

Annexure A



KEETMANSHOOP MUNICIPALITY

KEETMANSHOOP ELECTRICITY BUSINESS UNIT (KEBU)

**SPECIFICATION FOR LIGHTING
SCISSOR MASTS & GALVANIZED
POLES & OUTREACH GOOSENECK
BRACKETS**

Reference:
KEBU_SPEC_007
Revision: 0
December 20

Contents

Foreword	3
1 Scope	3
2 Normative References	3
3 Definitions and Abbreviations	4
4 Requirements High Mast	4
4.1 General.....	4
4.2 Design	4
4.3 Construction	4
4.4 Scissor Mast Requirements	5
4.5 Material and Corrosion Protection.....	6
4.6 Spigots	7
4.7 Access Hole and Cable Entries.....	7
4.8 Electrical Connection to Luminaires (If Required).....	8
4.9 Foundation	8
4.10 Earthing of Mast	9
5 REQUIREMENTS: STREET LIGHT GALVANIZED POLES & OUTREACH GOOSENECK BRACKETS.....	9
5.1 GENERAL	9
5.1.1 All Poles shall comply fully with the requirements of SANS 10225 and this specification..	9
5.2 DESIGN.....	10
5.3 POLE PLANTING	10
5.4 STREETLIGHT BRACKETS	12
5.5 STREETLIGHT JUNCTION BOX.....	12
5.6 SUPPLY CABLE TO LUMINAIRE	12
5.7 STREET LIGHTING LUMINAIRE.....	12
5.8 STREETLIGHT SUPPLY CIRCUIT	12
5.9 DAYLIGHT SWITCH / PHOTOCCELL	13
5.10 STREETLIGHT METERING	13
5.11 EARTHING OF STREET LIGHT POLE.....	13
6 Inspection and Testing.....	13
7 Marking and Packaging	14
8 Drawings and Documentation.....	14
9 Training	15
10 Quality Assurance	15
ANNEXURE B – TECHNICAL COMPLIANCE SCHEDULES A AND B.....	16

FOREWORD

This specification covers Keetmanshoop Electricity Business Unit's requirements for Scissor Masts for area lighting purposes and Galvanized Poles & Outreach Gooseneck brackets are used in Keetmanshoop Municipality's area of supply for streetlighting purposes.

Bidders shall complete the technical schedules as detailed in Annex C – Technical Schedules A and B. All deviations from the requirements shall be stated in the tender documentation. In the absence of such a statement, it shall be understood that all requirements of this specification are fulfilled without exception.

Specifications are referenced in the normative references section; the list of standards may be used as a guide, but should not be regarded as a complete list. Bidders shall be responsible for obtaining copies of NRS documents and any other relevant and current national and international standards.

Scissor masts shall comply with the relevant SANS and/or IEC equivalent standards or similar approved.

1 SCOPE

This specification covers Keetmanshoop Electricity Business Unit's requirements for 25 m Scissor Masts for area lighting in accordance with SANS 10225 and Galvanized Poles & Outreach Gooseneck brackets in accordance with SANS 044-3, SANS 657-1, SANS 121, ISO 1461 and SABS 1088-1978.

2 NORMATIVE REFERENCES

Parties using this specification shall apply the most recent edition of the documents listed below.

SANS 044-3, *Welding – the fusion welding of steel. Part 3 – Tests for the approval of welding procedures and production welds.*

SANS 10198, *The selection, handling and installation of electric power cables of rating not exceeding 33 kV (All parts)*

SANS 10225, *The design and construction of lighting masts.*

SANS 657-1, *Steel tubes for scaffolding and for structural and general engineering purposes.*

SANS 1063, *Earth rods, couplers and clamps*

SANS 1418-1, *Aerial bundled conductor systems.*

SANS 121, *Hot-dip galvanised coatings on fabricated iron and steel articles – specifications and test methods.*

SANS 182-1, *Conductors for overhead electrical transmission lines Part 1: Copper wires and stranded copper conductors (metric units)*

SANS 044-3, *Welding – the fusion welding of steel. Part 3 – Tests for the approval of welding procedures and production welds.*

SANS 10198, The selection, handling and installation of electric power cables of rating not exceeding 33 kV (All parts)

SABS 1088-1978 All luminaire spigots are in accordance with SABS 1088-1978 "Luminaire Entries and Spigots".

