the NIPP obligation value. The guarantee shall be valid from commencement date and shall terminate when the DTI informs the Contractor in writing that it has fulfilled its NIPP obligations. The performance guarantee shall be adjusted from time to time relative to either changes in the purchase contract or successful performance of NIPP projects in terms of the NIPP credits earned.

Z4 **Defects Correction
Guarantee**
Z4.1

The Contractor gives the Employer a Defects correction bond, provided by a bank with a minimum long term credit rating of A – (Fitch rating or equivalent) which the Project Manager has accepted, to the value of 10% of the Contract value and in the form set out in document C1.3 Sureties in Part 1 Agreements and Contract Data. The bond shall be given to the Employer prior to the final delivery, commissioning, testing and handover of the Ship-to-Shore Crane.

Z5 **Additional clause relating
to Performance Bonds
and/or Guarantees**
Z5.1

The Performance Guarantee under X13 above shall be an irrevocable, on-demand performance guarantee, to be issued exactly in the form of the Pro Forma documents provided for this purpose under C1.3 (Forms of Securities), in favour of the *Employer* by a financial institution reasonably acceptable to the *Employer*.

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Z6 Contract Hedging
Z6.1

The Contractor shall accept responsibility of all risks associated with foreign exchange hedging contracts for the purpose of providing protection against the currency exposure assumed by the Contractor under this agreement to fluctuations in exchange rate movements. The Contractor has made its own independent appraisal of all risks arising under or in connection with the Hedging Contracts and has not relied on any information provided to it by Employer in connection with the Hedging Contracts.

Z7 Anti-Corruption Warranty
Z7.1

CONTRACTOR hereby undertakes and warrants that, at the date of the entering into force of the Contract, itself, its directors, officers or employees have not offered, promised, given, authorized, solicited or accepted any undue pecuniary or other advantage or gift of any kind (or implied that they will or might do any such thing at any time in the future) in any way connected with the Contract (hereinafter referred to as any "Corrupt Act") and that it has taken all reasonable measures to prevent its subcontractors, agents or any other third parties, subject to its control or determining influence, from doing so.

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DESCRIPTION OF THE WORKS: THE DESIGN, MANUFACTURE, DELIVERY, ERECTION, TESTING AND COMMISSIONING OF ONE (1) 65 TON TWIN-LIFT SHIP-TO-SHORE (STS) AT PORT ELIZABETH CONTAINER TERMINAL FOR TRANSNET SOC LTD (REG.NO.1990/000900/30) OPERATING AS TRANSNET PORT TERMINALS HEREINAFTER REFERRED TO AS "TPT" AS A ONCE OFF SUPPLY

Z7.2

In the event that CONTRACTOR has committed a any Corrupt Act or is found by any competent court or judicial body to have committed any Corrupt Act in relation to this Contract or in relation to another contract that has a material impact on this Contract,
or in the event that:

- I. Improper payments are being or have been made or offered to Transnet officials or any other person by CONTRACTOR or those acting on behalf of CONTRACTOR with respect to the Services; or
- II. CONTRACTOR or those acting on behalf of CONTRACTOR has accepted any payment or benefit, regardless of value, as an improper inducement to award, obtain or retain business or otherwise gain or grant an improper business advantage from or to any other person or entity.
then:
 - a) In addition to the remedies available in law to Transnet, Transnet reserves the right to instruct CONTRACTOR to (i) dismiss the employee(s) involved, and/or (ii) to terminate its contracts with the relevant supplier/sub-Contractor, as the case may be, and should CONTRACTOR fail to do so, or if the breach is incapable of being remedied, Transnet may terminate the Contract; and
 - b) Transnet will be entitled to recover the direct damages suffered by Transnet as a result of the termination of the Contract and no further payments will be made to CONTRACTOR, save for those sums which have already been committed. CONTRACTOR shall deliver to Transnet all works already completed in terms of the contract which Transnet has paid for.

**Z8 Right Reserved by the
Employer to Conduct
Vetting through SSA**

**TRANSNET PORT TERMINALS****TENDER NUMBER:** TPT/2022/06/0297/5745/RFP

DESCRIPTION OF THE WORKS: THE DESIGN, MANUFACTURE, DELIVERY, ERECTION, TESTING AND COMMISSIONING OF ONE (1) 65 TON TWIN-LIFT SHIP-TO-SHORE (STS) AT PORT ELIZABETH CONTAINER TERMINAL FOR TRANSNET SOC LTD (REG.NO.1990/000900/30) OPERATING AS TRANSNET PORT TERMINALS HEREINAFTER REFERRED TO AS "TPT" AS A ONCE OFF SUPPLY

Z8.1

The *Employer* reserves the right to conduct vetting through State Security Agency (SSA) for security clearances of any *Contractor* who has access to National Key Points for the following without limitations:

1. Confidential – this clearance is based on any information which may be used by malicious, opposing or hostile elements to harm the objectives and functions of an organ of state.
2. Secret – clearance is based on any information which may be used by malicious, opposing or hostile elements to disrupt the objectives and functions of an organ of state.
3. Top Secret – this clearance is based on information which may be used by malicious, opposing or hostile elements to neutralise the objectives and functions of an organ of state.

**Z9 Protection of Personal
Information Act**
Z9.1

The *Employer* and the *Contractor* are required to process information obtained for the duration of the Agreement in a manner that is aligned to the Protection of Personal Information Act.

**Z10 Additional obligations in
respect of Termination**
Z10.1

The following will be included under core clause 91.1:
In the second main bullet, after the word 'partnership' add 'joint venture whether incorporate or otherwise (including any constituent of the joint venture)' and

Under the second main bullet, insert the following additional bullets after the last sub-bullet:

- commenced business rescue proceedings (R22)
- repudiated this Contract (R23)

TRANSNET PORT TERMINALS

TENDER NUMBER: TPT/2022/06/0297/5745/RFP

DESCRIPTION OF THE WORKS: THE DESIGN, MANUFACTURE, DELIVERY, ERECTION, TESTING AND COMMISSIONING OF ONE (1) 65 TON TWIN-LIFT SHIP-TO-SHORE (STS) AT PORT ELIZABETH CONTAINER TERMINAL FOR TRANSNET SOC LTD (REG.NO.1990/000900/30) OPERATING AS TRANSNET PORT TERMINALS HEREINAFTER REFERRED TO AS "TPT" AS A ONCE OFF SUPPLY

C1.2 Contract Data

Part two - Data provided by the *Contractor*

The tendering *Contractor* is advised to read both the NEC3 Engineering and Construction Contract - June 2005 (with amendments June 2006 and April 2013) and the relevant parts of its Guidance Notes (ECC3-GN) in order to understand the implications of this Data which the tenderer is required to complete. An example of the completed Data is provided on pages 156 to 158 of the ECC3 Guidance Notes.

Completion of the data in full, according to Options chosen, is essential to create a complete contract.

Clause	Statement	Data
10.1	The <i>Contractor</i> is (Name):	
	Address	
	Tel No.	
	Fax No.	
11.2(8)	The <i>direct fee percentage</i> is	%
	The <i>subcontracted fee percentage</i> is	%
11.2(18)	The <i>working areas</i> are the Site and	
24.1	The <i>Contractor's</i> key persons are:	
	1 Name:	
	Job:	
	Responsibilities:	
	Qualifications:	
	Experience:	
	2 Name:	
	Job	
	Responsibilities:	
	Qualifications:	
	Experience:	

TRANSNET PORT TERMINALS
TENDER NUMBER: TPT/2022/06/0297/5745/RFP

DESCRIPTION OF THE WORKS: THE DESIGN, MANUFACTURE, DELIVERY, ERECTION, TESTING AND COMMISSIONING OF ONE (1) 65 TON TWIN-LIFT SHIP-TO-SHORE (STS) AT PORT ELIZABETH CONTAINER TERMINAL FOR TRANSNET SOC LTD (REG.NO.1990/000900/30) OPERATING AS TRANSNET PORT TERMINALS HEREINAFTER REFERRED TO AS "TPT" AS A ONCE OFF SUPPLY

		CV's (and further key persons data including CVs) are appended to Tender Schedule entitled_____.		
11.2(14)	The following matters will be included in the Risk Register			
31.1	The programme identified in the Contract Data is			
A	Priced contract with activity schedule			
11.2(20)	The <i>activity schedule</i> is in			
11.2(30)	The tendered total of the Prices is	<div style="border: 1px solid black; padding: 5px;"> (in figures) <hr/> <hr/> <hr/> <hr/> </div> <div style="border: 1px solid black; padding: 5px; margin-top: 5px;"> (in words), excluding VAT </div>		
	Data for Schedules of Cost Components	<i>Note "SCC" means Schedule of Cost Components starting on page 60 of ECC, and "SSCC" means Shorter Schedule of Cost Components starting on page 63 of ECC.</i>		
A	Priced contract with activity schedule	Data for the Shorter Schedule of Cost Components		
41 in SSCC	The percentage for people overheads is:	%		
21 in SSCC	The published list of Equipment is the last edition of the list published by			
	The percentage for adjustment for Equipment in the published list is	% (state plus or minus)		
22 in SSCC	The rates of other Equipment are:	Equipment	Size or capacity	Rate

TRANSNET PORT TERMINALS

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DESCRIPTION OF THE WORKS: THE DESIGN, MANUFACTURE, DELIVERY, ERECTION, TESTING AND COMMISSIONING OF ONE (1) 65 TON TWIN-LIFT SHIP-TO-SHORE (STS) AT PORT ELIZABETH CONTAINER TERMINAL FOR TRANSNET SOC LTD (REG.NO.1990/000900/30) OPERATING AS TRANSNET PORT TERMINALS HEREINAFTER REFERRED TO AS "TPT" AS A ONCE OFF SUPPLY

61	in	The hourly rates for Defined Cost of design outside the Working Areas are	Category of employee	Hourly rate
62	in	The percentage for design overheads is	%	
SSCC				
63	in	The categories of design employees whose travelling expenses to and from the Working Areas are included in Defined Cost are:		
SSCC				

C1.3: Forms of Securities

C1.3 Forms of Securities

Pro forma Performance Guarantee

For use with the NEC3 Engineering & Construction Contract - June 2005 (with amendments June 2006 and April 2013)

The *conditions of contract* stated in the Contract Data Part 1 include the following Secondary Option:

Option X13: Performance bond

The pro forma document for this Guarantee is provided here for convenience but is to be treated as part of the *Works Information*.

The organisation providing the Guarantee does so by copying the pro forma document onto its letterhead without any change to the text or format and completing the required details. The completed document is then given to the *Employer* within the time stated in the contract.

The Performance Bond needs to be issued by an institution that are reasonably acceptable to the *Employer*.

Transnet may choose to not to accept an Issuer. Should the issuer not being accepted, the performance bond needs to be replaced by an issuer that are acceptable to Transnet. Issuers need to be verified for acceptance by Transnet before a performance bond is issued.

Pro-forma Performance Bond (for use with Option X13)

(to be reproduced exactly as shown below on the letterhead of the Surety)

Transnet SOC Ltd
(Reg no. 1990/000900/30)
Transnet Corporate Centre
138 Eloff Street
Braamfontein
Johannesburg
2000

Date:

Dear Sirs,

Performance Bond for Contract No. TPT/2022/06/0297/5745/RFP

With reference to the above numbered contract made or to be made between

Transnet SOC Limited, Registration No. 1990/000900/30 (the *Employer*) and

{Insert registered name and address of the *Contractor*} (the *Contractor*), for

{Insert details of the *works* from the Contract Data} (the *works*).

I/We the undersigned

on behalf of the
Guarantor

of physical address

and duly authorised thereto do hereby bind ourselves as Guarantor and co-principal debtors in solidum for the due and faithful performance of all the terms and conditions of the Contract by the *Contractor* and for all losses, damages and expenses that may be suffered or incurred by the *Employer* as a result of non-performance of the Contract by the *Contractor*, subject to the following conditions:

1. The terms *Employer*, *Contractor*, *Project Manager*, *works* and Completion Certificate have the meaning as assigned to them by the *conditions of contract* stated in the Contract Data for the aforesaid Contract.
2. We renounce all benefits from the legal exceptions "Benefit of Excussion and Division", "No value received" and all other exceptions which might or could be pleaded against the validity of this bond, with the meaning and effect of which exceptions we declare ourselves to be fully acquainted.
3. The *Employer* has the absolute right to arrange his affairs with the *Contractor* in any manner which the *Employer* deems fit and without being advised thereof the Guarantor shall not have the right to claim his release on account of any conduct alleged to be prejudicial to the Guarantor. Without derogating from the foregoing compromise, extension of the construction period, indulgence, release or variation of the *Contractor's* obligation shall not affect the validity of this performance bond.

4. This bond will lapse on the earlier of

- the date that the Guarantor receives a notice from the *Project Manager* stating that the Completion Certificate for the whole of the *works* has been issued, that all amounts due from the *Contractor* as certified in terms of the contract have been received by the *Employer* and that the *Contractor* has fulfilled all his obligations under the Contract, or
- the date that the Surety issues a replacement Performance Bond for such lesser or higher amount as may be required by the *Project Manager*.

5. Always provided that this bond will not lapse in the event the Guarantor is notified by the *Project Manager*, (before the dates above), of the *Employer's* intention to institute claims and the particulars thereof, in which event this bond shall remain in force until all such claims are paid and settled.

6. The amount of the bond shall be payable to the *Employer* upon the *Employer's* demand and no later than 7 days following the submission to the Guarantor of a certificate signed by the *Project Manager* stating the amount of the *Employer's* losses, damages and expenses incurred as a result of the non-performance aforesaid. The signed certificate shall be deemed to be conclusive proof of the extent of the *Employer's* loss, damage and expense.

7. Our total liability hereunder shall not exceed the sum of:

(say)

R _____

8. This Performance Bond is neither negotiable nor transferable and is governed by the laws of the Republic of South Africa, subject to the jurisdiction of the courts of the Republic of South Africa

Signed at _____ on this _____ day of _____ 201_

Signature(s)

Name(s) (printed)

Position in Guarantor company

Signature of Witness(s)

Name(s) (printed)

Part C2: Pricing Data

PART 2: PRICING DATA

Document reference	Title	No of pages
	This cover page	1
C2.2	Activity Schedule	2
	Total number of pages	2

C2.1 Pricing Instructions – Option A

C2.1 Pricing Instructions: Option A

1. The *conditions of contract*

1.1. How the contract prices work and assesses it for progress payments

Clause 11 in NEC3 Engineering and Construction Contract, June 2005, (with amendments June 2006 and April 2013) (ECC) Option A states:

Identified 11

and defined terms

- 11.2 (20) The Activity Schedule is the *activity schedule* unless later changed in accordance with this contract.
- (22) Defined Cost is the cost of the components in the Shorter Schedule of Cost Components whether work is subcontracted or not excluding the cost of preparing quotations for compensation events.
- (27) The Price for Work Done to Date is the total of the Prices for
- each group of completed activities and
 - each completed activity which is not in a group
- A completed activity is one which is without Defects which would either delay or be covered by immediately following work.
- (30) The Prices are the lump sums for each of the activities on the Activity Schedule unless later changed in accordance with this contract.

1.2. Measurement and Payment

- 1.2.1 The Activity Schedule provides the basis of all valuations of the Price for Work Done to Date, payments in multiple currencies, price adjustments for inflation and general progress monitoring.
- 1.2.2 The amount due at each assessment date is based on **completed activities and/or milestones** as indicated on the Activity Schedule.
- 1.2.3 The Activity Schedule work breakdown structure provided by the *Contractor* is based on the Activity Schedule provided by the *Employer*. The activities listed by the *Employer* are the minimum activities acceptable and identify the specific activities which are required to achieve Completion. The activity schedule work breakdown structure is compiled to the satisfaction of the *Project Manager* with any additions and/or amendments deemed necessary.
- 1.2.4 The *Contractor's* detailed Activity Schedule summates back to the Activity Schedule provided by the *Employer* and is in sufficient detail to monitor completion of activities related to the Accepted Programme in order that payment of completed activities may be assessed.
- 1.2.5 The short descriptions in the Activity Schedule are for identification purposes only. All work described in the Works Information is deemed included in the activities.

-
- 1.2.6 The Activity Schedule is integrated with the Prices, Accepted Programme and where required the forecast rate of payment schedule.
 - 1.2.7 Activities in multiple currencies are separately identified on both the Activity Schedule and the Accepted Programme for each currency.
 - 1.2.8 The tendered total of the prices as stated in the Contract Data is obtained from the Activity Schedule summary. The tendered total of the prices includes for all direct and indirect costs, overheads, profits, risks, liabilities and obligations relative to the Contract.

C2.2 Activity Schedule

TRANSNET PORT TERMINALS**TENDER NUMBER:** TPT/2022/06/0297/5745/RFP

DESCRIPTION OF THE WORKS: THE DESIGN, MANUFACTURE, DELIVERY, ERECTION, TESTING AND COMMISSIONING OF ONE (1) 65 TON TWIN-LIFT SHIP-TO-SHORE (STS) AT PORT ELIZABETH CONTAINER TERMINAL FOR TRANSNET SOC LTD (REG.NO.1990/000900/30) OPERATING AS TRANSNET PORT TERMINALS HEREINAFTER REFERRED TO AS "TPT" AS A ONCE OFF SUPPLY

C2.2 Activity Schedule

Item	Activity Description	Qty	Rate	Total Price
1.	MAIN OFFER			
1.1	The design, manufacture, delivery, erection, testing and commissioning of one (1) 65 ton twin-lift ship-to-shore (STS) container handling gantry crane including 1 x twin-lift spreader (here-after called "crane") for berth 102 at PECT;	1		
1.2	The supply, testing and commissioning of two (2) spare interchangeable twin-lift telescopic spreaders suitable for handling 20' and 40'/45' containers, for the STS crane in 1.2.1.1;	2		
1.3	The supply testing and commissioning of one interchangeable heavy lift beam for the STS crane in 1.2.1.1;	1		
1.4	The supply of one (1) computer workstation and one (1) notebook computer for the STS crane in 1.2.1.1;	lot		
1.5	The supply of <u>Mandatory Critical Spares</u> as listed by the <i>Employer</i> , for the STS crane in 1.2.1.1;	lot		
1.6	The training of <i>Employer's</i> operational staff for the STS crane in 1.2.1.1.	lot		
1.7	The training of <i>Employer's</i> maintenance staff for the STS crane in 1.2.1.1.	lot		
1.8	The manufacture, supply, delivery and commissioning of one (1) spreader test panel for the twin-lift telescopic ship-to-shore crane spreaders in 1.2.1.1 and 1.2.1.2.			
2.	OPTIONS			
2.1	Recommended Critical Spares that <i>Employer</i> should keep in stock (over and above the Mandatory Critical Spares) to support the cranes for the first 10 years of operation.	lot		
2.2	Maintenance Spares to support the cranes for the first year of operation (approximately 120,000 cycles).	lot		
2.3	An engineer(s)/technician(s) stationed on site for the first 6 months on a 24hours-a-day basis. The functions of the engineer(s)/technician(s) will be to undertake root cause analysis, provide knowledge transfer to the <i>Employer's</i> maintenance and operations staff, undertake various adjustments as may be required, provide performance records and analysis information reports to the local maintenance manager.	lot		
Total Price to be carried over to the Form of Offer & Acceptance			R	

Part C3: The Scope

C3.1: Scope of Works

PART 3: SCOPE OF WORK

Document reference	Title	No of pages
	This cover page	1
C3.1	<i>Employer's Works Information</i>	
C3.2	<i>Contractor's Works Information</i>	21
	Total number of pages	

C3.1: EMPLOYER'S WORKS INFORMATION

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1 Description of the works

1.1 Background

Transnet Port Terminals operates various container terminals across South African ports. The Port Elizabeth Container Terminal (PECT) located in the port of Port Elizabeth requires one (1) new Ship-to-Shore Crane.

1.2 The scope of works

The works comprises the following:

1.2.1 Main Scope

- 1.2.1.1 The design, manufacture, delivery, erection, testing and commissioning of one (1) 65-ton twin-lift ship-to-shore (STS) container handling gantry crane including 1 x interchangeable twin-lift telescopic spreader (here-after called "crane") for PECT;
- 1.2.1.2 The supply, testing and commissioning of two (2) spare interchangeable twin-lift telescopic spreaders suitable for handling 20' and 40'/45' containers, for the STS crane in 1.2.1.1;
- 1.2.1.3 The supply testing and commissioning of one heavy lift beam, which is interchangeable with the spreader, for the STS crane in 1.2.1.1;
- 1.2.1.4 The supply of one (1) computer workstation and one (1) notebook computer for the STS crane in 1.2.1.1;
- 1.2.1.5 The supply of Mandatory Critical Spares as listed by the *Employer*, for the STS crane in 1.2.1.1;
- 1.2.1.6 The training of *Employer's* operational staff for the STS crane in 1.2.1.1.
- 1.2.1.7 The training of *Employer's* maintenance staff for the STS crane in 1.2.1.1.
- 1.2.1.8 The manufacture, supply, delivery and commissioning of one (1) spreader test panel for the twin-lift telescopic ship-to-shore crane spreaders to be supplied as in 1.2.1.1 and 1.2.1.2 above.

1.2.2 Priced Options

Priced options are to be provided for the following:

- 1.2.2.1 Recommended Critical Spares that *Employer* should keep in stock (over and above the Mandatory Critical Spares priced in 1.2.1.5) to support the cranes for the first 10 years of operation.
- 1.2.2.2 Maintenance Spares to support the cranes for the first year of operation (approximately 120,000 cycles).
- 1.2.2.3 An engineer(s)/technician(s) stationed on site for the first 6 months on a 24hours-a-day basis. The functions of the engineer(s)/technician(s) will be to undertake root cause analysis, provide knowledge transfer to the *Employer's* maintenance and operations staff, undertake various adjustments as may be required, provide performance records and analysis information reports to the local maintenance manager.

1.3 Supply of New Crane

The crane supplied shall be capable of hoisting 65 ton in twin-lift mode and shall have a minimum spreader outreach of 52m (from the seaside rail centre to centre of spreader). The crane shall have a back reach of 19m (from the landside rail centre). The spreader height shall be a minimum of 37m above the seaside rail to

the bottom of the spreader, with the lowest point of 16 m below the seaside rail.
Rail span shall be 20m to match the rails on site.

The crane will be electrically powered at 11,000 volts AC and must be equipped with a trailing cable of 400 m of cable on the cable reel.

The crane loads shall have wheel loadings no greater than the maximum allowable loads in the table below:

Table 1: Allowable loads

MAXIMUM ALLOWABLE STS LOADS at the PECT berths 102			
WORKING LOADS			
Seaside Rail		Landside Rail	
Max crane wheel load	63,5 tons	Max crane wheel load	63,5 tons
Max distributed crane rail load	490 kN/m *	Max distributed crane rail load	490 kN/m *
STORM LOADS			
Seaside Rail		Landside Rail	
Max crane wheel load	63,5 tons	Max crane wheel load	63,5 tons
Max distributed crane rail load	490 kN/m *	Max distributed crane rail load	490 kN/m *

* 490 kN/m crane rail loading per corner comprising 8 wheels at 1,3 m centres.

It must be noted that the allowable uniformly distributed load on the berth between the crane rails, as well as the back-up area behind the crane rails, is 40 kPa.

The Port Elizabeth Container Terminal uses a direct straddle carrier operation. The Terminal also loads manganese via a rotating spreader operation.

1.4 Interpretation and terminology

1.4.1 Abbreviations

The following abbreviations are used in this Works Information:

Abbreviation	Meaning given to the abbreviation
SANS	South African National Standards
FEM	Federation Europeenne De La Manutention
ISO	International Standard Organisation
ASTM	American Society for Testing and Material
IEC	International Electric Code
NEMA	National Electrical Manufacturing Association
BS	British Standards Institute Specifications
CEMP	Construction Environmental Management Plan
ISPS	International Port & Shipping Security
TNPA	Transnet National Ports Authority of South Africa

TPT	Transnet Port Terminals
MSL	Mean Sea Level
WS	Waterside
LS	Landside
STS	Ship-to-shore
c/l	Centre line
tor	Top-of-rail
WLL	Working Load Limit, previously known as Safe Working Load (SWL)

1.4.2 Definitions

SPECIFICATION means the document/s forming part of the contract in which are described the methods of executing the various items of work to be done, and the nature and quality of the materials to be supplied and includes technical schedules and drawings attached thereto as well as all samples and patterns.

Reference in the Works Information and standard specifications to "equipment" means the cranes as defined in the scope of *works*.

Where "tonne", "ton" or the abbreviation "t" is used, it means "metric ton" which is equivalent to 1 000kg or approximately 2 204.62-pound mass.

1.4.3 Interpretation of incorporated documentation

Word or phrase	Interpretation
'Transnet Port Terminals' in the context of: owner, occupier or user of the new asset; insurer of the <i>works</i> ; paymaster (i.e. Transnet Port Terminals shall pay); a party to the contract.	the <i>Employer</i>
'Transnet Port Terminals' in the context of: a duty or procedure to be performed in the administration of the contract	the <i>Project Manager</i> or the <i>Supervisor</i> as determined by the conditions of contract
accepted by (or to the satisfaction of) the <i>Project Manager</i> , Engineer or the Architect	accepted by the <i>Project Manager</i> or the <i>Supervisor</i>
a duty, procedure, decision or action of the Engineer or the Architect and of the Superintendent, client representative, Site Supervisor or Clerk of works	an action of the <i>Project Manager</i> or the <i>Supervisor</i> depending on the context. Clause 14 of the Core Clauses determines what the actions of each are. Either may delegate in terms of Clause 14.2

2 Management and start up.

2.1 Management meetings

The *Project Manager* shall arrange for a design review to be performed by a suitable third party inspectorate company during the planning phases of the contract. For the remainder of the contract, the *Contractor* shall attend all management meetings as called by the *Project Manager*. It is envisaged that at least monthly contract management meetings, plus weekly site meetings during the site erection phase and daily meetings during the commissioning phase, will be held. The *Contractor* must present all relevant information including quality plans, schedules, (including progress) subcontractor management, and health, environmental and safety issues at such meetings.

The *Project Manager* shall arrange for regular inspections during the manufacturing phase in accordance with agreed hold and witness points and shall also be used as a manufacturing progress report evaluation.

The *Contractor* shall attend risk reduction meetings as and when called by the *Project Manager*.

Other meetings of a specialist nature may be convened as specified elsewhere in this Works Information or if not so specified by persons and at times and locations to suit the Parties, the nature and the progress of the *works*. Records of these meetings shall be submitted to the *Project Manager* by the person convening the meeting within five days of the meeting.

All meetings shall be recorded using minutes or a register prepared and circulated by the person who convened the meeting. Such minutes or register shall not be used for the purpose of confirming actions or instructions under the contract as these shall be done separately by the person identified in the *conditions of contract* to carry out such actions or instructions.

2.2 Documentation control

The *Contractor* shall submit all documentation (including correspondence and drawings) to Transnet (*Employer*) standards and to the *Project Manager's* requirements in accordance with the *Project Manager's* document control procedure. The *Contractor* shall use his own suitable document control system for the control, maintenance and handling of all relevant documentation and drawings issued to him.

2.3 Safety risk management

All aspects of on-site works must comply with the Health and Safety requirement OHS Act No 85 of 1993.

2.4 Environmental constraints and management

All aspects of the *works* must comply with the *Employer's* environmental management plan referred to as the "TPT Standard Environmental Specifications", statutory requirements and regulations made by relevant authorities and the *Contractor* must ensure compliance of Site activities as well as the design of the equipment supplied.

2.5 Quality assurance requirements

Refer to EEAM-Q-009 for the *Employer's* Quality Management
Special attention must be paid to the following:

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- Quality management objectives.
 - Design control system with emphasis on design review procedures and *Employer* requirements evaluation.
 - Documentation and change control procedures.
 - Quality control procedures that will apply to purchased materials.
 - Quality control plan for all components manufactured or supplied to ensure conformance.
 - The identification of suitable hold points to ensure proper quality assurance throughout manufacturing.
 - Quality control of all welding and corrosion protection activities.
 - The quality control procedure that will apply to erection and painting on site.
 - Hold point on manufacture until design review approved.

The services of an independent third party will be engaged by the *Employer* to assist him with meeting his quality assurance objectives and the *Contractor* must give the necessary co-operation and supply all the necessary quality management documentation as required. The cost of the QA work by the third party will be borne by the *Employer*.

The *Contractor* shall ensure that the quality assurance requirements placed on him under this Contract are transferred into any subcontracts.

Quality system requirements shall be applied on all subcontracts to the point where the acceptability of supplies can be demonstrated solely by the conduct of inspection and/or examination of goods upon receipt at the designated point of delivery.

The *Contractor's* quality plan shall include or reference the quality plans of subcontractors.

2.6 Programming constraints

2.6.1 General

The Contract programme, progress reports, subsequent updates, revisions and supplementary programmes as detailed in this section are an essential part of the project control system used by the *Employer* for managing the *works* and in monitoring the progress of the work under the Contract. The information and data provided by the *Contractor* pursuant to this procedure must therefore be reliable, accurate and timely in presentation.

2.6.2 Programme submission

A copy of the *Contractor's* First Programme shall be submitted with the Tender Document Returnable Schedules that shall comply with the requirements as indicated in the Works Information. The *Contractor's* Detailed Programme shall be submitted in both hard and soft copy forms within two weeks of award using a computer software package approved by the *Project Manager*.

The preferred software package is Microsoft Projects or similar approved.

2.6.3 Contract programme (baseline)

The *Contractor's* First Programme, agreeing with the tender submission, shall become the "Contract Programme" or "baseline" against which actual time performance will be compared. Once the baseline has been established, all subsequent programmes will have baseline (target) bars shown against each activity. This programme will be used as the basis on which all variations, extensions of time and changes to methods of delivery shall be assessed.

Identified deviations from the baseline shall be addressed by the *Contractor* by either demonstrating that the deviation does not constitute a problem to the overall *Contractor's* Programme or providing a course of action to remedy the deviation.

2.6.4 Revisions to contract schedule

The *Project Manager's* written approval of any revised contract programme shall be given prior to the revised contract programme becoming the new contract programme.

Additional detail may be inserted into the Contract Programme at the request of either the *Contractor* or the *Project Manager*. In such cases, the overall start and finish dates of the detail activities shall not vary from the original summary activity(s) that were replaced.

All revisions to the contract programme shall be prepared by, and at the cost of the *Contractor*.

2.6.5 Supplementary programmes

The *Project Manager* may at any time, and at the cost and expense of the *Contractor*, direct the *Contractor* to produce supplementary programmes to highlight a particular aspect of the work under the Contract. The *Project Manager* shall not unreasonably request supplementary programmes.

2.6.6 Cash flow

The *Contractor* shall submit to the *Project Manager* a detailed cash flow chart based on the contract programme showing the anticipated cash flow as represented by expected payment claim submissions, not only payments received.

2.6.7 Progress reporting

To demonstrate the actual progress of the work under the Contract the *Contractor* shall, on a monthly basis, update and submit the contract programme and the progress to the *Project Manager*.

The contract programme shall be in the form of a three week look ahead schedule, and shall show the following two separate bars for each activity so as to enable comparison of the actual progress to the contract programme:

- The contract programme "baseline" activity bar
- The current schedule activity bar identifying the currently forecast start and finish dates of the activity, and the status (% completion of each activity).

2.6.8 Progress monitoring and review

Monitoring and review of the progress of work under the Contract shall consist of an assessment of all activities currently in progress. The following shall be determined:

- percentage complete;
- forecast completion date;
- deviations from the baseline programme; and
- actions required to remedy any deviations.

2.6.9 Monthly status report

The *Contractor* shall provide a written status report by the 20th of each month or such other reporting period as may be required by the *Project Manager* from time-to-time. The report shall summarise progress and problems encountered during that month in respect of all parts of the work under the Contract.

As a minimum the report shall include:

- progress against the current approved contract programme;

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- summary of progress achieved during the period;
 - list of milestones achieved during the period;
 - status of design, procurement, and off-site works;
 - status of on-site works;
 - deviations from the contract programme "baseline", and in particular, the forecast completion dates of activities which have or should have commenced;
 - status of approvals;
 - actual or anticipated problems with corresponding action plans to minimise the impact;
 - summary of works planned for the following period, and
 - cash flow status versus the original forecast.

The progress report shall form the basis of a monthly progress meeting between the *Project Manager* and the *Contractor*.

2.6.10 Monthly expediting report

The *Contractor* shall submit to the *Project Manager* by facsimile or email within four (4) days after month-end a report on progress of any off-site manufacturing activities of the *Contractor* during the previous month.

The report shall state the current percentage progress of each major piece of equipment as applies at that date.

Each report shall state the actual completion date for those manufacturing activities completed in the last reported period, shall advise the anticipated completion date for each major piece of equipment and shall comment on any delay or variance with respect to scheduled progress.

The *Contractor* shall also report his calculated overall completion percentage for each Subcontract at each report date.

2.7 Contractor's management, supervision and key people

The *Contractor* shall make an adequate, experienced and stable project team available for the duration of the contract. Every effort must be exercised by the *Contractor* to minimise replacement of individual project team members in order to ensure optimum contract management continuity.

It is a requirement of this contract that the *Contractor* employs a full time, fully qualified and experienced site manager who has been delegated sufficient authority to manage the contract efficiently on-Site during erection and commissioning. The site manager is required to be fluent in English, both in writing and orally.

An organogram of all the *Contractor's* people who will be directly involved with the management and execution of this contract down to supervisory level, showing each key person named to do the job as stated in the Contract Data, shall be submitted with the Tender Document Returnable Schedules.

2.8 Training workshops and technology transfer

2.8.1 Training of the Employer's personnel is required in the following timelines:

2.8.1.1 Maintenance personnel to be trained prior to the STS crane arriving / assembled on site via 'class-room' training, with 'hands on' training during commissioning of the STS crane. On completion of training OEM to perform an assessment on the Artisans to indicate the effectiveness of the training on critical maintenance activities.

2.8.1.2 Crane Operator training shall be conducted after the STS crane has been commissioned, prior to endurance testing.

2.8.2 The following *Employer's* personnel concerned with operating and maintenance of the STS crane will be made available for training by the *Contractor* in their various functions at the Port concerned:

Designation	Number to be trained for PECT
Crane Operator	24
Training Officer	2
Electricians	24
Millwrights	24
Technicians	6

These numbers are indicative only and may vary due to additional requirements of the *Employer* for the operation and maintenance of the equipment.

2.8.3 The *Contractor* must allow for Operator Training to take place day and night, including weekends.

2.8.4 Each trainee shall be given reference training documents prior to training by the *Contractor*.

3 Engineering and the *Contractor's* design

3.1 *Employer's* design requirements

The equipment shall be designed to comply with the *Employer's* specification for ship-to-shore gantry type container handling cranes, document number: TPT_TS_TwinLift_AC_STSCrane Rev No. 13 (Technical specification) as well as the requirements in 3.1.1 for the respective crane.

3.1.1 Design parameters

The *Contractor* must ensure that the STS crane as designed meets all performance and operational requirements as per the design parameters below:

Parameter	Value
Span	20m
Type of gantry rail	A100 with 100mm crown width
Difference in rail level WS to LS	209 mm (WS lower)
Twin-lift hoisting capability	Minimum 65 ton
Spreader Outreach (from c/l WS rail)	Minimum 52m
Spreader Back reach (from c/l LS rail)	19m
Lowest point of spreader below seaside rail	16m
Spreader hoisting height above seaside rail	Minimum 37m
Inside clearance between gantry legs	Minimum 17.00m

Overall crane width; width across buffers	+/- 27m
Clearance height under sill beam	Minimum 18.0m

3.1.2 Basic performance requirements

The crane shall be designed to handle standard 20' and 40'/45' ISO containers (using a standard twin-lift telescopic spreader), over-height containers and flat racks (using a universal over-height frame, supplied by Others) and heavy lifts (using a heavy lift beam, to be supplied by the *Contractor*). The cranes shall be designed for the loading and off-loading of container vessels, operating in single or twin lift mode. The crane's dimensions must be determined by the *Contractor* based on the ship size, quay geometry and sea levels but must not be less than the minimum values specified for the design parameters.

The crane must be able to operate unrestricted, i.e. at maximum design operating speed capabilities, at a wind speed of at least 80 km/hr, and at reduced speeds in wind speed of at least 90 km/hr.

The following minimum operating speeds for the various motions are required, but higher speeds may be offered.

Parameter	Value
Hoist speed (at no load, with spreader only)	180 m/min
Hoist speed (at rated load)	90 m/min
Trolley speed (at rated load)	210 m/min
Long travel (gantry) speed (at rated load)	45 m/min
Boom up, to fully raised position	6 min

The twinlift spreader to operates with a relay type control.

A mobile spreader testing station (test panel) to be supplied with the spreader for maintenance purposes.

In addition to containers, the Port Elizabeth Container Terminal also handles manganese export via rotating spreaders. The new STS crane must be able to operate with the existing rotating spreaders. Crane to be equipped with the additional push buttons and indications for the rotating spreader control. Necessary PLC programming to be included in the supply. Details of the rotating spreader is as follows:

Make	RAM
Spreader Model	RAM 4111
Spreader Type	RAM Revolver
Spreader Safe Working Load	38,0 ton
Typical Cargo load per lift	28,0 ton
Spreader Tare Weight	13,1 ton
Power Voltage	400 VoltsAC / 50 Hertz / 3 phase
Control Voltage : Solenoid Coils	24 VDC
Switches	24 VDC
Indicator Lights	24 VDC

Electrical Motor – Rating / Power consumption	18,5 kW
Electrical Protection	IP 65
Number of lifts per year with Revolver Spreader	+/- 60 000 load cycles per year

The cranes will be manually controlled by a certified crane operator from the operator's cabin.

Cranes to have anti-snag protection, and anti-sway and trim / list / skew capabilities.

Cranes to incorporate an IOT (Internet of Things) mind sphere, automatic lubrication, and with vibration sensors on hoist, trolley and boom drives, and heat sensors on bearings for hoist, trolley and boom drives

3.1.3 General requirements

The equipment as made and supplied shall be complete in every respect, of modern design using most advanced technology extensively supported by reputable local companies, and be designed and built to applicable recognised standards and good engineering practices. All electrical and mechanical Plant to be fitted shall have been type tested for reliability and extended lifetime in the conditions to be expected.

The equipment shall be designed and constructed such that as many common components as possible are used on the equipment to enable the minimization of spares types and numbers. This must specifically be applied to drives, brakes, ropes, sheaves, electrical plant and components, bearings and wheels. All drives must be such that the same drive can be used in both left hand and right-hand applications.

The trailing cable reel shall be off set 1240 mm on the outside (waterside) of the waterside rail. Walkway stringers, staircase stringers, support brackets, kickplates, handrails, knee rails and stanchions to be hot dip galvanised and painted. Stair treads and walkway grating to be hot dip galvanised. Width of access stairs and walkways from floor level to operator's cabin to be at least 700 mm.

3.1.4 Environmental conditions

The equipment offered must be able to operate in a marine environment subject to the following conditions:

- | | |
|----------------------------|---|
| ○ Altitude | Sea Level |
| ○ Ambient temperature | 5 – 45°C |
| ○ Relative humidity | Frequently 100% |
| ○ Air Pollution | Heavily saline, dust laden and industrial fumes |
| ○ Load / unload containers | Wind speeds up to 90 km/hour |

All electrical, hydraulic and pneumatic components shall be suitable and treated for use in tropical climate where rapid changes in weather conditions produce severe moisture condensation problems. The equipment shall be capable of withstanding the highly corrosive effects of the moist, saline atmosphere. All electrical components not installed in controlled environments (machine and electrical house or operator's cabin) must have a minimum enclosure protection of IP55.

3.1.5 Crane/Quay interface requirements

3.1.5.1 Electrical Power Supply

3.1.5.1.1 The cross-over funnel and cable anchor drums will be installed by others.

3.1.5.1.2 The trailing cable shall be installed and connected at the junction box by the Contractor.

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- 3.1.5.1.3 The trailing cable will run on top of the quay surface, on the landside of the waterside crane rail. The trailing cable will be protected by a pipe type cable protector.
- 3.1.5.1.4 The capacity of the mobile generators available for the purpose of making the cranes safe in case of emergency is 315 kVA, 3 phase.

3.1.5.2 Crane Rails, Parking Pins & Storm Tie-Down Anchors

Crane rails are of type A100 in accordance with DIN 536. The storm pin sockets are situated on the insides of the water side and landside rails respectively, at an offset of 450mm from the rail centre line. Storm tie-down anchors to be provided on the crane. Additional storm pin sockets and tie-down anchor connection points to suit the new crane will be installed by others, if required.

3.1.5.3 End-of-Rail Buffers

The contractor is to ensure that the crane buffers are designed in accordance with the existing end-of-rail buffers (stop blocks) and other cranes operating on the same rails, at a height of 1500 mm above the crane rails.

3.1.6 Maintenance Requirements

The crane must be provided with maintenance and manual modes as follows:

- In maintenance mode all the motions are manually controlled from the respective local control stations with all interlocking (except ultimate limits) overridden. The gantry travel shall be controlled from a conveniently located ground control station. The maintenance mode shall be activated / de-activated by a key switch.
- In manual control mode the operator shall have full control over all motions, properly sequenced and interlocked.

The engineering workstations (maintenance computers) shall be fitted with the latest WinCC, and an OPC server with a signal receiving system and shall be supplied by the *Contractor*.

The notebook computer(s) or Field PG for technicians and/or the head office engineer shall be fitted with the latest WinCC, and an OPC server with a signal receiving system and shall be supplied by the *Contractor*.

Each crane shall be supplied with its own set of special tools by the *Contractor*.

The *Contractor* shall identify all maintenance activities with such restricted access and cover the method statements for such activities in the maintenance manuals.

3.1.7 Branding Requirements

The crane shall be branded in accordance with the "TPT Equipment Branding and Logo Details". It shall consist of a white logo on the red background and sized as large as possible on the area it is to be located.

3.2 Parts of the works which the *Contractor* is to design

The *Contractor* shall do all the designs for the *works* to comply with the *Employer's* design requirements.

3.3 Procedure for submission and acceptance of *Contractor's* design

Immediately after the *starting date*, the *Contractor* shall start with the design of the equipment. During this design phase of the contract the *Contractor* is required to hold regular design review meetings to confirm all *Employer* requirements and to obtain the *Project Manager's* acceptance for all design concepts, design interfaces and specifications to ensure that quality is designed into the final product.

Structural and component design shall be verified by the *Contractor* by using finite element analysis models and tested material properties.

The services of an independent third party will be engaged by the *Employer* to review the *Contractor's* design, calculations, drawings and finite element analysis and the *Contractor* must give the necessary co-operation and supply all the necessary design data as required. The cost of the design review by the third party will be borne by the *Employer*. *Contractor* to make an allowance of 4 weeks in their schedule for the review of each submission of the design and finite element analysis. Design acceptance will be achieved when the FEA, designs, calculations and drawings have been approved by TPT / third party reviewer.

The *Contractor* must prepare and submit by the dates as indicated on the Accepted Programme two copies of black line paper prints of the general arrangements, working drawings and schematics for acceptance by the *Project Manager*. These drawings and schematics are to be submitted in a systematic manner, accompanied by an index sheet of all the completed and planned drawings and schematics.

Drawings which are submitted for the acceptance of the *Project Manager* must bear the signature and designation of the *Contractor's* responsible professional Engineer.

General arrangement drawings must show the complete structural layout arrangements with plan views, elevations, cross sections, location and sizes of members, erection details, cladding details, services where applicable, etc.

The *Contractor's* fabrication shop drawings and detailed drawings are not required for purpose of acceptance by the *Project Manager* except when the *Project Manager* specifically requests such drawings for approval or to assist the *Supervisor* in the inspection of the structure at any stage. Notwithstanding any formal acceptance of drawings and schematics submitted by the *Contractor*, the sole responsibility for the adequacy of the design remains entirely with the *Contractor*.

Time required for all the activities associated with the design of the equipment must be allowed for and indicated by the *Contractor* in his programme.

3.4 Use of *Contractor's* design

The *Contractor* will grant to the *Employer* a non-exclusive licence, in accordance with the provisions of section 22 of the Copyright Act 1978 (Act 98 of 1978), (a) to copy any plan, diagram, drawing, specification, bill of quantities, design calculation or other similar document made other than under the direction or control of the *Employer*, by the *Contractor* in connection with the installation, (b) to make free and unrestricted use thereof for its own purposes, (c) to provide copies thereof to consultants to be used by them for the purpose of the consultancy and (d) to provide other parties with copies for tenders invited by it. The *Contractor*, furthermore, if any plan, diagram, drawing, specification, bill of quantities, design calculations or other similar document made, other than under the direction or control of the *Employer*, by any principal or sub-contractor of the *Contractor*, is used in connection with the installation, shall cause such principal or sub-contractor to grant to the *Employer* a similar non-exclusive licence in respect of such plan, diagram, drawing, specification, bill of quantities, design calculation or other similar document. The provisions of this clause shall not apply to documents made, in the case of equipment to be supplied in connection with the manufacturing process of the equipment supplied but only to the equipment supplied itself. No separate or extra payment shall be due by the *Employer* in respect of any non-exclusive licence granted in terms of this clause.

3.5 As-built drawings, operating and maintenance manuals

The *Contractor* shall provide all the as-built drawings, operating and maintenance manuals 3 hardcopies and 2 electronic copies all in English. An advanced electronic copy of these manuals and drawings are required 3 months before crane delivery for approval purposes per batch delivered. Operating instructions to be mounted in a frame and displayed in the operator's cabin.

4 Procurement

4.1 Subcontracting

4.1.1 Subcontract documentation, and assessment of subcontract tenders

The *Contractor* is required to appoint his sub-contractors under the NEC3 Engineering Contract Sub Contract unless accepted otherwise by the *Project Manager*.

4.1.2 Attendance on subcontractors

The *Contractor* must notify the *Project Manager* of all inspections at his Subcontractors at least 3 working days in advance of such inspections. The *Contractor* must ensure that his Subcontractor has the relevant quality management plans available at such inspections. The *Supervisor* will give the *Contractor* 24 hour notice in writing of his intention to be present at the inspections.

4.2 Plant and Materials

4.2.1 Quality

If requested by the *Supervisor*, the *Contractor* must produce evidence to show that both his welding procedures and welders have passed all the relevant requirements and tests in terms of BS 5135 and SABS 044 Parts III and IV.

4.2.2 Contractor's procurement of Plant and Materials

The *Contractor* must take all necessary steps to ensure that all Plants and Materials are adequately protected against damage during shipping, transport and storage.

If the completed straddles are transported fully erected by sea, the *Contractor* shall take all necessary steps to ensure that all temporary sea bracing and strengthening required, as well as the lashing of the cranes can be fitted and removed without welding or cutting. No welding or cutting on the fully erected crane structure will be allowed.

If the completed cranes are transported fully erected by sea, the *Contractor* shall take extra precaution to protect all mechanical and electrical Plant from the corrosive effect of wave splashes, rain and salt spray. Waxoyl, or similar, shall be applied to the inside of handrails and other small sealed sections before being sealed.

4.2.3 Spares and consumables

The *Contractor* shall supply to site all the spares and consumables as identified by the *Project Manager* from the *Contractor's* recommended spares list. Packaging of the spares and consumables shall be suitable to protect its contents from environmental damage when stored in warehouses in close proximity to the coast. Packaging of sensitive spares and consumables shall be suitable to protect its contents from mechanical damage due to handling.

4.3 Tests and inspections before delivery

Where the Works Information requires inspections or tests to be performed, the *Contractor* shall provide such assistance, labour, materials, electricity, fuel, stores, apparatus and instruments as may be a requisite and as may be reasonable demanded to carry out such tests efficiently. The *Contractor* shall ensure that all gauges, templates, tools and other equipment required to check the accuracy of the work are calibrated at regular intervals by a laboratory approved by the National Calibration Services of the Council for Scientific and Industrial Research of South Africa, or by the respective authority in the country of origin of the equipment.

Unless the *Project Manager* otherwise accepts, no Plant or Materials shall be delivered to the *working areas* until the *Supervisor* issues an inspection certificate in respect of such Plant or Materials. The *Contractor* is responsible for taking delivery of all Plant and Materials delivered to the *working areas*.

Completed cranes that are to be shipped fully erected or in modules to site are to be inspected and commissioned or tested by the *Contractor* prior to leaving the *Contractor's* or his Subcontractor's works. The associated test and inspection protocol submitted by the *Contractor* must show the estimated duration for each item on the protocol.

5 Site work and completion of the works

5.1 Working Areas, Site services & construction constraints

5.1.1 Berthing services

The *Contractor* will be responsible for all planning and arrangements with the necessary authorities in this regard.

5.1.2 Working Areas

When required in terms of the delivery methodology, the *Contractor* will indicate his requirements for site erection on a suitable drawing submitted with the tender.

At least some of the Site work will take place while the adjacent port terminal areas will be in operation. The *Contractor* shall take all necessary steps for his works not to interfere with port operations and to ensure that normal traffic flow of the operational terminal is not obstructed. Establishment, fencing and other work required to make the *working area* fit for use is entirely the *Contractor's* responsibility.

The *Contractor* is responsible for the security of the *works* until completion and hand-over, and must make his own arrangements for security and the safekeeping of his property. The *Contractor's* watchmen are allowed on Site for this purpose.

The *Contractor* must ensure that the *working area* is well lit at night and that all the fences, obstacles and hazards are marked.

The *Contractor* must maintain the *working area* in a neat and tidy condition to the satisfaction of the *Project Manager*.

5.1.3 Housing

Housing of the *Contractor's* people on site is not permitted.

5.1.4 Clearing of site

The *Contractor*, within fourteen days after completion, must completely remove from site all his plant, materials, Equipment, stores and temporary accommodation or any other asset belonging to him and leaves the site in a tidy condition to the satisfaction of the *Project Manager*.

5.1.5 Site books

The *Contractor* must supply and have available at the site office at all times, the following site books which remains the property of the *Employer*:

- Risk register book:
This is a suitable carbon copy book; size A4, with two detachable sheets for registering risks and early warnings in triplicate as identified by the *Project Manager*, *Supervisor* or *Contractor*.
- Site diary book:
This is a suitable carbon copy book, size A4, with two detachable sheets for a page to a day where all events affecting execution of the *works*, such as arrivals of plans, breakdown of Equipment, weather conditions etc., are entered. Equipment, labour, Plant and Materials on site are recorded as well as work performed. Entries are made by the *Contractor* (or his appointed agent) and signed daily by both the *Contractor* and the *Supervisor*. The site diary may be used to establish the validity of claims for Compensation Events.

5.1.6 Co-operation with Others

During the course of the contract, departments of Transnet and other contractors may be working in the general area surrounding the *working area*. The *Contractor* must make allowance for the necessity to interface with the activities of Others, and to allow for safe access and working conditions.

The success of the project depends on the effective co-operation of all contractors on site, and the *Contractor*, if necessary, must discuss his programme on a day to day basis with the *Project Manager* to ensure effective co-ordination.

5.1.7 Customs and port regulations

The *working area* is situated within a Customs controlled area and the *Contractor* and his people shall observe all Customs regulations within the port area.

The *working area* is also within a promulgated port area and the *Contractor* and his people shall observe all ISPS and Port Regulations within the port area. Copies of the Harbour Regulations are obtainable from the Port admin offices.

The fullest collaboration between the *Contractor*, the Port and the *Project Manager* is essential in regard to the working of the port.

5.1.8 Health and safety facilities on Site

At all times during the fabrication, erection and testing of the equipment the *Contractor* is responsible for the safety of all persons on the Site and on the equipment and shall have the necessary systems and procedures in place to effectively manage this.

The Transnet Port Terminals Document titled "Contractor S.H.E. Specifications" shall be completed by the *Contractor* and submitted to the *Project Manager* for approval, prior to access to site being granted by the *Employer*.

5.1.9 Site services and facilities

The contractor shall indicate what services and facilities are required if any. The *Contractor* is responsible for connecting up and for electrical cabling in the *working area* together with any associated costs.

A water supply point is available to the *Contractor* if required in the *working area*.

The *Contractor* must make his own arrangements for the disposal of sewerage and wastewater. Sewerage may not be wasted on site. Transnet facilities may not be used.

The *Contractor* must make his own arrangements for telecommunication facilities, if required, for his use during the execution of the *works*.

The *Contractor* shall provide everything else necessary for Providing the Works.

5.2 Completion, testing, commissioning and correction of Defects

5.2.1 Work to be done by the Completion Date

On or before the Completion Date the *Contractor* shall have done everything required to Provide the Works. The *Project Manager* cannot certify Completion until all the work, done and is also free of Defects which would have, in his opinion, prevented the *Employer* from using the *works* and Others from doing their work.

5.2.2 Testing and commissioning

5.2.2.1 Prerequisites for commissioning

A complete and detailed test and inspection protocol for testing of pre-assembled modules (if applicable), as well as the commissioning of the crane, shall be submitted by the *Contractor* for approval by the *Project Manager*, two months before the start of testing and/or commissioning. This test and inspection protocol shall include all tests and inspections required in terms of the respective specifications and other tests and inspections deemed necessary by the *Contractor* to prove to the *Employer's* satisfaction that the equipment complies with the Works Information and must include the following where applicable:

- Pre-commissioning tests to be performed by the *Contractor*
- Performance test recording the speeds of all motions under various load conditions
- Overload tests to crane
- Stability tests
- Tests to prove the integrity of the safety devices, limit systems and emergency systems
- Tests to prove the integrity of all service brakes and emergency brakes
- Functional tests
- Operational tests under simulated conditions
- General inspection for final quality, including paint quality

The *Contractor* will be required to show practically and analytically that the crane can repeat the duty cycle continuously at rated capacity and rated speeds and accelerations, without over heating or unduly breaking down.

5.2.2.2 Testing and commissioning

Modules pre-assembled off site shall be trial assembled and fully tested as far as practical and be accepted by the *Supervisor* prior to delivery to site. All tests performed off site shall be repeated once the crane has been completely erected as part of commissioning.

Before commissioning starts, the *Contractor* shall satisfy himself that the equipment is complete in all respects and shall carry out the necessary pre-commissioning tests of the equipment. During this period the *Supervisor* will carry out visual inspections on the equipment.

After approval of the test and inspection protocol by the *Project Manager*, the *Contractor* shall fully test the equipment in the presence of the *Supervisor* and according to the approved protocol. As far as practical the equipment shall be fully tested prior to it being moved into the operational area.

Load testing on the crane shall be performed at the erection area in accordance with code of practice 29 (125% overload tests). The *Contractor* shall be responsible for the supply of all load testing masses and measuring instruments.

All motions of the equipment shall be tested under load to simulate actual conditions, where applicable, to prove correct operation and to enable position indicators and limit switches to be set, and other operational adjustments made. Load shall be defined as the safe working load when the crane is working at maximum capacity, and including dynamic factors such as wind loads, shock loads due to acceleration and deceleration, etc.

Before the commencement of any tests the *Contractor* shall provide the initial fill of oil for all gearboxes and grease for components which require grease lubrication.

All simulation devices and test weights required shall be provided by the *Contractor*.

On completion of Commissioning, the *Contractor* shall issue a Commissioning Certificate with all prescribed statutory documents; test certificates; documentation certifying the class and safe working loads of the equipment (and specific components e.g., twist-locks, ropes hoists etc.) for approval by the *Project Manager*, prior to the commencement of the Endurance Testing. Where required by law, relevant certificates shall be issued by local authorities.

5.2.2.3 Endurance Testing

After successful completion of commissioning (approved Commissioning Certificate), the equipment shall be subjected to Endurance Testing, i.e. actual operation of the equipment in the handling of containers in the operational area of the port.

Endurance Testing will constitute a minimum of 100 hours (either continuous or consecutive sessions) of actual hours operation of the equipment doing container handling, of which the last 80 hours must be completely trouble free operation to the satisfaction of the *Project Manager*. If the operation is not trouble free, Endurance Testing will continue until the equipment functions trouble free for 80 hours before the Endurance Testing is deemed complete.

During Endurance Testing the crane will be operated by the *Employer's* personnel. The *Contractor* shall provide at his own cost, sufficient number of suitably qualified personnel and all equipment necessary, to rectify all faults and malfunctions occurring during Endurance Testing.

5.2.3 Technical support after Completion

The *Contractor* shall undertake that spares for all mechanical and electrical components of the crane shall be readily available for at least 7 years from date of Completion. Should spares be required during this period but not be readily available, the *Contractor* shall make modifications to the cranes to use readily available spares at that time, and at no cost to the *Employer*.

Should the equipment become substantially inoperable, inefficient or unsafe during the period between take over and the *defects date* due to defects, the *defects date* will be extended by the same amount of time that it takes to return the equipment to satisfactory operating state.

The *Contractor* shall also have a footprint in South Africa, with technical support to respond to any technical issues and breakdowns encountered on the crane, when required. A response time for technical support of less than 8 hours is envisaged.

6 Plant and Materials standards and workmanship

6.1 Referenced standard specifications

The tests prescribed in the relevant standard specifications shall be carried out at the manufacturer's works before delivery of the Plant and Materials ordered by the *Contractor*. The test results shall be submitted to the *Project Manager*.

Plant and Materials made and tested to alternative standard specifications will be considered at the discretion of the *Project Manager*, provided that such specifications are not less stringent than those laid down.

6.2 Referenced TPT documents

The following TPT documents listed below shall form part of this Works Information:

- TPT_TS_TwinLift_AC_STSCrane Rev No. 13
- TPT Standard Environmental Specifications version 3
- TPT Contractor S.H.E. Specifications
- TPT Equipment Branding and Logo Details

6.3 General

All Plant and Materials shall be new.

All Plant shall be installed according to the manufacturer's recommendations.

All Plant must be securely mounted on the cranes such that vibration and movement will not dislodge any components.

All rotating components shall be statically balanced before fitting. High speed rotating components shall also be dynamically balanced.

All fatigue sensitive welds on manufactured components shall be post weld treated by local burr grinding and shot preening afterwards.

Part C4: Site Information

PART C4: SITE INFORMATION

DESCRIPTION OF THE WORKS: THE DESIGN, MANUFACTURE, DELIVERY, ERECTION, TESTING AND COMMISSIONING OF ONE (1) 65 TON TWIN-LIFT SHIP-TO-SHORE (STS) AT PORT ELIZABETH CONTAINER TERMINAL FOR TRANSNET SOC LTD (REG.NO.1990/000900/30) OPERATING AS TRANSNET PORT TERMINALS HEREINAFTER REFERRED TO AS "TPT" AS A ONCE OFF SUPPLY

Part C4 Site Information

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SECTION 1

1. DESCRIPTION OF THE SITE AND ITS SURROUNDINGS

1.1. General Description

The Port of Port Elizabeth is located on the east coast of South Africa. The Port Elizabeth Container Terminal (PECT) was opened in 1976 with the purpose of handling containerised cargo. The Port of Port Elizabeth Container terminal operates in containers and skip-tainer handling equipped with three (3) Ship to Shore Cranes (STS) as well as nineteen (19) Straddle Carriers and have the capacity to handle 440 000 TEU's per annum.

Further site information which describes the site and its surroundings will be discussed with the successful tenderer.

The *Contractor* and his workforce shall, prior to starting any site erection/ commissioning activities attend a compulsory induction course at the Terminal. All persons entering the site area must wear full personal protective equipment.

1.2. Port Aerial View



2. BUILDING SITES AND PLANT MACHINERY

The following buildings and plant machinery are currently existing at the Terminal:

- Administration Buildings
- Domestic water pipeline
- Substations
- Storm water system
- Sewer system
- 3 ship to shore cranes
- 2 mobile harbour cranes
- 820 reefer plugs
- 19 straddle carriers

Figure 1: Arial view of Port Elizabeth Container Terminal

- 3 haulers (terminal tractors)
- 13 bathtub trailers
- 1 sweeper machine
- 3 forklifts
- 1 cherry picker

3. EXISTING SERVICES

The following (hidden) existing services are expected to be present on Site:

- Storm water
- Sewers
- Fibre-optic telecommunications line(s),
- Electrical supply (LV and MV) for equipment and facilities.

4. LAND OWNER

Transnet National Port Authority is the land owner for the terminal.

5. OFF LOADING POSITION FOR STS CRANE AND VESSEL RESTICTION



- Area marked in red is where the crane / crane components will be offloaded at berth 102.
- Maximum vessel size is 315 m LOA and a draft restriction is 11,9 m.

6. ALLOWABLE PAVEMENT LOADING

It must be noted that the allowable uniformly distributed load on the paving/ berth between the crane rails, as well as the back-up area behind the crane rails, is 40 kPa. This needs to be taken into account when slipping the crane.

DESCRIPTION OF THE WORKS: THE DESIGN, MANUFACTURE, DELIVERY, ERECTION, TESTING AND COMMISSIONING OF ONE (1) 65 TON TWIN-LIFT SHIP-TO-SHORE (STS) AT PORT ELIZABETH CONTAINER TERMINAL FOR TRANSNET SOC LTD (REG.NO.1990/000900/30) OPERATING AS TRANSNET PORT TERMINALS HEREINAFTER REFERRED TO AS "TPT" AS A ONCE OFF SUPPLY

7. COASTAL INFORMATION

The values are retained from the monthly weather forecast for the Port of Port Elizabeth as listed below.

Table 1: Cumulative rainfall per month

Month	Cumulative Rainfall
January	36
February	40
March	54
April	58
May	59
June	62
July	47
August	64
September	62
October	59
November	49
December	34

Table 2: Average number of days per month with rainfall of more than 1mm

Month	No. of Days
January	1.4
February	1.6
March	2.1
April	2.3
May	2.3
June	2.4
July	1.9
August	2.5
September	2.4
October	2.3
November	1.9
December	1.3

Table 3: Average wind speed per month

Month	Wind speed (mph)
January	11.7
February	11.4
March	10.8
April	10.6
May	10.8
June	11.5
July	11.7
August	11.8
September	12.2
October	12.5
November	12.3
December	11.9

TECHNICAL SPECIFICATION - TPT_TS_TwinLift_AC_STSCrane



TECHNICAL SPECIFICATION

SUBJECT : Twin Lift Ship to Shore Crane
DOCUMENT NO : TPT_TS_TwinLift_AC_STSCrane
REV NO. : 13
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1. **Scope**

This specification is for a rail mounted ship-to-shore gantry type crane to be used for the handling of 20ft and 40ft containers, 45 ft containers, 20ft tank containers, out of gauge containers, flat racks and heavy lifts.

The ship to shore crane shall be commissioned complete and fully assembled in all respects, including standard equipment supplied by the manufacturer and shall comply with the South African Occupational Health and Safety Act, Act 85 of 1993/as amended or equivalent international standard for mobile lifting equipment such as ISO, DIN, etc.

