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KEYWORDS
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PORT OF RICHARDS BAY**SPECIFIC REQUIREMENTS FOR
MECHANICAL EQUIPMENT****SPECIFICATION HE 9/2/12
[VERSION 3]****August 1999**

- 1.0 This specification covers the amendments and / or additions to the standard Portnet Specifications for mechanical equipment and is applicable only to the Port of Richards Bay. This specification must be read in conjunction with the main specification and the Portnet standard specifications.

2.0 AMENDMENTS AND ADDITIONS TO THE STANDARD PORTNET SPECIFICATIONS

**2.1 SPECIFICATION HE 9 / 2 / 1
November 1996**

**BELT CONVEYORS AND
ASSOCIATED EQUIPMENT**

- 2.8. *Insert the following to clause 2.8*
Protective screens to be removable without the use of tools. Access is to be provided to all bearings with self-closing screens, for lubrication and condition monitoring. All screens to be hot dipped-galvanized after manufacture and prior to painting.
- 2.9. *Insert the following to clause 2.9*
Backweights to be sufficiently lit for inspection and maintenance. Backweights are to be fitted with a mechanical lifting device. Permanent access for maintenance and cleaning purposes is to be provided.
- 2.15 *Insert the following to clause 2.15*
The conveyors shall be designed for the conveyance of hazardous substances which could ignite and cause dust explosions.
- 2.16 *Insert the following as clause 2.16*
Cleaning devices supplied must be proven over the full range of products handled at DBT.
- 3.4. *Replace clause 3.4 with the following*
Idlers with a three equal roll design and a 35° or 45° troughing idlers are preferred. Rollers and troughing idlers exposed to the environment are to be of HDPE construction.
- 3.10. *Replace clause 3.10 with the following*
"Sure-Guide" self aligning roller or similar to be fitted on return belt at the HT snub going down to the backweight and behind the HT snub on the return at the head end. A snub pulley of approximately 150mm

diameter to be fitted behind and between the head pulley and the rear plate of the chute with plummer blocks mounted external to the chute.

4.3.1 *Insert the following to clause 4.3.1*

Double sealed bearings to prevent ingress of dirt and water under high pressure hose cleaning conditions are to be used. Seals to also be resistant to high pressure water cleaning.

5.1. *Replace clause 5.1 with the following*

Tenderers are to offer floor mounted drives. Allowance must be made for belts being started from rest under maximum load. Drives shall consist of an electric motor driving through fluid couplings, helical gear reducers and flexible couplings. Gearboxes are not to be mounted directly onto shafts. All guards around fluid couplings shall be of solid plate and no mesh construction will be accepted. Pulleys are to be removable without moving the drive. Motors and gearboxes are to have stainless steel jacking bolts at each corner for alignment purposes.

5.3 *Replace clause 5.3 with the following*

Only drive, head and tail pulleys are to be lagged.

5.7 *Insert the following as clause 5.7*

Drive power calculations for variable speed drives shall be shown in full for both the high and low speeds, and for the slow speeds the speed de-rating on motor power shall be taken into account for calculating the power of the motor required. The power unit for such variable frequency drives shall be adequately sized to permit start-up under full load trip-out conditions i.e. 6 times motor full-load current capacity. If DOL starting is used then a suitable fluid coupling must be fitted.

5.8 *Insert the following as clause 5.8*

Head, tail and bend pulleys to have plummer block bases fitted with sole plates and adjustment jacking screws in stainless steel for training of the belt.

5.9 *Insert the following as clause 5.9*

Maximum speed to be at 50HZ

6.2. *Insert the following to clause 6.2*

1 500mm conveyor belts are acceptable depending on project specification. Top cover to be 6,3mm and bottom 1,6mm minimum.

6.3. *Replace clause 6.3 with the following*

All conveyor belting to be anti-static and oil resistant.

8.9 *Insert the following to clause 8.9*

Transfer points to be totally sealed against loss of dust. Transfer points to have long enough trunking to slow down and stop dust emission. Suitable skirting rubbers and deflector plates to be fitted so as to keep product in center of the conveyor belt and prevent spillage.

