



STANDARD SPECIFICATION  
FOR  
AREA LIGHTING INSTALLATIONS

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1 SCOPE

This specification covers the design, manufacture, testing at works, preparation for delivery, and installation of area lighting installations.

2 DEFINITIONS

“Area Lighting” is defined as the artificial lighting of surface areas between structures and buildings.

3 STANDARDS AND REGULATIONS

The area lighting installations shall be designed to fully meet the requirements of the latest revisions and amendments of the following Acts, Regulations, Standards and Recommendations.

Occupational Health and Safety Act (No 85 of 1993)

SANS 10142-1:2001	The Wiring of Premises Part 1: Low voltage installations
SANS 60947-1:2008	Low-voltage switchgear and controlgear Part 1: General rules
SANS 60947-2:2009	Low-voltage switchgear and controlgear Part 2: Circuit-breakers
SANS 60947-3:2009	Low-voltage switchgear and controlgear Part 3: Switches, disconnectors, switch-disconnectors and fuse-combination units
SANS 60099-1:1999	Surge Arresters- Part 1 Non-linear resistor type gapped surge arresters for a c systems
SANS 60099-5:2007	Surge arresters Part 5: Selection and application recommendations
SANS 60529:2001	Degrees of protection provided by enclosures (IP code)
SANS 1507-1:2007	Electric cables with extruded solid dielectric insulation for fixed installations (300/500 V to 1 900/3 300 V) Part 1: General
SANS 1507-2:2007	Electric cables with extruded solid dielectric insulation for fixed installations (300/500 V to 1 900/3 300 V) Part 2: Wiring cables
SANS 783:1988	Galvanising
SABS 1431	
SANS 121:2011/ISO 1461:2009	Hot dip galvanized coatings on fabricated iron and steel articles - Specifications and test methods
SANS 10225:1991	The design and construction of lighting masts
SANS 10389-1:2003	Exterior lighting Part 1: Artificial lighting of exterior areas for work and safety

4 INSTALLATION REQUIREMENTS

4.1 Type

The lighting mast shall be the **SCISSOR** type as manufactured by Sectional Poles or equivalent of the correct height to meet the lighting design requirements.

4.2 Construction

4.2.1 The masts shall be octagonal in cross section and tapering uniformly to the top. The masts shall be assembled on site by means of one taper swage.

4.2.2 The lower half of the masts shall be divided into two fully enclosed half sections, which shall

form an octagonal section in the operating position with no unsightly steps or protrusions.

- 4.2.3 The pivoting shall be located approximately at the mid-point of the (fulcrum) mast and shall consist of two full-length stainless steel sleeves and NOT of a shaft and hinge plates.
- 4.2.4 The pivoting half of the mast shall be securely bolted to the base plate by means of an adequately designed vandal proof securing system. A special socket type spanner shall be provided for this securing system.
- 4.2.5 A vandal-proof automatic locking device shall be incorporated, requiring special tools for unlatching.
- 4.2.6 A suitable ring framework for the mounting of 6 x 400W HPS floodlight luminaires in a symmetrical orientation shall be fitted to the top of the mast.
- 4.2.7 The pivoting half of the mast shall permit the accurate balancing of the top load in such a manner that one person using a Nylon roper only can perform the lowering operation.
- 4.2.8 It shall not be necessary to use a winch or power tool to lower the pivoting section of the mast.
- 4.2.9 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.
- 4.2.10 A safety chain shall connect the pivoting half with the fixed half to prevent accidental lowering or damage to the trailing cable.
- 4.2.11 The fixed part shall have sufficient space to permit the mounting of electrical equipment such as Distribution board and a multi-pin socket.
- 4.3 Design
  - 4.3.1 The mast shall be designed to carry the specified quantity of luminaires on top in strict accordance with SANS 10225 1991-1 Code of Practice for the Design and Construction of Lighting Masts. The following site factors shall be considered:

Design wind speed	=	40m/s
Category of terrain	=	2
Altitude of site	=	1 800 m aMSL
  - 4.3.2 The following design calculations shall be submitted:
    - The mast in wind conditions
    - The mast during lowering
- 4.4 Material and corrosion protection
  - 4.5 All material used in the pivot construction shall be of AISI grade 316 stainless steel.
  - 4.6 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.
  - 4.7 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.
  - 4.4 No drilling, machining or welding shall be performed on the masts after galvanizing.

5 ELECTRICAL CONNECTION TO THE LUMINAIRES

5.1 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.

A fully enclosed IP30 distribution board shall be provided for mounting on the inside of the mast, containing:

- 1 – 3 pole isolator (main switch)
- 3 – Single pole MCB's (lights)
- 1 – 5 pin CEE plug and coupler
- 1 – Adequately rated contactor
- 1 – Single pole MCB acting as by-pass switch
- 1 – Single pole MCB protecting the contactor
- 1 – Photocell

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

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.

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

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

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

6 FOUNDATIONS

6.1 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 (ISO 1461) 2000-1. Two 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 3.1 above. Calculations shall be submitted upon request.

6.2 A foundation plan, adequately designed for the conditions as per 3.1 of this specification, and based on a soil bearing capacity of 150kPa, giving details of the reinforcing required shall be submitted. Soil pressure and overturning safety factor shall be stated.

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

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

One 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.

After casting of the foundation, the slab shall be covered by earth, properly compacted. The area around the plinth shall be brought to the original level and shall be left neat and tidy.

7 EARTHING OF MASTS

7.1 Standard system consisting of 2 x 1.2m earth spikes, installed under foundation and connected to foundation bolts via 70mm<sup>2</sup> copper conductors with brass clamps.

8 LUMINAIRES

8.1 The luminaires shall be 400 watt HPS, IP65 Beka Projectolux type or equivalent, complete with die cast aluminium housing with a separate but attached control gear box with the same material composition. The reflector system shall be manufactured from 99.98% super pure anodized aluminium and consist of the back reflector and two side reflectors. Stirrups shall be manufactured from hot dipped galvanized steel .All components shall bear the relevant SABS mark.

8.2 The temperature of any component or compartment, under the following power supply and environmental conditions, shall not exceed the lesser of either the maximum temperature recommended by individual equipment suppliers, or the maximum temperature indicated in the relevant SANS, IEC or BS standard.

8.3 Power Supply Details

Nominal supply voltage:	400V, 3 phase 4 wire
Variations:	+ 10% to -15% on nominal voltage
Phase rotation	RWBR
Frequency:	50Hz
Variations on frequency	±2%
Negative phase sequence voltage	2%
Total harmonic distortion	<3% (up to 25 <sup>th</sup> harmonic)
Neutral earthing (secondary)	Solid
Fault level	5 kA rating for 1 second as specified
Peak fault factor	2,1

Environmental Operating Conditions

Altitude (for design purposes)	1 800 metre above sea level
Maximum air temperature	+40 degrees Celsius
Minimum air temperature	-10 degrees Celsius
Maximum humidity	95% (non-condensing)