2. **Operational Requirements**

2.1 **Equipment Functionality**

2.1.1 The rail mounted ship-to-shore gantry crane shall be utilised for carrying one 20ft, two 20ft (twin lift), one 40ft container, one 20ft tank container or one 45 ft container.

2.1.2 These containers can be empty or fully laden with a SWL requirement (excluding spreader or hook beam weight) as follows:

Under Single Lift Spreader	:	SWL = 40,000 kg
Under Twin Lift Spreader	:	SWL = 65,000 kg
Under Hook beam to the end of the boom	:	SWL = 80,000 kg
Under heavy lift hook beam	:	SWL = 85,000 kg

2.1.3 The ship to shore gantry type crane design shall be suitable for operation at wind speeds as per the table below:

	Operating at maximum design operating speed	Operating at reduced speed	Stop operating	Preparation for anchor and lockdown
Wind speed	0 – 80km/h	81 – 90km/h	≥90km/h	91 – 100km/h

2.1.4 The crane shall be capable of handling the rated capacities for 24 hours per day.

2.1.5 Simultaneous operation of hoist, traverse and long travel is required, as well as boom and long travel, and maximum practical speeds must be employed for the motions in order to minimize cycle times.

2.1.6 The cranes must be equipped with standard trim, list and skew facilities and the hoist wire rope reeving system must be designed to minimize sway of the load

2.1.7 Main Crane design parameters.

2.2 Main Crane design parameters

No	Parameters	Description	Specification
1	Rated Load capacity	Load under the twin-lift spreader	65 tons
		Load under the single-lift spreader	41 tons
		under the hook to the end of boom hoist	80 tons
		under the hook	85 tons
2	Lifting Height	Above Rail	37m/43m (Works Info)
		Below Rail	16m
		Total	53m/59m(Works Info)
3	Outreach hoist	From sea side Rail	52m/65m(Works Info)
4	Back reach hoist	From land side rail	19m
5	Wheel Loading	Sea side rail	Works Information
		Land side rail	Works Information
6	Inside legs clearance	Maximum length of cargo	17m
7	Rail gauge	Distance between the seaside and landside wheels	Works Information
8	Overall crane width	Bumper to bumper	23m/27m(Works Info)
9	Hoist speeds (m/min)	Twin-lift full load	90m/min
		Empty spreader	180m/min
10	Trolley travel speed	Full Load	210m/min
11	Trolley travel acceleration	From zero to full speed	7s
12	Crane gantry speed	Boom full up	45m/min
		Boom down	20m/min
13	Boom hoist	From 0° to full stowage (80°)	6min
14	Anti snag	Alarm record for snag operation	Works Information
15	Anti sway	High wind operation	Works Information
15	Trim /list /Skew	Raging vessel operation	Works Information

2.3 Ergonomics

2.3.1 Operator's Cabin

- 2.3.1.1 The operator's cabin shall be mounted on the landside of the main trolley, facing the seaside, and is to be positioned such that the operator has full visibility of all operations when seated at the controls. The size of the cab shall be adequate for the operator, assistant operator and the equipment therein and shall allow ample space to permit convenient maintenance. The major items of equipment in the cabin are to be arranged such that they can be removed for repair without disturbing the walls, floors and structural frame.
- 2.3.1.2 The cabin shall be completely airtight sealed, weather and dust proof and fully constructed from 316 stainless steel. Cladding shall be fixed to the steel frame and be smoothed over to provide an aesthetic appearance. The outside of the cabin shall be painted as per the colour code in specification EEAM-Q-008.
- 2.3.1.3 The cabin shall have a double floor (for cabling) with removable galvanized checkered plates.
- 2.3.1.4 The walls and roof of the operator's cabin shall be suitably insulated to reduce the load on the air-conditioning system and improve the effectiveness of the system.
- 2.3.1.5 The inside of the cabin walls shall be clad in durable PVC or pre-painted aluminium. or Stainless steel.
- 2.3.1.6 A locally supplied and supported heavy duty, split type, marine air-conditioning unit that is available in South Africa is to be provided with due consideration to the high ambient temperature, solar, operator and equipment heat loads and humidity levels. It must be capable of maintaining the temperature in the cabin at 20°C and roughly 50% relative humidity for outside temperatures of up to 40°C and 90% relative humidity.
- 2.3.1.7 The condenser and evaporator of the air-conditioner must be easily accessible for cleaning and maintenance.
- 2.3.1.8 Ambient temperatures encountered may range from -5° C to +45° C dry bulb, with relative humidities varying from 15% to 100%.
- 2.3.1.9 The air must be distributed environmentally and not directly onto the driver, and must regulate the temperature between 18° C and 24° C (dry bulb).
- 2.3.1.10 The refrigerant must preferably be R134a. No hydrochlorofluorocarbons (HCFC's) will be permitted.
- 2.3.1.11 The unit must have an integral heating facility.
- 2.3.1.12 A pressurizing unit with replaceable intake filter shall also be provided. The filter must be able to prevent pollution from ship (exhaust gases) and dust from entering the cabin.
- 2.3.1.13 Demisting of the windows shall also be provided for.
- 2.3.1.14 A fully adjustable, upholstered chair with armrests and adjustable height shall be provided for the operator, and a tip-up seat for an assistant. Chair shall be designed in accordance with ISO 11226.

- 2.3.1.15 The noise level inside the operator's cabin shall not exceed 85dB during normal operation.
- 2.3.1.16 A stainless steel, hermetically airtight sealed door, opening outwards, with window and having handles of robust construction shall be provided, arranged for exterior locking, and connecting to an exterior access platform.
- 2.3.1.17 Hinged mirrors shall be mounted in front of the driver's cabin to enable the operator to observe vehicle activities on the ground, while trolleying towards the landside. All mirrors installed shall be of the convex type with a minimum diameter of 400 mm, and easily accessible for cleaning purposes.
- 2.3.1.18 The main access route to the cabin will be directly from a fixed access platform, at the trolley park position, onto the cabin access platform. This route shall be provided with interlocked access gates to prevent the trolley from travelling while somebody is entering onto or leaving the cabin through the main access route and prevent the gate from being opened when the trolley is not in the park position.
- 2.3.1.19 A secondary access route to the cabin must also be provided. This will give access to the cabin platform from the boom or girder via the top of the trolley by means of stairway or ladder. The driver must have access from the boom and girder walkway onto the trolley, and vice versa, irrespective of the position of the trolley along the boom or girder.
- 2.3.1.20 The cabin shall be glazed as necessary on all sides and bottom, giving the operator full visibility and a clear view at all times from the seated position. Structural members shall be arranged in a manner that minimises obstruction in the operator's field of vision.
- 2.3.1.21 All the glazing of the operator's cabin is to be of anti-glare, solar heat-reducing hardened safety (shatter proof) glass of 5mm minimum thickness.
- 2.3.1.22 The floor window of the Operator's cabin shall be sealed. The safety grid on which the Operator rests his feet shall be hinged to open upwards away from the glass to enable regular cleaning of the glass.
- 2.3.1.23 Fixed safety grids shall be provided over all other floor windows.
- 2.3.1.24 Where it will not obstruct the operator's view, a walkway with handrails shall be provided to allow for cleaning the windows.
- 2.3.1.25 A sufficient number of windows shall slide open to allow the cleaning of all windows that cannot be reached from the walkways, and to allow good ventilation in case the air-conditioner fails.
- 2.3.1.26 Electrically operated self-parking marine purpose windscreen wipers and washer system shall be provided for the main side and front windows.
- 2.3.1.27 A microphone and amplifier of 50 watt RMS power shall be mounted on the console in front of the operator and shall be operated through a foot or push-button switch to four re-entrant horn type loudspeakers mounted underneath the cabin.
- 2.3.1.28 A suitable locker for operating manuals is to be provided in the cabin.
- 2.3.1.29 A suitable shelf for mounting the radio and telephone equipment shall be provided in a position that would allow the operator easy access to the radio.

- 2.3.1.30 A suitable shelf for mounting the computer equipment shall be provided in a position that would allow the operator easy access to it
- 2.3.1.31 A small wall mounted shelf shall be supplied in a convenient position for oddments storage.

2.3.2 Operator's Controls

- 2.3.2.1 The operator's cabin shall contain control equipment, arranged in the form of a control console positioned on either side of, and integrated into, the armrests of the operator's chair. The design and positioning of the chair and control consoles shall be such as to ensure maximum visibility and accessibility. All the necessary controllers, selector switches, push buttons etc. for manual control shall be mounted on the consoles.
- 2.3.2.2 The man machine interface computer display shall be mounted in a convenient position. The display position and type shall be such as to prevent excessive glare and eye-strain.
- 2.3.2.3 It shall be possible to easily inspect or change equipment without removing any wiring or other equipment.
- 2.3.2.4 Robust digital joystick controllers of the stepless type are preferred for the control of the main mechanisms. The effort required to operate the controllers shall be such that no fatigue shall be suffered by the operator during long spells of duty.
- 2.3.2.5 The main controllers shall be equipped with a dead man facility causing the crane motions to revert to a safe situation when the operator's grip on the controllers is released.
- 2.3.2.6 The handle on controllers shall be of hardwood or equivalent synthetic material.
- 2.3.2.7 Each controller shall be fitted with an engraved plate label secured with stainless steel rivets clearly indicating the motions controlled and the direction of motion corresponding to the lever positions.
- 2.3.2.8 Switch contacts shall be of high quality silver and shall have a wiping action with provision to prevent "tracking" across insulation. Alternatively, inductive type controllers are acceptable.
- 2.3.2.9 Indicator lamp colours shall be as varied as possible, and all indicators shall be adequately marked. The use of embossed tape is not permitted. LED type indicator lamps are preferred.
- 2.3.2.10 The driver's console layout shall be as similar to the Employer's existing cranes as possible. All motion controllers shall be in the same position and orientation as the existing cranes.
- 2.3.2.11 The Employer's acceptance of the operating philosophy, operator's cabin layout, control equipment and displays must be obtained by the Supplier prior to any associated manufacture and/or procurement.
- 2.3.2.12 Control equipment shall consist of at least the following and be positioned as indicated:

2.3.2.12.1 Main hoist and long travel

2.3.2.12.1.1 One 4 quadrant combined controller slightly to the right of the operator's seat and placed so as to be convenient to the operator's right hand. The controller shall be arranged to operate as follows:

- Towards the front of the cab for lowering
- Towards the back of the cab for hoisting
- Towards the left of the cab for long travel to the left
- Towards the right of the cab for long travel to the right

2.3.2.12.1.2 This same controller shall be provided with push buttons on the controller for twistlock lock and unlock.

2.3.2.12.2 Trolley and cross travel

2.3.2.12.2.1 To the left of the operator's seat and placed so as to be convenient to the operator's left hand. The controller shall be arranged to operate as follows:

- To the front of the cab for cross travel towards the seaside
- To the back of the cab for cross travel towards the landside

2.3.2.12.3 Other control equipment

2.3.2.12.3.1 The following minimum additional controllers shall be arranged in the cabin within easy reach of and clearly visible from the operator's normal working position, preferably on the driver's consoles.

- Push buttons for tripping and resetting the main contactor
- Push button for over-riding the long travel anti-collision device
- Emergency stop push button. (Red Mushroom type).
- Rail brake operating switch
- Adjustment of the spreader telescopic length
- Operation of the twistlocks
- An automatic lock facility must be provided on the spreader to automatically lock the twistlocks when the spreader is correctly landed on the container. This facility must be able to be pre-selected or disabled by the operator. A time delay adjustable between 0 and 10 seconds must be provided to inhibit twistlocks lock to give the spreader time to land properly on the container
- Control for gathering devices (flippers). It is required that flippers can be controlled individually, in pairs or all four together
- A selector switch to select automatic landside lowering slow down for landing a container either on ground (straddle carrier operation), on a trailer (trailer mode) or to switch the facility off
- A selector switch to select or deselect the automatic waterside lowering slow down facility

- List, trim and skew controls, with push button selection of the neutral position
- Push buttons for boom hoisting and lowering
- Selector switch for rail brake application
- Selector switch for cabin control/ remote control
- Push button to test all indicator lights
- Push buttons for floodlights on/off
- Where crane is required to operate with a revolving spreader; control functions are required for gripper open/close and rotation seaside/landside

2.3.2.12.3.2 The following minimum indications shall be provided by means of LED type indicator lights:

- Main circuit breaker closed
- Position of twist locks
- Position of telescopic beam of spreader
- Hoisting overload
- Hoisting eccentric load
- Boom latches engaged/ disengaged
- Status of rail brakes
- Status of gantry storm pins
- Status of trolley storm pins
- General alarm
- Fault indication of faults on the spreader and headblock such as low oil level, low hydraulic pressure, overheating etc.
- Twistlock locked or unlocked
- Spreader landed correctly
- Wind speed reaching pre-set values
- Where crane is required to operate with a revolving spreader; LED indications are required for gripper open/close, rotation seaside/landside and home position.

2.3.2.12.3.3 The following shall be controlled from or displayed on the MMI:

- Engage heavy lift mode
- Manual or maintenance mode
- Overriding the anti-collision devices
- Mass of container lifted and eccentricity
- Warnings and fault messages

2.3.3 Crane Operational Aids

2.3.3.1 A simplified anti-sway control system shall be provided, utilizing a PLC control algorithm to control trolley and gantry travel accelerations and decelerations, using only motion speeds, load mass and hoist rope length as input parameters.

2.3.3.2 A visual (laser type) line-up system shall be fitted to the crane. The line-up system shall allow for longitudinal positioning of the yard equipment serving the crane.

2.3.3.3 The crane shall be fitted with a suitable load monitoring system. The load cell pins shall be mounted on suitable main hoist sheaves in such a way that mechanical work in that area will not damage the pins and wiring. The sheaves and pins shall be arranged and designed to ensure easy replacement of the pins.

- 2.3.3.3.1 The system shall measure the load corresponding to each of the two ends of the spreader independently, and have separate outputs for these two values as well as the total load.
- 2.3.3.3.2 The system shall be provided with the necessary signal conditioning equipment to prevent spurious readings.
- 2.3.3.3.3 Instantaneous load readings shall be sufficiently integrated to prevent spurious trips due to dynamic load transients.
- 2.3.3.3.4 The system shall have a separate display in the operator's cabin showing the mass of the container being lifted as well as whether the eccentricity is within allowable limits (10%). The system shall be fitted with an audible alarm, which must sound if either the safe working load of the crane or the eccentricity of the load is exceeded, for either normal container working or heavy lift.
- 2.3.3.3.5 All the outputs from the load monitoring system shall also be fed to the PLC for control and recording purposes.
- 2.3.3.4 The crane shall be equipped with a closed circuit television system with high depth of field (fixed focus) cameras.
- 2.3.3.5 The camera controls shall be mounted in the operator's cabin in a position that would be convenient to the operator while operating the trolley and hoist and must provide for manual zoom and contrast adjustment.
- 2.3.3.6 The cameras shall assist the operator with:
 - 2.3.3.6.1 Back-reach operation (wide angle lens with manual zoom capability)
 - 2.3.3.6.2 Monitoring of boom operation (wide angle lens with manual zoom capability)
 - 2.3.3.6.3 Monitoring of ship operations (wide angle lens with manual pan and zoom capability)
 - 2.3.3.6.4 Spreader positioning (manual zoom capability)
- 2.3.3.7 The camera shall be of suitable ruggedised design and be rigidly mounted in a position that offers unobstructed view of the backreach operations.
- 2.3.3.8 The monitor shall be mounted in the operator's cabin in a position that would be convenient to the operator while operating the hoist and that will minimise glare on the screen.
- 2.3.3.9 The camera system shall be capable of recording information for a 5 day period. The system shall contain a USB port which will enable the downloading of this information.

2.4 Terminal Specific Requirements

- 2.4.1 In terms of terminal specific technical requirements, the Supplier shall refer to the Works Information for the following items, included but not limited to:
 - Terminal operation type e.g. Straddle carrier or hauler and trailer, etc.
 - Crane rail type, span and distances from quay edge
 - Landside and waterside crane rail height differences
 - Maximum load distribution on rail

- Maximum permissible wheel loadings of crane
- Position of trailing power supply cable and reeling drum
- Position of storm pins
- Position and details of stop-block
- Details and position of holding down anchors
- Spreader outreach across vessel
- Spreader height above deck of vessel
- Backreach
- Inside clearance between crane gantry legs
- Height under crane portal tie beams

3. Technical Requirements

3.1 Design Requirements

3.1.1 Classification and structural design requirements

- 3.1.1.1 The principle design specifications shall be the following Standards and Rules for the design of cranes and components:
 F.E.M.1.001-3rd Edition – Revised 1998.10.01 – Rules for the design of hoisting appliances
 BS 2573 – Rules for the design of cranes
 F.E.M.1.004 – 2000.07.30 – Recommendation for the calculation of wind loads on crane structures

- 3.1.1.2 All load combinations, stress, mechanism and component calculations shall be according to the above specifications.

- 3.1.1.3 The crane structure shall be at least group A7, designed to provide a service life of at least 2 million complete hoisting cycles with the state of loading to be expected.

- 3.1.1.4 Classification of the crane structure in terms of FEM/1.001 3rd edition must be sufficient to provide at least 2 million operating cycles and hoist and traverse mechanisms with 50,000 hours operating life for single lift and 12,500 hours operating life for twin lift.

- 3.1.1.5 The major mechanisms shall be designed for the following minimum total duration of use for typical utilization of the particular mechanism and a state of loading to be expected:

Mechanism	<u>Minimum group classification</u>	<u>Minimum Total Duration of Use</u>
Boom hoist	M4	6,300 hours
Main hoist	M8	50,000 hours
Trolley travel	M8	50,000 hours
Gantry travel	M6	6,300 hours

- 3.1.1.6 Loads due to snow, ice and earthquakes can be excluded from the design as these conditions are not normally encountered in South Africa.

- 3.1.1.7 All other relevant main, additional and special loads and dynamic effects shall be taken into account. All load calculations shall be in accordance with the relevant specifications.

- 3.1.1.8 The cranes shall be designed for a maximum in-service wind (uniform with height above ground) of 100km/hr (450Pa) from the least favourable direction relative to the crane. The effects of such a wind on all mechanisms shall be taken into account.
- 3.1.1.9 The crane shall be designed to safely withstand wind pressures under “out of service” conditions as stipulated in BS 2573.
- 3.1.1.10 The design calculations have to take into consideration that when the crane is not in service the boom must be up in the stow position, so as not to jeopardize the sea traffic.
- 3.1.1.11 In wind speeds above the in-service conditions but below the out-of-service conditions, the crane would be required to be made safe. This would require the crane to be able to safely travel to the nearest parking position against such winds or be able to come to a complete stop, using the service brakes only, when travelling with such winds. The safety against drifting in these conditions shall also be attainable using the rail brakes only.
- 3.1.1.12 The safety against overturning shall at least comply with FEM. Supplementary means of mooring may only be considered to ensure stability when required for the out of service conditions.
- 3.1.1.13 The safety against drifting (due to wind and inclination) during operation in the limiting working wind shall at least comply with FEM1.001, based on only 90% of the respective brakes being operational.
- 3.1.2 Design Parameters
- 3.1.2.1 The following table lists the salient design parameters. The Supplier shall ensure that the crane as designed to meet parameters and shall clearly indicate where the design parameters differ.

Parameter	Value
Rated load, under single lift telescopic spreader	40,000 kg
Rated load, under twin lift telescopic spreader	65,000 kg
Rated load, under heavy lift beam	80,000 kg
Load eccentricity	610mm longitudinal and 200mm lateral for 20ft (6m) containers 1370mm longitudinal and 200mm lateral for 40t (12m) container
Max length over non-compressed buffers	27m
Boom construction preference	Single box / double box / lattice
Total long travel distance with trailing cable of 350m minimum from the turnover point	700m

3.2 Long Travel Structure

- 3.2.1 The portal structure shall consist of seal-welded box sections. The air-tight integrity of each box section shall be tested with compressed air up to a pressure of 0,5 bar (50kPa) absolute pressure.
- 3.2.2 Bogie assemblies shall be fully compensating with equalizing beams pin connected to the sill beams. Jacking points shall be provided on the main equalizing beams in order to jack up each corner.
- 3.2.3 The spacing between bogies and wheels and the design of the bogies shall be such as to allow the removal of middle wheels without lifting the entire leg. Suitable jacking points for the removal of individual wheels shall be provided.
- 3.2.4 Structural stops must be provided on each bogie to prevent the bogie from dropping more than 35 mm in case of a shaft or wheel failure.
- 3.2.5 In addition to the service brakes, a sufficient number of hydraulically released, spring applied stamp down type rail brakes or wedge type rail brakes are to be provided on each corner of the crane (at least one per corner). Clamp type rail brakes are not acceptable. These brakes are to engage automatically when the crane is powered down, in the event of a power failure or when the crane starts drifting during operation. Each rail brake must have its own hydraulic power pack. The coefficient of friction to be used for the calculation of braking effect between the rail crown and serrated brake block must not exceed $\mu = 0.25$.
- 3.2.6 The hydraulically released, spring applied stamp down type rail brakes should be designed such that the operator is able to have them released / activated while the crane power is still on. In such an event, a clear alarm should come on the operator screen showing that brakes are engaged.
- 3.2.7 The driving units of the rail brakes shall be enclosed in stainless steel or GRP weatherproof housing which must offer easy access for maintenance and servicing purposes. Due regard is to be given to heat loads and frequent wave splashing when designing the housings.
- 3.2.8 Reducers must drive directly onto the wheel shafts and be coupled to the wheel shafts with a rigid flange coupling or a hollow shaft mount. Any connecting / mounting bolts must be easily accessible.
- 3.2.9 Long travel drives will be mounted such that they do not stand proud of the bogies in a position that can cause collision hazard for passing traffic. The motor and gear arrangement must be protected by a bolted on guard frame manufactured from suitable tubing.
- 3.2.10 The long-travel structure must be designed to prevent crabbing from occurring and if required an active anti-crabbing device shall be fitted.
- 3.2.11 The long travel wheels shall be double flanged, with a maximum flange depth of 25 mm to suit the specified rail, and shall be carried on live axles in anti-friction bearings. The roller bearings shall be of adequate load bearing capacity and have an L10 life exceeding the total duration of use.
- 3.2.12 The bearing housings for long travel wheel bearings shall bolt onto the bogie frame to facilitate easy replacement of complete wheel assemblies.
- 3.2.13 The wheels shall be shrunk onto the wheel axles.

- 3.2.14 The wheel, axle and bearing assembly shall be so designed that removal for maintenance, inspection or replacement can be achieved with the minimum of delay and without removing the respective bogie. Substantial jacking points shall be provided.
- 3.2.15 At least one spare bogie, complete with motors, brakes, gear reducers and a new hinge pin, shall be supplied as part of the contract. Where more than three identical cranes are to be supplied per location, the Supplier shall supply one complete spare bogie for every three cranes supplied.
- 3.2.16 All long travel wheels and bogies shall be identical and completely interchangeable.
- 3.2.17 Bogies on both sides shall be completely interchangeable.
- 3.2.18 Rail sweeps shall be provided on the leading bogies. These sweeps must clean the top and flanks of the rails.
- 3.2.19 Suitable constant force hydraulic buffers (similar to OLEO) with telescopic dust boots shall be provided on the leading bogies on both sides. The centre line of the buffers must be 1500 mm vertically above the rail.
- 3.2.20 Parking pins must be provided on both the landside and seaside travel structure. These parking pins must be rated for the out of service wind conditions, must not be more than 100 mm diameter and must be suitable for manual connection to existing sockets. When parked, pins must engage at least 75 mm deep into the sockets. The Supplier shall provide storm tie-down anchors if required.
- 3.2.21 The parking pins are to be electrically interlocked with the travelling motion so that they must be disengaged before the motion can be operated.
- 3.2.20.1 The safety against drifting in storm wind conditions must be attainable using the rail brakes and 50% of the service brakes only or only the parking pins.
- 3.2.22 Two ground control stations must be provided at ground level, one each on the inside of the landside and seaside sill beams to give adequate view of parking operation. These ground control stations shall be provided with emergency stop buttons. The ground control stations shall be lockable.
- 3.2.23 Controls in the ground control station shall allow for inching of the long travel motion in order to facilitate the release of the parking pin.
- 3.2.24 Interlocking shall be provided such that when the operator is in control of the crane, the long travel from the ground control station is inoperative. It shall, however, still be possible to operate the emergency brakes from this position.
- 3.2.25 Brass, pantograph type earthing shoes running on the rails shall be provided on each side of the structure. The structure, equalizing beams, and all the bogies shall be electrically interconnected by means of 50mm² welding type insulated cable bonding straps.
- 3.2.26 A suitably sized cargo coordinator cabin must be provided at ground level in the centre of the crane under the landside sill beam. This cabin must be fitted with a swivel chair and table for use by the checker, and also be provided with a HMI panel indicating twist-locks selection / status, weights, wind speed, faults and other viewable parameters. Two lockable, sliding type access doors, one on the seaside and one on the landside must be provided. Provision must be made for latching these doors in the open position as well. This cabin must have a 316 stainless steel frame and external stainless steel

cladding of 1.3mm minimum thickness. The outside of the cabin shall be painted as per the colour code in specification EEAM-Q-008. Cabin to be fitted with a locally supplied and supported heavy duty, split type, marine air-conditioning unit that is available in South Africa, a sensor shall be included to automatically switch-off the air-conditioning unit when the cabin doors are left open.

3.3 Superstructure

- 3.3.1 The crane structure shall consist of seal-welded box or tubular sections. The air-tight integrity of each box section shall be tested with compressed air up to a pressure of 0,5 bar. (50kPa) absolute pressure.
- 3.3.2 Stays shall either be sealed sections of generous wall thickness (to allow for corrosion losses) or solid sections arranged such that all faces can be easily reached for painting and cleaning.
- 3.3.3 Ballast/counter weights shall be of concrete or cast iron, in manageable sections with the mass in kilogram cast into the visible surface, and shall be painted with an appropriate system. Stainless steel lifting lugs shall be provided on each section. A plate showing total ballast mass shall be fixed to the ballast structure.
- 3.3.4 Adjustable flange connections shall be installed in suitable positions to allow for future differences in the levels of the seaside and landside rails.

3.4 Boom and Boom Operation.

- 3.4.1 The boom shall be of welded construction, hinged at the inshore end to allow ship docking, and shall be rigidly supported in the horizontal working position by forestays between the outer end and the head of the main frame and by pads at the hinged joint.
- 3.4.2 The boom structure shall be of either the single; or double box; or lattice type.
- 3.4.3 The boom hinge shall be of the spherical plain bearing type. The hinge arrangement shall be such that the hinge pins/bushes can be readily replaced without removing the boom, and while maintaining the structural stability and safety of the crane during the replacement process. Self lubricating bush bearings will also be acceptable, however in addition, greasing connection must be made available. Any special tools that would be required for this process shall be supplied (1 set). Access platform or stairs will be provided to enable access to the greasing points for the forestay arms swivel joints.
- 3.4.4 The boom shall be capable of being raised to a near vertical position (at least 80° from horizontal) and lowered by means of a hoist drive with two independent ropes, each capable of supporting the boom.
- 3.4.5 The geometry of the crane shall be designed such that no part of the crane protrudes into the ships clearance area when the boom is in the stowed position.
- 3.4.6 The boom hoist wire rope safety factor shall not be less than 6 to ensure that should one rope break the second rope would carry the boom with a safety factor of 3. The boom hoist wire rope shall be designed such that it is not a single continuous wire rope but two independent wire ropes.
- 3.4.7 A system shall be provided to ensure an equal sharing of the load between the ropes (except when one rope breaks).
- 3.4.8 The boom hoist mechanism shall be installed in the machinery house.
- 3.4.9 The boom hoist mechanism shall be provided with a spring applied electrically/hydraulically released service brake able to stop and hold the boom safely in any position, as well as an emergency brake that operates directly on the rope drum. Both the service brake and emergency brake shall be a disk brake system, using self adjusting T-calipers. The emergency brake shall be of the spring applied, electrically/hydraulically released type and shall be capable of stopping and holding the boom if the emergency stop is activated or if the lowering speed exceeds 115% of the rated speed. A manual release to enable controlled lowering of the boom with the service brake shall also be provided. In the event that the boom hoist mechanism is equipped with two rope drums and the gearbox is located in the centre, each rope drum is to be equipped with an emergency brake.
- 3.4.10 The boom hoist motor, gearbox, brake and drum must be mounted on a common rigid frame such that their alignment can be easily and reliably adjusted.
- 3.4.11 All couplings shall be maintenance free i.e. greased and sealed.
- 3.4.12 An auxiliary hoist drive shall be provided for raising and lowering the boom under emergency conditions. This auxiliary hoist drive must be controlled from the machine house, in a position that affords a clear view of the boom while it is being hoisted.

- 3.4.13 A manually operated latch must be provided to lock the boom in its stowed position so that the load on the hoist ropes can be released. The mechanism shall be positive and failsafe. The boom hoist shall be interlocked so that the boom cannot be lowered while the latch is engaged. Provision shall be made so that the latch cannot be operated while the boom is resting on it.
- 3.4.14 Back-reach operation must be possible while the boom is in stow position.
- 3.4.15 The crane must be able to long travel with the boom at any inclination.
- 3.4.16 Rubber or elastic type buffers shall be provided to cushion the boom at the stowed position.
- 3.4.17 Special attention must be given to the elimination of any resonance in the super and boom structure due to the drive systems as well as high wind speed. A structural vibration analysis will be required to be done by the Supplier.
- 3.5 Cross Travel Trolley**
 - 3.5.1 The cross travel trolley shall be carried on four wheels.
 - 3.5.2 A self-driven trolley (not rope towed), with a redundancy system that will allow normal operation in case of failure of 50% of the drives, is required.
 - 3.5.3 The trolley frame shall be built up of structural steel, securely welded and bolted together, provided with ample stiffeners to ensure rigidity, and suitably decked where necessary for access and maintenance purposes.
 - 3.5.4 The wheels shall be double flanged type, with a width to suit the trolley rail, and with a bearing housing, all similar to wheels in accordance with DIN 15080. Roller bearings must be of adequate capacity, in accordance with F.E.M. Standards.
 - 3.5.5 To ensure perfect alignment and to prevent crabbing of the trolley, the wheel support faces must only be machined on the complete and properly aligned trolley structure.
 - 3.5.6 The trolley shall be provided with suitable devices to prevent derailment and protection against the trolley falling down in the event of a broken wheel or axle.
 - 3.5.7 All machinery on the trolley (including sheaves, wheel assemblies etc.) shall be arranged to permit easy removal for maintenance.
 - 3.5.8 Hydraulic impact absorbing buffers shall be provided to cushion any over travel on the trolley, with matching stops provided on the bridge and girder.
 - 3.5.9 The cross travel drives shall be mounted in easily accessible positions on the trolley.
 - 3.5.10 All the wheels of self-driven trolleys must be electrically driven and braked.
 - 3.5.11 The gearboxes shall be mounted by rigid flange couplings or a hollow shaft mount, directly to the wheel axles.
 - 3.5.12 The brakes and gearboxes shall comply with the same requirements as those for the long travel.
 - 3.5.13 Trolley rails of a freely available local and international section of at least 57kg/m must be fixed to the boom and girder by means of galvanized

Gantrex or similar adjustable rail clips. The rail clip fasteners shall be of minimum M16 dimension. The rail must be mounted on impact absorbing Gantrex or similar pads, with steel sections at the boom joint to provide a fixed point for expansion.

- 3.5.14 Alternatively, the Supplier may install trolley rails of suitable section and material that are permanently welded to the boom and girder, subject to acceptance by the Project Manager. The Supplier shall guarantee that the rails will last the lifetime of the structure without having to be replaced, realigned or re-profiled.
- 3.5.15 A system must be provided to allow the rails at the boom joint to be aligned both vertically and horizontally with minimal effort. The alignment must be able to be reliably maintained.
- 3.5.16 A system to ensure smooth cross-over of the trolley over the rail joint at the boom hinge must be provided.
- 3.5.17 Replacement and alignment of the trolley rails must be easily undertaken.
- 3.5.18 Interlocks shall be provided to ensure that all other motions are inoperative during boom hoisting and lowering.
- 3.5.19 It shall not be possible to raise the boom with the trolley on the seaside of the boom hinge, and the trolley motion shall be limited to the landside of the hinge if the boom angle is in excess of the maximum operational angle.
- 3.5.20 An emergency manual or power driven trolley retrieving system must be provided to move the trolley from the boom to the girder in the event of mains power failure or failure of the main trolley drive.

3.6 Catenary Trolleys

- 3.6.1 Catenary or auxiliary trolleys, when required, are to be rope-driven and shall provide effective and trouble-free support for the trolley ropes and the main hoist ropes. The catenary trolley ropes have to be pre-tensioned at the end of the fixed girder.
- 3.6.2 The arrangement of the auxiliary trolleys shall be such that they travel at half the speed of the main trolley.
- 3.6.3 All equipment on the catenary trolley (including sheaves, wheel assemblies, rollers etc.) shall be arranged to permit easy access and removal for maintenance.
- 3.6.4 The catenary trolley's wheels shall be double flanged to suit the trolley rail and shall be carried on live axles running in sealed for life roller bearings. The roller bearings shall be of adequate load bearing capacity. Anti-derailing brackets shall be fitted to the trolley.

3.7 Main Hoist

- 3.7.1 The main hoist mechanism must be located in the main machinery house.
- 3.7.2 The mechanism shall consist of one single gearbox with two motors, two service brakes and may have one or two rope drums.
- 3.7.3 The main hoist shall have two independent service brakes. The independent service brake shall be spring applied, electrically or hydraulically released,

self adjusting T-caliper disk brakes with manual release. They shall be of an approved make and must be fitted with reliable brakes open/closed limit switches.

- 3.7.4 A brake test facility shall be supplied, where the hoist brakes are tested under dynamic conditions and a full load current is held for 3 seconds without slipping. A software facility shall be added to the PLC and drives to allow for dynamic load tests to be performed. Crane shall trip if any brake slippage occurs.
- 3.7.5 Each main hoist drum shall be fitted with emergency disk brake, with the disk mounted directly onto the rope drum. The emergency brakes must engage in case of a hoist overspeed, emergency stop, and when the crane is powered down. Each emergency brake shall be capable of safely stopping and holding the rated load from 20% overspeed.
- 3.7.6 The crane's reeving system shall be a reeve through system. The spreader headblock shall be suspended on four sheaves minimum, sufficiently separated to provide stability and sway dampening when containers are being handled, even under windy conditions.
- 3.7.7 The reeving geometry shall be such that the allowable fleet angles are not exceeded for any position of the trolley and hoist.
- 3.7.8 Adequate rope clearances must prevail at all times when handling containers below ship's deck with the vessel listed by up to 2.5°.

Headblock

- 3.8.1 The crane shall be provided with a reeved-in headblock.
- 3.8.2 Attachment of the headblock to the lifting attachments shall be done manually by means of twistlocks, arranged to fit standard adjustable length and fixed length spreaders, as well as a heavy lift beam.
- 3.8.3 Suitable means of eliminating play between the headblock and attachments must be provided, in order to prevent wear.
- 3.8.4 Interlocks shall be provided to prevent the headblock from being hoisted when not correctly locked onto a lifting attachment.
- 3.8.5 The electrical and power and control circuit supplies from the cross-travel trolley to the headblock and spreader shall be furnished through a single, heavy duty, multi core flexible cable. The cable shall be arranged to wound onto a cable reeling drum mounted on the trolley. The cable shall consist of electrical power cores for the 3 phase power supply and neutral / earth and a sufficient number of shielded metallic or optical fibre control signal cores. A minimum number of 4 spare control signal cores must be provided. Metallic control cores must have a minimum cross-sectional area of 2,5 mm².
- 3.8.6 The cable reeling drum system must comply with Employer specification EEAM-Q-019 and the Supplier shall ensure that the system is suitably designed to provide for reliable operation even in maximum in-service wind conditions.
- 3.8.7 The cable shall be fixed solidly to the headblock and shall terminate with a standard weatherproof, quick change plug and socket of an approved make for connection to the spreader. A dummy weather proof socket shall be provided on the headblock to which the plug can be secured when the spreader is disconnected. Headblock to be fitted with a platform to allow access to the spreader supply cable.
- 3.8.8 The means of fixing the cable to the headblock shall be such as to protect the cable from damage due to mechanical shock loads during operation.

3.9 Spreaders

- 3.9.1 The crane shall be supplied with telescopic spreaders capable of single and twin lift container handling. If required as per works information mobile maintenance spreader testing station to be supplied.
- 3.9.2 The spreaders shall be capable of handling over height frames.
- 3.9.3 The crane management system and operator controls shall be ready for the use of either single lift or twin lift spreaders without the need for any further modification to the crane.
- 3.9.4 Spreaders shall be equipped with height detection and Smart Spreader Communication, Control and Monitoring System.
- 3.9.5 Each spreader must be provided with a key switch for selecting maintenance mode. In this mode it must be possible to manually operate all spreader mechanisms.

- 3.9.6 The spreader control system combined with the spreader on-board intelligence shall be designed to offer the following functionalities:
- 3.9.6.1 Arrangement to allow selection of various combinations of individual flippers shall be possible.
 - 3.9.6.2 Telescopic retraction if the spreader becomes jammed in the ship's container cell.
 - 3.9.6.3 Measurement of height between spreader and container and automatic slow-down when landing the spreader on a container, shall be possible.
- 3.9.7 Logging of monitoring and diagnostic information shall be possible. This information must be interrogated by the crane operating system but must also remain available on the spreader after the spreader is disconnected from the headblock, to be interrogated by maintenance staff by means of suitable spreader test panels. A mobile maintenance spreader testing station to be supplied with the spreader.
- 3.9.8 Small, unobtrusive, optical type indicator strips must be provided in the operator's cabin for indication of twistlocks open, twistlocks closed and spreader landed. These indicators must be positioned on the cabin floor between the position of the operator's feet
- 3.9.9 The twin-lift spreader will be provided with the safety feature to detect between 40 foot and two 20 foot containers. An alarm to warn the operator must be provided.

3.10 Heavy Lift Beams

- 3.10.1 Heavy lift beams must be designed to fit to the head block and to engage through the standard twist locks on the head block
- 3.10.2 The heavy lift beams must be fitted with a central latching and swivelling hook (80 ton capacity) and four lifting eyes of 20 ton capacity each.
- 3.10.3 The attachment of the heavy lift beam must be automatically detected by the crane control system to set and lock the operation to heavy lift mode.
- 3.10.4 In heavy lift mode all speeds must be reduced to a safe level to be determined by the Supplier. Where the maximum outreach is to be limited in heavy lift mode, such reduced travel position shall be set by the crane's control system and be detected by an ultimate limit.

3.11 Trim, List and Skew Devices

- 3.11.1 The crane shall be equipped with a system to independently trim, list and skew a suspended container at any normal hoist and trolley position, and with any admissible load.
- 3.11.2 These devices shall be mounted on the crane structure or trolley, and not on the headblock.
- 3.11.3 When mounted on the boom, it shall be mounted on the fixed girder section so as not to be directly exposed to the corrosive affects of the sea. Trim, list and skew devices fitted on the front boom tip shall not be accepted.

- 3.11.4 The list, trim and skew motions are defined as follow: Construct a right handed tri-axial coordinate system, with the x-axis horizontal and parallel to the gantry travel direction, y-axis parallel to the trolley direction, and z-axis vertical upwards.
- 3.11.4.1 List is a rotation around the x-axis, and a range of motion of – 5° to +5° is required
 - 3.11.4.2 Trim is a rotation around the y-axis, and a range of motion of – 5° to +5° is required
 - 3.11.4.3 Skew is a rotation around the z-axis, and a range of motion of –5° to +5° is required.
- 3.11.5 The average speeds of motion must be at least 0,25° per second for list and trim and 0,5° per second for skew.

3.12 Machinery and Electrical Houses

- 3.12.1 The crane shall be provided with a separate self contained, fully weatherproof, steel framed and pre-painted, aluminium clad machinery house, with the outside painted to RAL 3020.
- 3.12.2 A fully enclosed electrical house shall also be provided. If it is located inside the machinery house, it shall be steel framed and pre-painted Aluminium clad. If the electrical house is located outside the machinery room, it shall be fully constructed from stainless steel, the outside painted to RAL 3020.
- 3.12.3 The machinery house shall be fitted with suitably rated maintenance cranes (maintenance hoists) with an electrically operated wire rope hoists, capable of lowering or raising the heaviest piece of equipment or tools to and from quay level, but with a SWL of not less than 7 000kg. Hoisting from ground level must not take more than 5 minutes. The long and cross travel motions may be hand operated. The range of motion of these cranes must cover the slinging centres of all heavy equipment in the houses (including transformer). These cranes must comply with Employer specification EEAM-Q-011.
- 3.12.4 All equipment to be lifted by these cranes shall be supplied with lifting eyes or lugs above the centre of gravity.
- 3.12.5 Suitably sized access hatches, protected with toe boards and removable safety railings around them, must be provided through which the largest equipment in the machinery/electrical house can be lowered to the quay. The access hatches shall be fitted with proximity switches to activate four revolving warning lights in the machinery/electrical house when an access hatch is open.
- 3.12.6 The machinery house shall be fitted with air exhaust fans. The air exhaust system shall be sized to completely replace the air in the machine house every three minutes. The fans and enclosures shall be corrosion resistant. Comfortable temperatures must be maintained in the machinery house at all times.
- 3.12.7 The electrical control and drive equipment shall be mounted inside panels inside the electrical house.
- 3.12.8 The electrical house shall be fully insulated and air conditioned and have a degree of protection of IP65.
- 3.12.9 The electrical house shall be pressurized to at least 50Pa above atmosphere. The incoming air shall be filtered through a conventional filter system. The

adequacy of the pressurization, air conditioning and filtration shall be guaranteed.

- 3.12.10 The air-conditioner must be locally supplied and supported. All fittings, bolts, brackets, etc. must be stainless steel. The condenser/evaporator must be made from either stainless steel or brass tubing. The enclosure must be stainless steel.
- 3.12.11 The electrical house shall be fitted with a dehumidifier (to reduce corrosion of electrical components).
- 3.12.12 Should electrical panels with control equipment be required in the machine house, these panels shall be enclosed in a separate, self-contained, air conditioned, filtered and insulated steel framed enclosure with a lockable door. The enclosure shall be of sufficient size to permit unrestricted access to all equipment for routine service and maintenance.
- 3.12.13 Adequate measures are to be taken to maintain machinery / electrical house temperatures at comfortable levels for staff undertaking maintenance work while the crane is in operation.
- 3.12.14 A 1200mm x 900mm work bench, jaw bench vice and storage lockers shall be provided in the machinery house.
- 3.12.15 The machinery house and transformer room shall be fully bird-proof. All openings in the walls, roof and floor must be closed off with suitable GRP grids or gratings, and all cable entry openings must be sealed with foam.
- 3.12.16 The machinery house shall be fitted with all the necessary rope re-reeving equipment to facilitate the changing of hoist and boom hoist wire ropes. This must include a motorized winder and manually operated rope shears.

3.13 Gearboxes

- 3.13.1 All gearboxes must be fitted with conveniently located sight glasses for checking the oil level, as well as the drain plug / oil sampling point.
- 3.13.2 The breather and filler holes must be fitted with suitable filters to prevent the ingress of dust into the gearboxes.
- 3.13.3 All breathers and fillers must be designed such that the ingress of water and condensation is prevented.
- 3.13.4 The gearbox lubrication system must be suitable for the duty and cyclic duration of the particular mechanism. If pumps are required they must be electrically driven.
- 3.13.5 The appropriate mechanical and thermal rating and load factor of the application must be applied for the sizing of all gearboxes. Force cooled gearboxes are not acceptable.

3.14 Stairs, Walkways, Platforms, Ladders and Anchor Points

- 3.14.1 Stairs, walkways and platforms shall be provided to give easy access to the operator's cab, machinery house, electrical house, list/trim/skew mechanisms, latches, all sheaves and lubrication points, anemometer, energy chain system and all sections of the boom for normal operation, inspection, maintenance and lubrication, and shall be in full compliance with Employer specification EEAM-Q-006.
- 3.14.2 Walkways shall be provided on both sides of the boom along its full length.
- 3.14.3 Stairs shall be provided to give access from the ground level all the way to the boom/ girder, machine and electrical house and the operator's cabin.
- 3.14.4 A stairway shall be provided from the bottom to the top of the A-frame to enable easy and safe access.
- 3.14.5 Stairs shall be inclined no more than 45 deg to the horizontal and shall be broken at suitable intervals by platforms.
- 3.14.6 Stairs and walkways shall not be less than 700 mm wide and working areas around drives, etc. shall be of sufficient size to allow for ease of maintenance.
- 3.14.7 All other locations that require frequent inspections and maintenance shall be easily accessible by means of walkways and staircases. Vertical ladders will only be used for locations which are infrequently visited and maintenance personnel would not need to take heavy equipment to.
- 3.14.8 Further to the requirements of Employer specification EEAM-Q-006, glass reinforced plastic or fibreglass type walkway grids and stair treads shall only be considered when essential to reduce weight and then only in low traffic areas where only low impact loads can be expected and only where accepted by the Employer. It shall be of the non-skid open grid type and suitable for the loads to be expected (including maintenance parts and machinery).
- 3.14.9 Trapdoors must be of light but robust construction, hinged with opposing stainless steel hinges and provided with a catch to keep them in the open position when desired. Trapdoor openings must be suitably protected.
- 3.14.10 Platforms must be provided at suitable positions along the boom for safe maintenance and replacement of trolley and auxiliary trolley wheels.

3.15 Goods / Personnel Lift

- 3.15.1 The crane shall be fitted with a rack-and-pinion type, self-braking lift with fully enclosed lift cubicle of 500kg capacity (minimum), operating from the quay level to the machinery house level, with an additional stop at the operator's cabin access route level.
- 3.15.2 In the event of a failure between stops, the lift must permit safe escape.
- 3.15.3 The lift must be fitted with an alarm and a flashing light to alert the terminal should someone be stuck in the lift.
- 3.15.4 The lift must comply with the requirements of the SA Occupational Health and Safety Act, Act 85 of 1993, as amended.

- 3.15.5 The lift speed shall be approximately 30m/min.
- 3.15.6 The minimum inside dimensions of the lift cage shall be 740mm x 800mm x 2000mm.
- 3.15.7 The lift shall be fitted with an emergency stop inside the cage.
- 3.15.8 The lift shall be provided with a controlled manual lowering facility, emergency ladder and escape hatch.
- 3.15.9 Door closing shall be manual, with interlocks for the lift motion.

3.16 Electrical Power Reticulation

- 3.16.1 The equipment offered shall be designed to operate off the available electrical power supply of 11 KV, 3 phase, 50 Hz AC. The voltage may, however, vary within the range of 90% to 110% of the nominal and frequency from 49 Hz to 51 Hz and all equipment installed shall be suitable for continuous operation anywhere in this range.
- 3.16.2 All medium voltage plant shall be capable of withstanding an electrical fault level of at least 3,5 kA for a time duration of 1,0 second.
- 3.16.3 The power supply to the crane shall be via trailing cable and reeling drum system to be located on the gantry or portal structure, at a position not protruding into the clearance areas.
- 3.16.4 The reeling drum system shall be of the mono-spiral type, manufactured from 316 stainless steel in full compliance with Employer specification EEAM-Q-019 and designed to hold the entire length of cable sufficient for the crane to travel the full distance as specified.
- 3.16.5 The trailing cable shall be of the Protolon type in full compliance with DIN VDE 0250 part 813, suitable for cable reel application, with 3 power cores, 3 ground cores and at least 6 optical fibre control cores, all fully terminated by the Supplier at both ends.
- 3.16.6 The power trailing cable shall be capable of withstanding an electrical fault level of 3,5 kA for a time duration of 1,0 second.
- 3.16.7 The power and control cable reeling drum system shall be complete with all cables, sleeves, rollers and guides.
- 3.16.8 Cable compression glands shall be used for cables entering panels, distribution boxes and bulkheads.
- 3.16.9 A main disconnect switch (11kV incomer) shall be fitted for protection purposes and for the isolating of busbars and cables feeding power to the transformer. The disconnect shall have manual close and automatic trip mechanisms. This shall be a vacuum circuit breaker, and must not trip in case of a power failure. Electric protection relays shall be supplied complying with Employer specification EEAM-Q-018/021/030.
- 3.16.10 Door entrances into the medium voltage areas must be interlocked with the main disconnect switch by means of a key arrangement similar to the "Castle" system. All live parts must be effectively screened against accidental contact.

- 3.16.11 All plant on the crane shall be supplied from a 3-phase 11kV transformer, with a low voltage output to match the voltage requirements of the crane, and with $\pm 2,5\%$ and $\pm 5\%$ tap-off points. A dry cast resin type transformer is to be supplied.
- 3.16.12 The transformer and medium voltage switchgear must comply with Employer specification EEAM-Q-017 and shall be secured within a lockable cage in the machine house. The enclosure may be stand alone or may form part of the electrical room.
- 3.16.13 The transformer shall be fitted with three sets of PT100 type thermistors. Each thermistor shall have two levels of alarm, one for an overheating alarm to the operator, the other to trip the disconnecter if the transformer overheats, driven by a common controller / protection relay which will be linked to the main PLC.
- 3.16.14 The following low voltage plant must be provided as a minimum on the crane:
- 3.16.14.1 Harmonic filtering and automatic power factor correction / controlling equipment to prevent all harmonics entering the supply system. The power factor shall be kept to at least 0.96 lagging when the control is on.
- 3.16.14.2 One 500V triple pole, motorised, withdrawable, air-break main circuit breaker arranged to break all three phases. The main breaker shall incorporate overload, under voltage, phase failure, earth leakage and protection and shall have easily renewable contacts and arc shields. Interlocking shall be provided to prevent the main breaker from closing if any of the controllers is in the "ON" position. The main supply panel shall be fitted with a monitoring power meter displaying power consumption (kWh), power factor (pu), maximum demand and load. The power meter shall be linked to the main PLC / SCADA.
- 3.16.14.3 Phase reversal relay arranged to prevent the main circuit breaker from being closed in the event of supply phase reversal or if any open circuit occurs in any phase of the supply.
- 3.16.14.4 Individual starters for all auxiliary motors, incorporating one triple pole, lockable when isolated, and adjustable thermal overload relays, with adjustable time lags and incorporating single phasing protection, in respect of each motor circuit. (Relays are required in all 3 phases of the motor circuits).
- 3.16.14.5 A suitable transformer with a metering device to supply all single phase lighting and ancillary plant shall be supplied, if required, to reduce the transformer low voltage output to 400 V.
- 3.16.14.6 Individual moulded case circuit breakers, complying with SANS 156 or equivalent, feeding all equipment as well as power, lighting, field devices and other circuits. The moulded case circuit breakers shall be double pole or triple pole and arranged to completely isolate the respective circuit when in the open position. All moulded case circuit breakers shall be capable of withstanding vibration and be of approved types and makes. The breakers are to be used for protection as well as for isolation for maintenance purposes.
- 3.16.14.7 Voltmeters, ammeters and power factor meter for the main supply, connected to the incoming supply side of the main circuit breaker as well as voltmeters and ammeters for each individual motor circuit, mounted on the relevant electrical panels.

- 3.16.14.8 Frequency meters for the main incoming and for each motor circuit controlled by a frequency converter.
- 3.16.15 The power supplies to lighting, anti-condensation heating and other “standby” circuits shall be arranged to ensure uninterrupted supply to these even with the main circuit breaker off. Suitable notices shall be provided at the equipment to warn of live supplies.
- 3.16.16 All operating coils for all control gear, contactors, etc. shall be of the AC type operating at a voltage of 220 V.
- 3.16.17 Provision shall be made on the crane for lightning protection and protection against surges on the supply as well as possible direct lightning strikes on the structure.
- 3.16.18 A connection point for a mobile generator (3 phase, at crane operating voltage) must be provided on the crane at quay level, to be used in case of an emergency. Use of the emergency supply must activate an emergency mode where only the motions required for moving the crane off the ship are allowed.
- 3.16.19 The power, control and earthing circuits from the superstructure to the boom shall be supplied through a flexible cable system. A separate cable shall be provided to earth the boom to the superstructure.
- 3.16.20 Power supply to the trolley shall be by means of a heavy duty, corrosion proof energy chain in full compliance with Employer specification EEAM-Q-019. Trough and mountings for energy chain shall be manufactured from 316 stainless steel.
- 3.16.21 The energy chain shall be accessible from a walkway or access way to facilitate maintenance and repairs to the system.

3.17 Lighting, Heating, Air-conditioning and Power Points

- 3.17.1 Lighting shall be provided according to Employer specification EEAM-Q-018. However, all lighting shall be of the LED type.
- 3.17.2 All luminaires shall be locally supported.
- 3.17.3 Anti-glare variable level lighting shall be provided in the operator’s cabin.
- 3.17.4 Two spot lights shall be provided to enable quick and easy identification of container seal numbers.
- 3.17.5 The luminaires shall be fitted with stainless steel bolts onto stainless steel brackets in a way that will facilitate easy maintenance. All brackets shall be bolted to the structure and not welded.
- 3.17.6 Separate circuit breakers shall be provided for lighting.
- 3.17.7 Emergency lighting shall be provided with a back-up power supply .
- 3.17.8 Power points
- 3.17.8.1 Additionally to the 15A 230V 3 pin switched interlock socket outlets fitted inside the main electrical panels, the following power points shall be provided:

- Two in the operator's cabin in close proximity to the radio and computer shelves
 - Two in the electrical house
 - Five in the machinery house
 - Five per side along the length of the boom and bridge (weather proof)
 - Two on trolley (weather proof)
- 3.17.8.2 Sockets must be supplied from the 400/230V Auxiliaries transformer.
- 3.17.8.3 Automatic earth leakage protection complying with SABS 767 shall be provided on all socket outlets.
- 3.17.8.4 Approved, IP 65 enclosed, 5A, 2 pin, 24V socket outlets for portable lead lights complete with screw-up type covers and matching male plug (preferably of the Nippon type) shall be provided at all machinery locations. These socket outlets shall be supplied from a 400/24V transformer.
- 3.17.8.5 Welding sockets of the CEE No. 17 type for welding machines must be provided. The sockets shall be 63 Amp, 5 pole, 380V. (3 phases, neutral and earth). These sockets must be provided in the following locations:
- At three positions on the boom (at boom hinge, front of boom, back of bridge)
 - On the gantry structure at each corner of the crane
 - On the A - frame
 - And one on the trolley

3.18 Local Crane Management System (LCMS)

- 3.18.1 Control, monitoring and interlocking on the cranes shall be carried out by means of a Programmable Logic Controller (PLC) using hard wired safety circuits and distributed inputs/outputs (IO) systems. The particular make of PLC shall be readily available and supported in South Africa. The model utilised shall be the latest model available in the particular range.
- 3.18.2 A communication port for connecting a notebook type computer to the PLC for working on the PLC program must be provided in the driver's cabin and E-house. Any software required to communicate with the PLC, drives and HMI shall also be provided.
- 3.18.3 All bus communication to remote field devices shall be by a fibre-optic system.
- 3.18.3.1 Field devices in the same area may be grouped and connected to ET200 stations or the latest available system.
- 3.18.3.2 It is acceptable to use fibre-optic for the inter-connection between the field devices, but not between sensors and their field devices.
- 3.18.4 HMI colour touch panels, 7" or more, must be provided in the electrical room and in the checker's cabin for fault finding by technicians. A suitable port for connection of a notebook computer for fault finding must also be provided at each of these points.
- 3.18.5 Two un-interruptible power supplies (UPS) shall be provided per crane to provide power backup to the PLC and crane management computer system for a minimum of 30 minutes in case of power failure, after which time an automatic controlled shutdown shall take place. It is preferable the UPS will last for more than an hour.

- 3.18.6 The main PLC shall use minimum 32 bit microprocessors.
- 3.18.7 All main motions shall be supplied with a lockable isolation station near the respective prime movers. This is to be used for isolation during maintenance operations.
- 3.18.8 The Supplier shall provide all the necessary software and licenses to maintain and program the PLC, SCADA, HMI and drives.
- 3.18.9 The following motors shall be fitted with thermistors on the windings and bearings and temperatures recorded as well as tripping initialized when overheating occurs:
- Main hoist motors
 - Boom hoist motor
 - Auxiliary boom hoist motor
 - Trolley motors
 - Gantry motors
- 3.18.10 A position detecting system must be provided for long travel, trolley travel, hoist and boom hoist as follows:
- Travel position resolution must be less than 100mm over the travel distance
 - Trolley position resolution must be 50mm or better
 - Hoist position resolution must be 100mm or better
 - Boom hoist angle resolution must be 1° or better
- 3.18.10.1 The data must be displayed on the operator's control desk and mimicked in the SCADA systems.
- 3.18.11 The following discrete instruments must be provided in addition to the equivalent PLC counters:
- Elapsed time meters for all drives
 - Twistlock operation counter
 - Non-resetable operation cycle counter
- 3.18.12 Each gantry motor shall be provided with a monitoring device connected to the PLC and SCADA for monitoring motor current.

3.19 Computer Systems

- 3.19.1 A crane management computer system with graphical display of the crane and its states, limits selected, virtual controls for operating the crane, fault indication to the operator, storage of operational and condition monitoring data, and fault finding purposes must be provided in the electrical house.
 - 3.19.1.1 The system shall be based on a supervisory control and data acquisition (SCADA) type system and must allow for detailed monitoring of all plant as well as fault annunciation by means of graphics and text.
 - 3.19.1.2 An industrial workstation with the latest generation micro-processor, industrial quality pointer/controller, keyboard and colour LCD screen shall be provided.
 - 3.19.1.3 The system shall run under the latest stable version of Windows.
 - 3.19.1.4 A suitable printer (for reports and fault messages) shall be provided in the electrical house.
 - 3.19.1.5 The following minimum screen displays must be provided in the SCADA system:
 - 3.19.1.5.1 Main (default) screen with static and dynamic overviews of all operations, alarms, and specific status information for equipment control and monitoring
 - 3.19.1.5.2 Various sub-system screens with further details and static and dynamic overviews, which are selected by clicking on the item
 - 3.19.1.5.3 Real time and historic trending of drive positions, motor currents etc.
 - 3.19.1.5.4 Status, alarm and fault logging screen for listing of all alarms and faults
 - 3.19.1.5.5 Recording of emergency stops and over travel, collision and other abnormal conditions
 - 3.19.1.5.6 Report of all disabled functions and program changes
 - 3.19.1.5.7 A report on all critical operational indicators, where indicators must be mimicked in the cargo controller cabin e.g.
 - the number of containers handled,
 - the number of 20' and 40' containers respectively,
 - the average mass of containers,
 - the hoist hours, trolley hours, gantry hours, boom hoist hours
 - total duration of use of the crane.
 - Wind speed
 - Others

- 3.19.2 An engineering workstation (maintenance computer) system for fault finding, program changes, storage of fault log and printing thereof, recording and analysis of condition monitoring measurements, as well as automatically sending maintenance requests to the Employer's central maintenance management system, must be provided in the electrical workshop for use by maintenance personnel.
- 3.19.2.1 The system shall be based on a SCADA type system with graphical display of the crane and must allow for detailed monitoring of all plant as well as fault annunciation by means of graphics and text.
- 3.19.2.2 The latest available micro-processor with an interface module for wireless connection shall be used.
- 3.19.2.3 The workstation must be equipped with a USB port
- 3.19.2.4 Network connection points must be provided and configured in the electrical house for connection to the engineering workstation from the crane, using a notebook. All necessary software to accomplish this must be supplied, including one year's license.
- 3.19.2.5 The system must have all the screens as for the crane management system, with the following in addition:
- A fully fledged fault finding system to record snapshots of chosen parameters for assisting fault tracing
 - A self diagnostic function that will prioritise possible causes of faults detected
 - A subsystem screen dedicated to the display, trending and interpretation of condition monitoring data
- 3.19.2.6 An extensive range of sensors and feedback equipment such as limit and monitoring switches, pressure switches, temperature sensors and vibration sensors on the main hoist and boom hoist drives shall be provided on all the equipment to provide the necessary functionality for the engineering workstation.
- 3.19.2.7 Sufficient data storage capacity must be provided on the system to enable condition monitoring data and fault messages to be stored for at least a 12 month period before being archived.
- 3.19.2.8 The system shall also provide messages to notify the maintenance personnel when scheduled maintenance jobs are due. The completion of these jobs must be acknowledged.
- 3.19.3 The functionality of the crane management computer system and engineering station shall be combined in the machine room. This computer must then be able to be remote accessed via the network from the maintenance centre.
- 3.19.4 Tag information for wind speed shall be made available via the network.
- 3.19.5 The SCADA systems shall preferably be based on Win CC or In-Touch or alternatively on another proven software package. The system shall be based on a system of coloured graphics, flashing and colour changing icons, messages etc. and shall include an overview screen as well as various sub-system screens of the crane. Warnings/faults shall be displayed by pop-up windows requiring the operator to acknowledge the message.
- 3.19.6 The process control system shall be protected against viruses and external threats with anti-virus software on workstations and servers. Where anti-virus

software cannot be deployed, other protection devices should be implemented (e.g. gateway anti-virus scanning or manual media checking).

- 3.19.7 Procedures for future updates of anti virus software shall be made available.
- 3.19.8 Backup and recovery procedures for all software packages shall be provided and documented (programs, settings and any necessary data).
- 3.19.9 The integrity of backups shall be regularly tested through a full restore process.
- 3.19.10 The procedure to implement regular security patches updates for software package use shall be made available for implementation.

3.20 Main Drive Systems

- 3.20.1 Simultaneous operation of the hoist, trolley and gantry drives are required, as well as for boom and long travel drives.

- 3.20.2 The following main drive systems are preferred.

- 3.20.2.1 Main hoist drive

Two squirrel cage AC motors with forced cooling, driven by two 3 phase, 4 quadrant, IGBT field oriented (vector) variable speed control drives. Accurate load sharing shall be obtained between the motors. The hoist shall be able to operate at reduced speed with one motor out of order. A facility shall be provided to isolate the faulty motor electrically and mechanically. Speed control shall be stepless, closed loop control utilizing regenerative electrical braking down to 5% of the motion speed. Hoist acceleration time from zero to full speed shall be equal or less than 4 seconds. The response time shall be below 70 milliseconds. A slow speed (10%) mode for maintenance purposes must be provided.

- 3.20.2.2 Boom hoist

Single squirrel cage AC motor with 3 phase, 4 quadrant, IGBT, field oriented (vector) variable speed control drive. Speed control shall be stepless, closed loop control utilizing regenerative electrical braking down to 5% of the motion speed. Acceleration rate shall be adjustable between 3 and 20 seconds.

