

To Prospective bidders
From Thembi Phahla
Date 6 June 2023
Subject Addendum 1
Pages 54

TENDER NO. iCLM HQ 736/TPT / TPT/2023/05/0005/31081/RFP

DESCRIPTION OF THE WORKS: TPT/2023/05/0005/31081/RFP: MANUFACTURE, SUPPLY, DELIVERY AND COMMISSIONING OF THREE (3) INDUSTRIAL MECHANICAL SWEEPER TRUCKS FOR TRANSNET SOC LTD OPERATING AS TRANSNET PORT TERMINALS, (HEREINAFTER REFERRED TO AS "TPT"), AT VARIOUS DURBAN TERMINAL AS A ONCE OFF SUPPLY

The Technical Specification referenced in the Goods Info forms an integral part of the evaluation. It is required to populate T2.2-05, i.e. the Compliance to Technical Specification.

Refer to the below Annexures.

- * Please acknowledge receipt of this Addendum before the closing date of tender.

Regards

Thembi Phahla
Sourcing Specialist

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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 class "B" of B.S.435, 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. B.S. No. 436/Latest Edition, shall be worked to generally in regard to design and tolerances, in conjunction with Clause 32 of B.S. No. 2452/Latest Edition. 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 with 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 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.

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/Latest 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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REVISION 1	REFERENCE EEAM-Q-006																								
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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 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 2573 : Part 1 :	Classification, stress calculations and design of structures
BS 3923 :	Methods for ultrasonic examination of welds
BS 2600 :	Radiographic examination of fusion welded butt joints in steel
DIN 1026	Metric channels
ISO R657	Angles
SABS 094	The use of high strength friction grip bolts and nuts
SABS 135	ISO metric bolts, screws and nuts (hexagon and square) (coarse thread free fit series)
SABS 136	ISO metric precision hexagon-head bolts and screws, and hexagon nuts (coarse thread medium fit series)
SABS 435	Mild steel rivets

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. 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 0,5% 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.
 - 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 43C/grade 300W weldable structural steel complying with BS4360/SABS1431. The hollow sections can either be seamless for all sizes (BS6323HFS) or welded for sizes above 114.3mm outside diameter (BS 6323HFW).
 - 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 5135. Special care must be taken to prevent the ingress of moisture into hollow section members by ensuring that each member is airtight.
 - 3.5.1.4. Bolted or screwed attachments which require drilled holes through a hollow section will not be permitted.
 - 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 4360/SABS 1431
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 4848 Part 2
Cold formed sections :	BS 6363
Forgings :	BS 29
Steel castings :	BS 3100
Cast iron :	BS 1452

- 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 4360, "A" quality Structural Steel for Bridges and General Building Construction, Grade 43A or Grade 50B. 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. 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.

- 3.8. 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 B.S. No. 3100/Latest Edition, for grades A, B and C 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 B.S. 1452/Latest Edition, for grades 12 to 14 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 5135 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 5135. 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 not be permitted. 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 3923 or X-rayed in accordance with BS 2600 and those on minor joints by the dye-penetrant method. 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 excepted.)
- 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 SABS 044, BS-EN 287 Part 1 and BS-EN 288 Part 3 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: -

Commercial bolts and nuts Grade 4,6:	SABS 135
Precision bolts and nuts Grade 8,8:	SABS 136
Friction Grip Bolts and nuts Grade General:	SABS 094
Rivets:	SABS 435

- 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 SABS 094. Certificates shall be supplied for all bolts of grade 8.8 and 10.9.

- 5.5. 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 the rivet or bolt for which it is made. No rough or broken edge shall be left around any of the holes.

- 5.6. 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.
- 5.7. 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.
- 5.8. 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.
- 5.9. All field rivets must be supplied with shanks of suitable length for pneumatic riveting.
- 5.10. Bolts shall be of such length as to accommodate a full nut and washer when tightening up, and protrude a maximum of 3 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.
- 5.11. 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.
- 5.12. Where bolt heads or nuts are seated on bevelled surfaces of beams or channel flanges, 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. 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.

9.2.1. The handrail shall have a minimum diameter of 25mm and shall not be less than 1 050mm above the platform level. Toe boards shall not be less than 150mm high.

9.3. Stairs shall be inclined no more than 45° to the horizontal and shall be broken at suitable intervals by platforms.

9.4. 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.