3 DEFINITIONS AND ABBREVIATIONS

The definitions and abbreviations in the above documents shall apply to this specification.

4 REQUIREMENTS HIGH MAST

4.1 GENERAL

4.1.1 All masts shall comply fully with the requirements of SANS 10225 and this specification.

4.1.2 The masts shall be suitable for use at a mean altitude of up to 1500 m above sea level in an environment subject to heavy corrosion at ambient temperatures of -5 °C to 45 °C.

4.1.3 The masts will be installed in locations subject to high wind loading (as detailed in clause 4.2 below).

4.1.4 The masts shall be designed, approved and certified by an individual who is professionally registered with the Engineering Council as a structural engineer in accordance with SANS 10225 and manufactured from new materials.

4.2 DESIGN

4.2.1 The lighting mast shall be the Scissor type with mast height of 25 m.

4.2.2 The steel tubes used shall comply fully with SANS 657-1.

4.2.3 The masts shall be designed to carry the specified quantity of luminaires on top in strict accordance with SANS 10225.

4.2.4 The masts, when loaded as detailed above, shall be capable of withstanding a fluctuating wind load in accordance with the requirements of SANS 10225. The terrain category shall be Category 3, and the wind velocity shall be 40 ms⁻¹. Other information required (including force coefficients C_f) is given in schedule A.

4.2.5 Under the conditions detailed in SANS 10225 and those given above, the horizontal and vertical deflections shall not exceed the requirements of SANS 10225.

4.2.6 The design of each mast shall be accompanied by comprehensive strength calculations certified by a qualified professional structural engineer. The following design calculations shall be submitted:

- a) the mast in wind conditions
- b) the mast during lowering

4.3 CONSTRUCTION

- 4.3.1** Masts shall have a unitary fixed portion and a unitary moveable portion.
- 4.3.2** All changes in diameter shall be by means of swaging or continuous tapering. Under no circumstances will welded pieces (pipe reducers) inserted into the masts be accepted.
- 4.3.3** All joints shall be bevelled prior to welding and shall present a symmetrical appearance after welding. In addition, all joints (other than those designed for later assembly) shall be designed and manufactured to ensure that there is no ingress of water into the interior of the mast.
- 4.3.4** A fuse mounting bracket with a minimum thickness of 2 mm shall be mounted in the mast opposite the access opening. The mounting bracket shall incorporate a suitable length of DIN rail as well as an M10 x 40 mm earth stud. The earth stud shall be bonded to the mast so that connecting an earth conductor from an external source to it will have the effect of earthing the entire mast.
- 4.3.5** All welding shall be continuous and in compliance with SANS 044, Parts 1 to 4. All welds shall be dressed where necessary.
- 4.3.6** After manufacturing is complete, but before galvanising may commence, masts shall have all weld slag removed by shot- or sand-blasting and a visual inspection shall be carried out to ensure the efficiency of this operation. In addition, the masts shall be internally and externally degreased and all grit, loose rust, welding flux and spatter, rough edges and burrs shall be removed.
- 4.3.7** All masts shall be hot-dip galvanised in accordance with SANS 121. The minimum thickness of the zinc layer shall be 90 µm. The process used shall comply completely with the requirements of SANS 121.
- 4.3.8** No material may be removed from the mast either mechanically or chemically after galvanising has been carried out.
- 4.3.9** All items shall be protected against corrosion by either hot-dip galvanising as detailed above or by being manufactured of stainless steel. All possibility of galvanic action shall be avoided.
- 4.3.10** All threaded articles shall use standard metric threads. External threads may not be undercut.

4.4 SCISSOR MAST REQUIREMENTS

- 4.4.1** The masts shall meet all the requirements of SANS 10225 whether in the fully raised or lowered position, or any point in-between.
- 4.4.2** The masts shall use a mounting flange of thickness in accordance with the requirements of SANS 10225.