- 3.20.2.3 Auxiliary boom hoist

Single squirrel cage AC motor, with 3 phase electronic soft starter.

- 3.20.2.4 Gantry and trolley travelling

Multiple squirrel cage AC motors with a minimum of two 3 phase, 4 quadrant, IGBT field oriented (vector) variable speed control drives feeding the motors in a staggered design, for the gantry and trolley motion respectively. Both motions shall be able to operate at reduced speed with one drive out of order and at design capacity with up to 10% of the drive motors/brakes out of order. A switch over system shall be provided. Speed control shall be stepless, closed loop control utilising regenerative electrical braking down to 5% of the motion speed. Trolley and gantry acceleration time from zero to full speed shall be equal or less than 6 seconds. The response time shall be below 70 milliseconds.

- 3.20.3 Each motor shall have its own Voltmeter, Ammeter and individual overload protection.
- 3.20.4 The brakes shall be monitored by the PLC and the minimum amount of braking effort for safe operation shall be programmed into the system.
- 3.20.5 All the systems shall employ regenerative braking. Resistor braking is not preferred.
- 3.20.6 All the drives shall be provided with switch disconnectors with fast thyristor fuses. All the main drive motors shall be fitted with PT100 type thermistors on the bearings as well as stator coils and be provided with electronic protection relays. Anti-condensation heaters shall also be provided.
- 3.20.7 The mechanisms shall be designed for the following minimum electrical duty ratings:

Mechanism	Duty type	Cyclic Duration Factor	Starts / Hour
Boom hoist	Short time duty S2	10 minutes	
Aux. Boom hoist	Short time duty S2	30 minutes	
Trolley travel	Intermittent Periodic S5	60%	300
Gantry travel	Intermittent Periodic S5	60	150
Main hoist	Intermittent Periodic S5	100%	300
Service hoists	Intermittent Periodic S3	40%	150

- 3.20.8 Motors shall be selected that have been specifically designed and manufactured for heavy reversing crane duty and for control by frequency converter where applicable, and shall have a control factor related to the mode of control and as prescribed by the control gear manufacturer, but shall not be less than 1.25 for IGBT stator voltage control. The degree of protection shall be IP23 for indoor motors and IP65 for outdoor motors with weatherproof protection.

3.21 Electrical Enclosures and Mounting Panels

- 3.21.1 All the electrical, electronic control and protection equipment provided in the electrical house and operator's cabin shall be housed in metal cubicles, with lockable, hinged doors or lockable lift-off covers, floor mounted in a suitable position so as to provide sufficient space for maintenance purposes. The indoor panels shall have a minimum degree of protection of IP44. All doors and covers shall be of metal to provide for effective screening.
- 3.21.2 Where necessary, enclosures inside the electrical house shall be provided with louvres, raised roofs and/or ventilation fans for the dissipation of heat that may build up in the panels.
- 3.21.3 The electrical, electronic control and protection equipment not located in the electrical house or operator's cabin shall be housed in totally enclosed metal cubicles with lock-up hinged doors mounted in a convenient position. All doors shall be gasketed and the complete enclosure shall be dust tight and weatherproof, and fitted with air filters if required. These enclosures shall have a minimum degree of protection of IP 65 and shall be provided with anti-condensation heaters.
- 3.21.4 All enclosures shall be manufactured from Grade A 316 stainless steel. The hinges and locks shall also be manufactured from Grade A 316 similar

stainless steel. All enclosure locks shall be matched to operate with a single key.

- 3.21.5 The enclosures shall be designed to provide free and easy access to all equipment for maintenance and calibration purposes and adequate space for internal wiring.
- 3.21.6 Panels shall be arranged for bottom entry of cables via gland plates. Cables shall terminate on suitable terminals before being wired further in enclosure troughing. All equipment shall be front mounted, front assembled and front wired. Enclosures shall be internally fitted with a fluorescent light (or incandescent light if close to interference sensitive equipment) and a South African standard 3 point power plug (15 A, 220 V).
- 3.21.7 Cables shall be run on stainless steel wire type cable racks. Conduit will not be allowed. Cable trays shall be vertically mounted as far as possible. Cables shall be strapped with stainless steel cable straps.
- 3.21.8 In all areas where mechanical damage can occur, covers shall be fitted over cables.
- 3.21.9 Cables feeding motors controlled by frequency converters must be screened.
- 3.21.10 Welding type cables shall be provided for earth bonding straps across all pivot points and articulated joints.

3.22 Signage, Marking and Colour Scheme

- 3.22.1 Two Employer logos shall be supplied and fitted by the Supplier, one logo on either side of the machine house.
- 3.22.2 All necessary warning notices, i.e. emergency exits, no entry, warning signs, no unauthorized persons signs, etc. shall be provided where necessary and as accepted by the Project Manager.
- 3.22.3 A notice, stating the starting up and shutting down procedure of the crane, mounted in a glass frame, shall be provided in a prominent position in the operator's cabin.
- 3.22.4 The SWL of the crane shall be indicated in tonnes in a conspicuous position on each side of the crane on the portal tie beam and on the headblock and shall be readily legible from ground level. The crane number shall be indicated next to the SWL inscription on the portal tie beams.
- 3.22.5 Each lifting attachment shall bear a permanent inscription on each side, stating its SWL in tonnes. The SWL of each lifting hook of the heavy lift beam shall be marked on the particular hook.
- 3.22.6 The crane shall be prominently and permanently marked with a metal nameplate bearing the following information:
 - Employer's name and crane number.
 - Manufacturer's name and serial number
 - The year of manufacture
 - Rated lifting capacity
 - Crane classification with state of loading and class of utilization
 - Classification of each mechanism with state of loading and class of utilization

3.23 Corrosion Protection

- 3.23.1 The paint specification and colours employed on the crane shall comply with Employer specification EEAM-Q-008.
- 3.23.2 The manufacturer's standard painting procedure can be used if it is equivalent or better than that called for in the EEAM-Q-008 (Corrosion Protection Specification) and the manufacturer is able to provide a 10 year warranty on the provided paint according to BS 5439, Table 3, part 9, to ensure that the condition of the surface will be at least RE2 on the European scale of degree of rust, after 10 years in a environment of frequent salt spray, chemicals and polluted coastal atmosphere.
- 3.23.3 When using the Specification EEAM-Q-008. (Corrosion Protection) total paint dry film thickness shall not be less than 250µm.
- 3.23.4 Should a tenderer wish to offer coating systems other than those specified, as an alternative, he shall submit full technical details and a list comparing all appropriate details of the alternatives
- 3.23.5 .All hydraulic fittings shall be Denso wrapped.
- 3.23.6 Dissimilar materials shall be adequately isolated to prevent galvanic corrosion.

4. Crane Automation Functionality

4.1 Automation requirements

4.1.1 The crane shall be equipped with automation functionality as listed on the table 1 below.

Table 1: Crane Automation Functions

Item	Automation Function	Description
4.1.1.1	Gantry travel anti-collision	<ul style="list-style-type: none">a) The crane shall be equipped with an anti-collision system to prevent it from colliding with objects such as trucks, ground personnel, straddle carries and other objects on its travelling route.b) The crane shall automatically detect obstacles (e.g. trucks, straddle-carries, ground personnel etc.) on its path and around it and slow-down or stop depending on the conditions. The driver shall be able to override the system when required.c) The sensitivity of the system/sensors shall not result in nuisance tripping for example in case of rain and fog.
4.1.1.2	Crane to Crane anti-collision	<ul style="list-style-type: none">a) The crane shall be equipped with an anti-collision system to prevent it from colliding with adjacent cranes.b) The system shall automatically detect other cranes on its path and around it and slow-down or stop depending on the conditions. The drive shall be able to override the system when required.c) The sensitivity of the system/sensors shall not result in nuisance tripping for example in case of rain and fog.
4.1.1.3	Wind speed detection and alarm.	<ul style="list-style-type: none">a) The crane shall be equipped with a wind speed detection and alarm system to enable the driver to stop the operation, park and shut-down the crane safely in case of wind speeds above crane operating limit.b) The crane shall be automatically slow-down when the maximum wind-speed has been reached.c) A digital anemometer shall be installed in clear air at the top of the crane, giving an indication in the driver's cab, both audible and visual, that the safe operating wind limit has been reached.d) The digital anemometer shall be capable of recording well over the expected worst case windstorm. The wind speed, direction and time shall be recorded. The recommended maximum operating wind speed should be set at 25m/s.
4.1.1.4	Container weight and eccentricity measurement.	<ul style="list-style-type: none">a) The system shall measure, indicate and record the actual weight and eccentricity of each container.b) The measured container weight and eccentricity shall be used together with the anti-sway and anti-skew and other functions for container load control.c) The system shall have the functionality and capability to detect oversize containers and alert the crane operator.
4.1.1.5	Spreader anti-sway and anti-skew	<ul style="list-style-type: none">a) The spreader anti-sway system shall enable the crane to operate at high wind speeds of up to 90km/h and shall be highly accurate.b) The system shall enable container load fine positioning when the crane is stationary, without gantry or trolley movements.c) The systems shall be constantly active at all wind speeds when the crane is in the stationary, hoist, trolley and gantry activities.
4.1.1.6	Automated spreader system	<ul style="list-style-type: none">a) This system shall automate the spreader movement between ship and shore. The operator will perform the final landing and pick-up of containers on the truck and vessel, however, the system shall have the full functionality to perform final container landing and pick-up.b) The system shall utilize a 3D laser vessel and spreader path profiling system.

Item	Automation Function	Description
		<p>This system shall continuously update the profile including during the first spreader move over the vessel. The system shall continuously track the spreader and load position in relation to all other objects in the stored profile. The system shall create a slowdown envelope around the spreader and load and actively prevent collision with surrounding objects.</p> <p>c) This system shall provide a 3D laser-based vessel profile so that the layout of the containers in the vessel is known.</p> <p>d) The vessel profile shall be a three dimensional detailed map of the rows, columns, heights of stacked containers on the vessel.</p> <p>e) The vessel profiling system shall prevent the spreader with and without a container load from colliding with containers on the vessel.</p> <p>f) Install an operator assist spreader soft landing system. The system shall automatically scan the truck and trailer profiles, with and without container, loads and automatically position the spreader and container aligned to the twistlock positions for final landing and pickup by operator.</p> <p>g) The crane operator/driver shall be able to intervene and take control of the crane at any moment during the automation functionality.</p> <p>h) The crane shall be capable of switching from automatic to manual operating mode except for the safety related automation functions.</p> <p>i) The crane shall seamlessly switch between manual and automatic modes.</p> <p>j) The contractor shall supply the purchaser with a detailed manual on how to switch between the crane automatic mode to the manual mode.</p> <p>k) Video cameras and an HMI in the cabin shall be installed on the crane that will provide a clear 3D view in order to assist the operator with load handling, spreader handling and crane operation.</p>
4.1.1.7	Stack anti-collision system	<p>a) Utilizing the stack profiling system and other systems, this system shall guide the operator's movements to ensure that the spreader empty or loaded does not collide with the stacked containers in the vessel or other obstacles.</p> <p>b) This system shall through a user friendly interface on the cabin HMI to guide the operator against spreader stack collisions.</p> <p>c) The system shall automatically slow-down and stop in the event of imminent collisions. An override for this function shall be provided.</p>
4.1.1.8	Truck guiding system	The system shall guide the truck driver by means of signalling lights and an LCD screen to position their trucks accurately under the crane in line with the spreader loading position.
4.1.1.9	Boom Anti-collision system	This system shall prevent the boom from colliding with the ship structure when both the crane or ship are either stations or in motion.
4.1.1.10	On-board Crane Management System / Software	<p>a) The on-board crane management system (CMS) shall be installed in the crane's electrical house (E-house).</p> <p>b) The Contractor shall supply, install and commission a Crane Management System. The design of the CMS shall facilitate future expansion in terms of capacity and functional features. The CMS hardware and software shall be modular in design and construction to facilitate future expansion. There shall not be major re-configuration of the hardware and software modification and development. System expansion shall not be limited by the capacity of individual On-Board CMS, remote crane management system (RCMS) and programmable logic controllers (PLCs).</p> <p>c) The On-Board CMS and RCMS shall incorporate alarm/fault monitoring and graphics display, the crane systems status monitoring with graphics display, the fault diagnostic functions, cranes operational data and statistics, crane condition monitoring system, and shall allow access to the programming logic and software. These functions must be able to be downloaded as a softcopy and printed as a hardcopy.</p> <p>d) Electrical & mechanical condition monitoring shall be provided for key crane components including gearboxes, motors, drives and power supply components.</p> <p>e) The system shall enable engineers and technicians to perform root cause analysis, predictive maintenance, operations performance management and</p>

Item	Automation Function	Description
		<p>other similar engineering and operational functions.</p> <p>f) The software shall allow engineers to access (read and write) the PLC ladder diagrams, Boolean logic and other software codes. Forcing-on and forcing-off of switches, contacts and relays on the PLC ladder diagram shall be available on the On-Board CMS. Key switch and password shall be available to authorized personnel to carry out any modifications as described above.</p> <p>g) The proposed structure of the database system (e.g. Historian) for storing the CMS data and information has to be discussed and approved by the Purchaser.</p> <p>h) There shall be at least three (3) levels of security for accessing to different levels of CMS software to be confirmed with the purchaser.</p> <p>i) The CMS shall have proper documentation of circuit diagrams, source codes, hardware and software and associated peripherals.</p> <p>j) The On-Board CMS shall be able to copy or upload PLC software program to each PLC within 30 minutes. The On-Board CMS shall be able to download all data files which shall include all real time information of the CMS and time response graphs. This information shall be able to store in a diskette for printing. Time response graphs displaying different signals simultaneously shall be incorporated in the On-Board CMS.</p> <p>k) The on-board crane management computer system shall be an industrial type robust computer utilizing the latest software and fitted with fast processor, large memory and RAM.</p>
4.1.1.11	Remote Crane Management System	<p>a) The remote crane management system (RCMS) shall be installed in the maintenance base at the Engineering office building and also accessible remotely online.</p> <p>b) The remote condition monitoring system / software shall be identical to the on-board CMS system.</p> <p>c) The purchaser will supply the computer to be used for RCMS. The contractor shall supply the purchaser with detailed instruction on how to install the RCMS and training for maintenance and engineering staff on the use of the system.</p>
4.1.1.12	Programmable Logic Controllers (PLCs)	<p>a) A back-up softcopy of all the software/program installed on each PLC module on the crane shall be provided.</p> <p>b) A detailed instruction manual on how to re-install/format/remove all installed software and re-install the software/program shall be provided.</p> <p>c) The Siemens S7 PLCs are recommended due to their large install base within Transnet Port Terminals and maintenance and technical staff having being trained on them. Similar PLC technologies will be accepted on the approval of the purchaser.</p> <p>d) The racks shall be industrial type with a capability of expansion via simple communication interface between and among the racks. It is preferable to have a racking system of a minimum slot or cartridge-insert space for at least 8 modules which excludes the slots or cartridge-insert space for the power supply and CPUs.</p> <p>e) The racks shall have a back-plate communication design and back-plate power supply distribution system. This is to achieve maximum feasibility in module replacement as well as minimize the mean time to repair when it is required.</p> <p>f) The PLCs shall have multi-tasking, remote communication capabilities and supporting interrupts.</p>
4.1.1.13	Crane Software and Firmware	<p>a) All software and firmware installed on the crane shall be provided on a back-up softcopy allowing the purchaser to conduct a complete re-installation of the software and firmware in case of crane software system absolute failure.</p> <p>b) This includes software and firmware for on-board computers, PLCs, electrical drives and motors, control systems and others.</p> <p>c) A detailed instruction manual on how to format/remove all installed software and re-install the software and firmware shall be provided.</p> <p>d) Original Licensed software shall be used and provided to the purchaser as part of the crane purchase price. No additional software licenses shall be required by the purchaser for any of the software or firmware on the crane.</p> <p>e) Firmware upgrades and normal periodic crane software updates shall be</p>

Item	Automation Function	Description
		<p>included as part of the purchase price.</p> <p>f) Open system design approach shall be used, utilizing the latest open-system technologies and a minimum of proprietary components to provide a full featured, yet simple, system that can be easily extended now and in the future.</p> <p>g) The On-Board CMS and RCMS operating system shall be real time, multi-tasking, multi-user operating system. The operating system shall allow the On-Board CMS and other programs to run simultaneously and allow the user to access any software without affecting the real time condition monitoring of the ship unloader control system and the communication link between the On-Board CMS and the RCMS.</p> <p>g) The software shall be able to run on Windows operating platform. The operating platform and user interface software shall be approved by the Purchaser. The Contractor shall supply a complete back-up system that shall include the operating system and application software.</p>
4.1.1.14	SCADA Integration	<p>a) The on-board CMS shall have the functionality for full SCADA integration of the crane.</p> <p>b) The on-board CMS shall have telecommunication infrastructure for the crane to connect to SCADA, TOS, RCMS and other remote locations.</p> <p>c) These remote connections will be through eLte, wifi, fibre, Ethernet and other common networks. The crane's on-board CMS computer shall have network cards for communication through these networks.</p>
4.1.1.15	Container Identification and Visualisation	<p>a) The system shall by means of Optical Character Recognition (OCR) technology identify containers on trailers and perform verification with the TOS for optimal container handling.</p> <p>b) The OCR system shall communicate with TOS the details of container positions and container movements.</p> <p>c) It is preferred that the OCR system detects container damage and tempering.</p> <p>d) Video cameras and an HMI in the cabin shall be installed on the crane that will provide a clear 3D view in order to assist the operator with load handling, spreader handling and crane operation.</p>
4.1.1.16	Automatic Energy Management System	A robust, comprehensive and smart energy metering systems shall be installed to automatically record the crane's energy and power consumption including the active power, reactive power, apparent power, power factor etc. The crane's energy consumption data and history shall be available from the CMS and RCMS computers.
4.1.1.17	Driver Identification System	<p>a) The third camera will be provided inside the operator cabin and be positioned such that it is able to record the operator screen functions and store information in the memory bank for at least 7 days. This camera will operate automatically independent of the operator as long as the crane is in operation.</p> <p>b) A biometric scanner shall be provided in the operator's cabin, key functions of the crane (air-conditioned etc.) as specified by the purchaser shall only be activated by means of fingerprints.</p>

Safety and Environment

5.1 Safety Requirements

- 5.1.1 The equipment in general and the intended operation of the equipment to be supplied, shall be in full compliance with the South African Occupational Health and Safety Act, Act 85 of 1993, as amended.
- 5.1.2 The crane shall be designed and built to ensure maximum reasonable safety and comfort of the operator, maintenance personnel and people in the area of the crane.
- 5.1.3 Full protective measures are to be taken to protect personnel and the crane and equipment from harm and damage in the event of faults and mal-operation and the crane shall be designed to fail to safety.
- 5.1.4 Sudden electrical power losses will not have any adverse effect on the equipment and shall not unduly delay return to operation after power is restored.
- 5.1.5 Operational interlocks shall in general lead to controlled stops and not emergency stops.
- 5.1.6 All field instruments, limit switches etc. shall be individually wired to the PLC marshalling rack.
- 5.1.7 Emergency stop buttons of the red mushroom head, stay-in type shall be provided as below to obtain complete isolation of the electrical supply.
- One fitted in the operator's cab
 - One fitted at the access platform to the operator's cabin
 - One fitted in each machinery house/s and electrical house/s. These must be lockable in the activated position
 - One fitted in the centre of the walkway on the bridge girder
 - One fitted at each of the four corners of the crane, mounted within easy reach of a person standing at ground level
 - One fitted on either side of the trolley structure
 - One fitted at the list/trim/skew device
 - Rear of bridge, boom joint, front of boom
 - Each local control station
 - One fitted at the bottom of the main access onto the crane
- 5.1.8 Lockable emergency stops shall be fitted with individual lockout calipers, where possible. Key switches shall also be included. Alternatively the crane shall be locked out in the machine house without isolating the auxiliary supply.
- 5.1.9 The following minimum principle safety devices shall be included:
- 5.1.9.1 Main hoist
- 5.1.9.1.1 Maximum operational height (slow down & stop limit switches)
- 5.1.9.1.2 Overhoist weight operated limit switch to operate an emergency stop circuit should the maximum operational height limit switch fail. This limit switch must only be hand-resettable;

- 5.1.9.1.3 All safety limits shall be hard wired into the safety circuit and not only through the PLC.
- 5.1.9.1.4 Lowering slow down limit to operate when the load is just above the trailer/quay or when signalled from the Height Indication System on the spreader;
- 5.1.9.1.5 Interlocks to prevent hoisting or lowering unless the twist locks are in the fully locked or unlocked position;
- 5.1.9.1.6 Interlocks to prevent raising of the spreader unless the connecting pins on the quick change headblock are correctly located;
- 5.1.9.1.7 The main hoist mechanism shall be fitted with miss-winding, slack rope and over-tension (snag load) protection devices, independent of the crane's load monitoring system.
- 5.1.9.1.8 Dual overspeed switches fitted to the hoist drum shafts. Electronic overspeed switches that do not require an external power supply are preferred;
- 5.1.9.1.9 An electronic overload safety device with load indication and cut-outs. This device shall protect the hoisting mechanisms from overloads and eccentric loads i.e. prevent further hoisting when the total admissible loads are exceeded, but shall not be used for drive control purposes. A key-switch to override the cut-out signal must be provided;
- 5.1.9.1.10 A load indicator that gives an audible and visual indication to the operator when the lifted load exceeds the nominal load including the dead weight of the telescopic spreader. Separate indication lights must be used to indicate overload and eccentric load. The crane management system must record the actual masses of containers lifted for a rolling period of 96 hours.

5.1.9.2 Gantry

- 5.1.9.2.1 Absolute type encoders shall be used on the gantry for accurate position detection of the crane with reference to the quay. Passive reference checkpoints must be provided along the rails for cross referencing and updating of the position.
- 5.1.9.2.2 Anti-collision devices shall be provided to slow down and stop the crane at the extremes of travel and at a safe distance, minimum one meter, from the next crane or obstacle on the rail. Anti-collision devices shall operate independently from the terminal management and monitoring system and shall be provided to operate at both travel ends of the crane. A push button override must be provided in the operator's cabin for close proximity working of the cranes.
- 5.1.9.2.3 The position of the headblock/ spreader shall be monitored and interlocked to prevent the headblock/ spreader from colliding with the crane's sill beams.
- 5.1.9.2.4 Two weatherproof audible alarms of approved design shall be provided on the crane, mounted on the legs, one on each side.

The alarms are to sound automatically and continuously whenever the long travel motion is energized.

- 5.1.9.2.5 Four orange coloured flashing beacons mounted on the crane legs, one on each corner at about one meter above quay level, to operate automatically whenever the long travel motors are energized, shall be provided.

5.1.9.3 Trolley

- 5.1.9.3.1 Slow down and stop limit switches at the both ends of travel;
- 5.1.9.3.2 Interlocks to limit the travel of the trolley to the back of the bridge, a safe distance away from the boom joint, if the boom is not fully lowered;
- 5.1.9.3.3 Interlock on hoist and trolley drive to prevent the load being lowered onto or traversed / swung into the portal sill beam or traversed / swung into the side of the ship;
- 5.1.9.3.4 Interlocks to prevent the trolley from travelling away from the access platform if the access gates are open;
- 5.1.9.3.5 Interlocks to stop (controlled stop) the trolley if the trolley gate is opened;

5.1.9.4 Boom

- 5.1.9.4.1 The boom hoist mechanism shall be provided with both slack rope and over-tension protection devices.
- 5.1.9.4.2 Limit switches shall be provided to prevent over-hoisting.
- 5.1.10 The crane shall be provided with a maximum safe loading limit for lifting when the boom is up in the vertical or raised position.
- 5.1.11 A suitable anemometer of latest technology and design must be provided and mounted at the top of the A-frame for wind speed measurement. Visual and audible indication in the operator's cabin must be provided and the readout must read up to 200 km/h. Visual indication must also be provided in the checker's cabin. The operating point of the audible alarm shall be fully adjustable and shall be able to be preset at any value between 0 - 200 km/h and arranged to operate when the maximum safe wind velocity is exceeded. The wind speed reading shall be monitored by the crane management system and shall be available to be monitored and analysed by the engineering workstation.
- 5.1.12 Where maintenance cannot be undertaken directly from a walkway or access platform, anchor points shall be provided for fastening safety harnesses.
- 5.1.13 Removable covers, grids etc. shall be fitted with stainless steel safety chains to prevent accidental dropping thereof during maintenance and operation.

5.2 Fire Protection

- 5.2.1 A suitable and complete, locally supplied fire suppression system (fire extinguishing aerosol generators) shall be provided inside the electrical house including major electrical panels. It shall have automatic selective activation. The design of the system in all areas shall be suitable for the type of fire that can be expected there.
- 5.2.2 4,5 kg Fire extinguishers shall be provided by the Supplier and accompanied by a valid South African certificate, in the following positions:
- At the foot of the stairs leading to the superstructure
 - Inside the operator's cab just inside the door
 - Outside the doors of the machinery house and electrical house (with weather protection)
 - Inside the machinery and electrical houses and electrical enclosure if applicable
 - Inside the checker's cabin
 - Inside the personnel lift
 - At the hydraulic power packs if applicable
- 5.2.3 Suppliers shall confirm that these positions are adequate, or alternatively to indicate additional positions.

5.3 Environmental Requirements

- 5.3.1 The STS crane shall comply with the South African Occupational Health and Safety Act, Act 85 of 1993/as amended or equivalent international standards.

6. Maintenance

6.1 Lubrication

- 6.1.1 All lubrication points shall be grouped into the following manual battery systems:
- Boom and masts
 - Trolley
 - List, trim and skew mechanisms
 - Front sheaves
 - Rear sheaves
 - Gantry, one system per bogey
 - Main hoist machinery
 - Boom hoist machinery
 - Other items as required
- 6.1.2 All bearings on shafts, axles, and other bearings, exposed gears, drive chains, articulated hinge points etc must be included in these lubrication systems.
- 6.1.3 An automatic lubrication system for the wire ropes of the main hoist, boom hoist and auxiliary trolley must be provided. This system must be monitored by the PLC for correct operation.

6.2 Accessibility

- 6.2.1 All replaceable items including (but not limited to) critical components shall be designed for easy access, removal and replacement.

7. General

- 7.1 All components fitted and supplied shall be new.
- 7.2 All components shall be installed and fitted according to the manufacturer's recommendations.
- 7.3 The machine shall be to I.S.O. Metric Standards, and instrumentation gauges, dials, etc. shall be graduated in Systeme International (S.I.) units.
- 7.4 Operational, service and spare part manuals, and drawings all required in English (3 in electronic format with one hardcopy per machine).
- 7.5 All shafts shall be sealed by means of lip seals and additional labyrinth seals or Nilos type rings.
- 7.6 Breather vents on all equipment shall be fitted with replaceable filters. Filters on hydraulic tanks shall be of the water absorbing type.
- 7.7 Unless otherwise stated, all bearings shall be rated for a L5 service life that exceeds the total duration of use of the respective mechanism under the loads and conditions that can be expected.
- 7.8 Cooper or SRB split type bearings shall be used on all trapped shafts such as between motors and couplings as well as at areas where components would otherwise have to be removed to remove bearings or bearings/mountings would have to be removed to remove equipment.
- 7.9 All parts shall be designed so that they may easily be assembled, adjusted, removed for replacement and be accessible for inspection and maintenance. All moving parts shall be suitably protected.
- 7.10 The clearances between moving parts of the crane and fixed parts shall not be less than 350mm for crushing movement or 450mm for shearing movement, otherwise guards must be provided.
- 7.11 All structural elements shall be designed to minimize the settlement of water or dust on it, irrespective of the operational state of the equipment. All roofs shall be sloped.
- 7.12 Light weight stainless steel covers shall be fitted over all Plant where necessary to protect it from the environment or to prevent the settlement of water or dust.
- 7.13 The thread of all bolts and nuts shall be coated with anti-seizing agent before installation.

8. Referenced Specifications

8.1 Standard specifications

The following, not necessarily comprehensive, list of standard specifications are relevant:

ISO 4308	Cranes and Lifting Appliances – Selection of Wire Ropes
ANSI/AWS D1.1	Structural Welding Code - Steel
BS-EN 287 Part 1	Approval testing of welders/fusion welding
BS-EN 288 Part 3	Specification and approval of welding procedures for metallic materials
BS 5135	Metal arc welding of carbon and carbon manganese steels
BS 4360/SABS 1431	Weldable structural steel
BS 3923	Methods for ultrasonic examination of welds
BS 2600	Radiographic examination of fusion welded butt joints in steel
BS 5493	Code of practice for protective coating of iron and steel structures against corrosion
DIN 1026	Metric channels
ISO R657	Angles
SANS 094	The use of high strength friction grip bolts and nuts
SANS 135	ISO metric bolts, screws and nuts (hexagon and square) (coarse thread, free fit series)
SANS 136	ISO metric precision hexagon-head bolts and screws, and hexagon nuts (coarse thread medium fit series)
SANS 064	Preparation of steel surfaces for coating
SANS 763	Hot-dip (galvanized) zinc coatings
SANS 1091	National colour standards for paint
SANS 1431	Weldable structural steels

Regardless of which specifications are actually worked to when manufacturing Plant and Materials, such Plant and Materials shall be capable of satisfactorily passing all tests laid down in the standard specifications called for.

8.2 Employer specifications

The following Employer specifications are relevant:

EEAM-Q-002	Hydraulic Plant
EEAM-Q-003	Steel wire ropes, rope drums and sheaves
EEAM-Q-004	Gearing, shafts, bearings, brakes, lubrication, vee-belts, keys and keyways
EEAM-Q-006	Structural steelwork
EEAM-Q-008	Corrosion protection
EEAM-Q-009	Quality Management
EEAM-Q-011	Maintenance cranes and hoists for use on port equipment
EEAM-Q-012	General electrical Plant
EEAM-Q-014/015	Electrical motors and generators
EEAM-Q-017	Medium voltage Plant for port equipment
EEAM-Q-019	Cable Reeling Systems
EEAM-Q-018 / 021 / 030	Lighting / Electronic / Electrical equipment
EEAM-Q-020	Testing and commissioning of electrical Plant

End of Document

TPT Standard Environmental Specifications version 3



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STANDARD ENVIRONMENTAL SPECIFICATION TRANSNET PORT TERMINALS

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1 PURPOSE

This procedure describes the minimum standards for environmental management to which contractors and sub-contractors on a construction site must comply. It is a generic standard for use across all works within Transnet Port Terminals.

There may be project specific environmental standards in addition to the standards in the documents, or that exceed the standards prescribed here. These project specific environmental standards will be described in the Project Environmental Specification (PES) that will be issued separately for each project.

This document must be read in conjunction with the Transnet Port Terminals Construction Environmental Management Plan (CEMP)

2 SCOPE

This standard applies to Contractors that work on site under the authority of Transnet Port Terminals.

3 REFERENCES

- Constitution of the Republic of South Africa 108 of 1996
- National Environmental Management Act 107 of 1998
- National Environmental Management – Air Quality Act 39 of 2004
- National Environmental Management- Waste Act 59 of 2008
- National Environmental Management- Biodiversity Act 10 of 2004
- National Environmental Management- Protected Areas Act 57 of 2003
- National Environmental Management-Integrated Coastal Management Act 24 of 2008
- National Veld and Forest Fire Act 101 of 1998
- Marine Living Resources Act 18 of 1998
- Marine Pollution (Control and Civil Liability)Act 6 of 1986
- Mineral and Petroleum Resources Development Act 28 of 2002
- National Heritage Resources Act 25 of 1999
- National Forests Act 84 of 1998
- National Water Act 36 of 1998
- Environmental Authorisation (EA) applicable to the project
- Sea-shore Act No. 21 of 1935
- Standards Act 29 of 1993
- Dumping at Sea Control Act 73 of 1980
- Occupational Health and Safety Act 85 Of 1993
- Environmental Conservation Act 73 of 1989
- ISO 9001:2008
- ISO 14001:2004
- SANS OHSAS 18001:2011
- Road Traffic Act 29 of 1989
- Hazardous Substances Act 15 of 1973

- SANS 10103:2004. The measurement and rating of environmental noise with respect to land use, health annoyance and to speech communication
- Transnet Safety, Health, Environmental and Quality Risk Management System
- TPT SHEQ RS STD 001: Safety Health Environment and Quality Standard
- Transnet Port Terminals Construction Environmental Management Plan.

4. STANDARDS OF ENVIRONMENTAL MANAGEMENT

The Contractor shall identify the potential environmental impacts that may occur as a result of their activities and accordingly prepare separate Method statements describing how each of these impacts will be prevented or managed so that the standards set out in this document are achieved. These method statements will be prepared in accordance with the requirements set out in the Transnet Port Terminals Construction Environmental Management Plan.

4.1 SITE ESTABLISHMENT

4.1.1 Objective

To ensure the environmental issues are taken into account in the establishment of the site offices and all other facilities on site.

4.1.2 Scope

This standard applies to all activities relating to the planning of the site, site establishment, and operation of the site and closure of the site.

4.1.2.1 Site Plan

The contractor shall establish his construction camps, offices, workshops, staff accommodation and any other facilities on site in a manner that does not adversely affect the environment. However, before construction can begin, the Contractor shall submit to the Construction Manager for his approval, plans of the exact location, extent and construction details of these facilities and the impact mitigation measures the Contractor proposes to put in place. The following should also be included in the site plan:

- Service lines and servitudes;
- Areas and routes to be reworked, including the size (dimensions) of the stripped areas;
- The construction camp site and rest areas to be used during construction;
- Temporary on-site waste disposal areas to be used during construction;
- Designated areas for on-site storage of construction materials;
- Oil and hazardous chemical substances storage areas
- Designated areas for portable latrines (beyond 100m from quayside / harbour waters);

- Sources for water provision on site;
- Areas designated for power supply during construction;
- Existing roads and tracks to be used as transportation routes, and routes to gain access to construction areas; and

The plans shall detail the locality as well as the layout of all waste treatment facilities for litter, kitchen refuse, sewage and workshop-derived effluents. The site offices should not be sited in close proximity to steep areas. It is recommended that the offices, and in particular the ablution facilities, aggregate stockpiles, spoil areas and hazardous material and chemical substances stockpiles are located as far away as possible from any water course as possible.

Regardless of the chosen site, the Contractor's intended mitigation measures shall be indicated in the plan.

4.1.2.2 Sewage

Particular reference in the site establishment plan shall be given to the handling of sewage generated at the site offices and staff accommodation and at all localities on the site where there will be a concentration of labour. Sanitary arrangements should be to the satisfaction of the Construction Manager.

Safe and effective sewage treatment will require one of the following sewage handling methods: septic tanks and soak-aways, dry-composting toilets such as "enviro loos", or the use of chemical toilets which are maintained by a sub-contractor. The type of sewage treatment will depend on the location of the site and the surrounding land uses, the duration of the contract and proximity (availability) of providers of chemical toilets. Should a soak-away system be used, it shall not be closer than 800 meters from any natural water course or water retention system. The waste material generated from these facilities shall be serviced on a regular basis.

Toilets and latrines shall be easily accessible and shall be positioned within walking distance from wherever employees are on the works. Use of open areas (i.e. the veldt) shall not, under any circumstances, be allowed.

Outside toilets shall be provided with locks and doors and shall be secured to prevent them from blowing over. The toilets shall also be placed outside areas susceptible to flooding. The Contractor shall arrange for regular emptying of toilets and shall be entirely responsible for enforcing their use and for maintaining such facilities in a clean, orderly and hygienic condition to the satisfaction of the engineer.

4.1.2.3 Effluent management

All effluent water from the camp/office sites shall be disposed of in a properly designed and constructed system, situated so as not to adversely affect water courses (streams, rivers, pans, dams etc). Only domestic type wastewater shall be allowed to enter the designated system.

4.2 Waste Management

4.2.1 Objective

To ensure that all waste generated during construction and commissioning of the facilities is properly disposed of.

Example of typical construction waste which, could be expected on the site are indicated in the flowing table:

TABLE 2: EXAMPLE OF CONSTRUCTION WASTE CLASSIFICATION

WASTE	HAZARDOUS	GENERAL
Aerosol containers	X	
Batteries, light bulbs, circuit boards, etc.	x	X
Clean soil		X
Construction debris contaminated by oil or organic compounds	x	
Domestic waste		X
Empty drums (depends on prior use)	X	x
Empty paint and coating containers		X
Explosive waste	X	
PCB waste	X	
Rubble (not contaminated by oil or organic compounds)		X
Waste cable		X
Waste plastic		X
Waste paint and /or solvent	X	
Waste oil	X	
Waste concrete		X
Waste containing fibrous asbestos	X	
Waste timber		X
Sewerage sludge	X	
Scrap metal		x

4.2.2 Scope

This standard applies to all construction, commissioning and site activities that may lead to the generation of waste.

4.2.3 Approach

Waste is grouped into “general” or “hazardous”, depending on its characteristics. The classification determines handling methods and the ultimate disposal of the material.

General waste to be expected during construction includes the following:

- Trash (waste paper, plastics, cardboard. Etc.) and food waste from offices, warehouses and construction personnel
- Uncontaminated construction debris such as used wood and scrap metal

- Uncontaminated soil and non-hazardous rubble from excavation or demolition

Hazardous waste means any waste that contains organic or inorganic elements or compounds that may, owing to the inherent physical, chemical characteristics, such as toxic, ignitable, corrosive, carcinogenic or other properties or toxicological characteristics of that waste, have a detrimental impact on health and the environment.

Waste avoidance and minimization

A hierarchical control approach to waste management is encouraged. Waste should preferably be managed in the following order:

- **Avoidance of Waste**

Waste prevention is a preferred option in waste management and involves either avoiding waste being generated or being able to dramatically reduce the quantities of waste being produced.

- **Reduce waste**

This is a process whereby the production of waste should be curtailed, by all the best available methods

- **Reuse of waste**

Where waste is created and can be either recovered as product or sold on as a raw material for another process

- **Recycling of Waste**

Recycling of waste should be practical without transgressing legislation. The recycling must be cost effective, appropriate to the type and classification of waste, and must ensure that environmental benefits are realised.

- **Recovery of waste**

Recovery of waste is also extended to the recovery of the product before it becomes waste, and refers to the controlled extraction of a material or the retrieval of energy from waste to produce a product.

- **Treatment and disposal of waste**

This is the last and least preferred option in the waste hierarchy and is a last resort attempt if all the other options have failed, or if there is residual waste left from the

recycling processes. In certain terminals, radioactive products have to be treated before disposal, but disposal is the last option in the waste management hierarchy.

4.2.4 Waste Management

The Contractor is responsible for the removal of all waste from the site, generated through the Contractor's activities. The Contractor shall ensure that all waste is removed to appropriate licensed waste management facilities. (For the identification of an appropriate facility, the following source may be utilized: www.sawic.org.za)

The classification of waste determines handling methods and the ultimate disposal of the material. The contractor shall manage hazardous waste that is anticipated to be generated by his operations as follows:

- Characterize the waste to determine if it is general or hazardous
- Obtain and provide an acceptable container with label
- Place hazardous waste material in container which is free of holes and covered to prevent ingress of rainwater
- Inspect the container on a regular basis as prescribed by the contractor's waste management plan
- Track the accumulation time for the waste
- Haul the full container to the disposal site
- Provide documentary evidence for proper documentary disposal of the waste, including waste manifests, weighbills and safe disposal certificates
- Audit of licensed landfill site, including related documentation to

The Contractor's Environmental Officer will work in conjunction with the Contractor's construction safety and industrial hygiene personnel to create a Hazardous Materials Management Program. This program will establish the necessary protocol for proper handling and removal of hazardous material on the site.

Information on each hazardous substance will be available to all persons on site in the form of Material Safety Data Sheets (MSDS's). Training and education about the proper use, handling, and disposal of the material will be provided to all workers handling the material.

The Contractor's Environmental Officer must be informed of all activities that involve the use of hazardous substances to facilitate prompt response in the event of a spill or release. The contractor shall manage GENERAL WASTE that is anticipated to be generated by operations as follows:

- Determine if waste is non-hazardous and obtain containers for waste storage
- Notify waste hauler when container is full so that it can be removed and replaced with an empty container.
- No littering is allowed on site. In the event where staff mobility is high, refuse bags will be made available by the Contractor.

On the project, however, waste generating entities are directed to control the generation of non-hazardous waste by:

- Eliminating waste generation or reducing the total volume
- Reducing the degree of contamination of waste generated
- Reclaiming materials otherwise considered waste

The Contractor shall recycle GENERAL WASTE that is anticipated by its operation as follows:

- Obtain and label recycling containers for:
 - Office Waste
 - Aluminium
 - Steel
 - Glass
 - Ferrous Metals
 - Non Ferrous Metals
 - Waste Timber
 - And locate them within temporary office building and trailers
- Establish recycled material collection schedule
- Arrange for full bins to be hauled away
- Tracking of recyclable volumes and retention of records relating to recycling program.

Spent batteries, circuit boards, and bulbs, while non-hazardous, require special collection and handling.

4.3 CHEMICAL STORAGE AND SPILL MANAGEMENT

Minor amounts of fuel, oil, grease, paints and solvents (e.g. cement; epoxies; lime and other stabilizing agents; tar products, and paint) will be stored on the site for use during the construction phase. Contamination of the biophysical environment by substances must be avoided. These substances should be kept within either of the following:

- A concrete base surrounded by a low brick wall; or,
- A shallow excavation lined with two layers of thick plastic sheeting, weighted down with rocks in the base and sandbags on the edge.

4.3.1 Objective

- To prevent uncontrolled release of chemicals to the environment; and,
- To minimize the potential for contamination of land or water.

4.3.2 Scope

Handling, storage and management of chemicals, hazardous substances and spills onsite

4.3.3 Management of Chemicals, Hazardous Substances and Spills

- The contractor will ensure that all employees and sub-contractors who are responsible for handling chemicals or dangerous substances undergo relevant

training. The same applies to the section of the workforce who will be responsible for the maintenance of equipment, to prevent the accidental discharge or spill of fuel, oil, lubricants and other chemicals;

- Chemicals must be stored in labelled, closed containers within designated areas, preferably sheltered, with sealed floors away from drains, watercourses or harbour waters;
- MSDS's for all chemicals kept on site must be available at the point of use or storage;
- Chemicals must not be stored within 100 meters of any water body or drains. The ECO should be consulted when locating the chemical stores;
- Unauthorized access to the chemical stores must be controlled;
- Vehicles and machinery are to be well maintained. All servicing must be done at a workshop and not on site;
- Do not bury material from bunded areas (this should be treated as hazardous material);
- Store waste oil and grease away from drains or watercourses in bunded, roofed and sealed areas and ensure collection by a licensed waste contractor.
- A spill kit/s must be kept on site for responding to chemical/oil spills.
- Portable ablution facilities must not be located within 100m of drains, watercourses or harbour waters; and,
- Waste from ablution facilities will be regularly removed and care will be taken to ensure that there is no spillage, resulting in possible environmental contamination.
- Provide for spillage control by bunding or collecting spills to a sump for disposal or controlling by absorbent material on standby.
- If an incident occurs, ensure that the appropriate corrective actions are undertaken as described in Box 1.
- Contractor employees to be trained on spill procedures, and emergency response.

Box 1. Actions to be taken in the event of a major spill of hazardous substances:

- 1) Stop the source of the spill;
- 2) Contain and clean up the spill immediately and remediate or appropriately dispose of the contaminated material;
- 3) The affected area should be scraped off to the depth of contamination using a spade (small area) or a front-end loader or scoop (large area), absorbent materials such as sawdust or sand will be used to absorb and clean up any fuel or oil spills; The contaminated substrate will be stored in a suitable container for further appropriate disposal to an accredited landfill site. Hazardous waste disposal must be accompanied by a safe disposal certificate.
- 4) Report all spills in the onsite environmental incident book, including: the date, time and location, quantity and type of material spilled, circumstances that caused the spill, damage caused, description of the clean-up.
- 5) All significant spills must be reported to the Department (DEA) (Waste Management) and other relevant authorities. If remedial action is required, this must be taken in consultation with the Department of Water Affairs (DWA).
- 6) In the event that the spill cannot be contained the following departments must be informed of the incident within 48 hours:
 - Local Municipality;
 - DWA;
 - DEA;
 - Local Fire Department; and
 - Any other affected departments.

4.4 VEHICLE AND EQUIPMENT REFUELING

4.4.1 Objective

To eliminate/control fuel and oil spillage at refueling facilities.

4.4.2 Scope

This standard applies to all refueling, lubrication and oil changing requirements on all vehicles and machinery.

4.4.3 Refueling

Engine driven compressors, pumps, air conditioners, and arc welders can have small leaks (usually oil) that can accumulate to become spills, which require clean up. These leaks became more evident if the equipment remains in the same place for an extended period of time. Damaged fuel tanks, fuel hoses, and fuel pumps can be sources of significant fuel leaks. Hydraulic systems can blow gaskets or hoses resulting in large quantities of hydraulic fluid being spilled to the ground.

4.4.3.1 Control

No vehicles or machines shall be serviced or refueled on site except at designated servicing or refueling locations which are underlain by an impervious surface. No oil or lubricant

changes shall be made except at designated locations, or in case of breakdown or emergency repair.

The Contractor shall store fuel and oil at a secure area, which shall be bunded to contain 110% of the total volume within the bund and designed with an impervious layer or liner or paved surface to prevent spillage from entering the ground.

The Contractor shall provide details of its proposed fuel storage and fuelling facility to the TPT Environmental Officer for approval, the design shall comply with the regulations of the National Water Act, (Act 36 of 1998), the Hazardous Substances Act, (Act 15 of 1973), the Environmental Conservation Act, (Act 73 of 1989), and the Occupational Health and Safety Act - Chemical Substances Regulations (Regulation number R1179).

4.4.3.2 Spill Response

The Contractor shall comply with the approval of the National Water Act, (Act 36 of 1998), the Hazardous Substances Act, (Act 15 of 1973), The Environmental Conservation Act, (Act 73 of 1989), and the Occupational Health and Safety Act, (Act 85 of 1993).

The Contractor shall provide details for approval of its spill response plan in the event of any spills of fuel, oils, solvents, paints or other hazardous materials. The plan will show measures to be taken to remove contaminated soils from site and demonstrate complete removal of contamination, including safe disposal.

The Contractor shall instruct construction personnel on the following spill prevention and containment responsibilities:

- Immediately repair all leaks of hydrocarbons or chemicals
- Take all reasonable means to prevent spills or leaks
- Spill kits to be available at all times
- Do not allow sumps receiving oil or oily water to overflow
- Prevent storm water runoff from contamination by leaking or spilled drums of oil or chemicals
- Do not discharge oil or contaminants into storm water or sewer systems.

If a spill occurs on land, the Contractor must:

- Immediately stop or reduce the spill
- Contain a spill
- Contact the TPT SHEQ department
- Recover the spilled product
- Dispose of contaminated absorbent product and obtain safe disposal certificate for same
- Remediate the site
- Implement actions necessary to prevent the spill from contaminating groundwater, stormwater or off-site surface water
- Dispose of contaminated material to a location designated to accept such waste

Any spill to water has the potential to disperse quickly, therefore, the spill must be contained immediately using appropriate containment equipment.

If a spill to water occurs, the Contractor must:

- Take immediate action to stop or reduce the spill and contain it
- Notify the appropriate on-site authorities, including TPT and TNPA
- Implement actions necessary to prevent the spread of the contamination by deploying booms and /or absorbent material
- Recovery of the spilled material and safe disposal certificates for same.

4.5 SPRAY PAINTING AND SANDBLASTING

4.5.1 Objective

To ensure that all spray painting and sandblasting on site is done in a controlled manner where appropriate measures are taken to prevent paint contamination of the soil and to ensure that sandblasting grit/media is properly contained and disposed of.

4.5.2 Scope

All spray painting and sandblasting on site.

4.5.3 Spray Painting and Sandblasting

Spray painting and Sandblasting should be kept to a minimum. All painting should, as far as practicable, be done before equipment and material is brought on site. Touch-up painting is to be done by hand painting or by an approved procedure. A Method Statement shall be submitted to the TPT Environmental Officer for approval.

The relevant Contractor will inform his Environmental Officer of when and where spray painting or sandblasting is to be carried out prior to commencement of work. The Environmental Officer will monitor these activities to ensure that adequate measures are taken to prevent contamination of the soil.

NB: If the area is in confined or high (elevated) areas, a protection plan must be issued for approval.

4.6 DUST MANAGEMENT

4.6.1 Objective

To prevent/control the generation of dust on the construction site and access roads.

4.6.2 Scope

Contractors (associated with activities such as road works, geotechnical surveys, pilling, storm water drainage, construction of roads and railways, foundations, brick building, operating workshops, fencing, erecting construction camps, and batch plant activities, etc.) shall submit a dust control plan for approval by the Environmental Officer.

4.6.3 Management of Dust

Material in transit should be loaded and contained within the load bin of the vehicle in such a way as to prevent any spillage onto the roads and the creation of dust clouds. If necessary, the load bin of the vehicle shall be covered with a tarpaulin to prevent dust.

Dust is to be controlled on unpaved access roads and site roads using sprayed water. Contractors are responsible for managing dust generated as a result of their activities. The Contractor will be responsible for dust control of the entire construction area.

Some dust control measures which are normally applied during construction are presented in this section for inclusion by the Contractor in his Dust Control Method Statement.

These dust mitigating procedures include the following:

- Limit vehicle speeds on unpaved roads to 20km/h
- Wash paved surfaces within the construction area twice a week
- Minimize haulage distances
- Apply water to gravel roads with a spraying truck when required
- Environmentally friendly soil stabilizers may be used as additional measures to control dust on gravel roads and construction areas
- Dust suppression measures will also apply to inactive construction areas. (an inactive constructive site is one on which construction will not occur for a month or more)
- Construction material being transported by trucks must be suitably moistened or covered to prevent dust generation
- Strip and store topsoil in separate stockpiles with mounds not exceeding 2m in height to, among other things, prevent wind-blown dust.
- Spray water on unsealed surfaces in high winds to reduce dust.
- Minimise disturbance of natural vegetation during right-of-way construction (e.g. transmission lines and erection of fences) to reduce potential erosion, runoff, and air-borne dust
- Ensure that vehicles are well maintained to reduce emissions; and
- Do not use open fires for cooking or for the burning of refuse.
- Implement a system of reporting excessive dust conditions by construction personnel (as instructed through Environmental Awareness Training)

Water for dust control shall be taken only from approved sources.

4.7 STORM WATER AND DEWATERING MANAGEMENT

4.7.1 Objective

To ensure that storm water and dewatering drainage across the site occurs in a manner that will negate contamination by oils, fuels, litter and other waste and prevent erosion of the construction terrace.

4.7.2 Scope

All runoff and dewatering activities.

4.7.3 Storm water and Dewatering Management

Water is a valuable resource. Both the quality and quantity of water used by the Contractor should be considered in making resource conservation plans.

Construction activities may affect water quality and/or quantity of groundwater and/or surface water of the area.

The Contractor shall be aware that, apart from runoff from overburden emplacements and stock piles, storm water can also be contaminated from batch plants, workshops, vehicle wash-down pads, etc., and that contaminants during construction may include hydrocarbons from fuels and lubricants, sewerage from employee ablutions and excess fertilizer from rehabilitated areas, etc.

The Contractor shall take note that discharges to controlled waters such as the sea, rivers, groundwater or to the sewerage systems are controlled under South African Water Legislation.

4.7.3.1 Surface runoff

Construction activities such as surface grading and evacuation will disturb surface areas on site. This will increase the potential for soil erosion and subsequent sediment transport during periods of precipitation runoff or when excavation dewatering is required. Construction activities also have the potential to change local surface drainage and sediment transport patterns, site floodplain delineation, and percolation rates into soil.

4.7.3.2 Dewatering

Dewatering during groundwork produces a surface water discharge that will require collection and sedimentation. Dewatering also has the potential to affect ground water quality and quantity.

4.7.3.3 Waste water

Liquid wastes including used solvents, used lubricating oils, chemical flushing agents, spill cleanup wastes, painting wastes, and concrete mixing drum washings, etc., have the potential to affect surface water and groundwater quality.

4.7.3.4 Management Requirements

- Temporary drainage must be established on site during the construction period until permanent drainage is in place. Contractors are responsible for maintaining the temporary drainage in the areas. Contractors must provide secondary drainage that prevents erosion.
- Contractors must employ good housekeeping in their areas to prevent contamination of drainage water

- The Contractor shall clear stagnant water

Specific water management measures (surface and groundwater) for incorporation by Civil/Earthworks Contractors into their EMP's include the following:

- The Contractor shall ensure that no contaminated surface water shall flow off-site as a result of Contractor operations. Silt traps shall be constructed to ensure retention of silt on site and cut-off ditches shall be constructed to ensure no runoff from the site except at points where silt traps are provided
- If applicable, the Contractor shall be responsible for collection, management, and containment within the site boundaries of all dewatering from all general site preparation activities. The dewatering water shall be contained within the site boundaries by sequentially pumping or routing water to and from sub-areas within the site as the construction activities proceed. No discharge/dewatering to off-site land or surface water bodies will be allowed
- On-site drainage will be accomplished through gravity flow. The surface drainage system shall consist of mild overland slopes, ditches, and culverts. The graded areas adjacent to building shall be sloped away with a 5% slope. Other areas shall have a minimum slope of 0.2% or as otherwise indicated.
- Ditches shall be designed to carry a 25-year storm event with velocities in accordance to minimize erosion. Erosion protection shall consist of suitable stabilizing surfaces in all ditches
- Prevent stormwater runoff from coming into contact with wastes or contaminants on the site;
- All potential contaminants (oil, diesel etc) will be stored in bunded areas which have a capacity of more than 110% of the substances being contained therein
- All machinery should be re-fuelled and serviced offsite. If on-site re-fuelling is required, machinery will be re-fuelled and serviced in a designated area with an impermeable layer
- Vehicles will be carefully maintained to ensure that they do not leak (oil, hydraulic fluids, and diesel). Drip trays or fuel sumps are to be placed under machinery that are being refuelled; or that are parked overnight
- Adequate ablutions (such as chemical toilets) must be located in an area 100m or more from stormwater drainage systems and water bodies
- Culverts shall be designed to ensure passage of the 25-year storm peak runoff flow

Both structural and non-structural (vegetative) erosion control measures will be designed, implemented, and properly maintained in accordance with best management practices which will include the following.

- Scheduling of activities to minimize the amount of disturbed area at any one time
- Implementation of re-vegetation as early as feasible
- Limiting construction traffic and/or avoidance thereof on access roads and areas to be graded to the extent feasible at drainage ditches
- Compacting loose soil as soon as possible after excavation, grading, or filling

- Using silt fences, geo-textiles, temporary rip-rap, soil stabilization with gravel, Diversionary berms and swales, small sedimentation basins, and graveled roads to minimize transport of sediment
- Implementing the erosion and sedimentation control plan and ensuring that construction personnel are familiar with and adhere to it
- Managing runoff during construction
- The Contractor shall be responsible for checking and maintaining all erosion and sedimentation controls.

4.8 REHABILITATION

4.8.1 Objective

To ensure that all areas affected by the project are appropriately rehabilitated and re-vegetated in a manner congruent with the surrounding biophysical environment and the prevention of spread of alien invasive species.

4.8.2 Scope

All areas affected by the project including lay down grass.

4.8.3 Rehabilitation

Contactors shall rehabilitate their lay-down area/s upon completion of work on site. A rehabilitation plan will be submitted to the Construction Manager for approval at least six weeks before completion. The following are critical issues to be included in the rehabilitation plan:

- Details of soil preparation procedures including proposed fertilisers or other chemicals being considered for use.
- A list of plant species that will be used in the rehabilitation process. Note that these should all be indigenous species, and preferably species that are endemic to the area. The assistance of an appropriately qualified botanist should be sought in developing this list.
- An indication of the monitoring procedures that will be put in place to ensure the successful establishment of the plants (duration and frequency of monitoring, proposed criteria for declaring rehabilitation as being successful)
- Procedures for the prevention of the establishment and spread of alien invasive species.

4.9 NOISE MANAGEMENT

4.9.1 Objective

To maintain construction noise at the site within legal limits.

4.9.2 Scope

Any noise generated at the construction site

4.9.3 Noise Management

- Keep all equipment in good working order
- Operate equipment within its specification and capacity and don't overload machines
- Apply regular maintenance, particularly with regards to lubrication
- Operate equipment with appropriate noise abatement accessories, such as sound hoods
- As far as possible, construction activities must be limited to weekdays (Monday – Friday) during working hours (7:30am – 5pm);
- Investigate all instances of excessive noise and assess possibilities for mitigation

Noise control measures for incorporation by the Contractor in its noise control plan shall include the following:

- Ensure that the potential noise source will conform to the South African Bureau of Standards recommended code of practice, SANS 10103:2008, so that it will not produce excessive or undesirable noise when released
- All the Contractor's equipment shall be fitted with effective exhaust silencers and shall comply with the South African Bureau of Standards recommended code of practice, SANS 10103:2008, for construction plant noise generation
- All contractor's vehicles shall be fitted with effective exhaust silencers and shall comply with the Road Traffic Act, (Act 29 of 1989) when any such vehicle is operated on a public road
- If on-site noise control is not effective, protect the victims of noise (e.g. ear-plugs) by ensuring that all noise-related occupational health provisions and met. (Occupational Health and Safety Act, (Act 85 of 1993).

4.10 PROTECTION OF HERITAGE RESOURCES

4.10.1 Objective

To ensure the protection of archaeological, historical artifacts, or heritage resources discovered during construction activities, in line with the National Heritage Resources Act (Act No. 25 of 1999). The following activities have the potential to impact on heritage and cultural resources, should these be found on the proposed site:

- Activities associated with site excavation, clearing, and construction;
- Handling / transporting of materials on site;
- Operation of construction vehicles and machinery on site; and
- Presence of workers on site and in the site camp.

4.10.2 Scope

Archaeological, historical artifacts or heritage resources discovered on or near the site.

4.10.3 Archaeological Sites

If an artifact on site is uncovered, work in the immediate vicinity shall be stopped immediately. The Contractor shall take reasonable precautions to prevent any person from removing or damaging any such article and shall immediately upon discovery thereof inform the engineer of such a discovery. The South African Heritage Resources Agency (SAHRA) is to be contacted and will appoint an archaeological consultant. Work may only resume once clearance is given in writing by the archaeologist.

4.10.4 Graves and middens

If a grave or midden is uncovered on site, or discovered before the commencement of work, all work in the immediate vicinity of the graves/middens shall be stopped and the engineer informed of the discovery. The National Monuments Council should be contacted and in the case of graves, arrangements made for an undertaker to carry out exhumation and reburial. The undertaker will, together with the National Monument Council, be responsible for attempts to contact family of the deceased and for the site where the exhumed remains can be re-interred.

4.11 FIRE PROTECTION

4.11.1 Objective

To minimize the risk of uncontrolled fires.

4.11.2 Scope

All activities on or near the site that could initiate an uncontrolled fire.

4.11.3 Fire Control

Fires shall only be allowed in facilities or equipment specially constructed for this purpose. A firebreak shall be cleared and maintained around the perimeter of the camp and office sites. All conditions incorporated in the requirements of the Occupational Health and Safety Act shall be implemented.

Specific management measures for fire control include:

- Fire prevention facilities must be present and easily accessible at all storage facilities.
- Firefighting equipment is to be present on site at all times in accordance with the Occupational Health and Safety Act (85 of 1993).
- All firefighting equipment to have been tested and serviced in line with regulatory requirements.
- Do not use open fires for cooking or for the burning of refuse.
- Onsite fire extinguishers will not be utilized by contractors for any purpose other than for fighting fires.

4.12 SUPPLY OF WATER FOR HUMAN USE

4.12.1 Objective

To ensure that there is an adequate, safe water supply for all personnel on site.

4.12.2 Scope

Managing the water supply on site and controlling the abstraction of water from natural resources in the area.

4.12.3 Collection of water from natural resources

No water for domestic use (drinking water or for bathing or washing) shall be abstracted from any water resource (stream, river, or dam) without the express permission of the Construction Manager. Such permission shall only be granted once it can be shown that the water is safe for use, that there is sufficient water in the resource to meet the demand, and once permission has been obtained from the Department of Water Affairs in accordance with the requirements of the National Water Act (Act 36 of 1998).

4.12.4 Provision of drinking water

Water for human consumption shall be available at the site offices and at other convenient locations on site. The generally acceptable standard is that a supply of drinking water shall be available within 200m of any point on the construction site.

4.13 PROTECTION OF LIVESTOCK OR GAME AND THE COLLECTION OF FIREWOOD

4.13.1 Objective

To prevent illegal activities potentially perpetrated by site staff and to prevent the killing of any animal trapped in construction works or discovered on the construction site or surroundings.

4.13.2 Scope

Managing the activities of staff during work- and after hours

4.13.3 Poaching of livestock or game

On no account shall any hunting or fishing activity of any kind be allowed. This includes the setting of traps, or the killing of any animal caught in construction works.

4.13.4 Killing of animals

On no account shall any animal, reptile or bird of any sort be killed. This specifically includes snakes or other creatures considered potentially dangerous discovered on site. If such an animal is discovered on site, an appropriately skilled person should be summoned to remove

the creature from the site. Consideration should be given to selection and nomination of such a person prior to site establishment. If no-one is available, training should be provided to at least two site staff members.

4.13.5 Collection of firewood

The Contractor shall provide adequate facilities for all his staff so that they are not encouraged to supplement their comforts on site by accessing what can be taken from the natural surroundings. The Contractor shall ensure that energy sources are available at all times for construction and supervision personnel for heating and cooking purpose.

4.14 ENVIRONMENTAL AWARENESS TRAINING

An Environmental Awareness Program is considered a necessary part of the Construction Environmental Plan for the project. Training of the appropriate construction personnel will help that all environmental regulations and requirements are followed to be defined in the relevant Method statement to be prepared by the Contractor.

Objectives of environmental awareness training are:

- Environmental Management – protecting the environment from the effects of construction by making personnel aware of sensitive environmental resources
- Regulatory compliance – complying with requirements contained in project – specific permit conditions, also complying with requirements in regional and local regulations.
- Problem recognition and communication – training personnel to recognize potential environmental problems, i.e. spills, and communicate the problem to the proper person for solution.
- Liability control – non-compliance with regulatory requirements can lead to personal and corporate liability.

All individuals on the Project construction site will need to have a minimum awareness of environmental requirements and responsibilities. However, not all need to have the same degree of awareness. The required degree of knowledge is greatest for personnel in the Safety, health, and Environmental Sections and the manual personnel.

