



AUSTRALIAN RAIL TRACK CORPORATION LTD

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Signalling

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Small Buildings, Location Cases, Terminal Cases and General Purpose Cases

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About This Standard

This specification defines the requirements for small buildings, such as relay rooms or combined relay and communications rooms, of brick construction: small pre-cast concrete buildings and stainless steel or aluminium location cases, termination cases and general purpose cases.

This specification is not to be used for buildings with more than one story, nor is it to be used for larger single story buildings where the roof span over the outside walls exceeds six (6) metres in its smallest dimension.

Specifications for multiple story buildings and larger single story buildings shall be prepared by a qualified architect.

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1. General

1.1. Introduction

This Specification is defines the requirements for the construction of small buildings of brick construction; for the construction of small buildings of pre-cast concrete construction and for the manufacture and installation of location cases, termination cases and general purpose cases.

This Specification shall be read in conjunction with the Particular Specification and other relevant Standard Specifications.

The Contractor shall supply all labour, material and equipment plus any other thing necessary for the design and construction of small buildings, location cases, termination cases and general purpose cases.

Unless specified otherwise in the Particular Specification, the Contractor shall carry out the necessary work for the design (including geotechnical investigations) and construction of the foundations determined by him, based upon his inspection and testing of the site, as being necessary for the building at its designated location and complying with relevant Australian Standards and building codes.

1.2. Drawings

The drawings to be used in the execution of the works shall be the relevant Principal's Standard Drawings plus any other drawings nominated in the Particular Specification and the Contractor's drawings which have received approval for use.

1.3. Referenced Documents

AS 1650	Galvanising
AS 3000	Wiring Rules
AS 1603 Pt 4	Automatic Fire Detection, Control and Indicating Equipment
AS 1851 Pt 8	Fire Alarm Systems, Maintenance and Certificates
AS 1557	Fixed Walkways, Handrails and Ladders
AS 1449	Wrought Alloy Steels (Stainless Steel)
AS 1734Purposes	Aluminium and Alloys, Flat Sheet
AS 1665	Welding, aluminium
AS 1554 Pt 1	Welding, steel

AS 1289 Methods of Testing Soils for Engineering

AS 3600 Concrete Structures

AS 1225 Clay Building Bricks

Specification SPS 03 Documentation and Drawings

Specification SCP 13 Protection of Persons, Property and Trains

Specification SCP 21 Construction of Cable Route

Specification SCP 04 Lighting and Surge Protection

2. Brick Buildings

2.1. Earthworks

2.1.1. General

Earthworks shall be carried out as required or as shown on the Drawings to:

- Clear the site and allow correct finished levels and falls for floor slabs and external paved or graded areas.
- Allow for underground services such as stormwater, drainage, sewerage, power cable, earthing cable, cable route entry to the building, pits, ducts etc. included on the Drawings or in the Specifications.

The area up to 5 metres away from the building on all sides (unless shown otherwise on the Drawings) shall be graded to achieve a minimum fall away from the building, of 1 : 100.

2.1.2. Certification of Foundations

Following the excavation of the foundations and before any foundation concrete is poured, a certificate from a Structural Engineer approved by ARTC, certifying the suitability of the foundations, recognising the geotechnical conditions, for the proposed building, shall be supplied.

2.1.3. Filling and Back-filling

Filling or back-filling shall not be carried out before all timber and rubbish has been removed from the area to be filled and until the ARTC Corridor Manager or nominated Signalling representative has :

- Inspected and approved the area to be filled or back-filled and
- Approved clean fill material to be used in the filling or back-filling.

If the excavated material is insufficient or unsuitable, then suitable filling material shall be provided. The unsuitable fill material shall be removed from site.

All filling or back-filling material shall be placed in layers of not greater than 150mm thickness and compacted by an approved means to 95% Standard Density in accordance with AS1289.

All filled or back-filled areas shall be finished to a even level surface.

2.2. Concrete Work

2.2.1. Formwork

Design and construction of the formwork shall produce concrete elements which will conform with the specified tolerances to shapes, lines, levels, dimensions and quality of surface finish

required by the Contract. Unless stated otherwise on the Drawings, this maximum tolerance shall be 25 mm whilst irregular/abrupt deviations shall not exceed 6 mm.

Unless stated otherwise on the Drawings or approved by the ARTC GM ISP or nominated Signalling Representative, the minimum stripping times shall be:

Vertical Faces of Slabs on Ground	24 hours after completion of the pour
Vertical faces, columns or walls	14 days after completion of the pour
Suspended Horizontal Faces	14 days after completion of the pour

2.2.2. Reinforcement

All reinforcement including necessary tie wire, support chairs, spacers and the like shall be supplied and fixed in accordance with the Drawings.

- Reinforcing steel shall have a minimum yield strength of 250 MPa.
- Reinforcement shall be clean and free of loose rust.
- Unless stated otherwise on the Drawings, all reinforcement shall be located within a tolerance of 25 mm of its design location.
- Unless stated otherwise on the Drawings, the minimum concrete cover to the reinforcement shall be 40mm on all surfaces except the top of the slab, which shall have a minimum concrete cover to reinforcement of 25mm.
- Conduits encased in the concrete shall be located at least 40mm clear of any reinforcement and shall have a minimum concrete cover of one half the conduit diameter or 20mm, whichever is the lesser.

