SPECIFICATION FOR THE SUPPLY OF SCISSOR LIGHTING MAST

This specification covers Transnet National Ports Authority requirements for Scissor Mast

REVISIONS		
REV	**DATE**	**APPROVED**
0	20/01/2022	

INDEX

SECTION	CONTENTS
1	SCOPE
2	OPERATIONAL REQUIREMENTS
3	DESIGN AND QUALITY
4	METHOD OF TENDERING
5	SERVICE CONDITIONS
6	STANDRADS AND SPECIFICATION
7	DESIGN
8	MAST CONFIGURATION
9	MATERIAL USED FOR CONSTRUCTION
10	ELECTRICAL
11	CORROSION PROTECTION
12	SIGNAGE AND MARKINGS
13	SAFETY OF OPERATION
14	LUBRICATION
15	TOOLS
16	SPARES
17	TRAINING
18	LITERATURE
19	ADDITIONAL EQUIPMENT AND ACCESSORIES
20	INSPECTION BEFORE DELIVERY
21	FUNCTIONAL TEST BEFORE DELIVERY
22	OTHER REQUIREMENTS BEFORE DELIVERY
23	INSPECTION AFTER DELIVERY
24	ACCEPTENCE AND FUNCTIONAL TESTING
25	GENERAL
26	ANNEXURE A
27	ANNEXURE B

1. SCOPE

1.1 This specification is for scissor lighting masts of various lengths, here after called “the mast”.

1.2 The masts shall be supplied complete in all respects, including standard equipment supplied by the manufacturer.

1.3 The mast shall comply with The South African Occupational Health and Safety Act, Act 85 of 1993/as amended and to the requirements as stipulated in SANS 10225:2012 (The design and construction of lighting masts.)

2. OPERATIONAL REQUIREMENTS

2.1. The masts will be utilized in yards and roadways to provide luminaire support.

3. DESIGN & QUALITY

3.1. For the design and manufacturing of the mast, the Supplier shall have a quality system in place that meets the requirements of the ISO 9000 Series of quality control.

4. METHOD OF TENDERING

4.1. Tenderers shall submit their main offers in accordance with the requirements of this specification. Deviations from the requirements of this specification which are of a minor nature and do not depart materially, will be considered at the discretion of Transnet National Ports Authority.

4.2. All documents forming part of the Tender shall be firmly bound. No loose documents will be considered.

4.3. Failure to comply with the above requirements may preclude a tender from consideration.

4.4. All tender documents shall be presented in a clear format with index, uniquely numbered pages and cross-referenced. The total number of pages shall be clearly stated in the index.

4.5. Test reports/certificates shall be issued or certified by the appropriate test authority, that is accredited by South African National Standards (SANS).

5. SERVICE CONDITIONS

The mast shall be designed and rated for continuous operation under the following conditions:

5.1. Environmental Conditions.

- Altitude ranges from 0 to 1800m above sea level.
- Ambient temperature to range from -10 to +50 degrees Celsius.
- Relative humidity to range from 10% to 90%.
- Lighting condition to be 2 ground flashes/square kilometer per annum.
- Level of pollution to be heavily salt laden or polluted with smoke from industrial sources.

6. STANDARDS AND SPECIFICATIONS

The following standards and Specification are referred to in this specification

SANS 10225:2012 - The design and construction of lighting masts

SANS 121 - Hot dip galvanized coatings on fabricated and steel articles – Specifications and test methods

SANS 50025-1:2009 - Hot rolled products of structural steels Part 1: General technical delivery conditions

SANS 2001 - Construction Works Part CS1: Structural steel works

7. DESIGN

7.1. The mast shall be designed in accordance with SANS 10225:2012

7.2. The mast shall be designed to carry the luminaires as specified in the information provided, i.e. drawings and *Works Information* (WI).

7.3. The site factors are specified in the *Works Information*.

7.4. The manufacturer approved foundation layout including reinforcing details and other technical foundation details for the mast shall be submitted.