4.4.3 The masts shall be hinged at a height which will allow easy maintenance of the luminaires at ground level when lowered. The hinge joint shall use a generously proportioned sleeve and pin construction of non-corroding materials. The hinged portion shall be secured to the fixed portion when in the upright position by means of an adequately designed vandal proof securing system. A special socket type spanner shall be provided for this securing system.

4.4.4 A safety chain shall link the hinged and fixed portions to prevent accidental lowering.

4.4.5 It shall be possible to accurately balance the pivoting section of the mast on site by installing internal counter-weights which remain permanently attached to the interior of the mast. The balancing shall be of such a nature so as to allow lowering and raising of the mast to be carried out by one person using a nylon rope, with an effort of not more than 150 N required. The use of hand or power winches shall not be acceptable.

4.4.6 The mast design shall be such that the hinged portion of a correctly balanced mast will at all times remain in the upright position until deliberately lowered by releasing the securing system and pulling down on the hinged portion. Changes in the top load of the mast shall be accommodated by changes in the counterweights at the base of the pivoting section of the mast.

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

4.4.8 A suitable ring framework for the mounting of 9 x 400 W HPS floodlight luminaires in a symmetrical orientation shall be fitted to the top of the mast.

4.4.9 A mounting plate shall be provided in the base of the mast at the access opening. The mounting plate shall be suitable for the installation of a distribution board if required, and allow easy opening of the sliding front cover.

4.4.10 Unless otherwise specified, the distribution board will be supplied, installed and commissioned by Keetmanshoop Electricity Business Unit, as well as associated electrical equipment and provision of the electricity supply.

4.5 MATERIAL AND CORROSION PROTECTION

4.5.1 All material used in the pivot construction shall be of AISI grade 316 stainless steel.

4.5.2 Steel used in the construction of the mast shall have an ultimate tensile strength of between 460 and 680 MPa and identical to SABS 1431 grade 355WA.

4.5.3 All parts of the masts shall be hot dip galvanized to SANS 121 (ISO 1461) 2000-1 specifications and test certificates shall be provided if required.

4.5.4 No drilling, machining or welding shall be performed on the masts after galvanizing.

4.6 SPIGOTS

4.6.1 The spigots shall be manufactured to comply with the requirements of SANS 1088 for spigots with locking devices.

4.6.2 All spigot adaptors shall be of a unitary, all-welded construction.

4.6.3 A modular device is required to be clamped to the top of the mast, which can accommodate up to nine spigot adaptors. If such a device is offered, detailed scale drawings are required with the tender documentation.

4.7 ACCESS HOLE AND CABLE ENTRIES

4.7.1 An access opening of adequate size shall be provided at a comfortable height in order to accommodate the distribution board, if required. All edges shall be free of burrs and protrusions.

4.7.2 The mast dimensions shall be increased to provide the required modulus of section or alternatively interior reinforcing may be provided, if either of these is necessary.

4.7.3 A suitably curved UV stabilised, impact-resistant plastic cover of the same wall thickness and colour as the mast at the access opening shall be fitted to cover the access opening. The cover plate shall fit snugly against the mast and a silicon sealing gasket shall be provided for sealing the cover plate to the mast.

4.7.4 The plate shall be secured in the closed position by means of two M6 x 25 mm stainless steel 7 sided Allen key bolts (with centre pin) to be recessed on both sides of the cover. The Allen bolts shall screw into a back plate behind the cover which clamps on both ends of the access opening when secured. This arrangement shall be recessed i.e. when the cover is secured to the mast, the Allen bolts shall not protrude beyond the diameter of the mast, and it shall only be possible to remove them by the use of an appropriate 7 sided Allen key spanner with centre pin.

4.7.5 The cover plate shall be permanently secured to the mast by means of a fixing mechanism e.g. a chain onto both the cover plate and the mast. This arrangement shall not impede legitimate access to the mast for maintenance, etc.

4.7.6 Due to the prevalence of removal and theft of cover plates by vandals, preference will be given to designs where the cover sits flush with the exterior surface of the mast in order to prevent external leverage by means of tools and other implements.