To allow inspection of reinforcement, the ARTC Corridor Manager or nominated Signalling representative shall be given not less than one working days prior notice of the intention to pour concrete.

2.2.3. Concrete

All concrete necessary for the works in shall be supplied and placed in accordance with AS3600.

No concrete shall be poured until permission to pour has been received from the ARTC Corridor Manager or nominated Signalling representative.

Concrete to be placed on the ground shall have an underlay of 50mm of clean sand covered with Forticon 200 microns. The joints in the Forticon shall be lapped 200mm minimum and sealed with self adhesive waterproof tape.

Unless stated otherwise on the Drawings, the concrete shall have a minimum 28 day compressive strength of 20 MPa with 20 mm maximum aggregate. Concrete shall be supplied from a batching plant approved by the ARTC GM ISP or nominated Signalling Representative.

When the air temperature exceeds 32°C or is less than 10°C, concrete shall not be placed unless special precautions, approved by the ARTC GM ISP or nominated Signalling Representative, are in operation.

Concrete shall be placed in a manner that will avoid segregation of material.

Concrete shall be compacted using mechanical vibration and/or hand methods and shall be finished to accommodate the following trade(s).

Freshly placed concrete shall be protected from premature drying and excessively high or low temperatures.

Curing of concrete shall be carried out for a minimum of seven days and this may be achieved by either keeping the concrete constantly wet or by the application of an approved curing oil membrane.

2.3. Security Fencing

Following completion of the concrete slab, a 1800mm high galvanised chain wire security fence, constructed in accordance with Standard Specification SCP 21, shall be supplied and erected with access gates, except where this requirement is specifically excluded in the Particular Specification.

Unless otherwise nominated in the Particular Specification or precluded by site restrictions, the fence shall be constructed at a distance 3000mm from the walls of the building.

The security fence shall have three rows of galvanised barbed wire attached to the posts above the 1800 mm chain wire.

Buildings with two or more rooms shall have access gateways at each end of the building whilst one room buildings shall have one access gateway opposite the main entry door.

The access gateway openings shall be a minimum of 3600mm wide and shall consist of two equal width galvanised chain wire gates.

2.4. Brickwork

2.4.1. Brickwork

All brickwork associated with the building shall be supplied and constructed in accordance with AS1225.

The external face bricks shall be of similar colour and texture to any adjacent buildings and the internal brickwork shall be smooth surfaced face bricks of light colour.

The ARTC Corridor Manager or nominated Signalling representative shall submit samples of the proposed bricks for approval. The supply price of bricks, at the time of tendering shall be included in the tender.

The Contract Price will be adjusted to reflect the actual cost of the bricks used in the work.

Bricks shall be laid in a mortar using a mix ratio of 1 : 1 : 6, cement : lime : sand, unless stated otherwise on the Drawings and shall be laid to give a regular pattern.

Mortar shall be placed such that beds and perpends are filled solid with mortar.

Finished brickwork shall be acid cleaned with a solution containing 1 part muriatic acid to 10 parts water. Following the acid cleaning, the brickwork shall be thoroughly washed down with clean water.

Over masonry openings, hot dipped galvanised mild steel flat or angle lintels of the following dimensions shall be supplied and installed, unless otherwise shown on the Drawings:

MAXIMUM SPAN (mm) LINTEL DIMENSION (mm)

1050	75 x 10	flat bar
1200	75 x 75 x 8	angle
1350	90 x 90 x 8	angle
1500	90 x 90 x 8	angle
1650	100 x 75 x 8	angle
1800	100 x 75 x 10	angle
2100	125 x 75 x 10	angle
3000	150 x 90 x 12	angle

For spans of less than two (2) metres, the lintels shall have a minimum bearing at each end of 150 mm.

For spans of greater than two metres and up to three metres, the minimum bearing area at each end shall be 230 mm.

Damp course and flashing shall be provided where necessary or shown on the Drawings and shall be bitumen coated aluminium 0.7 mm thick.

Joints in internal face brickwork and brickwork to be rendered or plastered shall be cut flush.

External face brickwork shall have 5 mm deep ironed joints.

Where control joints are required, unless shown otherwise on the Drawings, they shall be 15 mm wide, and shall be completely filled with a elastomeric sealing compound.

2.5. Steelwork

The supply and installation of all materials necessary to complete any steelwork, including chequer plate, steel posts, pit covers, cable duct covers, purlins and grates shown on the Drawings shall form part of the contract.

Structural steel shall be Grade 250 unless otherwise stated on the Drawings.

After the fabrication and the drilling of any necessary holes in the steel, the steel shall be hot dipped galvanised in accordance with AS 1650.

All bolts, nuts and washers used in steel work shall be hot dipped galvanised.

2.6. Roof Cladding

2.6.1. Roofing

Roofing shall be constructed in accordance with good building practice and shall include metal roofing and reflective thermal insulation sarking, plus fibre glass insulation.

Fibre glass insulation and reflective insulation shall be placed on bird wire placed on top of the roof purlins and shall be mineral wool batts, 75 mm thick with a minimum Rating R2.5.

Reflection insulation shall be Sisalation 430 or equivalent.

Metal roofing shall be Klip-Lok Hi-Ten 0.65mm or Spandek Hi-Ten 700 0.53 thick or similar steel sheeting with Colorbond finish, colour to be matched to the local environment.

Ridge capping shall be preformed Colorbond, colour to match the roofing sheet.