9.8. *Insert the following as clause 9.8*

Adjustable deflectors to be fitted to transfer chutes and receiving hoppers which can easily be adjusted to be fitted with a fully sealed

reduction gearbox, while product is being conveyed in order to adjust feed onto the receiving belt conveyor and suppress dust which is generated at the transfer point, this must however not create a restriction for product flow.

- 9.9. *Insert the following as clause 9.9*
Inspection hatches are to be provided to all areas within the transfer point which require inspection and cleaning.

2.2 SPECIFICATION HE 9 / 2 / 2
March 1998

HYDRAULIC EQUIPMENT

- 4.3 *Insert the following to clause 4.3*
Test gauges and capillary tubes to be also supplied for future tests.
- 3.1 *Replace clause 3.1 with the following*
A non-flammable, high boiling point hydraulic fluid to be used, and all equipment to be compatible with the fluid used.
- 3.8 *Insert the following as clause 3.8*
All hydraulic equipment shall be freely available in South Africa and a comprehensive spares list giving part numbers shall be provided for each installation.
- 4.1 *Replace clause 4.1 with the following*
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 and hydraulic units to be earth-bonded to the structure so as to prevent the possibility of a flow of current through the piping.
- 4.5 *Replace clause 4.5 with the following*
“Fail-Safe” design principles shall be used so that in the event of a failure of any part of the system no danger to persons or equipment will arise.
- 8.6 *Insert the following to clause 8.6*
The breather hole on the reservoir must be protected by an air cleaner (10 micron) and dehumidifier.
- 9.5 *Insert the following as clause 9.5*
Side-stream or “off-line” filters are also in order on systems where large fluctuations in flow rate occur. All filters shall be to 10 micron or less to properly protect the hydraulic equipment.

2.3 SPECIFICATION HE 9 / 2 / 3
July 1996

STEEL WIRE ROPES

- 6.6 *Insert the following to clause 6.6*
In addition the individual wire diameters to be specified.
- 6.10. *Insert the following as clause 6.10*
Life expectancy to be specified.
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9. *Insert the following as clause 9*
All sheave bearings to be fitted with double lip oil seals and no NYLOS rings to be fitted.
10. *Insert the following as clause 10*
Fleet angles between wire rope drum to sheave to comply with International Standards (e.g. $\pm 2\frac{1}{2}^\circ$).

2.4 SPECIFICATION HE 9 / 2 / 4
February 1998

SPECIFICATION FOR
GEARING, SHAFTS,
BEARINGS, BRAKES,
LUBRICATION, VEE- BELTS,
KEYS AND KEYWAYS

- 2.8. *Insert the following to clause 2.8*
Flexible couplings which can be removed without disturbing other components are preferred.
- 2.9 *Insert the following as clause 2.9*
All gearboxes to be fitted with Silica gel breathers.
- 3.2.2 *Insert the following as clause 3.2.2*
All external shafts in gearboxes to be fitted with double lip oil seals protected by steel covers.
- 4.3 *Insert the following as clause 4.3*
All braking systems must be of "fail-safe" design so that if power is lost to control the machine the brakes will automatically apply and stop all motions safely.
- 4.4 *Insert the following as clause 4.4*
Ingress of dust must be prevented and micro-switches are to be installed on each brake indicating whether the brake is operational or not.
- 5.6 *Insert the following to clause 5.6*
Remove copper piping and replace with ultra violet UV compatible plastic piping.

2.5 SPECIFICATION HE 9 / 2 / 6
February 1998

STRUCTURAL
STEELWORKS

- 3.15 *Insert the following as clause 3.15*
Forgings and castings for critical components to be supplied with X-Ray and ultrasonic test certificates.
- 4.12 *Insert the following to clause 4.12*
Certificates of stress-relieving heat treatment to be supplied.
- 5.5 *Insert the following to clause 5.5*
All edges of drilled and reamed holes to be chamfered.

6.2.1 *Replace clause 6.2. with the following*

The mating and intermediate 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.

9.1 *Insert the following to clause 9.1*

All ladders, walkways, hatches, stairways and platforms shall comply with the requirements of the OSH Act.

