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## ARISO Contact details:


**Head office:**

| Phone: | Email: | Web: |
|---|---|---|
| (07) 3724 0000<br>+61 7 3724 0000 | info@ariso.org.au | www.ariso.org.au |

**Standard Development Manager:**

| Name: | Phone: | Email: |
|---|---|---|
| Cris Fitzhardinge | 0497 919 619 | cfitzhardinge@ariso.org.au |


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| **SDM name** | Cris Fitzhardinge |
| **SDM phone** | 0497 919 619 |
| **SDM email** | cfitzhardinge@ariso.org.au |

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## Preface

This Standard was prepared by the Signalling Equipment Enclosures Development Group, overseen by the ARISO Train Control Systems Standing Committee.

This document has been updated from the previous version, including;

(a) reformatted to ensure clarity of requirements;

(b) removal of duplicated information; and

(c) renamed to better reflect the content.

Notes used in this Standard are of an advisory nature only and are used to give explanation or guidance to the user on recommended considerations or technical procedures, or to provide an informative cross-reference to other documents or publications. Notes to clauses in this Standard do not form a mandatory part in order to conform to this Standard.

## Objective

The objective of this Standard is to provide a framework that describes the requirements for the design, construction, commissioning, monitoring, maintenance and decommissioning of signalling equipment enclosures in Australian railway corridors.

This Standard is intended to outline requirements that govern signalling equipment enclosures on a whole-of-life approach.

This Standard covers a set of requirements to manage the identified industry hazards by identifying risks associated with the signalling equipment enclosures.

## Compliance

There are four types of provisions contained within Australian Standards developed by ARISO:

(a) Requirements.

(b) Recommendations.

(c) Permissions.

(d) Constraints.

***Requirements*** – it is mandatory to follow all requirements to claim full compliance with the Standard. Requirements are identified within the text by the term ‘shall’.

***Recommendations*** – do not mention or exclude other possibilities but do offer the one that is preferred. Recommendations are identified within the text by the term ‘should’.

Recommendations recognize that there could be limitations to the universal application of the control, i.e. the identified control is not able to be applied, or other controls are more appropriate or better.

***Permissions*** – conveys consent by providing an allowable option. Permissions are identified within the text by the term ‘may’.

***Constraints*** – provided by an external source such as legislation. Constraints are identified within the text by the term ‘must’.

### Using this Standard

Appendices in ARISO Standards may be designated either “normative” or “informative”. A "normative" appendix is an integral part of a Standard and compliance with it is a requirement, whereas an "informative" appendix is only for information and guidance.

ARISO Standards identify known hazards relevant to the railway industry. Appendix A provides a non-exhaustive list of hazards relevant to the scope of this Standard.

Commentary *C Preface*

This Standard includes a commentary on some of the clauses. The commentary directly follows the relevant clause, is designated by 'C' preceding the clause number and is printed in italics in a box. The commentary is for information and guidance and does not form part of the Standard.

## Table of Contents

# Section 1 Scope and general

## 1.1 Scope

This document specifies the accepted criteria to be employed when designing, procuring or installing signalling equipment enclosures and the internal wiring.

This document provides requirements for enclosures for rail signalling equipment. The Standard covers:

(a) materials and configuration for signalling equipment enclosures;

(b) siting enclosures;

(c) principles for locating equipment therein; and

(d) processes for installation of equipment and wiring.

The document covers all signalling equipment enclosures used for signalling equipment, including location cases, terminal boxes, and equipment rooms.

This document is intended to be used by RIMs, operators and suppliers of signalling equipment enclosures.

This document is intended to be applied for new and modified installations.

This document applies to all railways in Australia and New Zealand.

## 1.2 Normative references

The following documents are referred to in the text in such a way that *some* or all of their content constitutes requirements of this document:

- AS 1170.4:2024, *Structural design actions, Part 4: Earthquake actions in Australia*
- AS 1657:2018, *Fixed platforms, walkways, stairways and ladders - Design, construction and installation*
- AS 7633:2026, *Railway Infrastructure - Clearances*
- AS 7637:2025, *Hydrology and Hydraulics*
- AS 7664:2020, *Railway signalling cable routes, cable pits, and foundations*
- AS 7702:2023, *Rail Equipment Type Approval*
- AS 7703:2020, *Railway signalling – Power supply Systems*
- AS 7708:2026, *Signalling Earthing and Surge Protection*
- AS 7717:2026, *Signalling Testing & Commissioning*
- AS/NZS 3000:2018, *Electrical installations*
- AS/CA S009:2020, *Installation requirements for customer cabling (Wiring rules)*

NOTE:
Documents for informative purposes are listed in a Bibliography at the back of the Standard.

## 1.3 Defined terms and abbreviations

For the purposes of this document, the following terms and definitions apply:

**1.3.1**
**clean wiring (protected)**
wiring downstream of surge or transient protection devices, where surge energy has been limited, and segregated from dirty (unprotected) wiring to prevent surge coupling

**1.3.2**
**design life**
period which a product is expected to perform its intended function under normal conditions

**1.3.3**
**dirty wiring (unprotected)**
wiring upstream of surge or transient protection devices, or wiring not subject to surge energy limitation, including external field interfaces and associated earth conductors, which is capable of carrying surge energy

**1.3.4**
**rail infrastructure manager (RIM)**
As defined in Rail Safety National Law.

**1.3.5**
**type approval**
approval of a specific item of railway equipment for a defined application

**1.3.6**
**validation**
confirmation that the requirements for a specific intended use are fulfilled

**1.3.7**
**verification**
testing and evaluation of an item of equipment or a system to assure compliance with its specification or other requirements

General rail industry terms and definitions are maintained in the ARISO Glossary. Refer to: https://www.ariso.org.au/glossary/

# Section 2 General

## 2.1 General

These requirements shall be applied when a signalling equipment enclosure has been selected for a site.