Eaves closures shall be factory formed eaves with the Colorbond finish, colour to blend with the brickwork and roofing colours.

Barge flashings shall include preformed barge capping with Colorbond finish, colour to match the eaves closures.

Metal cladding and accessories shall be installed in accordance with good building practice and the Manufacturer's Specifications.

2.6.2. Gutters

Roof gutters shall be Lysaght Sheerline or equivalent, Colorbond finish, colour to match the barge flashings, with overflow slots and supported on brackets at centres no greater than 900 mm.

2.6.3. Down Pipes

Down pipes shall be size 100 x 75 x 0.7 mm constructed from steel with Colorbond finish, colour to match the guttering, and supported with matching straps at centres not exceeding 1200mm .

2.7. Timberwork

Unless stated otherwise in the Particular Specification or on the Drawings, timber shall be Grade F5 and shall be clean and straight and shall be fixed using galvanised fastenings.

2.8. Eaves Lining and Ceilings

Eaves lining shall be versilux sheet or equivalent.

Ceilings shall be minimum two (2) hour fire resistant gyprock. All joints shall be taped and plastered.

2.9. Doors

Unless shown otherwise in the Drawings, doors shall have a minimum fire rating of 1 hour. External doors shall be steel clad or of all steel construction.

Door frames shall consist of galvanised steel sections with suitable provision for fixing specified hardware such as hinges, closers and the like and include necessary accessories such as mortar guards, strike plates, buffers, cavity flashing, fixing lugs, base plates, spreaders and the like, pre-finished with a protective primer coat and built in. The door frames shall be designed and installed to accommodate fire rated doors and steel clad doors.

Doors shall be hinged using four/100 mm stainless steel fixed pin hinges per door welded to the door and bolted or screwed to the door jamb.

Door handles shall be chrome finish and shall be 1000 mm above finished floor level.

Locks shall be chrome finish Falcon S Series, S100DG latch set with D4470 dead lock fitted with interchangeable core cylinders.

Door closers shall be chrome finish Briton 532 or similar and shall be provided on all doors.

Door latches shall be bronze finish and shall be attached to the building to hold the doors in the fully open position.

Bottom edge door seals of a type approved by the ARTC GM ISP or nominated Signalling Representative shall be provided on all external doors and shall fit neatly in the recessed step to prevent water and rain entry.

Security grill flyscreen doors shall be fitted to the external doors of Traffic Rooms.

2.10. Metalwork

Metalwork shall be neat and tidy in appearance with accurate joints.

Ducted skirting shall be installed on all walls and shall consist of an extruded aluminium anodised dual cavity section to accommodate the electrical and telephone wiring.

Room nameplates shall be provided on all doors and the building nameplate shall be provided on the brick wall facing the main railway line.

Nameplates shall be Architectural Bronze alloy plate stock, satin finished with engraved areas painted with Dulux Pioneer colour enamel or similar.

The lettering shall be Helvetica Medium or similar, with a height of 50 mm.

Ventilators shall be provided in all rooms.

Ventilators shall be IVR LTV 200 or equivalent and installed in accordance with the manufacturer's specifications and the Drawings. The ventilators shall be ducted through the ceiling lining and shall include a removable insect mesh screen fitted to the ceiling.

2.11. Windows

Windows shall be supplied and installed as shown on the Drawings or nominated in the Particular Specification.

Windows shall be constructed of anodised aluminium and shall be installed as shown on the Drawings.

Security grill flyscreens shall be installed on all opening windows.

2.12. Electrical Services

The Contractor shall supply and install approved wiring, junction boxes and electrical services associated with the buildings and connect to the distribution point.

The Contractor shall supply and install approved internal and external lighting for a 240V 50 Hz AC supply. All rooms with two or more doors shall have multi-way switching to the lights.

Where the building includes a Motor Generator or Power Room the Contractor shall supply and install an approved step-up isolating transformer of at least 5kVA rating to convert the Signalling 120V 50 Hz AC supply to 240 volts suitable for use in ordinary equipment. The transformer shall isolate the higher voltage supply so that the signalling power supply remains unearthed under all conditions.

The 240 volt supply shall be connected to the power outlets.

Lights, light switches and G.P.O.'s in the Battery Room shall be spark proof fittings satisfying the requirements of AS3000 Hazardous Areas Class 1 Zone 1.

Generally, wiring shall be concealed or placed in ducted skirting as specified in Clause 2.10. When the wiring cannot be concealed, consideration will be given for the use of surface mounted conduit. Surface mounted conduit shall not be installed unless approved by the ARTC GM ISP or nominated Signalling Representative.

Where the building includes one or more showers or a kitchen, the Contractor shall supply and install a Rheem Australia Ltd. Model A441/045 boiling water unit, or equivalent.

Where the building includes a kitchen, the Contractor shall supply and install a continuous boiling unit, Zip Auto Boil 7.5 litres or equivalent over the sink.

When the electrical installation is considered complete, a Ready for Test Certificate shall be submitted to the ARTC GM ISP or nominated Signalling Representative.

2.13. PLUMBING

The plumbing and associated fittings shown on the Drawings plus items nominated hereunder shall be supplied and installed.

Battery Rooms shall have a eyewash facility equivalent to Bradley Eye Wash Fountain Model S 1922 plus a chrome plated hose cock adjacent to the eyewash. The water supply to the eyewash and hose cock shall also be provided.