10.1. *Replace clause 10.1. with the following*

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 walkway of minimum 700mm to be provided between panel doors and opposite panel or wall with the door in the opened position (i.e 90 degrees)

10.4. *Replace clause 10.4. with the following*

Machinery houses must be clad with Stainless Steel sheeting, minimum thickness 0.8 mm. 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 Stainless Steel of minimum thickness 1.2mm

1. Sheeting fasteners shall be 6.3 mm grade 304 stainless steel self tapping screws with hexagonal washer heads.
2. Galvanic isolation rubber strips shall be used between the metal frame and the cladding.

10.7 *Insert the following to clause 10.7*

All operator cabin windows used for the control viewing of working machinery shall be equipped with industrial standard windscreen wipers accessible from inside the cabin for maintenance and repair.

**2.6 SPECIFICATION HE 9 / 2 / 7
November 1993**
COMPRESSED AIR SYSTEMS**1.1** *Insert the following to clause 1.1*

No aluminium compressor casing is allowed.

2.6.4 *Insert the following as clause 2.6.4*

A nameplate which complies with the OSH Act is to be supplied on the air receiver.

3.5 *Replace clause 3.5 with the following*

Water traps and automatic water discharge drains are to be provided at all low points in the distribution system to eliminate as much water as possible from the system.

Air used for reverse pulse cleaning of fabric air filter bags shall be additionally dried to ensure that the bags are not clogged by compressed air borne moisture.

3.9. *Insert the following as clause 3.9*

If the compressor is mounted in the machine house cognizance should be taken of the temperature within such house and if needed the air inlet to the compressor should not be from within the machine house.

**2.7 SPECIFICATION HE 9 / 2 / 8
December 98**

CORROSION PROTECTION

4.6 *Insert the following to clause 4.6*

Components manufactured from stainless steel or 3CR12.

The following is to be read in conjunction with specification HE9/2/8.

[Replace the relevant clauses with the following]:

7. COLOUR CODES

7.1 Machinery and equipment shall be painted in the following final colours:-

	AREA	COLOUR	CODE NO. (SABS 1091 AND INTERNATIONAL NO'S)
7.1.3	(o) Structure	Transnet White	RAL 9016
7.1.3	(j) Part of Stationary machinery [Electrical, motors, brakes, transformers, etc.]	Light Grey	G25 RAL 7000
7.1.3	(e) 400V motors, 400V panels and DB's.	Emerald Green Green (High Gloss)	E14 (**)
7.1.3	(p) High Voltage Electrical Switch-gear (only 11kV) other than starting and stopping devices and emergency stop control.	Light Orange (High Gloss)	E04 and white RAL 6005
7.1.9	(g) Medium voltage cable trays and motors	Oxford Blue	SABS F02 RAL 5003

8. FIELD TOUCH UP PAINTING

8.1 *Clause 8.1 to read: Damaged painted area - not DAMAGED AND UNPAINTED.*

8.1.1 *insert the following to clause 8.1.1*

Welded areas longer than 300mm to be re-sandblasted and painted, and not mechanically cleaned.

**2.8 SPECIFICATION HE 9 / 2 / 9
November 1998****GENERAL REQUIREMENTS
AND CONDITIONS****10.6** *Insert the following to clause 10.6*

One full set of drawings to be supplied on CD-ROM in AutoCad 12 or 13 format, the first drawing to be an index, plus any other required drawings on paper or microfilm. All maintenance and instruction manuals and parts lists shall also be supplied on CD-ROM in MS Word format.

11.1.3. *Insert the following as clause 11.1.3*

Safety Book: This shall be a suitable carbon copy book, size A4, with two detachable sheets for the recording of all safety issues. This should be the first item on the agenda for site meetings.

**2.9 SPECIFICATION HE 9 / 2 / 11
November 1998****4.3** *Insert the following to clause 4.3*

All holding down bolts shall be fabricated from grade 304 stainless steel with ISO metric thread and nuts of course thread free fit series to SABS 135. (NOTE: contradiction to HE9/2/6 5.2.1 Stainless steel fasteners).

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END OF SPECIFICATION HE 9 / 2 / 12 [VERSION 3]

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