Basic environmental awareness training must include:

- What is meant by “environment”;
- Why the environment needs to be protected and conserved;
- How construction activities can impact on the environment;
- What can be done to mitigate against such impacts;
- Awareness of emergency spill response provisions;
- Social responsibility during construction (being considerate to residents etc.);
- Translators are to be used if necessary, to ensure that all staff understands what is required of them in terms of the EMP;
- A copy of the EA must be kept at the site where the activity will be carried on. The EA must be produced to any authorised official of the department who requests to

see it and must be made available for inspection by any employee or agent of the holder of the EA who works or undertakes work at the premises;

- The client must be on hand to explain any technical issues and to answer questions;
- Use should be made of environmental awareness posters on site; and
- The need for a 'clean site' policy needs to be explained to everyone working on site.

The Contractor shall keep a record of all the environmental related training of the personnel.

4.15 HANDLING AND BATCHING OF CONCRETE AND CEMENT

4.15.1 Objective

To control cement and concrete batching activities so as to prevent the spillage of cement waste water and potential contamination of soil, groundwater and marine environment (where applicable). To avoid or substantially reduce dust emissions caused by cement and concrete activities on site and ensure that no noise nuisance results from batching activities.

4.15.2 Scope

Cement and concrete batching activities commonly produce cement-laden (contaminated) runoff, mainly from washing of mixing equipment. The contaminated runoff is alkaline and contains high levels of chromium, which causes leachate that may ultimately contaminate groundwater. Cement-contaminated water can also increase the pH of marine waters and cause detrimental damage to aquatic life.

Fine dust particles containing cement and concrete are pollutants and can cause damage to neighboring amenities when allowed to spread.

Excessive noise during batching may cause stress to employees on site and other people within the construction vicinity.

This procedure applies to all cement and concrete batching activities, delivery of ready-mix concrete and small-scale mechanical and hand mixing of concrete and cement, as well as the washing of equipment used in these activities on construction sites managed by TPT.

4.15.3 Handling and batching of Concrete and Cement

4.15.3.1 Siting

Concrete batching shall only be conducted in demarcated areas which have been approved by the TPT construction Manager.

Such areas shall be fitted with a containment facility for the collection of cement-laden water. This facility shall be bunded and have an impermeable surface protection so as to prevent soil and groundwater contamination. Drainage of the collection facility will be separated from any infrastructure that contains clean surface runoff.

The batching facility will not be placed in areas prone to floods or the generation of stagnant water. Access to the facility will be controlled so as to minimize potential environmental impacts.

4.15.3.2 Handling and storage

Hand mixing of cement and concrete shall be done on mortarboards and/or within the bunded area with impermeable surface or concrete slab.

Bulk and bagged cement and concrete additives will be stored in an appropriate facility at least 10m away from any watercourses, gullies and drains.

Waste water collected in the containment facility shall be left to evaporate. The Contractor shall monitor water levels to prevent overflows from the facility. Water can be pumped into sealed drums for temporary storage and must be disposed of as liquid hazardous waste with safe disposal certificates obtained.

All concrete washing equipment, such as shovels, mixer drums, concrete chutes, etc. shall be done within the washout facility. Water used for washing shall be restricted as far as practically possible.

Ready-mix concrete trucks are not allowed to wash out anywhere other than in an area designated for this purpose.

The Contractor shall periodically clean out hardened concrete from the wash-out facility or concrete mixer, which can either be reused or disposed of as per accepted waste management procedures.

Empty cement and concrete bags, if temporarily stored on site, will be secured with adequate binding material.

Sand and Aggregates containing cement will be kept damp to prevent generation of dust.

4.15.3.3 Disposal

Concrete and cement or any materials containing concrete and cement will be disposed of at a registered facility. Where disposal facilities for general waste are utilized, written consent from the relevant municipality must be obtained.

5 DOCUMENTATION

- Refer to Section 6.5 of the Construction Environment Management Plan

6 RECORDS

All documents generated in terms of this procedure will be classed as records and retained for the life of the project.

TPT Contractor S.H.E. Specifications



CONTRACTOR

S.H.E

SPECIFICATIONS

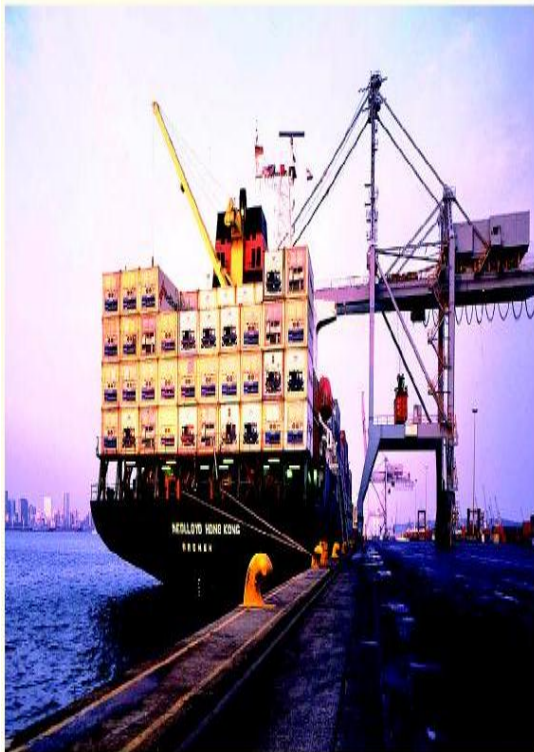


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1. Introduction

The Occupational Health and Safety Act No 85 of 1993, and in particular the Construction Regulations (2003), provides for the relationship between the employer (TPT) and Contractors. It also stipulates the way in which employers are required to manage contractors in ensuring a safe working environment. Transnet Port Terminals is required to manage safety, security, health and environmental impacts associated with contractor's activities and operations whilst the contractor remains on their premises.

To achieve this goal, Transnet Port Terminals has developed Safety, Health and Environment (S.H.E) Specification to Assist all parties to effectively and efficiently manage safety, security, health and environment standards established for the project life-cycle, from project conceptualization to project completion phase.

The Transnet Port Terminals S.H.E Specifications Manual provides the requirements to be complied with and gives guidance for the management of a S.H.E during a construction project life-cycle. The responsibility for adherence to these requirements rest with the Principal Contractor.

The above document serves as a basis to ensure that provision of all costs related to compliance with Transnet Port Terminals S.H.E Specifications are included at the tender stage for a construction project.

2. Scope

This Manual covers the Safety, Security, Health, Environment Specifications required for compliance by all Transnet Port Terminals service providers and contractors rendering contractual projects at Transnet Port Terminals and Corporate Office.

3. Objectives

To ensure that all Transnet Port Terminals employees utilizing any service providers and/or contractors at our Terminals and Corporate Office comply with the Construction Regulations, as detailed in the Occupational Health and Safety Act No. 85 of 1993 and any other relevant legislation.

This also includes relevant Transnet Port Terminals Policies, Procedures and Working Instructions and all relevant legislation pertaining to Safety, Health and Environment. The above provides a management framework for the manner in which S.H.E shall be applied on site by all contractors and/or service providers who work at a Transnet Port Terminals or Corporate Office.

Transnet Port Terminals S.H.E Specifications shall:

- Indicate to all service providers and/or contractors TPT's requirements which shall be incorporated in the project
- Ensure that all principal contractors and sub-contractors are aware and comply with the Safety, Health and
- Environmental rules and regulations for construction projects
- Assist Transnet Port Terminals with the adjudication criteria of contractors when submitting tender applications.

4. Definitions

The following definitions shall have the following meaning:

Agent - Any person who acts as a representative for a client;

Client - Any person for whom construction work is performed, i.e. The Company;

Client Representative - Any person appointed as a competent person, i.e. Clerk of works, Engineer or other such person in whom the client vests authority to represent him/her on the project;

Competent Person - Any person having the knowledge, training, experience and qualifications Specific to the work or task being performed: Provided that where appropriate qualifications and training are registered in terms of the provisions of the South African Qualifications Authority Act, 1995 (Act No. 58 of 1995), these qualifications and training shall be deemed to be the required qualifications and training;

Contractor - Any person or company who's tender to perform construction work has been accepted by the Principal Contractor;

Contractor Responsible Person - Person appointed by the Contractor or Project Manager responsible for implementing work instructions on the construction site; also communication liaison with TPT's Safety Manager

Contractual Project - Any work as per the "construction work" definition

Construction Manager - The Contract Project Representative appointed as the Resident Construction Manager by the Project Manager to be responsible for the management of the construction site

Construction work - Any work in connection with:

- the erection, maintenance, alteration, renovation, repair, demolition or dismantling of or addition to a building or any similar structure
- the installation, erection, dismantling or maintenance of a fixed plant where such work includes the risk of a person falling
- the construction, maintenance, demolition or dismantling of any bridge, dam, canal, road, railway, runway, sewer or water reticulation system or any similar civil engineering structure; or
- the moving of earth, clearing of land, the making of an excavation, piling, or any similar type of work

Construction vehicle - A vehicle used for means of conveyance for transporting persons or material or both such persons and material, as the case may be, both on and off the construction site for the purposes of performing construction work

Design - In relation to any structure includes drawings, calculations, design details and Specifications;

Designer - Any of the following people;

- a person who prepares a design;
- a person who checks and approves a design;
- a person who arranges for any person at work under his control (including an employee of his, where he is the employer) to prepare a design, as well as;

- an architect or engineer contributing to, or having overall responsibility for the design;
- building services engineer designing details for fixed plant;
- surveyor specifying articles or drawing up specifications;
- contractor carrying out design work as part of a design and build project;
- temporary works engineer designing formwork and false work; and
- interior designer, shop-fitter and landscape architect;

Employee - Any person who is employed or working on the site

Employer - The party for whom the construction works are to be executed. This may be Transnet Port Terminals (the relevant Departmental manager) overseeing the construction activities), a tenant, a developer with land rights or any other party developing a site or sites at Transnet Port Terminals.

Excavation Work - The making of any man-made cavity, trench, pit or depression formed by cutting, digging or scooping;

Fall protection plan - A documented plan, of all risks relating to working from an elevated position, considering the nature of work undertaken, and setting out the procedures and methods to be applied in order to eliminate the risk;

Hazard identification - The identification and documenting of existing or expected hazards to the health and safety of persons, which are normally associated with the type of construction work being executed or to be executed

Medical certificate of fitness - A certificate valid for one year issued by an Occupational Health Practitioner, issued in terms of these regulations, this shall be registered with the Health Professions Council of South Africa

Method statement - A document detailing the key activities to be performed in order to reduce as reasonably as practicable the hazards identified in any risk assessment

National Building Regulations - The National Building Regulations made under section 17 (1) of the National Building Regulations and Building Standards Act, 1977 (Act No. 103 of 1977), and published under Government Notice No. R.1081 of 10 June 1988, as amended

Transnet Port Terminal's Safety, Health and Environment Specifications Manual - A documented specification of all safety, health and environment requirements pertaining to the associated works on a construction site, so as to ensure the health and safety of persons and the care for the environment

S.H.E Specifications Manual - A generic guideline document, listing the most common safety, health and environmental requirements applicable to construction and maintenance contracts on Transnet Port Terminals which shall be customised to cater for specific risks.

Person day - One day for carrying out construction work by a person on a construction site for one normal working shift

Principal contractor - An employer, as defined in Section 1 of the Act who performs construction work and is appointed by the client to be in overall control and management of a part of or the whole of a construction site

Professional Engineer or Professional Certificated Engineer - Any person holding registration as either a Professional Engineer or Professional Certificated Engineer under the Engineering Profession Act, 2000 (Act No. 46 of 2000)

Professional Technologist - Any person holding registration as a Professional Technologist under the Engineering

Profession Act, 2000

Project Engineer - The Contractor Project Representative appointed by the Project Manager to be responsible for the management of the design of the works

Project File - The location of records pertaining to a specific construction project that will be maintained by the Terminal Safety Manager.

Project Manager – Transnet Port Terminals: Project Manager refers to Manager designated to carry out the responsibilities and activities of a Project Manager whilst located at Transnet Port Terminal or Corporate Office.

Provincial Director - The provincial director as defined in Regulation 1 of the General Administrative Regulations under the Act

Risk Assessment - A program to determine any risk associated with any hazard at a construction site, in order to identify the steps needed to be taken to remove, reduce or control such hazard

Safety, Health and Environment File - A file or other record in permanent form, containing the information required as contemplated in the S.H.E Specification Document

Safety, Health and Environment Plan - A documented plan which seeks to address all hazards identified, means and ways to control and eliminate such to ensure compliance to the S.H.E Specification

Structure Means-

- any building, steel or reinforced concrete structure (not being a building), railway line or siding, bridge,
- waterworks, reservoir, pipe or pipeline, cable, sewer, sewage works, fixed vessels, road, drainage works,
- earthworks, dam, wall, mast, tower, tower
- crane, batching plants, pylon, surface and underground tanks, earth retaining structure or any structure designed
- to preserve or alter any natural feature, and any other similar structure
- any formwork, false work, scaffold or other structure designed or used to provide support or means of access
- during construction work; or
- any fixed plant in respect of work which includes the installation, commissioning, decommissioning or dismantling
- and where any such work involves a risk of a person falling two meters or more;

Sub-Contractor - Any person or company who's tender to perform construction work has been accepted by the Principal Contractor

5. Abbreviations

AIA - Approved Inspection Authority

EO -Environmental Officer or Transnet Port Terminals designated person responsible for environmental management at the terminal.

ESA - Environmentally Sensitive Areas

ES -Environmental Specification, of a generic document listing environmental requirements applicable to construction

projects. In general, the ES will apply to all construction projects at Transnet Port Terminals, although it is anticipated that certain aspects will have to be modified for application to specific projects. The ES is to be included in tender documents for construction as an Environmental Specification.

(NB: The Environmental Specification is often referred to as an Environmental Management Plan or EMP by local environmental authorities. Due to the use of the term Environmental Management Programme (EMP) elsewhere in TPT's Environmental Management System (EMS), the term Environmental Specification has been used in this case to avoid confusion.)

EMP - Environmental Management Programme

EMS - Environmental Management System

HCS - Hazardous Chemical Substances

HIRA - Hazard Identification and Risk Assessment

HIV - Human Immune Deficiency Virus

MHI- Major Hazard Installation

MSDS - Material Safety Data Sheet

OHS Act - The Occupational Health and Safety Act, 1993 (Act No. 85 of 1993)

SANS 10227 - South African Bureau of Standards' Code of Practice for the evaluation of the technical competence of inspection authorities for the certification of vessels under pressure

SANS 10400 -South African Bureau of Standards' Code of Practice for the application of the National Building Regulations

SANS 1085 - South African Bureau of Standards' Code of Practice entitled "The Design, Erection, Use and Inspection of Access Scaffolding"

SANS EN 1808 - South African Bureau of Standards' Standard Specification entitled

SANS 1903- South African Bureau of Standards' Standard Front-end Specification entitled

SAHRA - South African Heritage Resource Agency

SANS - South African National Standard

S.H.E - Safety, Health and Environment

SSSI - Site of Specification Scientific Interest

TPT - Transnet Port Terminals

6. Roles and Responsibilities

The overall responsibility for adherence to this S.H.E Specification Manual lies with the Transnet Port Terminals-Chief Executive Officer. However in his absence the Transnet Port Terminals designated person will assume responsibility for the overall management of major projects. The above Contractor SHE management duty has been assigned and delegated to the respective Chief Operations Officer and the relevant General Managers. (Engineering Projects and Procurement)

Client (Transnet Port Terminals)

■ **TRANSNET PORT TERMINALS – General Manager : Engineering Project**

The Transnet Port Terminals Project Manager shall be appointed in writing by the General Manager: Engineering to assume the overall responsibility for the safe management of Projects as assigned.

The Transnet Port Terminals Project Manager shall sign an appointment letter, to ensure that safety related responsibilities are taken care of as per Appendix H – Appointment Letter – Transnet Port Terminals Management (Project and Safety Manager) – S.H.E 008.

The Transnet Port Terminals – Engineering Project Manager shall ensure that all S.H.E aspects of project design are adhered to during each phase of the project. All the SHE requirements are to be embedded into the tender and procurement process of services. These requirements are to be included during project conceptualization, design, site establishment, mobilisation, construction and commissioning phase.

The General Manager: Engineering shall be required to:

- Ensure designers comply with their responsibility to eliminate, mitigate and reduce risks during demolition, excavation, construction, commissioning, and maintenance by identifying hazards and detailing method statements, sequences, equipment and materials to be used during the project
- Ensure co-operation between designers to identify hazards at interfaces and overlapping areas of construction in order to eliminate and mitigate risks
- Ensure all necessary information collated is to be incorporated into the Contractors S.H.E Plan. The Transnet Port Terminals' Safety, Health and Environmental **Form S.H.E 00**
- Ensure information is available on the competence and allocation of resources by designers and all contractors
- Ensure statutory notifications are made to the appropriate authorities where construction work will take place
- Ensure that a S.H.E file is available for each contractor and is handed over to Transnet Port Terminals – Engineering / Safety Department during and after completion of the project
- The construction is effectively embellished from normal operational activities.
- All geo-hydrological surveys are conducted to pronounce the soil quality and utilities in the construction site.
- The Environmental Impact Assessment has been conducted and that a record of decision has been kept for perusal by the Inspector- Department of Labour.

■ **TRANSNET PORT TERMINALS - Safety, Health, Environment & Quality (S.H.E) Manager**

- Issue site specific S.H.E Specifications to the Transnet Port Terminals-Project Manager and/or Agent
- Ensure compliance with the Transnet Port Terminals Operations Procedure – Transnet Occurrence Management Systems (TOMS) for reporting of all occurrences by appointed contractors
- Monitor and assess contractors to ensure adherence and compliance with the Transnet Port Terminals S.H.E Specifications Manual for construction activities. Appendix I – Transnet Port Terminals Safety Department

Checklist for Contractors - S.H.E 009 shall be used as a checklist to determine required documents submitted by Contractor.

- Ensure that all Transnet Port Terminals employees are aware of and conversant with the S.H.E requirements by providing training that is in line with Transnet Port Terminals S.H.E Specifications
- Keep management at all Terminals updated on developments or findings that require their attention with respect to any safety, health and environmental matters relating to the contractor.
- Check and ensure that the S.H.E programme is reviewed as agreed upon to ensure that it is current and applicable.
- All the activities with potential environmental impacts are addressed with the responsible contractors and action plans are developed to address the identified aspects related thereto.
- Keep all records updated, traceable, legible, identifiable and readily retrievable relating to any S.H.E matters on a construction site or project.
- In conjunction with the Project Managers / Engineers review and approve in writing valid method statements for the projects prior to commencement of the projects /construction activities.
- The Transnet Port Terminals-Safety Department shall inspect the Contractor's site to check compliance with method statements and the requirements of the Transnet Port Terminals' S.H.E specifications.
- The above inspections shall be documented on a monthly basis or more frequently, if deemed necessary and such inspection reports and records shall be maintained on file for perusal by the Inspector of Labour.
- Meet with the Contractor Responsible Person for the development and reporting on the implementation of the Transnet Port Terminals - S.H.E Specifications monthly and keep a record of minutes of these meetings.
- Provide any Transnet Port Terminal SHE manuals or induction material which may assist the Contractor Responsible Person to conduct initial S.H.E training sessions
- Report in writing any non-conformances with respect to the Transnet Port Terminals S.H.E Specifications which cannot be resolved in conjunction with the relevant Contractor Responsible Person.
- Issue stop certificates in instances wherein there are life-threatening circumstances to the Contractor and the Transnet Port Terminal designated Manager (Client Agent).

Client's Agent

This is the person who has been appointed, as per a contract agreement, to undertake and represent the interests of Transnet Port Terminal which involve construction and maintenance activities.

Principal Contractor

The Principal Contractor shall comply with all responsibilities as defined in the Construction Regulations. They shall assume the safety responsibility of all persons, including any sub-contractors, who carry out any construction activities at Transnet Port Terminals. The Principal Contractor shall be appointed in writing by the Transnet Port Terminals Manager Project / Engineering, who shall act on behalf of the Client. The Principal Contractor shall have the overall responsibility to manage health, safety and environmental issues when construction activities are taking place at the premises of Transnet Port Terminals.

The key duties for the Principal Contractor are to:

- Develop and implement a S.H.E plan in accordance with Transnet Port Terminal's S.H.E Specification Manual
- Appoint competent and adequately resourced sub-contractors
- Ensure sub contractors comply with their responsibility to eliminate or reduce risks during construction activities
- Ensure hazards are identified and risks assessed which may involve a sub-contractor and verify compliance
- Ensure co-operation between sub-contractors exists to identify hazards at interfaces where overlapping

- areas of construction activities may take place
- Ensure appropriate signage of construction work is prominently displayed on site entrances.
- Provide the Construction Supervisor with all necessary information which shall be kept on the S.H.E file
- Ensure sub-contractors comply with Transnet Port Terminal's Policies, Procedures and Working Instructions and any other site rules which are contained in their S.H.E plan
- Monitor and measure the application of the S.H.E plan on site
- Ensure regular meetings are held to discuss the implementation of the S.H.E plan with relevant role players
- Ensure only authorised persons are permitted to enter the construction site by barricading and demarcating the site accordingly

An appointment letter shall be kept on file for all appointments made for sub-contractors.

The Principal Contractor shall be required to ensure that all employees working on site are made aware of their responsibilities with regards to safety, health and environment during induction awareness training; this shall include items such as:

- Familiarisation with the workplace and any related safety procedures
- Ensuring all work undertaken does not endanger their safety or that of any other person
- Good housekeeping practices to ensure that the work area is kept clean, neat and tidy at all times.
- Ensure all injuries are reported immediately to the Contract Supervisor and Transnet Port Terminals designated S.H.E Manager within twenty four (24) hours (Refer Transnet Port Terminals Operations Procedure Reporting of Occurrences)
- Ensure personal protective equipment and measures are in place for co-workers
- Ensure that all occurrences are reported immediately, including 'near misses' as per the Transnet Port Terminals Operations Procedure Reporting of Occurrences.
- Ensure that all dangerous situations are reported to Contract Supervisor and addressed to prevent an incident
- Ensure that staff comply to legislative requirements and obey all safety rules
- Ensure that all substandard work practices involving colleagues are reported immediately to the Supervisor
- Ensure all requirements relating to personal protective equipment/clothing and signage are provided to employees, depending on risk assessment for the respective working environment
- Provision of fire protection rule, regulations and training.
- Ensure that staff are aware of the site emergency evacuation procedures and first-aid and medical facilities
- Job Safety Analysis, Risk Assessments, Safe Work Procedures and Planned Job Observations are in place for all critical tasks identified during construction life-cycle.

The Principal Contractor shall ensure:

- Applicable training is provided to all workers on site and that acknowledgement signatures are kept on file
- All appointed persons are competent to carry out their responsibilities – Appointment letters kept on file
- All persons working on site carry out work in a safe manner without risk to other persons or the environment
- Constant supervision and monitoring of all activities, operations and employees during construction process.
- All work is conducted in accordance with clearly defined and well communicated working instructions to employees
- All appointment letters, as required by the Construction Regulations are made and kept on file
- Where the work is carried out entirely by the Principal Contractor, their employees shall be responsible for the implementation of safe working methods at each stage of the work and shall plan accordingly for any hazardous activities.

- Where sub-contractors are employed, the Principal Contractor shall have the overall responsibility of the safe management of work on the construction site. Although the Principal Contractor shall bear the responsibility for the co-ordination of any sub-contractors work on site, this shall not relieve the sub-contractor from their own safety, health and environment responsibilities.

SUPERVISION OF CONSTRUCTION WORK

■ **Construction Supervisor**

The Construction Supervisor shall be appointed in writing to supervise work activities on site, on behalf of the Principal Contractor. The Construction Supervisor shall be responsible to ensure that where work is performed under his/her supervision is completed, and that the following is taken into consideration:

- All persons shall be suitably trained and competent to carry out work for which they are employed
- All statutory appointments shall be made in writing and kept on record
- All statutory requirements are strictly adhered to
- Establish a Health and Safety Committee and ensure regular site meetings are conducted
- Ensure that all persons are aware and understand the hazards attached to the work being carried out
- Ensure that all legislative risk assessments are carried out prior to undertaking critical tasks
- Identify all precautionary measures relating to critical work and ensure that these are implemented
- Ensure that discipline is enforced on the construction site for deliberate disregard for rules.
- Planned Job Observations are carried during for all critical operations and activities
- A critical task inventory is developed after risk assessments are conducted to guide supervisors which tasks require Planned Job Observations.
- Regular compliance inspections are conducted to ensure compliance with established rules and regulations
- Submit weekly written report on all shortfalls or deviations to the Principal Contractor to ratification
- In conjunction with the Client, develop remedial measures to address all identified short-falls

■ **Contractor Responsible Person**

The Principal Contractor shall appoint a person, in writing suitably qualified and experienced person to co-ordinate and manage S.H.E activities on his/her behalf. The Contractor's Responsible Person shall report directly to the Construction Supervisor.

The following criteria shall be used to determine the need for an appointment of a Contractor Responsible Person consideration shall be given to the size of the project and associated risks and hazards.

- Where thirty (30) to forty-nine (49) people are present on site, a part-time Contractor Responsible Person shall spend two full days per week on site
- Where fifty (50) or more people are present on site, a full-time Contractor Responsible Person shall be appointed for all work activities which are carried out during a night-shift, a full time Contractor Responsible Person shall be appointed for day-shift activities.
- Develop a system to ensure that the Transnet Port Terminals S.H.E specifications are effectively implemented
- Audit this system so that the Contractor responsible Person can demonstrate to the designated Transnet Port Terminals S.H.E Manager that the established S.H.E Specification and Plan is being adhered to.

- Ensure that Contractors' staff, sub-contractors, suppliers etc. receive appropriate safety, health and environmental awareness training prior to commencement of work on the project and maintain training records.
- It is anticipated that the Contractor Responsible Persons shall deliver training sessions to all staff members to an extent that they are familiar and conversant with the S.H.E plan for the construction site
- Ensure that the responsible person for sub-contractors or their sub-contractors are designated to carry out the requirements of Transnet Port Terminals S.H.E specifications
- Submit method statements to the designated Transnet Port Terminals- Project Manager for approval as specified in the Transnet Port Terminals S.H.E specifications and maintain approved method statements on file for record keeping purposes
- Have sufficient authority to issue site instructions to the Contractors staff on their site.
- In instances where the contractor makes use of the services of a sub-contractor, the contractor carries full responsibility and accountability for the sub-contractor and its employees.
- Each sub-contractor must be selected according to a specific selection criterion, preferably the Transnet Port Terminals criteria (S.H.E performance must form an integral part of the selection criterion).
- Sub-contractors must participate fully in the site S.H.E Management system and should they be found to be non-compliant then the contractor will be held accountable and responsible.
- No sub-contractor will be allowed onto site without first informing the Transnet Port Terminals designated persons / Safety Officer and providing an overview of their organization including the following: name of sub-contractor, amount of employees, work to be done, estimated period of work, risk assessments, appointments, proof of induction training and medical examinations, WCC good standing letters and any other information as may be required by the Transnet Port Terminals: Project Engineer or Safety Officer.
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Designer

The key responsibilities for the Designer shall be, as far as reasonably practicable to comply with their responsibility as per the definition contained of a designer in the Construction Regulations.

Employer

Each Employer shall:

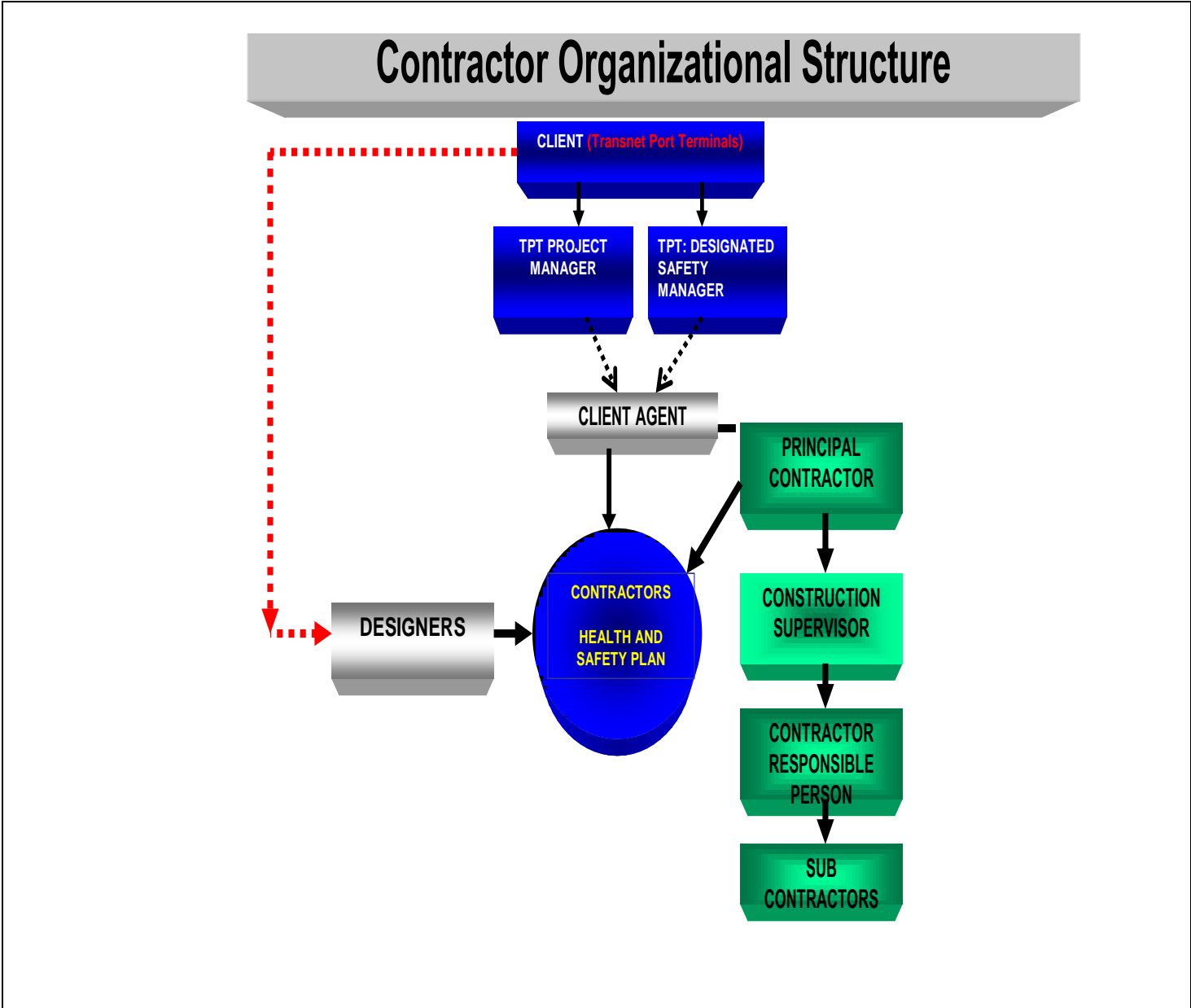
- Include Transnet Port Terminals S.H.E specifications Manual, with any revisions, in any tender document related to construction activities on site;
- Designate in writing a S.H.E Manager for the proper implementation of the Transnet Port Terminals S.H.E specifications.

Organizational Structure

This section outlines the required management structure for the administration of Transnet Port Terminals - S.H.E specifications, with particular emphasis on the roles and responsibilities of key individuals.

The organizational structure for the implementation of Transnet Port Terminals's S.H.E specifications is presented in Figure 1 and should be viewed in conjunction with the roles and responsibilities listed above.

Figure 1: Organizational structure showing lines of responsibility and communication during the construction phase at the Terminals



7. Documents Required

The following documentation must be provided with the tender submittal in order to assist with the evaluation in terms of S.H.E performance, which in turn will assist with the selection of contractors. Should the requested information not be provided then it would be assumed that it does not exist.

Letter of good standing with insurance body or compensation commissioner

An organizational safety structure (organogram) stipulating the names of all the persons proposed by the vendor who would hold legal appointments on the project in terms of the Construction Regulation issued in terms of the Occupational Health and Safety Act (Act 85 of 1993).

The expected roles, responsibilities and authority of those who are proposed to receive legal appointments.

The resume'(s) of the proposed Safety Officer(s) and his/ their roles, responsibilities and authority.

Contractors' Safety, health and environmental policies.

Provide an overview of the safety system / program that is used to manage safety, health and environment.

Provide an overview of your risk assessment process (methodology) as well as examples of completed assessments.

Provide a list of the different job families and categories for the project as well as competency requirements per job category. Also provide a plan regarding how all outstanding competency requirements will be met.

Provide a synopsis of major S.H.E. incidents experienced by your organization during the past six-month period. (Name, date, short description, type of incident, remedial action taken.)

Provide an overview of the selection process that will be followed when sub-contractors and labour-hire contractors are selected and indicate which factors will be considered to be most critical when selection is made.

Recognition and specification of what the vendor deems to be the safety, health and environmental challenges of the project, and how he proposes to address and overcome them.

A statement acknowledging that the vendor has received reviewed and accepted the Transnet Port Terminals Contractor Project S.H.E specifications as an integral part of his contractual obligations and that his tender includes all funding necessary to meet all obligations stipulated therein.

The above information must be contained in a folder with a contents page and dividers between various documents. The same numbering system as is reflected within this document can be adopted. The folder must then be submitted as an annexure to the tender document.

8. Special Conditions

The following conditions will apply throughout the lifespan of the project and should you not abide/ comply, it will be deemed as a breach of contract. (This provision applies to all contractors/project that perform work at any of the Transnet Port Terminals. The contractor will carry full responsibility regarding the adherence to any S.H.E aspect when the contractor uses sub-contractors.

All contractors must participate in and adhere to the Project S.H.E Management system requirements. It is the duty of the contractor to familiarize themselves with such requirements through discussion with the Project Engineer or Manager and then subject themselves to familiarization process before any work commences.

All S.H.E specifications reflected in this document must be adhered to at all times and all instructions given in terms of safety, health and/ or environment must be adhered to and executed without any compromise.

At least one updated hard-copy of the following legislation must be available with each contractor on site:

- Atmospheric Air Pollution Prevention Act
- National Ports Act
- Compensation for Occupational Injuries and Diseases Act
- Occupational Health and Safety Act
- National Environmental Management Act and regulations
- Basic Conditions of Employment Act
- Labour Relations Act

A selected and appointed S.H.E representative must be available for each contractor at each area of work. (At least one S.H.E rep for each twenty employees or part thereof.) Such S.H.E representative must have attended at least a relevant S.H.E representative training course.

The contractor must appoint a competent Safety Officer for each project if contractor employees (including sub-contractor employees.) are equal to or more than thirty and then for each hundred employees or part of each hundred employees thereafter. The Safety Officer must have attended at least the following training courses:

- SAMTRAC or COMSOC 2
- Hazard Identification and Risk Assessment training - HIRA
- ISO 9000 and ISO 14000
- Training regarding applicable legislation
- Standard Operating Procedures / Planned Job Observations
- Train-the-Trainer /Instructional Techniques In Safety (ITIS)
- The Safety Officer must further have at least two years applicable experience.

NB: The Safety Officer(s) must be on site when work commences and be present daily until all activities for the day are completed. The presence of the Safety Officer(s) during weekends must be discussed with the Project Engineer / Manager at least three days in advance and a binding decision will be made in this regard by Project Manager / Engineer. (Only if specific contractor(s) performs work during weekends.)

Each contractor must have a qualified Level-3 First-Aider for each working area and where employees per working area are equal to or more than twenty there must be a qualified First-Aider per twenty employees or part thereof.

Each contractor must have a person trained regarding basic fire-fighting for each working area and where employees per working area is equal to or more than twenty there must be such a person per twenty employees or part thereof.

Contractor management personnel for the project must have attended at least the following S.H.E training:

- Training regarding hazard identification and risk assessment (HIRA) techniques
- Training regarding incident investigation techniques
- Training regarding Job Safety Analysis / Planned Job Observations
- Training regarding applicable legislation
- Training should have been attended during the past five years.

Contractors will be subjected to regular S.H.E assessments and corrective action plans must be drafted regarding deviations noted during such assessments and the contractor will be responsible for implementing correcting actions.

The following persons will be required to attend weekly S.H.E meetings: Safety Officer(s), S.H.E representative(s), Project Manager / Engineer, Project Agents, Construction Supervisor and a Management member. (The attendance of at least two from the three persons is compulsory per meeting.)

Each contractor must submit weekly S.H.E statistics. Specific requirements in terms of format and day of the week must be obtained from the Project Safety Officer.

Tested emergency response plans, developed from a review of potential emergency scenarios, will be in place before commencement of work.

Proof of all of the above mentioned training requirements must be submitted to the Transnet Port Terminals Safety Officer before site establishment.

Standing time claims related to any S.H.E matters will not be entertained.

The Project S.H.E Management is founded on the “**Zero Incident Principle**” - (ZIP), which means **Stop Unsafe Work**. This approach to S.H.E management requires an absolute adherence to standards at all times and intolerance to substandard actions and / or conditions.

Hazards and risks must be reviewed whenever processes, people or natural circumstances change in order to ensure that all unacceptable risks in terms of S.H.E are effectively managed.

A risk-based safety management process will be implemented at each site and the following is expected from each contractor in this regard:

- In order to sustain and maintain the risk-based safety process roll-out it is imperative that all Contractor Management and Supervision buy into visible support of the roll-out for the duration of their tenure on the project.
- Send all new employees and existing employees (including site supervision and management) through a risk-based induction course. This induction will be done within the existing Project Safety induction course format.

- The course contents will cover a brief introduction to risk-based safety, identification of coaches to support the supervisors, and what the employees can expect from the coaches / supervisors when working on site.
- Site Management and supervision (Superintendent level down to Charge-hand level) will be required to attend a basic orientation session on risk-based safety, within the context of the operational environment.
- Each Construction Manager and his second in charge (2 I.C.) will be appointed to the Project steering team and will be required to attend a one-day training session on the principles of the risk-based safety, methodology and the implementation of methodology.
- The role of the Project Steering Team is that of being the owner of the risk-based safety process through out the duration of the project and will be chaired by the Construction manager.
- The key responsibilities of the Project Steering Team are listed below, but not limited to:
 - Identify and agree to a Code of Conduct. Agree on critical behaviours in sustaining and maintaining the risk-based safety process.
 - The above behaviours are normally contained in the safety induction manual or booklets (5'S).
 - 5's – **S**peeding: **S**ubstance Abuse: **S**leepiness: **S**ubstance Abuse: **S**upervision
 - Make a pact with each team member pertaining to the above critical behaviours.
 - Compile an alignment strategy to ensure that the risk-based safety requirements and strategy is in line with the overall project policy and directives.
 - Critical areas and barriers will be identified through Planned Job Observations and coaching techniques by the supervisors in the field which will require formal interventions.
 - These interventions will be compiled and presented by the Transnet Port Terminals-Safety Department and presented to the Project Steering Team in the form of a Risk Action Plan (R.A.P) for their action and endorsement.
 - In order to sustain and maintain the risk-based safety process roll-out it is imperative that all Contractor Management and Site Supervision buy into visible support of the roll-out for the duration of their tenure on the project.
 - Once the R.A.P and has been endorsed by the Steering Team, the coaches will intervene in the identified following the agreed to action plan. The Management representative affected by the intervention must ensure the success of that intervention.
 - Each Steering team member will be required to actively participate in problem solving sessions based on barriers identified by the coaches that could not be solved following the lines of responsibility in the field.
 - Establish and maintain effective feedback / review sessions with all employees and stakeholders.
 - Evaluate progress, successes and failures of interventions at regular intervals.
 - Agree and implement "Explain Your Sins" policy in the event where serious transgression are committed by employees
 - The above can be achieved at the Shift Indabas or toolbox talks.
- Each sub-contractor will be required to inform all their employees that will be observed at their work places by clearly identifiable supervisors / coaches who will interact with them using predetermined critical behaviour or risk checklists. Through their observations the supervisors will employ three types of coaching techniques and conduct "on the spot" problem solving and feedback with employees when required.
- Supervisors will also interact with line-supervision to remove barriers identified during observations and provide instant feedback.

- Supervisors will also conduct formal weekly feedback and goal setting sessions with employees during the existing toolbox talks or “shift indabas”.

9. General S.H.E Specifications

There are several additional requirements in terms of the S.H.E Management systems, which are not reflected in this document as only the most relevant issues were extracted. It is however recommended that the contractors should submit their S.H.E plan to the Project Engineer / Manager who will then enter into a formal discussion with the Transnet Port Terminals-Safety Manager to determine the adequacy of the S.H.E plan. Should the S.H.E plan be found to be inadequate, then the S.H.E plan will not be approved and during this period the contractor will not be allowed to commence with his operations and activities. Should further information be required, the above would be forwarded to the Transnet Port Terminals - Project Engineer/Manager and routed to the respective S.H.E Managers. The S.H.E plan will comprise of the following items

9.1 S.H.E Commitment and Leadership

Management members of the contractor must:

- Policy statement for the contractor to be displayed on site .
- A copy of the relevant legislation to be made available
- The construction company to promote a culture in which safety is the prime concern and will never be compromised.(Zero Incident Principle).
- Promote the involvement of all employees in improving S.H.E management.
- Ensure adherence to the site S.H.E management system.
- Conduct full S.H.E audits and inspections to evaluate compliance with the S.H.E management system
- Ensure reporting of all S.H.E matters and performance (especially S.H.E incidents.) to the Project Manager / Transnet Port Terminals-Safety Manager before end of shift.
- Participate in S.H.E meetings – Safety to be first agenda item on all construction meetings.
- Prepare of emergency response plans and co-ordinate and participate in drill and exercises to test the effectiveness of Emergency Response Plans.
- Ensure that all involved personnel, prior to commencement of any work; complete a Hazard Identification and Risk Assessment (HIRA).
- Further ensure that identified hazards, risk and controls are communicated and understood by the personnel involved as well as the implementation of remedial actions.
- Focus on the elimination of unsafe acts, and rectify unsafe conditions as soon as practicable possible.
- Conduct regular workplace inspections. (Frequency dependent on nature of risk but at least once a month.)
- Carry out Planned Job Observation on all critical activities and operations

9.2 Legal Compliance:

- No work may commence until all legal appointments have been completed, signed and copies handed to the Transnet Port Terminals-Safety Manager.
- Competent appointed person(s) must complete all registers and checklists and these registers must be updated regularly.
- Compliance to all applicable legislation is non-negotiable. Contractors will fully be accountable for their sub-contractors, and in this regard, any breach of a legal requirement will be deemed to be a direct breach of contractual obligation by the Principal Contractor.
- Establish a company (Contractor) S.H.E policy and submit to the Transnet Port Terminals-Safety Manager prior to commencement of project.

- Write a letter stating that their commitment to the effective implementation of the site S.H.E management system. This letter must be signed by the company Chief Executive Officer and be submitted to the Transnet Port Terminals Project Engineer / Safety Manager before commencement of the project.
- No person will be allowed to do any project related work unless he / she has attended general induction training as well as site specific familiarization training and is declared and deemed fit to conduct such work after undergoing thorough medical examination.
- All applicable legal requirements must be adhered to.

9.3 Risk Assessments – Process / Activity based and Continuous assessments

- Risk assessments shall be conducted by a competent person that has been appointed in writing on behalf of every contractor
- A risk assessment process must be adopted and described by means of a written procedure.
- All relevant contractor employees must be made fully conversant with this procedure and trained .
- Continuous risk assessment process must be implemented and conducted throughout the project life-cycle.
- Risk assessment must address safety, health and environment and shall be undertaken prior to commencement of work and during the project life-cycle.
- The safety plan shall include identification of risks and hazards as well as a detailed risk analysis and evaluation before work starts on site.
- Standard Operating procedures shall be developed and documented to reduce or eradicate hazards identified
- Planned Job Observations should be carried before carrying out any critical activities and operations.
- All employees on a construction site are to be informed, trained and made conversant with all possible hazards at the construction site by a competent person.
- The above training is normally achieved through induction training programme
- The contractor shall have in his possession proof of records pertaining to health and safety induction(including risk assessments).

9.4 S.H.E Incident Management

- The Transnet Port Terminals-Safety Manager will institute a site S.H.E incident reporting and recording procedure. The contractor must familiarize himself with this procedure and report and record all S.H.E incidents accordingly.
- All S.H.E incidents, however minor, shall be reported to the Transnet Port Terminals-Safety Manager before the end of a shift.
- Each contractor is responsible for the investigation of all relevant incidents (Minor or Major)
- Incident investigators shall be appointed in writing and be competent to conduct investigations. (A formal training course in this regard should have been attended.)
- The contractor is responsible to report relevant S.H.E incidents to the necessary authorities (Department of Labour).
- Remedial action to prevent similar incidents must be monitored and executed as soon as possible.
- Incident records must be kept for a period of at least twelve months after completion of the project.

9.5 S.H.E Training

- The Contractor shall ensure that all his employees and those of his Sub-contractors' working on the site are adequately trained and rendered competent to do their jobs and are trained in relevant procedures and have

the appropriate competency e.g. qualifications, certificates and tickets, and are under competent supervision. Records of appropriate training and qualifications of all employees are to be maintained.

- The main contractor and all contract employees must be holders of current certificates or licences, where the operation being performed requires such e.g. Crane Drivers Certificate, Riggers and Scaffolders Certificate, Welding Certificate, etc. All to be in compliance with Legislation.
- The contractor shall ensure that all his employees, agents and sub-contractors have undergone the induction programme for the appropriate site location, prior to commencing work on the site. At least two full days must be set-aside for induction and “permit applications ” of all employees.
- The induction process shall comprise of the hazards and risks associated with all construction activities as well as the Transnet Port Terminals safety rules and regulations.
- The Contractor shall supply the Transnet Port Terminals - Safety Officer / Engineer with evidence that employees have attended induction training before employees are allowed access to site.
- The above proof is normally obtained through a signature of acknowledgement of receipt of training which is normally kept on all employee records for the duration of the project.
- In addition to the basic safe working practices induction, the contractor shall ensure that all his employees and those of his sub-contractors are inducted in site-specific safety issues.
- Visitors to the site shall be required to comply with site-specific safety induction prior to being allowed access to site.
- The contractor, at the Transnet Port Terminals Safety Officer's discretion, MAY allow casual visitors, who will be on site for less than one (1) day, access to the site without attending an induction, provided that, for the full period their visit on site they would remain in the constant care, supervision and custody of a person who is conversant and familiar with the risks associated with the construction activities.

10. S.H.E Specifications - Construction

Introduction

The Occupational Health and Safety Specifications provide guidelines to ensure full compliance by contractors or service providers who carry out construction activities at all Transnet Port Terminals or Corporate Office. The requirements, as detailed, shall ensure that contractors or service providers comply with applicable legislative requirements and Transnet Port Terminals policies, procedures and working instructions.

The above legal framework provides a platform for contractors and service providers to ensure that safety precautionary measures are addressed constantly whilst work on a construction site takes place.

The above legislative framework exists for all contractors to comply with South African legislation as contained in the Occupational Health and Safety Act (Act No 85 of 1995 as amended) and shall be used as a reference point for compliance by any person who carries out such work at the South African Port Operations..

11. Administration

Registration-Compensation Commissioner

The Transnet Port Terminals-Project Manager and S.H.E Manager shall ensure that an original copy of the letter of good standing from the Compensation Commissioner or a licensed compensation insurer is provided to by all contractors/service providers who conduct construction work at Transnet Port Terminals or Corporate Office. This shall be approved in writing by the Compensation Commissioner at least ten (10) days prior to commencement of construction work. If the contractor is unable to provide this document, a 'Letter of Good standing' shall be requested and validated by the Transnet Port Terminals-Project and designated S.H.E Manager directly from the Compensation Commissioner, to confirm the status of the contractor's registration with the above statutory fund or licensed compensation insurer.

The above letter is mission-critical and in the unfortunate event of serious injuries by the contractor staff members there could be subsequent litigation against Transnet Port Terminals. The unavailability of the above letter could make Transnet Port Terminals (client) legally accountable for all consequential losses arising from any such incidents.

Section 37 (2) OHS mandatory contract

Appendix D - Section 37 (2) Mandatory Contract – S.H.E 004, shall be completed and submitted by the Contractor/Service Provider to the Transnet Port Terminals Project / designated S.H.E Manager by the Principal Contractor at least ten (10) days prior to the commencement of construction work at Transnet Port Terminals premises. The Principal Contractor shall ensure that all their sub-contractors have completed a Section 37 (2) mandatory or indemnity contract and copies of these documents are submitted to the Transnet Port Terminals- Project/ Engineer / designated S.H.E Manager responsible for record keeping purposes.

Appointment letters

■ **Principal Contractor**

The Transnet Port Terminals - Project Manager shall ensure that a contractor is issued with a copy of the formal appointment letter, as per Appendix E - Appointment Letter of Principal Contractor - S.H.E 005.

■ **Copies of Appointment Letters from Principal Contractor**

The Principal Contractor shall supply signed copies of appointment letters to the Transnet Port Terminals-Project Engineer or designated S.H.E Manager fifteen (15) working days prior to commencement of any construction work. The appointment letters shall be kept on file and shall include the following:

OHS Act – Section 16 (2)	Chief Executive Officer
OHS Act – Section 17 (1)	Health and Safety Representative
Construction Regulations 10 (a)	Form Work and Support Work Supervisor
Construction Regulations 11 (1)	Excavation Work Supervisor
Construction Regulations 12 (1)	Demolition Work Supervisor
Construction Regulations 14 (2)	Scaffolding Supervisor
Construction Regulations 15 (1)	Suspended Platform Supervisor
Construction Regulations 17 (1)	Material Hoist Inspector
Construction Regulations 18 (1)	Batch Plant Supervisor
Construction Regulations 19 (2) (g) (i)	Explosive Powered Tools Issuer
Construction Regulations 21 (1) (j)	Construction Vehicles & Mobile Plant Inspector
Construction Regulations 22 (e)	Temporary Electrical Installation Controller
Construction Regulations 26 (a)	Stacking and storage Supervisor
Construction Regulations 27 (h)	Fire Extinguisher Inspector
Construction Regulations 4 (1) (c)	Principal Contractor
Construction Regulations 4 (5)	Client Agent
Construction Regulations 5 (3) (b)	Appointment of the Contractor
Construction Regulations 6 (1)	Construction Work Supervisor
Construction Regulations 6 (2)	Assistant Construction Work Supervisor

Construction Regulations 6 (6)	Construction Site Health and Safety Officer (Full-time or part-time)
Construction Regulations 7 (1)	Construction Site Risk Assessor
Construction Regulations 8 (1) (a)	Fall Protection Plan Developer
Driven Machinery Regulations 18 (5)	Lifting Machinery Inspector
Driven Machinery Regulations 18 (6)	Lifting Tackle Inspector
Driven Machinery Regulations 8 (2)	Grinding Machinery
Electrical Machinery Regulations 9 (4) & 10	Portable Electrical Equipment Inspector
Environmental Regulations-Workplaces 9 (2)	Fire Warden/Fighter
General Administrative Regulations 7	Hazardous Chemical Substances Controller
General Administrative Regulations 9 (2)	Incident Investigator
General Machinery Regulations 3	Workshop and Plant Supervisor
General Machinery Regulations 2 (1)	Supervisor of Machinery
General Machinery Regulations 2 (7)	Assistant to Competent Person
General Machinery Regulations 4 (3)	Shiftsman Appointment letter
General Safety Regulations 13 (A)	Ladder Inspector Appointment letter
General Safety Regulations 2	Personal Protective Equipment Inspector Appointment letter
General Safety Regulations 3 (4)	First Aider Appointment letter
General Safety Regulations 9 (1)	Welding, Flame Cutting & Soldering Appointment letter

All these appointment letters shall be required to be provided to the Transnet Port Terminals-Projects Manager / Engineer and designated S.H.E Manager unless a specific task will not take place during the construction activities. This shall be stipulated as such in writing to Transnet Port Terminals with the submission of these appointment letters.

Should an ad-hoc inspection by Transnet Port Terminals or a designated person from Transnet Port Terminals identify specific work being carried out without the required appointment letter or proof of training, the construction activity shall be immediately stopped by a designated Transnet Port Terminals. This shall be communicated, in writing to the Transnet Port Terminals-Project Manager Engineer and designated S.H.E Manager.

■ **Personal Protective Equipment**

A contractor shall ensure:

- Personal Protective Equipment (PPE) or a clothing needs analysis is conducted and incorporated into the initial risk assessments.
- Records pertaining to Personal Protective Equipment shall be kept in the contractor's health and safety file. The contractor shall be in a position to prove that this has taken place prior to construction work activities commencing.
- All records for further Personal Protective Equipment issued during the project shall be kept updated on-site by the contractor, should an inspection or audit be carried out by a designated Transnet Port Terminals person.
- Only South African National Standards (SANS) approved personal protective equipment or clothing shall be provided to the contractor's employees.
- The contractor's employees shall not be permitted on-site without the necessary personal protective equipment or clothing.

- All Personal Protective Equipment or clothing shall be kept in good working order.
- Each contractor shall clearly stipulate his/her procedures, which shall be followed when Personal Protection Equipment or clothing is lost or stolen, worn or damaged
- Ensure Personal Protective Equipment shall only be provided as the last resort where hazards have been identified.
- All Personal Protective Equipment shall be provided by the contractor to his/her employees free of charge and this shall be worn, as required, at all times whilst work is conducted on-site.
- Where a contractors employees work near live electrical installations, they shall be issued with non-metallic equipment and helmets.
- Ensure that his/her employees understand the requirements to use PPE and have been trained on the use thereof.
- A contractor shall be responsible to provide safety belts to employees who are working in height restricted areas.
- All safety harnesses shall be made of double lanyard and shall be worn when work in elevated positions takes place.
- Even though properly built scaffolding is in place, employees are required to use safety harnesses when working in elevated positions.
- Suitable impact resistant eye-protection shall be worn for grinding, chipping and chasing work.
- Welders, bracers and cutters shall wear suitable eye-protection, gloves and apron spats. Screens shall be provided to protect onlookers and passers by.
- Where work involves any corrosive liquid, suitable eye protection, gloves and special overalls shall be worn, as identified in the original risk assessment.
- Areas which are demarcated by signage shall be adhered to at all times, i.e. Noise Zones – Appropriate Ear Protection. This shall apply to all persons entering the construction site.
- All mandatory signs shall be prominently and conspicuously displayed at all entrances and strategic locations.
- Safety harness shall be provided and suitably secured where work in an elevated position is being carried out, any area over two (2) meters, as per the fall-protection plan.
- Where gas may pose a risk to the health and safety of an employee, a suitable respirator shall be provided as identified in the risk assessment.
- Transnet Port Terminals shall be permitted to remove any person from the construction site who is working without necessary personal protective equipment and/or clothing.
- Any worn or tattered personal protective clothing shall not be permitted at a Transnet Port Terminals managed construction site or operated Terminals / Corporate Office.

■ **Intoxication - Liquor, drugs and dangerous weapons/firearms**

A contractor shall ensure that no person is allowed on-site who may appear to be under the influence of intoxicating liquor or drugs. A contractor shall encourage his/her employees to disclose the medication that may pose a health and safety threat towards his/her fellow employees. No person shall be allowed to enter the site and work if the side effects of any such medication do constitute a threat to the health or safety of the person concerned or others at such workplace. No dangerous or firearms shall be allowed on a construction site.

■ **Employee Assistance Programme (EAP)**

A contractor shall be required to demonstrate that they have a Health and Safety Management Programme in place which addresses HIV, Hepatitis and any other blood borne diseases. Programme for the prevention of transmission of HIV, Hepatitis Virus and other Blood borne diseases is necessary for contract workers and negotiations could be entered into the Transnet Port Terminals in this regard

■ First Aid, Emergency Equipment

A contract shall ensure that a qualified First Aider is available to work on each shift per group of fifty (50) employees. A First Aid Box shall be present and readily available on each worksite for the First Aider to use in a case of an emergency. The contents of the First Aid Box shall be equipped to meet the nature of the work carried out by the contractor, as determined in the original scope of work and risk assessments. The First Aid Box shall be prominently displayed with appropriate signage at the contractors work-site and indicate the name of the person in charge of the First Aid Box, including his photograph.

12. Site Specific Requirements

■ Site Establishment

The Transnet Port Terminals- Project Engineer / Manager will allocate an area for the establishment and erection of the Contractor's site offices, stores, workshops, change-house, ablutions facilities; etc. All work to be carried out during site establishment must be subjected to proper risk assessment prior to commencement of such work. Comprehensive risk assessments shall be submitted to the Transnet Port Terminals- Projects Engineering Department for approval.

Once risk assessments have been approved, site establishment and mobilisation may commence wherein the lay-down area shall be effectively hoarded, fenced and fitted with double-lockable gates for separate vehicle and pedestrian access gates (s). No "Unauthorized Entry" signage in three languages – English, Afrikaans and other dominant Black language from local community-shall be prominently displayed at the entrance. In addition, mandatory and warning symbolic signs indicating the type of hazards and personal protective equipment required within the enclosure shall be displayed at the entrances. Adequate lighting shall be provided to improve visibility for evening operations.

Site offices shall be of acceptable design, sound construction, aesthetically appealing and maintained in good condition. The Offices must be clearly marked to indicate occupancy and function for example, "Reception", Conference Room, SCAD Room, Construction Supervisor "etc.

Water and electricity reticulation must be in compliance with the relevant SANS codes. Storage of oil and flammables must be in line with relevant legislation and be of an acceptable standards, the Hazardous Chemical Substance Regulations issued in terms of the Occupational Health and Safety Act (Act 85 of 1993). Specific facilities for eating must be provided as well as other amenities for employees.

A Safety, Health and Environmental notice-board must be provided at a conspicuous place and all parking areas must be clearly indicated and clearly demarcated.

■ Fall Protection Plan

- Fall protection shall be conducted by a competent person that has been designated and appointed in writing as a responsible person for fall protection on behalf of the principal contractor
- A risk assessment shall be conducted taking into account the implementation and maintenance of a fall protection plan throughout the project life-cycle.

- The fall protection plan is normally described by means of safe operating procedure detailing as-and-when the above plan would be amended.
- The Contractor shall ensure that an appointed person, who is competent to do so for the specific site, draws up a fall protection plan, and that the plan must be adopted as the work-standard on the site.
- The fall protection plan shall be submitted to a designated Transnet Port Terminals-Project Manager / Engineer for approval.
- The Contractor shall ensure that the Transnet Port Terminals-Project Manager / Engineer approves any changes to the original plan and that the Construction Supervisor shall keep a copy of the latest version of the fall protection plan or procedure including inspection, testing and maintenance records and a method statement.
- A contractor shall ensure that employees working in elevated positions undergo a medical examination, conducted by a registered Occupational Health Practitioner.
- A certificate of fitness, (physical and psychological fitness), shall be valid for a year and shall be kept on the contractor's health and safety file .
- The contractor shall ensure that employees working from elevated positions receive proper training and such records are kept on file for reference purposes. Records may be checked by a designated Transnet Port Terminals person for verification during a monthly/weekly inspection or audit.
- A contractor shall ensure that no person works in an elevated position, unless such work is performed safely, as if working from a scaffold or ladder.
- The fall-arrestor equipment shall only be used in instances wherein fall-prevention is not practical.
- A contractor shall ensure that fall-prevention and fall-arrest equipment is inspected for its suitability and strength before use to ensure that it is safe for use.
- Inspections for fall-arrestors (safety harnesses) shall be recorded and kept on file for reference purposes.
- A contractor shall ensure that fall-arrest equipment is used only if not reasonably practicable for fall-prevention equipment.
- Precautionary measures shall be taken by the contractor to ensure that in the event of fall by any person, that the fall-arrest equipment or the surrounding environment does not cause further injury to that person.
- Similarly, the contractor shall ensure that permission is obtained for any roof-work prior to commencement of such activities and every time after inclement or hazardous weather conditions.
- Roof-work contractor shall provide competent roof-workers to perform such work safely.
- The contractor shall also ensure that suitable support is provided for persons passing across or working on fragile material.
- Sufficient guard-rails and toe-boards shall be provided to prevent any persons, materials or equipment from accidentally falling onto the work areas
- The construction site shall be properly barricaded using the correct hoarding-specifications, to prevent unauthorised access and entry to the work-areas.
- All unprotected openings in floors, edges, hatchways and stairways must be adequately guarded, fenced or barricaded or that similar means are used to safeguard any person from falling down such openings.
- Where it is not possible to safeguard an employee according to the above provisions, the employee shall be provided with a suitable fall protection system and is to be adequately trained by his employer in the correct use of such fall protection system.
- All fall protection systems to comply with SABS – EN 354, 355, 358, 360, 361, 362, 363, and 795. All equipment must be inspected at regular frequencies and defectively barricaded.
- All tools in elevated positions must be attached to lanyards, attached to person or structure.
- Equipment in elevated positions must be tied back to the structure.
- No loose items are allowed on elevated positions.
- Powered mobile platforms are designed to fail-safe in the event of an electrical or hydraulic failure.

- Mandatory and warning signage shall be prominently and conspicuously posted and displayed at all entrances to the work sites, highlighting the risks associated with construction activities

■ Structures

- A contractor shall provide Transnet Port Terminals with the necessary precautionary safety measures to be taken as stipulated in the Construction Regulations-9 to obviate any uncontrolled collapse of a new structure or existing structure or any part thereof which may become unstable or is in temporary state of weakness or instability due to construction work activities.
- The contractor shall ensure that all drawings and technical specifications pertaining to the construction work are kept on site and made available for inspection by Transnet Port Terminal designated persons, Inspector of Labour, Clients, Agents and Employees.
- The Designer shall conduct a comprehensive risk assessment during modifications of designs to prevent anything in the design that could necessitate the use of dangerous procedures, methods and hazardous materials.
- The above risk assessment should also take into account subsequent maintenance into account and make the necessary provision in the engineering design solutions to eliminate such hazards.
- The designer shall also ensure that before contract is put out on tender that the necessary conceptual design information is available that may affect pricing of the work.
- The Designer shall also inform contractors of any anticipated dangers in writing and make available all relevant information and risk assessments outlining the safe execution of construction work.
- The information contained in the Designer report includes geo-scientific technical design report, designed loading of the structure, methods and sequences of the entire construction process.
- The designer has an important role to play during construction work which includes conducting regular inspections to ensure that work undertaken complies with the design criteria and specifications.
- The above process will enable the designer to identify any deviations on the structure and to stop the process moving forward.
- Records of such inspections shall be kept for perusal by the client and inspector of labour.
- Upon completion of construction work and prior to commissioning of the project, the designer shall conduct a final inspection to validate the design criteria and technical specifications, and a certificate of completion would be issued to the contractor.
- The designer should ensure that during commissioning that the ergonomic design principles are taken into account to minimize hazards in the life-cycle of the structure, including accessibility by physically challenged persons.
- It is recommended that the above process be undertaken in conjunction with the local authorities and approved electrician to ensure that an occupancy certificate is issued for the building structure.
- Equally important is that the owner of the building shall participate in the commissioning phase and that a competent person shall inspect the structure to ensure that it remains safe t continued use.
- Records of all inspections and maintenance shall be kept for perusal by Transnet Port Terminal designated person or inspector of labour.