All signalling equipment enclosures shall be designed and installed to the applicable Australian standards and RIM requirements.

NOTE: See Appendix B for general guidance information.

## 2.2 Safety

Signalling equipment enclosures shall be designed, constructed, installed and maintained to support safe operation and maintenance for the intended operational and environmental context.

## 2.3 Environment and heritage

All signalling equipment enclosures shall be designed and installed based on an assessment of all reasonably foreseeable impacts to environmental and heritage matters.

Signalling equipment enclosures shall comply with the legal and associated regulatory requirements.

Relevant State or Territory registers shall be referenced before planning any changes to the assets, to ensure that changes comply with the requirements of all relevant heritage acts.

## 2.4 Type approval

Signalling equipment enclosures shall either be:

(a) type approved in accordance with the requirements and recommendations in AS 7702:2023; or

(b) designed in accordance with RIM requirements.

# Section 3 Design

## 3.1 General

The design of signalling equipment enclosures must comply with the obligations of the Rail Safety National Law and applicable Work, Health and Safety legislation.

The design of each signalling equipment enclosure shall identify and manage risks to the health and safety of persons:

(a) during the construction of the signalling equipment enclosure;

(b) when the signalling equipment enclosure has been constructed and is being used for the purpose it was originally designed for;

(c) accessing the enclosure or site;

(d) viewing operating rail vehicles approaching or moving through the site;

(e) where the signalling equipment enclosure and wiring has been decommissioned and is not being used for the purpose it was originally designed, yet has not been removed or demolished, and either all or partial components remain.

NOTE: See Appendix C for guidance information about the design of the signalling equipment enclosures.

## 3.2 Design parameters and criteria

The design of a signalling equipment enclosure shall assess any site constraints and requirements, as well as constructability and maintainability, stakeholder, local, RIM and AS/NZ 3000:2018 requirements.

Design parameters and criteria shall be subjected to an interdisciplinary review process.

Assessment of site constraints shall include the following:

(a) Selection of suitable signalling equipment enclosure.

(b) Suitability of materials.

(c) Environmental requirements.

(d) Intended use and life.

(e) Design life assessments including operational integrity, constructability, maintainability and decommissioning.

(f) Accessibility.

(g) Location, including:

  (i) site survey information;

  (ii) impacted stakeholder requirements;

  (iii) sighting impacts to signals, signs, level crossings and operational sightlines;

  (iv) access to enclosure;

  (v) proximity to other equipment;

  (vi) ventilation;

  (vii) orientation; and

  (viii) local conditions.

(h) Site specific issues.

(i) Clearance.

(j) Drainage.

(k) Internal temperature control.

(l) Installation of equipment in the enclosure.

(m) Spare space review.

(n) Earthing and surge protection.

(o) Cable and wiring management.

(p) Internal lighting.

(q) Storage for maintenance record documents.

(r) Doors and door hardware.

(s) Nameplates.

(t) Foundation.

(u) Exterior finish.

(v) External structures requirements and assessments.

(w) Positioning and installation.

(x) Security.

(y) Vandalism.

(z) Vermin proofing.

### 3.3 Selection of a suitable signalling equipment enclosure

The type, size and facilities of a signalling equipment enclosure shall be determined in consultation with the RIM and be based on:

(a) site survey constraints and conditions;

(b) types of enclosures;

(c) physical dimensions;

(d) maintenance requirements;

(e) materials and amount of equipment that needs to be housed at a particular location; and

(f) providing adequate spare capacity for future requirements.

### 3.4 Suitability of materials

The materials used in the construction of signalling equipment enclosures shall be:

(a) highly durable based on the environmental conditions;

(b) maintainable;

(c) resistant to vandalism and corrosion; and

(d) capable of meeting the expected design life of the enclosure.

### 3.5 Environmental

Design, orientation and location of a signalling equipment enclosure shall be based on an assessment of local site environmental conditions, including:

(a) potential for flooding;

(b) exposure to fire;

(c) exposure to icing;

(d) solar exposure;

(e) restricted air circulation;

(f) high humidity;

(g) cyclonic conditions;

(h) earthquake;

(i) fire resistance;

(j) UV exposure;

(k) vermin proofing; and

(l) direction of prevailing wind and rain.

Ingress protection for signalling equipment enclosures shall comply with the requirements, ratings and recommendations set out by the RIM and other local requirements and guidelines.

Seismic activity protection on signalling equipment enclosures shall comply with the requirements and recommendations set out in AS 1170.4:2024 and other local requirements and guidelines.

### 3.6 Intended use and life

Signalling equipment enclosures shall be designed for a minimum design life of 40 years unless otherwise specified by the RIM. The RIM may specify an alternative design based on asset strategy, site context or the intended service life of the asset.

The design life of the signalling equipment enclosure shall be determined in accordance with the relevant standards and manufacturers' recommendations for the materials and components.

Signalling equipment enclosures and wiring shall be designed to support safe and efficient maintenance over the specified design life.

### 3.7 Accessibility

The location of signalling equipment shall be designed to facilitate safe inspection and maintenance activities.

Signalling equipment enclosures shall:

(a) be of sufficient size and configuration to accommodate the components required to be fitted therein;

(b) be located based on site constraints; and

(c) provide reasonable access to maintain or change components without disturbing adjacent safety-critical wiring or equipment, where practicable.

The RIM shall ensure that the provision of safe and adequate access is assessed in the design and construction of the site location.

### 3.8 Clearances

Infrastructure clearances for signalling equipment enclosures shall comply with the requirements and recommendations in AS 7633:2026 and RIM requirements.

Clearances around enclosure doors shall be assessed and be compliant with the RIM requirements.