A water waste outlet shall be installed in the floor of the Battery Room and toilet.

Water waste from the battery room shall be discharged into an appropriate sealed concrete pit approved by the ARTC GM ISP or nominated Signalling Representative.

Where the building includes toilet(s), the toilet(s) shall be Concorde 150 vitreous china dual flush model with Deluxe model flap seat or equivalent.

Where the building includes hand basin(s), the hand basin(s) shall be Caroma Industries V564 vitreous china wall basin or equivalent. A threaded tap shall be provided under one hand basin in each toilet and shall drain to the floor waste.

Where the building includes a shower(s) each shower shall include a ceramic soap holder on the wall.

Where the building includes a kitchen, the kitchen shall include a 1200mm long Clarke Model 100F stainless steel sink, or equivalent.

2.14. Finishes

2.14.1. Walls

Cement Render

Toilet and bathroom walls and other walls nominated in the Particular Specification or by the ARTC GM ISP or nominated Signalling Representative shall be cement rendered.

To overcome brick manufacture tolerances, a minimum of one side of brick partition walls shall be cement rendered.

The finished cement rendered surface shall be smooth without voids and with a uniform architectural stipple.

Tiling

Unless otherwise nominated in the Drawings or in the Particular Specification, the following walls and areas shall be tiled with 150mm x 150mm white ceramic tiles:

- a) shower walls to a height of 1800mm above floor level.
- b) walls at the back of bench tops in the kitchen - 2 rows of tiles

- c) walls at the back of hand basins and extending 150mm beyond each side of the hand basin - 2 rows of tiles

The tiles shall be glued to the cement render finish and shall be grouted with white ceramic grout.

2.14.2. Flooring

Unless stated otherwise on the Drawings all rooms excepting Battery Rooms, toilets and shower areas shall have vinyl tile flooring which shall be 2 mm thick x 300 mm x 300 mm and shall be laid with an approved waterproof adhesive and finished with two coats of approved sealer.

Unless stated otherwise on the Drawings Battery Room floors and skirting shall be light brown non skid ceramic tiles. The skirting shall be one tile width or 100mm in height whichever is the greater. The tiles shall be grouted with epoxy grouting.

Unless stated otherwise on the Drawings, toilet floor areas shall be tiled with ceramic tiles and include a skirting tile of one tile width or 100mm high, whichever is the greater.

Each shower shall include a floor tray and unless stated otherwise on the Drawings, the floor tray shall be tiled with ceramic tiles approved by the ARTC GM ISP or nominated Signalling Representative.

2.14.3. Painting

All exposed surfaces (excluding external brickwork and steel chequer plate) which have not been paint finished at manufacture shall be painted.

Prior to the application of any coating, the surface shall be properly prepared. Woodwork shall have primer coat, undercoat and two finishing coats applied. Steelwork and metalwork shall have primer coat and two finishing coats applied. Galvanised steel shall have an etch primer, undercoat and two finishing coats applied. Internal brickwork shall have a clear silicone based sealer coat applied. Cement render shall have a sealer coat and two finishing coats applied.

Versilux and gyprock shall have a sealer/undercoat coat and two finishing coats applied.

Finishing coat colours will be approved by the ARTC GM ISP or nominated Signalling Representative.

2.15. Fire Protection

2.15.1. General

The fire detection system for buildings shall include:

One surface mounted ASA1603 Part 4 Fire Detection Panel with the number of alarm groups equal to the number of rooms in the building, battery charger, sealed internal lead

acid batteries, two sets of changeover voltage free contacts for extended alarm, log book and operating instructions.

- One external alarm bell.
- Exit signs on the inside of all external doors.
- Twelve months regular inspection and listing as per ASA1851 Part 8.

2.15.2. Relay Room

Relay rooms shall be provided with a Vesda or similar single zone control panel complete with standby batteries and sealed lead acid batteries.

2.15.3. Communications Rooms, Power Rooms

Communications rooms and power rooms shall be fitted with sufficient numbers of smoke detectors.

2.15.4. A15.4 Other Rooms

All rooms, excluding relay rooms and communications rooms shall be fitted with thermal detectors.

2.15.5. A15.5 Ducts

Cable ducts in all rooms in buildings shall be fitted with smoke detectors.

2.16. Furniture

The Contractor shall provide the following items:-

- One toilet paper holder, Bradley Model 5085 or equivalent for each toilet.
- One mirror, Bradley Model 705 or equivalent installed above each hand basin.
- Cupboards constructed from 19mm thick particle board surfaced with laminated sheet with doors and handles where cupboards are shown on the Drawings or nominated to be provided in the Particular Specification.

2.17. Retaining Walls

Retaining walls shall be provided where the pathway around the building is below the adjacent ground level.

The retaining wall shall be built so that it is no closer than 1200mm from the building.

The retaining walls shall be built to a height of 300mm above the ground level on the fill side of the wall and the material shall be compacted and levelled to allow water run off to flow behind the wall.

The retaining wall shall be constructed of either adequately designed brick, block, or reinforced concrete materials.

Retaining walls with heights greater than 1000mm shall be designed by a Structural Engineer approved by the ARTC GM ISP or nominated Signalling Representative prior to construction.

Where the retaining wall will be 1000mm more in height at any point, free draining backfill shall be placed within 300mm of the rear of the wall and shall be drained into an agricultural pipe of diameter no less than 100mm which shall be located at the base of the wall.

