



Assets Planning and Delivery Group
Engineering

DESIGN STANDARD 26-24

Type Specifications – Electrical Type Specification for Light & Power Distribution Board ≤ 250 Amps

VERSION 1
REVISION 0

FEBRUARY 2023

FOREWORD

The intent of Design Standards is to specify requirements that assure effective design and delivery of fit for purpose Water Corporation infrastructure assets for best whole-of-life value with least risk to Corporation service standards and safety. Design standards are also intended to promote uniformity of approach by asset designers, drafters and constructors to the design, construction, commissioning and delivery of water infrastructure and to the compatibility of new infrastructure with existing like infrastructure.

Design Standards draw on the asset design, management and field operational experience gained and documented by the Corporation and by the water industry generally over time. They are intended for application by Corporation staff, designers, constructors and land developers to the planning, design, construction and commissioning of Corporation infrastructure including water services provided by land developers for takeover by the Corporation.

Nothing in this Design Standard diminishes the responsibility of designers and constructors for applying the requirements of the Western Australia's Work Health and Safety (General) Regulations 2022 to the delivery of Corporation assets. Information on these statutory requirements may be viewed at the following web site location:

[Overview of Western Australia's Work Health and Safety \(General\) Regulations 2022 \(dmirs.wa.gov.au\)](https://dmirs.wa.gov.au)

Enquiries relating to the technical content of a Design Standard should be directed to the Senior Principal Engineer, Electrical, Engineering. Future Design Standard changes, if any, will be issued to registered Design Standard users as and when published.

Head of Engineering

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Any interpretation of anything in the Standards/Specifications that deviates from specific Water Corporation Project requirements must be referred to, and resolved by, reference to and for determination by the Water Corporation's project manager and/or designer for that particular Project.

REVISION STATUS

The revision status of this standard is shown section by section below:

| REVISION STATUS | | | | | | |
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DESIGN STANDARD DS 26-24

Type Specifications – Electrical

Type Specification for Light & Power Distribution Board ≤ 250 Amps

CONTENTS

| <i>Section</i> | <i>Page</i> |
|--|-------------|
| 1 GENERAL..... | 7 |
| 1.1 Scope..... | 7 |
| 1.2 General Requirements..... | 7 |
| 1.3 Standards..... | 7 |
| 1.4 Supervising Engineer..... | 8 |
| 1.5 Conformance with the Drawings..... | 8 |
| 1.6 Quality Assurance..... | 8 |
| 1.7 Contractor’s Drawings..... | 8 |
| 1.8 As-Constructed Drawings..... | 8 |
| 2 CONSTRUCTION..... | 9 |
| 2.1 General..... | 9 |
| 2.2 Form of Separation..... | 9 |
| 2.3 Type of Mounting..... | 9 |
| 2.4 Mechanical..... | 9 |
| 2.4.1 Enclosure..... | 9 |
| 2.4.2 Escutcheon..... | 9 |
| 2.4.3 Door..... | 9 |

| | | |
|-----|---------------------------------------|----|
| 2.5 | Electrical | 10 |
| 3 | DEGREE OF PROTECTION | 10 |
| 3.1 | Degree of Pollution..... | 10 |
| 4 | DESIGN VERIFICATION REQUIREMENTS..... | 10 |
| 4.1 | General Requirements..... | 10 |
| 4.2 | Design Verification Ratings..... | 10 |
| 5 | CREEPAGE DISTANCES..... | 11 |
| 6 | RATED IMPULSE WITHSTAND VOLTAGE..... | 11 |
| 7 | ROUTINE VERIFICATION | 11 |
| 8 | LABELLING | 11 |
| 9 | DELIVERY AND INSTALLATION | 11 |
| 10 | ON SITE VERIFICATION..... | 12 |
| 11 | MANUALS | 12 |

1 GENERAL

1.1 Scope

This Specification covers the requirements for the configuration, construction and verification of a light and power distribution board:

- (a) Having a full load current rating in the range of not more than 250 Amps
- (b) Operating at a nominal voltage 240/415 V AC
- (c) Installed inside a building or structure
- (d) Mounted on a wall

1.2 General Requirements

Except as specified in this Specification, the light and power distribution board shall be constructed in accordance with the requirements of the Water Corporation's Type Specification DS26-09 Low Voltage Distribution Boards – General Requirements. Light and power distribution boards shall be constructed in accordance with AS 61439.2.

