SUPPLY, DELIVERY, TESTING AND CALIBRATION OF TWO OFF HIGH VOLTAGE TESTERS (USED TO TEST MOTORS).

(ROTATING MACHINES DEPOT, 150 EEL ROAD, UMBILO).

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DOCUMENT AUTHORITIES

Departments	Rotating Machines and Facilities and Infrastructure
Department Affected	Rotating Machines
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1. INTRODUCTION / SCOPE of Work

This specification is for the:

#	TASK	REQUIRED
1	Design	
2	Manufacture	
3	Assess	
4	Structural Drawings	
5	Supply	✓
6	Delivery	✓
7	Documentation	✓
8	Testing	✓
9	Calibration	✓
10	Training	✓
11	Commissioning	✓

Of the specified:

#	ITEM	REQUIRED
1	Design, supply, delivery, testing and calibration of 2 off high voltage testers (used to test rotating machines).One machine will be used for all necessary static tests of Traction and Auxiliary stator coils and one will be used for DC Armatures.	✓
2	Training for 6 of Transnet Engineering personnel on how to use the supplied equipment.	✓
3	Submission of project completion documents.	✓

2. SITE INSPECTION

2.1 All prospective contractors shall be required to undertake a compulsory site inspection to fully acquaint themselves with all aspects involved.

2.2 Arrangements to visit the site and confirmation of the date and time of the site inspection shall be made with Transnet Engineering Contract Manager.

2.3 The site inspection certificate shall be completed and countersigned by the contract Manager on the day of the visit and must be submitted with the tender documents.

3. INFORMATION REQUIRED

3.1 Offers will not be considered unless full particulars and sufficient literature are provided at the tendering stage to enable Transnet Engineering Technical Officers the opportunity to assess each technical offer properly.

3.2 Prospective Contractors will complete the relevant questionnaire in full and must indicate whether their offer complies with each item of the specification

3.3 Should there be insufficient space for furnishing full details; contractors shall provide the additional details in their covering letter. The additional details shall be numbered in accordance with the applicable clause specified in the specification.

3.4 As prospective contractors are considered to be experts in their field, they are obliged to identify any shortcomings, such as omissions or sub-standard requirements, to the completeness of this specification. These must be brought to the attention of Transnet Engineering at tender stage with alternatives to address these shortcomings. However, each offer shall be quoted for separately.

4. TECHNICAL REQUIREMENTS

The following regulation and codes must be complied with:-

- **The Occupational Health and Safety Act – Act 85 of 1993.**
- **SANS 17025 : 2005 General requirements for the competence of testing and calibration laboratories**

4.1 Except where otherwise provided for in the specification, all equipment offered will comply with the requirements of the relevant standard specifications of the SABS, if published, otherwise with the relevant standard of the British Standards Institution in force at the time of tendering.

4.2 Where equipment offered complies with the recognized standards of the country of manufacture and not specifically with the standards required by this specification, such equipment will be considered at the discretion of Management. In this case, tenders shall state fully all respects in which the equipment departs from the standard laid down in this specification.

4.3 The successful tender will at the conclusion of the installation provide a document along the lines "that the installation complies with national/international requirements and that all selected /designed items are compliant with Act 85 of 1995 and SABS practices applicable to the installation. The equipment has been commissioned/ calibrated and employees as specified have been trained and found competent to operate the plant."

5. SPECIFIC REQUIREMENTS

Any person with the intention of procuring the material or goods shall ensure that the information below is complied with.

5.1 Operating Environment

- Indoors – workshop environment.

5.2 Design

Item no.	**Requirements** **Minimum requirements.**
5.2.1	Supply 2 off new fully operational High Voltage testing equipment, a printer for each, compatible power pack unit, software, licence(s). Transnet Engineering shall own software licence(s) after 2 years. One machine for the testing of Traction and Auxiliary stator coils and one for the testing of traction and auxiliary armatures.
5.2.2	The machine must be compatible to plug into a 220Volt supply for operation.
5.2.3	Testing, commissioning and training • 6 Transnet Engineering employees to be trained. • Training shall cover all aspects of safe usage of equipment. • The supplier shall supply training manuals.

