

PROTECTED



Standard: Streetlight Poles

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

Original Issue Date: 18th April 2017

Document Number: 4885108

Print Date: 30/10/2023

Uncontrolled document when downloaded. Refer to Horizon Power's website for most current version.

© Horizon Power Corporation 2016

Document Control		
Author	Name: Mondli Moyo Position: Power Systems Engineer	
Reviewed By	Name: Paul Savig Position: Senior Standards and Plant Engineer	
Endorsed By	Name: Johnathan Choi Position: Standards and Plant Manager	
Approved By *	Name: Victor Cheng Position: Senior Manager Engineering and Project Services	
Date Created/Last Updated	30/10/2023	
Review Frequency **	5 years	
Next Review Date **	30/10/ 2028	

* 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
2	30/10/2023	Reviewed and updated
1	20/10/2017	Amended

STAKEHOLDERS	
<i>The following positions shall be consulted if an update or review is required:</i>	
Manager Engineering & Project Services	Asset Managers
Manager Systems & Network Planning	Manager Assets Services
Senior Manager Safety, Health and Wellbeing	

TABLE OF CONTENTS

1	Introduction	5
1.1	Purpose	5
1.2	Application	5
1.3	Scope	5
2	Normative References	5
2.1	Standards	5
2.1.1	Horizon Power Standards	5
2.1.2	Australian Standards	6
2.1.3	Other Standards	6
2.2	Definitions and Abbreviations	6
3	Requirements	6
3.1	Pole Life	6
3.2	Pole Size	7
3.3	Environmental Conditions	8
3.3.1	Pole Classification to Wind Regions	8
3.3.2	Soil Parameters for Pole Embedment	8
3.4	Luminaire	8
3.4.1	Luminaire Sail Area	8
3.4.2	Luminaire Weight	8
3.5	Other Attachments	8
3.5.1	Attachment Sail Area	8
3.5.2	Attachment Weight	8
4	Pole features	9
4.1	Rigid Poles	9
4.2	Frangible – Energy Absorbing	9
4.3	Inspection Hatch	9
4.4	Outreach Arms	9
4.5	Cable Entry Port	9
4.6	Construction	9
4.7	Slip Joints	9
5	Foundation	10
6	Dimensions	10
6.1	Tolerances	10

6.2	Cable Entry Port	11
6.3	Cut-out Connection Box.....	11
7	Electrical requirements	12
7.1	Earth Bond	12
7.2	Luminaire Cables.....	12
8	Materials	12
8.1	Steel	12
8.2	Coatings	12
	Appendix A Revision Information	13

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 roadside, for the purpose of lighting public roadways
 - a) The roadway is not a state road, as defined by Main Roads Western Australia [12].

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.

2 NORMATIVE REFERENCES

2.1 Standards

2.1.1 Horizon Power Standards

- [1]. *Horizon Power's Environmental Conditions*, standard number HPC-9EJ-01-0001-2013, available at <https://horizonpower.com.au/contractors-suppliers/contractors/manuals-and-standards/> under the 'Standards' heading.
- [2]. *Justification Report – Streetlight Poles*, standard number HPC-10MJ-14-0001-2016, Internal document, DM# 4883941.
- [3]. *Pole Foundation Design Boundary Condition Assessment*, APD, 24/01/2013, internal document, DM# 4741825.
- [4]. *Horizon Power's Coating and Colour Coding Standard*, standard number HPC-9AJ-01-0001-2014, available at [available at https://horizonpower.com.au/contractors-suppliers/contractors/manuals-and-standards/](https://horizonpower.com.au/contractors-suppliers/contractors/manuals-and-standards/) under the 'Standards' heading.

PROTECTED

- [5]. *Horizon Power's LED Luminaires and PE Cells for Streetlighting*, Standard Number HPC-8DJ-14-0001-2013, available at <https://www.horizonpower.com.au/contractors-installers/manuals-standards/> under the 'Standards' heading.

2.1.2 Australian Standards

The following standards are available at <http://www.saiglobal.com>.

- [6]. *AS 1074, Steel tubes and tubulars for ordinary service*, Standards Australia, 1989 (R2018)
- [7]. *AS/NZS 1158.1.2, Lighting for roads and public spaces, Part 1.2: Vehicular traffic (Category V) lighting—Guide to design, installation, operation and maintenance*, Standards Australia, 2010
- [8]. *AS/NZS 1170.2, Structural Design Actions – Wind Actions*, Standards Australia, 2021
- [9]. *AS 1798, Lighting poles and bracket arms—Recommended dimensions*, Standards Australia, 2014
- [10]. *AS 60529, Degrees of protection provided by enclosure (IP Code)*, Standards Australia, 2004 (R2018)

2.1.3 Other Standards

- [11]. *BSI 7654, Single-phase street lighting cut-out assemblies for low-voltage public electricity distribution systems – 25 A rating for highway power supplies and street furniture*, British Standards Institution, 2020
- [12]. *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

2.2 Definitions and Abbreviations

For the purposes of this standard, definitions shall apply as in the relevant Australian Standards (AS 1798 [9]) with the addition of a few general definitions listed below in alphabetical order.

BSI: British Standards Institution

Internal friction angle: Is the angle on the graph (Mohr's Circle) of the shear stress and normal effective stresses at which shear failure occurs

3 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 3.3.

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 [9]. This is shown in **Error! Reference source not found.**

Horizon Power standard nominal sizes are 6.5 m, 10.5 m, and 12.5 m. The outreach for the 6.5 m poles is 1.5 m. For 10.5 m and 12.5 m poles, the outreach is 3 m.