■ Form-Work and Support Work

- A contractor shall ensure that all formwork and support work is conducted under the supervision of a competent person who has been appointed in writing.
- A letter of appointment shall be kept on the contractors health and safety file. A designated Transnet Port Terminals person may request to review copies thereof during an inspection or audit.

- All formwork and support work shall be done in accordance with the requirements as stipulated in the Construction Regulations.
- Form and support work structures shall be designed, erected, supported, braced , shored and maintained to be able to sustain applied loads.
- These structures shall not be over-loaded and shall be installed in consultation with the structural design and in constant reference to the structural design drawings.
- The construction site shall be properly hoarded or barricaded to prevent any unauthorised persons from gaining access to the construction site.
- Hoarding shall be done according to the SANS 0400 – National Building Regulations or in line with the Transnet Projects Hoarding specifications.
- All the drawings shall be kept on site for perusal by Transnet Port Terminal responsible person or department of labour inspector.
- The Contractor has an obligation to ensure that form and support work structures are inspected by competent persons before, during and after placement of concrete and thereafter daily until the structure is removed.
- Form and support structures found damaged or weakened shall be removed and reinforced immediately
- Precautionary measures shall be taken to prevent displacement of deck panels that is caused by application of release agents.
- The contractor shall ensure that foundation conditions are suitable to ensure that imposed loads are withstood and that form and support work is stable.
- All employees involved in form and support work shall be competent and adequately trained and instructed to execute the above activity.

■ **Excavation Work**

- The Contractor shall ensure that all excavation work is conducted by a competent person that has been designated and appointed in writing as a responsible person for excavation work.
- A comprehensive risk assessment shall be conducted to determine the location of utilities and services such as electricity, fiber-optic cables, water, fuel and gas-pipelines, to ensure that these sensitive utilities are not affected by excavation work.
- The contractor must ensure that underground piping; cabling or any other installations are not damaged while conducting excavation work.
- The Contractor shall evaluate the stability of adjacent buildings and structures to an extent that these are not affected by the excavation work.
- A risk assessment is necessary to enable the contractor to identify safety hazards and thereby take suitable steps and precautions to prevent persons from being buried and trapped in an excavation due to a fall or dislodgement of materials.
- The Contractor shall not permit any excavation work to be undertaken if such excavation exceeds 1.5 metres in depth, unless the excavated area is adequately shored and braced.
- The Contractor shall not undertake any excavation without prior written permission from the Transnet Port Terminals-designated person.
- The contractor must ensure that all the sided of any excavation is effectively “stabilised” by some means for example bracing.
- Shoring and bracing is not necessary in instances wherein the sides are slopped at maximum angle of repose or where the excavation is in stable material and that permission was granted by a competent person.

- Standard Operating Procedure is required for all excavation work to ensure a uniform approach towards excavation work.
- The contractor shall further ensure that loads, materials, plant and equipment are not placed in positions that could cause excavations to collapse and cave into the excavated areas.
- All excavated sites shall be adequately protected and hoarded to avoid any unauthorised access.
- The Contractor shall provide sufficient warning signage and illuminants for evening work, to improve visibility.
- The contractor shall ensure that where explosives are used that a method statement is developed in line with the Explosives Act and regulations issued there-under.
- Contractor shall ensure that excavations are inspected at regular intervals before the commencement of a shift and after every blasting operations
- These inspections are mandatory after every unexpected fall of ground, substantial damage to support and after inclement weather(rain) to pronounce the safety of the excavated area before employees could be allowed to access the excavated areas.

■ Demolition Work

- The Contractor shall ensure that all demolition work is carried out under constant supervision of a competent person that has been designated and appointed in writing as a responsible person for demolition work.
- A comprehensive structural survey or risk assessment shall be done and a method statement for demolition procedures
- The above survey will also able to Contractor to ascertain the location of utilities and services such as electricity, fiber-optic cables, water, fuel and gas-pipelines, to ensure that these sensitive utilities are not affected by demolition work.
- The structural survey also includes a structural integrity check to avoid premature structural collapse.
- The contractor should guard against the possibility of overloading or overhanging debris and waste that could render the demolition process unsafe.
- Any overloaded or overhanging material shall be adequately braced, shored made strong enough to support the material
- The Contractor shall evaluate the stability of adjacent buildings and structures to an extent that these are not affected by the demolition work.
- All the stairwells used and floors on which work is done would be adequately illuminated through natural and artificial lighting
- The Contractor shall also erect a catch-platform or net where necessary, to prevent injury to persons by falling objects
- The Contractor shall ensure that appropriate waste disposal facilities are provided, and that waste is not dropped outside the designated waste disposal area.
- A chute of adequate strength and rigidity shall be designed to prevent free-fall of waste materials, provided to disposed waste from elevated positions and
- The chute shall be properly enclosed on all sides and shall discharge into a closed container to eliminate dust emanating from waste debris
- e waste shall be removed at intervals agreed with the client.
- In the event that demolition work would involve the use of explosives, then a method statement for detonation shall be developed by a competent person and approved by the Transnet Port Terminals- Chief Safety Officer in conjunction the Project Engineer.

- Should the risk assessment suggest the presence of lead or asbestos, then the contractor shall ensure that an accredited asbestos / lead removing organization is sub-contracted and that all the legal procedures as contained in the respective regulations are strictly adhered to.

■ **Tunnelling**

A contractor shall ensure that where tunnelling activities are performed that this is done in accordance with the Mine Health and Safety Act No 29 of 1996. Entry into any area where tunnelling activities are taking place shall be restricted where the height restriction is less than eight hundred (800) mm.

■ **Scaffolding**

A contractor shall ensure that scaffolding is erected and dismantled under the supervision of a competent person. A letter of appointment of the scaffold erector, team leaders and inspector and their proof of competency shall be provided prior to commencement of work to the Transnet Port Terminals- Project Manager and copied to the Transnet Port Terminals designated S.H.E Manager. All certified competent persons will be issued with a certificate of authorisation for the use of such scaffolding. The scaffold must be tagged as Safe/unsafe to use and such information shall be properly displayed prominently. All users of scaffolding shall be trained in the correct use thereof.

A proof of weekly inspections conducted after inclement weather shall be kept on the contractor's health and safety file for reference purposes and shall be inspected or audited by a designated Transnet Port Terminals person. Every user of scaffolding and associated plant and equipment shall ensure that such equipment, when used, complies with the specific safety standard. (SANS 085). A contractor shall ensure that all safety standards stipulated in Construction Regulations are strictly adhered to.

■ **Suspended Platforms**

A contractor shall ensure that all work activities on suspended platform is conducted under the constant supervision of a competent person who has been appointed in writing. All suspended platform erectors, operators and inspectors shall be qualified and competent to carry out such work. A letter of appointment shall be provided to the Transnet Port Terminals designated S.H.E Manager or responsible person prior to commencement of work. This shall be kept in the contractors health and safety file and made available for inspections and audits by a designated Transnet Port Terminals person. Every user of suspended platform associated plant and equipment shall ensure that such equipment, when used, complies with the specific safety standard. (SANS 1898 and SANS 1903), that deals with safety requirements of suspended access equipment and design calculations, stability criteria and construction tests for platforms.

All work which requires the use of a suspended platform work shall be done in accordance with the requirements as stipulated in the Construction Regulations.

■ **Boatswain's chair**

A contractor shall ensure that where a boatswain's chair or similar device is being used that it is securely suspended and is constructed in such a manner that prevents any person from falling.

An inspection shall be carried out prior to use of a boatswain's chair. A performance test shall be conducted immediately after it has had its initial inspection. Daily visual inspections shall be carried out once the

boatswain's chair has been erected and installed. Any deviations noted during a visual inspection shall be recorded and action taken to address problems. All inspection reports shall be kept in the contractor's health and safety file for record keeping purposes, which may be inspected or audited by a designated Transnet Port Terminals person.

■ **Lifting Equipment, Tackle, Material Hoist & Cranes**

A contractor shall ensure that all lifting equipment and tackle is inspected before use and a monthly register is completed by a competent person. Proof of such inspections shall be recorded and kept on the contractors health and safety file for reference. A contractor shall ensure that a safe working load is conspicuously displayed on lifting equipment and tackle and a copy of a service certificate shall be provided to the designated Transnet Port Terminals S.H.E Manager prior to commencement of work. A contractor shall ensure operators are properly trained on how to operate the above equipment and a proof of competency is provided prior to commencement of work. A Contractor shall provide information on a procedure which shall be followed in the case of:

- (a) Malfunctioning of equipment; and
- (b) Discovery of a suspected defect in the equipment

A contractor shall ensure that safety measures stipulated in Driven Machinery Regulation and Construction Regulations with regard to above equipment are adhered to at all times. All required documentation shall be kept in the contractors health and safety file for reference purposes and readily available for inspections and audits by a designated Transnet Port Terminals person. Lifting equipment shall be constructed of sound material and to generally acceptable technical standards. Manufacturers design specifications for lifting equipment . tackle, material hoist and cranes shall be kept on record for perusal by a designated Transnet Port Terminals person.

An assessment of tasks involving significant lifts shall be completed and the method statement and equipment determined by a competent and authorised person(s). Operators of powered-lifting devices are competent and authorised to execute rigging of the load.

The above risk assessment shall ensure that the load does not exceed the dynamic and / or static capacities of the lifting equipment. Any safety devices installed on lifting equipment shall be mechanically sound, operational and tested routinely. Suitable tools, PPE, and procedures are in place, particularly for manual materials handling.

■ **Batch plants**

A contractor shall ensure that all batch plant are operated and under the supervision of a competent person who has been appointed in writing. A letter of appointment shall be provided to the designated Transnet Port Terminals S.H.E Manager or responsible person prior to commencement of work.

All batch plant operations shall be done in accordance with the requirements as stipulated in the Construction Regulations. All dangerous and moving parts of the mixer shall be adequately guarded and placed beyond reach. Machine guards are normally permanently attached to the batch plant and these should not be removed or modified. The start /stop button are to be ergonomically accessible, however these buttons should be constructed such that, it would prevent any accidental and unauthorized activation of the batch plant.

■ **Work in Confined spaces**

A contractor shall ensure that all precautionary measures, as stipulated for confined spaces, as stated in the General Safety Regulations, are complied with when entering any work area which may be classified as a confined space. All confined spaces shall be tested for any toxic gases or material and where the oxygen

demand is within acceptable levels, a life-line shall be attached to the person entering such areas. A second person shall keep watch outside such confined areas as a back-up to the other colleague that would have entered a confined space. Testing of atmospheres is conducted, verified, recorded and repeated as often as such confined spaces are to be identified and marked as such.

A confined space entry permit shall be issued to the affected persons and further communicated to all affected persons after authorisation is obtained from the responsible person(s). All involved persons are competent to work and required to use appropriate PPE. All energy-sources affecting the confined space have been isolated and locked out.

Emergency response arrangements are in place as per permit requirement.

■ **Working in danger of engulfment**

A contractor shall ensure that no person is permitted to enter any place from or into which solid or particulate material is being discharged where a danger exists of an employee being engulfed by such a solid or particulate material unless reasonable precautionary measures have been introduced.

■ **Stacking of Articles**

A contractor shall ensure a competent person, is appointed in writing, with the duty of supervising all stacking and storage for construction work or on-site. Proof of such an appointment shall be kept on the contractors health and safety file. This shall be kept for inspections and auditing purposes by a designated Transnet Port Terminals representative. A contractor shall ensure that stacking is conducted under supervision and good housekeeping practices are maintained at all times.

■ **Welding, flame cutting, soldering and similar operations**

A contractor shall ensure that where welding, flame cutting, soldering and similar operations are being undertaken that the persons utilising such equipment are:

- A proper risk assessment has been carried to carry out hot-work on the premises
- Competently trained in the execution of hot-work and that the correct equipment is used for such activities
- A hot-work permit has been obtained from the relevant Transnet Port Terminals: Project Engineer/ Manager to carry out such work
- Adequately trained in fire-fighting skills and techniques – The artisan shall be able to identify any possible fire hazards associated with the above activities and the necessary precautionary measures.
- Provided with suitable Personal Protective Equipment
- Ensure that the area would be sufficiently partitioned and provided with fire-blankets where such work is being undertaken
- Leads and electrode holders are effectively insulated to protect against conduction and possible
 - electrocution
- Comply with the requirements as stipulated in the General Safety Regulations
(Refer TPT's Operational Safety Directive and Procedure B070 – Hot Work Permits)

■ **Ladders**

A contractor shall ensure that all ladders are numbered, inspected before use and weekly inspections are recorded in a register.

- A contractor shall ensure that a competent person who carries the above inspections is appointed in writing.
- All records of inspections on ladders shall be maintained in the contractors health and safety file.
- This shall be kept on file for inspections and audit by a designated Transnet Port Terminals person.

■ Ramps

A contractor shall ensure that where ramps are constructed they are:

- Constructed in accordance with acceptable technical standards
- Have a load factor of at least two (2) with respect to the load it is expected to carry.
- Consideration shall be taken with respect to vehicles if the ramp is used for such activities and allow for turning, braking and acceleration of these vehicles on ramps
- Have an inclination to the horizontal level of not more than thirty four (34) degrees or one vertical to one and one half (1½) horizontal
- The inclination of each ramp renders additional foothold when necessary except where the inclination is more than fourteen (14) degrees or one (1) vertical to four (4) horizontal is provided with laths which are placed at suitable intervals and extend the full width of the ramp. These stepping laths may be interrupted over a width not exceeding two hundred and thirty (230) mm to facilitate the movement of wheelbarrows
- A ramp which is higher than two (2) meters shall have substantial guard rails which are at least nine hundred (900) mm and not exceed one thousand (1000) mm in height and toe boards which are at least one hundred and fifty (150) mm high with no open spaces between the toe board and the ramp.

■ Explosive powered tools

- A contractor shall ensure that no person uses explosive power tools unless they have been properly trained.
- Explosive power tools shall be properly guarded and inspected daily before use, by a competent person, who has been appointed in writing.
- A proof of such appointment and competency shall be kept on the health and safety file for reference purposes. A contractor shall ensure that warning signs are conspicuously displayed when explosive power tools are in use.
- A contractor shall ensure that all safety precautions are adhered to as stipulated in the Explosive Regulations and Construction Regulations.
- Explosive power tools shall be provided with guard of adequate strength around the muzzle to effectively confine flying fragments or particles towards the working area.
- The firing mechanism shall be inter-lockable to prevent unauthorized or accidental firing.
- All records required for use of explosive tools shall be readily available for inspections and audits by a designated Transnet Port Terminals person.

■ Electrical Installations and machinery on construction sites

- A contractor shall ensure that all portable electrical tools are properly maintained, inspected before use by a competent person, who is appointed in writing to perform such duties.

- A letter of appointment shall be provided to the designated Transnet Port Terminals S.H.E Manager or responsible person prior commencement of work.
- All records of such appointments shall be kept on the contractors health and safety file for reference purposes and may be inspected or audited by a designated Transnet Port Terminals person.
- A contractor shall ensure that the electrical power tools are provided with earth leakage protection and are of double insulated type.
- Furthermore, contractors are expected to ensure that portable electrical tools are numbered and identified and entered onto a register.
- Regular inspections shall be recorded onto a register and kept on site. A contractor shall ensure that prior notice is given to Transnet Port Terminals Electrical Engineer of any work involving electrical isolation.
- A lock-out certificate shall be issued to the relevant Contractor in conjunction with Transnet Port Terminals designated persons.
- A contractor shall ensure that a lock-out procedure is developed and adhered to by his/her employees whenever required.
- A contractor shall ensure that all safety measures stipulated in the Electrical Installation Regulations, Machinery Regulations, General Machinery Regulations and Construction Regulations are adhered to at all times.
- The methods of isolation and discharge of stored energy are agreed and executed by a competent and authorised person(s).
- Any stored energy is managed and / or discharged properly using “Zero Mechanical Status” principle.
- A lock-out procedure incorporating personal locks and labels is utilised at isolation points.
- A test is conducted to ensure that the isolation effectiveness is periodically monitored.
- On completion of work, isolation cannot be removed until: All guarding and safety systems are re-established.
- Lock-out includes vehicles, plant and equipment been properly secured and locked to prevent any accidental or unauthorised activation other employees.

■ Tower -Cranes

- A contractor shall ensure that all tower cranes are operated and maintained by competent persons, and that work is carried out safely.
- Maintenance on tower-cranes to be conducted under the supervision of a competent person who has been appointed in writing.
- The appointed person should be physically and psychologically fit for such work and must be in possession of a medical certificate of fitness.
- When work is done on tower-cranes the contractor should take due regard and account of effects of adverse wind / weather forces on the structure.
- In addition, account is to be taken of the bearing capacity of the ground and the bases for tower cranes.
- Rail tracks for mounted tower-cranes shall be firm and level.
- The contractor to ensure that tower cranes are installed and erected within safe distances from excavations to allow sufficient operational space when installing and dismantling such structures.
- A letter of appointment shall be provided to the Transnet Port Terminals designated S.H.E Manager or responsible person prior commencement of work.

- This shall be kept in the contractors health and safety file and available for inspections and audits by a designated Transnet Port Terminals person.
- All work which requires the use of a suspended platform work shall be done in accordance with the requirements as stipulated in the Construction Regulations.

■ **Construction Vehicles and Mobile Plant**

- The contractor shall provide construction vehicles that are of acceptable design and construction.
- Such vehicles will be maintained in good working order and used in accordance with their design specifications. an appropriate vehicle service book and checklist shall be kept at all times.
- The Contractor shall ensure that these vehicles are only operated by trained, certified and competent persons who are also physically and psychologically fit for the class of vehicle.
- The vehicle will have safe and suitable means of access and fitted with structures that would adequately prevent falling objects and materials from causing injuries to the operator in the cab.
- These structures will also provide sufficient protection to the operator from being crushed in instances where the plant or equipment overturns.
- Normally these vehicles are fitted with electronic reversing alarms and acoustic signalling devices. Further safety measures include the installation of reflective tape for evening operations and that the equipment would be parked in barricaded areas.
- In instances where such vehicles would be expected to work on Quayside, then the Quayside Vehicle Operator's permit requirements shall be complied with. The Operator shall ensure that persons, unsecured material and equipment are not being transported together in the same compartment.

■ **Use, Handling & Storage of hazardous substances / chemicals**

- A contractor shall ensure that a competent person is designated in writing to control the storage and usage of Hazardous Chemical Substances (HCS).
- A letter of appointment shall be kept on the contractors health and safety file. All records of contractors appointment letters may be inspected or audited at any time by a designated Transnet Port Terminals persons.
- A contractor shall ensure that Material Safety Data Sheets (MSDS) or suitable copies thereof (Refer Transnet Port Terminals Occupational Health and Safety Working Instruction S100 005 – Hazardous Chemical Substances in the workplace) of chemical substances brought on site are kept on site and such documents have been communicated to the chemical substance users , First Aiders and Medical Personnel.
- A contractor shall ensure that safety measures stated in Hazardous Chemical Substances Regulations, General Safety Regulations, Construction Regulations and Community Safety Fire By-laws are applied at all times.

■ **Water Environments**

- Where construction work is performed over or in the close proximity of water, Contractors shall ensure provision is made to prevent workers from falling into water and that rescue workers shall be deployed to reduce the risk of drowning.
- All employees exposed to the risk and danger of drowning by falling into water shall be provided with and use life-jackets for the duration of work in the close proximity of water

■ **Good Housekeeping – Construction Sites**

- A contractor shall ensure that good housekeeping is maintained and enforced at all times. A contractor shall ensure that safety precautionary measures stipulated in Environmental Regulations for Workplaces and Construction Regulations and Construction.
- The contractor shall make the necessary provision for proper storage of materials and equipment
- The construction site shall be accessible and unobstructed by loose materials and all waste materials from elevated positions shall be disposed through the chute at regular intervals.
- All hazardous waste shall be disposed in an environmentally friendly manner, and disposal certificates and waste manifestos shall be kept on record for audit purposes.
- Stacking and storage of materials and equipment shall be performed under the constant supervision of a competent person who is appointed in writing.
- Provision shall be made by the contractor for storage areas which shall be properly demarcated.
- Contractor employees shall be properly trained for the purposes of stacking and storage to ensure that the stacking areas are properly controlled and kept clean at all times.

■ **Fire Precautions and Emergency Preparedness**

- The contractor must identify and evaluate all potential emergency scenarios related to their work processes, so that appropriate emergency response plans could be developed for such emergency scenarios with the highest likelihood for occurrence.
- These emergency response plans must be submitted to the Transnet Port Terminals – Safety Department to ensure that the emergency plans have synergy to the existing Terminal emergency response / contingency plans.
- The contractor must inform all employees regarding relevant emergency procedures and conduct regular emergency drills to ensure that employees are aware of the procedures to be followed to different emergency scenarios.
- Proof of emergency exercises and drills shall be submitted to the Transnet Port Terminals; Project Engineer.
- The contractor shall ensure that adequate fire equipment is provided in strategic places (that is, where there is a mobile distribution board, flammable liquids, vessels under pressure, confined spaces, hot work etc).
- Sufficient and suitable storage areas shall be provided for flammable liquids, solids and gases
- Smoking shall be prohibited at designated non-smoking areas
- The contractor shall ensure that such equipment is inspected by a competent person on a regular basis and such inspections are recorded on a register.
- The contractor shall ensure that all fire-equipment is serviceable and person(s) have been properly trained on how to use the equipment.
- A proof of such training shall be kept in the contractors health and safety file and available for inspections and audits by a designated Transnet Port Terminals persons.
- All hot-work shall be undertaken after due authorization by designated Transnet Port Terminals person.

■ Hazardous Materials

- The contractor shall comply with all relevant national, regional and local legislation with regard to the transport, use and disposal of hazardous materials.
- If necessary, the contractor shall obtain the advice of the manufacturer with regard to the safe handling of hazardous materials. Any claims against the contractor shall be for his/her account.
- The contractor shall provide the designated Transnet Port Terminals S.H.E Manager with a list of hazardous substances on site, together with storage procedures for these materials.
- The contractor shall ensure that there is an emergency procedure to deal with accidents and incidents (e.g. spills) arising from hazardous substances. The Contractor shall report major incidents (spills in excess of 50 liters) to the Responsible Person immediately. (Refer Environmental Management Systems Working Instruction T050 003 – Handling and Storage of Hazardous Chemical Substances and T050 004 – Spillage and Oil Management)
- The contractor shall maintain a register of spills or incidents involving hazardous materials, as well as measures taken. (Refer Environmental Management Systems Working Instruction)
- The contractor shall ensure that information on all hazardous substances is available to all personnel on site.
- The contractor shall also be responsible for the training of all personnel on site who will be handling the material about its proper use, handling and disposal.

■ Transport of materials outside the site

- The Contractor shall comply with all the applicable local, regional and national by-laws with regard to road safety and the transport of materials, especially hazardous and/or toxic materials. Any claims against the contractor shall be for his/her account.
- The Contractor Responsible Person shall provide the Transnet Port Terminals designated S.H.E Manager with a schedule of the proposed transportation of significant quantities of hazardous material onto the site, before commencing work on site.
- The designated S.H.E Manager may request further details or notifications of specific material movements if considered necessary.

■ Use of cement/concrete

The contractor is advised that cement and concrete are regarded as highly hazardous to the natural environment on account of the very high pH of the material, and the chemicals contained therein. Therefore the Contractor shall ensure that:

- Concrete is mixed on mortar boards, and not directly on the ground;
- Visible remains of concrete, either solid, or from washings, are physically removed immediately and disposed of as waste.
- Washing visible signs into the ground is not acceptable; and all aggregate is also removed.
- Environmental Specifications are adhered to at all times.

■ **Construction Welfare Facilities**

- The Contractor shall comply with the provision of the Facilities Regulations issue in terms of the Occupational Health and Safety Act (Act 85 of 1993) which deals specifically with the construction welfare facilities.
- Changing facilities for each sex shall be kept and maintained in a hygienically clean condition and in a good state of repair
- The Contractor shall provide adequate ablution facilities, change rooms (if necessary) and eating facilities must for all employees for the duration of the project.
- Store-rooms may not be used as change-rooms.
- Lockers for the storing of personal belongings shall be made available for employees to be able to change clothes before and after work.
- Suitable living accommodation shall be erected on site with separate toilet and washing facilities for male and female staff employed on site.
- Appropriate notices shall be affixed at the entrances of these areas.
- Toilet-paper, waste-bins, urinal-screens, soap-dispensers and towels shall be made available in all toilet facilities

■ **Environmental Management**

- Refuse and waste may only be disposed of in an environmentally friendly manner
- The contractor must familiarise himself with this standard operating procedures and adhere to such procedures.
- If any refuse or waste is disposed of in a manner unacceptable to the Transnet Port Terminals, the Contractor shall arrange for cleaning / rehabilitation using the “Polluter Pays Principle”.
- Any costs incurred as a result of rehabilitation or remedial work, shall be recovered from the Contractor

■

S.H.E Performance Measurements and Monitoring

- The Transnet Port Terminals designated personnel will conduct regular S.H.E inspections and assessments of critical activities. These inspections and assessments shall be (Planned and unannounced) and contractors are expected to participate and give full cooperation during such assessments.
- Sub-contractors are more than welcome to participate in planned inspections and assessments.
- S.H.E accident and injury statistics shall be reported on a weekly basis to Transnet Port Terminals Safety Officer.
- Serious and reportable injuries and accidents shall be reporting to the Department of Labour and a copy of such report will be made available to the Transnet Port Terminals designated persons.
- All accidents and incidents shall be reported on a monthly basis and late reporting of S.H.E statistics is not accepted.
- Contractor S.H.E personnel will be expected to conduct inspections and submit reports to the Transnet Port Terminals designated person on weekly or monthly basis depending on the frequencies of such inspection..

Annexure A – Notification of Construction Work (S.H.E Form 001)

Annexure A		
NOTIFICATION OF CONSTRUCTION WORK		
OCCUPATIONAL HEALTH AND SAFETY ACT, 1993		
Regulation 3 of the Construction Regulations, 2003		
1.	(a) Name and postal address of principal contractor:	
	(b) Name and telephone number of principal contractor's contact person:	
2.	Principal contractor's compensation registration number:	
3.	(a) Name and postal address of client:	
	(b) Name and telephone number of client's contact person or agent:	
4	(a) Name and postal address of designer(s) for the project:	
	(b) Name and telephone number of designer's contact person:	

5.	Name and telephone number of principal contractor's construction supervisor on site appointed in terms of regulations 6 (1):	
6.	Name/s of principal contractor's sub-ordinate supervisors on site appointed in terms of regulation 6 (2):	
7.	Exact physical address of the construction site or site office:	
8.	Nature of the construction work:	
9.	Expected commencement date:	
10.	Expected completion date:	
11.	Estimated maximum number of persons on the construction site:	
12.	Planned number of contractors on the construction site accountable to principal contractor:	
13.	Name(s) of contractors already chosen:	
Principal Contractor		
Date		
Client		
Date		
	NB: This document is to be forwarded to the office of the Department of Labour prior to commencement of Construction work on site. It is recommended that all Transnet Port Terminals Projects submission be made at least two weeks prior to commencement of construction activities.	
	<ul style="list-style-type: none"> All principal contractors that qualify to notify shall do so even if another principal contractor on the same site had done so prior to the commencement of work. 	

Annexure B – Pre Qualification S.H.E Contractor Assessment Questionnaire (S.H.E Form 002)
PRE QUALIFICATION S.H.E CONTRACTOR ASSESSMENT QUESTIONNAIRE

1. S.H.E POLICY, ORGANISATION AND MANAGEMENT INVOLVEMENT		
	YES	NO
1.1 Do you have a S.H.E Policy? Is this signed by the Chief Executive Officer / Managing Director? Please supply copy of this policy		
1.2 Does a S.H.E structure exist in your organization? Please provide details		
1.3 Are senior and middle management actively involved in the promotion of S.H.E? Please provide details e.g. <ul style="list-style-type: none"> Periodical work area inspections Regular Health and Safety meetings with personnel 		
1.4 Are the S.H.E responsibilities of managers clearly defined? Please provide details		
1.5 Are annual S.H.E objectives included in your business plan? Please provide examples		
1.6 Is your company registered with the Compensation Commissioner (COLD Act) or licenses compensation insurer? If so, please provide registration number		
1.7 Do you have a copy of good standing certificate, confirming that your registration is paid up? If so, please provide copy thereof		
2 S.H.E TRAINING		
	YES	NO
2.1 Is training provided to employees at the following stages? <ul style="list-style-type: none"> When joining the company When changing jobs within the company When new plant or equipment needs to be operated As a result of experience of and feedback from an accident/incident reports Are you able to provide proof of specialist training provided? Please state how this can be achieved		

2.2	What formal S.H.E training is provided specifically to		
	▪ First line supervisors?		
	▪ Middle and top management?		
	Please describe		
2.3	Are all employees (including sub-contractors) instructed as to the application of rules and regulations within your organization?		
	When is this done and how is it achieved?		
2.4	Does this training include the selection, use and care of personal protective equipment?		
2.5	What refresher training is provided and at what intervals?		
	Please list examples		
	Course title	Target audience	Interval
2.6	Has the person (s) allocated as your S.H.E advisor followed specific S.H.E training?		
	Please list most recent courses		
	Does this include refresher training?		
3.	PURCHASE OF GOODS, MATERIALS AND SERVICES		
		YES	NO
3.1	Do you have a system for establishing S.H.E Specification as part of the assessment of goods, materials and services?		
	Please describe		
3.2	Do you have a system which ensures that all statutory inspections of plant and equipment are carried out?		
	Please give examples of plant/equipment covered		
3.3	Is there a record of inspections?		
	Where is it kept?		
	Are you able to supply copies of these inspections records if required?		
3.4	Do you carry out plant and equipment inspections prior to work commencing to ensure the safety hazards are identified?		
	Please provide copies of these inspection reports		
3.5	Do you evaluate the S.H.E competence of all sub contractors?		
	Please describe how this is achieved and how the results are monitored		
4	S.H.E INSPECIFICATIONIONS		
		YES	NO
4.1	Are periodic work inspections carried out by first line supervisors?		
	Please provide copies of these inspection reports		

Transnet Port Terminals – SHE Specifications

7.1	How do you manage emergency situations?		
	Are these documented and communicated to your sub-contractors?		
	Please supply proof thereof		
7.2	What provision have you made for first aid? e.g. Trained First Aiders		
7.3	What training do you provide to employees in Fire Safety/Fire Fighting?		
	Please list institution used for this training		
8	RECRUITMENT OF PERSONNEL		
		YES	NO
8.1	Are S.H.E factors considered when hiring personnel?		
8.2	Are medical examinations carried prior to employment?		
	In all cases		
	Where type of work requires medical examination (e.g. Airside – Audiometric Tests)		
8.3	Do you cover exit medicals on staff once they have resigned?		
8.4	How do you assess the competence of staff before an appointment is made?		
	E.g. Via trade testing, reference checks		
9	REPORTING AND INVESTIGATION OF ACCIDENTS, INCIDENTS AND DANGEROUS CONDITIONS		
		YES	NO
9.1	Do you have a procedure for reporting, investigating and recording accidents and incidents?		
	Please supply copy of this procedure		
9.2	Is there a standard report/investigation form used?		
	Please supply copy thereof		
9.3	Do you have a formal system for reporting situations/near misses etc.?		
	Please provide copy thereof		
9.4	Please provide the following statistics for the last five years		
9.5	Do you keep copies of the Annexure 1 as detailed in the General Administrative Regulations of the Occupational Health and Safety Act No 85 of 1993?		
	Please supply copies thereof		
		YEAR-1	YEAR-2
		YEAR-3	YEAR-4
		YEAR-5	
	Lost time accidents per 100 employees		
	Major/Reportable injuries per 100 employees		
	Number of dangerous occurrences		

Lost man days due to accidents						
10	HEALTH AND SAFETY COMMUNICATION AND CONSULTATION					
				YES	NO	
10.1	Are S.H.E Committee meetings held between management and appointed S.H.E representatives?					
10.2	Are the results of these meetings communicated to all employees?					
	If YES please describe method					
10.3	Are S.H.E meetings held?					
	At what frequency?					
	Chaired by whom?					
10.4	Do you carry out S.H.E promotions/campaigns?					
	If YES please provide examples					
Name of Transnet Port Terminals Project Manager/Designated Transnet Port Terminals Person: <hr/> Signature of Transnet Port Terminals Project Manager/Designated Transnet Port Terminals Person: <hr/> Date of receipt of documentation: <hr/> Comments: <hr/>						
Name of Transnet Port Terminals Safety Manager/Designated Transnet Port Terminals Person: <hr/> Signature of Transnet Port Terminals Safety Manager/Designated Transnet Port Terminals Person: <hr/> Date of endorsement of documentation: <hr/>						



TRANSNET
port terminals

Annexure C – TRANSNET PORT TERMINALS Safety Department Contractor Risk Profiling (S.H.E Form 003)

CONTRACTOR RISK PROFILING

Company Name					Contact Number		
Contractor Rep					Commencement Date:		
COMPANY ADDRESS					Nature of Work		
No.	Description	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Score
1.	The contractor is going to work in a dangerous area	5	4	3	2	1	
2.	A serious incident on the contractor's site would pose an interruption risk for the whole business/project	5	4	3	2	1	
3.	The contractor will be on site for a long time	> 1 year	> 3 months	1 – 3 months	3 days – 1 month	< 3 days	
4.	The contractor makes use of dangerous equipment such as portable gas cylinders, compressors, explosive tools, radioactive sources	5	4	3	2	1	
5.	The contractor uses Hazardous Chemical Substances	5	4	3	2	1	
6.	The contractor will perform hazardous tasks, such as confined space entry, hot work, working at heights, electrical work and working with dangerous equipment	5	4	3	2	1	
7.	The contractor will fall under the scope of Construction Regulations	5	4	3	2	1	
8.	Contractor employees will work in close proximity to other contractor /aircraft /members of the public	5	4	3	2	1	
9.	The site contains hazards that the contractor would not normally encounter in his line of work	5	4	3	2	1	

	Description	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Score
10.	Due to the nature of the project, deadlines and current status, the contractor will be necessitated to work long hours everyday	5	4	3	2	1	
12.	The contractor will work in close proximity to other medium and high risk activities	5	4	3	2	1	
13.	The contractor will work regularly after 23h00 and before 06h00	5	4	3	2	1	
14.	The contractor does not have the right equipment for the job. Hired or leased machinery or equipment will be used	5	4	3	2	1	
15.	The contractor poses a significant risk of harming the environment through the activities	5	4	3	2	1	
16.	The contractor does not have any formalized S.H.E policies, procedures and practices in place	5	4	3	2	1	
17.	The contractor does not have a steady and reliable workforce, and make use of casuals and temporary staff	5	4	3	2	1	
18.	It seems that the contractor is a fly-by-night type, and is not long established or part of a larger organization	5	4	3	2	1	
19.	The contractor has done adequate health and safety training for its own employees	5	4	3	2	1	

PROFILE AND CONTROLS

Total score	Risk profile	Proposed Controls
18 – 36	Low risk	<ul style="list-style-type: none"> Permit work Schedule of Contractors on the Landside/Airside. Mandatory Form or contractor agreement completed. Letter of good standing. Risk assessment conducted Provision being made for the cost of safety, health and environment Ad-hoc inspections
37 – 54	Medium risk	<ul style="list-style-type: none"> Permit work Schedule of Contractors on the Landside/Airside. Mandatory form or contractor agreement completed. Letter of good standing Contractor shall have basic S.H.E management system Risk assessment conducted and S.H.E plan submitted. Provision being made for the cost of safety, health and

		<p>environment.</p> <ul style="list-style-type: none"> ▪ Inspects and audits conducted by the competent person appointed by the Contractor. ▪ Inspects and audits conducted by TPT
55 – 75	High risk	<ul style="list-style-type: none"> ▪ Permit work ▪ Schedule of Contractors on the Landside/Airside. ▪ Letter of good standing ▪ Mandatory agreement ▪ Contractor shall have adequate S.H.E management system ▪ The contractor's S.H.E performance is evaluated and considered prior to awarding the contract ▪ Provision being made for the cost of safety, health and environment ▪ Contractor undergoes basic induction course – S.H.E and/or Airside Safety Induction ▪ Site inspections and audits are done by the competent person appointed by the Contractor. <p>Site inspection and audits conducted by TPT</p>
76 – 100	Very high risk	<ul style="list-style-type: none"> ▪ Permit work ▪ Schedule of Contractors on the Landside/Airside. ▪ Letter of good standing ▪ Mandatory agreement ▪ Contractor shall have adequate S.H.E management system ▪ Contractor also complies with employer's system ▪ The contractor's S.H.E performance is evaluated and considered prior to awarding the contract ▪ Provision being made for the cost of safety, health and environment ▪ Contractor undergoes full induction course ▪ Site inspections and audits are done by a competent person appointed by the Contractor. ▪ Audits and inspections are conducted by TPT.

**TRANSNET PORT TERMINALS SIGNATURE
 (RESPONSIBLE PERSON):**

**TRANSNET PORT TERMINALS / NATIONAL
 PORTS AUTHORITY SAFETY/ FIRE AND
 RESCUE DEPARTMENT SIGNATURE:**

DATE:

DATE:



Appendix D – Section 37 (2) Mandatory Contractor Appointment Letter (TRANSNET PORT TERMINALS S.H.E Form 004)

Occupational Health and Safety Act 85 Of 1993 - Section 37(2) Contract Arrangements and procedures for Contractors on the premises

In terms of Section 37(2) of the Occupational Health and Safety Act 85 of 1993 and its regulations, henceforth referred to as the OHS Act, the provision of Section 37(1) of the same act apply to (INSERT CONTRACT COMPANY) henceforth referred to as the contractor, in as far as, Transnet Port Terminals (TPT) (INSERT TERMINAL NAME) shall not be responsible or liable for the actions or omission whatsoever in contravention of the OHS Act taken by the employees of the contractor, in the fulfillment of the contract undertaken by the contractor.

As an **employer in your own right**, you, the contractor are obliged to comply with all the provisions of the OHS Act while on the premises of (INSERT CONTRACT COMPANY), you shall also be required to comply with the conditions and safety procedures of Transnet Port Terminals (TPT) (INSERT TERMINAL NAME).

Transnet Port Terminals (TPT) (INSERT TERMINAL NAME) hereby reserves the right to cause all work undertaken by the contractor, that is in contravention of the OHS Act and that has come to the attention of Transnet Port Terminals (TPT) (INSERT TERMINAL NAME) to cease, until satisfied that such contravention has been rectified. Non compliance to South African Ports Operations (TPT) (INSERT TERMINAL NAME) arrangements and procedures will adversely affect future contracts, while serious non compliance may lead to immediate expulsion from the premises.

Requirements, arrangements and procedures for contractors

It is a condition of this contract that your employees, and any sub-contractors, be covered in terms of the Compensation for Occupational Injuries and diseases Act 130 of 1993 as amended. A copy of good standing with the Compensation Commissioner shall be attached to the signed copy of this legal document. Furthermore, the contractor or sub-contractor certifies that such cover will not expire during the execution of the task nor wills the contractor become in arrears with any payment due to the Commissioner or any other documentation required by the Commissioner.

The contractor furthermore agrees to the following health and safety rules of Transnet Port Terminals (TPT) (INSERT TERMINAL NAME):

- The contractor shall have available a copy of the OHS Act on request.
- Any contractor with more than five employees at any time on the premises shall have available a first aid box for prompt first aid.
- Any contractor with ten or more employees shall have at least one competent and valid first aider on the premises at their workplace. Should there be fifty or more employees on the premises a further first aider for every fifty employees or part thereof shall be available.

- Any contractor with less than ten employees on the premises shall ensure that such employees are made conversant with the first aider at their workplace.
- The contractor shall keep up to date and available for inspection all applicable legally required registers.
- The contractor shall make himself and his employees conversant with Transnet Port Terminals (TPT) (INSERT TERMINALNAME) emergency and evacuation procedures.
- The contractor shall not misuse anything, which is supplied in the interest of health and safety.
- The contractor shall adhere to all Transnet Port Terminals (TPT) (INSERT TERMINAL NAME) safe working procedures.
- The contractor shall be subject to the health, safety and security rules of Transnet Port Terminals (TPT) (INSERT TERMINAL NAME).
- No intoxicating drugs or liquor will be consumed on or brought onto the premises and no person under the influence or who appears to be under the influence will be permitted to come onto or remain on the premises or at a workplace.

Indemnification

The contractor hereby certifies that all contracting workmen recognize the inherent hazards that exist on the premises of Transnet Port Terminals (TPT) (INSERT TERMINAL NAME) and that the Contractor:

- Enters the property entirely at his/her own risk and therefore the Contractor waives any claim of whatsoever nature against Transnet Port Terminals (TPT) (INSERT TERMINAL NAME), its employees, agents and/or mandatory in respect of any loss, damage and/or injury whether same is the result of any negligent act or omission on the part of Transnet Port Terminals (TPT) (INSERT TERMINAL NAME), its employees, agents and/or mandatory or other independent contractors or by a third person or by way of defective equipment or materials supplied by the company, and further the Contractor;
- Hereby indemnifies Transnet Port Terminals (TPT) (INSERT TERMINAL NAME), its employees, agents and/or mandatory against any claims from the Contractor's employees and/or from any other person, arising and being caused in the manner set out above.

I, (INSERT NAME OF AUTHORIZED PERSON) on behalf of the Contractor, do hereby declare that my company (INSERT CONTRACTORS COMPANY) acknowledges having read and understood the conditions contained in this legal document and furthermore, our employees agree to abide by these conditions.

_____ Name of Authorized Person
_____ Name of Contracts Company
_____ Signature of Authorized Person
_____ Witness 1
_____ Witness 2

_____ Date
_____ Date
_____ Date
_____ Date
_____ Date



Annexure E – Appointment Letter – Principal Contractor (Transnet Port Terminals S.H.E Form 005)

Name
Company
Address

Date:

Project reference:

Dear

It is a requirement of the Transnet Port Terminals (TPT) that all construction works within Transnet Port Terminals be undertaken in accordance with the Transnet Port Terminals Safety, Health and Environmental Specifications Manual.

- We enclose a copy of the Transnet Port Terminals Safety, Health and Environmental Specifications .
- Please ensure that your Safety Plan has been included in the tender documents issued to Contractors/Sub Contractors/Service Providers for the above project.
- The Environmental Specifications should be incorporated as an Environmental Particular Specification.
- You will be required to appoint a “Responsible Person” for the project, where construction activities shall be taking place to ensure the contents of the Transnet Port Terminals Safety, Health and Environmental Specifications document are implemented.
- All copies of other legislative appointments shall be submitted to the Transnet Port Terminals Safety/Fire and Rescue Department for record keeping purposes.

Should you require any additional information, please do not hesitate to contact writer.

Yours sincerely

On behalf of the Safety/Fire and Rescue Department



Annexure F – Method Statement for Construction Activities (TRANSNET PORT TERMINALSS.H.E Form 006)

Project reference:	
Contractor:	
Responsible Person:	
Date:	

Method statement(s) audited:

Tick one box:

<input type="checkbox"/>	<input type="checkbox"/>	Method statement properly implemented
<input type="checkbox"/>	<input type="checkbox"/>	Method statement not properly implemented

If method statement not properly implemented, describe deviations/omissions/problems:

1.

2.

3.

Describe actions/plans to ensure proper implementation of the method statement:

1

2

3

Other observations about implementation (if any):

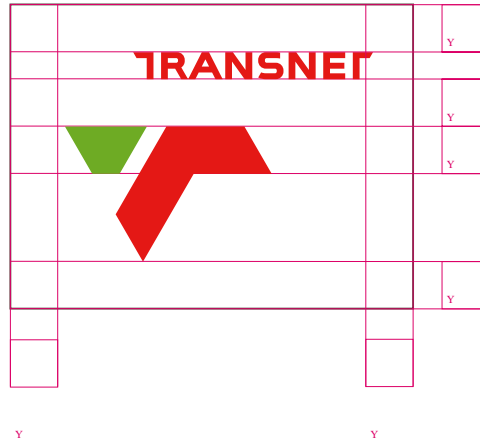
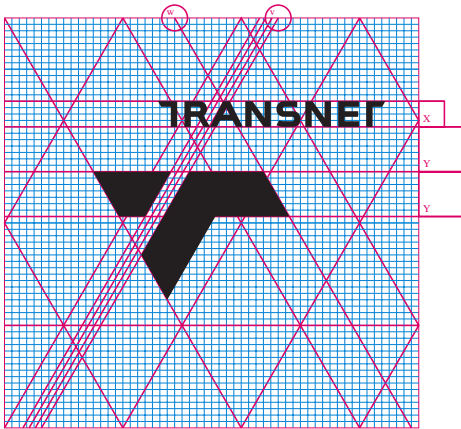
1

2

3

Signed:			Signed:	
	(TRANSNET PORT TERMINAL SEO/ Safety Manager or designate)			(Responsible Person)

TPT Equipment Branding and Logo Details



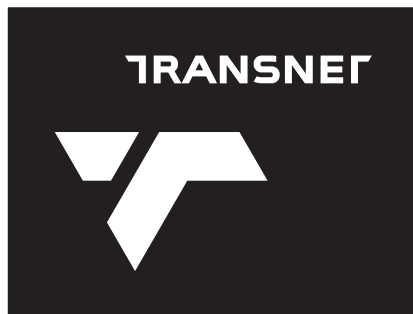
The geometry of the brand identifier, as illustrated above, is based on a horizontal and vertical grid, as well as a secondary grid that runs on a 60° angle. These grids form the backbone of the house style.

The 'A' in the logotype is central to the continuance of the angles created by the chevron (shown in W and V). This is the most common relationship between the logo and logotype.

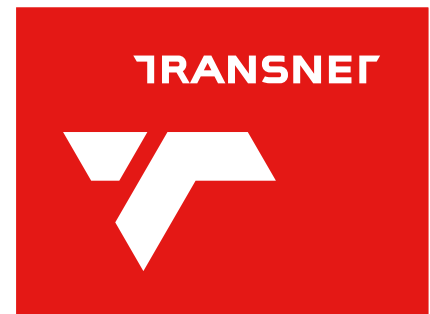
Clear space around the logo elements is determined by the measure 'Y' which is equal to the space between the Brand Mark and the Word Mark.



Single colour application - Black on white




Single colour application - Reverse white on black



Single colour application White on a colour background

Annexure Summary

**Annexure A - EEAM-Q-002
SPECIFICATION - HYDRAULIC
EQUIPMENT (HE9-2-2Ver 6)(rev 1)-
WCS**

REVISION 0	REFERENCE EEAM-Q-002		
DOCUMENT TYPE: SPECIFICATION			
TITLE: TIPPLER MAINTENANCE REGIME		PAGE 0 of 08	
COMPILED BY: QUALITY MANAGER (COE) KRIS NAIDOO _____ Date:	REVIEWED BY: ENGINEERING MANAGER (COE) JESSENDRAN PILLAY _____ Date:	REVIEWED BY: PRINCIPAL ENGINEER (COE) ROFHIWA TAKALANI _____ Date:	
REVIEWED BY: CHIEF ENGINEER (COE) SABELO MZIMELA _____ Date:		AUTHORIZED BY: GENERAL MANAGER ENGINEERING JOSIAH MPOFU _____ Date:	
FUTURE REVISION RECORD NUMBER	DESCRIPTION OF REVISION	APPROVAL	DATE
Revision -1-			
CONTENTS			
KEYWORDS		DATE OF LAST REVIEW: N/A DATE OF NEXT REVIEW: 2019-02-01	

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10. Filters		6
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12. Piping, Fittings And Fasteners		7
13. Service Life Of Hydraulic Equipment		8

1. GENERAL

- 1.1 The Tenderer must note that the equipment will be required to work under humid and corrosive conditions and must supply details of design features. To meet these conditions over an extended service life, the maximum working pressure of the system must be limited to 20 MPa.

2. DIAGRAMS AND MANUALS

- 2.1 Graphical diagrams showing each piece of hydraulic equipment including all interconnecting lines, by means of graphical symbols as specified BS ISO 1219-1 must be submitted with the tender.
- 2.2 Final diagrams form part of the drawings that must be supplied according to Specification HE9/2/9. Please refer to HE9/2/9 for details on the requirements for these drawings and delivery times.
- 2.3 All diagrams should bear TPT's standard drawing numbering system and should be included in the main drawing index.
- 2.4 A descriptive text shall be supplied with each diagram and should include the following:
- 2.4.1 Each item of equipment must have a distinct identification letter or number.
 - 2.4.2 Identification of all hydraulic equipment by name, catalogue number, serial or design number and manufacturer's name.
 - 2.4.3 Size of pipes (outside or inside diameter of pipes and wall thicknesses).
 - 2.4.4 Diameter of each cylinder and length or stroke.
 - 2.4.5 Pump input (kW power required) and speed.
 - 2.4.6 Pressure range and/or setting of all pressure operated components.
 - 2.4.7 The delivery at maximum working pressure for fixed displacement pumps.
 - 2.4.8 Reservoir capacity.
 - 2.4.9 Recommended fluid type and viscosity range as well as cleanliness limits.

-
- 2.4.10 Nominal capacity, speed range and torque rating of each hydraulic motor.
 - 2.4.11 Quantity, capacity and type of strainers and/or filters.
 - 2.4.12 Pressure test points.
 - 2.4.13 Identification of directional control valve spool positions.
 - 2.4.14 Flow rate and/or setting of flow controlling or operated components.
 - 2.4.15 Clear identification of all port connections, with the same identification as that marked on the equipment.
 - 2.4.16 Sequence of operations.
 - 2.4.17 Bleed points.
- 2.5 The service requirements, details and other information for all hydraulic equipment must be incorporated into the manuals as described in HE9/2/9.
- 2.6 All valves and accessories shall be plainly identified with the same identification as shown on the diagram.

3 GENERAL DESIGN REQUIREMENTS

- 3.1 All hydraulic system components shall be compatible with the hydraulic fluid used.
- 3.2 Under conditions of continuous operation, the pump inlet temperature of the fluid must not exceed 65°C. The equipment shall operate satisfactorily in an ambient temperature range of -5 °C to 45°C. (Relative humidity 100 %).
- 3.3 A pressure relief valve capable of relieving the maximum flow at the outlet of the pump shall be provided on the delivery side of the pump and there shall be no other valves between the pump and this relief valve. Where control valves in a closed position or any other circumstances which could result in an excessive hydraulic pressure in any component or circuit, pressure overload must be provided.
- 3.4 Hydraulic equipment shall be so designed that there is no external fluid leakage or ingress of air into it.
 - 3.4.1 Where the design is such that the ingress of moisture into the hydraulic fluid cannot be completely prevented, the design shall ensure that moisture is extracted from the system by means of a dryer device.

3.4.2 Bleed points shall be provided to release air which would otherwise cause malfunctioning of the system.

3.5 Each individual component in a hydraulic circuit shall be capable of functioning satisfactorily after being subjected to a static pressure of 50 % in excess of the maximum working pressure.

3.6 Piping shall not be used to support valves or other equipment where such mounting would over stress the piping.

3.7 All short stroke cylinder rods shall be protected by means of suitable bellows on longer stroke cylinders where this is not feasible, full details shall be submitted by the Tenderer on exactly what steps will be taken to minimise the effect of the aggressive environment on the cylinder rods.

3.8 Cylinders, motors and pumps shall be mounted in such a way that replacement of seals can be done in situ and without removing other equipment.

4 GENERAL CIRCUIT DESIGN REQUIREMENTS

4.1 All the hydraulic equipment and piping shall be so located or protected as to prevent damage from external forces and adverse atmospheric conditions. All piping must be insulated electrically from the structure.

4.1 Hydraulic circuits shall be designed so that load variations and changes in fluid temperature will not cause variations in the cycle time inconsistent with the service intended.

4.2 Where pressure testing points are necessary, they shall be provided in accessible positions clearly identified.

4.3 All equipment and piping shall be accessible and shall be mounted in a position that will permit adequate maintenance and adjustment. components must be removable without undue loss of fluid.

4.4 Hydraulic circuits shall be so designed that any failure of a pipe or joint in a circuit will not endanger the operation. All cylinders used for hoisting/luffing motions shall be fitted with burst pipe protection devices directly on the cylinder ports.

4.5 Hydraulic circuits for hoisting/luffing shall be fully redundant in terms of both the actuators and hydraulic supply. When a cylinder/pump fails, the motion must still be functional at full load but a reduced speed.

5 INSTALLATION REQUIREMENTS

-
- 5.1 All openings in hydraulic equipment shall be sealed, and all hydraulic reservoirs shall be thoroughly cleaned prior to installation.
 - 5.2 The bores of all piping and fittings shall be cleaned to ensure that all scale, swarf and foreign matter are removed prior to final assembly.
 - 5.3 Hydraulic power packs shall be mounted on a common base with a drip pan fixed underneath the machine to catch leaks and spills, with capacity at least equal to that of the pack. .

6 PUMPS AND MOTORS

- 6.1 Positive displacement pumps and motors are preferred.
- 6.2 Means are to be provided for filling or draining pump motor casings in accordance with the manufacturer's specifications.
- 6.3 When drive shafts of hydraulic pumps or motors are subjected to side loading, approval of the drive shall be obtained from the supplier of this equipment.

7 CYLINDERS

- 7.1 Cylinder shafts shall be of high quality stainless steel and protected by bellows against dust.
- 7.2 Double seals shall be used on all cylinders.
- 7.3 The end caps of big hydraulic cylinders shall be bolted to the cylinders to enable easy replacement of the seals.
- 7.4 All valves shall be suitable for continuous use in a highly corrosive marine environment, preferably stainless steel construction. Details to be provided with tender.

8 VALVES

- 8.1 Wherever possible, valves should be mounted so that their removal and replacement can be made without disconnecting pipe fittings.
- 8.2 Adjustable valves shall be such that their settings, when made, will be maintained against vibration.
- 8.3 Variable flow control valves shall show the direction of operation for increase and decrease of throughput.

-
- 8.4 Electrically operated control valves and other hydraulic control equipment shall be grouped and fitted in IP65 panels (as per electrical specifications). All pipes shall enter the panel from the sides or bottom only and through suitable pipe glands.

9 FLUID RESERVOIRS

- 9.1 The capacity of the fluid reservoirs shall be sufficient to contain at least all the fluid that can flow from the system into the reservoir, and maintain the fluid level at a safe working height to prevent cavitation in the pump during the operation cycle.
- 9.2 Reservoirs shall be equipped with flush mounted or protected fluid level indicators. They must be provided with markings indicating high and low levels with pump(s) running and high level with pump(s) stopped.
- 9.3 Reservoirs shall be constructed to prevent entry of foreign matter, including fluid contamination and moisture.
- 9.4 Both fluid intake and return points shall terminate sufficiently below the minimum fluid level to prevent aeration.
- 9.5 Ample and accessible provision shall be made for complete cleaning and filling of reservoirs. The bottom of the reservoir must be shaped in such a way that emptying and cleaning is easily facilitated.
- 9.6 Filler holes shall have strainers which do not unduly restrict the filling process, fixed such that hand tools are required for removal, and shall also be provided with well fitting caps. The breather hole on the reservoir must be protected by an air cleaner with replaceable filter.

10 FILTERS

- 10.1 The system shall have a "Rosean Tell-Tale", "Fawcett" or similar, full flow, hydraulic filter with electric light or mechanical flag indication. This filter may be fitted either in the intake, pressure or return lines (subject to the filter's limitations), and shall have a 10 μ m filtration. Hydraulic coping valves and sensitive servo valves shall be supplied with hydraulic fluid via a 5 μ m pressure line filter. A mesh, with 0, 16 mm aperture (or finer), screen shall be fitted to the pump intake except when the main filter is fitted at that point.
- 10.2 Where swash-plate type hydraulic pumps are used, a 6 μ m pressure line filter shall be fitted.
- 10.3 All filters shall be easily accessible for replacement without draining the reservoir and/or system.

-
- 10.4 Junctions shall be provided in the hydraulic system for the testing of both the circuit and the hydraulic pump.
 - 10.5 A suitable magnet should also be fitted in the bottom of the reservoir between the return side of the reservoir and the suction strainers. Magnets shall be easily removable for service.

11 SEALING DEVICES

- 11.1 All sealing devices shall be of materials which are compatible with the hydraulic fluid and operating conditions.

12 PIPING, FITTINGS AND FASTENERS

- 12.1 Where-ever practical, rigid piping must be used in lieu of flexible hoses.
- 12.2 Due to the corrosive conditions copper alloy, nickel alloy or stainless steel piping must be used.
 - 12.2.1 Copper alloy piping must comply with the latest version of BS EN
 - 12.2.2 Nickel alloy piping must comply with the latest version of BS 3074.
 - 12.2.3 Stainless steel piping must comply with the latest version of BS EN 10216-5
- 12.3 Flexible hoses and couplings shall be in accordance with the requirements of BS ISO 12151 (Latest) or BS EN 853
- 12.4 Piping between actuating and control devices shall be as short as possible and pipes must be removable without dismantling equipment, components or adjacent piping. All rigid piping shall be securely supported to minimise vibration or movement. The length and method of supporting flexible piping shall be such as to avoid sharp flexing and straining, particularly at end fittings.
- 12.5 All hydraulic connectors and adaptors shall have dimensions complying with the latest version of BS 5200.
- 12.6 Only compression fittings must be used throughout (no capillary fittings).
- 12.7 All fittings and couplings shall be corrosion resistant, preferably brass, CUPRO-NICKEL alloy or stainless steel. Surface treated steel fittings are not acceptable.
 - 12.7.1 Copper and copper alloy fittings must conform to the latest version of *these were withdrawn in August 2013, no new standard yet.*

12.7.2 Braided Stainless steel fittings must conform to the latest version of BS4368.

12.8 All saddles and other accessories for fixing the hydraulic components to a structure shall be corrosion resistant and UV stabilised (where applicable). All threaded and other fasteners shall be stainless steel.

12.9 Long pipe runs shall be broken up into sections by flanged connections and manual shut-off valves where necessary.

13 SERVICE LIFE OF HYDRAULIC EQUIPMENT

13.1 All hydraulic equipment shall be designed to last the design life of the machines they are fitted on.

13.2 The following minimum service intervals shall be guaranteed unless otherwise specified:-

13.2.1 Filter change: 5 000h

13.2.2 Hydraulic oil changes: 10 000h


13.2.3 Overhauls of pumps, motors and cylinders: 10 000h

---OOo---

END OF SPECIFICATION HE 9/2/2 [Version6]

---OOo---

**Annexure B - EEAM-Q-003 SPECIFICATION
FOR STEEL WIRE ROPES (HE9-2-3 Ver4)
rev 1-wcs**

REVISION 0	REFERENCE EEAM-Q-003			
DOCUMENT TYPE: SPECIFICATION				
TITLE: SPECIFICATION FOR STEEL WIRE ROPES			PAGE 0 of 02	
COMPILED BY: QUALITY MANAGER (COE) KRIS NAIDOO Date: _____		REVIEWED BY: ENGINEERING MANAGER (COE) JESSENDRAN PILLAY Date: _____		REVIEWED BY: PRINCIPAL ENGINEER (COE) ROFHIWA TAKALANI Date: _____
REVIEWED BY: CHIEF ENGINEER (COE) SABELO MZIMELA Date: _____			AUTHORIZED BY: GENERAL MANAGER ENGINEERING JOSIAH MPOFU Date: _____	
FUTURE REVISION RECORD NUMBER	DESCRIPTION OF REVISION	APPROVAL	DATE	
Revision -1-	Point (3) rectified (s) for shall was missing			
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KEYWORDS STEEL WIRE ROPES		DATE OF LAST REVIEW: N/A DATE OF NEXT REVIEW: 2019-02-01		

1.0 STEEL WIRE ROPES

**SPECIFICATION HE 9/2/3
[Version 4]**


March 1999

1. The steel wire ropes shall conform to a recognised international specification.
2. The ratio of the diameter of the rope to the diameter of the rope drums and sheaves, over which the rope passes shall be as laid down in Clause 4.2.3 of FEM
3. Ropes used in cranes shall also comply with BS EN 12385-1 (Latest)
4. All steel wire ropes used must be freely obtainable from local suppliers.
5. The ropes shall be tested and a test certificate issued by an approved organisation must be supplied with the ropes.
6. Tenderers must supply the following information for all the wire ropes offered:-
 - 6.1. Construction
 - 6.2. Type of lay
 - 6.3. Finish
 - 6.4. Type of core
 - 6.5. Tensile grade of steel wire
 - 6.6. Nominal diameter (mm)
 - 6.7. Minimum breaking force (kN)
 - 6.8. Estimated mass/metre (kg/m)
 - 6.9. International specification to which steel wire ropes have been manufactured
 - 6.10. Expected life of rope
 - 6.11. Recommended fabrication of rope
7. Detailed reeving instructions must be included in the maintenance manuals (ref. HE9/2/9)
8. The length of each piece of rope as fitted in the equipment must be listed in the maintenance manuals (reference HE 9/2/9)

---oOo---

END OF SPECIFICATION HE 9/2/3 [Version 4]

**Annexure C - EEAM-Q-004 SPECIFICATION
FOR GEARING, SHAFTS, BEARINGS,
BRAKES, LUBRICATION, VEE-BELTS, KEYS
AND KEY WAYS HE9-2-4Ver 4() rev 1)-wcs**

REVISION 0	REFERENCE EEAM-Q-004		
DOCUMENT TYPE: SPECIFICATION			
TITLE: SPECIFICATION FOR GEARING, SHAFTS, BEARINGS, BRAKES, LUBRICATION, VEE-BELTS, KEYS AND KEYWAYS		PAGE 0 of 5	
COMPILED BY: QUALITY MANAGER (COE) KRIS NAIDOO Date: _____	REVIEWED BY: ENGINEERING MANAGER (COE) JESSENDRAN PILLAY Date: _____	REVIEWED BY: PRINCIPAL ENGINEER (COE) ROFHIWA TAKALANI Date: _____	
REVIEWED BY: CHIEF ENGINEER (COE) SABELO MZIMELA Date: _____		AUTHORIZED BY: GENERAL MANAGER ENGINEERING JOSHIAH MPOFU Date: _____	
FUTURE REVISION RECORD NUMBER	DESCRIPTION OF REVISION	APPROVAL	DATE
Revision -1-	OEM specified grade & availability clause 5.7		
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KEYWORDS GEARING, SHAFTS, LUBRICATION VEE BELTS		DATE OF LAST REVIEW: N/A DATE OF NEXT REVIEW: 2019-02-01	

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4. BRAKES		3
5. LUBRICATION		4
6. VEE BELTS		5
7. KEYS AND KEYWAYS		5

1. SCOPE

- 1.1. This specification covers TPT's requirements for gearing, shafts, bearings, brakes, lubrication, vee-belts, keys and key ways.