9.5. Vertical ladders must be provided with back hoops.

9.6. 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.

9.7. 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.

9.8. 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.

9.9. 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.
- 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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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):-

SABS 064	"Preparation of steel surfaces for coating"
SABS 763	"Hot-dip (galvanized) zinc coatings"
SABS 1091	"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 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. 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	1	Surface tolerant epoxy primer	DULUX /SIGMA Sigmacover primer INTERNATIONAL (PLASCON) Intergard 269 STONCOR (CHEMRITE COATINGS) Carboline 193 Primer	65-75
	2	Two component recoatable, polyurethane finish (Gloss)	DULUX / SIGMA Sigmadur gloss INTERNATIONAL (PLASCON) Interthane 990 STONCOR (CHEMRITE COATINGS) Carboline 134	65-75
Galvanized Steel	1	Surface tolerant epoxy primer	DULUX /SIGMA- Sigmacover primer INTERNATIONAL (PLASCON) Intergard 269 STONCOR (CHEMRITE COATINGS) Carboline 193 Primer	65-75
	2	Two component recoatable, polyurethane finish (Gloss)	DULUX /SIGMA- Sigmadur gloss 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 MC60 OR Sigma-cover primer	65-75

		epoxy primer	INTERNATIONAL (PLASCON) Interzinc 233 OR Interzinc 52 or 53	
			STONCOR (CHEMRITE COATINGS) Carbo Zinc 11 OR Carbo-line 658 Primer	
	2	Flexible recoatable high build polyamide cured MIO epoxy	DULUX/SIGMA – Sigmacover CM MIO	125-150
			INTERNATIONAL (PLASCON) Interseal 010 MIO	
			STONCOR (CHEMRITE COATINGS) Carboline 190 HB M.I.O. or Carboline 193 M.I.O.	
	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 SABS 763 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 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 which are to be covered with wear pads, linings etc.
- 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 SABS SM159 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 SABS 064 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. [SABS 1091 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 (Lightgrau) or SABS 1091 G62 (Pale grey)
	c) Steel columns, rafters, trusses	Pantone cool grey 5	RAL 7004 (Signalgrau)
7.1.3	General		
	a) Guards	Golden yellow	SABS 1091-B49 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. [SABS 1091 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
f) Low voltage switchgear panels where orange is not aesthetically acceptable	Light grey	SABS 1091-G29 BS 381C-631
g) Medium voltage cable trays, switchgear and motors (3,3 kV and up)	Oxford Blue	SABS FO2 BS 381C-105 RAL5003
h) Starting devices, low voltage cable trays and switchgear	Mid brunswick green (high gloss)	BS 381C-228 SABS1091-EO4 RAL6005
i) Portnet Logo	Transnet White	RAL 3012
j) Parts of stationary machinery (Electrical, motors, gearboxes, brakes, transformers, etc.)	Light Grey	SABS G29 BS 381C-631
k) Hand levers, hand wheels, oiling points, handrails on walkways, ladders	Golden Yellow (High Gloss)	SABS 1091 B49 BS 381C-356
l) Stopping devices, grease points, motor fan covers and danger signs (not symbolic safety signs for which see SABS 1186)	Signal red (High Gloss)	SABS 1091 A11 BS 381C-537 RAL3001
m) Walkways (non slip surfaces) (galvanized gratings not to be painted)	Shop floor green	
n) Informatory signs and notices (not symbolic safety signs for which see SABS 1186)	White on Emerald Green (High Gloss)	White on SABS 1091 E14 BS 381C- 228

Area	Colour	Code No. [SABS 1091 and International No's]
7.1.4	Pipe lines	
	a) Reclaim water piping	Aluminium
	b) Slurry pipe lines	Dark admiralty grey
	c) Fire protection piping	Signal red
	d) Washwater drain pipes	Light grey
	e) Instrument air	White with Strong blue band
	f) Plant air	White with Flag blue band
	g) Potable water	Grass green
		SABS 1091-G12 SABS 1091-A11 SABS 1091-G29 White and SABS 1091-F11 White and SABS 1091-FO4 SABS 1091-D14

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 $\pm 30\text{mm}$ 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 MC60 INTERNATIONAL (PLASCON) Interzinc 233 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) Carboline 1248	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 468,	125-150
2	Same as first coat OR micaceous iron oxide (MIO) epoxy	DULUX/SIGMA – Sigmacover CM MIO	125-150