Retaining walls shall be provided with weep holes at 600mm centres maximum, 100mm above the adjacent dish drain.

When retaining walls are required, a dish drain with minimum gradient of 1:100 shall be provided between the retaining wall and the pathway.

2.18. Hand Rails

Hand rails shall be supplied and installed where nominated in the Particular Specification or shown on the Drawings.

Handrails shall be constructed in accordance with AS1557 and shall be hot dipped galvanised after fabrication.

Handrail posts shall be constructed of 50mm diameter galvanised steel pipe with centres not greater than 1500mm apart and shall be concreted 300mm into the ground. The posts shall extend 50mm above the top horizontal rail and shall be fitted with galvanised steel caps.

Completed handrails shall be painted and finished as nominated in Clause 2.14.

2.19. Stairs and Ladders

Stairs and ladders shall be supplied and installed where nominated in the Particular Specification.

Ladders shall be 450mm wide with rungs at centres not greater than 300mm or less than 250mm. The bottom ladder rung shall not be less than 300mm from the bottom of the ladder.

Ladders shall be constructed using 50mm x 10mm steel plate stiles with 20mm diameter steel rungs.

Steel ladders shall be hot dipped galvanised after fabrication and all fastenings shall be hot dipped galvanised.

Ladders shall be securely concreted into the ground.

Stairs shall be designed by the Contractor and approved by the ARTC GM ISP or nominated Signalling Representative and shall have tread size of no greater than 250mm or less than 200mm with a maximum riser height of 150mm and minimum tread width of 600mm.

Stairs shall be constructed using "Forgeweld" or similar treads with 6mm chequer plate sides. The stairs shall have open risers.

Stairs shall have 50mm diameter steel handrails and posts on both sides of the stairs. The posts shall be at centres not greater than 1200mm apart and shall be welded to the stairs.

Stairs and handrails shall be hot dipped galvanised after fabrication. The stairs shall be securely concreted into the ground.

2.20. Boundary Fence/Gate

Where a boundary fence giving access to a public road or street is within 50 metres of the building, the Contractor shall modify the fence and supply and install a 900mm wide x 1800mm high galvanised chain wire mesh gate, with catch and provision for the Principal's standard access padlock.

2.21. Concrete Pavement

When the building is constructed on piers above ground level, the Contractor shall supply and install a 75mm concrete layer to cover the exposed earth under the building and protrude 1 metre beyond the extremes of the building. The concrete to be used shall have a 28 day strength of 15MPa.

When the building is constructed directly on the ground, the Contractor shall supply and install a 1000mm wide by 100mm thick concrete pavement around the building as shown on the Drawings.

The pathway shall be reinforced with one layer of F61 mesh and expansion joints shall be provided at 1800mm intervals. Finish shall be wood float and edges shall be rounded.

The concrete to be used shall have a 28 day strength of 20MPa.

2.22. CLEAN UP

Upon completion of the building works, the Contractor shall grade the ground between the concrete walkway around the building and up to 4 metres away from the building and remove all rubbish, surplus materials and surplus excavated materials from the site.

2.23. ROAD BASE

Following completion of the clean up, the Contractor shall supply and compact a 50mm layer of stabilised road base including a minimum 5% cement content, over the area graded under Clause 2.1.1

The road base shall be compacted and levelled to RTA Class A standard.

3. Pre-cast Concrete Buildings

3.1. General

This part of the Specification sets out the requirements for the manufacture and installation of precast concrete small buildings to a maximum size of two rooms. The type of building specified herein is one which is manufactured complete off-site and lifted or slid into place on a prepared foundation.

The Particular Specification will define the size of building and number of rooms required.

This type of building shall not be used in areas which are known to be subject to (local) flooding.

3.2. Inspection

Access to the Contractor's and/or Manufacturer's premises, for the ARTC Corridor Manager or nominated Signalling representative during construction of these buildings shall be provided.

3.3. Warranty

The building shall be warranted free of defect in manufacture and installation for a period of two (2) years from the date of installation.

3.4. Roof, Wall and Floor Construction

Cement mortar strength shall be not less than 32 MPa at 28 days.

The floor thickness shall be a minimum of 125 mm with two (2) layers of F82 reinforcing mesh. Starter mesh to tie the floor to the walls shall be two (2) layers of WG11G3 with a minimum overlap of 300 mm. Cable entry aperture(s) shall be provided in the floor as shown on Drawing No. 122000/04 or where stipulated by the ARTC Corridor Manager or nominated Signalling representative.

Lifting hook sizes and positions shall be determined by the manufacturer and the adequacy of the hooks to withstand all lifting and handling loads shall be the responsibility of the manufacturer.

Walls shall be manufactured from cement mortar placed over two (2) layers of WG11G3 galvanised reinforcing mesh and shall have a minimum rendered thickness of 60 mm. The walls shall be vertical and of regular line and finish.

Roofs shall be manufactured from cement mortar placed over two (2) layers of WG11G3 galvanised reinforcement and shall have a minimum rendered thickness of 60 mm and shall be waterproof. Roof slope shall be 3 or more with the high point at the centre (or on the centre line) of the building.

Additional reinforcement around apertures shall be positioned diagonally to corners and shall be not less than 25 mm from the aperture perimeter. The reinforcement shall be galvanised WG 11G3.

Buildings shall be cured for at least fourteen (14) days following manufacture and shall not be transported, lifted or otherwise moved from their place of manufacture for twenty eight (28) days following manufacture.