2. GENERAL

- 2.1. All spur gearing shall be straight or helical spur of standard tooth form having a 20° pressure angle of standard module, machine cut to, BS ISO 21771 and having ample width of face for strength and wear. Other standards will be considered, but must be specified.

The pinions are to be cut from solid blanks of heat treated nickel-chrome steel of suitable composition, and the gear wheels are to be of normalised high carbon cast steel, carbon 0,4 % minimum to 0,45 % of tensile strength not less than 590 Mpa.

- 2.2. BS ISO 21771 / Latest Edition, shall be worked to generally in regard to design and tolerances, For strength all gears shall be designed for 1,8 x full load, and for wear 0,6 x full load, with the combined speed factors Xb and Xc of charts 10 and 11 respectively, of B.S. 436, for a running time of 6 hours.
- 2.3. All gearing shall be suitably heat treated. It is desired to have the wear factor of the gearing as high as practicable in order to reduce maintenance.
- 2.4. As far as practicable, all gearing shall be totally enclosed and operated in oil baths. Sight glasses or dipsticks to indicate the oil level must be fitted. All gearing not totally enclosed shall be guarded where necessary. Where practicable, all gears must be supported between bearings, none being overhung. A full detailed specification of all gearing must be given when tendering, together with details of diametral pitch and width of all gearing. Particular care must be taken to ensure that the seals provided for the gearboxes effectively exclude grit and prevent leakage of the oil where the shafts protrude through the casing. It should be noted that helical or straight spur gearing is preferred.

- 2.5. Where it is not possible to "age" the castings for cast iron gearboxes by weathering them for an adequate period before machining, they must be stress-relieved by heat-treatment at 450/590°C. It is preferred that the boxes be rough machined before stress-relieving. Suppliers will be required to guarantee that the gearboxes supplied will not warp in service.

Dowels or fitted bolts must be used to ensure the alignment of the top and bottom halves of gearboxes.

- 2.6. All worm gearing shall have worm wheels having phosphor bronze rims and the worms are to be of 3, 5 % nickel or nickel chrome case hardened steel and shall conform generally to B.S. 721/Latest Edition, in regard to design and tolerance.
- 2.7. Provision must be made to eliminate noise, as far as practicable from the motors and gearing.
- 2.8. Flexible couplings shall be provided between each motor and its extension shaft, and the tenderers must give particulars of the type they propose to supply.

3. SHAFTS AND BEARINGS

- 3.1. All shafts shall be of suitable mild steel, the quality of which is to be specified by the tenderer, in accordance with the British Standard series of steels.
- 3.1.1. All shafts shall be carried on precision ball and/or roller bearings, which shall be of the self-aligning type where necessary.
- 3.2. All bearings shall be of the anti-friction ball or roller type, mounted in dust proof housings, and shall be lubricated by oil bath or grease gun.
- 3.2.1. Bearings must have a lifetime, which is compatible with the lifetime of the mechanism.

4. BRAKES

- 4.1. An efficient and ample braking system for all motions, consistent with the requirements of maximum safety and compliant with design code requirements must be provided, full particulars of which must be furnished by tenderers. Tenderers are to note that it is desirable that the mechanical parts should not be adversely affected by the sudden application of brakes.
- 4.2. Tenderers are to note that all braking systems are to be so designed that brakes may be readily inspected, adjusted and/or removed for overhaul, without resorting to stripping of major components such as motors, etc.
- 4.3. All brakes shall have manual release levers, with a means to prevent unauthorized Crane operation.

- 4.4. Where specified brakes shall be equipped with an individual brake mounted monitoring/diagnostic device linked into the Crane Management System.
- 4.5. Disk brakes shall have automatic wear compensation and sintered linings.

5. LUBRICATION

- 5.1. All bearings on shafts, axles, etc., and other bearings wherever practicable, must be arranged for lubrication by a positive grease lubrication system using an efficient button type nipple which will allow the grease gun being attached by the operator to the nipple and left hanging on the nipple, so that if necessary he can use both hands in shifting his position to get better command when screwing down the grease gun in difficult positions.

Parts difficult to access should be provided with spring feed lubricators of an approved type.

- 5.2. Particular attention should be given to provide straight or angle nipples, as the case may be, making it as easy and safe as possible for the operator to grease the bearings efficiently. Full particulars shall be furnished by tenderers of what they propose to supply in this connection.
- 5.3. All lubricating nipples shall be of the hexagon type in accordance with either types Nos. 11A or 11E under Table 1 of B.S. No. 1486 Part 1/ (withdrawn, no supersede) Edition, and shall be spaced for the "hook-on" type of lubricating connector as reflected under Table 10 of the above mentioned specification.
- 5.4. The arrangement of the lubrication system shall be such that all greasing points are brought out to common batteries which are easily accessible.
- 5.5. Where grouped lubrication is used the diameter of the piping used must be ample and in no case shall they be less than 8 mm outside diameter.
- 5.6. Only stainless steel or copper piping and brass fittings shall be used. Copper piping must be protected from physical damage.
- 5.7. Tenderers shall supply the following information regarding all lubricants to be used on the appliance:-

Application: (E.g. crank-case hydraulic system, gearbox etc.)	Lubricant normally recommended by tenderer (Not more than 2 brands per application to be given)	
	Local available (grade –equivalent)	OEM Specified grade
1.		
2.		

3.		
4.		
5.		
6.		

6. VEE BELTS

- 6.1. Vee belts and pulleys shall be to an established standard and such standard stated. The sizes, code numbers, name and address of manufacturer and the source of supply ex stock in the Republic of South Africa of all vee belts offered shall be stated.

7. KEYS AND KEYWAYS


- 7.1. All keys and keyways shall be in accordance with B.S. 4235: Part 1 / Latest. No shimming of taper keyways will be allowed.

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END OF SPECIFICATION HE 9/2/4 [Version 4]

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**Annexure D - EEAM-Q-006 SPECIFICATION
FOR STRUCTURAL STEEL WORK (HE9-2-
6Ver 9) February 2005-wcs-C**

REVISION 0	REFERENCE EEAM-Q-006		
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FUTURE REVISION RECORD NUMBER	DESCRIPTION OF REVISION	APPROVAL	DATE
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KEYWORDS STEEL WORK		DATE OF LAST REVIEW: N/A DATE OF NEXT REVIEW: 2019-02-01	

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STRUCTURAL STEELWORK

**SPECIFICATION HE9/2/6
[Version 9] February
2005**

1. SCOPE

- 1.1. This specification covers TPT's requirements for the design, manufacture and erection of structural steelwork for dynamic structures like cranes, including associated components.

2. GOVERNING CODES AND STANDARDS

ANSI/AWS D1.1: Structural Welding Code – Steel

BS-EN 287 Part 1: Approval testing of welders/fusion welding

BS EN ISO 15614-1:2004+A2:2012 Specification and qualification of welding procedures for metallic materials. Welding procedure test Arc and gas welding of steels and arc welding of nickel and nickel alloys

BS EN 1011-2:2001 Welding. Recommendations for welding of metallic materials Arc welding of ferritic steels

BS EN 10025 Hot rolled products of structural steels

BS 2573: Part 1: Classification, stress calculations and design of structures

BS EN ISO 17640:2010 Non-destructive testing of welds. Ultrasonic testing. Techniques, testing levels, and assessment

BS EN ISO 17636-2:2013 Non-destructive testing of welds. Radiographic testing X- and gamma-ray techniques with digital detectors

DIN 1026	Metric channels
ISO R657	Angles
BS EN 14399-7:2007	High-strength structural bolting assemblies
BS EN ISO 898-1:2013	Mechanical properties of fasteners made of carbon steel and alloy steel Bolts, screws and studs with specified property classes. Coarse thread and fine pitch thread
BS 3692:2001	ISO metric precision hexagon bolts, screws and nuts. Specification
BS 4620:1970	Specification for rivets for general engineering purposes

3. STRUCTURAL STEELWORK

- 3.1. The design of all structural steelwork shall be such as to provide a robust and rigid structure requiring the minimum of maintenance and providing a long service life.
- 3.2. In the design of steel structures, due cognisance shall be taken of environmental and wind load conditions as specified in the main specification.
- 3.3. Due to the highly corrosive conditions experienced in Transnet Port Terminals, the permissible stresses shall not exceed those set out in British Standard No. 2573 or other applicable standard as agreed with TPT. The minimum thickness of steel for load bearing members shall be 15mm for gussets, 10mm for angles, tees, plates and flats and 9mm for webs of channels and joists. Punching of holes over and above that permitted in BS 2573, shall not be permitted. Other structural steel shall be of not less than 6 mm thickness.
- 3.4. The design of mobile structures shall be such that the induced von Mises stress (effective stress in triaxial loading) will not exceed 90% of the elastic limit strength of the steel when the equipment is travelling at maximum speed and colliding with either other stationary equipment or fixed stop blocks. In calculating von Mises stresses, due cognisance must be taken of stress concentrations. If the elastic limit strength of the steel is not known, it will be determined by using a 0, 2% strain offset on the stress-strain curve of the material.

- 3.5. Where applicable, the design may be in bolted, riveted or welded box construction except that no site welding will be permitted in the final erection at the port except with the approval of TPT's Engineer.
- 3.5.1. Alternatively, a welded hollow section lattice type structure will be acceptable, subject to the following requirements:
- 3.5.1.1. The members must be structural sections manufactured from grade S275J0 weldable structural steel complying with BS EN 10025, or better... The hollow sections can either be seamless for all sizes or welded for sizes above 114.3mm outside diameter.
- 3.5.1.2. Tube wall thickness must not be less than 6mm.
- 3.5.1.3. All joints must be completely seal welded in accordance with BS EN 1011-2:2001. Special care must be taken to prevent the ingress of moisture into hollow section members by ensuring that each member is airtight. TPT reserve the right to request evidence of airtightness.
- 3.5.1.4. Bolted or screwed attachments which require drilled holes through a hollow section will not be permitted, unless a welded sleeve. Passing through the complete section, is used.
- 3.5.1.5. Non-hollow structural sections and plate used on the structure, in conjunction with the hollow section framework, must comply with the relevant requirements of this specification.
- 3.6. All steel sections shall be manufactured in accordance with the following standards: -
- | | |
|--|---------------|
| Weldable structural steel: | BS EN 10025 |
| I and H sections: | BS 4 Part 1 |
| Metric channels: | DIN 1026 |
| Structural steel, hot rolled sections: | BS 4 Part 1 |
| Angles: | ISO - R657 |
| Hot finished hollow sections: | BS EN 10210-2 |
| Cold formed sections: | BS EN 10219-2 |
| Forgings: | BS EN 10250-2 |
| Steel castings: | BS EN 10293 |
| Cast iron: | BS EN 1561 |
- 3.7. All steel plates and rolled steel sections used in the construction of the structures shall be of steel made by the open hearth process (acid or

basic) and shall comply in every respect with BS EN 10025 quality Structural Steel for Bridges and General Building Construction, Grade S275JR or Grade S355JR. That is, the percentage of phosphorous and sulphur shall not exceed 0, 06.

- 3.7.1. The above is laid down as a standard, but tenders will also be considered for rolled steel not conforming strictly to the above standard provided an internationally recognised alternative is proposed and accepted. Full particulars of the guaranteed properties of the steel tendered for should in this case be furnished, i.e. chemical composition, tensile strength, yield point, reduction in area, bend tests, etc.
- 3.7.2. All welded steel must have a maximum Carbon equivalence (CEV) of 0.41
- 3.8. Forgings and drop forgings shall be free from flaws and surface defects of any kind and be accurately finished to the prescribed dimensions.
- 3.9. Steel castings shall be sound, clean and free from all defects and distortion of any kind and should, except where otherwise specified, conform with the conditions and tests specified in BS EN 10293, ~~for~~ according to requirements. They shall be thoroughly annealed and all working parts and bearing surfaces shall be machined and turned accurately with correct finish.
- 3.10. Cast iron used throughout must be close grained, tough and free from all defects, and shall conform with the conditions and tests specified in BS EN 1561 according to requirements.
- This applies to functional components only. A lower grade is acceptable for portal and machinery house ballast. Tenderers to state grade of cast iron proposed.
- 3.11. The dimensional and out-of-square tolerance as specified in the above Standards shall also apply to built-up components. Edge preparations, welding techniques, straight beds and material fit-up shall be considered when welded joints are designed.
- 3.12. The shape of all members and connections must allow easy accessibility for maintenance painting of all surfaces. No members shall comprise a double member which cannot be painted and maintained.
- 3.13. Structural details must be so designed as to eliminate or seal off any cavities or pockets where water or condensation could collect and promote corrosion. Horizontal members with upstanding flanges require special drainage.
- 3.14. All hollow sections shall be completely closed and airtight, and all welding is to be of such size and quality as to ensure complete airtightness. No tapping or drilling of holes into sealed sections will be permitted.

4. WELDING

- 4.1. All the provisions of BS EN 1011-2 shall be complied with as far as applicable.
- 4.2. Design of weld joints shall be such that crevices, overlaps, pockets, arc strikes and dead ends do not exist.
- 4.3. All joints shall be completely seal welded in accordance with BS EN 1011-2:2001. Special care must be taken to prevent the ingress of moisture into the tubular members by ensuring that each such tubular member is airtight. "Stitch" welding will only be permitted inside sealed sections. Otherwise only continuous welding will be accepted.
- 4.4. Weld cracks, undercut, or pock marks will not be accepted.
- 4.5. All welds on the load bearing frame structure, containers, piping, pipe line flanges, etc., shall be continuous and shall be visually inspected for cracks and other discontinuities.
- 4.6. Welds on the main chords must be tested ultrasonically in accordance with BS EN ISO 17640 or X-rayed in accordance with BS EN ISO 17636-2 and those on minor joints by the dye-penetrant or Magnetic Particle methods. The equipment required for these tests must be supplied by the Contractor and the testing done at his cost.
- 4.7. Steel, except in minor details, which has been partially heated, shall be properly annealed. (Electrically welded structural members accepted.)
- 4.8. All brackets, clamps, lugs, straps, suspenders, etc. required for attaching mechanical and electrical equipment must be welded on prior to erection and special precautions must be taken not to damage welds or puncture tubes during erection.
- 4.9. The welding of all rails shall be done by an approved method.
- 4.10. Welding shall only be carried out by a coded welder according to BS-EN 287 Part 1 and procedures to BS EN ISO 15614-1 or ANSI/AWS D1.1.
- 4.11. All parts to be welded shall be thoroughly cleaned and dried before welding. The welding will only be done in dry surroundings and all steps taken to prevent hydrogen embrittlement.
- 4.12. Where materials of different compositions are joined by welding, especially carbon steel to chrome steel, the filler welding method and post welding treatment shall be such that embrittlement and other degradation of both steel and filler are prevented.
- 4.13. It must be ensured that welded joints are ductile.

5. **FASTENERS**

- 5.1. All bolts, nuts and rivets shall be manufactured in accordance with the following standards (or internationally recognised equivalents): -

Precision bolts and nuts Grades 4.6 8, 8: & 10.9 BS EN ISO 898-1

Friction Grip Bolts and nuts Grade General: EN 14399-7

Rivets: BS 4620:1970

- 5.2. All fasteners (excluding friction grip) shall be hot dipped galvanised (and their nuts and washers), structural rivets and Huck Bolts.
 - 5.2.1. All holding down bolts and nuts and brackets, as well as all fixing bolts, washers, studs and nuts, less than 12mm diameter shall be of stainless steel. Fixing rivets shall be of either stainless steel or brass.
- 5.3. Bolts and setscrews shall be locked in an approved manner and shall not be stressed in tightening to beyond the recommended loads.
- 5.4. The quality of friction grip bolts, nuts and washers, bolt lengths, sizes of holes, tightening standards, surface condition of clamped components, shop and site assembling and acceptance inspection of friction grip joints shall comply with the latest edition of BS EN 14399-7.
- 5.5. Certificates shall be supplied for all bolts of grade 8.8 and 10.9.
- 5.6. All bolt and rivet holes must be accurate to size and location, the centres of holes shall not be placed nearer the edge of a plate than 1, 5 diameters with an extra allowance of 3mm for sheared edges. All holes in the structural work shall be drilled or otherwise punched to a diameter not exceeding 1,5mm less than the diameter of the finished hole on the die side, and afterward reamed out to the exact size

Where possible the adjoining parts forming a connection shall be drilled or reamed together, with holes not exceeding 1, 5 mm diameter greater than the rivet or bolt for which it is made. No rough or broken edge shall be left around any of the holes.
- 5.7. For turned and fitted bolts, the holes shall be accurately drilled or reamed, the diameter of the hole shall not exceed the finished diameter of the bolt by more than 0,25mm.
- 5.8. The holes, after assembly of the parts, shall be true throughout the thickness of all the parts and perpendicular to the axis of the member.
- 5.9. Rivets shall be cup-headed or countersunk as required, unless otherwise specified. No rivet head shall contain less metal than does a length of the rivet equal to 1, 25 times its diameter. All loose and defective rivets shall be cut and replaced by sound ones; also others when required for the purpose of examining the work. Rivets shall be driven with pressure tools whenever possible and pneumatic hammers shall be used in preference to hand driving.
- 5.10. All field rivets must be supplied with shanks of suitable length for pneumatic riveting.
- 5.11. Bolts shall be of such length as to accommodate a full nut and washer when tightening up, and protrude a minimum of two thread pitches

beyond the nut. Excessive projection of threads beyond the nut must be avoided. Bolts that are flush or under top of nut are not acceptable.

- 5.12. All bolts having countersunk heads shall have strong feathers forged on the neck and head to prevent turning and the bolt holes shall be cut to receive same. All nuts and bolts (excluding countersunk bolts) shall be furnished with circular washers of sufficient thickness, the outside diameter being at least twice the nominal diameter of the bolt, and washers fitted correctly.
- 5.13. Where bolt heads or nuts are seated on bevelled surfaces of beams or channel flanges, appropriate bevelled washers must be inserted.

6. JOINTS AND MATING SURFACES OF MEMBERS

- 6.1. Mating surfaces of members to be joined by high tensile steel bolts in friction grip shall be cleaned and primed as specified for the rest of the steelwork. Mating surfaces shall lay flat against each other to eliminate gaps which may allow ingress of water. After joining, the edges shall be sealed with an approved brand of Butyl/ Rubber sealing compound by means of a suitable caulking gun, or shall be seal welded.
- 6.2. Other joints shall be formed by one of the following methods:
 - 6.2.1. The mating surfaces of members shall be blast cleaned, primed and protected prior to sub-assembly by the liberal application of caulking compound. While the compound is still wet, the members shall be bolted together and caulking compound which is squeezed out shall be completely removed.
 - 6.2.2. The mating surfaces shall be protected with the full corrosion protection system as specified, the surfaces joined together and the joint so formed shall be sealed with butyl rubber sealer.
 - 6.2.3. After being cleaned and primed the surface shall be joined together and the joint so formed shall be seal welded.
- 6.3. The primer coating on mating surfaces must be applied not more than 4 hours after cleaning and the edges must be sealed within 3 weeks of assembly of the part.

7. FABRICATED PARTS

- 7.1. All fabricated parts shall be properly fitted during assembly to result in properly aligned equipment having a neat appearance. Fabrications of load bearing members shall have no abrupt changes in cross section and regions of severe stress concentration. All sharp corners accessible by personnel during erection or operation shall be ground, rounded, or removed by other methods. Burrs, welding spatter and stubs of welding wire shall be removed.

8. BALLAST OR COUNTER MASS

- 8.1. Tenderers must include for the supply of all necessary ballast or counter mass.
- 8.2. These must preferably be of cast iron and be removable for maintenance of structural steelwork.
- 8.3. Concrete ballast is not recommended but will be accepted provided the Tenderer satisfies TPT that it will not cause corrosion of any steel parts.
- 8.4. Fastenings used for removable pieces must be of non-corrosive material.
- 8.5. Ballast must be in suitable shapes to be secured in position against movement but in sizes easily removable for maintenance.
- 8.6. Lifting hooks or eyes of non-corrosive material and of adequate strength must be provided in the removable ballast pieces.
- 8.7. Concrete ballast must be reinforced so as to prevent cracking or breaking, and must be coated with an approved corrosion protection system for concrete.

9. STAIRS, LADDERS, PLATFORMS AND WALKWAYS

- 9.1. Platforms, stairways, walkways, hatches and ladders, shall be provided where necessary to give easy access to all parts of the equipment for inspection, maintenance and lubrication purposes (including the insides of all box sections if inspection covers are provided).
- 9.2. All access shall comply with the requirements of BS EN ISO 14122 (Safety of Machinery – Permanent means of access to machinery)
- 9.3. The hand rails and ladders shall be complete with stanchions, knee rails, back hoops, mounting brackets etc. and shall be manufactured in sections which are hot-dipped galvanized and painted and bolted onto the structure.
 - 9.3.1. The handrail shall have a minimum diameter of 25mm and shall not be less 1100 mm above the platform level. Toe boards shall not be less than 150mm high.
- 9.4. Stairs shall be inclined no more than 45° to the horizontal and shall be broken at suitable intervals by platforms.
- 9.5. Stairs and walkways shall not be less than 700 mm wide and working areas around drives etc. shall be of sufficient size to allow for ease of maintenance.
- 9.6. Vertical ladders must be provided with back hoops.
- 9.7. Trap doors and hatches must be of light, but robust, construction, suitably hinged with stainless steel hinges and provided with a catch to

keep them in the open position, if necessary. Trap door openings are to be protected by means of toe boards and removable handrails.

- 9.8. All external platforms, stair treads and walkways shall be hot dipped galvanised open grating construction, similar to Andrew Mentis "Rectagrid" type RS40 to allow for free drainage and avoid the accumulation of water and dust. Bearer bar thickness shall not be less than 4, 5 mm. The top surface shall provide for adequate grip to avoid underfoot slipping.
- 9.9. TPT's prior approval is required for all external platforms and walkways where open grating cannot be used. This will only be permitted where the primary purpose of the walkway/platform is for maintenance purposes. All such surfaces are to be provided with a non slip surface coating.
- 9.10. No obstructions or sudden changes in levels will be permitted on walkways.

10. **MACHINERY AND ELECTRICAL HOUSES AND OPERATOR'S CABINS**

- 10.1. Where required, separate, self contained fully weather proof machinery and electrical houses as well as operators cabins shall be provided. The houses shall be of the steel framed metal clad type, and shall allow ample space and strength for all equipment and control panels housed therein, permitting unrestricted access to all equipment for routine service and maintenance. Headroom shall not be less than 2, 13 metres. A minimum of 700mm working space must be provided around all machinery and in front of all panels.
- 10.2. The major items of machinery, electrical equipment and panels shall be so arranged that it can be removed for repairs or replacement without disturbing the walls, roof, floor or structural framework and furthermore shall be so arranged that full access to all holding down bolts is provided from inside the house.
- 10.3. For electrical houses both the inner and outer cladding must be stainless steel, unless otherwise approved. Side cladding plates are to be joined with butting joints with butt cover straps where required (no lap joints), and the plates must be in as large sizes as practicable to reduce the number of vertical joints, and to eliminate horizontal joints. Alternatively cladding may be welded to the frame and all joints completely seal welded. All angles around windows are to be suitably joggled to obtain a waterproof and flat surface butting on the side sheets. The whole of the framing shall be well stayed and fixed on its base. Air-conditioned electrical houses shall be provided with thermal insulation material of an approved type between the cladding.
- 10.4. Machinery houses must be cladded with prepainted Aluminium sheeting, minimum thickness 0.8 mm, colour coated with the appropriate colour. The profile and fastenings must be suitable for the spans and wind uplift forces corresponding to the windspeeds stated in the main specification. Flashing, corner trim, closure pieces ridge

cappings etc. shall consist of prepainted Aluminium of minimum thickness 1.2mm

10.4.1. Sheeting fasteners shall be 6.3 mm grade 304 stainless steel self-tapping screws with hexagonal washer heads.

10.4.2. Galvanic isolation rubber strips shall be used between the metal frame and Aluminium cladding, and between the fixing screws and the cladding.


10.5. Both machinery and electrical houses shall be provided with two access doors, sealed to suit pressurisation and/or air-conditioning, one on each side of the house, arranged for external locking, but allowing exit from the inside without a key. Rain guards must be provided above external doors.

10.6. Operator's cabins shall be fully constructed from 3CR12 or similar type stainless steel. Cladding shall be welded to the frame and shall be smoothed over to provide an aesthetic appearance. The cabin shall be insulated from the heat of the sun with an approved material. A stainless steel or similar material door with a robust industrial type door lock shall be provided. The door must be lockable from the outside, but must allow exit without a key from the inside.

10.7 All windows shall be of solar heat reducing toughened safety glass.

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END OF SPECIFICATION HE9/2/6 [Version 9]
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**Annexure E - EEAM-Q-008 SPECIFICATION
FOR CORROSION PROTECTION
(HE9_2_8VER 17)-wcs-C**

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1. SCOPE

- 1.1. This specification covers Transnet Port Terminals requirements for protective coating of iron and steel structures, electrical motors, gear boxes etc. against corrosion and must be read in conjunction with the main specification as well as the following (latest editions):-

BS EN ISO 8502 "Preparation of steel surfaces for coating"

BS EN ISO 1461 "Hot-dip (galvanized) zinc coatings"

BS 5252 "National colour standards for paint"

BS 5493 "Code of practice for protective coating of iron and steel structures against corrosion"

2. TYPES OF CORROSION PROTECTION TO BE USED

- 2.1. The coatings specified in this specification are chosen according to BS 5493 Table 3, part 9, to ensure that the condition of the surface will be at least RE2 on the European scale of degree of rust, after 10 years in a environment of frequent salt spray, chemicals and polluted coastal atmosphere. During the 10 years, the normal maintenance painting will be done.
- 2.2. The paint manufacturer shall guarantee the paint for at least 10 years.
- 2.3. Should a tenderer wish to offer coating systems other than those specified, as an alternative, he shall submit full technical details and a list comparing all appropriate details of the alternatives proposed, with the original specified.
- 2.4. Tenderers must ensure that the different coats they offer in their tenders are compatible with each other.
- 2.5. The coating of proprietary items must be done according to Clause 3.
- 2.6. All galvanized components including bolts and nuts but excluding walkway gratings, must be painted with the specified system, unless otherwise approved.

The following coating systems must be used unless otherwise specified in the main specification:-

Substrate	Coat No	Generic Description	Approved Brand Products	Dry Film Thickness (µm)
3CR12 steel (EN 10088)	1	Surface tolerant epoxy primer	DULUX /SIGMA Sigmacover primer 7413 INTERNATIONAL (PLASCON) Intergard 269 STONCOR (CHEMRITE COATINGS) Carboline 193 Primer	65-75
	2	Two component recoatable, polyurethane finish (Gloss)	DULUX / SIGMA Sigmadur gloss 520 INTERNATIONAL (PLASCON) Interthane 990 STONCOR (CHEMRITE COATINGS) Carboline 134	65-75
Galvanized Steel	1	Surface tolerant epoxy primer	DULUX /SIGMA- Sigmacover primer 7413 INTERNATIONAL (PLASCON) Intergard 269 STONCOR (CHEMRITE COATINGS) Carboline 193 Primer	65-75
	2	Two component recoatable, polyurethane finish (Gloss)	DULUX /SIGMA- Sigmadur gloss 520 INTERNATIONAL (PLASCON) Interthane 990 STONCOR (CHEMRITE COATINGS) Carboline 134	65-75
Substrate	Coat No	Generic Description	Approved Brand Products	Dry Film Thickness (µm)
Mild steel	1	Two component self curing inorganic zinc ethyl silicate OR two component zinc rich polyamide cured	DULUX /SIGMA- Sigma Sigma zinc 160 OR Sigma-cover primer	65-75

	epoxy primer	INTERNATIONAL (PLASCON) Interzinc 52	
		STONCOR (CHEMRITE COATINGS) Carbo Zinc 11 OR Carbo- Zinc 658 Primer	
2	Flexible recoatable high build polyamide cured MIO epoxy	DULUX/SIGMA – Sigmacover CM 456	125-150
		INTERNATIONAL (PLASCON) Interseal 670	
		STONCOR (CHEMRITE COATINGS) Carboline 193	
3	Two component recoatable, polyurethane finish (Gloss)	DULUX/SIGMA Sigmadur gloss	65-75
		INTERNATIONAL (PLASCON) Interthane 990	
		STONCOR (CHEMRITE COATINGS) Carboline 134	

- 2.7. The paint manufacturer's recommendations for the application of the different coating systems, curing time before handling or application of subsequent coats, health and safety recommendations etc. must be carefully adhered to.
- 2.8. Paint contractors must have a quality management system which must be submitted to the Engineer for approval before commencement of the work.
- 2.9. Galvanizing shall be done to BS EN ISO 1461 heavy duty hot dip galvanizing to a thickness of at least 85µm. Electroplated components in zinc or cadmium are not acceptable.
- 2.10. All mounting bolts, nuts, washers and brackets as well as all fixing bolts, studs nuts and washers, less than 12mm, shall be of stainless steel. Fixing rivets shall be of either stainless steel or brass.
- 2.11. High tensile bolts for friction grip joints must not be galvanised and must be primed and painted after installation. High tensile bolts must be certified.
- 2.12. The full paint system shall be applied to all surfaces except for wear pads, linings etc., which are to be covered with appropriate protection.
- 2.13. For steelwork which will be transported over long distances and erected on site the two pack epoxy primers is preferred.

3. **PROPRIETARY ITEMS**

- 3.1. Proprietary items such as gearboxes, motors, brakes etc. must either be painted according to this specification or where the coating system is equal to or exceeds this specification sufficient proof of the coating system applied must be provided. Items which are nearly equal to this specification shall be given a finishing coat according to this specification's thicknesses and final colours and to the following procedure:-
 - 3.1.1. A cross cut test must be done to BS EN ISO 2409 to determine if the original coating adheres correctly to the substrate;
 - 3.1.2. The original coating shall be rubbed down to remove any smooth finishing to form a suitable key for the finish coat and any damaged areas prepared and patch primed with a suitable primer;
 - 3.1.3. The item must then be detergent washed to remove any foreign matter, taking care that no dust, solvent etc. contaminates any working part of the item;
 - 3.1.4. A test shall be done on the existing coat to ensure that the finish coat will not react with and cause undue dissolving and lifting of the existing coat. This can be done by applying a small quantity of the finishing coat thinners.
 - 3.1.4.1. Should any undue dissolving or lifting occur, a suitable intermediate or barrier coat must be applied before the finishing coat is applied.
 - 3.1.5. Proprietary items which failed the cross cut test and which generally have inadequate protection shall be dismantled and the full corrosion protection specification applied.

4. SURFACE PREPARATION

- 4.1. All steel surfaces shall be detergent washed and fresh water rinsed to remove all oil, grease and surface contaminants before shot blasting.
- 4.2. Sharp edges shall be radiused and major roughness of welds shall be removed by grinding. Welding spatter and flux shall be removed.
- 4.3. Components manufactured from hot rolled steel sections and steel plate shall be blast cleaned to base metal in accordance with Swedish Standard SSPC SP10 grade SA2½ - very thorough blast cleaning, to remove all mill scale, rust, weld spatter etc.
 - 4.3.1. "Sharp" chilled iron shot, chilled iron grit, or granular abrasive slag is to be used to produce a proper degree of surface roughness.
 - 4.3.2. Blast profile shall be determined by micrometer profile gauge, Keane-Tator surface profile comparator or Testex press-o-film.
 - 4.3.3. The profile height shall be between 40 and 50µm at any point.
- 4.4. Good quality blast cleaning and spray painting equipment shall be used. Air used for spraying and blast cleaning shall be free from all traces of oil, water and salinity. Water and oil traps must be fitted to all equipment.
- 4.5. Wheel abrading equipment shall not be used unless an angular profile the same as clause 4.3.3 is achieved.
- 4.6. When wet blasting is done the primer shall be applied before oxidization starts or surface contamination occurs.
- 4.7. Components manufactured from 3CR12 steel shall be lightly abraded. The components shall then be passivated by using a mixture of 10 - 15% nitric acid in water which is rinsed off after 10 - 15 minutes. The surface shall be neutralized to pH 7 before it is coated.
- 4.8. Hot-dip galvanized components, galvanized bolts and nuts etc. shall be lightly abraded with a galvanizing pre-cleaner. The components shall then be washed with detergent and water and washed down with clean water until a water break free surface is achieved. Allow to dry thoroughly.

5. JOINTS AND MATING SURFACES OF MEMBERS

- 5.1. Mating (faying) surfaces of members which have to be joined by high tensile steel bolts in friction grip shall be cleaned according to Clause 4 and painted with primer only.
 - 5.1.1. After being assembled joints so formed shall be seal welded and painted or after the intermediate coat was applied the edges shall be sealed with an approved brand of paintable flexible sealant or mastic (e.g. Butyl rubber, polyurethane sealer or two component epoxy), by means of a suitable caulking gun.
- 5.2. All rivets, bolts, welds, sharp edges etc. must be covered with a "stripe coat" of the primer or intermediate coat specified to ensure the correct dry film thickness on sharp edges, as well as sealing of bolt threads to head etc.
- 5.3. All other mating surfaces must be sealed with an approved brand of flexible Butyl rubber, paintable Silicone, polyurethane sealer or two component epoxy sealer, and joined while still wet. All excess compounds must be completely removed.

6. PAINTING PROCEDURES

- 6.1. Directly before the application of paint, the area to be painted shall be degreased with a suitable degreaser and left to dry.

- 6.2. Paint shall only be applied under the following conditions:-
 - 6.2.1. There is adequate light.
 - 6.2.2. The steel temperature is between 5 and 50°C and at least 3°C above the dew point of the air.
 - 6.2.3. The relative humidity of the air is between the limits specified by the paint supplier.
 - 6.2.4. Wind does not interfere with the method used and sand and dust cannot be blown onto wet paint.
- 6.3. Steelwork shall be supported on trestles, at least 900 mm off the ground for painting purposes.
- 6.4. An adequate number of test readings shall be taken per square meter in order to determine the dry film thickness.
 - 6.4.1. The paintwork shall be acceptable if the average of the test readings taken falls within or exceeds the ranges given.
 - 6.4.2. Paintwork shall not be acceptable if any single test reading is less than the specified minimum thickness.
- 6.5. An ultrasonic or electronic magnetic flux thickness measurement gauge shall be used, but in case of dispute, destructive testing shall be applied. The painted steelwork shall present a clean, neat appearance of uniform colour and gloss as applicable to the paint used. Each coat of paint shall be applied as a continuous, even film of uniform thickness. More than one application of paint may be required to achieve the dry film thicknesses specified or to obliterate the colour of the previous coating.
- 6.6. The use of thinners or solvents at any stage of the work is prohibited, unless specified by the paint manufacturer.
- 6.7. Precautions shall be taken to prevent coatings from being applied to equipment nameplates, instrument glasses, signs etc.

7. COLOUR CODES

Machinery and equipment shall be painted in the following final colours:-

	Area	Colour	Code No. [091 BS 5252 and International No's]
7.1.1	Mobile equipment (cranes, loaders etc.)		
	a) Structure, machinery and electrical houses, operator's cabins, chutes, hoppers etc.	Transnet Red	RAL 3020
	b) Undercarriage, travel bogies, rubber tyred rims	Transnet Red	RAL 3020
7.1.2	Industrial buildings, conveyor structures		
	a) Roofs and canopies	Pantone cool grey 10	RAL 7037 (Staubgrau)
	b) Painted walls	Pantone cool grey 3	RAL 7035 (Lightgray)
	c) Steel columns, rafters, trusses	Pantone cool grey 5	RAL 7004 (Signalgray)
7.1.3	General		
	a) Guards	Golden yellow	RAL 1003
	b) Sheaves	Orange	RAL 2008
	c) Cable reels (Stainless steel)	Orange	RAL 2008
	Machine buffers and parts of machine which could constitute a serious hazard	Golden Yellow (High Gloss) with Luminous green stripes in chevron pattern	SABS B49 and Luminous green

Area	Colour	Code No. [BS5252 and International No's]
e) Any exposed rotating part of machinery, electrical Switch-gear (other than starting and stopping devices and emergency stop control), electrical services e.g. conduit and allied fittings	Light Orange (High Gloss)	SABS 1091 B26 BS 381C-557 RAL 2007
f) Low voltage switchgear panels where orange is not aesthetically acceptable	Light grey	RAL 7035
g) Medium voltage cable trays, switchgear and motors (3,3 kV and up)	Saphire Blue	RAL5003
h) Starting devices, low voltage cable trays and switchgear	Moss Green	RAL6005
i) Transnet Logo	Transnet Red (Traffic Red)	RAL 3020 on White (RAL 9010) Background
j) Parts of stationary machinery (Electrical, motors, gearboxes, brakes, transformers, etc.)	Light Grey	RAL 7035
k) Hand levers, hand wheels, oiling points, handrails on walkways, ladders	Golden Yellow (High Gloss)	RAL 1004
l) Stopping devices, grease points, motor fan covers and danger signs (not symbolic safety signs for which see SABS 1186)	Signal red (High Gloss)	RAL3001
m) Walkways (non slip surfaces) (galvanized gratings not to be painted)	Shop floor green or black	
n) Informatory signs and notices (not symbolic safety signs for which see SABS 1186)	White on Emerald Green (High Gloss)	White on RAL 6001

Area	Colour	Code No. [SABS 1091 and International No's]
7.1.4 Pipe lines		
a) Reclaim water piping	Aluminium	
b) Slurry pipe lines	Iron Grey	RAL 7011
c) Fire protection piping	Signal red	RAL 3001
d) Washwater drain pipes	Light grey	RAL 7035
e) Instrument air	White with Strong blue band	White RAL 5005
f) Plant air	White with Flag blue band	White RAL 5015
g) Potable water	Grass green	RAL 6010

7.1.5 Colour bands for pipes shall be 75 mm wide for pipe sizes up to 150 mm diameter and 100 mm wide for 150 mm and above. The colour bands shall be applied to the pipe flanges, valves, junctions, walls or structures etc. in such a manner that the pipe may be easily identifiable. On straight sections the maximum spacing shall be 100 x the pipe diameter.

8. FIELD TOUCH-UP PAINTING

8.1. Damaged and unpainted areas, fasteners, welds, etc. shall be cleaned by wire brushing with hand tool or power tool in a manner which will minimize damage to sound paint. Grinding will not be allowed. Rust spots shall be cleaned to bright metal. Thick edges of old paint abutting on bare metal surfaces shall be feathered by scraping and sanding.

8.1.1. Where welding is required on areas already coated with the coating system, the coat should be stepped back for ± 30 mm around the weld area.

8.2. The paint shall be applied to match the original coats in accordance with the manufacturer's recommendations for the specific paint system.

Note: Inorganic zinc primers shall not be re-covered with an inorganic primer, but only with an organic zinc primer.

8.3. Areas of damaged galvanizing shall be repaired with an approved cold galvanizing product or metal sprayed by the wire spraying process with Zinc, and then touched up with the specific paint system.

9. GENERAL

9.1. All walkways, floors, maintenance platforms etc. must be painted with a durable, non skid coating of the appropriate colour.

9.2. Exposed machined surfaces must be coated with a strippable corrosion inhibitor (e.g. Tectyl).

9.3. Where different materials will be in contact with each other and galvanic corrosion can occur the contact areas of the materials must be isolated from each other or the joints made water proof to prevent ingress of moisture.

9.4. All components must be designed with corrosion prevention in mind and specifically the following:-

- 9.4.1. No entrapment of dirt, product, moisture etc.
- 9.4.2. No areas must be inaccessible for maintenance such as too narrow gaps etc.
- 9.4.3. Large flat areas rather than complicated shapes and profiles.
- 9.4.4. No sharp corners and discontinuous welds.

9.5. Parts of equipment which are exposed to high temperatures must be coated with the following system:-

Coat No	Generic Description	Approved Brand Products	Dry Film Thickness (µm)
1	Two component self curing inorganic zinc ethyl silicate	DULUX /SIGMA-Sigma Xinc 160 INTERNATIONAL (PLASCON) Interzinc 52 STONCOR (CHEMRITE COATINGS) Carbo Zinc 11	65-75
2	Single component high temperature moisture curing silicone with aluminuim flakes	DULUX/SIGMA – Sigmatherm Silicate INTERNATIONAL (PLASCON) Intertherm 50 STONCOR (CHEMRITE COATINGS) Thermaline	40

10. MAINTENANCE PAINTING OF STRUCTURES

10.1. Areas which are only lightly corroded must be cleaned by means of high pressure water blasting or wire brushing by power tool and the following system applied:-

Coat No	Generic Description	Approved Brand Products	Dry Film Thickness (µm)
1	Surface tolerant two pack epoxy primer with aluminuim pigments	Dulux/SIGMA Aluprimer STONCOR (CHEMRITE COATINGS) Carbomastic 15 INTERNATIONAL (PLASCON) Intergard 242	125-150
2	Same as first coat OR micaceous iron oxide (MIO) epoxy	DULUX/SIGMA – Sigmacover 456 INTERNATIONAL	125-150

		(PLASCON) Interseal 1052	
		STONCOR (CHEMRITE COATINGS) Carboline 193	
3	Two component recoatable, polyurethane finish (Gloss)	DULUX/SIGMA Sigmadur gloss INTERNATIONAL (PLASCON) Interthane 990 STONCOR (CHEMRITE COATINGS) Carboline 134	65-75

10.1.1. Alternatively, the Noxyde paint system can be used, consisting of two to three coats of water based Noxyde paint to achieve a DFT of 350 to 400 microns. Where the Noxyde system is used on areas other than slightly corroded structural areas, the following additional requirements must be observed:

10.1.1.1. Very smooth surfaces (e.g. 3CR12, stainless steel or hot-dip galvanized components, bolts, nuts and fittings, and HT bolts): Parts must be thoroughly degreased using OptiDegreaser, washed down with potable water, and immediately when dry, a single coat of OptiPrimeAqua applied.

10.1.1.2. Paintable flexible sealant/mastic: Only sealant approved by the paint manufacturer may be used, and an initial coat of OptiPrimeAqua applied over it before the further coats of Noxyde are applied.

10.1.1.3. Bolted/rivited connections: After blasting or and/or cleaning as required, apply a coat of OptiPrimeAqua and an additional stripe coat of Noxyde, in contrasting colour, to all bolt/nut and plate edges and crevices.

10.2. The adhesion of old coatings must be verified by doing a cross cut adhesion test on selected areas.

10.3. The compatibility of the new paint system on the old coating must be tested and guaranteed in writing by the paint supplier.

10.4. The work and coating system must be guaranteed for a minimum of 12 months.

10.5. All heavily corroded areas must be shot blasted to minimum SA2 and the three coat system indicated in clause 2.6 applied.

10.6. Areas where the old coating is still sound need only be high pressure cleaned with a suitable solvent and coated with one of the primers suggested in clause 10.2 (as tie coat) and then with one of the top coats suggested in clause 2.6 to get the appropriate colour and finish. The minimum dry film thickness of this tie coat must be 75 microns and top coat must be 50 microns, but the previous coating colour shall be completely obliterated to present a uniform colour.

Note: Inorganic zinc primers shall not be re-covered with an inorganic primer, but only with an organic zinc primer.

- 10.7. Repairs to the insides of all the enclosed sections of the booms as well as the insides of the crane legs, sill beams, cross beams, pylon cross bracing members etc. shall be done as above but the top coat need not be applied.

***** END OF SPECIFICATION HE 9/2/8 [Version 17] *****

**Annexure F - EEAM-Q-009 SPECIFICATION
FOR QUALITY MANAGEMENT FOR
SUPPLIER CONSTRUCTION – WCS**

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DETAILS CONTENTS

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1. Introduction

This Specification outlines the minimum requirements to ensure that products and services supplied to Transnet Port Terminals are manufactured, provided, constructed or installed in accordance with all specified requirements as defined in the Contract, all associated specifications, drawings, codes and standards.

2. Definitions

Term, Abbreviation	Meaning
Data	All drawings/documents/data/information and DP's required to be supplied under the Contract
Data Pack (DP)	A compilation of manufacturing data, certification, inspection and testing records prepared by the Supplier/Contractor to verify compliance with the Contractual requirements.
Employer	For the purposes of this document, the term Employer has the same meaning as applied to the term Client.
Field Inspection Checklist (FIC)	A document that details the checks, requirements and test parameters for each type of equipment to permit field installation and pre- commissioning of the equipment.
TPT	Transnet Port Terminals is the Employer's Nominated Agent in terms of the Conditions of Contract.
Inspection Release Report (IRR)	A document issued to the Supplier/Contractor by TPT advising release of the Materials for shipment. This does not relieve the Supplier/Contractor of its obligations in accordance with the Terms and Conditions of the Contract.
Inspection Waiver Report (IWR)	<p>A document issued to the Supplier/Contractor by TPT advising that TPT has waived final inspection for the materials listed in this document. The issue of this Report does not preclude further inspection by TPT, is issued without prejudice and does not relieve the Supplier/ Contractor from the guarantees and obligations included in the Contract/ Contract.</p> <p>A document prepared by the Supplier/Contractor providing relevant information applicable to the installation and maintenance of the specific equipment, including consumables (eg. oils etc)</p>
Project Quality Plan (PQP)	A document that outlines the Supplier/Contractor's strategy, methodology, resources allocation, Quality Assurance and Quality Control coordination activities to ensure that Goods and Services supplied meet or exceed the requirements defined in the Contract, drawings, codes and standards.
Quality Control Plan (QCP)*	<p>A document outlining specific manufacturing / construction inspection and testing requirements, including responsibilities, test acceptance criteria, nomination of witness and hold points.</p> <p>For the purposes of this document, the term Supplier/Contractor has the same meaning as applied to the term Sub-Supplier/Sub-Contractor</p>
Supplier/Contractor	This refers to the documentation required to be submitted by the relevant Supplier / Contractor in terms of the Contract.
Supplier/Contractor Data Requirements	These requirements are generally tailored to suit the particular Scope of Work, although it also addresses the manner in which the documentation is required to be submitted, eg Hard copy, Electronic copy etc
Technical Query Note (TQN)	This refers to a document used by the Supplier/Contractor to formally clarify a Technical Query related to the scope of supply. This should not be used where a non-conformance has already been initiated.

3. Applicable Documents

3.1 General

All work performed shall comply with the requirements of this Specification, the documentation referenced in the Contract and the latest revision/edition of the relevant Codes and Standards referenced herein.

3.2 Statutory Regulations

Occupational Health & Safety Act, Act No 85, of 1993 and Regulations as amended.

3.3 Codes and Standards

Document No.	Title
ISO 9001	International Standard Series Quality Systems

WCS have been supplied with 3 documents EEAM-Q-013 Commissioning and Handover, Standard and Technical Data Sheets. There is some renumbering needed

4. Quality System

4.1 General

The Supplier/Contractor shall be responsible for all quality activities necessary to ensure the Work meets the requirements specified in the Contract, and shall manage and coordinate all Quality aspects of Work in accordance with the requirements of this Specification, and the Supplier/Contractor's PQP and QCP's once reviewed and approved by TPT.

The Supplier/Contractor shall ensure that all Sub-Suppliers/Sub-Contractors also conform to the requirements of this Specification.

4.2 Supplier/Contractor Quality System Requirements

The Supplier/Contractor shall have, maintain and demonstrate its use to TPT, its documented Quality Management System. The Supplier/Contractors Quality Management System should be in accordance with the International Standard ISO 9001.

The Supplier/Contractor shall submit its Quality System documentation to TPT at the time of tender and at Contract Phases as detailed below:

- Project Quality Plan
- Quality Policy
- Index of Procedures to be used
- Programme of internal and external audits

4.3 Supplier/Contractor Documentation Requirements

The Supplier/Contractor shall develop and maintain a comprehensive register of documents that will be generated throughout the project, and shall include all quality related documents. The register shall be submitted to TPT for review.

TPT shall indicate those documents required to be submitted for information/review and/or acceptance and this shall be indicated in the Supplier/Contractors' Document Register. The register shall indicate the dates of issue of the documents taking into account sufficient time to allow TPT review/acceptance cycle prior to the document being required for use.

5. Quality Assurance

5.1 Project Quality Plan

Where specified, the Supplier/Contractor shall submit a PQP to TPT within 28 days after the Contract start date. The PQP shall detail how the Supplier/Contractor's Quality System will be applied to the Scope of Work specified in the Contract, and shall address the following:

- Satisfying the technical and quality requirements of the Supplier/Contractor's Scope of Work, and relevant elements of the applicable ISO 9001 standard
- include all quality activities relevant to the Scope of Work, identifying all procedures, reviews, audits, controls and records used to control and verify compliance with the specified Contractual requirements

Include a listing of all special processes (eg. welding and non-destructive testing, cube testing etc) envisaged for use, including confirmation of personnel certification as required

- Include all proposed method statements (for site based work activities)
- Include a description of the Supplier/Contractor's project organisation, with key positions and responsibilities identified and individuals named. The organisation structure shall also indicate the resources committed to the management / coordination of QA / QC activities
- Include a listing of all Quality Control Plans (QCP's), and associated Field Inspection Checklists (FIC's), as applicable
- Identify in the Project Quality Plan any Sub-Supplier/Sub-Contractor work. Sub-Supplier/Sub-Contractor plans shall be approved by the Supplier/Contractor, and a copy forwarded to the TPT
- Include the proposed Authorised Inspection Authority (where applicable – for example pressurized equipment and systems)
- Include a schedule of proposed quality records

The PQP shall be controlled and re-submitted for approval when required to incorporate any change necessary during the Contract duration to ensure that the document is maintained as an effective control, change management and records. The change management will be done to an agreed policy or procedure.

Note: Where the Supplier/Contractor is required to provide a PQP, no work shall commence until the PQP is approved by TPT.

5.2 Procedures

The Supplier/Contractor's PQP and procedures shall address the system elements and activities appropriate to the Scope of Work, in compliance with the specified Quality Standard.

Where specified, the Supplier/Contractor shall submit copies of Quality Procedures for review. In addition, the Supplier/Contractor shall ensure that copies of all Procedures relevant to the Scope of Work are available for reference by TPT at each work location.

These will include, as applicable, the following:

5.2.1 Document Control

The Supplier/Contractor's Project Quality Plan shall provide a description of how TPT provided, Supplier/Contractor and Sub-Supplier/Sub-Contractor documents are to be managed. The description shall address as a minimum:

- Management tools and databases
- Receipt, registration and maintenance
- Internal and external distribution to Employer, third parties and Sub-Contractors
- Management of Codes, Standards and Specifications

-
- Internal review and approval routines and authorities
 - How it is ensured that the correct revisions of documents are available at the point of use including retention periods for all documentation.

5.2.2 Design Control

Where the Supplier/Contractor is responsible for any aspect of design related to their Scope of Work, the Quality Plan shall describe the Supplier/Contractor's methods and procedures for the control of these design activities.

5.2.3 Procurement

Where the Supplier/Contractor is responsible for any aspect of procurement related to their Scope of Work, the Quality Plan shall describe the Supplier/Contractor's methods and procedures for the control of these activities.

5.3 Supplier/Contractor Audits

The Supplier/Contractor shall:

- Carry out audits in accordance with its Quality System at its own and Sub-Supplier/Sub-Contractor's facilities to ensure project quality requirements are being achieved
- Include a QA Audit Schedule in the Supplier/Contractor PQP submitted to TPT prior to commencement of the Scope of Work. The Audit Schedule shall include all audits to be implemented by the Supplier/Contractor and Sub-Supplier/Sub-Contractor during the execution of the Contract
- Where stipulated in the Contract, perform an audit within three months after the Contract start date and thereafter at a minimum frequency of three months. Audit reports shall be submitted to TPT at the completion of each Audit. Where unsatisfactory performance is evident, additional audits shall be performed by the Supplier/Contractor as directed by TPT.

5.4 Transnet Port Terminals Audit

TPT reserves the right to perform quality audits or participate as an observer in Supplier/Contractor audits to verify compliance with the Contractual requirements. The Supplier/Contractor shall within a time frame as agreed upon, correct any adverse audit finding advised by TPT.

6. Inspection and Testing

6.1 General

TPT may, at its discretion perform surveillance inspection at the Supplier/Contractor's premises, SubSupplier/Sub-Contractor's premises or at the location of the Scope of Work.

Dependent on the nature of the Scope of Work and the frequency of inspections TPT may elect to have inspection personnel resident at the place of manufacture, fabrication, or assembly.

The Supplier/Contractor shall ensure free entry and access is given to TPT, certifying authorities and statutory authorities to inspect the Scope of Work and review procedures and quality records at all parts of the Supplier/Contractor's and Sub-Supplier/Sub-Contractor's premises, or at the location of the Scope of Work while any work or test is in progress.

The Supplier/Contractor shall provide TPT with all necessary tools, calibrated measuring equipment, safety equipment and workspace to verify or witness tests in progress.

While TPT is at the Supplier/Contractor's premises, the Supplier/Contractor shall provide, free of charge, reasonable facilities including office facilities and reasonable access to a telephone, facsimile machine and computer connection point with internet access.

The Supplier/Contractor shall provide notice in writing in within a time frame time as agreed upon, to allow the attendance of TPT and other representatives at nominated witness and hold points.

6.2 Quality Control Plans

The Supplier/Contractor shall prepare and submit QCP's to TPT for review in accordance with the requirements of the Contract and PQP.

QCP's shall identify all inspection, test and verification requirements to meet the Contractual obligations, specifications, drawings and related details including destructive and non-destructive testing, witness and hold points.

The Supplier/Contractor shall not commence fabrication or manufacture prior to review and approval of the applicable QCP by the TPT.

QCP's shall include reference to all tests specified in the Contract Document.

A typical format for a QCP is shown in Appendix A. The Supplier/Contractor may use its own format providing all information shown in Appendix A is included.

6.3 Inspection Points

The QCP shall identify points in the fabrication, manufacturing and/or installation process that are selected for inspection and shall be denoted by the following inspection codes:

- Hold Point (H) Inspection point in the manufacturing cycle, beyond which work shall not proceed without the specified activity, work or function being witnessed. Holding points require written notification to TPT.
- Witness Point (W) An inspection point in the manufacturing cycle that will be witnessed or verified. If TPT confirms it is unable to attend after being provided with the written notification then manufacture may proceed. Witness points require written notification to TPT.
- Review Point (R) A point at which products and quality records are verified and endorsed. Review points are not notifiable points.
- Surveillance (S) An inspection point in the manufacturing cycle during which any activity, work or function is observed. No formal notification is required.

The Supplier/Contractor shall maintain the status of testing and inspection by progressively having the QCP's signed off.

6.4 Revision to Quality Control Plans

Revision of the QCP shall be subject to the same submission, review and acceptance routines as described for the original QCP issue

6.5 Kick off Meeting

After the Contract start date, and prior to manufacture, TPT will require a Kick off Meeting with the Supplier/Contractor to discuss fully the implications of meeting TPT quality requirements. This meeting may be held as part of the Contract kick-off meeting for each package or may be a separate meeting, subject to the critical or complex nature of the work. This requirement for a pre-inspection meeting may be repeated when sub-Supplier/Contractors of key equipment are engaged.

After mobilization of the Contractor, and prior to the commencement of any construction activities, TPT will arrange for a Quality kick-off meeting to discuss fully the implications of meeting the projects' quality requirements. This meeting may be held as part of the formal kick-off meeting for each contractor, or may be a separate meeting subject to the critical or complex nature of the work.

6.6 Schedule of Inspection

The Supplier/Contractor shall submit a Schedule showing the proposed dates for inspections and tests nominated in the QCP where witness and hold points are required. The Schedule shall be regularly updated with progress and issued to TPT to show the current inspection and test status.

6.7 Field Inspection Checklists

For site installation and construction activities, the Supplier/Contractor shall prepare Field Inspection Checklists (FIC's) to permit inspection and testing of installed equipment and constructed facilities in accordance with the respective QCP's.

FIC's shall be provided to TPT for initial review, and shall be used to record the results of inspection and testing (where applicable), and on completion be submitted to TPT to confirm satisfactory completion of the tests and inspections at nominated QCP witness and hold points.

6.8 Inspection Notification

The Supplier/Contractor shall notify TPT in writing at least two calendar weeks prior to the advent of inspections or tests that require witnessing.

For inspections or tests within the country, arrangements shall be confirmed at least two working days before the event. For inspection and tests outside of the country, arrangements shall be confirmed at least seven working days before the event.

Inspection notifications shall include the following essential information:

- Contract Number
- Location of Inspection or Test
- Nature of Inspection or Test
- Date and Time of Inspection or Test
- Name and telephone number of the Supplier/Contractor's Representative.

6.9 Inspection and Testing

The Supplier/Contractor is responsible for the conduct of all Supplier/Contractor inspections and tests, and includes:

- Documenting inspection and tests result in the QCP's and relevant FIC's
- Progressively inspecting the quality of the Scope of Work performed, including that of all Sub-Supplier/Sub-Contractors
- Inspecting to meet all Contractual requirements, in number, type and form
- Inspecting day to day activities, material receipts, issue of material for installation, in-process inspections, and final inspections.

Completed original QCP's and FIC's shall be submitted to TPT in the DP

6.10 Inspection Release

At completion of the Scope of Work, either in total or in phases, TPT may issue an Inspection Release Report (IRR) or a waiver of inspection.

The issue of either an inspection release or waiver of inspection does not relieve the Supplier/Contractor of its obligations under the Contract. The Supplier/Contractor shall ensure a copy of the release note and final expediting release note for transport, where appropriate, is attached to the delivery docket and accompanies the Work to the designated destination indicated in the Contract. Items delivered to TPT without a copy of these documents may not be accepted.

A copy of the inspection release or waiver of inspection shall be included in the DP.

6.11 Special Processes

It is the Supplier/Contractor's responsibility to ensure that all processes which require prequalified procedures and/or work methods are tested and qualified before work begins. This typically covers such activities as welding, non-destructive testing, special fabrication techniques and painting. Unless specified such procedures are the Supplier/Contractor's responsibility and do not require submission to TPT before work begins. When such procedures are requested, no work shall commence until procedures are approved by TPT.

It is the Supplier/Contractor's responsibility to ensure all operators are qualified for the processes in accordance with the procedure and/or applicable standards. Records of qualification of operators shall be maintained by the Supplier/Contractor and made available to TPT when requested.

Records of qualification of procedures and processes shall be maintained by the Supplier/Contractor in accordance with the applicable procedure or code.

6.12 Welding Procedures

Where the Supplier/Contractor's Scope of Work includes fabricated weldments, Welding Procedure Specifications (WPS) defining the method, preparation and sequences to be adopted to achieve a satisfactory welded joint shall be provided for all weld types required in the execution of the Supplier/Contractor's Scope of Work. The procedure shall only be submitted to TPT when requested in the Contract.

WPS shall include all welding essential and non-essential variables for each process used, including appropriate test results and shall comply with the standard or code pertaining to welding required in the execution of the Supplier/Contractor's Scope of Work.

When requested in the Contract a suitably marked "weld map" shall be completed by the Supplier/Contractor for all items to be fabricated. A summary of WPS shall be prepared and when used, shall be identified on the weld map.

Where TPT approval is required, fabrication shall not commence until written approval of WPS and Welding Procedure Qualification Records (WPQR) is received by the Supplier/Contractor. No welding fabrication will be accepted that is not covered by a TPT approved WPS/WPQR.

Welding Procedure Qualification (WPQ) tests may be witnessed by TPT and/or an independent inspection authority. Testing of the specimens prepared during the WPQ Tests shall be carried out by an independent approved testing laboratory independent of the Supplier/Contractor. In certain instances, a certificate to EN 10204 3.1 B may be required which will be clarified at Tender review and clarification stage.

Where actual weld deposit analysis and weld metal physical properties are required for procedure qualification, the information shall be taken from the procedure qualification tests. Data listed in the catalogues of the manufacturer of welding consumables is not acceptable.

Welders/welding operators shall be qualified in accordance with the relevant welding code prior to commencing production fabrication. Specific Welder Qualifications (WQ's) records will be reviewed by TPT in the Supplier/Contractor's works and should NOT be submitted for review.

A register of welders qualified to work shall be maintained by the Supplier/Contractor.

6.13 Material Traceability

Where, and to the extent that material traceability is required, the Contractor shall provide its procedures for the maintenance of material identification throughout all phases of manufacture. Methods of identification, routines for re-stamping or stencilling as appropriate shall be defined and agreed with the Employer.

Adequate records shall be maintained throughout construction enabling traceability of key materials from final product back to original material certificates. The material traceability records shall form part of the DP

The Contractor shall prepare a schedule of materials and equipment that are subject to traceability requirements.

6.14 Material Certification

Where specified in the Contract the following certificates shall be provided to TPT and included in the DP.

- Type A: A Supplier/Contractor's certificate of compliance with the Contract. This certifies that the goods or services are supplied in compliance with the Contract without mention of any test results (EN10204 certificate 2.1).
- Type B: A certificate issued by a laboratory or test facility independent of the Supplier/Contractor's works. It shall quote test results carried out on the product supplied and state whether compliance with the relevant technical standard, code etc has been complied with. (EN 10204 certificate 3.1 B).
- Type C: The same as Type B, the tests are to be witnessed by a third party (EN 10204 certificate 3.1C).

6.15 Non Destructive Testing

The Supplier shall provide all Non Destructive Testing (NDT) procedures for TPT review and approval where specified. The submissions shall detail the procedures for each technique employed and the acceptance criteria.

The Supplier shall maintain records of NDT procedures and Personnel training records and certification and make these available to TPT or their nominated inspector.

The Supplier shall provide repair methods where NDT inspections are failed for TPT to review and retain.

7. Non Conforming Products

7.1 General

The Supplier/Contractor shall establish and maintain procedures to control material or products that do not meet the specified requirements.

All Supplier/Contractor product and/or materials identified as not conforming to requirements shall be dealt with promptly as follows:

- If the Supplier/Contractor discovers material or product which is not in accordance with the requirements of the Contract, i.e. a non conformance (NCR), the Supplier/Contractor shall promptly initiate the non-conformance procedure in terms of the Supplier/Contractor's Quality Management System, advise TPT promptly, and provide a copy of the NCR to TPT
- If TPT or its agent identifies a non-conformance and TPT NCR may be raised.
- Originals of all closed out NCR's shall be included in the DP.