		INTERNATIONAL (PLASCON) Interseal 010 MIO	
		STONCOR (CHEMRITE COATINGS) Carboline 190 HB M.I.O. or Carboline 193 M.I.O.	
3	Two component recoatable, polyurethane finish (Gloss)	DULUX/SIGMA Sigmadur gloss	65-75
		INTERNATIONAL (PLASCON) Interthane 990	
		STONCOR (CHEMRITE COATINGS) Carboline 134	

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/riveted 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] *****

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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
EEAM-Q-013	Punch Listing Standard

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 with 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 pressurised 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

Request for Concession				No: _____ of 2		
A.SUPPLIER/CONTRACTOR SUPPLIED INFORMATION						
SUPPLIER/CONTRACTOR NAME:			CONTRACT NO.:			
SUPPLIER/CONTRACTOR CONCESSION NO.:			DATE:			
Required concession applicable to: (Item/Material/Equipment/Area)						
Description of Concession — Revised Requirements:						
Justification:						
(NOTE: This concession will be rejected if the following information is not provided):						
(i) VALUE OF BENEFIT TO CLIENT	(ii) AGREE TO AN EXTENSION OF THE WARRANTY	YES	NO	(iii) ANY IMPACT ON SCHEDULE?	NO	YES
S/R	IF "YES" WHAT PERIOD?			CF "YES" \ WHAT PERIOD?		
References:						
Original Requirements	reference:					
	Rev.:	Specification	N		Rev.:	
Drawing No.:	Rev.:	Specification	O.		Rev.:	
Drawing No.:	Rev.:	Specification	:		Rev.:	
Attached applicable	documentation:	N				
Requested by:						
(Supplier/Contractor) Name:			Signature		D	
Note: Sections B to F on Page 2						

-
- 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.

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 an 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 an 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). |

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 it's agent identifies a non conformance an 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.

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.



Annexure A - Sample Quality Control Plan

Quality Control Plan No.:	Rev:	Date Issued:
Contract No.:	Description:	Item No.:
Supplier / Contractor:	Location:	

Activity No.		Activity Description	Procedure Ref./Code Specification		Specification Acceptance Criteria	Verifying Doc./Report Certification

<i>Request for Concession No:</i>					
B. SITE ADMINISTERED CONTRACT?	Yes <input type="checkbox"/>	Nn <input type="checkbox"/>	Go to "D"		
Possible QC implications:					
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; padding: 5px; vertical-align: top;"> Recommendations Recommendations </td> <td style="width: 50%; padding: 5px; vertical-align: top;"> Rejected </td> </tr> </table>				Recommendations Recommendations	Rejected
Recommendations Recommendations	Rejected				
<div style="display: flex; justify-content: space-between; margin-top: 20px;"> <div>Site Construction Manager:</div> <div>Signature:</div> <div>Date:</div> </div>					
<div style="display: flex; justify-content: space-between; margin-top: 20px;"> <div>Site Engineer:</div> <div>Signature:</div> <div>Date:</div> </div>					
C. RECOMMENDATION BY CONTRACT ADMINISTRATOR: Name: <div style="display: flex; justify-content: space-between;"> <div>Signature</div> <div>Date:</div> </div>					
D. RECOMMENDATION BY ENGINEERING: <div style="display: flex; justify-content: space-around; align-items: center;"> <input type="checkbox"/> Recommended <input type="checkbox"/> Rejected <input type="checkbox"/> Conditional, with the following recommendations: </div>					
<div style="display: flex; justify-content: space-between; margin-top: 20px;"> <div>Package Engineer:</div> <div>Signature:</div> <div>Date:</div> </div>					
<div style="display: flex; justify-content: space-between; margin-top: 20px;"> <div>Lead Discipline Engineer:</div> <div>Signature:</div> <div>Date:</div> </div>					
<div style="display: flex; justify-content: space-between; margin-top: 20px;"> <div>Engineering Manager:</div> <div>Signature:</div> <div>Date:</div> </div>					
Comments:					
E. PROJECT MANAGER DISPOSITION: Accepted <input type="checkbox"/> Rejected <input type="checkbox"/>					
<div style="display: flex; justify-content: space-between; margin-top: 20px;"> <div>Name:</div> <div>Signature</div> <div>Date:</div> </div>					
F. EMPLOYER DISPOSITION: Accepted <input type="checkbox"/> Rejected <input type="checkbox"/>					