### 3.9 Temperature control

#### 3.9.1 Internal temperature control

The control of internal temperature of a signalling equipment enclosure shall be sufficient to maintain its internal temperature within the manufacturer-specified operational temperature ranges of all equipment in the enclosure and to maintain operational integrity.

Equipment enclosures shall be provided with temperature control measures appropriate to the amount of heat generated by the equipment that it will house.

The temperature control capacity to be provided shall be based on the calculated equipment generated heat load.

#### 3.9.2 Active temperature control

Where active temperature control (e.g., air conditioning) is installed, compliance with clauses 3.9.3, 3.9.4, and 3.9.5 is only required where those devices are included in the design.

Signalling equipment enclosures fitted with active temperature control shall have temperature monitoring equipment installed. Where the temperature exceeds a defined limit the monitoring equipment shall alert personnel nominated by the RIM.

#### 3.9.3 Ventilation

Ventilation shall be incorporated into the design to prevent excessive internal temperature rise and to provide air flow as necessary to prevent the accumulation of gases.

High and low air vents shall be used to prevent the accumulation of heat and gases in the signalling equipment enclosure.

Unrestricted high and low-level inlet air vents shall be provided by a combination of wall, door and roof vents.

Vents shall be designed to:

(a) prevent water (i.e. rain) entry;

(b) minimize the entry of airborne dust; and

(c) be fitted with effective insect barriers or screen mesh which provides minimal restriction to the air flow.

All vents shall:

(d) have vandal-resistant covers fitted;

(e) be water resistant;

(f) be spark retarding;

(g) be resistant to insects;

(h) be made of corrosion-resistant material; and

(i) be welded in place or securely fixed by an approved permanent type adhesive or method of fixing.

Adequate ventilation clearance shall be provided around heat-producing equipment.

Heat-producing equipment shall be sited within the enclosure to ensure compatibility with other equipment.

### 3.9.4 Double skin designs

Location cases containing electronic or heat producing equipment, including field modules and object controllers, shall be double-skinned construction.

The double-skin design shall include an air gap between inner and outer wall and door skins, or otherwise constructed to minimize temperature rise if ventilation alone would not provide the necessary temperature control in some locations or installations.

Double-skin designs shall include an increase in the size of the ventilation as required to maintain temperatures within the signalling equipment enclosures commensurate to the requirement of the apparatus located within.

### 3.9.5 Shade structures

Shade structures, where installed, shall be designed to:

(a) reduce heat generated by sun exposure; and

(b) prevent the entrapment of heated air underneath the structure.

NOTE: Open metal louvre mesh should be used in preference to solid metal roofing.

The shade structure roof shall have a slope to ensure condensation runs to the side and reduces the amount of condensation dripping onto the enclosure.

## 3.10 Internal design

### 3.10.1 Location of rack-mounted apparatus

All rack-mounted apparatus located in location cases or equipment rooms shall be mounted in positions:

(a) in accordance with the approved design;

(b) no less than 300 mm from the base of the rack;

(c) no more than 1,800 mm above the base of the rack;

(d) securely fixed to the equipment racks by an approved method;

(e) based on the assessment of environmental, electrical and interference risks;

(f) that meet with manufacturers' and RIM requirements; and

(g) facilitate ease of access for regular maintenance, inspection, testing or replacement.

NOTE: Vital and non-vital signalling apparatus, power supply apparatus and communication apparatus should be grouped and mounted separately.

Signalling equipment enclosures shall be constructed so that the loaded weight of the equipment rack is directly supported by the base of the enclosure and there is only minimal reliance on the sides or top of the enclosure for stability.

### 3.10.2 Apparatus spacing

All new signal equipment enclosures shall be designed and sized so that the apparatus spacings allow for heat dissipation and ventilation and contain sufficient unused space to allow for spare capacity for future development and requirements.

The spare space allowance for future additional equipment shall be established and determined by the RIM.

### 3.10.3 Storage for maintenance record documents

Where paper-based maintenance records and documents are required to be stored, they shall be able to be stored so that they are protected from vermin, moisture and condensation.

## 3.11 Enclosure doors and door hardware

Doors shall be secured with a RIM approved locking system.

A three-point locking system shall be used to secure door(s).

NOTE: The requirement for three-point locking does not apply when the signalling enclosure is a building.

Doors shall be fitted with automatic latching top or bottom, with stays to support the door in the open position. The stays shall be secured to door and the enclosure such that the method of securing is stronger than the stay.

Doors shall be effectively weather sealed with a RIM approved material securely and permanently attached to either the enclosure or door to prevent ingress of water, contaminants and insects.

Doors shall be robust and designed to resist attempts at forced entry using implements other than power tools.

## 3.12 Earthing and surge protection

Earthing and surge protection for signalling equipment enclosures and surrounding structures shall comply with AS 7708:2026 and other local requirements and guidelines.

## 3.13 Cable and wiring management

### 3.13.1 General

Designers of signalling cable routes in signalling equipment enclosures shall assess the cables and wiring entering and leaving the enclosure so that it is:

(a) arranged to avoid obstruction, mechanical damage, unsafe access constraints and maintainability issues;

(b) as unobtrusive as possible; and

(c) installed in accordance with the requirements and recommendations in AS 7664:2020 and RIM requirements.

The design shall ensure cables do not overload cable trays or the mounting frame.

All fibre-optic cable installations within the signal equipment enclosure shall comply with AS/CA S009:2020 and other local requirements and guidelines.

Suitable notes shall be provided on the approved plans to detail the cabling and wiring requirements of all new or upgraded signalling equipment enclosures.

### 3.13.2 Clean and dirty wiring

Dirty wiring shall be separated from all clean wiring to limit EMI of clean wiring due to potential surges in dirty wiring.

Separation between clean and dirty wiring shall comply with AS 7703:2020 and RIM requirements.