7.5. The bolt group and and the installation thereof for the applicable mast type shall be submitted.

7.6. The stubby and bolts required to erect the mast shall be submitted.

8. MAST CONFIGURATION

8.1. The mast shall be of the pivot scissor type, mid hinged and counter balanced.

8.2. The cross section of the mast shall be octagonal tapering uniformly to the top.

8.3. The mast shall be assembled on site by means of a slip joint.

8.4. The lower half of the mast shall be divided into two fully enclosed half sections which shall form the octagonal section

8.5. In the operating position, no unsightly steps or protrusion shall be visible.

8.6. The pivoting hinge shall consist of two full length 3CR12 stainless steel sleeves.

8.7. The pivoting half of the mast shall be securely bolted to the base plate by means of an adequate vandal proof system.

8.8. Steel used in the construction of the mast shall have an ultimate tensile strength of between 460 and 680MPA and identical to SABS 1431 grade 355WA. Full details of the device provided shall be furnished.

8.9. The pivot half of the mast shall permit the accurate balancing of the top load such that one person using a Nylon rope can perform the lowering operation.

8.10. Changes to the top load of the mast shall be counter balanced by counterweights at the base of the pivoting section of the mast. The method of counter balancing shall be fully described in Annexure A.

8.11. A safety chain shall be provided to connect the fixed and the pivoting half to prevent accidental lowering or damage to the trailing cable.

8.12. The fixed half of the mast shall have sufficient space to permit the mounting of electrical equipment such as a distribution board and a multi-pin socket.

9. MATERIAL USED FOR CONSTRUCTION

9.1. The mast components shall be manufactured from material conforming to SANS 50025-1:2009.

9.2. The pivot joint shall be manufactured from AISI Grade 3CR12 stainless steel.

10. ELECTRICAL

10.1 Provision shall be made on the structure for the installation of a fully enclosed IP30 distribution board inside the mast.

10.2 The distribution board shall be fitted before delivery to site.

10.3 The distribution board shall contain the following:

10.3.1 Three Pole isolator (Main Switch)

10.3.2 Single pole MCB's for each luminaire

10.3.3 One 5 pin CEE plug or coupler

10.3.4 A suitable flexible trailing cable with connectors.

10.3.5 A single pole MCB acting as a by-pass switch

10.3.6 One single pole MCB protecting the contactor

10.4 The mast earthing shall comprise of the following:

10.4.1 The mast shall be earthed by means of at least two stainless steel earthing spikes which must be installed under the foundation of the mast.

10.3.9 The earthing spikes shall be connected to the foundation bolts with copper connectors and brass clamps. The area of the copper conductor shall be tested and shall comply with SANS.

11. CORROSION PROTECTION

11.1 The mast section and components shall be hot dipped galvanized to SANS 121.

11.2 No drilling, machining or welding shall be performed on the components after being galvanized.

11.3 All bolted joints must be thoroughly sealed with sealer to prevent rusting between mating surfaces.

11.4 Drain holes must be provided in areas where water can accumulate.

11.5 All aluminium components shall be suitably protected with a corrosion inhibiter.

11.6 All fasteners used in the construction of the mast shall be stainless steel. The only exclusion will be safety critical fasteners and those fitted on components supplied by OEM's

11.7 All electronic and electrical components shall be suitable and treated for use in tropical climate where rapid changes in weather conductions produce severe moisture condensation problems. The components shall be capable of withstanding the highly corrosive effects of the moist, saline atmosphere. All electrical components not installed in controlled environments must have minimum enclosure protection of IP65.

12. PAINTING OF COMPLETE HIGH MAST STRUCTURE

12.1 All surfaces shall be detergent washed and fresh water rinsed to remove oil and grease.

12.2 Sharp edge shall be radiused and major roughness of welds shall be removed by grinding. Weld spatter and flux shall be removed.

13.3 The painting of the mast shall be in accordance to Annexure B.

13. SIGNAGE AND MARKING

13.1 Each mast shall have an identification number. This number shall be stamped on the unhinged sections to the particular mast assembly.

14. SAFETY OF OPERATION

14.1 The system fitted shall be provided by the supplier.

14.2 Complete and detailed description of the features employed on the masts to ensure safe operation under all conditions shall be submitted.

15. LUBRICATION

15.1 A list of all recommended lubricants and the associated application shall be furnished by the supplier before the mast is delivered.