4.7.7 Consideration will also be given to alternative designs of cover plate. Full technical details and working drawings must be supplied with such offers.

4.8 ELECTRICAL CONNECTION TO LUMINAIRES (IF REQUIRED)

4.8.1 A flexible, heavy-duty 5-core trailing cable shall be provided. The trailing cable shall be firmly connected to the luminaire carriage. Suitable connectors of the CEE type or connectors meeting IP44 within DIN 40-050 shall be provided.

4.8.2 A fully enclosed distribution board shall be provided for mounting on the inside of the mast, or at the point of supply as specified, containing:

- a) 1 – 3 pole isolator (main switch)
- b) 3 – single-pole MCBs (lights)
- c) 1 – 5 pin CEE plug and coupler
- d) 1 – adequately rated contactor
- e) 1 – single-pole MCB acting as by-pass switch
- f) 1 – single-pole MCB protecting the contactor; and
- g) 1 – rated photocell

4.8.3 The photocell of approved type shall be mounted 4 m above ground level on the outside of the mast behind a vandal proof cover.

4.8.4 A splitterbox with a IP65 rating shall be mounted on top of the mast, fitted with a test socket of the CEE type with at least IP44 rating at the bottom of the box.

4.8.5 All circuit breakers and isolators shall have a rupturing capacity of 5 kA and shall bear the SABS mark and shall be accessible through cut outs in the cover without having to remove the cover.

4.8.6 All equipment shall be clearly marked with engraved labels. No stick-on embossed tape shall be used.

4.8.7 The distribution board shall be fully wired and ready for connection to the incoming supply cables.

4.9 FOUNDATION

4.9.1 Each mast shall be supplied with foundation bolts and templates. The bolts shall be hot dip galvanised over their entire length in compliance with SANS 121 (ISO 1461) 2000-1. Three galvanised nuts, two washers and one spring washer shall be supplied for each bolt. The number of foundation bolts shall be determined according to the design of 4.2 above. Calculations shall be submitted upon request.

4.9.2 A foundation plan, adequately designed for the conditions as per 4.2 of this specification, and based on a soil bearing capacity of 150 kPa, giving details of the reinforcing required shall be submitted if required. Soil pressure and overturning safety factor shall be stated.

4.9.3 Adaptor plate to guide bolts shall be provided.

4.9.4 All reinforcing and foundation bolts shall have a minimum of 100 mm concrete cover. The 28 days cube strength of the concrete shall be 25 MPa.

4.9.5 All foundations shall have a circular flat base from which a square plinth shall rise to above the surrounding ground level.

4.9.6 Once or two PVC, Class B cable sleeves shall be provided from the centre of the top of the foundation plinth, through the concrete to a point below ground level on the side of the plinth.

4.9.7 After casting of the foundation, the slab shall be covered by earth, properly compacted.

4.10 EARTHING OF MAST

An earthing system consisting of two 1,2 m earth spikes, installed under the foundation and connected to the foundation bolts via 70 mm² copper conductors with brass clamps shall be provided, if specified.

5 REQUIREMENTS: STREET LIGHT GALVANIZED POLES & OUTREACH GOOSENECK BRACKETS

5.1 GENERAL

5.1.1 All Poles shall comply fully with the requirements of SANS 10225 and this specification

- a) Steel streetlight poles - single outreach Gooseneck of 2.0 meter, mounting height 8 / 9 / 10 meter, spigot size of 42mm diameter. Access door and cover required. Poles must be hot-dipped galvanized to SABS 763-1988. Information on tendered item must be included. (Poles must be to bottom section of single outreach 8 / 9 / 10 meter mounting height. The successful tenderer must submit as build drawings before pole manufacturing commence.
- b) Steel streetlight poles - single outreach Gooseneck of 2.5 meter, mounting height 8 / 9 / 10 meter, spigot size of 42mm diameter. Access door and cover required. Poles must be hot-dipped galvanized to SABS 763-1988. Information on tendered item must be included. (Poles must be to bottom section of single outreach 8 / 9 / 10 meter mounting height. The successful tenderer must submit as build drawings before pole manufacturing commence.
- c) Steel streetlight poles - single outreach Gooseneck of 3.0 meter, mounting height 8 / 9 / 10 meter, spigot size of 42mm diameter. Access door and cover required. Poles must be hot-dipped galvanized to SABS 763-1988. Information on tendered item must be included. (Poles must be to bottom section of single outreach 8 / 9 / 10 meter mounting height. The successful tenderer must submit as build drawings before pole manufacturing commence.
- d) Streetlight poles shall be planted not less than 1m away from the erf boundary towards the street, along streets with a servitude width of up to 15.0 metres.
- e) Streetlights shall be mounted on straight galvanised poles with a total length of 9.5m, and a mounting height of 8.0 metres from ground level.
- f) Unless otherwise specified streetlight poles shall be planted not more than 40m apart from each other in urban areas.