### 3.13.3 Cabling and terminations

The following applies to all cabling and wiring of all new and upgraded signalling enclosures:

(a) Termination of signalling cables and wires shall be carried out in accordance with approved circuit plans.

(b) The design selection, type and location of all wiring shall ensure that the specifications of the wires are not exceeded by their installation.

(c) All specified wiring shall be durable and capable of withstanding the vibration and environment likely to be encountered in service, without deterioration of the mechanical, electrical and insulation properties.

(d) Suitable mechanical protection shall be specified on plans when wiring is required to be installed between enclosures or in areas subject to vibration and abrasion.

(e) Labels shall be installed on all signalling conductors and data cables, as per the approved plans and on individual cores using bead or sleeve type labels.

(i) The labels shall indicate the ports and terminals to which the wires or cable cores are to be connected.

(ii) The labels shall be placed on the wires or cable cores before any crimps are fitted and the wires or cables terminated.

(f) At all new signal equipment installations, all wiring and cables shall be terminated within captive type terminations.

(g) At existing signal equipment locations, where captive type terminations are not achievable, the wire ends of unused conductors shall be labelled and sealed with heat-shrink tubing or have insulated blind crimps installed to prevent accidental contact with live wires or equipment racks.

(h) All wiring shall be protected to avoid accidental contact.

(i) All wiring shall be neatly arranged and secured to prevent damage to insulation.

(j) All cabling and wires shall be installed loosely within cable trays and ducts. They shall not:

(i) be under tension;

(ii) be bent in excess of maximum bending radius;

(iii) be bearing heavily on sharp corners; or

(iv) show signs of chafing or damage. Where damage is likely, protective measures shall be taken to prevent long-term damage from occurring.

(k) Sufficient slack shall be provided to ensure that, apart from the weight of the wiring, no extra load is placed on the conductors passing from one plane to another.

(l) Sufficient slack shall be left in the wires to enable the removal of plug-couplers, etc., which are attached to the wiring terminations.

(i) The slack shall enable easy removal of equipment and allow for three re-terminations of broken wires in the equipment enclosure.

(ii) There shall be no further excess of slack wire other than for the above purposes.

(m) Wiring to relays on racks in the equipment enclosure shall come from the wire-way above the relay down to the relay base and not from below the relay unless specified by the RIM.

(n) Wiring to relay boxes, terminal strips and plug couplers shall be neatly formed and allow sufficient access for testing and inspections.

(o) Jointing of wiring within the equipment enclosure shall only be carried out with permission of the RIM and in accordance with an approved design.

(p) Provision shall be made for the termination of all external cables and wires on terminals conveniently situated together near cable and wire entries to equipment enclosure.

(q) All signalling cable terminations shall be made on rail-mounted terminals of a type approved by the RIM.

(r) Internal wiring of equipment enclosures shall be in accordance with the local requirements, as determined by the RIM.

(s) All cables shall be terminated in cable-core sequence and on sequentially numbered terminals.

(t) Equipment enclosure terminations shall only be installed in approved locations and where access is not unduly restricted.

(u) All incoming or outgoing signal equipment cabling within equipment enclosures shall be terminated on disconnect-type terminations, with test points.

(v) Provision shall be made in equipment enclosures for a mounting bar to support all incoming cables.

(w) All incoming cables shall be securely attached to the mounting bar.

(x) All fibre-optic cable jointing and termination shall be carried out using fusion splicing or by other fibre jointing methods type approved by the RIM.

(y) Coiling of all cabling shall be carried out in accordance with the manufacturer's specification relative to bending radius.

(z) All crimps and soldered connections shall be checked to ensure that they are mechanically sound and have no exposed conductors.

(aa) Wires shall not be kinked, twisted or knitted.

NOTE: All crimping tools should be tested each day by means of a pull test using a force gauge and the manufacturer manual referred to for correct operation.

### 3.14 Internal lighting

Location cases and equipment rooms shall be provided with lighting that is suitable for inspection, testing and maintenance tasks.

### 3.15 Equipment enclosure identification

External nameplates shall be provided on all signalling equipment enclosures.

The nameplate material shall be weatherproof, clear and legible and low maintenance. Nameplates shall be securely fixed to the enclosure by an approved method of fixing.

Nameplates shall be positioned so that they are visible from the safe access as well as from the track.

### 3.16 Foundations

The civil design and installation of the signalling equipment enclosure foundations shall be based on an assessment of the location and position.

Foundation design shall comply with the requirements and recommendations in AS 7664:2020 and other local requirements and guidelines.

The type and size of each signalling equipment enclosure foundation shall be determined by the designer in consultation with the respective civil engineering representative.

The surface area of the top of the foundation shall be suitable to mount the equipment enclosure on and at the same time encompassing the cable entry holes.

From the outside, the foundation shall appear totally enclosed from ground level to the underside of the signalling equipment enclosure. This shall provide the means to allow a totally enclosed cable entry to the signalling equipment enclosure.

The materials used in the construction of the foundation shall be durable and resistant to vandalism and corrosion so as to reduce minimize maintenance requirements. The materials shall be type approved by the RIM.

The finished base foundation shall be true to dimension, free from cracks, fractures or chipping and with a smooth finish.

The enclosure foundation shall have a crushed rock or concrete surround.

### 3.17 Exterior finish

Holes drilled as part of the installation process or any other cut, machined or ground surface shall be left clean, free of corrosion and free of burrs.

All parts shall be free from sharp corners and burrs which could cause injury to personnel during normal installation and maintenance procedures.

The finished assembly shall have a uniform finish and be free from defects, burrs, sharp edges and corrosion.

### 3.18 External structures

#### 3.18.1 Security fence gate

Where the access to a proposed signalling equipment enclosure is restricted by a security fence or an existing fence, the fence shall be cut and modified, and an access gate supplied and installed.