15.2 Grease points which are not easily reachable must be provided with a steel extension tube to an accessible position.

15.3 Grease points must be clearly marked by means of:

- A red circle on graphite grey.
- White circle on traffic red of approximately 2,5cm in diameter.

16. TOOLS

16.1 A list, providing details of the tools supplied with the mast shall be submitted in Annexure A.

17. SPARES

17.1 Any spares recommended as being necessary to cover the first year's operation shall be detailed and quoted for separately under the heading Recommended Spares.

17.2 All components shall be selected such that local agents are available and the spares are freely available in South Africa.

17.3 The names and addresses of the company who will be responsible for carrying spares and repairs of defects during the warranty period shall be stated in Annexure A.

18. TRAINING

18.1 Operator and maintenance staff must be trained in the operation and maintenance of the mast.

18.2 Training must commence once the masts have been tested and accepted.

18.3 A name list of the personnel which must receive training will be provided by the owner's team. Where applicable, driver's license numbers or other information needed will be provided

18.4 The minimum qualifications for trainees must be stated.

18.5 The duration of theoretical training must be stated.

18.6 The duration of practical training must be stated.

18.7 One complete set of theoretical training documents which will be used must be submitted at least a week before training starts.

18.8 A description on the practical training which will be done must be submitted at least a week before training starts.

18.9 An agenda, detailed the training program, must be submitted at least a week before training starts.

18.10 If any lecture documentation is handed to the trainee, the documents, must be listed on the transmittal note. A separate document must be supplied for each trainee. The trainee must sign for the documents received.

18.11 The attended register and transmittal notes must be forwarded to the Transnet National Ports Authority representative after completion of the training.

18.12 All certificates issued must be forwarded to the Transnet National Ports Authority representative.

19. LITERATURE

19.1 Maintenance and operating instructions handbooks and the following must be supplied:

- Material certificates.
- Warranty certificates
- Corrosion warranty certificate
- Internal inspection and quality control reports

20. ADDITIONAL EQUIPMENT AND ACCESSORIES

20.1 A list describing the function and purpose of all options that can be offered for use with the mast shall be supplied. All the options shall be listed and priced separately in the price schedule.

21. INSPECTION BEFORE DELIVERY

21.1 Transnet National Ports Authority reserve the right to carry out inspection on any item of mast and work at any time during manufacturing at the manufacture's work and to be present at any test.

21.2 The complete mast will be subjected to an inspection by the Transnet Technology Management (QA Department). If any component on the mast is rejected during this inspection, it shall be repaired or replaced by the Supplier to the satisfaction of a Transnet National Ports Authority (TNPA) representative.

22. FUNCTIONAL TEST BEFORE DELIVERY

22.1 The *Supplier* will be required to show practically and analytically that the mast comply with the requirements of the specification.

22.2 All consumables required for the functionality tests, e.g. fuel as well as the operators shall be provided by the Supplier.

22.3 All test results will be measured against the technical specifications of the relevant components/systems.

22.4 Once the test is completed successfully; the mast will be released for delivery to its destination.

23. OTHER REQUIREMENTS BEFORE DELIVERY

23.1 Before delivery, the Supplier shall supply in triplicate complete test certificates, as necessary, and such prescribed statutory documents as are required certifying the class and Safe Working Loads of the equipment (and specific components e.g. hooks, hoists etc.) and that the equipment is in complete working order and that all working parts are effectively lubricated. Where required by law these certificates shall be issued by local authorities.

24. INSPECTION AFTER DELIVERY

24.1 After delivery, but before acceptance of the goods, the masts will be inspected again by a Transnet National Ports Authority representative to ensure that no damage occurred during the delivery process.

24.2 If any component on the mast is rejected during this inspection, it shall be repaired or replaced by the Supplier to the satisfaction of Transnet National Ports Authority.

25. ACCEPTANCE AND FUNCTIONAL TESTING

25.1 All consumables required for the acceptance and endurance test.

25.2 The Transnet National Ports Authority representative will witness the acceptance and functional test.

25.3 All test results will be measured against the technical specifications of the relevant components/systems.

25.4 Details of the testing protocol, with results which must be obtained, must be furnished by the Supplier at least 4 weeks before delivery and shall include at least the following:

- Stability tests
- Functional tests

25.5 Once the acceptance test is completed successfully, the mast shall be subjected to a one-hour endurance test at full capacity.