3.5. External and Internal Finishes

The exterior surface shall be smooth rendered without voids and with a uniform architectural stipple. The surface shall be coated with one coat of acrylic sealer/undercoat and two finish coats of full gloss acrylic, colour as nominated by the ARTC Corridor Manager or nominated Signalling representative.

The interior roof and wall surfaces shall be smooth rendered and free of voids. These surfaces shall be painted with one coat acrylic sealer/undercoat and two finish coats of white full gloss acrylic.

The floor shall be coated with heavy duty paving paint or covered with vinyl/vinyl tiles as nominated in the Particular Specification.

3.6. Doors and Door Jambs

3.6.1. Doors

Doors shall be of all steel construction. The door shall have dimensions 2040mm height x 820mm width and shall consist of a 25 x 25 RHS perimeter frame with four cross members, two at mid height to support the locking mechanism.

The exterior skin shall consist of 2.4 mm (minimum) thick steel sheet with light cross breaks to prevent drumming. The skin shall either be folded around the frame and intermittently welded or if not folded shall be continuously welded to the frame all round.

The lower section of the door shall be fitted with, or have pressed into the exterior skin, a 600 mm wide x 200 mm high vent panel. The panel shall be suitably proofed against vermin and insect entry.

3.6.2. Door Jambs

Door jambs shall be formed from 3mm steel sheet as shown on Drawing No. 122000/01 and shall be fitted with a 50 mm wide awning over the doorway.

3.6.3. Corrosion Protection

Doors and jambs shall be coated with one coat inorganic zinc silicate primer to a dry film thickness of 75um and one coat white Vinyl Copolymer paint to a minimum dry film thickness of 100um. Painting shall be carried out after welding and assembling has been completed.

3.6.4. Hardware

The doors shall be hinged with four (4) 100 mm stainless steel fixed pin hinges per door welded to the door and bolted or screwed to the door jamb.

Unless otherwise directed by the ARTC GM ISP or nominated Signalling Representative or noted in the Particular Specification, doors shall be hinged on the left hand side as observed from outside of the building.

The doors shall include a Lockwood model 355 deadlatch lock or equivalent with the strike plate set on the inside frame stop as shown on Drawing No. 122000/01.

Doors shall be fitted with an exterior handle and lock guard as shown on Drawing No. 122000/02.

A catch which fits over the handle to restrain the door in the open position shall be fixed to the location wall with chemset anchors.

3.7. Communications Compartment

A communications compartment 1200 mm high x 500 mm wide x 300 mm deep shall be fitted into the end wall beside the door as shown on Drawing No.122000 / 03.

This compartment and door shall be made from 3 mm steel and construction shall be generally as required for the main door and door jamb. The compartment door shall be hinged with 2 off 120 mm stainless steel fixed pin hinges. Locking shall be as required for the main door and corrosion protection shall be as for the main door and jamb.

A 150mm x 300mm cable entry aperture shall be provided in the floor immediately under the communications compartment.

3.8. Ventilation

Buildings with floor area of ten (10) square metres or less shall include two (2) 300mm x 250mm vermin and insect proof vents located in the wall opposite the door at a height 150mm below the ceiling level.

Buildings with floor area of more than ten (10) square metres shall include four (4) 300mm x 250mm vermin and insect proof vents located 150mm below ceiling level. Two of the vents shall be installed in the wall opposite the doorway and one vent shall be installed in each of the side walls.

3.9. Electrical

Cabling to light fittings and switches shall be carried in corrugated conduit encased in the floor, walls and roof. The cable shall be as required by AS 3000 for medium voltage application but fluorescent fittings shall be double insulated and not earthed.

Three (3) metres of cable shall be left at the cable aperture in the floor to permit termination by others.

Fluorescent lights shall be single 120 volt 38/40 watt with a minimum of two lights in each room for rooms up to 3.3 m long and four lights for rooms over 3.3 m long.

When the Contractor considers his electrical installation is complete he shall submit a Ready for Test Certificate to the ARTC GM ISP or nominated Signalling Representative.

The electrical circuit design shall be included in the Signal Circuit Book and the installation tested as part of the testing of the signalling system.

3.10. INSTALLATION

3.10.1. Location

Buildings shall be positioned as shown on the detailed site survey plans. Care shall be taken to ensure that the buildings are positioned clear of:

- Structure Gauge 1987 detailed in Standard Specification SCP 21
- Access roads and pathways, preferably no part of the building shall be closer than 1.5 metres to an access road.
- The area where catchpoints or a derail will deflect a derailed vehicle.
- The ends of sidings where error may lead to overrun
- Non-interlocked (hand thrown) points in yard areas.

Where used for level crossing locations, the building shall be positioned as close as practicable to the ARTC boundary and at least 15 metres from the edge of the roadway. It shall also be positioned to cause the least obstruction to the vehicle drivers sight of approaching trains.

3.10.2. Site Preparation

The site shall be cleared and levelled to provide for the building and a 1 metre wide pathway all round. Where it is necessary to excavate into a cutting wall or bank to locate the building a suitable retaining wall shall be provided and provision made for drainage around the building.

A level bed 100 mm below ground level shall be provided to accept the roadbase building foundation

3.10.3. Foundation

The foundation shall consist of a minimum of 200 mm of a stabilised roadbase pad compacted and levelled to RTA class A. Roadbase cement content shall be at least 3% and aggregate size shall not exceed 20 mm.