The gate shall:

(a) not obstruct access to the signalling enclosure from any direction;

(b) be sufficiently wide to enable component/equipment replacement;

(c) match the existing fencing and maintain security; and

(d) be secured and padlocked with the RIM-approved locking system.

### 3.18.2 Protection and warning posts

Where signalling equipment enclosures are installed in open areas and there is an assessed risk of vehicular damage, protection posts or warning posts shall be installed.

The design of the protection posts shall provide a sufficient numbers of posts, located on appropriate sides of the equipment enclosure, to minimize the risk of damage to the enclosure.

### 3.18.3 Handrail and guardrail

Handrails or guardrails shall be supplied and installed in accordance with AS 1657:2018 and other local requirements and guideline where:

(a) equipment enclosures are installed within 2 m of:

(i) the top of embankments or cuttings;

(ii) drains or culverts;

(iii) walkways; or

(iv) the danger zone.

(b) there is a danger of persons falling from the working area during maintenance, inspection, testing or replacement works.

### 3.18.4 Retaining walls

Where the soil instability poses a hazard to persons or equipment, retaining walls shall be installed to reinforce the soil.

The structural elements of all retaining walls shall be checked and certified by a suitably qualified engineer and approved by the RIM.

Embankments adversely affected by excavation works shall be assessed to determine the need for retaining walls.

## 3.19 Positioning and installation

### 3.19.1 General

Prior to commencement of the design of signalling equipment enclosures, an enclosure siting review involving track, civil and electrical disciplines shall be undertaken to identify hazards. These hazards shall be documented on an equipment housing siting form, and controls designed to mitigate specific siting hazards.

### 3.19.2 Location near roadways

If signalling equipment enclosures are to be installed close to or adjacent to a road crossing, the enclosure shall be positioned as close as practicable to the railway boundary.

When designing the location of a signalling equipment enclosure, the risk of road traffic impacting the signalling equipment enclosure due to an incident shall be assessed.

Signalling equipment enclosures shall be positioned to not obstruct a road vehicle driver’s line of sight of approaching trains.

Where signalling equipment enclosures are required to be located in areas where vehicle impact is possible, the area surrounding the enclosure shall be protected by bollards spaced to prevent vehicle entry.

The positioning of signalling equipment enclosures shall not obstruct the viewing of signalling, signage or sighting distance of level crossings by rail traffic crew (including pedestrian crossings).

### 3.19.3 Location within the rail corridor

Signalling equipment enclosures shall be installed adjacent to and clear of access roads and pathways, for ease of access.

The signalling equipment enclosures shall be installed based on an assessment of any possible sighting obstruction of nearby signals and signage required for safeworking purposes.

Signalling equipment enclosures shall not be positioned and installed:

(a) within the clearance envelope;

(b) in an area where catchpoints or a derailer will direct a derailed vehicle toward the enclosure;

(c) close to the ends of sidings where a shunting error could lead to an overrun toward the enclosure.

Signalling equipment enclosures shall not be installed at dimensions less than the minimum specified by the RIM, without conducting a site specific risk assessment and obtaining approval from the RIM.

NOTE: Equipment enclosures should be located to ensure personnel working on the enclosure remain greater than 3 m from the nearest running rail. Where this is not practical, the equipment enclosure should be risk assessed with approved derogation to this document.

### 3.19.4 Environmental factors

Signalling equipment enclosures shall not be located where they could impede the flow of water, cause ponding or drainage issues.

If signalling equipment enclosures are located on embankments or in a flood prone area (as defined in AS 7637:2025), the enclosure shall be installed to a level above the known flood level complete with a compliant walkway, handrails and steps as required and recommended in AS 1657:2018 and other local requirements and guidelines.

## Section 4 Constructability

### 4.1 General

Processes shall be in place that assure the installation requirements associated with a specific design are documented and communicated to the installation work force.

The asset safety and reliability risks associated with the construction and implementation of signalling equipment enclosure and wiring shall be assessed.

Controls and practices required to minimize risk associated with construction and implementation shall be documented.

NOTE: See Appendix D for guidance information about the construction of signalling equipment enclosures.

### 4.2 Construction and implementation

All construction works shall be undertaken in compliance with the railway operational regulatory requirements and that personnel on-site are aware of all regulatory railway safety requirements.

Signalling equipment enclosures and wiring shall be constructed to comply with all approved and current plans, manufacturers' material specifications and the specifications of the RIM.

### 4.3 Transportation

Transportable signalling equipment enclosures shall be designed and constructed so that they are to be able to be transported by road, loaded and unloaded from trucks using a crane or other mechanical handling equipment.

Any items that could be damaged during transit and delivery to site shall be packaged, protected and secured by the supplier prior to transportation.

## Section 5 Commissioning

Signalling equipment enclosures shall be commissioned in accordance with AS 7717:2026.

Inspections carried out at commissioning shall, in addition to the requirements of AS 7717:2026, verify the following that the signalling equipment enclosure:

(a) is located greater than 3 m from the nearest rail;

(b) is located for safe site access;

(c) does not obstruct sighting lines;

(d) is earthed as per the approved design;

(e) has the required surrounding protection bollards and fencing;

(f) is constructed of the specified materials;

(g) includes the designed heat vents and shielding;

(h) is installed to the correct height for apparatus installation, maintenance and changeover;

(i) has the approved surface installed; and

(j) has the approved locking system fitted.

NOTE: See Appendix E for guidance information about the commissioning of signalling equipment enclosures.

## Section 6 Maintainability

### 6.1 General

The RIM shall assess the asset safety and reliability risks associated with the monitoring and maintenance of signalling equipment enclosures and wiring.

The RIM shall document the appropriate controls and practices required to minimize risk associated with monitoring and maintenance.

NOTE: See Appendix F for guidance information about the monitoring and maintenance of signalling equipment enclosures.