- g) Streetlight poles shall be planted with a minimum depth of 1.5m in the ground.
- h) Unless otherwise specified streetlight poles along main road shall be planted not less than 5m from the edge of the road.
- i) Streetlights installed in main roads shall have a protruding arm of not less than 2.0m.
- j) Street light constructions in urban areas shall contain a cantilever for an epoxy tar coating.

5.2 DESIGN

- (i) All Poles to be designed in accordance with SANS 10225 and all tubing to SANS 657-1 Grade GW355J HT.
- (ii) Manufacturing should comply to SANS 10214-1987-1.
- (iii) All Galvanizing to be done in accordance with ISO 1461 and SANS 121-2000-1 and certificates to be provided if required.
- (iv) All Welding to be done by coded welders to SANS 10044 Part 1-4.

5.3 POLE PLANTING

- (i) The contractor shall be responsible for setting out the pole positions. Approval of the positions shall be obtained from the Engineer / Employer as the case may be before the holes are excavated.
- (ii) Excavation depths for planting poles shall be as stipulated for the poles.
- (iii) The pole holes shall be suitably sized to allow for working in the hole. Street lighting poles shall be planted vertical in all directions and in positions indicated on the drawings.
- (iv) Terminal poles of all straight runs of poles shall be planted first after which intermediate poles shall be planted to line up accurately with the terminal poles.

a) For road servitudes with a servitude width up to 20 m:

- (i) The straight steel pole shall be continuously or stepped tapered and of oval or circular cross-section with a 75mm diameter top.
- (ii) Overall length of the pole shall be 9.5m, with a mounting height of 8.0m and a planting depth of 1.5m.
- (iii) Each pole shall have two cable entries (opposite) 450 mm below ground level. The slot shall measure 100 x 50 mm. The access opening shall be about 1300 mm above ground level with backboard for the mounting of a 5A G.E.C moulded H.R.C. fuse carrier (or circuit breaker). A 30 amp neutral bar shall be fixed internally opposite the access door. An earth terminal, 12 mm in diameter, shall be provided within the access opening. The removable gland plate will be drilled with 2 x 25 mm holes in the lug to terminate entering cables. All poles must be fitted with a corrosion sleeve.

(iv) These following poles should be installed along street with a servitude width of not more than 20m.

- Mounting height : 8.0m
- Planting depth (not less than) : 1.50m
- Minimum wall thickness at swages : 3.00mm
- Access door to control gear : 300mm x 127mm
- Height of access door above ground level : 1,370m
- Base plates (not less than) : (400 x 400 x 6)mm
- Pole planting arrangement : One Sided

b) For road servitudes with a servitude width 20m to 25m:

(i) The single cantilever steel pole shall be continuously or stepped tapered and of oval or circular cross-section with a 75mm diameter top.

(ii) Mounting height of the pole shall be 10.5m, with a planting depth of not less than 1.5m. Each pole shall have two cable entries (opposite) 450 mm below ground level. The slot shall measure 100 x 50 mm. The access opening shall be about 1300 mm above ground level with backboard for the mounting of a 5A G.E.C moulded H.R.C. fuse carrier (or circuit breaker). A 30 amp neutral bar shall be fixed internally opposite the access door. An earth terminal, 12 mm in diameter, shall be provided within the access opening. The removable gland plate will be drilled with 2 x 25 mm holes in the lug to terminate entering cables. All poles must be fitted with a corrosion sleeve.

