# Standard: Streetlight Poles

Standard Number: HPC-9DC-14-0001-2017

| Document Control | | |
|---|---|---|
| **Author** | **Name:** Adrian Barnes<br>**Position:** Senior Standards Engineer | Adrian Barnes 2017.10.17 16:22:27 +08'00' |
| **Reviewed By** | **Name:** Anthony Seneviratne<br>**Position:** Standards Engineer | Digitally signed by Anthony Seneviratne DN: cn=Anthony Seneviratne, o, ou, email=anthony.seneviratne@horizonpower.com.au, c=AU Date: 2017.10.23 15:35:12 +08'00' |
| **Endorsed By** | **Name:** Dieter Mendoza<br>**Position:** Engineering Services Manager / Principal Engineer | Digitally signed by Dieter Mendoza Date: 2017.10.24 13:00:27 +08'00' |
| **Approved By *** | **Name:** Marc Beckx<br>**Position:** Manager Engineering and Project Services | 2017.10.24 16:00:36 +08'00' |
| **Date Created/Last Updated** | October 2017 | |
| **Review Frequency **** | 5 years | |
| **Next Review Date **** | October 2022 | |

** Shall be the Process Owner and is the person assigned authority and responsibility for managing the whole process, end-to-end, which may extend across more than one division and/or functions, in order to deliver agreed business results.*

*** Frequency period is dependent upon circumstances– maximum is 5 years from last issue, review, or revision whichever is the latest. If left blank, the default shall be 1 year unless otherwise specified.*

| Revision Control | | |
|---|---|---|
| **Revision** | **Date** | **Description** |
| 0 | 18/04/2017 | Initial Document Creation |
| 1 | 20/10/2017 | First Revision |
| | | |

| ***STAKEHOLDERS***<br>*The following positions shall be consulted if an update or review is required:* | |
|---|---|
| Asset Managers | Field Practices |
| Senior Asset Frameworks Engineer | Supply Chain Manager |

## TABLE OF CONTENTS


**1 Introduction ..... 5**
1.1 Purpose ..... 5
1.2 Application ..... 5
1.3 Scope ..... 5
1.4 Referenced documents ..... 5

**2 Environmental conditions ..... 6**
2.1 Soil parameters ..... 6
2.2 Other environmental conditions ..... 6
2.3 Classification of cyclonic and non-cyclonic zones ..... 6

**3 Pole requirements ..... 6**
3.1 Pole life ..... 6
3.2 Pole size ..... 6
3.3 Accommodation of luminaire ..... 7
**3.3.1** Luminaire sail area ..... 7
**3.3.2** Luminaire weight ..... 7
3.4 Accommodation of other attachments ..... 7
**3.4.1** Attachment sail area ..... 8
**3.4.2** Attachment weight ..... 8

**4 Pole features ..... 8**
4.1 Frangible – energy absorbing ..... 8
4.2 Inspection hatch ..... 8
4.3 Outreach arms ..... 8
4.4 Cable entry port ..... 8

**5 Foundation ..... 8**

**6 Dimensions ..... 9**
6.1 Tolerances ..... 9
6.2 Cable entry port ..... 10
6.3 Cut-out connection box ..... 10

**7 Electrical requirements ..... 10**
7.1 Earth bond ..... 10
7.2 Luminaire cable ..... 10

**8 Materials ..... 11**

8.1 Steel ..... 11
8.2 Slip joints ..... 11
8.3 Coatings ..... 11
Appendix A Revision Information ..... 12

# 1 INTRODUCTION

## 1.1 Purpose

This standard describes the requirements for streetlight poles for Horizon Power.

## 1.2 Application

This standard applies to:

1) poles for Horizon Power standard luminaires, and approved equivalents
2) poles placed at the road side, for the purpose of lighting public roadways
    a) The roadway is not a state road, as defined by Main Roads Western Australia [4]

This standard does not apply to the mounting of luminaires on bridges, tunnels, or other mountings.

## 1.3 Scope

This standard covers the following attributes of streetlight poles:

- material,
- dimensions, and
- features.

This standard also describes:

- typical soil parameters, to facilitate foundation design, and
- internal components not supplied with the pole, such as cable and cut-out connection box.