### 6.2 Monitoring and maintenance requirements

The RIM shall monitor and maintain the enclosure to ensure the condition of signalling equipment enclosures and wiring stays within intended performance limits and is compatible with the operating parameters.

The RIM shall:

(a) carry out inspections as determined through a risk assessment approach, conducted during the design and maintenance review phase and in assessment of

the operational environment under which the signalling equipment enclosure and wiring is operating;

(b) document and retain all results of inspections, analyses and testing undertaken in all assessments as part of the asset condition records;

(c) have in place evaluation procedures to establish whether further action is required, to ensure that the signalling equipment enclosure and wiring does not pose an unacceptable risk to safety or the environment as a result of its condition or use; and

(d) have in place procedures which cover the immediate inspection, evaluation and potential decommissioning of the signalling equipment enclosure during unforeseen incidents (e.g., floods and collisions).

All maintenance work on existing signal equipment enclosures and wiring shall be carried out in accordance with RIM policies and procedures.

Any changes to the design shall be approved by the RIM and accompanied by a relevant risk assessment.

Temporary repairs or emergency maintenance arrangements shall be monitored and controlled until permanent restoration is completed.

Regular maintenance shall be carried out to reduce the deterioration of the integrity of the assets.

## Section 7 Planning, decommissioning, removal and disposal

### 7.1 Planning

The RIM shall assess risks to operations, third-party assets, safety, asset protection and reliability associated with the decommissioning and disposal of signalling equipment enclosures and wiring.

The RIM shall document the appropriate controls and practices required to minimize risks associated with decommissioning and disposal.

### 7.2 Decommissioning

The RIM shall ensure that the decommissioning plan includes the reduction or elimination of hazards and liabilities adjacent to and at the location of signalling equipment enclosures, at which the usage will change.

Where any components from decommissioned work are to remain, the RIM shall ensure that these components are monitored and maintained in compliance with the requirements of Section 6 of this document and other relevant Australian standards.

Part of the decommissioning plan shall include a risk assessment and appropriate change management processes.

Records shall be kept of decommissioning activities.

NOTE: See Appendix F for guidance information about decommissioning signalling equipment enclosures.

### 7.3 Removal

Decommissioned signalling wiring shall be removed in accordance with AS 7717:2026.

### 7.4 Disposal

When the equipment is being removed from site, disposal work shall be carried out in accordance with requirements of:

(a) relevant commonwealth, state and territory regulatory requirements; and

(b) RIM requirements.

During the disposal work, public safety and environmental safeguards shall be maintained.

In disposing of hazardous material, consultation shall be undertaken with local waste disposal authorities or organisations to ensure safe handling, transportation and disposal of such material.

Where applicable, the RIM shall record and, if appropriate, notify the relevant commonwealth, state and territory authority of all decommissioned sites that have been used for a notifiable activity or have been contaminated by hazardous material.

## Appendix A Hazard register (Informative)

| Hazard Number | Source (The risk of….) | Related factors (could result in loss or harm in the context of….) |
|---|---|---|
| 9.6.1.2 | Field equipment and or enclosures failures (Design) | Equipment not being suitable for a specific use or location |
| 9.6.1.3 | Field equipment and or enclosures failures (Design) | Equipment not interfacing with existing equipment/design |
| 9.6.1.4 | Field equipment and or enclosures failures (Design) | Equipment not operating as intended |
| 9.19.1.1 | Field equipment and or enclosure failures (Construction) | Lightning surge damage to equipment |
| 9.19.1.2 | Field equipment and or enclosure failures (Construction) | Poor construction |
| 9.19.1.3 | Field equipment and or enclosure failures (Construction) | Incorrect position |
| 9.19.1.5 | Field equipment and or enclosure failures (Construction) | Damage to equipment |
| 9.38.1.1 | Field equipment and or enclosure failure (Operations) | Signal equipment being damaged by weather |
| 9.38.1.2 | Field equipment and or enclosure failure (Operations) | Signal equipment being struck by trains |
| 9.38.1.3 | Field equipment and or enclosure failure (Operations) | Signal equipment struck by train or part of train (including load) |
| 9.38.1.4 | Field equipment and or enclosure failure (Operations) | Signal equipment damaged and not operable |
| 9.38.1.5 | Field equipment and or enclosure failure (Operations) | Track circuit failure |
| 9.48.1.1 | Field equipment and or enclosures failure (Maintenance) | Signal equipment failure |
| 9.48.1.2 | Field equipment and or enclosures failure (Maintenance) | Signal equipment sharp edge or similar OHS issue |
| 9.58.1.1 | Field equipment and or enclosure failure (De-commission) | Signal infrastructure failure |
| 9.58.1.2 | Field equipment and or enclosure failure (De-commission) | Signal equipment being damaged |
| 9.58.1.3 | Field equipment and or enclosure failure (De-commission) | Unprotected electrical voltages |
| 9.58.1.4 | Field equipment and or enclosure failure (De-commission) | Equipment being damaged by incorrect operation |

| Hazard Number | Source (The risk of….) | Related factors (could result in loss or harm in the context of….) |
|---|---|---|
| 9.58.1.5 | Field equipment and or enclosure failure (De-commission) | Interference with third party services |

# Appendix B Guidance information – General (Informative)

NOTE:

The scope of this appendix is to provide guidance information on the application, implementation, and adoption of Section 2 of this document.

## B.1 General

The development, implementation and maintenance of the product life cycle process should include tailored conformance with Australian Standards, which provides a common framework for describing the product life cycle, and a set of well-defined processes and associated terminology.

## B.2 Safety

No guidance information provided for this clause.

## B.3 Environment and heritage

No guidance information provided for this clause.

## B.4 Type approval

No guidance information provided for this clause.