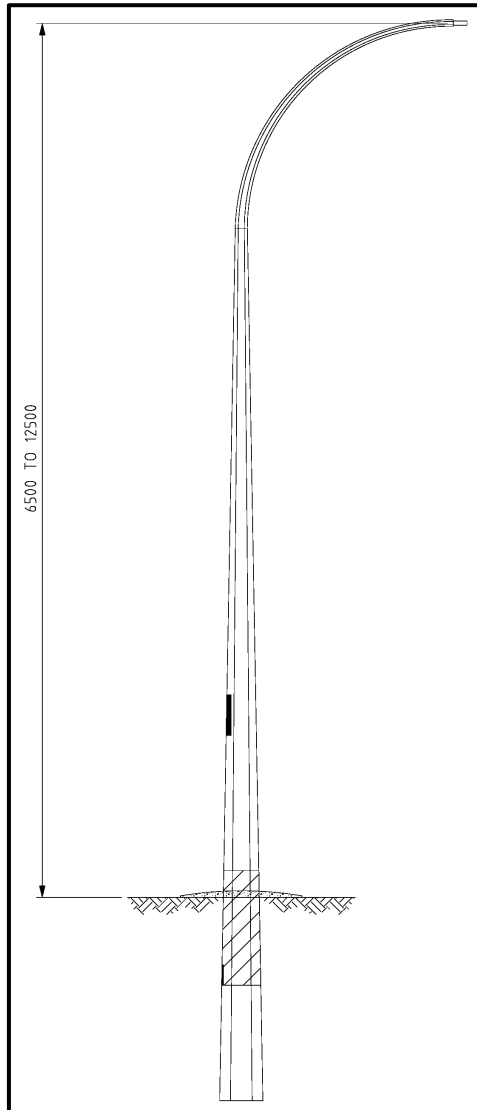


Figure 1: Nominal size, defined from the ground level to the highest level of the outreach arm centreline, excluding the luminaire mounting spigot.

3.3 Environmental Conditions

The equipment must be suitable for continuous operation under the environmental conditions specified in Section 4.1 of *Horizon Power's Environmental Conditions* [1].

3.3.1 Pole Classification to Wind Regions

All areas serviced by Horizon Power that lie within regions A,B, C and D use poles rated for region D. Non-Cyclonic and Cyclonic regions are defined respectively as Region A to B and Region C to D, terrain category 2, to AS/NZS 1170.2 [8].

3.3.2 Soil Parameters for Pole Embedment

The soil properties should be assumed to be medium density sand [3], described technically as:

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

3.4 Luminaire

Poles must be of sufficient structural strength to bear the luminaires with specifications outlined in *Horizon Power's LED Luminaires and PE Cells for Street lighting Specification* [5].

3.4.1 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.

3.4.2 Luminaire Weight

The maximum weight of luminaires for a 6.5 m pole is 20 kg.

The maximum weight of luminaires for 10.5 m and 12.5 m poles is 20 kg.

3.5 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.

3.5.1 Attachment Sail Area

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

3.5.2 Attachment Weight

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

4 POLE FEATURES

4.1 Rigid Poles

Horizon Power requires rigid poles suitable for use in cyclonic areas. The supplier shall supply the relevant calculations and load ratings showing the pole's suitability for use in Horizon Power's network.

4.2 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.

4.3 Inspection Hatch

The door will have minimum ingress protection of IP4X to AS 60529 [10]. Calculations must be available proving the strength of the pole in the location of the inspection hatch. Dimensions as per Table 4.

4.4 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.

For detachable arms, refer to Section 4.7 for slip joint requirements.

4.5 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.

4.6 Construction

For all detachable arms the supplier must provide instructions on how to attach the detachable arms onto the pole.

For all poles the instructions should also detail the lifting methodology and indicate in the schematics all lifting points.

4.7 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. The supplier must clearly indicate/mark the extent/overlap of the slip joint.

5 FOUNDATION

Pole designs 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 varies 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	Concrete
10.5	Compacted soil	Concrete
12.5	Compacted soil	Concrete

6 DIMENSIONS

6.1 Tolerances

Tolerances must be in accordance with AS 1798 [9].

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 [9] and also meet the dimensions outlined in *Horizon Power's LED Luminaires and PE Cells for Street lighting Specification* [5].

Table 4 : Inspection hatch dimensions

Nominal size (m)	Minimum hatch dimensions (height x width in mm)
6.5	300 x 110
10.5	300 x 110
12.5	300 x 110

The inspection hatch shall be located 1200mm above ground line and shall be of sufficient strength to prevent local deformation under design loads.

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 must 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: 70 mm

The cut-out connection box must conform to BS 7654 [11]

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.

Where an insulating coating is applied to the pole, ensure that the earth bonding point is not coated so adequate contact can be archived between earthing bond and pole.

7.2 Luminaire Cables

All luminaire cables so meet specifications outlined in *Horizon Power's LED Luminaires and PE Cells for Street lighting Specification* [5].

8 MATERIALS

8.1 Steel

Poles must be steel, hot-dipped galvanised and an anti-corrosion coating applied as detailed in Section 8.2.

The corrosion allowance used in the design, to meet the design life shall be stated. Accompanying this should be:

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

8.2 Coatings

Coatings around the ground line are recommended, coatings should be applied to from the base of the pole to below the cut-out. Such coatings must be suitable for environmental conditions described in Section 3.3, be of sufficient thickness to maintain integrity during transport, handling and installation as detailed in Horizon Power's Coating and Colour Standard [4]. The coating application must also adhere to Section 7.1 for earthing purposes.

There must also be instructions supplied on how the coating can be repaired if damaged during transport, handling, and installation.

The coating's susceptibility to fire, corrosion, and acid sulphate soils must be stated. The recommended inspection method and frequency for the coating, including any specialist equipment required must be provided to Horizon Power.

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 **DM# 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
30/10/2023	2	Reviewed and updated