## 1.4 Referenced documents

1. AS 1074 *Steel tubes and tubulars for ordinary service*, Standards Australia, 1989
2. *AS/NZS 1158 Lighting for roads and public spaces, Part 1.2: Vehicular traffic (Category V) lighting—Guide to design, installation, operation and maintenance*, Standards Australia, 2010
3. AS 1798 *Lighting poles and bracket arms—Recommended dimensions*, Standards Australia, 2014
4. *Road Lighting Part A: Policy Statement*, Main Roads Western Australia, accessed from https://www.mainroads.wa.gov.au/BuildingRoads/StandardsTechnical/RoadandTrafficEngineering/RoadsideItems/light/Pages/default.aspx 30th August 2016
5. *Horizon Power's Environmental Conditions*, CS10# 2302921 available at https://horizonpower.com.au/contractors-suppliers/contractors/manuals-and-standards/
6. *Justification Report – Streetlight Poles*, HP Standards number HPC-10MJ-14-0001-2016, CS10# 4883941

7. *Pole Foundation Design Boundary Condition Assessment*, APD, 24/01/2013, CS10# 4741825

# 2 ENVIRONMENTAL CONDITIONS

## 2.1 Soil parameters

The soil properties should be assumed to be medium density sand [7], described technically as:

- Density of 18 kN/m³
- Internal friction angle of 33°
- No cohesion (i.e. 0 kPa)

## 2.2 Other environmental conditions

The equipment must be suitable for continuous operation under the environmental conditions specified in *Horizon Power's Environmental Conditions* [5].

## 2.3 Classification of cyclonic and non-cyclonic zones

Cyclonic areas are defined as region D, terrain category 2, to AS/NZS 1170.2. All areas serviced by Horizon Power that lie in regions B, C and D are considered cyclonic and use assets rated for region D.

Non-cyclonic areas are defined as region A, terrain category 2, to AS/NZS 1170.2. All areas serviced by Horizon Power that lie in regions A1 to A4 are considered non-cyclonic and use assets rated for region A.

# 3 POLE REQUIREMENTS

## 3.1 Pole life

The design life of streetlight poles is 50 years.

90% of the population should meet this design life, in the environmental conditions described in section 2.

## 3.2 Pole size

Throughout this document, unless otherwise stated, poles are referred to by their *nominal size*, equivalent to the *nominal mounting height for lighting poles with outreach arms*, as defined by AS 1798. This is shown in Figure 1.

Horizon Power standard nominal sizes are 6.5 m, 10.5 m, and 12.5 m.

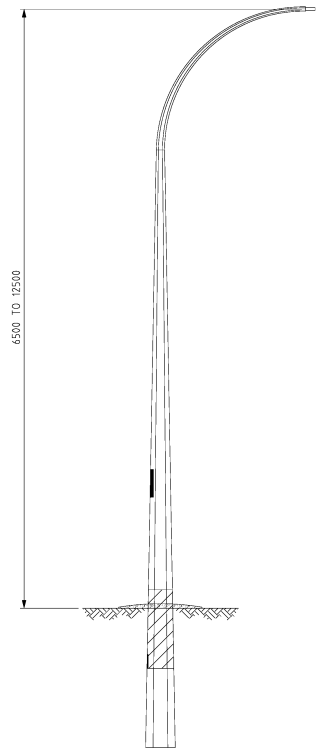


Figure 1 Nominal size, defined from the ground level to the highest level of the outreach arm centreline, excluding the luminaire mounting spigot

The arm projection for the 6.5 m poles is 1.5 m. For 10.5 m and 12.5 m poles, the arm projection is 3 m.

## 3.3 Accommodation of luminaire

Poles must be of sufficient structural strength to bear the luminaires as stated below.

### 3.3.1 Luminaire sail area

The maximum sail area of luminaires for a 6.5 m pole is 0.1 m².

The maximum sail area of luminaires for 10.5 m and 12.5 m poles is 0.2 m².

### 3.3.2 Luminaire weight

The maximum weight of luminaires for a 6.5 m pole is 10 kg.

The maximum weight of luminaires for 10.5 m and 12.5 m poles is 15 kg.

## 3.4 Accommodation of other attachments

In some circumstances Horizon Power is mounting network communication devices on streetlight poles. Poles must be of sufficient structural strength to bear these devices as described below. These are only mounted to poles of size 10.5 and 12.5 m. Such attachments will be mounted only on the vertical section of the pole, at a minimum distance of 1 m below the outreach joint, and a minimum of 4 m above ground.

### 3.4.1 Attachment sail area

The combined sail area of all non-luminaire attachments is 0.25 m².

### 3.4.2 Attachment weight

The combined weight of all non-luminaire attachments is 12 kg.

# 4 POLE FEATURES

## 4.1 Frangible – energy absorbing

In addition to rigid poles, energy-absorbing frangible poles must be considered during tenders, designed to:

- deform progressively
- collapse in a predictable manner
- slow the impacting vehicle at a controlled rate

## 4.2 Inspection hatch

The door will have minimum ingress protection of IP4X to AS 60529. Calculations must be available proving the strength of pole in the region of the inspection hatch.

## 4.3 Outreach arms

For all pole sizes, single and double outreach arms must be available.

Outreach arms for 10.5 m and 12.5 m poles must be detachable.

For 6.5 m poles, outreach arms may be either fixed or detachable.

## 4.4 Cable entry port

The cable entry port must have rounded edges to protect the service cable from abrasion. The minimum radius of the edges is 5 mm.