(iii) These poles should be installed along street with a servitude width of 20m to 25m shall be spaced at not more than 50m apart.

- Mounting height : 10.5m
- Planting depth (not less than) : 1.50m
- Outreach : 3.00m
- Rake Angle – after mounting luminaire: 5°
- Radius of rake : 3.00m
- Minimum wall thickness at swages : 3.00mm
- Access door to control gear : (300 x 127)mm
- Height of access door above ground level : 1,370m
- Base plates (not less than) : (600 x 600 x 6) mm

- Pole planting Arrangement : Staggered across

5.4 STREETLIGHT BRACKETS

Unless otherwise specified for mounting the luminaire a side entry hot dip galvanized bracket in accordance with SANS 121 (150mm short), no outreach required shall be clamped to the top of the pole providing a 15 degree rake angle for the luminaire. Care shall be taken that the luminaire is fixed properly and that the axis of the luminaire is vertical to the line of the street.

5.5 STREETLIGHT JUNCTION BOX

A mounting plate suitable for mounting equipment shall be fixed to the pole on the inside of the access opening and shall be mounted 1370mm above ground level against the pole suitable to take the street lighting cable to be looped into at each pole and the luminaire supply cable. 60 A terminal blocks for terminating the street lighting cables and a 5A HRC fuse for individual control of the light shall be provided on the mounting plate on the inside of the access compartment

5.6 SUPPLY CABLE TO LUMINAIRE

The supply cable to the luminaire shall be 10mm² x 4 core PVC SWA PVC and 16mm² x 4 core (where necessary) cable terminated at the junction box and run along the pole through the bracket to the luminaire. The cable shall be neatly saddled in a straight run onto the pole. The street lighting cable shall be looped into each pole. The cable ends shall be made off inside the junction box to be provided on 5 terminal blocks. From the junction box mounted against the pole the luminaire shall be supplied by means of a 2,5mm² x 3 core cable (phase, neutral, earth). A 10A miniature circuit breaker for the individual control of the luminaire shall be installed either inside the junction box at the bottom of the pole or the luminaire as agreed to by the Employer or inside the miniature substation control board. All streetlights to be connected to a single street lighting feeder shall be distributed equally over the three phases and the expected load balanced.

5.7 STREET LIGHTING LUMINAIRE

The street lighting luminaires shall be of the side entry type suitable to be mounted onto the bracket mentioned above at a rake angle of 15°. The luminaires shall be supplied complete with ballast, power factor correction gear, etc.

5.8 STREETLIGHT SUPPLY CIRCUIT

The street lighting control contactor C1 shall have 3 N/O contacts rated 60A. The contactor shall be mounted in a separate dustproof box and shall be positioned easily accessible for maintenance purposes. The control wiring shall be as schematically indicated on the drawing and shall provide C1 to be energized by the photo electric relay. Circuit breakers for controlling the individual streetlight circuits, the photo electric relay and contractor coil and to provide a bypass for the contractor shall be circuit breakers having a rupturing capacity of 5kA and in accordance with SANS 152 and SANS 156. Photo electric relay bypass switch a 5A switch in accordance with BS 2631 shall provide for manually by-passing the photo electric relay.

5.9 DAYLIGHT SWITCH / PHOTOCELL

A Photocell suitable for mounting inside kiosk, rated for 220-240 V a/c, 10 A shall be installed. One photo electric relay shall be supplied loose with each substation. The contactor shall be rated 5A and all switching shall be time delayed for a period of 30 to 60 seconds.

5.10 STREETLIGHT METERING

Unless otherwise specified, streetlight metering shall be provided by the Supply Authority.

5.11 EARTHING OF STREET LIGHT POLE

Streetlight POLES and any other metal part shall be bonded to the earth wire in accordance with SANS 10292.

6 INSPECTION AND TESTING

High Mast

6.1.1 All masts shall comply with the test requirements of SANS 10225, SANS 121 and SANS 10198.

6.1.2 No cracks shall be permitted, and penetration, lack of fusion, undercutting and porosity shall be taken into account.