TECHNICAL SPECIFICATION

SUBJECT : **Mechanical Sweeper**
DOCUMENT NO : **TPT_TS_MS**
REV NO. : **6**
DATE OF ISSUE : **17 December 2014**

AMENDMENT RECORD		
Rev	Section	Description of Change
3	2.2.1.2	Add "...seat in accordance with EN 13059, complete with"
	2.3.1.3	Add to clause for aircon ".....with spares available locally."
	2.3.1.4	Add clause "When door/s left open the air-conditioner shall switch off...."
	2.3.1.5	Add clause for cabin air filtration requirements refer to Goods Information.
	3.5.14	Add to clause "..... which shall also allow for shutting the engine down when seat is not occupied for a predetermined time lapse ..."
	3.5.15	Move clause 4.2.2 re Euromot III to 3.5.15, & change to "Euromot IV"
	3.8.3	Clause rewritten to include LED lights.
4	2.1.4	Move clauses 2.1.1/2&3 to clause 1. Move 2.4.1 to 2.1.1, and add additional site specific requirement.
	2.3.1.5	Change clause to indicate heavy or medium duty air filter for type of terminal.
	3.10.5	Add clause for Transnet Logo.
	4.2.2	Add clause "The mechanical sweeper shall be recyclable."
	5.1.2	Remove clause for Automatic Lubrication System.
	6.5	Remove clause: "The machine shall be homologated with the necessary certification."
5	2.2	Remove clause 2.2: "Constraints None". Clause 2.3 then becomes 2.2.
	2.2.1.3	Change: Temp range changes from "-5° C to +40° C" to "0° C to +45° C"
	3.5.14	Add to clause: "...facility must be available to allow Purchaser to adjust time ...")
	3.7.5	Add clause: Wheel nut position indicators shall be provided for all wheel nuts.
	3.8.2	Add to clause: ... "and shall be in the range of 80 - 85 dB."
	3.8.4	Add 'numbered' to clause:wiring colour coded," numbered", grommited, sleeved.
	6.6	Add clause for magnet to be fitted to sweeper.
	6.7	Add clause for manuals.
6	3.8.4	Add to clause: "Wire numbers to be carried through into the schematic diagrams and detailed drawings."

CHANGE MANAGEMENT CONTROL			
Name	Department	Signature	Date
Reviewed and Approved by Equipment Specification Committee Members:			
Ben Blom	Senior Project Manager		
See Rev 5 for signed document, signed off with comment as per change made in rev 6.			
Akash Maharaj	Capacity Planning and Project Manager		

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1. Scope

This specification is for a mechanical sweeper. The mechanical sweeper shall be utilised to sweep, vacuum, contain and dispose debris and granular substances that are present within the port terminal environment. The mechanical sweepers shall be capable of operating efficiently in harsh terrain i.e. potholes, uneven surfaces, water drenched roads, etc.

The machine shall be fitted with a steering system capable of making quick, easy turns (minimal turning radius) ensuring that sweeping close to obstacles and curbs is achieved without damaging the tyres and equipment.

The sweeper shall be supplied 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 such as ISO, DIN, etc.

2. Operational Requirements

2.1 Site Specific Requirements

2.1.1 In terms of site specific requirements, the Supplier shall refer to the Goods Information for the following items, including but not limited to:

- Sweeping width
- Area that can be swept in an hour
- Volume of debris hopper
- Minimum filter area of the sweeper filter
- Sweeping and travelling speeds
- Water requirement for dust suppression
- Environmental conditions including altitude, ambient temperature, relative humidity and air pollution concerns

2.2 Ergonomics

2.2.1 Operator's Cabin

2.2.1.1 The driver's cabin shall be ergonomically designed to ensure that visibility, safety and comfort is not compromised. The cabin must be fitted with side and rear mirrors that are suitably positioned for maximum visibility.

2.2.1.2 The cabin shall be fitted with a comfortable, full suspension, fully adjustable, sprung type seat, in accordance with EN 13059, complete with arm rests and seat belt, upholstered with a good quality material, and ensuring easy reach of controls and instrumentation.

2.2.1.3 The machine shall be fitted with a locally supported air-conditioning system, with spares available locally. Ambient temperatures encountered may range from 0° C to +45° C dry bulb, with relative humidity varying from 15% to 100%. Accessibility to all parts of the air-conditioner, ease of maintenance and simplicity of control and operation are essential.