1.3 Standards

The following Australian Standards are referred to in this Specification:

| | |
|--------------------|--|
| AS/NZS 2124 | General conditions of contract |
| SA/SNZ TR 61439.0 | Low-voltage switchgear and control assemblies – Guide to specifying assemblies |
| AS/NZS 61439.1 | Low-voltage switchgear and controlgear assemblies Part 1: General Rules |
| AS/NZS 61439.2 | Low-voltage switchgear and controlgear assemblies Part 2: Power switchgear and control gears assemblies |
| AS/NZS IEC 60947.1 | Low voltage switchgear and control gear – General rules |
| AS/NZS IEC 60947.2 | Low voltage switchgear and control gear – Circuit breakers |
| AS 60529 | Degrees of Protection Provided by Enclosures for (IP Code) |
| AS/NZS 3000 | Electrical installations (known as the Australian/New Zealand Wiring Rules) |
| AS/NZS 3008.1.1 | Electrical installations - Selection of cables Cables for alternating voltages up to and including 0.6/1 kV - Typical Australian installation conditions |
| AS/NZS ISO 9001 | Quality management systems - Requirements |

1.4 Supervising Engineer

For work being carried out under a formal contract utilising General Conditions of Contract AS 2124, Supervising Engineer shall mean the Contracts Superintendent.

In all other instances, Supervising Engineer shall mean the engineer who approved the relevant drawings, or an engineer authorised to act on his/her behalf.

1.5 Conformance with the Drawings

The light and power distribution board shall be constructed strictly in accordance with the Principal's drawings and with this Specification. The arrangement of the primary circuit and the type and rating of equipment shall be as shown on the Principal's drawings and shall not be modified unless by written variation from the Supervising Engineer.

In the event of a discrepancy between the Principal's drawings and this Specification, the matter shall be referred to the Supervising Engineer for resolution.

1.6 Quality Assurance

The light and power distribution board shall be manufactured under a Quality System certified by an Accredited Authority in accordance with AS/NZS ISO 9001 or an approved equivalent.

1.7 Contractor's Drawings

- (a) All drawings provided by the Contractor shall be in accordance with the latest issue of the Water Corporation Design Standard DS24 – Electrical Drafting
- (b) All drawings shall be prepared in AutoCAD format, Release 2018 or later software
- (c) Drawings shall be prepared on the “Electrical” A1 metric drawing sheet and title block provided in the Water Corporation eXternal (WCX) package (available for download) in accordance with the Water Corporations Design Standard DS80
- (d) The drawings shall provide within the title block, the details to identify the drawing, including but not limited to its title, plan number, revision status, date of issue, Corporate project number, contractor's name and reference number (if applicable)
- (e) Drawing detail shall include, but not limited to, the general arrangement, panel layout, power and control circuit diagrams and equipment specifications, as required
- (f) The contractor shall submit drawings in both AutoCAD and PDF formats in accordance with the Drawing Submission Process. Adequate contrast within the PDF image shall be maintained between drawing content and background to ensure the clarity and quality of the drawings

1.8 As-Constructed Drawings

The Contractor shall provide as-constructed information on all drawings detailing all changes and modifications made during the construction and installation phases of the project.

The contractor shall submit drawings in both AutoCAD and PDF formats in accordance with the Drawing Submission Process. Adequate contrast within the PDF image shall be maintained between drawing content and background to ensure the clarity and quality of the drawings.

2 CONSTRUCTION

2.1 General

- (a) The light and power distribution board shall meet the requirements of AS/NZS 61439.2
- (b) The light and power distribution board shall be either locked or located with accessibility restricted to authorised personnel only
- (c) Cable entry shall be bottom entry
- (d) Removable gland plates complete with gasket shall be fitted and fixed to the bottom
- (e) Doors and gland plates shall be fitted with earth studs

2.2 Form of Separation

Form of separation shall minimum 2b.

2.3 Type of Mounting

The enclosure shall be wall mounted.