5.2.4	The equipment to have a high performance impulse generator and capable of testing very high voltage windings on traction motors and armatures. The standards-compliant range of tests it performs must include the following: 1. Resistance 2. Insulation resistance 3. Dielectric absorption (DA) 4. Polarization index (PI) 5. Step voltage 6. DC hipot 7. Surge 8. Surge PD (partial discharge) 9. Phase angle 10. Rotor influence check (RIC) 11. Bar to Bar test
5.2.5	The output to be controlled by a variable transformer from 2,000 V up to a maximum of 20,000 V.
5.2.6	To have a supply monitor for safe operation from a grounded supply.
5.2.7	Provide the 20 kV rated test lead cables.
5.2.8	The surge generator to provide IEEE 522-2004 compliant test voltages.
5.2.10	• The tester to supply 0.1 to 0.2 mS voltage pulses to the coil or winding under test. • The tester to provide 0.1 mF (20 kV)) storage capacitors to allow proper test voltages to be developed on highly capacitive loads.
5.2.11	• Current to be displayed and an overcurrent trip circuit to monitor the test. • If current exceeds the trip level, the test to be automatically halted. In its most sensitive setting, the protective circuit to operate as low as 1,2mA
	Surge test:
5.2.12	Maximum output voltage: 15Kv
5.2.13	Maximum surge energy: 11.25J
5.2.14	Capacitor Size (nF) : 100
	DC high potential test
5.2.14	Maximum output voltage: 20Kv
5.2.15	Maximum output current: 8,3mA
5.2.16	Overcurrent trip: 1,2mA
5.2.17	Current resolution: 1/10/100 µA
5.2.18	Documentation: The following documentation shall be supplied at tender stage: To allow TE team to fully assess the bidder's proposal, a product literature shall be attached in the bid documents.
5.2.19	The following documents shall be supplied on the day of testing: • 3 sets of hard copies, with 1 disc containing documentation in PDF format. • Operating manual. • Parts list. • Setup guides for software on computer. • Transnet to own passwords for software(s). • Install files for software on computer. • Calibration certificates for all equipment that need calibration.

5.2.20	**Spares** • The supplier shall indicate detail spare parts list of the equipment. • The supplier shall indicate the critical maintenance spares. • The supplier shall indicate if consignment spares will be readily available in South Africa and average lead time. • The supplier shall describe in details the main components and how they operate in details.
	Additional requirements
5.2.21	The test equipment shall be tested and calibrated. Valid calibration certificates shall be submitted for one year from date of receipt.
5.2.22	The bar to bar attachments suitable for testing of traction armature shall be supplied.
5.2.23	• The tester shall have an USB port for data transfer. • Software for each machine for report generation. • Power pack where necessary to reach rated voltage. • The tester shall have a minimum of 2gig memory storage. • Each tester shall come with all necessary attachments, cables and clamps, including a spare set. • Each tester shall have a trolley and nylon cover to enable the whole unit to be mobile. • The tester shall have automatic switching for surge testing. • A suitable foot switch must be supplied. • A 64G USB storage device must be supplied with each test machine for transfer of data. • Each machine must have safety test lights. • Supply 4 x additional spare ink cartridges for the printers • Recommended make and Model: Baker DX12 or DX15

5.3 Supply and delivery

- The equipment shall be supplied and delivered at Transnet Engineering, 150 Eel Road, Umbilo.

5.4 Spares

- The tenderers shall indicate the availability and required lead times for the spares considered to be critical for the successful operation of the equipment.
- The successful tenderer shall supply Transnet Engineering with three sets blown out diagrams and schematics of the complete machine as well as detailed copies of the list of critical spares for equipment including original equipment manufacturer (OEM) numbers.
- The successful tenderer shall provide TE with acceptable proof that spares can be easily and speedily procured for the equipment within 7 working days through agents locally.

5.5 Calibration

- Service and calibration plan for 24 months shall be included in this contract.
- No equipment will be accepted by TE without the satisfaction of the conditions above.

5.6 Testing

- All tests to be done on site.
- Additional tests can be ordered by Transnet Engineering.

5.7 Completion / handover

- A testing period of 1 month (744 hours for 24/7 shifts and 248 hours for 8 hour shifts). Confirmation shall be given on site visits and captured minutes.
- No equipment will be accepted by TE without the satisfaction of the conditions above.

5.8 Warranty

- The warranty shall be 2 years.

- A maintenance contract for the warranty period shall be included in the quoted price and shall involve the training of TE employees.

- The contractor shall undertake to repair all faults due to bad workmanship and/or faulty materials during a period of 24 months, calculated from the date that the completed plant installation is accepted by TE.
- Any latent defects that become apparent during the warranty period shall be rectified to the satisfaction of TE at the cost of the supplier.
- The supplier shall agree to replace at his/her cost any defective items discovered within the guaranteed period.

Note: All work to be completed in each respect by suitably qualified person.

6. OTHER INFORMATION RELATED TO THE SCOPE

6.1 This specification states the minimum requirements relating to the work and in no way absolves the contractor from responsibility for sound engineering practice. Any omissions or sub-standard requirements of this specification must be brought to the attention of Transnet Engineering at tender stage and optional prices for addressing such omissions must be provided.

6.2 Any matter relating to this work, which requires a decision from Transnet Engineering shall be presented to the Project Manager in charge.

6.3 All offers shall be completed in every respect with this specification. Only completed tenders shall be considered.

6.4 The Technical Officer reserves the right to have the proposal checked independently by a third party.

6.5 Tenders must allow for monthly progress and clarification meetings on site initially and after commissioning for defect meetings when required. A meeting will be held after issuing of the tender to establish the exact scope and magnitude of the contract. No tender will be considered unless it has this Certificate signed by the Engineer or his representative.