The height of the foundation pad shall be 50 mm minimum above ground level whether natural level ground or levelled area.

The foundation shall span the total area of building and surrounding path plus 150 mm and shall be battered to ground level at not more than 30.

A layer of sand not less than 50 mm deep shall be laid between the foundation and the building floor. A waterproof membrane (Fortecon or similar) shall be laid between the sand and building floor to extend at least 300 mm outside the building.

Where retaining walls and/or drainage systems and/or stairways are required, designs shall be submitted to the ARTC GM ISP or nominated Signalling Representative for permission to use before any construction is commenced. Stairways shall conform to the requirements of AS 1657.

3.10.4. Pathway

A pathway of 100 mm minimum thickness shall surround the building. The pathway shall be 1000 mm wide on sides with doorways and 750 mm wide on other sides. The path shall slope away from the building with a slope of 1 .

The pathway shall be reinforced with one layer of F61 mesh and expansion joints shall be provided at 1800 mm intervals. Finish shall be wood float and edges shall be rounded.

The concrete to be used shall have a 28 day strength of 20 MPa.

3.10.5. Pits, Pipes and Ground Level Troughing

Ground level troughing, where used, shall be positioned in the foundation so that it aligns with the building cable aperture. The top of the GLT cover shall not project above foundation level and all trough and cover joints shall be sealed with sand cement mix (3:1).

Pits adjoining the pathway shall be level and flush with the top of the path. The pits shall be positioned as close as possible to and in line with the cable aperture. Pits shall include chequer plate covers.

Where a power supply room is provided, two (2) 100mm diameter heavy duty orange PVC conduits shall be provided from the power supply room cable aperture to a point three (3) metres outside the pathway. One conduit shall run in the direction of the ARTC normal supply, the other in the direction of the (ARTC or COUNCIL) emergency supply. Buried ends of the conduits shall be capped and draw wires provided.

The ends of the conduits shall be temporarily buried under sand bags to enable ready access for others to install power cables.

3.10.6. Earthing

Conduits for earth cables shall be installed as shown on Drawing No. 122000/04.

Earth stakes and earthing shall be installed to the requirements of Standard Specification SCP 04.

3.10.7. Handling of Building

The building shall be lifted onto the foundation or may be slid off a tilt tray directly onto the foundation. If slid off the tilt tray, care shall be taken to ensure that the prepared sand surface of the foundation is not disturbed to the extent that voids will be left under the floor.

3.10.8. Handrails and Bollards

Handrails shall be provided to any path where any part of the path is within three metres of the nearest rail of any railway line. Handrails shall be constructed in accordance with the provisions of Standard Specification SCP 21.

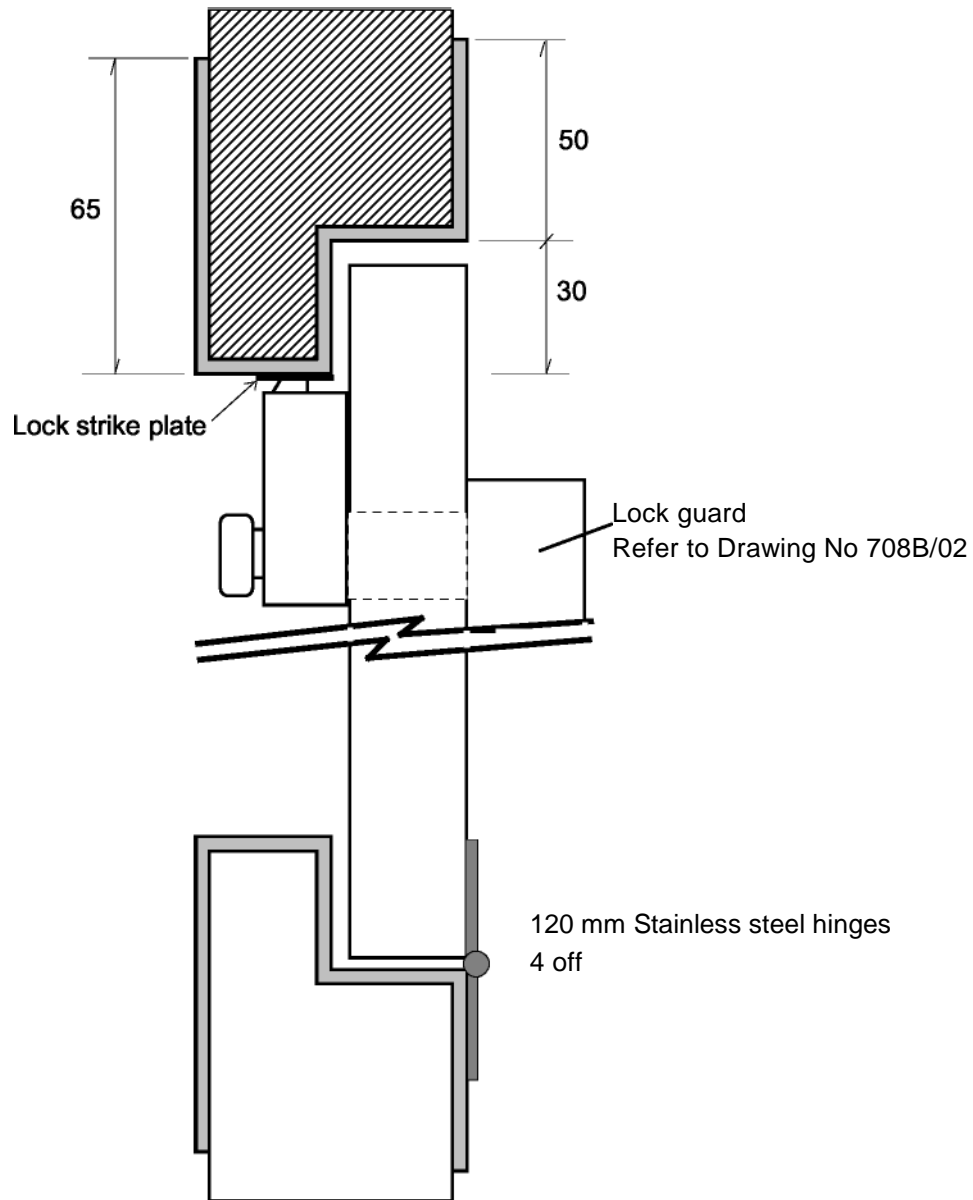
Bollards shall be located where directed by the ARTC Corridor Manager or nominated Signalling representative and shall be in accordance with the provisions of Standard Specification SCP 21.