# Appendix C Guidance information – Design (Informative)

NOTE:

The scope of this appendix is to provide guidance information on the application, implementation, and adoption of Section 3 of this document.

## C.1 General

The correct selection of a suitable enclosure that meets operational, safety, equipment and site requirements, is critical to the designed service life of the enclosure.

Design should take into account the age and condition of adjacent infrastructure, the operating regime, traffic tasks and seasonal climate conditions.

Where an enclosure has been specified, a suitably qualified designer, or designers should always minimize the negative impacts of an enclosure through a design process that examines and resolves any issues.

This can be achieved by minimising the adverse impacts and ensuring the enclosure represents the best possible outcome across the intended design service life of the installed equipment.

Through adoption and implementation of AS 7720:2026 designers can achieve this outcome.

## C.2 Design parameters and criteria

Design criteria can be developed through:

(a) site inspections;

(b) digital imaging;

(c) site drawings; and

(d) post installation review of previously installed enclosures.

Valuable guidance can also be gained through user input. This can come through operational readiness teams or directly from maintenance staff.

### C.3 Selection of a suitable signalling equipment enclosure

When determining the size and configuration of the signal equipment enclosure, consideration should be given to the:

(a) apparatus layout;

(b) site issues;

(c) accessibility;

(d) future proofing (i.e. expansion of signalling requirements)

(e) ventilation; and

(f) and maintainability.

Standardization of enclosure type and size has significant benefits, which include:

(g) common spare parts (e.g., doors, racks, etc);

(h) ease of supply (manufacturers have built previously);

(i) ease of transportation and installation (i.e. common methods).

This can reduce the risk of incorrect build, transport and installation.

### C.4 Suitability of materials

Selection of the right materials can reduce maintenance and enable achievement of the required design life.

The materials used in the design should be the most appropriate to the function, location, lifespan and requirements of the signal equipment enclosures.

### C.5 Environmental

Environmental conditions can have a significant impact on signalling enclosures and the internal equipment. Consideration of the environment in which the enclosure operates in can reduce maintenance, increase reliability of the internal equipment and the lifecycle of that equipment.

AS 60529 can be used to define a protection rating requirement that can assist manufacturers in meeting RIM requirements.

### C.6 Intended use and life

The design should align with the life cycle and durability of the rail infrastructure it supports. For example, the design life could be different for an enclosure on a railway with an expected 10-year life compared to an enclosure on a suburban railway with a long-expected life.

### C.7 Accessibility

It is important that maintainers have good access to all equipment located within a signalling enclosure. Access could be required for:

(a) testing;

(b) replacement of components;

(c) general cleaning; and/or

(d) installation of new equipment.

The use of testing equipment can also affect the accessibility of equipment. For example, if a laptop is required for testing purposes easy access to a socket outlet (240 V AC) and a small fold-down bench can make maintenance considerably easier.

Access should be available in all reasonably expected environmental conditions. For example, it is preferable that enclosures are not located where local flooding could cut the access road.

Consideration of human factors/ergonomics can assist in this determination.

Signalling equipment enclosures should be installed to enable easy and safe access to, from, over, around and on the equipment enclosure, for maintenance purposes.

Access area around signalling equipment enclosures should have a level and smooth area of at least 2 m in every direction (where practical and achievable).

### C.8 Clearances

Maintenance staff should be able to park vehicles within a reasonable distance of a signalling enclosure. This reduces the need to carry equipment over long distances, or up/down gradients/stairways.

It is good practice to locate enclosures beyond any defined danger zone with an additional buffer zone so that maintainers can work without requiring possession of track.

### C.9 Temperature control

Where active temperature control is fitted, it is important that operations or maintenance personnel are alerted if that equipment fails. Modern monitoring equipment can provide options to provide alerts via text messages and/or email which can enable any fault condition to be addressed before system failure occurs.

In some locations or installations, local conditions mean that ventilation alone would not provide the necessary temperature control. In these locations, a shade structure comprising roof and (possibly) wall-screening should be provided to reduce the risk of the internal temperature within the equipment enclosure exceeding the temperature rating of the apparatus.

Open louvre mesh should be oriented to present the maximum opaque surface to midday and afternoon sun.

Provision of shade structures is secondary to the provision of proper ventilation.

The shade roof and wall-screening may be attached directly to the equipment enclosure or be a standalone structure spanning over the equipment enclosure.

Roof slope angle may be reduced if the roof material is not solid and permits heated air to rise through the roof.

If fitted, wall-screening should only be required:

(a) on northern and western walls where the equipment enclosure will be fully exposed to afternoon sun; and

(b) where roof shading does not protect the equipment wall.

### C.10 Internal design

The requirement to locate apparatus more than 300 mm from the base of the rack is provided to:

(a) reduce the risk of damage to equipment from personnel accidently kicking the equipment;

(b) ease maintenance of the apparatus; and

(c) reduce the risk of water egress from minor flooding or splashes from cleaning equipment (mops, etc).

Apparatus that is heavy (which is generally considered to be over 15 kg) should be located, where possible, in the lower section of the cabinet. This would typically apply to power equipment such as transformers.

Equipment may be located above 1,800 mm from floor height if a safe means of accessing that equipment can be provided.

### C.11 Enclosure doors and door hardware

Doors should be designed to open and latch in different positions, depending on the access arrangement for that location. For example, doors could be latched at:

(a) 90 degrees;

(b) 135 degrees; and

(c) 180 degrees.

Doors and access points should be designed to meet LPS 1175 SR2 rating for security. This rating could be increased where an assessed higher risk of vandalism and attempted illegal access is identified.

Door handles should be recessed when in the locked position to reduce the risk of vandalism and illegal access.

### C.12 Earthing and surge protection

No guidance information provided for this clause.