7. HEALTH AND SAFETY REQUIREMENTS

7.1 All equipment and installation whether detailed in this specification or not shall comply with the requirements of the Occupational Health and Safety Act 85 of 1993 as amended and all other applicable legislation including Specific set of regulations and local authority bylaws where applicable. All equipment shall be designed **to be fail safe.** Sudden power losses must not have an adverse effect on equipment and shall not unduly delay return to operation after power is restored.

7.2 All the necessary safety equipment such as guards over rotating equipment shall be supplied and the equipment shall comply fully with all the requirements of the South African Occupational Health and Safety Act, Act 85

of 1993 and all other applicable legislation including specific set of regulations and local authority bylaws where applicable. At all times during the manufacture, assembly and testing of the equipment the contractor will be responsible for the safety of all persons on site and the equipment.

7.3 SHE SPECIFICATION

Prior to commencement of contract, the contractor shall be issued with a SHE specification in order to compile a SHE file in line with TE requirements.
Prior to establishing on site, it is an explicit requirement of this contract that all of the Contractor's personnel directly involved with this contract, including those of sub-contractors, attend a **Safety induction course**. Transnet will provide the course free of charge and attendance is compulsory for all personnel under the control of the Contractor who, during the duration of the contract, will be present on site whether on a full time or adhoc basis.
The contractor must allow for all additional charges because of these requirements as no claims for extras will be accepted in connection with the foregoing.

7.4 **As part of the legislative and TE SHE requirements.**

The successful contractor is required to conduct a Risk assessment to ascertain all potential risks associated with this project. The completed risk assessment is to be formally submitted to the Risk department via the project manager at least two weeks prior to the commencement of the actual project. A safety file and associated documents will be required from a successful tenderer and such will be communicated by the Risk department.

8. SPECIALIST SUB-CONTRACTORS

8.1 Only specialist sub-contractors who have previously successfully completed work of the type and extent specified in this document should be engaged. The tenderer shall provide the technical officer with sufficient proof of having suitable experience regarding the design and manufacturing of similar equipment. To this end, complete and detailed reference list shall be submitted with the tender. Reference list shall include addresses as well as contact person who may be visited for inspection of the equipment during the adjudication period.

8.2 The tender shall submit a complete list of proposed sub-contractors and suppliers of major components with his tender.

8.3 The tenderer shall be prepared to commit themselves in writing to the technical officer with an adequate, experienced and stable project team for the duration of the contract.

8.4 Transnet Engineering will not consider any Tenderer's offer that, in the sole opinion of Transnet Engineering, does not have adequate experience in the design and manufacture of such equipment.

8.5 Contractors shall do the installation simultaneously with other contractors on-site busy with other work and shall plan work that it integrates with other work performed.

9. MATERIAL AND WORKMANSHIP

9.1 The equipment shall be offered complete in all respects, including all standard equipment normally offered by manufactures, all of which shall be specified in detail.

9.2 The equipment, as made and supplied, shall be complete in every respect, of modern design, using the most advanced proven technology extensively supported by reputable local companies, and be built to good engineering practices. Tenderers shall supply a list of all the main components (mechanical, electrical etc.) proposed as well as the addresses of the local support companies

9.3 All parts and components shall be adequately protected against damage and corrosion during shipping,

transport and storage. Should any of the items called for be standard equipment, then the words

"Standard Equipment" shall appear against the item.

10. GENERAL REQUIREMENTS

Operation will be in the following conditions:

Altitude	Sea level
Ambient temperature	0˚C to 45˚C
Relative humidity	50% to 100%
Atmosphere	Heavy saline

10.1 Tenderers shall indicate clause-by-clause either that they comply in every respect with the specific requirements, or if not, exactly how it differs.

10.2 Supplier shall agree and accept to work and deliver according to minimum requirements as laid down in Specification.

11. DEFINITIONS AND ABBERVIATIONS

CLIENT	Transnet Engineering Durban
TECHNICAL OFFICER	Project Manager, Transnet Engineering Durban
CONTRACTOR	Contractor appointed under this specification document
SABS	South African Bureau of Standards
BS	British Standard Specification
FEM	Federation of European Mechanical Handling Standard
ISO	International Organisation for Standardisation

12. GENERAL

12.1 The successful tenderer will be subjected to a workshop inspection by Transnet Engineering, to ensure that the facilities are to the satisfaction of the Transnet Engineering in terms of the quality control and equipment capabilities for manufacturing such type of equipment.

12.2 The tenderers shall guarantee that the rating and size etc. of the equipment offered, will be adequate to perform the duties required.

13. SITE ESTABLISHMENT

13.1 The contractor shall be solely responsible for safety of his staff and for providing security to safeguard his works and material on site, until such a time.

13.2 The contractor shall be required to attend site meetings when convened by the Project Leader controlling the contract.

13.3 The contractor will be responsible for any damages caused by his staff to the existing buildings, electrical installations, water pipes and all plumbing infrastructure, civil work infrastructure, CCTV camera infrastructure, perimeter fences, vehicles (locomotives, wagons, coaches, trucks, cherry pickers, and golf carts), trolleys, and all property on site.

14. PENALTY CLAUSES

1 4.1 Due to the criticality of this project, penalties will be levied for late deliveries.