26. GENERAL

26.1 The mast shall be guaranteed for a minimum of 12 months. Electrical systems must be included in the guarantee.

26.2 The mast and all fasteners shall be to I.S.O. Metric Standards, and instrumentation gauges, dials, etc. shall be graduated in System International (S.I.) units.

26.3 In order to standardize on spares and consumables, the use of alternative components to that offered may be requested by the Purchaser.

ANNEXURE A

To be completed by tenderer

Method of counter balance	……...
Material Specification	……
Earthing copper conductor of base	……
Tools to be supplied with the mast pole	……

ANNEXURE B

Painting Specification for Lighting Masts

1. Painting Of Masts

1.1. The preparation and painting of masts shall comply with SABS 064 and BS 5493 respectively. Colours shall be in accordance with SABS 1091.

1.2. The primer coating shall be equal or similar to Plascon “Plascoguard Gehophon” GW 5, Dulux “Sigmacover”’ or Chemrite Coatings “Carboline 193 HB”.

1.3. The two coats covering the primer surface shall be equal or similar to Plascon “Plascothane Recoatable Enamel” CPC series; Product data sheet U-8B, Dulux “Sigmadur Gloss HB”, or Chemrite Coatings” Caroboline 133 HB”. Colours shall be as specified in clause 4.11.8.

1.4. All paints shall be stirred and mixed to homogeneous condition incorporation the whole contents of the paint container. Mixed paint shall be kept mixed and in good condition throughout, stirring when necessary to keep the pigment in suspension. Thinning shall only be undertaken in accordance with manufacturer’s recommendations and directions. Partially used containers shall be resealed to prevent evaporation of solvent.

1.5. Galvanised surfaces shall be scrubbed with steel wool soaked in a cleaning solution to remove the protective film against formation of white rust and all other foreign matter and also to provide a key for adhesion of the primer. Protective clothing, gloves and masks must be used by workers during this cleaning process. Rinse the cleaned surface copiously with water.

1.6. All painted surfaces, prior to application of the following coat, shall be sound, dry and free from oil, grease and other contamination. Any unsound paint to be removed completely, the surface prepared as in clause 4.11 above and repainted coat for coat as specified below.

1.7. After preparation of the galvanised surfaces apply one coat of primer by spraying to give a dry film thickness of 80 microns to all surfaces with the exception of the mast interior which need not be painted. Allow to dry for a minimum period of 4 hours before overcoating.

1.8. The primed surface shall then be painted in accordance with clause 4.11.2. One coat of colour G12 (Dark Admiralty Grey), by suitable airless spray equipment to give a dry film thickness of 75 – 100 microns for this coat. An overall final coat colour H30 (French Grey), to give a dry film thickness of 25 – 35 microns shall be applied. The total dry film thickness of the primer and two successive coats shall be between 180 – 215 microns.

1.9. Paints shall be applied under suitable conditions of light, temperature, humidity and ventilation. At time of overcoating, the painted surface shall be clean, dry, sound and free of misses and defective paint. Each coat of paint shall be applied as a continuous, even film of uniform thickness.

1.10. Painted steel shall not be handled until the paint has dried except where necessary in turning for painting of stacking for drying. Paint damaged in handling shall be scraped off and touched up by replacing each coat of paint scraped off. Painted steel shall not be transported or packed for transport until paint is dry.

1.11. When loading at the manufacturer's premises and when off-loading at the erection site, components shall be handled with hessian covered slings in order to cause minimum damage to paintwork. During transportation, the components shall be placed on wooden dunning and securely fastened to prevent sliding and other movement.

1.12. Prior to erection of masts, damaged areas of paint shall be repaired by spot cleaning in a manner that will minimise damage to sound paint. Bared areas shall be spot primed and spot painted with the materials specified, to restore all coats.

1.13. During erection, mast shall be handled with hessian covered slings to minimise damage to paintwork. After erection, paintwork shall be repaired in the manner described above.