7.2 Corrective and Preventative Action

If the Supplier/Contractor proposes a disposition of any non conforming materials or product which varies from the requirements of the Specification or Contract, such a proposal shall be submitted in writing to TPT whose decision on the proposal shall be obtained in writing before the non conforming material or product is covered up or incorporated into the Works, or is the subject of any other disposition.

The disposition of non-conformances which do not vary the requirements of the Contract, specification or drawings may be approved by the Supplier/Contractor following discussion and agreement with TPT.

8. Concession Requests and Technical Queries

8.1 Concession Requests

Where a Supplier/Contractor requests a Concession to deviate from the requirements of the Contract or specified requirements, the Supplier/Contractor shall raise the request with TPT using the format as shown in Annexure B.

The Concession Requests shall clearly identify all elements of the proposed deviation together with

any resulting technical, commercial and/or schedule impacts.

Completed original Concession Requests shall be included in the DP.

8.2 Technical Queries

For clarification of technical issues (only), Supplier/Contractor may submit a Technical Query Note (TQN) to TPT in accordance with the Contract.

The TQN shall clearly identify all elements of the query, and all supporting documentation and/or drawings shall be attached where appropriate.

Completed original TQN's shall be included in the DP.

9. Inspection, Measuring and Test Equipment

9.1 Calibration

The Supplier/Contractor, including its Sub-Supplier/Sub-Contractors shall ensure the calibration of test and measuring equipment is performed and maintained in accordance with the relevant Supplier/Contractor procedures and/or the equipment manufacturer's specifications.

Where calibration is required by an external laboratory, the Supplier/Contractor shall ensure that the facility selected for calibration possesses current certification. Calibration certificates shall contain a statement that the test equipment is accurate to within specified tolerances.

The Supplier/Contractor should establish the frequency of calibration for each item of equipment (including jigs, fixtures or templates) and record the details in a 'Measuring and Test Equipment Register' (or similar).

9.2 Use of Inspection, Measuring and Test Equipment

The Supplier/Contractor shall ensure that authorised equipment users:

- Use the equipment in accordance with manufacturers instructions, and accepted industry practices
- Ensure the equipment is covered by a current calibration certificate
- Conduct the measurements or tests in accordance with the equipment manufacturer's specifications or other relevant specification
- Prior to commencement of each inspection or test activities:
 - Identify the measurements to be made
 - Determine the accuracy required
 - Select the appropriate inspection, measuring or test equipment for the scope of work.

The supplier shall ensure that personnel using equipment are adequately competent, and where necessary, completed the required training.

9.3 Verification of Previous Test Results

Where the calibration status of the equipment is unknown, expired or has doubtful accuracy, the equipment shall immediately be quarantined, and tagged according to Supplier/Contractor's Quality System procedures. The Supplier/Contractor shall then arrange for either in-house or external calibration, and:

- review all previous test results associated with the suspect equipment
- identify the inspections, measurements or tests required to re-validate the results
- ensure that suitable re-testing is performed with calibrated equipment
- document the results of the re-testing on the respective inspection and test documentation.

10. Quality Records

Supplier/Contractors shall maintain Quality Records necessary to provide objective evidence that demonstrates and verifies achievement of the QA / QC requirements associated with the Scope of Work. All Quality Records, including original source material test certificates and non destructive

test reports, shall be retained by the Supplier/Contractor during the project, and be provided to TPT at the times, and in the quantities specified in the Contract.

The Supplier/Contractor shall collate all quality records in the DP and submit the DP to TPT in accordance with the Contract and all referenced standards and specifications. This DP shall be compiled progressively, and shall be available for review at all phases of manufacture or construction activities.


The Scope of Work shall not be complete until the Supplier/Contractor's DP including the quality records from Sub-Supplier/Sub-Contractors have been reviewed and accepted by TPT.

The DP shall be compiled progressively during the execution of the Scope of Work and shall be made available for review by TPT as required.

[illegible]

Request for Concession No:			
B. SITE ADMINISTERED CONTRACT?	Yes		Nn Go to "D"
Possible QC implications:			
<div style="border: 1px solid black; padding: 5px;"> <input type="checkbox"/> Recommendations <input type="checkbox"/> Recommended with the following Conditions: </div>		<div style="border: 1px solid black; padding: 5px;"> <input type="checkbox"/> Rejected </div>	
Site Construction Manager: _____ Signature: _____ Date: _____			
Site Engineer: _____ Signature: _____ Date: _____			
C. RECOMMENDATION BY CONTRACT ADMINISTRATOR: Name: _____			
Signature		Date:	
D. RECOMMENDATION BY ENGINEERING:			
<input type="checkbox"/>	Recommended	<input type="checkbox"/>	Rejected
<input type="checkbox"/>	Conditional, with the following		
recommendations:			
Package Engineer: _____ Signature: _____ Date: _____			
Lead Discipline Engineer: _____ Signature: _____ Date: _____			
Engineering Manager: _____ Signature: _____ Date: _____			
Comments:			
E. PROJECT MANAGER DISPOSITION: Accepted <input type="checkbox"/> Rejected <input type="checkbox"/>			
Name: _____		Signature _____ Date: _____	
F. EMPLOYER DISPOSITION: Accepted <input type="checkbox"/> Rejected <input type="checkbox"/>			

**Annexure G - EEAM-Q-011SPECIFICATION
FOR MAINTANANCE OF CRANES AND
HOIST FOR USE ON PORTS EQUIPMENT-
WCS (002)**

REVISION 0		REFERENCE EEAM-Q-011			
DOCUMENT TYPE: SPECIFICATION			AUTHORISATION DATE: 2019-01-29		
TITLE: SPECIFICATION FOR MAINTENANCE CRANES AND HOISTS FOR USE ON PORTS EQUIPMENT				PAGE 0 of 09	
COMPILED BY: QUALITY MANAGER (COE) KRIS NAIDOO _____ Date:		REVIEWED BY: ENGINEERING MANAGER (COE) JESSENDRAN PILLAY _____ Date:		REVIEWED BY: PRINCIPAL ENGINEER (COE) ROFHIWA TAKALANI _____ Date:	
REVIEWED BY: CHIEF ENGINEER (COE) SABELO MZIMELA _____ Date:			AUTHORIZED BY: GENERAL MANAGER ENGINEERING JOSIAH MPOFU _____ Date:		
FUTURE REVISION RECORD NUMBER	DESCRIPTION OF REVISION	APPROVAL	DATE		
Revision -1-					
CONTENTS					
					Page
1.0 SCOPE					04
2.0 GENERAL REQUIREMENTS					04
3.0 SPECIFIC REQUIREMENTS					08
4.0 TESTING, COMMISSIONING AND GUARANTEES					09
KEYWORDS MAINTANANCE OF CRANES			DATE OF LAST REVIEW: N/A DATE OF NEXT REVIEW: 2019-02-01		

DETAIL CONTENTS

[illegible]

The following annexures form an integral part of this specification and must be read in conjunction with this specification.

ANNEXURE 1: STANDARD SAPO SPECIFICATIONS

EEAM-Q-003	Steel wire ropes
EEAM-Q-004	Gearing, shafts, bearings, brakes, lubrication, vee-belts, keys and keyways
EEAM-Q-006	Structural steel work
EEAM-Q-008	Corrosion protection
EEAM-Q-016	General requirements and conditions
EEAM-Q-012	General electrical equipment
EEAM-Q-015	Electrical motors and generators
EEAM-Q-020	Testing of electrical equipment
EEAM-Q-021	Electronic equipment

When conflicting requirements occur between this specification and these other standard specifications, this specification shall have precedence in matters relating to maintenance cranes and hoists.

1 SCOPE

- 1.1 This specification covers the design, fabrication, delivery to site, erection, installation, testing and commissioning of all maintenance cranes and hoists supplied with port equipment.
- 1.2 The cranes and hoists will be used for lifting mechanical and electrical components on the equipment for doing maintenance and adjustments, lowering and lifting components and tools to and from the quay level.
- 1.3 All cranes and hoists supplied shall be complete, installed – including connecting up to an isolator box, tested and commissioned. They shall be of a modern design and built to good engineering practice.

2 GENERAL REQUIREMENTS

- 2.1 Only well proven equipment will be considered for this tender.
- 2.2 Only cranes and hoists that are fully supported locally to the end location as part of the standard range of a supplier may be offered.
- 2.3 Cranes and hoists that will be stored and operated exclusively in a machine/electrical room may be designed for indoors operation, but all other cranes and hoists must be designed for outdoors coastal operation. All equipment offered must be designed for operation in the following conditions:

- 2.3.1 Altitude: Sea level
- 2.3.2 Ambient temperature: -5 °C to 45°C
- 2.3.3 Relative humidity: Frequently 100%
- 2.3.4 Heavily saline atmosphere
- 2.4 All parts and components shall be adequately protected against corrosion during transit and storage.
- 2.5 Each crane/hoist shall be designed to prevent the accumulation of product or standing water on it.
- 2.6 The work shall be carried out in an efficient and workmanlike manner in accordance with this specification and to the satisfaction of the Engineer.
- 2.7 Tenderers shall submit with their tender's detailed information as called for in Appendix C of BS466 (or equivalent) for the crane offered.
- 2.8 All tenders are subject to the General Requirements and Conditions of Specification EEAM-Q-016. Full documentation for each crane/hoist must be provided in accordance with EEAM-Q-016 by the contractor.
 - 2.8.1 As part of the construction documents, the successful tenderer will be required to present the technical characteristics in accordance with Appendix C of BS466
- 2.9 The equipment tendered for must comply with all the Standard Specifications listed on page 1.
- 2.10 Tenderers shall indicate clause by clause either that their offer complies in every respect with that clause of this specification, or if not, exactly how it differs.

3 SPECIFIC REQUIREMENTS

- 3.1 All cranes and hoists shall be designed and manufactured according to BS466 and BS2573 (latest) or FEM.
- 3.2 **Mechanical and structural requirements:**
 - 3.2.1 The following information must be supplied for each crane hoist by the tenderer:
 - 3.2.1.1 Span (centre to centre of rail)
 - 3.2.1.2 Capacity: SWL below hook
 - 3.2.1.3 Range of lift above and below floor level

- 3.2.1.4 Length of travel
- 3.2.1.5 Driving method for each motion
- 3.2.1.6 Manufacturer and model of each drive unit
- 3.2.1.7 Speeds of each motion (including creep speeds if relevant)
- 3.2.1.8 Rail/beam type and size
- 3.2.1.9 Type of rail clips used
- 3.2.1.10 Type and size of each hoist wire/chain
- 3.2.1.11 Reeving and winding arrangement
- 3.2.1.12 Maximum wheel loads:
 - 3.2.1.12.1 Vertical kN per wheel
 - 3.2.1.12.2 Transverse kN per wheel
 - 3.2.1.12.3 Bending moment induced by wheels on crane rail: kNm
- 3.2.1.13 Distance between adjacent wheels
- 3.2.1.14 Wheel diameters and material, in particular the wheel tread hardness
- 3.2.1.15 Maximum longitudinal force (braking and buffer): kN
- 3.2.1.16 Maximum power consumption: kW
- 3.2.1.17 Clearance profile: horizontal from centre of rail, vertical from top of rail
- 3.2.1.18 Height, floor to top of crane rails/hanging point and quay to top of crane rails/hanging point
- 3.2.1.19 Rail alignment tolerances (not stricter than BS466 Appendix F or FEM para 8.2.3)
- 3.2.1.20 Detail of hook
- 3.2.2 The design life for the maintenance cranes and hoists must be 30 years, taking due consideration of the effects of corrosion.
- 3.2.3 All maintainable parts must be easily accessible for maintenance.

- 3.2.4 For maintenance cranes the wheels, axles, gearboxes and motors of the bogies must be removable towards the inside of the crane,

i.e. no access must be needed between the bogies and electrical/machine-house walls.

- 3.2.5 Buffers capable of absorbing impact at maximum long travel speed against stops without structural damage to crane/hoist, and maximum longitudinal force as stated in 3.2.1.15, shall be fitted to the bogies.

- 3.2.6 The group classification of the all maintenance cranes/hoists shall be A2 (Class of utilisation U2, State of loading Q2).

- 3.2.7 Electric drive units: gear-motor-brake units where the brakes are disc type, spring applied, electrically released and self adjusting.

- 3.2.8 The hoist braking motion shall be capable of safely controlling the lowering of the load. Should an over-speed occur, the hoist brake shall automatically engage.

- 3.2.9 All wire ropes/chains shall be of the galvanised type and fully lubricated.

- 3.2.10 Chain baskets shall be made of 3CR12 or other stainless steel.

- 3.2.11 All cranes/hoists shall be suitable for extended use in the highly corrosive wet saline atmosphere, and shall comply in all respects with specification EEAM-Q-008 (Corrosion Protection).

- 3.2.12 The hook assembly shall swivel, and the hook must be fitted with a latch. Both must be hot dip galvanised and painted.

- 3.2.13 Where a hoist runs directly on a beam, this entire beam shall be hot dip galvanised and painted.

- 3.2.14 A sturdy anchor point (for securing the crane/hoist during machine operation) shall be supplied on the main machine for each crane/hoist, together with a bracket for storing the pendant and cable in this position.

- 3.2.15 All travel wheels shall be fully painted (excluding running surfaces).

3.3 Electrical requirements:

- 3.3.1 The power supply to all cranes/hoists shall be 400V three phase, 50Hz, with earthed neutral, by means of a highly corrosion resistant festoon cable system or energy chain fitted to the crane rail beam.

- 3.3.2 The supply voltage may vary within the range of 90% to 110% of the nominal, and all equipment shall be suitable for continuous operation in this range.
- 3.3.3 All supplies are to be taken between phases (i.e. the supply system shall be regarded as a 3 phase 3 wire system), and the fourth wire shall be used only for the earthing of the crane.
- 3.3.4 The isolator box must include a switch disconnecter.
- 3.3.5 Slip-ring motors or two speed squirrel cage motors will be preferred for all motions.
 - 3.3.5.1 All motions shall have two speeds: fast and slow.
 - 3.3.5.1.1 The fast speeds shall be stated:
 - 3.3.5.1.1.1 Hoist: m/min
 - 3.3.5.1.1.2 Cross travel: m/min
 - 3.3.5.1.1.3 Long travel: m/min
 - 3.3.5.1.2 The slow speeds shall be approximately one quarter to one third of the fast speed and must be stated:
 - 3.3.5.1.2.1 Hoist: m/min
 - 3.3.5.1.2.2 Cross travel: m/min
 - 3.3.5.1.2.3 Long travel: m/min
 - 3.3.5.2 On hoisting, the control system shall prevent the load from lowering in the case where a load may overpower the motor, particularly when the slow speed is selected.
- 3.3.6 All motors shall be totally enclosed fan cooled induction motors specifically for heavy reversing crane duty, taking the height of lift from ground level into account.
 - 3.3.6.1 The contractor would be required to submit calculations during the contract showing how they arrive at their choice of motor for each motion of the crane.
 - 3.3.6.2 Tenderers must submit with their tender full information on the types of motors and control offered.

- 3.3.7 The cranes/hoists must be controlled from the floor or nearby walkway by using a robust push-button pendant controller suspended from the trolley.
 - 3.3.7.1 The pendant push-button controller shall be enclosed in, or manufactured from a material similar to PVC or polycarbonate.
 - 3.3.7.2 It shall have a degree of protection rating of at least IP65.
 - 3.3.7.3 The pendant controller shall be capable of withstanding rough handling.
 - 3.3.7.4 The push-buttons shall be spring loaded and shall return to the "OFF" position when thumb pressure is released. Separate push buttons shall be provided for each speed of each motion. The type of control whereby the further depression of the push button selects a higher speed for the motion being controlled, is not acceptable.
 - 3.3.7.5 The electrical control circuits to the pendant control shall be supplied at 110 volt from a suitably rated 400/110 volt double wound step-down transformer with the midpoint of the secondary winding effectively earthed.
 - 3.3.7.6 The motion controlled by each push-button shall be clearly engraved.
 - 3.3.7.7 The weight of the pendant shall be supported independently from the flexible electric cable by a stainless steel cable.
 - 3.3.7.8 The controller shall also be provided with a latching red mushroom headed type emergency push button for tripping the main contactor.
- 3.3.8 An electronic overload safety device with audible indication must be provided.
- 3.3.9 Electric motion limiting is required on all motions.
- 3.3.10 All electrical equipment shall be suitable for operation under the conditions listed under clause 2.3 and shall be suitably treated for use in tropical climate where rapid changes in weather conditions can produce severe moisture condensation problems. The equipment shall also be capable of withstanding the highly corrosive effects of the moist saline atmosphere.

3.3.11 For cranes or hoists that will be used exclusively inside an electrical/machinery room, all enclosures of electrical equipment shall have a minimum degree of protection of IP45, and all motors of IP24.

3.3.12 For cranes or hoists that would at any time operate outside an electrical/machinery room, all enclosures of electrical equipment shall have a minimum degree of protection of IP65, and all motors of IP54. The entire crane/hoist shall be suitable for outdoor use and storage.

4 TESTING, COMMISIONING AND GUARANTEES

4.1 Each crane/hoist shall be tested according to BS466 or FEM

4.1.1 A complete and detailed test and inspection protocol for the commissioning of the cranes/hoists shall be submitted by the Contractor to TPT for approval two weeks before the anticipated date for commissioning. The test and inspection protocol shall include all tests and inspections required in terms of BS466 (or FEM), and all other tests and inspections deemed necessary by the Contractor to prove to TPT's satisfaction that the cranes/hoists have been delivered according to the contract.

4.1.2 The manufacturer shall carry out proof load tests at 125% the rated load on the cranes/hoists, at his workshop, to verify that the girder deflection is within the limits specified by BS466.

4.1.3 After manufacture and erection, the Contractor shall satisfy himself that the equipment is complete and in accordance with the contract in all respects, and shall carry out the necessary pre-commissioning tests on the equipment. During this period TPT's representatives will carry out visual inspections of the equipment.

4.1.4 After approval of the commissioning test and inspection protocol by TPT, the Contractor shall fully test the crane according to the protocol in the presence of TPT's representatives.


4.1.5 On completion of the tests, a report shall be prepared by the Contractor, listing the conclusions and findings of the tests. The report shall identify the crane/hoist tested, and shall give the date and location of the tests and the name of the test supervisor. It shall be specific as to the loads, positions, configurations, procedures and findings in each case.

4.1.6 The Contractor shall provide all initial lubrication and consumables required to carry out the tests.

- 4.1.7 All personnel, equipment, test devices and materials required for the approved tests shall be provided by the Contractor, at his cost.
- 4.2 If the a crane/hoist fails any of the tests or inspections, these tests and inspections may be repeated on request by the Contractor -- at the discretion of TPT. If the Contractor wishes to make modifications to the equipment in an attempt to obtain the required performance, this must be approved by TPT. The failed tests shall then be repeated after the adjustments and a modification made by the Contractor has been completed. TPT may also require the repetition of other related tests that might have been affected by the adjustments or modifications.
- 4.3 Notwithstanding the successful completion of the commissioning tests and inspections, the Contractor shall remain liable for defects in the equipment during the defects liability period.
- 4.4 On completion of the commissioning tests the Contractor shall supply in triplicate complete test reports, certificates as necessary, and such statutory documents as are required certifying the class and safe working load of the crane and that the equipment is in complete working order and that all working parts are effectively lubricate Guarantee period:
 - 4.4.1 Notwithstanding the guarantee period of the machine on which the maintenance cranes/hoists are fitted, the Contractor shall guarantee for a period of 12 months after the successful commissioning of the cranes/hoists that all components, plant, equipment and material are new and fit for the specified purpose which they are purchased, and are free from any defects in design, workmanship and material, and are in strict accordance with the Contract, unless otherwise agreed in writing by TPT.
 - 4.4.2 The Contractor shall agree to replace at his cost any defective items discovered within the defects liability period, provided that the equipment has been operated and maintained substantially in accordance with the Contractor's written operating and maintenance instruction, normal wear and tear excluded.

***END OF SPECIFICATION HE 9/2/13 (Version 1) ***

**Annexure H - EEAM-Q-012 SPECIFICATION
GENERAL ELECTRICAL EQUIPMENT(HE8-2-
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KEYWORDS
SPECIFICATION

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GENERAL ELECTRICAL EQUIPMENT

SPECIFICATION HE8/2/2 [Version 4]

February 1997

1. SCOPE

- 1.1. This Specification covers TPT's requirements for low voltage general electrical equipment and must be read in conjunction with the main specification.

2. FACTORY BUILT ASSEMBLIES (FBA) OF SWITCHGEAR AND CONTROL GEAR

This section shall be read in conjunction with BS EN 61439-2:2011 Part 1 and /or IEC 61439 -2.

- 2.1. All electronic control modules, printed circuit boards, electrical control and protection equipment etc. shall be housed in robust enclosures with minimum protection of IP 55 for indoor and IP65 for outdoor usage and shall be designed to protect the equipment from mechanical damage as far as possible.
 - 2.1.1. All enclosures used indoors shall be manufactured from mild steel and enclosures used outdoors shall be manufactured from 3CR12 or stainless steel, and shall be painted in accordance with Specification HE9/2/8.
- 2.2. All equipment shall be housed in a FBA in terms of the following:-
 - 2.2.1. A multi-cubicle-type design shall be used;
 - 2.2.2. The FBA shall be for in- or outdoor installation according to use;
 - 2.2.3. The FBA shall be of the stationary type;
 - 2.2.4. All the cubicles shall be spaciouly made in order to allow easy access for maintenance and troubleshooting.
 - 2.2.5. All enclosures and J-boxes shall be suitably sized to accept all equipment, cables, and terminations, including spares, neatly and without crowding.
 - 2.2.6. Panels and component mounting plates shall be accessible and removable from the front
 - 2.2.7. Covers of electrical enclosures shall be hinged at 95° and where possible at 180° and shall be capable of being opened

to fully expose and allow removal of panels and other equipment mounted inside

- 2.3. Protection against shock should comply with IEC 62262:2002. It shall be by means of:

2.3.1. By using protective circuits;

2.3.2. By discharging of electrical devices;

2.3.3. All the live parts in the assessable areas should be protected using the quality perspex covers.

2.3.4. Barriers or enclosures noting that

Where it is necessary to make provision for the removal of barriers, opening of enclosures, or withdrawal of parts of enclosures (doors, casings, lids, covers etc.), this shall be in accordance with the following requirements:

2.3.4.1. Removal, opening or withdrawal shall necessitate the use of a key or by a locked mechanism in automatic mode.

2.3.4.2. All live parts which can accidentally be touched after the door has been opened shall be disconnected before the door can be opened. This shall be by interlocking the door or doors with a switch disconnecter so that they can only be opened when the disconnecter is open and that the disconnecter cannot be closed when the door or doors is/are open.

If, for reasons of operation, the FBA is fitted with a device permitting authorised persons to obtain access to live parts while the equipment is switched on, the interlock shall automatically be restored on re-closing the door or doors.

2.3.4.3. For withdrawable equipment:

The FBA shall include an internal barrier or shutter shielding all live parts in such a manner that they cannot accidentally be touched when the door is open. It shall either be fixed in place or shall slide into place the moment the door is opened. It shall not be possible to remove this barrier or shutter except by the use of a key or tool.

2.3.4.4. Where applicable, warning labels shall be used.

Where any parts beyond an enclosure need occasional handling (such as replacement of a lamp

or a fuse-link), the removal, opening or withdrawal without the use of a key or tool and without switching off shall be possible only if the following conditions is fulfilled:

A second barrier shall be provided inside the enclosure so as to prevent persons from coming accidentally into contact with live parts not protected by another protective measure. However this barrier need not prevent persons from coming intentionally into contact by by-passing this barrier with the hand. It shall not be possible to remove the barrier except through the use of a key or tool.

- 2.4. It shall be possible for competent electrical personnel to perform the following operations while the assembly is in service and live:

Visual inspection of switching devices and other apparatus;

Adjusting and resetting of relays and releases;

Certain fault location operations, e.g. voltage and current measuring with suitably designed and insulated devices.

- 2.5. Accessibility for maintenance shall be provided by use of barrier protected sub-sections for each functional unit or group.
- 2.6. All panels shall have an internal fluorescent light as well as 230 V 3 point plug fitted.
- 2.7. Anti-condensation heaters shall be fitted when called for by the main specification.

3. AC CONTACTORS

- 3.1. Contactors shall comply with IEC 947-4-1/latest.
- 3.2. Contractors shall be chosen by taking the following factors into account:-
- 3.2.1. Load to be switched;
 - 3.2.2. Utilization category, e.g. AC1, AC2, AC3, AC4, AC11;
 - 3.2.3. Electrical life (Clause 3.3);
 - 3.2.4. Short circuit immunity;
 - 3.2.5. Starting time;

3.2.6. Mechanical life: - All contactors shall have a mechanical life of at least 10 million operations. (1 operation equals 1 make and 1 break).

3.3. The electrical life shall be not less than that laid out below for the following utilization categories:-

Utilisation Category	Electrical Life in Hours
AC 1	8 000
AC 2	6 000
AC 3	8 000
AC 4	2 500
AC 3/4	5 000

The category AC 3/4 is defined as one where the usual operation is in category AC 3 with more than 1% of total operations occurring in AC 4.

For the purpose of determining life in this category the percentage operations in category AC 4 shall be equivalent to the expected value, but shall in any case not be less than 20% of the total.

3.3.1. The duty class shall be at least class 3. Should the operating class exceed that of class 3, i.e. 300 cycles per hour, the actual value shall be used when computing the expected electrical life.

3.4. Block type contactors shall be used for all low voltage motor control applications.

3.5. The maximum thermal current rating shall be at least 1.25 times the rated full load current.

3.6. Auxiliary contacts shall be contained in a separate unit directly operated from the main armature.

3.7. Visual indication by means of a pin or protrusion that the contactor is energized must be provided.

4. **SWITCH DISCONNECTERS**

4.1. Switch disconnectors shall comply with BS 5419 and/or SABS 152.

4.2. The rating of the disconnector shall suit the system fault level and the breaking capacity of the associated moulded case circuit breaker (where used), or fuses, and shall be rated for fault make load break operation.

4.3. The mechanical endurance shall not be less than:-

10 000 operating cycles for rated currents between 0 and 63 A;

3 000 operating cycles for rated currents between 63 and 250 A;

1 000 operating cycles for rated currents exceeding 250 A.

- 4.4. The electrical endurance in the appropriate utilization category shall not be less than 20% of the mechanical endurance.
- 4.5. Where the neutral link is external to the disconnecter and is removable without first opening the disconnecter it shall be labelled in terms of SABS 0142.
- 4.6. The disconnecter shall be interlocked with the front cover of the enclosure in a way to prevent opening of the cover if the switch is "ON". The switch must be able to be switched on with the cover open, only by a competent electrician for maintenance purposes.
- 4.7. The disconnecter shall be suitable for padlocking in the off position.

5. INDICATING INSTRUMENTS AND PROTECTION RELAYS

- 5.1. All indicating instruments shall be flush-mounted industrial type that comply with the relevant clauses of IEC 51-1, IEC 51-2, IEC 51-7, IEC 51-8 and IEC 51-9 and shall have a minimum accuracy of 3% or better and shall have a scale length of not less than 90 mm.
- 5.2. All scales except for thermal ammeters shall be linear and shall be marked in accordance with BS 3693 with the scale selected for the accuracy class.
- 5.3. All instrument glass shall be glare free.
- 5.4. All current operated instruments and protection relays shall be protected against continuous over current of up to 120% of the nominal value as well as short circuit currents that may be experienced.
- 5.5. Ammeters shall be marked with the ratios of the associated current transformer.
- 5.6. Ammeter full-scale deflection shall be 120% of primary current of the associated current transformer.
- 5.7. Voltmeter scales shall indicate 80%-120% of the nominal system voltage. Where 0-120% indication is needed the nominal voltage shall be approximately 75% of full scale. The nominal voltage shall be marked with a red line.

- 5.8. If required by the system or main specification ammeters shall incorporate a thermal maximum demand indicator with a time lag of 15 minutes. A built in saturation current transformer shall be provided to protect the indicator against the maximum fault currents that may be experienced. A resettable pointer shall be provided to indicate the maximum value reached.

6. CONTROL SWITCHES

- 6.1. Control switches shall comply with BS 4749.
- 6.2. "Emergency-stop" push buttons shall be of red colour, shall have one normally closed and one normally open contact and shall be of the mushroom head twist lock type and be lockable in the "off" position.
- 6.3. All push buttons shall have non corrosive appropriately engraved and anodized escutcheon plates fitted.

7. LIMIT SWITCHES

- 7.1. All "end" or "ultimate" limit switches (e.g. slow down, end of travel, maximum travel etc.) shall be of the rotary cam operated type or mechanically operated lever type , housed in an extremely rigid cast iron enclosure with a minimum protection of IP 55, with large roller levers of the spring return-to-neutral action. It is stressed that the entire limit switch must be of an extremely robust construction.
- 7.2. All limit switches shall meet IP65 if external, IP55 if internal and be located in an accessible and maintainable position with the cover easily removable
- 7.3. All limit switches shall be mounted in easily accessible positions to facilitate adjustment, maintenance and replacement.
- 7.4. Magnetic or inductive proximity type limit switches are preferred and are to be used wherever possible.
- 7.5. The limit switch contact form shall be selected to ensure fail-safe operation in the event of a failure of the switch or the switches interconnect wiring
- 7.6. All limit switches shall have factory made threaded connections to the cable, this cable is connected in a connection box situated in the surrounding of the switch (< 2 m)

8. RATING PLATES AND LABELS

8.1. Rating plates complying with the relevant requirements of IEC 298 showing the following information shall be provided:-

- 8.1.1. Manufacturer's name;
- 8.1.2. Manufacturer's type number;
- 8.1.3. Manufacturers serial number
- 8.1.4. Portnet contract number;
- 8.1.5. Year of manufacture;
- 8.1.6. Rated values, etc.

8.2. Identification labels is required on or adjacent to all electrical control equipment, switches, relays, instruments, meters, fuses, MCCB's, test blocks, terminal strips etc. The text shall be in black letters on a white background and shall be at least 5mm in height.

8.2.1. These identification labels shall correlate with the corresponding schematic and wiring diagram and the wording shall be in English.

8.3. All labels shall be of a corrosion resistant material and shall be securely attached.

8.4. Labels shall be placed adjacent to all fuses and circuit breakers to indicate their rating.

8.5. All switching devices shall be provided with labels that indicate ON, OFF, EARTH, as required. These labels shall be permanently marked with characters at least 10 mm in height, and shall be visible to the operator in a normal operating position, in a fixed position or located on a moving component of the switch that is visible through an opening and shall be as follows:-

- 8.5.1. I - white lettering on black background for the ON position;
- 8.5.2. O - white lettering on a green background for the OFF position;
- 8.5.3. Earth symbol in black on a yellow background for earth position.

9. MOULDED CASE CIRCUIT BREAKERS

9.1. Moulded case circuit breakers shall comply with SANS 156:2007.

10. FUSES

- 10.1. Fuse links shall be of a high rupturing capacity type complying with SABS 172 and/or BS 88. Fifty percent spare fuse links of each size shall be supplied loose at handover of the equipment.

11. RESISTANCE UNITS

- 11.1. Resistance units shall be made up of standard modules (mill-banks). These shall be to Nema 26.5" dimensional standards and each bank shall be made up of grids of one size only. The grids shall be of the heavy duty stamped chromium steel or nickel chromium alloy corrosion resistant grid type. There must be a terminal tap on every second grid.
- 11.2. Modules must be easily removable without the need to dismantle any part of the enclosure.
- 11.3. All taps and terminations shall be clearly identified with relevant numbers, which must correspond to the numbering shown on the schematic and wiring diagrams.
- 11.4. The resistance banks shall be enclosed in robust well ventilated drip-proof enclosures with louvred side and rear fixed covers. All units shall be accessible from the front only by "lift-off" type doors. Exterior and interior surfaces of the enclosure shall be painted with a suitable heat-resistant paint.
- 11.5. The resistance enclosed shall be arranged for floor mounting and bottom entry of electrical cables.
- 11.6. Warning labels shall be provided
- 11.7. Resistors shall be accessible from both sides of the enclosure
- 11.8. When resistance enclosure doors are removed, all terminals on resistance tapplings, the terminal blocks, cable terminations and the individual grid banks must be readily accessible.
- 11.9. Resistance units shall be mounted in accessible positions as near to their motion panels as is practical. Cast iron, sheradized mild steel, or wire wound resistances are not acceptable. All insulation used in the construction of the resistances must be fire proof and non-hygroscopic. Soldered joints must not be used in connection to resistances.
- 11.10. The resistances must be designed to at least Nema Class 174 P rating for hoist drives and Nema Class 94 rating for permanently connected resistances and shall be capable of prolonged operation in service without overheating.

NOTE: Resistances mounted in or on top of the control panels will definitely not be acceptable.

11.11. Resistance units shall be individually designated to indicate to which motion they apply.

12. POWER FACTOR CORRECTION AND HARMONIC FILTERING EQUIPMENT (IF ASKED FOR IN THE MAIN SPECIFICATION)

12.1. Capacitors must comply with BS EN 60871-1:2005 and shall have passed the routine tests specified.

12.2. Capacitors must be of the "dry" metallized film or paper "self sealing" type, impregnated with a non PCB, fully biodegradable non-toxic dielectric.

12.3. Each capacitor must be fitted with an external HRC fuse rated at 2 times capacitor full load current, for protection.

12.4. Capacitors must be fitted with discharge resistors to discharge the capacitor voltage to less than 50 V in one minute.

12.5. Inrush currents of capacitors must be kept to an acceptable level by using reactors or resistors. Details of actual and allowable inrush currents to be given in tender documents.

12.6. Capacitors should be mounted vertical with the terminations on the top.

13. WIRING AND CABLES

13.1. All cables for fixed installations must comply with SABS 1507, except where special cables have otherwise been specified.

13.2. Steel wire armoured cables must be used where the possibility of mechanical damage exists.

13.3. Armouring of cables will not be used for earthing purposes or any return circuit but shall be bonded to earth. An earth conductor shall be provided in each cable for earthing purposes. If an earth core is not provided a separate, appropriately coloured, insulated earth wire shall be run.

13.3.1. Metallic structures shall not be used for any return or earthing circuit under normal operating conditions but all structures shall be electrically bonded together with welding type cables.

13.4. Spare cores and terminals for all control cables shall be provided as follows:

<u>Number of Conductors/Cables</u>	<u>Spare Cores</u>
3 - 6	1

7 - 12	3
Over 12	4

13.5. The standard method for numbering small wiring shall be as indicated in NRS 003, Annex A.

13.6. Colour coding of cables

13.6.1. Unless otherwise agreed to the colour of all auxiliary and control wiring (except earth wires) shall be grey. The colour of earth wires shall be green/yellow.

13.6.2. All three phase supplies shall be colour coded red, white and blue.

13.6.3. Single phase supply cables shall be blue for neutral and brown for live.

13.6.4. DC supply cables to motors, fields, magnets etc. shall be orange.

13.6.5. If the correct colour cables are not available cable ends may be marked with "air-shrink" or "heat shrink" type insulation material for ± 200 mm. Colour coding of cables with insulation or marking tape is not acceptable.

13.7. Cable Installation on structures and in electrical rooms etc:

13.7.1. Except where otherwise specified, the entire electrical installation including the wiring, shall where applicable, be in accordance with the "Code of Practice for the Wiring of Premises" (SANS 10142-1:2012) or the IEEE Wiring Regulations for Electrical Installations.

13.7.2. The cables must be installed by the following methods:

13.7.2.1. In cable ducts or hollow floors with covers;

13.7.2.2. On structures, strapped to cable trays or in electrical conduits, with protection against mechanical damage where necessary.

13.7.2.3. No loop-in wiring shall be permitted. All limit switch and field wiring shall return to junction boxes for re-marshalling.

13.7.2.4. All cable glands shall be corrosion resistant glands of the "Posi" or "Pratley Envirogland", Exe type, or similar.

13.7.2.5. Junction and connection boxes must be manufactured in glass fibre reinforced polyester with

threaded brass inserts and earthing continuity rods, and must be suitable for threaded (minimum 8 threads) glands. The minimum enclosure protection must be IP65. Pratley "EZEE-FIT" or similar boxes will be preferred.

13.7.2.6. The number and size of cables that may be accommodated in cable ducts, trays or conduits shall be in accordance with the manufacturer's recommendations and the temperature rise permissible for the cables used for the load that may be carried.

13.7.2.7. All the cable trays and cable ducts should be earthed properly

Internal panel wiring shall be in accordance with BS 6739:2009

13.7.3. All instruments and control wiring shall be carried out in minimum size of 1.5mm² cross section, with stranded copper conductors. Wires connected to current transformers shall have a minimum cross sectional area of 4 mm².

13.7.4. The communication cores of screened cable shall have a minimum area of 1 mm².

13.7.5. The wiring shall be done in a neat and orderly manner using any of the two methods below:

13.7.5.1. In covered switchboard type wire channels or,

13.7.5.2. Suitably strapped with approved strapping material.

13.7.6. When wiring is looped from the cubicle interior to the door or to the back it must be suitably strapped and enclosed in a flexible conduit.

13.7.7. Cable Trays:

13.7.7.1. Cable trays shall be of "Unistrut" or similar and equal manufacture and shall consist of butting sections made from stainless steel of minimum thickness of 1.2 mm. Cable trays shall be painted according to Specification HE9/2/8 for colour coding purposes.

13.7.7.2. Cable trays shall be bolted to structures on both horizontal and vertical runs at centres recommended by the number and mass of cables carried. Maximum distances 1.3. Metre for steel.

13.7.7.3. Each section of metal cable tray must be provided with a stainless steel connection tab/lug at each

end prior to being painted, for continuous earthing purposes.

13.7.7.4. All cable trays in areas exposed to likely mechanical damage shall be covered

13.7.7.5. Cable tray systems, where accepted for use, shall be designed, fabricated and installed such that wiring is not subject to damage. Cable trays shall have continuous, removable covers for access

13.7.7.6. Cable tray covers shall be secured using stainless steel screws

13.8. Terminals and connections:

13.8.1. All terminal connections shall be done with good quality connectors and/or lugs and each wire end shall be marked with durable tags or clips on which shall be clearly and indelibly marked, the identifying code numbers of each wire, corresponding to the wiring diagrams.

13.8.2. The system of wire and terminal numbering shall be provided in the terminal boxes for possible additional wiring.

13.8.3. A minimum of 20% but not less than 4 spare terminals shall be provided in the terminal boxes for possible additional wiring.

13.8.4. Box type rail mounted terminals complying with EN 50035 with a pressure pad between the conductor and clamping screws shall be used. Cage clamp systems may also be used except in areas where high shock forces exist, e.g. on spreader beam or headblock equipment.

13.8.5. Moulding and insulation materials shall be resistant to flame or self extinguishing as required by IEC 216.

13.8.6. Access to all terminals shall be through doors, covers etc.

13.9. Flexible Connections:

13.9.1. Where wiring crosses from one structure to another and relative motion between the structures is possible, a welding type cable earth bond shall interconnect the two structures.

13.9.2. Flexible connections shall be made with heavy duty flexible cord using watertight terminators. Where the length of cable is greater than 1.6. Metres a basket type cable grip shall be provided at each end.

- 13.9.3. Flexible cables shall run in free air and shall not contact other cables or structures.

14. PROTECTION AGAINST CORROSION


- 14.1. All enclosures, cabinets etc. shall be manufactured from 3CR12 or similar stainless steel sheeting, as called for in the main specification and shall be painted according to Specification HE9/2/8 for identification.
- 14.2. All fixing screws, bolts, nuts, washers, clips, terminals, brackets, etc. shall be stainless steel.

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END OF SPECIFICATION EEAM-Q-012

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**Annexure I - EEAM-Q-014 SPECIFICATION
FOR ELECTRICAL MOTORS AND
GENERATORS**

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1. SCOPE

- 1.1. This Specification and Appendix covers TPT's requirements for electrical motors and generators and must be read in conjunction with the main Specification.
- 1.2. All motors offered shall have performances and dimensions complying with SABS 948, VDE 0530, or BS 4999 and BS 5000 and other relevant standards.
- 1.3. Tenderers shall furnish detailed calculations including load cycle diagrams, max. torque/ RMS comparison, service conditions, derating factors, insulation, duty type and cyclic duration factors, etc. with their tenders, indicating how they arrive at the kW rating of all machines and to support their choice of each motor. All parameters and variables used in the calculations must be clearly defined.
- 1.4. The preferred nominal voltage for AC motors under 132kW shall be 400 V 3-phase, 50 Hz.
 - 1.4.1. Motors 132 kW and above must be supplied from 3.3 kV unless otherwise approved.
- 1.5. For variable frequency variable speed drives the motor shall be correctly rated for all speeds over which it is envisaged to run the motor, and power calculations shall show the torque and kilowatts required for each speed. The highest torque needed will be determined by the power of the motor selected. The torque/speed/power relationship must be observed. The variable frequency supply unit shall have at least twice motor full load current amperage capacity.
- 1.6. The full load efficiency of electrical motors and generators shall not be less than 80%, except for motors under 3 kW in which case not less than 60%.
- 1.7. All motors shall have a minimum degree of protection of IP 54 to IEC 144, except for motors which are installed in a clean and controlled environment for which the minimum protection is IP 23.
 - 1.7.1. Suitable drain holes shall be provided at the lowest points in the machines to allow condensed moisture to escape.
 - 1.7.2. Motor frames and endshields shall be cast iron unless otherwise approved.

- 1.8. All motors shall be equipped with parallel shafts to metric standards with keyways parallel to the axis and screwed ends.
- 1.9. All motors 18,5 kW and above and all motors which can become covered with product dust, shall be fitted with the following over temperature protection equipment:-
 - 1.9.1. Positive temperature coefficient thermister (PT100) type sensors fitted to the stator windings to trip the motor overloads when the temperature reaches the maximum stipulated for class B insulation at 45°C ambient temperature;
 - 1.9.2. Bearings are to be fitted with positive temperature coefficient RTD type sensors, embedded in the bearing housing of each bearing, set to trip according to the manufacturer's specification.
- 1.10. All DC Motors must be fitted with over speed trip devices on the motor shafts.
- 1.11. All motors shall be supplied with anti-condensation heaters (unless otherwise approved), terminated in a terminal box (No loose leads).
 - 1.11.1. Low voltage heating of the stator windings may be used on small motors.
- 1.12. The insulation of all motors shall be to at least class "F". Additional impregnation shall be used for the high relative humidity conditions. Temperature rise of motors on full load shall not exceed the temperature limits as laid down for class "B" insulation.
- 1.13. The material used in construction of sliprings and brush gear shall be corrosion resistant. The insulation shall be at least class "F" and non hygroscopic and specially designed to avoid tracking due to deposition of saline moisture.
 - 1.13.1. Sliprings shall be manufactured from electrical quality brass. Brush gear shall either be brass or stainless steel.
 - 1.13.2. Sliprings shall preferably be fitted with a brush lifting and short-circuiting device.
- 1.14. Provision shall be made for easy access to sliprings, brush gear and bearings.
- 1.15. Where an electrical motor needs to be braked a suitable method shall be used e.g. mechanical, reverse current, D.C. injection, thyristor controlled etc. (Preferably electrical to 10% of rated speed, then mechanical to hold load etc.)
- 1.16. In addition to the normal data, motor name plates shall show the

following information (where applicable):-

- 1.16.1. Bearing particulars;
 - 1.16.2. Lubrication data;
 - 1.16.3. Thermostat details;
 - 1.16.4. Anti-condensation heater details;
 - 1.16.5. Grade of brush for slip rings.
- 1.17. Suppliers must state the specifications to which all motors and generators are manufactured.
- 1.18. Motor Tests and Certificates:**
- 1.18.1. Type test certificates in respect of the current design of each motor or generator shall be submitted in addition to routine test certificates. Motors or generators for which type test certificates are not available are not acceptable.
 - 1.18.2. One motor of each size for all motors over 30 kW must be subjected to a type test as well as routine tests at the manufacturer's premises. Tenderers must include for these costs in their offer.
- 1.19. Motor Starters and Controllers:**
- 1.19.1. Motor starters shall comply with BS 587 and/or BS 4941 Part 1 or other relevant standards.
 - 1.19.2. All motor starters shall generally be provided with the following:
 - 1.19.2.1. Switch disconnectors;
 - 1.19.2.2. Fuses for short circuit protection;
 - 1.19.2.3. Contactors;
 - 1.19.2.4. Overload, phase imbalance and single phasing protection devices;
 - 1.19.2.5. Earth leakage protection;
 - 1.19.2.6. Control relays;
 - 1.19.2.7. Under voltage protection. (Contractors dropping out to disconnect the motor from the supply when the supply voltage falls below 65% of the nominal value are acceptable);

- 1.19.2.8. Emergency stop buttons;
- 1.19.2.9. Overspeed trip devices where applicable;
- 1.19.2.10. Voltmeter and ammeter connected to the incoming supply side of the main contactor;
- 1.19.2.11. All motors 55 kW and above shall be fitted with capacitors to correct their power factor to at least 0,97 lagging.
- 1.19.3. All starters and controllers must be marked designating the type of starter, rating etc.
- 1.19.4. A diagram of connections of each motor and schematic diagram of the control circuits in booklet form, size A4 shall be housed in the main panel.
- 1.19.5. The operating voltage of the motor starter shall be 231 V AC which shall be supplied by means of a 400/231V transformer (which has an earthed screen between the primary and the secondary windings) for each motor starter panel.
- 1.19.6. All equipment associated with a motor starter shall be housed in the same cubicle/enclosure and control buttons and selector switches shall be fitted on the cubicle door.
- 1.19.7. Where low voltage motor starters are a considerable distance away or not visible from the motor, a remote start/stop station with a lockable switch disconnecter must be provided at the motor for maintenance purposes.
- 1.19.8. The type of starter shall be (based on an expected voltage drop of $\pm 5\%$ of nominal supply voltage during starting).
 - 1.19.8.1. "Direct-on-line" for motors up to 30 kW.
 - 1.19.8.2. AC variable speed drives for motors of 30 to 132 kW.
 - 1.19.8.3. Motors over 132 kW will be supplied from 3.3 kV 3-phase AC and started direct-on-line unless otherwise specified.
- 1.19.9. Tenderers may alternatively tender for electronically controlled starters and solid state motor protection devices. Full details must be submitted.
- 1.19.10. All resistors used with rotor-resistance starters shall be adequately rated for normal operating duty of the machine and shall be of robust construction, suitably protected and

enclosed and not subject to fatigue or disintegration due heating or vibration.

- 1.19.11. Starters for medium voltage motors must comply with Specification HE8/2/11.

1.20. Over-load Protection:

- 1.20.1. Motor protection relays shall comply with BS 4941 Part 1, IEC 292-1, 1975, or other relevant standards.

- 1.20.2. Motor starters up to 30 kW shall have adjustable 3 phase electronic thermal overload relays with stalled overload protection, selectable tripping class, as well as ground fault protection.


- 1.20.2.1. Motor starters of 30 kW and larger shall be fitted with current-transformer operated solid state motor protection relays.

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END OF SPECIFICATION HE8/2/3 [VERSION 5]

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**Annexure J - EEAM-Q-015 SPECIFICATION
FOR ELECTRICAL MOTORS AND
GENERATORS-TECHNICAL DATA SHEET
(he8-2-3ver5 annexure 1) -wcs-C**

REVISION 0	REFERENCE TPT-EEAM-Q-015		
DOCUMENT TYPE: DATA SHEET			
TITLE: ELECTRICAL MOTORS AND GENERATORS - TECHNICAL DATA SHEET - ANNEXURE 1		PAGE 0 of 2	
COMPILED BY: QUALITY MANAGER (COE) KRIS NAIDOO _____ Date:	REVIEWED BY: ENGINEERING MANAGER (COE) JESSENDRAN PILLAY _____ Date:	REVIEWED BY: PRINCIPAL ENGINEER (COE) ROFHIWA TAKALANI _____ Date:	
REVIEWED BY: CHIEF ENGINEER (COE) SABELO MZIMELA _____ Date:		AUTHORIZED BY: GENERAL MANAGER ENGINEERING JOSIAH MPOFU _____ Date:	
FUTURE REVISION RECORD NUMBER	DESCRIPTION OF REVISION	APPROVAL	DATE
Revision -1-			
CONTENTS			
1.0	NAME AND ADDRESS OF TENDERS	Page 01	
2.0	ELECTRICAL MOTORS	02	
KEYWORDS DATA SHEET		DATE OF LAST REVIEW: N/A DATE OF NEXT REVIEW: 2019-02-01	

**TRANSNET PORT TERMINALS
A DIVISION OF TRANSNET LIMITED**

TECHNICAL DATA SHEET

[Information to be completed by the Tenderer and submitted as part of his tender]

NOTE: TENDERERS SHALL LIST EVERY ITEM OF EQUIPMENT SPECIFIED IN THE SPACE PROVIDED BELOW. SHOULD THE SPACE BE INSUFFICIENT, ADDITIONAL COPIES OF THESE PAGES SHOULD BE MADE.

1	NAME AND ADDRESS OF TENDERER
----------	-------------------------------------

2	ELECTRICAL MOTORS
----------	--------------------------

2.1	Application driven:	
2.2	Name of manufacture of motor:	
2.3	Manufacturer's type number:	
2.4	Type of motor	
2.5	Continuous at sea level [kW]:	
2.6	Speed (r.p.m.):	
2.7	Voltage rating:	
2.8	Motor characteristics:	

		FL	$\frac{3}{4}$ Load	$\frac{1}{2}$ Load	No load
2.8.1	Speed (r.p.m.)				
2.8.2	Current [A]				
2.8.3	Torque [Nm]				
2.8.4	Power factor				
2.8.5	Efficiency [%]				

2.9	Direct on line starting current [A]:	
2.10	Starting current with starter offered [A]:	
2.11	Pull-out torque [Nm]:	
2.12	Speed at pull-out torque (r.p.m.)	
2.13	Current at pull-out torque [A]:	
2.14	Type of bearing [e.g. ball/roller]:	
2.15	Type of enclosure [see IEC 144][IPXX]:	
2.16	Method of cooling [ICXX]:	
2.17	Thermal limit capacity [locked rotor time][s]:	
2.18	Mounting [foot or otherwise]:	

2.19	Shaft diameter:	
2.20	Shaft length:	
2.21	Design code	
2.22	Frame size	
2.23	Service factor	
2.24	Locked rotor indicating code letter	
2.25	Peak Power	
2.26	Time rating	
2.27	Rated volts	
2.28	Full load amps	
2.29	Insulation class	


TENDERER'S SIGNATURE:	DATE:
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END OF EEAM –Q-015

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**Annexure K - EEAM-Q-017 SPECIFICATION
FOR MEDIUM VOLTAGE SWITCHGEAR AND
CONTROL GEAR FOR SUBSTATIONS(HE8-2-
5Ver6) -wcs-C**

REVISION 0		REFERENCE TPT-EEAM-Q-017																		
DOCUMENT TYPE : SPECIFICATION			AUTHORISATION DATE: 2019-01-29																	
TITLE: SPECIFICATION FOR MEDIUM VOLTAGE SWITCHGEAR AND CONTROL GEAR FOR SUBSTATIONS				PAGE 1 of 15																
COMPILED BY: QUALITY MANAGER (COE) KRIS NAIDOO _____ Date:		REVIEWED BY: ENGINEERING MANAGER (COE) JESSENDRAN PILLAY _____ Date:		REVIEWED BY: PRINCIPAL ENGINEER (COE) ROFHIWA TAKALANI _____ Date:																
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FUTURE REVISION RECORD NUMBER	DESCRIPTION OF REVISION	APPROVAL	DATE																	
Revision -1-																				
<p style="text-align: center;">CONTENTS</p> <table> <tr> <td>0.0</td> <td>SCOPE</td> <td style="text-align: right;">Page</td> </tr> <tr> <td>1.0</td> <td>GENERAL REQUIREMENTS</td> <td style="text-align: right;">04</td> </tr> <tr> <td>2.0</td> <td>MEDIUM VOLTAGE SWITCHGEAR PANELS</td> <td style="text-align: right;">04</td> </tr> <tr> <td>4.0</td> <td>EARTHING AND BONDING</td> <td style="text-align: right;">05</td> </tr> <tr> <td>5.0</td> <td>PROTECTION AGAINST CORROSION</td> <td style="text-align: right;">15</td> </tr> </table>						0.0	SCOPE	Page	1.0	GENERAL REQUIREMENTS	04	2.0	MEDIUM VOLTAGE SWITCHGEAR PANELS	04	4.0	EARTHING AND BONDING	05	5.0	PROTECTION AGAINST CORROSION	15
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1.0	GENERAL REQUIREMENTS	04																		
2.0	MEDIUM VOLTAGE SWITCHGEAR PANELS	04																		
4.0	EARTHING AND BONDING	05																		
5.0	PROTECTION AGAINST CORROSION	15																		
KEYWORDS SPECIFICATION			DATE OF LAST REVIEW: N/A DATE OF NEXT REVIEW: 2019-02-01																	

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**MEDIUM VOLTAGE SWITCHGEAR AND CONTROL GEAR
FOR SUBSTATIONS**

**SPECIFICATION HE8/2/5
[Version 6]**

October 1995

1. SCOPE

- 1.1. This specification covers Transnet's requirements for medium voltage switchgear and control gear to be installed in sub-stations and is based on the various NRS (Rationalized user specifications) referred to. All potential electrical suppliers of the equipment must be in possession of the relevant NRS specifications.

2. GENERAL REQUIREMENTS

- 2.1. All equipment shall be suitable for service in the system and environmental conditions specified in the main specification.
- 2.2. Medium voltage cables shall comply with NRS 013:2007/latest and pilot cables with NRS 011:2001/latest except where special cables have otherwise been specified.
- 2.3. General electrical equipment must comply with Transnet's Specification HE8/2/2.
- 2.4. Routine as well as type test certificates of all equipment certified by a recognised testing authority shall be supplied in duplicate.
- 2.5. The pollution level (NRS035:2002) shall be taken as medium (creepage distance of 20mm/kV) for all equipment installed indoors or inside enclosures with a minimum protection of IP55. For equipment installed outdoors the pollution level shall be taken as "Heavy" (creepage distance of 25 mm/kV).
- 2.6. Enclosures for cable termination in air shall comply with SANS 876:2013.
- 2.7. Mini-substations shall comply with SANS 1029:2010.
- 2.8. Insulated bushings shall comply with SANS 1037:2011.
- 2.9. Battery chargers shall comply with SANS 1652:2013.
- 2.10. Definitions in this specification are according to NRS 040-1:1999, High voltage operating regulations (Definitions).
- 2.11. Work on medium voltage equipment shall be carried out in accordance with the Safety Instructions: High-Voltage Electrical Equipment of Spoornet.
- 2.12. Earthing in the sub-stations should comply with NRS 040-6:2009

3. MEDIUM VOLTAGE SWITCHGEAR PANELS

These clauses are based on the requirements of SANS 1885:2012 and highlights Transnet's preferences for alternatives given there in.

3.1. Metal enclosed ring main units shall comply with SANS 1874:2012.

3.2. General:

3.2.1. The type of switchgear to be used for the equipment will either be circuit-breakers, switch-disconnectors or switch-fuses, as specified in the main specification and shall be suitable for the specified fault levels and suitably rated for the equipment they feed.

3.2.2. Each switchgear panel shall be a self-contained unit with a minimum degree of protection of IP44 for indoor use and IP55 for outdoor use or as specified in the main specification.

3.2.3. Access to equipment installed inside switch-gear panels (e.g. current transformers, cable terminations etc.) shall be such that removal and replacement there of can be conveniently carried out with the panels on site, by removal of barriers or covers fixed with screws (not self tapping).

3.2.4. Anti-condensation heaters shall be provided to ensure that no condensation can occur in any of the compartments. A switch shall be provided to control the heaters.

3.2.4.1. The heaters shall be supplied from 230V AC.

3.2.4.2. The wiring from the heater elements to connection terminals shall be high temperature insulation covered, with a suitable compression-type gland.

3.2.5. Panels shall have the following equipment or as specified in the main specification:-

3.2.5.1. Isolating and switching devices;

3.2.5.2. Medium voltage contactors;

3.2.5.3. Striker pin trip feature for HRC fuses;

3.2.5.4. Voltage transformer/s;

- 3.2.5.5. Current transformers;
 - 3.2.5.6. Ammeter and volt meter with selection switch as well as phase rotation indicator;
 - 3.2.5.7. Protection relays, instruments, control fuses, push buttons etc. mounted on the front of the panel;
 - 3.2.5.8. Busbars;
 - 3.2.5.9. Earthing devices;
 - 3.2.5.10. Normal/test switch and circuitry for testing of the panel without the medium voltage present.
 - 3.2.5.11. Differential protection type control voltage shall be designed to always monitor the 3 phases on the incoming and outgoing side of the switch-gear.
- 3.2.6. Where fixed type switchgear is installed and the switchgear is fed from a common busbar, a disconnecter shall be installed on the incoming side of the switching device.
- 3.2.6.1. These panels shall be provided with an armoured glass window to visually inspect the state of the disconnecting and switching devices.
 - 3.2.6.2. A notice bearing the following inscription shall be provided adjacent to the operating mechanism of the disconnecter:-

"DO NOT OPERATE UNDER LOAD"
- 3.2.7. Voltage transformer operated or DC battery operated switching devices as required by the main specification must be offered.
 - 3.2.8. Trip and live circuit indication shall be provided on the front of the switchgear panel.
 - 3.2.9. Continuous neon lamp or light emitting diode indication for switching device shunt trip healthy shall be provided on the panel.
 - 3.2.10. All joints and tees in busbars shall be made with hot-dipped galvanized high tensile steel bolts, nuts and washers.
 - 3.2.11. High voltage and low voltage equipment shall be housed in separate compartments.
 - 3.2.12. The busbars shall be contained in a separate compartment. For air

insulated equipment this compartment shall be easily accessible and shall be fitted with removable panels secured by means of an adequate number of screws. (Not self tapping).

- 3.2.13. SF6 switching devices shall be fitted with a pressure gauge to monitor gas pressure.
- 3.2.14. Each switchgear panel shall be provided with a suitable panel pack ("P" pack), jointing pack ("J" pack) as well as switchboard accessories pack ("S" pack).
- 3.2.15. Only one test pack for each type of switching device supplied shall be provided for testing the switching device in the isolated position.
- 3.2.16. The SF6 gas input shall be marked clearly to identify the input during the next recharge in case if required.

3.3. Circuit-breaker panels:

- 3.3.1. The circuit-breaker shall be of the vertical or horizontal isolating, draw out, truck type, as specified in the main specification.
- 3.3.2. Circuit-breakers shall be of the sulphur-hexafluoride (SF₆) or vacuum type.
- 3.3.3. Both the cable as well as busbars shall be provided with earth fault facilities, unless otherwise approved.
- 3.3.4. The breaker panel shall be provided with the necessary over current and earth fault on the bus bars / current transformers and associated digital protection relay and control equipment for short circuit, overload and earth fault protection.
- 3.3.5. The control voltage should be derived from the 3-phases in order for the best protection on the potential transformers.

3.4. Switch-disconnector panels:

- 3.4.1. Integral type circuit test facilities shall be provided.
- 3.4.2. Disconnector panel should be provided with the earth protection when switched OFF.
- 3.4.3. Proper marking on the disconnector panels shall be provided for the easy understanding of the maintenance personnel during the ON operation and OFF operation.

3.5. Switch-fuse panels:

-
- 3.5.1. Integral three-pole earthing facilities to earth both sides of the switching device shall be provided, unless otherwise approved.
 - 3.5.2. Fuses shall be of the air-insulated, cartridge striker pin type.
 - 3.5.3. Integral type circuit test facilities must be provided.
 - 3.6. Cable termination compartments:
 - 3.6.1. Cables shall terminate in air-insulated compartments complying with SANS 876:2013
 - 3.6.2. Insulated gland plates with substantial copper earthing strips connected to the earth terminal shall be provided for termination of cables.
 - 3.6.3. Proper earthing connectors shall be provided
 - 3.6.4. Differentiation should be shown between the control and power earthing
 - 3.7. Current transformers:
 - 3.7.1. Current transformers shall comply with IEC60044-8
 - 3.7.2. Current transformers shall have the following minimum accuracy classes:-
 - 3.7.2.1. Indicating instruments - 3.
 - 3.7.2.2. Protection purposes - 10P10.
 - 3.7.2.3. Metering purposes - 0.5.
 - 3.7.3. The secondary rating of the transformer shall be either 1 or 5 amp as required by the protection or metering equipment. However the tenderer should be selecting appropriately and submit the design for the review of TPT.
 - 3.7.4. Core balance current transformers used for earth fault protection shall have an injection test winding.
 - 3.8. Voltage transformers:
 - 3.8.1. Voltage transformers shall comply with IEC 60044-7
 - 3.8.2. Dry type voltage transformers of the withdrawable type shall be provided in switchgear panels for the provision of 230 V AC control voltage as well as 230V AC anti-condensation heater supplies and for voltage instrument indication and phase rotation, or as required by the main specification.
-

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- 3.8.3. Voltage transformers shall have the following minimum accuracy classes:
 - 3.8.3.1. Indicating instruments - 3;
 - 3.8.3.2. Protective systems - 6P;
 - 3.8.3.3. Metering - 0.5.
 - 3.8.4. The primary of the voltage transformer shall be connected to the busbar side through high-voltage fuse-links.
 - 3.8.5. The potential transformers should be connected in such a way that there is consideration of the differential protection of the switch-gear circuit.
 - 3.8.6. Secondaries of voltage transformers shall be protected by MCCB's mounted on panel doors.
 - 3.8.7. The rating of the transformer shall be suitable for the connected load but shall be a minimum of 100 VA per phase.
 - 3.8.7.1. In the case of solenoid closing mechanisms the voltage transformer shall be capable of closing the switching device twice in quick succession without overheating.
 - 3.8.7.2. Where DC closing circuits are used the voltage transformer shall be connected to its own suitable silicon rectifier, adequately rated for the duty, and provided with surge protection.
- 3.9. Control, protection and alarm circuitry:
- 3.9.1. Control, protection and alarm systems and circuitry shall be as required by the system or as specified in the main specification but shall be approved by Transnet's.
 - 3.9.2. Voltage as well as ammeter selector switches shall be provided.
 - 3.9.3. All the control protection shall be considered using the voltage derived from differential protection.
 - 3.9.4. Proper earthing for the control circuits shall be provided
 - 3.9.5. All the alarms, protection shall be interlocked and logged in case of the switchgear is connected in the circuit integrated with PLC and CMS.
 - 3.9.6. The circuit breakers in the outgoing shall be made in the trip circuit of the switch-gear protected for all type of alarms and trips considered from the
-

switch-gear.