# 5 FOUNDATION

Pole vendors must state a suitable embedment depth for poles to meet structural requirements. Poles must be a designed to a suitable length to meet both the *nominal size* (i.e. above ground) requirement, and the structurally required embedment depth.

Horizon Power's standard foundation material vary by application and cyclonic region, as shown in Table 1.

Table 1 Standard foundation material

| Nominal size (m) | Standard foundation for wind regions A and B (non-cyclonic) | Standard foundation for wind regions C and D (cyclonic) |
|---|---|---|
| 6.5 | Compacted soil | Compacted soil |
| 10.5 | Compacted soil | Concrete |
| 12.5 | Compacted soil | Concrete |

The strength of concrete, and also the diameter and depth of the concrete footing must be stated by the vendor.

# 6 DIMENSIONS

## 6.1 Tolerances

Tolerances must be in accordance with AS 1798.

Dimensions must be as per the tables below, except for those labelled as 'suggested'.

Table 2 Pole dimensions

| Nominal size (m) | Suggested pole embedment depth* (m) |
|---|---|
| 6.5 | 1.5 |
| 10.5 | 2.0 |
| 12.5 | 2.2 |

*This may be altered as required to meet structural requirements

Table 3 Outreach arm dimensions

| Nominal size (m) | Projection in the horizontal direction (mm) |
|---|---|
| 6.5 | 1500 |
| 10.5 | 3000 |
| 12.5 | 3000 |

The spigot must be as per AS 1798:

1) No shorter than 130 mm in length

2) DN32 to AS 1074 for 10.5 and 12.5 m poles

3) DN25 to AS 1074 for 6.5 m poles

The angle of the spigot must be 5° upcast.

Table 4 Inspection hatch dimensions

| Nominal size (m) | Minimum hatch dimensions (height × width in mm) |
|---|---|
| 6.5 | 200 × 110 |
| 10.5 | 300 × 110 |
| 12.5 | 300 × 110 |

### 6.2 Cable entry port

The port for cable entry port must be 150 mm in height and 50 mm in width. The top of the port should be 500 mm below the burial depth line.

### 6.3 Cut-out connection box

The pole must accommodate a cut-out connection box of dimensions:

- Height: 150 mm
- Width: 80 mm
- Depth: 60 mm

The cut-out connection box will conform to BS 7654.

## 7 ELECTRICAL REQUIREMENTS

### 7.1 Earth bond

An earth bonding point must be provided in the vicinity of the cut-out, suitable for connection of a lug using a M6 bolt (316 stainless steel).

The bonding point must be welded to the steel pole interior, and must not be used for any other purpose.

Welds between stainless and carbon steel must be suitably coated to inhibit galvanic corrosion.

### 7.2 Luminaire cable

For the electrical cable inside streetlight poles (from cut-out to luminaire), the cable will have the following properties:

- two-core-and-earth cable
- copper conductors with 1.5 mm² cross-sectional area for active, neutral and earth cores
- V-90 PVC insulation
- PVC sheath, with chemical barrier or additional nylon barrier

- round cross-section

# 8 MATERIALS

## 8.1 Steel

Poles must be steel, hot-dipped galvanised.

Vendors should state the corrosion allowance used in the design, to meet the design life. Accompanying this should be:

- the assumed zinc consumption rate
- the assumed steel consumption rate

## 8.2 Slip joints

All slip joints, including those between pole and outreach, must be suitably rated to withstand forces on the pole, such as uplift forces from wind.

## 8.3 Coatings

Coatings around the ground line are recommended, applied to a height of 650 mm above ground level. Such coatings must be suitable for environmental conditions, and be of sufficient thickness to maintain integrity during transport, handling and installation.

Where coatings are offered by vendors, there must also be instructions on how the coating can be repaired if damaged during transport, handling, and installation.

Vendors must state the coating's susceptibility to fire, corrosion, and acid sulphate soils. Vendors must detail the recommended inspection method and frequency for the coating, including any specialist equipment required.

## APPENDIX A REVISION INFORMATION

(Informative) Horizon Power has endeavoured to provide standards of the highest quality and would appreciate notification of errors or queries.

Each Standard makes use of its own comment sheet which is maintained throughout the life of the standard, which lists all comments made by stakeholders regarding the standard.

A comment sheet found in **CS10# 4884712** can be used to record any errors or queries found in or pertaining to this standard. This comment sheet will be referred to each time the standard is updated.

| Date | Rev No. | Notes |
|---|---|---|
| 18/04/2017 | 0 | Initial document creation |
| 20/10/2017 | 1 | Amended section 6.1 spigot sizes adding DN25 for 6.5 m poles. In section 3.2 amended ‘outreach’ to ‘arm projection’ as per definition in appendix B of AS 1798 |
| | | |