2.2.1.4 When operator's cabin door/s is left open the air-conditioner shall switch off after a predetermined time lapse. (Supplier to indicate the time period.)

2.2.1.5 The air-conditioner shall have a heavy duty air filter if sweeper is used in a bulk or multi-purpose terminal, and a medium duty air filter if used in a container or Ro-Ro terminal.

The Supplier shall refer to the Goods Information for the terminal where the sweeper is intended to be used.

3. Technical Requirements

3.1 Mechanical Brooms

- 3.1.1 The mechanical sweepers shall be fitted with heavy duty, low maintenance brooms.
- 3.1.2 The brooms shall be of a bristle type and shall be resistant to water, fuel and oil substances.

3.2 Debris Conveyor

- 3.2.1 The debris conveyor shall allow for the movement of reasonably large debris from the cleaning surfaces to the debris dump hopper without failure or jamming.
- 3.2.2 The debris conveyor belt and piping shall be constructed of heavy duty, abrasion and corrosion resistant material.

3.3 Debris Dump Hopper

- 3.3.1 The machine shall be installed with a hydraulic system for the operation of the debris dump hopper.
- 3.3.2 The dump hopper shall have a large capacity to provide for maximum sweeping time with minimum interruption for disposing.
- 3.3.3 The dump hopper shall be easily accessible for inspection and maintenance.
- 3.3.4 The dump hopper shall allow for easy removal of the dust and debris.

3.4 Chassis

- 3.4.1 The machine shall be constructed with a heavy-duty, low maintenance chassis.

3.5 Diesel Engine and Transmission

- 3.5.1 Engines shall be robust and have sufficient power for the duty required. The engine should be efficient in delivering power for both the sweeping and vacuuming functions, without impacting on the vehicle speed.
- 3.5.2 The engine must be capable of transporting a fully laden dump hopper.
- 3.5.3 The engine shall be easily accessible for maintenance purposes.
- 3.5.4 An efficient three-stage dry type air cleaner (stage 1 - spinner, stage 2 - centrifugal, stage 3 - dry element) shall be fitted.
- 3.5.5 The exhaust shall be sufficiently silenced in such a manner as not to adversely effect the engine performance to any great extent and shall be reasonably positioned.
- 3.5.6 A full length stainless steel exhaust shall be fitted.
- 3.5.7 The exhaust outlet must be of the 'goose neck' type to prevent the ingress of water under any operational or non-operational conditions.

- 3.5.8 The exhaust pipe must be protected by a stainless steel heat shield if it is exposed and could cause injury to the driver or any other person.
- 3.5.9 The outlet manifold must be protected by a heat shield if exposed when the engine compartment is opened.
- 3.5.10 An efficient pressure fed engine lubrication system is required and shall incorporate an external oil filter of the full flow type, utilising elements of the replaceable cartridge type.
- 3.5.11 The cooling system shall be filled with a coolant mixture which complies with the engine manufacturer's specifications.
- 3.5.12 An engine monitor and cut-out system shall be fitted to protect the engine from over heating, low oil pressure and over revving under no load conditions.
- 3.5.13 The following functions shall be monitored: water temperature, water level and oil pressure.
- 3.5.14 The engine shall be fitted with an Electronic Management System (EMS), which shall also allow for shutting the engine down when the seat is not occupied for a predetermined time lapse. (Supplier to indicate the time period. However, facility must be available to allow Purchaser to adjust time.)
- 3.5.15 The engine shall comply with 'EUROMOT III' with regard to emission standards

3.6 Brake system

- 3.6.1 The mechanical sweepers shall be fitted with a heavy duty braking system, which is capable of stopping and holding the fully loaded machine.

3.7 Tyres and rims

- 3.7.1 The machine shall be supplied with heavy duty pneumatic tyres.
- 3.7.2 Tyres manufactured in the Republic of South Africa or standard tyres which are readily available in South Africa must be supplied.
- 3.7.3 Tyres and rims must conform to the standards as laid down in ERT0 or S.A.N.S. ARP 007 and ARP 008 and shall be of an approved brand.
- 3.7.4 The wheels shall not foul or touch the chassis at maximum oscillation.
- 3.7.5 Wheel nut position indicators shall be provided for all wheel nuts.