2.4 Mechanical

2.4.1 Enclosure

- (a) Shall be manufactured from minimum 1.6mm mild sheet steel or 1.6mm stainless steel (grade 316, 306)
- (b) Shall be folded and fully welded and incorporate a gutter system to prevent water ingress, welds shall be ground smooth, filled, and prepared prior to being painted
- (c) Shall incorporate single jointless continuous gasket sealing system to prevent water ingress
- (d) If enclosure is mild steel, it shall be electrostatically painted with polyester powder coating
- (e) If enclosure is stainless steel, it shall be raw finish or electrostatically painted with polyester powder coating

2.4.2 Escutcheon

- (a) Shall be a flat construction and hinged independently of the door as standard
- (b) Shall require tooling to be removed

2.4.3 Door

- (a) Shall be manufactured from minimum 1.6mm mild sheet steel or 1.6mm stainless steel (grade 316, 306)
- (b) Shall be provided with 3-point locking. Locking points including rods and cam shall be fitted with rollers to aid in ease of door closing and to prevent paint damage
- (c) If door is mild steel, it shall be electrostatically painted with polyester powder coating
- (d) If door is stainless steel, it shall be raw finish or electrostatically painted with polyester powder coating
- (e) Shall contain semi-flush swing handle style, key-lockable, with the option to fit a padlockable handle

2.5 Electrical

- (a) The light and power distribution board rated insulation voltage U_i shall be minimum 500 V
- (b) The light and power distribution board shall have continuous rated service voltage 415 VAC
- (c) The light and power distribution board shall have a rated short time withstand current of 10 kA for 1s
- (d) There shall be no accessible bare conductors as these shall be rated IP2x
(i.e. where all conductors are insulated when all insulating covers and sleeves are in place)

3 DEGREE OF PROTECTION

- (a) If the light and power distribution board specified in the Annexure is to be installed in indoor environments with a pollution degree rating of not more than 2, it shall have a degree of protection rating of not less than IP42
- (b) If the light and power distribution board specified in the Annexure is to be installed in locations with a pollution degree higher than 2, it shall have a degree of protection rating of not less than IP52

3.1 Degree of Pollution

For the purposes of determining the light and power distribution board minimum degree of protection required, in the absence of locally generated pollution, separate switch rooms may be considered to provide an environment with a pollution degree rating of 2.

4 DESIGN VERIFICATION REQUIREMENTS

4.1 General Requirements

The light and power distribution board shall be design verified in accordance with AS/NZS 61439.2

4.2 Design Verification Ratings

Supporting documentation is to be made available to show verification has being achieved as required by AS/NZS 61439.2.

Documentation can be in the following forms:

- (a) Support declaration of conformity
- (b) Supporting manuals
- (c) General arrangement drawings
- (d) Test Reports
- (e) Certificates
- (f) Any combination of the above options

5 CREEPAGE DISTANCES

The light and power distribution board shall be rated for operating in a micro-environment with an atmospheric pollution level to degree 3, Material Group IIIa in accordance with AS/NZS 61439.1, Table 2.

6 RATED IMPULSE WITHSTAND VOLTAGE

The light and power distribution board shall have a withstand voltage rating of 6 kVp in accordance with AS/NZS 61439.1, considering altitude during test, as presented in Table 10.

7 ROUTINE VERIFICATION

- (a) The Contractor shall subject the light and power distribution board to routine verification in accordance with section 11 of AS/NZS 61439.2
- (b) The Contractor shall provide appropriate test certificates detailing the routine verification results obtained
- (c) The cost of all testing shall be to the Contractor's account
- (d) All routine verification shall be carried out to the satisfaction of, the Supervising Engineer or his authorised representative

8 LABELLING

- (a) "Lexan" labels, fixed about the center of the escutcheon, shall be used to identify circuits. Control gear mounted within the light and power distribution board shall be identified with traffolyte labels
- (b) Light and power distribution board identification label shall be fixed on the front of the hinged outer door
- (c) Circuit schedule card shall be provided, fixed to the rear of the door within a clear schedule card holder
- (d) Colours shall be permanent and free from fading. Unless otherwise approved all designation labels shall be engraved with black lettering on a white background. "Warning" labels shall have black lettering and a yellow background. The minimum lettering height shall be 3mm
- (e) Rating plates shall be fitted to each item of equipment and shall provide the information specified in the relevant standard to which the item of equipment has been manufactured

9 DELIVERY AND INSTALLATION

- (a) The Contractor shall deliver, unload, unpack and assemble as necessary the complete light and power distribution board at the site
- (b) The Contractor shall inspect the unpacked light and power distribution board and shall ensure that the Board is undamaged
- (c) The Contractor shall give the Principal seven days' notice of when the light and power distribution board will be ready for installation

- (d) The Contractor shall install the light and power distribution board in its permanent position in the switch room ready for connection by others