3.10. Auxiliary supplies:

3.10.1. Control supplies can be either of the following as required by the main specification:

3.10.1.1. Voltage transformer, 230V AC;

3.10.1.2. Voltage transformer and rectifier 230VAC / 24V DC

3.10.1.3. V DC battery operated if applicable.

3.10.2. Nickel-Cadmium or Lead Acid batteries of the vented wet cell type complying with SANS 60335-2-107:2013 is preferred.

Note: Only the same battery type e.g. Lead acid or Nickel-Cadmium as originally installed or which are presently installed in a substation shall be offered.

3.10.2.1. The number of cells and capacity of batteries shall be determined from the voltage requirements of the system closing and tripping circuitry. The capacity shall be sufficient to perform the largest requirements of the following (without the aid of the battery charger):-

3.10.2.1.1. Five successive tripping and reclosing operations of 20% of the switching devices supplied by the battery, or;

3.10.2.1.2. Single tripping and reclosing of all the switching devices supplied by the battery plus supplying all the standing loads on the battery for at least 10 hours.

3.10.2.2. The battery set shall be accommodated on a battery stand or in a dedicated battery compartment on shelves suitably arranged to facilitate inspection and maintenance as required. No other equipment shall be mounted inside such compartments.

3.10.2.2.1. The compartment shall be adequately ventilated to prevent the build-up of heat or explosive gasses which may accumulate during the recharging cycle.

3.10.2.2.2. The level of electrolyte shall be clearly visible

and sufficient space shall be provided to enable the electrolyte to be topped up when necessary.

- 3.10.2.2.3. The shelves or trays shall be manufactured from stainless steel and shall be supplied with suitable drain holes and plastic piping to drain spilled liquid to a suitable container.

3.10.3. Battery chargers shall comply with SANS 1652:2013.

3.11. Protection Relays and instruments:

3.11.1. Ammeters shall incorporate thermal maximum demand indication.

3.11.2. Accuracy for all indicating instruments shall be at least 3%.

3.11.3. Energy meters shall comply with IEC 62053-61 and shall have the following features:-

- 3.11.3.1. be suitable for 3 phase unbalanced and asymmetrical systems;

- 3.11.3.2. be of accuracy class 2;

- 3.11.3.3. must not be of the plug-in type;

- 3.11.3.4. shall have digital type cyclometer dials.

- 3.11.3.5. Maximum demand indicators shall:-

- 3.11.3.5.1. be of the thermal type, unless integrated into digital relays;

- 3.11.3.5.2. operate over a 15 minute period;

- 3.11.3.5.3. indicate vKA or kW as required.

- 3.11.3.6. All energy meters shall be tested and calibrated by a recognised testing authority.

3.11.4. Protective relays shall be designed, manufactured and tested in accordance with BS 142:2002 or IEC 60055-444.

- 3.11.4.1. Protective relays shall have been type tested to verify performance and safety. Proof of these tests in the form of type test certificates shall be included in tender documents.

- 3.11.4.2. Relays shall have the following minimum ratings:

- 3.11.4.2.1. Error class rating of 10;
- 3.11.4.2.2. Operating time class index of 60;
- 3.11.4.2.3. Rated number of contact operations with electrical duty class index N3;
- 3.11.4.2.4. Mechanical stability class index S2.
- 3.11.4.3. Relays shall:
 - 3.11.4.3.1. have three over current elements for each pole;
 - 3.11.4.3.2. be rated in conjunction with its associated current transformer(s), to withstand the over current in the secondary winding of the current transformer/s under fault conditions;
 - 3.11.4.3.3. be continuously rated for any current setting;
 - 3.11.4.3.4. be clearly marked with the current ratio of the current transformer associated there-with;
 - 3.11.4.3.5. be directional;
 - 3.11.4.3.6. have contacts rated to make and carry the current of their associated circuits. The trip coil current shall be interrupted by auxiliary contacts on the circuit breaker;
 - 3.11.4.3.7. have manual reset for short circuit, earth fault and phase failure;
 - 3.11.4.3.8. have an additional set of normally open and normally closed contacts, or auxiliary relays, for remote indication of the relay operation. The contacts shall be capable of handling 50 W in the range of 24 to 110 V DC, and shall be wired to a terminal strip at the back of the panel.
- 3.11.5. Digital protection relays with the following features or as required by the system or as specified in the main specification shall be supplied:-
 - 3.11.5.1. Definite minimum dependent time lag featuring either an inverse time lag, very inverse time lag or extremely inverse time lag time/current relationship;
 - 3.11.5.2. Instantaneous;

3.11.5.3. Combined time lag and high-set instantaneous;

3.11.5.4. Definite time lag;

3.11.5.5. Differential pilot wire protection if required.

3.11.6. Auto reclosing systems shall consist of instantaneous, time lag, over current and earth fault protection and auto-reclosing relay and shall operate as follows:-

3.11.6.1. Trip no. Tripping by means of Result

Initial condition	Auto reclosing relay reset	
1	Instantaneous O/C or E/F	Reclosing cycle and lockout of instantaneous O/C and E/F relay
2	O/C or E/F timelag	Reclosing cycle
3 etc.		
Final trip	O/F or E/F timelag	Lockout

3.11.6.1.1. If the fault remains, the relay will lockout after a preselected number of trips. If the fault clears before lockout the auto-closing relay shall reset to initial condition. Auto-reclosing shall be inhibited in the event of sensitive earth fault operation.

3.11.6.2. The following functions shall be available:-

3.11.6.2.1. selection of the number and sequence of trippings, up to at least four;

3.11.6.2.2. adjustment of the time between the tripping and reclosing in the range of 0 - 30 seconds;

3.11.6.2.3. adjustment of the definite minimum time of the delayed tripping between 0 - 10 seconds;

3.11.6.2.4. cumulative operation counter.

- 3.11.7. Where required in critical supply systems, busbar/frame earth protection shall be provided.
 - 3.11.7.1. Individual zone relays shall trip all the switching devices in their respective zones to isolate the fault from all sources of supply.
 - 3.11.7.2. A bus-switching device shall always be a separate zone.
 - 3.11.7.3. Insulating materials between zones and earth shall be high grade non-deteriorating and non-hygroscopic, at least 2 mm thick and shall have an electric strength of not less than 4kV when tested in accordance with IEC 60243-1 for 1 minute, cut to size and ready for installation.
 - 3.11.7.4. The reaction time of the protection system shall be such as to limit the duration of an internal arc fault to the withstand capability of the insulation material.
- 3.11.8. Relays for transformer protection shall have the following features:-
 - 3.11.8.1. over current and earth fault protection consisting of at least two extremely inverse definite minimum time lag over current elements, at least two high set instantaneous over current elements with low transient over reach characteristics, at least one extremely inverse definite minimum time lag earth fault element;
 - 3.11.8.2. restricted earth fault protection of star windings, the relay shall be of the instantaneous type and shall be tuned to 50 Hz;
 - 3.11.8.3. biased differential protection with high speed characteristics, biased to provide stability during through faults and shall not be operated by normal inrush currents.
 - 3.11.8.4. over temperature, gas detection and overpressure for oil-type transformers and PT 100 thermistors for dry type transformers;
 - 3.11.8.5. tank earth protection with a current transformer installed between the tank and earth, with an instantaneous type relay.
- 3.11.9. The relays shall have current settings adjustable in infinite steps.
 - 3.11.9.1. The time delay relays shall have adjustable time lag ranging from 0 to 2 seconds.
- 3.11.10. Sensitive earth fault relays shall be of the static type and have a current

setting of 0.5% to 8% and an operating time adjustable from 1 to 99 seconds.

3.11.11. Digital relays shall incorporate PT100 RTD inputs where required.

3.12. Test Terminal Blocks:

3.12.1. Readily accessible, suitably enclosed test terminal blocks shall be provided on the front panel of the switch unit for the purpose of testing the protective systems.

3.13. General:

3.13.1. Two copies of all type and routine test certificates shall be for all equipment in the panels as applicable.

Marking labelling and documentation shall be done.

3.13.2. Wire numbering shall be done according to Annexure A of SANS 10142-1. Graphic symbols for wiring diagrams shall comply with SANS 7296-1:2007.

4. EARTHING AND BONDING

4.1. All equipment shall be connected to the substation earthing by means of separate insulated copper bars or straps which shall have a minimum cross sectional area as specified below:-

4.1.1. Medium voltage switch boards-

- bonding together of frames of all panels of each zone :- 90mm²
- earthing cable glands of each zone :- 90mm²

4.1.2. Low voltage switchboards-

- earthing frame work :- 35mm²

4.1.3. Distribution transformers -

- earthing framework :- 90mm²
- earthing separately of neutral terminal :- 90mm²

4.1.4. Batteries and battery charging equipment, other low voltage equipment and other accessory equipment such control relay panels, fire extinguishing equipment, exposed metal work, etc. :-

25mm²

5. PROTECTION AGAINST CORROSION


- 5.1. Panels for indoor installation shall be constructed from mild steel frames and mild steel sheeting (at least 2 mm), painted according to specification HE9/2/8.
- 5.2. Panels for outdoor installation shall be constructed from mild steel frames and 3CR12 or similar steel sheeting (at least 2 mm), painted according to specification HE9/2/8.
- 5.3. All bolts, nuts, washers, fixing components, hinges catches, etc. shall be stainless steel.

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END OF SPECIFICATION EEAM-Q-017

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**Annexure L - EEAM-Q-018 SPECIFICATION
FOR LIGHTING ON EQUIPMENT(HE8-2-
6Ver5)-wcs**

REVISION 0	REFERENCE EEAM-Q-018			
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4.0	AIRCRAFT WARNING LIGHTS			04
5.0	GENERAL			04

KEYWORDS: LIGHTING AND EQUIPMENT	DATE OF LAST REVIEW: N/A DATE OF NEXT REVIEW: 2019-02-01
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LIGHTING ON EQUIPMENT

SPECIFICATION EEAM-Q-018 2014

1. SCOPE

- 1.1. This Specification covers TPT's requirements for lighting equipment required on equipment and must be read in conjunction with the main Specification.
- 1.2. The following fixed lighting shall be provided in each part of the machine to provide safe operation and maintenance at all times:-
 - 1.2.1. LED type lighting over all access ways, stair ways, walk ways, maintenance platforms, electrical equipment and similar locations to give a minimum level of maintained illuminance of 50 Lux with emergency lighting facilities to provide lighting for at least 30 minutes in the event of a power failure.
 - 1.2.2. Walkway light Fittings shall be provided on all changes of direction
 - 1.2.3. The floodlights shall be of Primalence, or equivalent. They will be metal halide type provided on booms, bridges, fixed structures etc. to provide over the ship's hold and the quay at all operating points below the equipment at \pm 6 meters around the equipment a minimum level of maintained illuminance of 50 Lux at quay level;
 - 1.2.3.1. In addition floodlights shall be fitted to the operator's cabin to illuminate the operator's furthest/deepest working area to a minimum level of maintained illuminance of 100 Lux;
 - 1.2.4. Fluorescent luminaires for all electrical and machinery house's, operator's cabins, external electrical panels etc. to give a minimum level of maintained illuminance of 200 Lux at floor level, with emergency lighting facilities to provide emergency lighting for at least 30 minutes in the event of a power failure.
 - 1.2.5. Red aircraft warning lights at the highest point of the fixed structure of the equipment and on the seaward end of the hinged section of the boom (if the boom is higher than the highest point of the fixed structure when raised), with emergency backup facilities.

2. FLUORESCENT LUMINAIRES AND CONTROL GEAR

- 2.1. All fluorescent luminaires shall comply with SABS 1119.
- 2.2. Luminaires in machinery houses etc. must be so arranged to avoid stroboscopic effect on rotating equipment.
- 2.3. Sufficient switches shall be installed to conveniently control the lighting.

3. FLOODLIGHTS

- 3.1. All floodlights shall comply fully to SABS 1279.
- 3.2. Metal Halide type is preferred
- 3.3. The control gear shall be an integral part of the floodlight but be placed external to the luminaire in a housing separate to that of the lamp. All floodlights shall be fitted with power factor correction equipment.
- 3.4. The logo on the side of the machinery house shall be illuminated by floodlights, controlled by the photo cells only. These fixtures shall be accessible for servicing

4. AIRCRAFT WARNING LIGHTS

- 4.1. Aircraft warning lights are to be controlled by a twilight switch with override from the operator's cabin and shall be supplied from a low voltage DC power supply with an emergency power pack (Nickel-cadmium batteries) with sufficient capacity to keep the lamp/s burning for approximately 12 hours in the event of mains power failure.
- 4.2. Warning lights with two lamps and automatic switch over facilities to the second lamp in the event of lamp failure, with alarm indication in the operator's cabin is preferred.
- 4.3. Lighting shall comply with the International Civil Aviation Organization (ICAO) standards

5. GENERAL

- 5.1. All luminaires shall be mounted such that as little light as possible is "spilled" beyond the wharf or ship's edge, since any light falling on the water surface is likely to cause reflected glare difficulties and glare interference with harbour navigation. Details of all lighting must be stated by tenderers at tender stage.
 - 5.1.1. All the flood lighting on booms etc. which are raised at some stage, shall be automatically switched off when the boom is raised.
 - 5.1.2. Access lighting shall be controlled by two-way switches from the main operator's cabin and from ground level.


- 5.1.3. Self-contained luminaires incorporating Nickel-cadmium batteries and charger is preferred for emergency lighting. Emergency lighting will only switch on when the respective luminaires were energized before the break in electricity supply occurred.
- 5.1.4. All fixed lighting shall be supplied from an adequately rated 400/231V double wound air cooled transformer with the centre point of the 231 V winding solidly earthed to the structure.
 - 5.1.4.1. Primary and secondary fuses or circuit breakers must be provided in the transformer housing or electrical control cabinet.
- 5.1.5. All luminaires must be wired in PVC, armoured cable to a connection through box and from there to the luminaire with Silicon or other approved heat resistant cable.
- 5.1.6. All luminaires shall be provided with a glass visor of 4mm, heat tempered, clear armoured glass. Plastic light fittings and fittings having plastic refractors, diffusers or covers are not acceptable. Light fittings shall be adequately protected for corrosion and UV damage by a protective cover
- 5.1.7. It must be stressed that all the luminaire bodies, diffusers, brackets, control gear housings etc. shall be manufactured from either stainless steel grade 304 or die-cast aluminium.
- 5.1.8. All luminaires shall be installed in positions that is readily accessible for lamp replacement and maintenance.
- 5.1.9. All luminaires shall be resiliently mounted to avoid ill effects from vibration. An anti-vibration/stabilizing support bracket is to be provided to support all luminaire which can be adjusted.
- 5.1.10. Tenderers are to state whether igniters, control gear, etc. will be suitable for all makes of British, Continental and American lamps available in South Africa.

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END OF SPECIFICATION EEAM-Q-018

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Annexure M - EEAM-Q-019 SPECIFICATION FOR CABLE REEL SYSTEMS

REVISION 0	REFERENCE EEAM-Q-019																				
DOCUMENT TYPE SPECIFICATION		AUTHORISATION DATE: Date signed by CEO																			
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CABLE REEL SYSTEMS

SPECIFICATION HE8/2/7 [Version 6]

March 1997

1. SCOPE

- 1.1. This specification covers TPT's requirements for medium and low voltage trailing cables and motorised cable reeling drums and must be read in conjunction with the main specification.

2. CABLE REELING DRUMS

- 2.1. Electromagnetic or permanent magnet type couplings are preferred, such that automatic torque compensation is provided for constant cable tension.
- 2.2. Mono-spiral drums must be of bolted sections. All drums shall be manufactured from 3CR12 steel or stainless steel and shall be painted according to Portnet Specification HE9/2/8.
- 2.3. The rotating speed of the cable reel must be co-ordinated with the motion related to it to ensure the correct cable tension at all times.
 - 2.3.1. Cable tension protection devices or systems shall be provided to trip out the associated motion should the recommended cable tension be exceeded. In addition a slack cable device must be incorporated to trip out the associated motion should there be excessive slack cable.
- 2.4. Limit switches shall be provided to automatically slow down and stop the associated motion before the last two turns are unwound from the drum.
- 2.5. The cable reeling drum installation shall be complete with all cables, sleeves, rollers, guides etc.
- 2.6. All brush gear shall be individually removable without having to remove other gear. Separate brush gear connection bolts shall be provided.
- 2.7. Sliprings housed in the drum body will not be acceptable.
- 2.8. The Sliprings shall be fully protected against weather, water and dust, with anti-condensation heating in the slipring compartment.

- 2.9. The sliprings shall be readily accessible for convenient maintenance and shall be provided with easily removable covers. They shall be of ample current carrying capacity and shall be constructed of corrosion resistant material throughout, all sliprings being of brass. The insulation shall be specifically designed to avoid "tracking" due to the deposition of saline moisture.

NOTE: When the covers are removed all sliprings and brushes must be exposed for visual examination and access from all sides. Covers of the split type will not be accepted.

- 2.10. Slipring enclosures shall be manufactured in 3CR12 or stainless steel and shall be painted according to Portnet specification HE9/2/8.
- 2.11. Provisions shall be made to relieve the slipring connecting studs of the weight of the cables.
- 2.12. An extra collector point and brass slipring of ample capacity shall be provided for efficient earthing.
- 2.13. The power collector gear shall be capable of withstanding a short circuit fault capacity as stated in the main Specification.

3. TRAILING CABLE

- 3.1. Adequate lengths of flexible trailing cable in compliance with the following Specifications or equivalent shall be supplied: VDE 0250 (Construction), VDE 0768 (Bending Radii), VDE 0100 (Current Carrying Capacity).
- 3.2. The cable shall be capable of withstanding a short circuit capacity as stated in the main Specification.
- 3.3. Power cables with integrated control cables will be preferred where control signals are required onto or off the equipment.
- 3.3.1. An alternative offer may be submitted for power cables with optical fibre cores for control purposes. Prove of use of these cables as well as for reliability must be supplied with the tender.

4. CENTRE FEED PITS

- 4.1. Centre feed pits shall be equipped with suitably designed cable horns and drums, manufactured in stainless steel. At least two turns of the trailing cable shall be wound on the drum portion of the cable horn.
- 4.2. Connection boxes in the centre feed pits shall be of robust construction, made of stainless steel, with IP65 enclosures, and suitably rated for the voltage concerned.

- 4.2.1. Connection boxes for power cables shall preferably be similar or equal to "Martco" and for control cables connection boxes similar or equal to "Controp Esaco" type, sized so as to accept at least the same amount of double terminals as the amount of cores.
- 4.2.2. Cable connections of medium and high voltage cables shall be encapsulated in a gel similar or equal to "Fasa Semisol". Hot cured resin encapsulation is not acceptable.
- 4.2.3. Alternatively cable joints shall be in line splice type joints if called for in the main Specification.

5. GENERAL


- 5.1. All equipment shall be suitably designed such that the minimum bending radius of the specific cable used, is not reduced below that recommended by the manufacturer.
- 5.2. All equipment are to be as maintenance free as possible.
- 5.3. All cables and equipment shall be sufficiently protected against mechanical damage where necessary.

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END OF SPECIFICATION HE8/2/7 [Version 6]

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**Annexure N - EEAM-Q-020 SPECIFICATION
FOR TESTS ON ELECTRICAL
EQUIPMENT(HE8-2-8) -wcs**

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1. SCOPE

- 1.1. This specification covers site electrical pre-operational tests and commissioning tests required for electrical apparatus, wire, cables and other miscellaneous equipment and material as called for in the specifications and must be read in conjunction with the other specifications.

2. GENERAL INFORMATION

- 2.1. Pre-operational tests and acceptance certificates as herein specified are defined as those tests and inspections required by the ENGINEER or third party inspector designated by the client prior to equipment being energized to determine that the apparatus involved may be safely energized.
- 2.2. Calibrating tests, checks on limit switch settings, interlocking, PLC functioning etc. are so called cold commissioning or dry tests.
- 2.3. Hot commissioning tests are the tests as specified by the Engineer or third party inspector designated by the client such as thermal imaging on the bus bars, connections of circuit breakers, terminals...etc., electronic equipment during continuous cycle tests when the equipment is handling the product it was designed for.
- 2.4. Final acceptance will not only depend on equipment reliability, as determined by the subject tests, but will depend on complete operational tests on all equipment to show that the equipment will perform the functions for which it was designed without major breakdowns during the continuous cycle tests.
- 2.5. These specifications intend that the workmanship methods, inspections and materials used in erection , installation and commissioning of equipment and shall comply with accepted engineering practices, the specifications as prepared and agreed by the Engineer or third party inspector designated by the client. Manufacturer's instructions and the relevant Standards as referred to in all the attached specifications.
- 2.6. The Contractor shall bear the costs of all tests required.

3. RESPONSIBILITY

- 3.1. The testing shall be performed by and under the immediate supervision of the Contractor and to be witnessed by the engineer or third party inspector designated by the client either at the contractor's premises or at the Client's premises.
- 3.2. The Contractor shall adjust, set, co-ordinate, calibrate and test all systems and equipment furnished and/or installed by him. This is also applicable for all the metering / testing equipment used for the testing of equipment's.
- 3.3. Prior to any of the tests to be conducted on the equipment, the contractor should submit the test procedure / protocol for the review of the engineer or third party inspector designated. The later reserves the right to change in case of any additional tests are to be required.

-
- 3.4. The Contractor shall determine, and the Engineer or third party inspector designated by the client shall approve the individuals in whom final responsibility and authority rests for carrying out these tests and inspection procedures on particular equipment. The method to be followed in obtaining clearances on electrical equipment shall also be established and such method rigidly adhered to.
 - 3.5. All testing shall be scheduled by the Contractor and cleared through the Engineer or third party inspector designated by the client. No testing of any kind shall be done or scheduled without this clearance.
 - 3.6. The Contractor shall notify in person or by letter all the interested parties at least 24 hours prior to tests, establishing the time and location of the test to be performed.
 - 3.7. The interested parties to be informed will be determined in conjunction with the Engineer or third party inspector designated by the client.
 - 3.8. The parties notified shall be responsible for having their representatives present at the designated time. Absence of any one representative will not stop the contractor in carrying out of the test, unless such representative is essential in doing the tests.
 - 3.9. Each of the notified interested parties and the Inspectors employed shall be individually responsible for the safety of all members of their organization during the tests performed on equipment.
 - 3.10. All the representatives of the contractors should undergo the safety induction of the Port and should well versed with the safety regulations of the port
 - 3.11. The Contractor will coordinate all testing to ensure that all trades are prepared and that the conditions are safe.
 - 3.12. Detailed testing method and equipment shall be approved by the Engineer or third party inspector designated by the client.
 - 3.13. On some tests, particularly the final inspections of important equipment, the Engineer or third party inspector designated by the client shall be present and witness. The request for a Client's representative shall be made sufficiently prior to the date of Scheduled test so that satisfactory arrangements for the representative's services can be made.
 - 3.14. Frequently, the manufacturer's quality checks has to be conducted on both electrical and mechanical equipment and the reports has to be submitted for the review of Engineer or third party inspector designated by the client.
 - 3.15. Wherever a joint inspection has to be done by both the manufacturer's quality and the client's representative then prior intimation to be sent for the client for the visit to be done.
 - 3.16. Manufacturer's instructions shall be carefully read for any special conditions that may be required for testing.
-

Following established procedures, equipment will be energized after certification on the relevant form by the personnel performing the tests that equipment is ready for energizing and with the concurrence of the Engineer or third party inspector designated by the client.

4. TESTING EQUIPMENT

- 4.1. All testing equipment for tests which are to be performed shall be furnished by the Contractor.
- 4.2. Testing equipment required to prove guarantee values shall be calibrated immediately prior to the relevant tests to be performed. The error curves shall be submitted with the report.

5. TESTING RECORDS

- 5.1. Test results shall be entered in test forms provided by the Contractor or, if such forms are not available, in test forms approved by the Engineer or third party inspector designated by the client.
- 5.2. Authorized, qualified representatives of the parties interested (see paragraph 3.0 shall be present to approve a test when made. One (1) copy of the rough draft-test report shall be given to each authorized representative at the time the test is made.
- 5.3. Formal test reports approved by the Engineer or third party inspector designated by the client shall be supplied and prepared by the party performing the test within 48 hours, signed by the authorized representatives, and furnished to the Engineer for distribution.

6. SAFETY PRECAUTIONS

- 6.1. The Contractor shall exercise extreme care in performing the tests specified so as to not jeopardize the safety of personnel and to prevent equipment damage during the tests. All exposed live parts subject to testing shall be guarded by personnel, barricades, or other practical means to ensure against personnel being injured by coming in contact or in close proximity to exposed parts.
- 6.2. All equipment, exposed live parts, etc., shall be completely discharged by grounding or other accepted methods so as to eliminate the possibility of injury to personnel from electrical shock during certain tests in case of checking the bus bars, transformers, motors etc.

7. PROVISIONAL ACCEPTANCE

- 7.1. The Engineer or third party inspector designated by the client's Provisional Acceptance of any electrical installation shall be based upon the completion of tests and checks prescribed in clauses 8 through 13., submission of test data (where required), satisfactory materials and workmanship, and demonstration of satisfactory start-up.
- 7.2. Prior to the acceptance all the technical data of the equipment like Maintenance manuals, operation manuals, test certificates of all safety related equipment which are but not limited to load cells / wire ropes / twist locks / motors /

-
- anemometers...etc., data sheets of all components being used on the equipment along with their functional description
 - 7.3. All quality check documents from the manufacturer for the checks / tests conducted on the equipment during the process of manufacturing, erection, installation, commissioning and testing.
 - 7.4. Test protocol signed between the parties for the tests conducted on the equipment
 - 7.5. Snag list with points of priority as stated below
 - 7.5.1. Priority-1: Points to be attended before the acceptance
 - 7.5.2. Priority-2: Points to be attended in a definite time
 - 7.5.3. Priority-3: Points to be attended in a due course of equipment which are not affecting any safety and functionality of equipment during the operation

8. EARTH CONTINUITY AND RESISTANCE TESTS

- 8.1. General:
 - 8.1.1. All earthing and bonding cables must be checked for continuity and earth resistance.
 - 8.1.2. All the documentation should be submitted immediately after the tests conducted.
- 8.2. Test procedure:
 - 8.2.1. Measuring the cable and connection resistance simultaneously with a resistance bridge or accurate multi-meter.
 - 8.2.2. Megger test needs to be performed on the cables before they are terminated
 - 8.2.3. In case if the cable has to be tested with terminations, voltage levels have to be monitored.
- 8.3. Acceptance:
 - 8.3.1. The resistance of the earthing and bonding cables and connections must be less than stated in IEC60949:2008-2009
 - 8.3.2. Complete and accurate records of all resistance readings of all earthing conductors of motors, transformers, power cables etc. must be made.

The records shall include the following:
 - 8.3.2.1. Complete identification of the cable and connection points including its approximate length;
 - 8.3.2.2. Resistance reading;
 - 8.3.2.3. The approximate average cable temperature.
 - 8.3.3. No electrical systems will be energized until the master copy of its test record is approved by the Engineer or third party inspector designated by the client.

9. MEDIUM VOLTAGE CABLES

9.1. General:

- 9.1.1. The Contractor shall give all medium voltage cables a high potential test in compliance with the cable manufacturers specifications, after all splices and potheads or cable terminations have been made.
- 9.1.2. The medium voltage cables shall be given a complete dielectric absorption test before and after the high potential test. The cable test shall be performed prior to connections to the electrical equipment at either end.

9.2. The Contractor shall supply all instruments for testing. Test Procedures:

- 9.2.1. Medium voltage stress cone type terminations or potheads shall remain intact but testing shall not include any bus work beyond the pothead or stress termination.
- 9.2.2. Cable continuity and phase identification shall be checked.
- 9.2.3. In setting up the test set special safety precautions should be taken regarding grounding of the test equipment. The test set, its voltmeter and the cable shield should be grounded at the same ground.
- 9.2.4. All 4 core cables shall be tested between one conductor and ground with the other conductors and the metallic shield, metallic sheath or armour grounded to the same ground. Each conductor to be tested in this manner.
- 9.2.5. All single conductor cables shall also be tested between one conductor and ground with the other conductor in the same conduit grounded.
- 9.2.6. Each cable is to be given a full dielectric absorption test as herein specified with a suitable motor driven or electronic megger. The readings taken shall be recorded in the test record.
- 9.2.7. The dielectric absorption megger test shall be applied for a long enough duration to fully charge the cable. Megger readings shall be taken every fifteen (15) seconds during the first three (3) minutes and at one (1) minute intervals thereafter. The test shall continue until three (3) equal readings one (1) minute apart are obtained. The cable may then be considered to be fully charged.
- 9.2.8. All cables should have approximately the same megohm reading. In the event that a cable shows an appreciably lower resistance value than the others in the same conduit or cable run, this condition shall be discussed with the Engineer or third party inspector designated by the client prior to the application of the high potential test.
- 9.2.9. After an acceptable megger test, the Contractor shall give the cables a direct current (DC) high potential test. The test potential shall be 80% of the factory test voltage for 15 minutes. The test voltages shall be applied gradually during the first minutes in five equal steps. Leakage

current readings shall be taken at each voltage increment, and at one (1) minute intervals after full test voltage has been applied for the remainder of the test. After completion of the test, cables shall be discharged slowly. No test will be accepted where there is an appreciable increase in leakage current throughout the test.

9.2.10. Cables shall not be subjected to more than one (1) high potential test without approval of the Engineer or third party inspector designated by the client. During these tests a man shall be stationed at each point where the cable has exposed connections.

9.2.11. The successful high potential test shall be immediately followed by another megger test as heretofore specified.

9.3. Acceptance:

9.3.1. The cable must withstand the specified high voltage without an appreciable increase in leakage current.

9.3.2. Final acceptance will also depend on satisfactory results of the two megger tests. The results of the final megger test should reasonably parallel those of the first megger test and should show no evidence of permanent injury to the cable caused by the high voltage test.

9.3.3. Complete and accurate records of all megger and accompanying high potential tests shall be made. The records shall include the following:-

9.3.3.1. Complete identification of the cable including its approximate length;

9.3.3.2. Megger readings vs time data;

9.3.3.3. High potential and leakage current readings vs time data;

9.3.3.4. The approximate average cable temperature.

9.3.4. No cable shall be energized until the master copy of its test record is approved by the Engineer or third party inspector designated by the client.

10. LOW VOLTAGE POWER CABLES

10.1. General:

10.1.1. All wires and cables shall be tested for continuity. Except for 60 volt services and below, all wires and cables shall be given a megger test.

10.1.2. All cable connections must pass visual inspections for workmanship and conformance with standard practice.

10.2. Test Procedure:

10.2.1. Continuity shall be checked by means of a DC test device using bell or buzzer.

- 10.2.2. Bus tie cables shall be meggered before connections to buses are made.
- 10.2.3. Each 400 volt service cable from substations shall be meggered with the cable connected to the switch gear with the corresponding breaker racked in and open. Connections at the other end of each of these cables shall be as follows:-
 - 10.2.3.1. Cables to individual motors shall be disconnected from the motor for initial tests, and followed by cables connected to motors as per specification for rotating equipment;
 - 10.2.3.2. Cables to control centres shall be connected to the control centre main breaker with breaker in the open position.
- 10.2.4. Minimum megger readings shall be 1 Me 6 ohm.
- 10.2.5. The megger test must be held until the reading reaches a constant value. For 400 volt cables the cable megger test shall be held until three (3) equal readings, each one (1) minute apart, are obtained.
- 10.2.6. A 1000 volt motor-driven or electronic megger with a value of at least twice that of the RMS voltage shall be used on all service conductors.
- 10.3. Acceptance:
 - 10.3.1. Minimum megger requirements must be met.
 - 10.3.2. Any cable having a megger reading 50% lower than average, even though meeting minimum requirements, shall await further instructions from the Engineer or third party inspector designated by the client as to drying or other treatment to be given the cable prior to acceptance.
 - 10.3.3. Complete and accurate records of all tests and inspections shall be made.

11. MEDIUM VOLTAGE SWITCH GEAR AND CIRCUIT BREAKERS

- 11.1. General:
 - 11.1.1. All switch gear shall be given operational tests. This shall include mechanical operation, as well as operation by control circuits, relays and tripping devices. All breakers and busbars shall be given a megger test.
- 11.2. Test Procedures:
 - 11.2.1. Megger tests on the medium voltage bus shall be applied between each phase separately and ground with other phases tied to ground. All breakers shall be racked-out.

-
- 11.2.2. In addition each breaker shall be given a megger test in the racked-out and closed position. Megger tests shall be applied between each phase to ground and to each other phase.
 - 11.2.3. A suitable motor driven or electronic megger shall be used. Each test shall be held until a constant reading is obtained. Minimum test values shall be as specified in specifications.
 - 11.2.4. All test readings shall be recorded.
 - 11.2.5. All circuit breakers shall be operated through at least three (3) open-close-open cycles in both the rack-in and test positions by manual operation and by control circuits from each control point. All indication lights, annunciators, alarms and targets shall be observed to determine correct operation and breaker mechanism shall be observed for correct alignment, freedom of binding and good contact. All breakers shall be checked for ease of rack-in and rack-out and checked to determine that the breaker cannot be moved out of operation position while the breaker is closed.
 - 11.2.6. The interchangeability of the circuit breakers shall be demonstrated.
 - 11.2.7. PT and CT data shall be recorded and PT and CT circuits shall be checked with a multi-tester.
 - 11.2.8. Protective relays shall be adjusted and calibrated with an injection type test arrangement (multi-amp or equal). Results shall be recorded and the co-ordination of the protective relaying shall be proved.
 - 11.2.9. After initial energization, switch gear shall be checked for correct phase sequence.
- 11.3. Acceptance:
- 11.3.1. Minimum megger requirements must be met;
 - 11.3.2. Proper mechanical and electrical operation of switch gear must be assured;
 - 11.3.3. Correct protective relaying operation must be proven;
 - 11.3.4. Complete and accurate records of all tests and inspections shall be made.

12. POWER TRANSFORMERS

- 12.1. General:
- 12.1.1. Before testing, all transformers shall be inspected for cleanliness, damage, moisture (blue coloured silica gel), oil leaks and phase identification. Each transformer winding shall be given megger tests.
 - 12.1.2. Oil filled transformers shall have the oil checked for dielectric strength.

- 12.1.3. Accessories and auxiliary circuits to switchgear and alarm panels shall be checked.

12.2. Test Procedures:

- 12.2.1. Transformer windings shall be meggered with cables disconnected. (The cables have to be disconnected anyhow for cable high potential tests). See clause 9.0.
- 12.2.2. The 400 volt connection to the switchgear does not have to be opened, but the secondary isolator shall be racked out.
- 12.2.3. The transformer neutral has to be disconnected from ground.
- 12.2.4. When meggering the primary side, the secondary winding has to be grounded and vice versa.
- 12.2.5. The minimum values of the specified megger tests shall be as specified in the standard specification.
- 12.2.6. All 2500 V megger tests shall be held at least five (5) minutes and until three (3) consecutive equal readings one (1) minute apart are obtained. Readings shall be taken every thirty (30) seconds during the first two (2) minutes and every minute thereafter. 1000 V Megger readings must be held until the reading reaches a constant value and until three (3) consecutive equal readings one (1) minute apart are obtained.
- 12.2.7. The oil samples for the dielectric strength test shall be taken from the bottom of the transformer tank and tested in accordance with SABS Specifications.
- 12.2.8. Oil temperature indicator, level gauge and pressure relief devices must be manually actuated to check operation of auxiliary circuits.
- 12.2.9. To check the Bucholz relay, air shall be injected at the test connection.

12.3. Acceptance:

- 12.3.1. Minimum megger requirements must be met.
- 12.3.2. Oil dielectric strength shall be above the minimum specified by the manufacturer.
- 12.3.3. Auxiliary circuits shall be fully operational.

13. LOW VOLTAGE SWITCH GEAR

13.1. General:

- 13.1.1. The 400 volt switch gear bus shall be given a phase-to phase and phase-to-ground megger test.
- 13.1.2. All switch gear, relays and control devices shall be given complete operational tests to show that the equipment performs all design

functions and meets design and equipment procurement specifications.

13.2. Test Procedures:

- 13.2.1. With transformer secondary breaker and load breakers open, all current transformers shorted, all potential transformer fuses removed and all 400 volt feeder breaker load terminals grounded, the 400 volt bus shall be given a phase-to-phase and phase-to-ground megger test.
- 13.2.2. Megger tests on the 400 volt bus shall be applied between each phase and ground with phases not under test also grounded.
- 13.2.3. All circuit breakers shall be operated through at least three (3) open-close-open cycles in both the rack-in and test position by manual operation and by control circuits from each control point (draw out breakers only). All indicating lights, annunciators, and breaker mechanisms shall be observed for correct alignment, freedom of binding and good contact. Draw out breakers shall be checked for ease of rack-in and rack-out and checked to determine that the breaker cannot be moved out of operating position while the breaker is closed.
- 13.2.4. PT and CT data shall be recorded and PT and CT circuits shall be checked with a multi-tester.
- 13.2.5. Protective relays shall be adjusted and calibrated with an injection type test arrangement (multi-amp or equal). Results shall be recorded and the co-ordination of the protective relaying shall be proved.
- 13.2.6. After initial energization, switch gear shall be checked for correct phase sequence.

13.3. Acceptance:

- 13.3.1. Minimum megger requirements must be met.
- 13.3.2. Proper mechanical and electrical operation of switch gear must be assured.
- 13.3.3. Correct protective relaying operation must be proven.
- 13.3.4. Complete and accurate records of all tests and inspections shall be made.

14. ROTATING EQUIPMENT - 400V AND LOWER

14.1. General:

- 14.1.1. All rotating equipment, large and small, rated 400 volt and lower shall pass a minimum megger reading at room temperature. Any machine

not passing this test shall be dried and retested until it either passes or is found unsatisfactory.

- 14.1.2. Prior to testing, all rotating equipment shall be inspected for cleanliness, damages, moisture, alignment, proper lubrication, oil leaks and phase identification.
- 14.1.3. For motors fed from main control panels or motor control centres, the setting of the protective equipment shall be checked.
- 14.1.4. For motors fed directly from 400 volt, switchgear setting of the protective relays is covered by clause 13.0.

14.2. Test Procedures:

- 14.2.1. The circuit breaker is to be racked in, but in the open position. Where magnetic contractors are used, the contactor shall be in the open position so that the section of conductor between the contactor and terminals is included in the test. Control circuit conductors shall be isolated.
- 14.2.2. Megger tests shall be applied between all phases tied together and ground.
- 14.2.3. Megger tests shall be taken with the motor winding temperature at room temperature.
- 14.2.4. All 400 volt motor cables shall be tested before connections are made at the motor in accordance with clause 10.0. Megger tests for each 400 volt motor shall include the cables feeding it.
- 14.2.5. A motor-driven or electronic megger with a service voltage of at least twice the RMS voltage shall be used on all motors.
- 14.2.6. Minimum megger readings shall be 1 Meg ohms.
- 14.2.7. The megger test must be held until the reading reaches a constant value and until three (3) consecutive equal readings one (1) minute apart are obtained.
- 14.2.8. For motors fed from main control panels or motor control centres, overload- and instantaneous over-current protection has to be set to suit the particular drives.
- 14.2.9. After successful performance of mechanical and insulation tests and after the electrical starter protection have been adjusted, the motor may be "bumped" to check for proper rotation.

14.3. Acceptance:

- 14.3.1. All rotating equipment must pass the megger insulation tests as specified and satisfy all representatives as to cleanliness and neatness of the installation.

-
- 14.3.2. Complete and accurate records of all tests shall be made. Final acceptance of rotating equipment cannot be made until the equipment is operated during hot commissioning. The equipment shall prove proper rotation, lubrication, alignment and freedom from excessive vibration to the satisfaction of the Engineer or third party inspector designated by the client.

15. COLD COMMISSIONING

- 15.1. The programmable logic control system shall only be tested once the LV switchboard and other control panels have been tested in the manual mode and been provisionally accepted by the Engineer or third party inspector designated by the client.
- 15.2. The control system shall firstly be tested DRY, i.e. all motor fuses shall be removed or circuit breakers shall be in the OPEN positions.
- 15.3. All plant/external inputs to the PLC shall be individually checked in the field or motor control centre by operating the required field limit switch, relays etc. and checked on the programmer monitor if the status indication of the correct input reference alters.
- 15.4. All plant/external outputs shall be checked individually by forcing the PLC output coil by means of the programming unit and checking the field, motor control or mimic display panel if the correct relay, indication lamp or contactor has operated.
- 15.5. A signed test record showing all input/ output references and reference to which field, motor control centre or mimic panel device was initiated or was operated shall be made and handed to the Engineer or third party inspector designated by the client before the second part of the DRY test commences.

The second part of the DRY test shall be by carrying out drive selections, route start-ups and route stops for all possible drives as listed. All inputs which cannot be present because of the absence of any plant movement shall be simulated by a plant input simulator to be provided by the Contractor.

- 15.6. Upon completion of the tests, a signed test record showing all route selections, starts and stops simulated for every route and a list of all simulated inputs/outputs used shall be made and handed to the Engineer or third party inspector designated by the client.
- 15.7. The Contractor shall then call upon the Engineer to witness a repetition of all previous DRY tests.
- 15.8. All the alarms created should be integrated with the schematic diagrams of the equipment.

16. HOT COMMISSIONING

- 16.1. Commissioning of the whole installation shall not commence until all work which is essential for safe operation has been completed.


- 16.2. First, the electrical equipment and circuitry shall be checked and tested in each Motor Control Board and shall be rendered "healthy" and fully operational before any other part of the installation is commissioned.
- 16.3. The settings of all protective, instrument and timing devices are to be correctly based on the manufacturer's characteristic curves.
- 16.4. The operation of all equipment and motors shall be tested on the "manual" sequence first prior to attempting "automatic" sequence control.
- 16.5. Commissioning shall follow the electrical testing procedures necessary prior to start-up of the equipment.
- 16.6. The start-up of each system or plant shall be done in the presence of the authorized representatives of the machine suppliers, the mechanical contractors, the electrical suppliers of the boards, the Electrical Contractor and the Engineer, unless otherwise arranged by the Engineer or third party inspector designated by the client.
- 16.7. During hot commissioning the temperature rise of all motors will be calculated using the resistance method.
- 16.8. For a period determined elsewhere in this document, after completion of the foregoing operations, the Electrical Contractor shall arrange for a competent representative to remain on site to test-run the installation to the satisfaction of the Engineer or third party inspector designated by the client.

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END OF SPECIFICATION EEAM-Q-020

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**Annexure O - EEAM-Q-021 SPECIFICATION
FOR ELECTRONIC EQUIPMENT(HE8-2-
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1. **SCOPE**

- 1.1. This specification covers TPT's requirements for electronic equipment and must be read in conjunction with the main Specification.
- 1.2. The production standard of all electronic equipment shall be in accordance with the relevant and recognized standards and recommendations for the electronics industry such as contained in IEC Publications, British Standard Specifications, DIN Specifications, standards recommended by the Electronic Industries Association or any other pertinent and widely accepted standards/recommendations.
- 1.3. For the installations of electronic components, it should comply with IEC60668:1980 (Or equivalent)
- 1.4. For the wiring on electronic equipment and tests, it should comply with IEC60512-9-2:2012 (or equivalent)
- 1.5. The national or international standards (if any) to which the electronic equipment complies shall be stated.
- 1.6. TPT reserves the right to inspect and/or test electronic equipment offered and to use relevant standards/ recommendations for the electronics industry as outlined in Clause 1.2. above as a basis for acceptance/rejection of equipment supplied by the successful tenderer.
- 1.7. When the equipment offered includes, or is required to interact with a Programmable Logic Controller or a microprocessor based device the mode of interfacing between the programmable device and other equipment offered shall clearly be described and should be best available in the market for spares.
- 1.8. Manufacturer / Tenderer has to provide the references of the similar technology used by them with same electronic equipment along with the application. (e.g. names of major users, volume of sales etc.)
- 1.9. Tenderers shall certify that electronic equipment is designed and/or protected to operate reliably under the service conditions listed in the main Specification.
- 1.10. Tenderers shall certify that electronic equipment as designed and supplied is capable of operating reliably with the electrical system of supply as specified in the main Specification.
- 1.11. All electronic equipment shall be suitably protected against voltage spikes, over voltage, over current, over temperature and best designed for the working environment without ageing factor. Details of the protection shall be submitted at the time of tendering.
- 1.12. All electronic equipment shall be effectively screened against electromagnetic, radio or microwave interference.

- 1.11. All electronic cards must be treated (coated) for use in a tropical environment.
- 1.13. Electronic equipment must be installed in a dust free/air-conditioned environment.
- 1.14. Proper protection for the temperature control should be interlocked with the power supply
- 1.15. The functions of all controls, switches, indications etc. shall be engraved or otherwise clearly and permanently marked on all equipment in English.
- 1.16. Construction and installation of all equipment offered shall be such that overhaul and maintenance will be easily possible.
- 1.17. Microprocessor based devices:
 - 1.17.1. All microprocessor based devices, e.g. Programmable Logic Controllers offered shall be of a standard design with respect to both hardware and software and must be freely available in the Republic of South Africa.
 - 1.17.2. Only the latest generation modules available in South Africa shall be used.
 - 1.17.3. A fully documented and commented source code listing must be supplied for the program used by the PLC.
 - 1.17.4. All software and hardware required for software maintenance must be specified and must be listed with recommended initial spares.
 - 1.17.5. The unit shall be of a heavy duty industrial type specifically designed for this type of application.
 - 1.17.6. The programming language of the software should be in LAD
 - 1.17.7. A standard should be followed in writing the language for easy handling of the software
 - 1.17.8. All the symbols used in the software should be clearly match with the respective schematics in terms of name, location, sheet no...etc.
- 1.18. All PLC output cards shall be fitted with relays rated at least 4A 230V in preference to semi-conductor switching devices.
- 1.19. Electronic equipment manuals:
 - 1.19.1. Maintenance manuals required in terms of the main specification shall include all the necessary information on electronic equipment to enable SAPO's maintenance staff to fully comprehend the function of the equipment down to module or card level. In order to comply with this condition the following information (as applicable) shall be included in manuals:-


- 1.19.1.1. Complete circuit diagrams;
 - 1.19.1.2. System block or logic diagrams;
 - 1.19.1.3. Layout and interconnection diagrams;
 - 1.19.1.4. Test procedures (flow chart form preferred) and information to enable testing such as voltage values and tolerances, waveforms, polarities etc.
 - 1.19.1.5. A complete description of the electronic equipment, including the function of all input and output points, maintenance and calibration procedures, reference to special test instruments required etc.
- 1.19.2. Symbols used on diagrams shall be in accordance with IEC62687
- 1.19.3. In the case of encapsulated modules (i.e. discrete components permanently enclosed), the complete internal circuitry, including the identification of all discrete components, shall be submitted on diagrams.
- 1.20. All electronic equipment shall be certified by the supplier and/or designer as such. Completed and signed certificates shall be submitted to TPT immediately after final commissioning of the equipment. Please refer on testing, submission of documents and handover procedures to EEAM –Q-20

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END OF SPECIFICATION EEAM –Q-21

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**Annexure P - EEAM-Q-030 SPECIFICATION
FOR ELECTRICAL EQUIPMENT TO BE
SUPPLIED WITH MACHINERY AND PLANT
FOR PORTS (HE8-2-12Ver1)-wcs**

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2.0 CABLE REELING DRUMS					04
3.0 TRAILING CABLES					05
4.0 CENTRE FEED PITS					05
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1.0 SCOPE

This Specification covers Transnet Port Terminals requirements for low voltage general electrical equipment to be supplied with machinery and plant for Ports and must be read in conjunction with the main specification governing the mechanical requirements of the equipment.

2.0 STANDARDS

The following standards are referred to in this specification. The contractor shall be responsible for using the latest version or international equivalent):-

2.1 South African Bureau of Standards (SABS)

SANS 10064, EN-10163-2 Code of practice for the preparation of steel surfaces for coating
SANS 100086-1, IEC / EN -60079-1-7-8 Electrical equipment in explosive atmospheres
SANS10108, IEC /EN-60079-1 Classification of hazardous locations
SANS 10111-1, BS ISO 128-24:2014 engineering drawings
SANS 10142-1 Code of practice for the wiring of premises
BS EN 61095:2009 Air break isolators
SANS 156:2007 Moulded Case Circuit Breakers
SANS 60269 Cartridge
SANS 60079 Enclosures for electrical apparatus for hazardous locations
BS EN 61558-2-4:2009 Low voltage isolating transformers
SANS 1804 3 Phase induction motors
BS EN 60470:2001, Contactors
SANS 1274 Coatings applied by the powder coating process
SANS 1507 Cables

2.2 British Standards (BS)

BS EN 60051-1:1999 Indicating instruments
BS ISO 128 Engineering drawing practise
BS EN 60947-4-1:2001 Motor starters and controllers
BS EN 60617-2:1996 Graphical symbols for electrical power diagrams
BS 6518:1984, EN 50041:1981 Control switches
BS EN 60947-3:2009+A1:2012 Combination fuse switches

2.3 International Electro technical Commission (IEC)

IEC 51 Indicating instruments
IEC 117 Recommended graphical symbols
IEC 60529 Enclosures

Users of this specification must ensure that they are in possession of the latest issues of the above-mentioned standards.

Where equipment offered complies with the recognised standards of the country of manufacture and not specifically with the standards required by this specification, such equipment will be considered by Transnet Port Terminals. Tenderers shall however state the standards to which the equipment is manufactured and supply TPT (on request) with the relevant specification in English.

2.4 Annexures

The following annexures form part of this specification:-

Annexure 1 - Schedule of requirements

Details specific requirements and/or deviations to this specification

Annexure 2 - Technical data sheet

Calls for specific information to be submitted with tenders.

2.5 Service conditions

All electrical equipment shall be suitable for service under the following conditions:-

Environmental conditions:-

Altitude	- sea level
Ambient temperature	- minus [-] 5°C to plus [+] 45°C
Relative humidity	- frequently 100%
Air pollution	- industrial fumes, dust laden and heavy saline

2.6 Electrical conditions

Voltage	- 220V \pm 5% single phase AC or 380V \pm 5% three phases AC, 4 wire, earthed neutral
Frequency	- 50 Hz \pm 2Hz
Interference	-severe switching surges and noise typical of heavy industrial environment

Wave form distortion	-high percentage harmonic content
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Phase imbalance	- up to 2.5% transient
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2.7 Environmental requirements

All electrical equipment shall be suitably designed for use in a tropical environment where rapid changes in weather conditions produce severe moisture condensation problems.

The equipment shall also be capable of withstanding the high corrosive effects of moist saline and dust-laden atmosphere, which is also contaminated with sulphurous smoke.

All electrical equipment used indoors shall be housed in enclosures with minimum degree of protection of IP44 and equipment to be used outdoors at least IP 55 unless otherwise stated in the schedule of requirements.

2.8 Hazardous locations

Where the electrical equipment is required to operate in hazardous locations the details of locations and the type of enclosure protection for use in such location shall be in terms of SANS10108 or as stated in Annexure 1.

The equipment shall be certified by a recognised testing authority who has authorised certification qualification for the fire or hazardous equipment.

Details of the testing authority and the relevant test certificates shall be submitted prior to the contract.

Equipment in hazardous locations shall be installed in accordance with SANS 10086-3:2001

Where flame proof equipment is required it shall be in accordance with SANS 60079-1:2009

2.9 Electrical installation

The tenderer shall guarantee that the rating and size etc. of the electrical equipment offered will be adequate to perform the duties required by the machine.

All the calculations for the equipment should be submitted along with the tender prior to the contract for the review of TPT.

Installation of the electrical equipment offered shall comply with, SANS 60079-1:2012, BS/EN-60079:2014 and Code of practice for the wiring of premises.

All the marking of the electrical equipment should comply with IEC61293

2.10 Spares and accessories

Tenders shall submit separate quotations for the following spares and accessories (as applicable):

Critical spare parts which are considered as the spares which will stop the whole functionality of the application.

Special testing instruments essential for testing/calibrating of the equipment which are not normally considered as standard maintenance test equipment in the electronics industry which are used to test the components / equipment's / panels without complete dismantling.

Non-standard semi-conductor devices and control equipment not freely available in the local market and from more than one source of supply;

All the critical electrical/electronic components of special ratings used on the panels which are not easily available in South Africa.

2.11 Training of TPT's maintenance staff

Tenderers shall submit proposals to undertake training of TPT's maintenance staff in the principles of operation, maintenance and fault finding of the new equipment installed.

Tenderer shall ensure that the training being provided is strictly towards the equipment installed but not in general.

Tenderer should ensure that the contents of the training covers explanation of the functionality, importance, and maintenance of the equipment along with any sort of integration on schematics and software.

Training has to be classified as basic and advanced where all the complex trouble shooting procedures is imparted to the trainees with respect to maintenance and trouble shooting.

Tenderers shall submit the training contents along with a programme with no. of trainees allowed per session as an appendix to the proposal.

Tenderers may quote separate costs in respect of such training.

2.12 Drawings

All electrical drawings must conform to specifications, SANS 10111-1, BS ISO 128, or-IEC 117.

Drawings must be supplied in printed A3 versions as well as one set supplied electronically on CD or similar media.

Drawings shall be prepared on ISO “A” series size sheets and shall not be bigger than A3 in size.

All the drawings have to be provided as-built initially and then has to be amended with all the updates during the installation and commissioning steps.

Final updated drawings has to be provided by the time the equipment are handed over and are set for full time operation.

2.13 Technical support facilities available from tenderers.

Tenderers shall state the following: -

The address of their nearest servicing centre.

List of the technical staff who are qualified to work / maintain / trouble shoot the new equipment installed.

Point of contact of the their service centre: Name / Designation / mobile no/phone no/ email address / fax

To what extent complete electronic and electrical maintenance and repairs to the equipment under consideration can be carried out by their own maintenance staff at the service centres mentioned:

Whether all electronic and electrical spares for the equipment under consideration are kept as local spares for supporting the equipment during operation / breakdown.

2.14 Electronic equipment

The production standard of all electronic equipment shall be in accordance with the relevant and recognised standards and recommendations for the electronics industry such as contained IEC Publications, British standards Din specifications SABS specifications and other standards recommended by the Electronics Industries Association or other pertinent and widely accepted standards and recommendations.

Anti-condensation heaters shall be fitted when called for by the main specification.

Electromagnetic compatibility (EMC) should be clearly marked for handling the electronic components if applicable so that maintenance personnel are aware of requirements during the maintenance / troubleshooting / breakdown.

3. AC CONTACTORS

Contactors shall comply with SANS 60470:2008, SANS 60947-4-1:2011

Contactors shall be chosen by taking the following factors into account:-

Load to be switched:

Utilization category, e.g. AC1, AC2, AC3, AC4, AC11;

Electrical life (Clause 3.3);

Short circuit immunity;

Starting time;

Mechanical life: - All contactors shall have a mechanical life of at least 10 million operations. (1 operation equals 1 make and 1 break).

The electrical life shall be not less than that laid out below for the following utilization categories:-

Utilisation Category	Electrical Life in Hours
AC 1	8 000
AC 2	6 000
AC 3	8 000
AC 4	2 500
AC 3/4	5 000

The category AC 3/4 is defined as one where the usual operation is in category AC 3 with more than 1% of total operations occurring in AC 4.

For the purpose of determining life in this category the percentage operations in category AC 4 shall be equivalent to the expected value, but shall in any case not be less than 20% of the total.

The duty class shall be at least class 3. Should the operating class exceed that of class 3, i.e. 300 cycles per hour, the actual value shall be used when computing the expected electrical life.

Block type contactors shall be used for all low voltage motor control applications.

The maximum thermal current rating shall be at least 1.25 times the rated full load current.

Auxiliary contacts shall be contained in a separate unit directly operated from the main armature.

Visual indication by means of a pin or protrusion that the contactor is energized must be provided.

4. SWITCH DISCONNECTERS

Switch disconnectors shall comply with SANS 60947-3:2012

The rating of the disconnector shall suit the system fault level and the breaking capacity of the associated moulded case circuit breaker (where used), or fuses, and shall be rated for fault make load break operation.

The mechanical endurance shall not be less than:-

10 000 operating cycles for rated currents between 0 and 63 A;

3 000 operating cycles for rated currents between 63 and 250 A;

1 000 operating cycles for rated currents exceeding 250 A.

The electrical endurance in the appropriate utilization category shall not be less than 20% of the mechanical endurance.

Where the neutral link is external to the disconnector and is removable without first opening the disconnector it shall be labelled in terms of IEC61293

The disconnector shall be interlocked with the front cover of the enclosure in a way to prevent opening of the cover if the switch is "ON". The switch must be able to be switched on with the cover open, only by a competent electrician for maintenance purposes.

Proper earth protections needs to be provided for the switch disconnector.

Once the disconnector is OFF the panel should be possible to open only when the ground / earth switch is also closed.

The disconnector shall be suitable for padlocking in the off position.

5. INDICATING INSTRUMENTS AND PROTECTION RELAYS

All indicating instruments shall be flush-mounted industrial type that comply with the relevant clauses SANS 61-1:2009, IEC 60051-1, IEC 60051-2, IEC 60051-7, IEC 60051-8, and IEC 60051-9 and shall have a minimum accuracy of 3% or better and shall have a scale length of not less than 90 mm.

All scales except for thermal ammeters shall be linear and shall be marked in accordance with BS 3693:1992 with the scale selected for the accuracy class.

All instrument glass shall be glare free.

If any integrated instruments are used for the protections and indications, the tenderer should provide the documentation and manual before suggesting with references for the approval from TPT.

All current operated instruments and protection relays shall be protected against continuous over current of up to 120% of the nominal value as well as short circuit currents that may be experienced.

Ammeters shall be marked with the ratios of the associated current transformer.

Ammeter full-scale deflection shall be 120% of primary current of the associated current transformer.

Voltmeter scales shall indicate 80%-120% of the nominal system voltage. Where 0-120% indication is needed the nominal voltage shall be approximately 75% of full scale. The nominal voltage shall be marked with a red line.

If required by the system or main specification ammeters shall incorporate a thermal maximum demand indicator with a time lag of 15 minutes. A built in saturation current transformer shall be provided to protect the indicator against the maximum fault currents that may be experienced. A resettable pointer shall be provided to indicate the maximum value reached.

6. CONTROL SWITCHES

Control switches shall comply with SANS -609475-5-5:2001:

"Emergency-stop" push buttons shall be of red colour, shall have two normally closed and shall be of the mushroom head twist lock type and be lockable in the "off" position.

All push buttons shall have non corrosive appropriately engraved and anodised escutcheon plates fitted.

All the emergency push buttons should be legibly marked to alert to the location.

Any local stop push button should be of the same configuration as defined as above for the emergency stop push button but shall be of YELLOW colour.

7. RATING PLATES AND LABELS

Rating plates complying with the relevant requirements of SANS 60034-1:2010 showing the following information shall be provided:-

Manufacturer's name;

Manufacturer's type number;

Manufacturer's serial number

TPT contract number;

Year of manufacture;

Rated values, etc.

Identification labels is required on or adjacent to all electrical control equipment, switches, relays, instruments, meters, fuses, MCCB's, test blocks, terminal strips etc. The text shall be in black letters on a white background and shall be at least 5mm in height.

Labels should be placed in such a way that even though the equipment should be removed in case of breakdown the label should be still present at where the new equipment should be placed.

These identification labels shall correlate with the corresponding schematic and wiring diagram and the wording shall be in English.

All labels shall be of a corrosion resistant material and shall be securely attached.

Labels shall be placed adjacent to all fuses and circuit breakers to indicate their rating.

All switching devices shall be provided with labels that indicate ON, OFF, EARTH, as required. These labels shall be permanently marked with characters at least 10 mm in height, and shall be visible to the operator in a normal operating position, in a fixed position or located on a moving component of the switch that is visible through an opening and shall be as follows:-

I - white lettering on black background for the ON position;

O - White lettering on a green background for the OFF position:

Earth symbol in black on a yellow background for earth position.

8. MOULDED CASE CIRCUIT BREAKERS

Moulded case circuit breakers shall comply with SABS 156.

9. FUSES

Fuse links shall be of a high rupturing capacity type complying with 60269:2010 and/or BS88-3:2010 fifty percent spare fuse links of each size shall be supplied loose at handover of the equipment.

10. WIRING AND CABLES

All cables for fixed installations must comply with SANS 1507-1:2007 , except where special cables have otherwise been specified.

Steel wire armoured cables must be used where the possibility of mechanical damage exists.

In all the conditions the power earth should be separated from the control earth. Cables shall be designed and used for the above purpose needs to be met.

Armouring of cables will not be used for earthing purposes or any return circuit but shall be bonded to earth. An earth conductor shall be provided in each cable for earthing purposes. If an earth core is not provided a separate, appropriately coloured, insulated earth wire shall be run.

Metallic structures shall not be used for any return or earthing circuit under normal operating conditions but all structures shall be electrically bonded together with welding type cables.

Spare cores and terminals for all control cables shall be provided as follows:

<u>Number of Conductors/Cables</u>	<u>Spare Cores</u>
3 - 6	1
7 - 12	3
Over 12	4

The standard method for numbering small wiring shall be as indicated in NRS 003:2008, Annex A.

10.1 Colour coding of cables

Unless otherwise agreed to the colour of all auxiliary and control wiring (except earth wires) shall be grey. The colour of earth wires shall be green/yellow.

All three phase supplies shall be colour coded red, white and blue.

Single-phase supply cables shall be blue for neutral and brown for phase.

All 24V DC shall be dark blue.

24V DC +ve shall be dark blue and –ve shall be light blue

DC supply cables to motors, fields, magnets etc. shall be orange.

If the correct colour cables are not available cable ends may be marked with "air-shrink" or "heat shrink" type insulation material for ± 200 mm. Colour coding of cables with insulation or marking tape is not acceptable.

10.2 Cable Installation on structures and in electrical rooms etc.:

Except where otherwise specified, the entire electrical installation including the wiring, shall where applicable, be in accordance with the "Code of Practice for the Wiring of Premises" (SANS 10142-1) or the IEEE Wiring Regulations for Electrical Installations.

11. PROTECTION AGAINST CORROSION

All enclosures, cabinets etc. shall be manufactured from 2 mm mild steel or 3CR12 sheeting, as called for in the main specification and shall be painted according to Specification EEAM-Q_008

All fixing screws, bolts, nuts, washers, clips, terminals, brackets, etc. shall be stainless steel. Bolts and nuts above 12 mm may be hot dipped galvanized steel bolts.

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END OF SPECIFICATION EEAM-Q-030

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