### C.13 Cabling and wiring management

All wiring between the field and the signal equipment enclosure that does not have any form of surge or transient protection is to be known as dirty wiring. Clean wiring includes all internal wiring electrically isolated from dirty wiring, as well as all internal wiring electrically interfaced to dirty wiring via appropriate surge or transient protection.

Wiring labels may be colour coded for all numerals using resistor colour coding.

Wires should not be insulated by tape as tape can fall off and leave residue on the crimped lug which could impact the performance of the termination.

Installation requirements should be documented by designers on the drawings or in work instructions compatible with the design, in accordance with all relevant Standards.

### C.14 Internal lighting

Internal lighting can be achieved through the use of:

(a) battery power lights;

(b) mains lighting; and/or

(c) solar lighting.

Low maintenance lights, such as LED lights, are preferable to reduce the need for replacement.

AS 1680 provides a methodology for the assessment of the requirements for internal lighting.

### C.15 Location case identification

Location case numbering is typically determined by the signalling design. Nameplates may be required to be duplicated to enable identification from both safe access and track positions.

Location cases are easier to locate when the numbering follows a logical sequence. This could be in alignment with kilometre marks or other infrastructure, such as point numbers. RIMs will typically have guidance on preferred numbering and identification.

### C.16 Foundations

Durability and maintenance should be a factor in the design of foundations.

Future proofing should form part of the design of the enclosure foundations so that standard enclosures can be used to replace damaged or life expired cases.

External cable entry should be through the base of the enclosure and suitably sealed.

### C.17 Exterior finish

The exterior surfaces of signalling equipment enclosures should be finished with an anti-graffiti finish.

The use of anti-graffiti finishes should be considered. Such finishes should resist the adhesion of applied paints and spray coatings and permit the removal of graffiti using non-aggressive cleaning agents without deterioration of the finish.

### C.18 External structures

No guidance information provided for this clause.

### C.19 Positioning and installation

The positioning and installation of signalling equipment enclosures is fundamental to the achieving design functionality and the safety of construction and maintenance personnel.

Road traffic accidents can result in significant damage to signalling equipment enclosures if the road vehicles enter the rail corridor. The likelihood of this occurring can increase if a signalling equipment enclosure is located:

(a) opposite a curve in the road;

(b) near road traffic intersections; or

(c) any high road traffic incident risk location.

Where practical, signalling equipment enclosures should be installed on the same side of the track as the access point.

Signalling equipment enclosures should be installed with main access doors opening away from the main running lines and installed perpendicular, with doors shut, to the nearest rail track.

Equipment enclosure orientation should be based on an assessment of:

(d) the impact of the access doors opening;

(e) impact on surrounding equipment and structures;

(f) prevailing wind direction;

(g) strong winds that could cause door wind loading issues;

(h) proximity of the track; and

(i) local stakeholder and RIM requirements.

Care should be taken when positioning equipment enclosures near service or access roads. To maintain safety the use of protection posts or bollards could be necessary.

## Appendix D Guidance information – Constructability (Informative)

NOTE:

The scope of this appendix is to provide guidance information on the application, implementation, and adoption of Section 4 of this document.

### D.1 General

No guidance information provided for this clause.

### D.2 Construction and implementation

No guidance information provided for this clause.

### D.3 Transportation

No guidance information provided for this clause.

## Appendix E Guidance information – Commissioning (Informative)

No guidance information provided for Section 5.

## Appendix F Guidance information – Maintainability (Informative)

NOTE

The scope of this appendix is to provide guidance information on the application, implementation, and adoption of Section 6 of this document.

### F.1 General

No guidance information provided for this clause.

### F.2 Monitoring and maintenance

Monitoring and maintenance usually consist of the following activities:

(a) Visually inspecting, testing and monitoring of critical elements of the enclosure to determine their condition.

(b) Recording of irregularities or defects which may affect, or have the potential to affect, the capability of the enclosure to safely perform its required function.

(c) Assessing the visual inspection, test and monitoring results to determine the necessary action required for the enclosure.

(d) Take action before the enclosure is unable to safely carry out the required functions (e.g., where conditions are outside prescribed performance limits).

Maintenance work should be performed during the service life of the signalling equipment enclosure to:

(e) maintain its installed operational capacity, other functional capability and safe serviceability (e.g. insulation inspection, voltage measurements, insulation testing, pest ingress, moisture ingress, dust ingress, corrosion, seals, locks, bonding etc.) and

(f) ensure that the enclosure maintains its design service life.

The following items should be checked during maintenance activities:

(g) All protective coatings (paint, galvanising, etc.) are still performing a protective action.

(h) Ventilation/cooling systems are in place and effective.

(i) Security locking systems are in place and effective.

(j) Any significant drainage issues are reported.

(k) Infrastructure clearance is maintained.

(l) Maintenance records, including, drawings and maintenance test records, are available and legible.

# Appendix G Guidance information – Planning, decommissioning, removal and disposal (Informative)

NOTE:

The scope of this appendix is to provide guidance information on the application, implementation, and adoption of Section 7 of this document.

## G.1 Planning

No guidance information provided for this clause.

## G.2 Decommissioning

Any decommissioned items of signalling equipment enclosures and wiring should be removed or clearly identified as decommissioned and have necessary clearances maintained to ensure the safe passage of trains.

The process of decommissioning should involve the following:

(a) Initial site inspection.

(b) Determination of assessment criteria.

(c) Development of decommissioning technical specifications.

(d) Decommissioning implementation.

(e) Decommissioning documentation.

## G.3 Removal

No guidance information provided for this clause.

## G.4 Disposal

No guidance information provided for this clause.

## Bibliography (Informative)


- AS 60529*, Degrees of protection provided by enclosures (IP Code)*
- AS ISO 31000, *Risk management - Guidelines*
- LPS 1175, *Requirements and testing procedures for the LPCB certification and listing of intruder resistant building components, strongpoints, security enclosures and free standing barriers*