10 ON SITE VERIFICATION

- (a) Before the Contractor makes the light and power distribution board available to the Principal for connection to the electrical system, the Contractor shall carry out an insulation resistance test
- (b) In addition, if the light and power distribution board was delivered to the site partially assembled, the Contractor shall repeat the routine verification listed in Clause 7 after the Board has been re-assembled completely

11 MANUALS

- (a) The Contractor shall supply 3 copies of comprehensive instruction manuals, written in English and covering the complete operation and maintenance requirements of all equipment supplied under the Contract
- (b) The manuals shall be printed on high grade A4 size paper and shall be bound in a high grade A4 size loose leaf binder
- (c) Information in the manual shall include:
 - a. Operating instructions
 - b. Safety instructions and warnings
 - c. Maintenance instructions and schedules
 - d. Recommended spare parts and special tool list
 - e. As-constructed Contractor's drawings
 - f. Test reports and/or test certificates

Annexure to Specification for Light and Power Distribution Board ≤ 250 Amps

Project:.....

Function (e.g. Light and Power Distribution-Board or Photovoltaic Distribution Board):.....

Work by the Principal (the following work will be undertaken by the Principal):.....

Board Requirements:

IP Rating (IP42 or IP52).....

Surge protection required.....(yes/no)

Door construction (type of material, thickness and colour).....

Escutcheon construction (type of material, thickness and colour).....

Enclosure construction (type of material, thickness and colour).....

Neutral – Earth Bar requirements:

No. of luggable connection points.....

Size of luggable connection point (specify how many of each size).....

DIN rail requirements:

Din Rail position (left, right or either side of main switch).....

Din rail lengths (mm).....

Service Conditions:

- Pollution degree.....
- Maximum ambient air temperature..... °C
- Maximum 24-hour average air temperature..... °C
- Maximum relative humidity..... %
- Nominal Operating Voltage..... Volts
- Nominal Operating Frequency..... Hz
- Main Busbar Rated Current..... Amp
- Rated Short Time Current kA (specify I_{cc} , I_{cw} or I_{cp}).....
- Single Line Diagram, describing all main circuit equipment including the generic type, ratings and arrangement thereof, shown on drawing number(s).....

| Type Specification for Light and Power Distribution Board ≤ 250 Amps Tender Technical Response Schedule | | | | | |
|--|---|-------|------------|----|--------------------------------------|
| DS26-24 | Subject | Noted | Compliance | | Comments |
| Clause No. | | | Yes | No | |
| 1 | General | | | | |
| 1.1 | Scope | | | | |
| 1.2 | General Requirements | | | | |
| 1.3 | Standards | | | | |
| 1.4 | Supervising Engineer | | | | |
| 1.5 | Conformance with the Drawings | | | | |
| 1.6 | Quality Assurance | | | | |
| 1.7 | Contractor's Drawings | | | | |
| 1.8 | As-Constructed Drawings | | | | |
| 2 | Construction | | | | |
| 2.1 | General | | | | |
| 2.2 | Form of Separation | | | | |
| 2.3 | Type of Mounting | | | | |
| 2.4 | Mechanical | | | | |
| 2.4.1 | Enclosure | | | | |
| 2.4.2 | Escutcheon | | | | |
| 2.4.3 | Door | | | | |
| 2.5 | Electrical | | | | |
| | | | | | Rated Insulation Volts = |
| | | | | | Short time withstand current = |
| 3 | Degree of Protection | | | | IP rating = |
| 3.1 | Degree of Pollution | | | | |
| 4 | Design Verification Requirements | | | | |
| 4.1 | General Requirements | | | | |
| 4.2 | Design Verification Ratings | | | | |
| 5 | Creepage Distances | | | | |
| 6 | Rated Impulse Withstand Voltage | | | | |
| 7 | Routine Verification | | | | |
| 8 | Labelling | | | | |
| 9 | Delivery and Installation | | | | |
| 10 | On Site Verification | | | | |
| 11 | Manuals | | | | |
| | Annexure | | | | List any non-conformances separately |

| Type Specification for Light and Power Distribution Board ≤ 250 Amps | | | | | |
|---|--|--------------|-------------------|-----------|-----------------|
| Tender Technical Response Schedule | | | | | |
| DS26-24 | Subject | Noted | Compliance | | Comments |
| Clause No. | | | Yes | No | |
| | Overall Distribution Board Dimensions | | | | |
| | | | | | Length mm = |
| | | | | | Width mm = |
| | | | | | Height mm = |
| | | | | | Weight kg - |

END OF DOCUMENT