6.1.3 None of these provisions free the tenderer from any of the inspection and quality control requirements of SANS 10198, SANS 10225 and SANS 121.

STREET LIGHT GALVANIZED POLES & OUTREACH GOOSENECK BRACKETS

6.1.4 The following tests shall be conducted in accordance with SANS 1749:

- a) Pole-top deflection, and
- b) Resistance to maximum bending moments.

6.1.5 A valid test report in respect of the above tests, issued by an accredited testing authority, must be produced on demand.

7 MARKING AND PACKAGING

High Mast

7.1.1 A metal name plate, at least 80 x 40 mm in size and using letters at least 10 mm high, shall be permanently fixed to the inside of each mast opposite the access opening. The name plate shall preferably use raised coloured lettering, although other permanent and robust lettering will be considered, provided full details are supplied.

7.1.2 The name plate and method of fixing shall have a service life at least equal to that of the mast, and shall remain in place and legible even if the mast suffers serious structural damage of any sort.

7.1.3 The name plate shall include the following information: manufacturer's name, month and year of manufacture, height, and provision for Keetmanshoop Electricity Business Unit asset ID.

7.1.4 All masts shall be weld marked with the user reference just below the access opening. The weld mark, which shall be carried out before galvanising preparation, shall consist of a neat raised weld run on the exterior of the mast, with letters approximately 100 mm high.

7.1.5 Spigot adaptors and caps shall be marked with the user reference on the top by means of number and letter punches with a character size of at least 10 mm. The lettering and numbers shall be clearly visible after galvanising.

7.1.6 Masts shall be bundled with stainless steel strapping for delivery.

Street Light Galvanized Poles & Outreach Gooseneck brackets

7.1.7 Each pole shall be suitably packaged to avoid damage during handling and off-loading.

7.1.8 Marking of each pole shall be in accordance with SANS 1749.

7.1.9 Each pole shall be marked by means of indelible ink or similar, at the ground line level of the pole, with a continuous line around the entire circumference of the pole and the words "Ground Level" or the letters "GL".

8 DRAWINGS AND DOCUMENTATION

High Mast

8.1.1 As per clause 4.2.6, the design of each mast shall be accompanied by comprehensive strength calculations certified by a qualified professional structural engineer. In addition, detailed drawings and documentation as required in clause 4.3 of SANS 10225 shall be supplied.

Street Light Galvanized Poles & Outreach Gooseneck brackets

8.1.2 Full technical information and descriptive literature relating to the poles offered shall be submitted in order that the poles can be fully evaluated. This shall include:

- a) materials used in the manufacture of the poles;
- b) the method of manufacture;

- c) details of quality assurance procedures;
- d) comprehensive drawings;
- e) recommended stacking arrangements;
- f) recommended handling and installation instructions; and
- g) details of tests carried out, etc.

8.1.3 Test reports from a test authority recognised by Keetmanshoop Municipality with respect to the tests above shall be provided:

8.1.4 All documentation shall be in English.

9 TRAINING

9.1.1 If required, all Bidders shall offer certified training courses in the correct installation of all masts offered.

9.1.2 All associated costs for the certified training courses detailed above shall be given in terms of cost per person and shall remain fixed for the period of the contract.

9.1.3 If required, the following certified training courses shall be offered for Keetmanshoop Municipality's staff:

- a) Correct handling and care of the Street Light Galvanized Poles & Outreach Gooseneck brackets; and
- b) Correct and safe installation and maintenance of the Street Light Galvanized Poles & Outreach Gooseneck brackets.

9.1.4 The associated costs for the certified training courses in 9.1.3 shall be given per person and shall be fixed for the period of the contract.

10 QUALITY ASSURANCE

A quality management system shall be set up in order to assure the quality of the scissor masts during design, development, production, installation and service. Guidance on the requirements for a quality management system may be found in the following standards: SANS 9000 and SANS 9001. The details shall be subject to agreement between Keetmanshoop Electricity Business Unit and the supplier.

ANNEXURE B – TECHNICAL COMPLIANCE SCHEDULES A AND B