3.8 Electrical system

- 3.8.1 All electrical lights must be capable of effective visibility and functionality in extreme operating conditions such as rain, fog and mist.
- 3.8.2 A warning horn and reverse buzzer shall be fitted, and shall be in the range of 80 - 85 decibels.
- 3.8.3 The machine shall be fitted with the following minimum lighting system:
- 2 x headlamps
 - 2 x LED tail lights
 - 2 x LED stop lights
 - 2 x LED front and 2 x LED rear direction indicator lights

- 2 x LED reverse lights coupled to an automatic reverse warning sound mechanism
 - An amber strobe light shall be fitted in such a manner as to not hinder the operator
- 3.8.4 All electric wiring must be colour coded, numbered, grommited, sleeved, trunked and securely clamped. Wire numbers to be carried through into the schematic diagrams and detailed drawings.
- 3.8.5 Referenced specifications for electrical:
- SABS 1376 Parts 1, 2 and 3 (Lights for motor vehicles)

3.9 Painting

- 3.9.1 The machine shall be painted in accordance with Specification EEAM-Q-008 (Corrosion Protection).
- 3.9.2 The manufacturer's standard painting procedure can be used if it is equivalent or better than that called for above, and has been approved by the Supply Manager.
- 3.9.3 The total paint dry film thickness shall not be less than 250µm.
- 3.9.4 The colour scheme of the sweeper shall be as follows:
- Red to colour specification RAL 3020
- 3.9.5 No other colours shall be accepted.
- 3.9.6 Drain holes must be provided in areas where water can accumulate.
- 3.9.7 The paintwork shall be covered by a ten year corrosion guarantee.

3.10 Signage and markings

- 3.10.1 A data plate as required by the South African Road and Traffic Act shall be fitted.
- 3.10.2 Durable, ultraviolet resistant and weather resistant warning signs shall be provided at all locations that impose a danger.
- 3.10.3 Durable, ultraviolet resistant and weather resistant information signs shall be provided to assist the driver/maintenance staff with operation/maintenance.
- 3.10.4 A fuse diagram shall be displayed at the fuse box.
- 3.10.5 The Transnet Logo (white on the red background) is to be provided on each side of the machine. (Position and size to be agreed.)

4. Safety and Environment

4.1 Safety Requirements

- 4.1.1 The machine shall comply with the South African Occupational Health and Safety Act, Act 85 of 1993/as amended.
- 4.1.2 All surfaces where operating or maintenance personnel shall tread must be laid out with non-slip material.
- 4.1.3 Suitable fire extinguishers shall be provided.

4.2 Environmental Requirements

- 4.2.1 The mechanical sweepers shall be fitted with a dust control system.
- 4.2.2 The mechanical sweeper shall be recyclable.

5. Maintenance

5.1 Lubrication

5.1.1 Manual lubrication

- 5.1.1.1 All grease points must be clearly marked by means of a yellow circle of approximately 2,5cm in diameter.
- 5.1.1.2 Grease points that are not easily reachable must be provided with a steel extension tube to an accessible position.

5.2 Accessibility

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

6. General

- 6.1 The machine and all components fitted shall be new.
- 6.2 All components shall be installed and fitted according to the manufacturer's recommendations.
- 6.3 All electrical and mechanical components shall have been tested for reliability and extended lifetime in the conditions to be expected.
- 6.4 The machine will only travel within the boundary of the port; however it shall comply with the requirements of The South African Road Traffic Act, where applicable.
- 6.5 The mechanical sweeper must be designed for all parts and components to be easily assembled, adjusted and removed.
- 6.6 A magnet shall be fitted to the front of the machine to collect steel debris prior to sweeper passing over the steel.
- 6.7 The machine must be supplied with detailed maintenance, operating, training and spares manuals (in English), including technical data for each spare, as well as general arrangement drawings and a bill of materials. Maintenance manuals to have sufficient information to allow terminal to capture maintenance schedules in terms of inspections, servicing and replacement of parts. Three hardcopies and two electronic copies of the operating, maintenance, training and spare parts manuals shall be provided, as well as a training manual for each trainee.

7. Referenced Specifications

7.1 Standard specifications

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

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 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 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
SNS 1376 Parts 1, 2 & 3	Lights for motor vehicles
SABS 1327: 1981	Electrical connectors for towing and towed vehicles
SANS 1207 & SANS SV 1051	Braking

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.

7.2 Employer specifications

The following Employer specifications are relevant:

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

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