3.10.9. Site Clean-up

On completion of installation of the building and any cable route to, or in the vicinity of, the building, the site shall be restored to as close as possible to its original topography and (where previously improved, e.g. by landscaping) its original appearance.

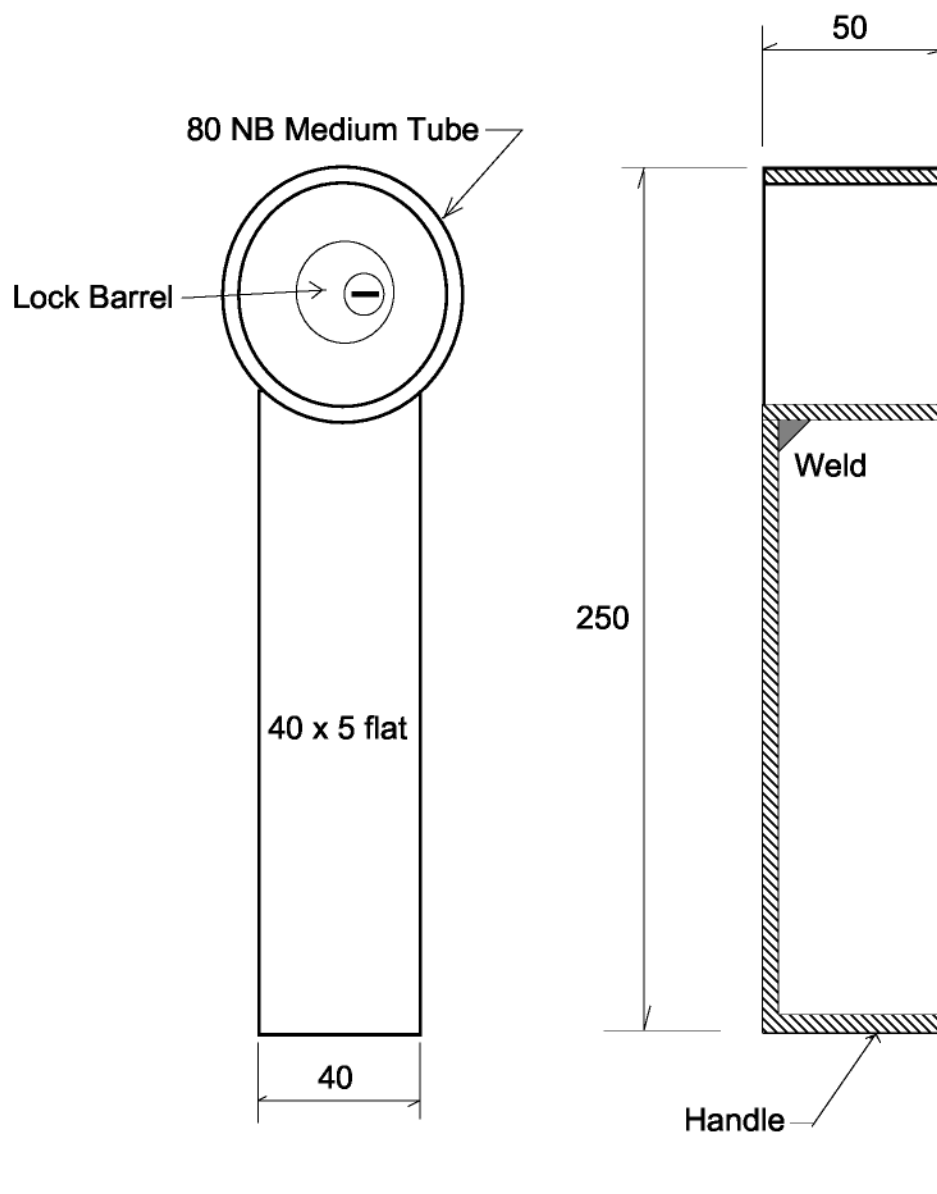
Where special drainage provision has been made to protect the building, care shall be taken to ensure that run-off from these drains will not cause erosion or direct water onto access roads or pathways or into private property unless this is a natural drainage route.

3.11. Drawings



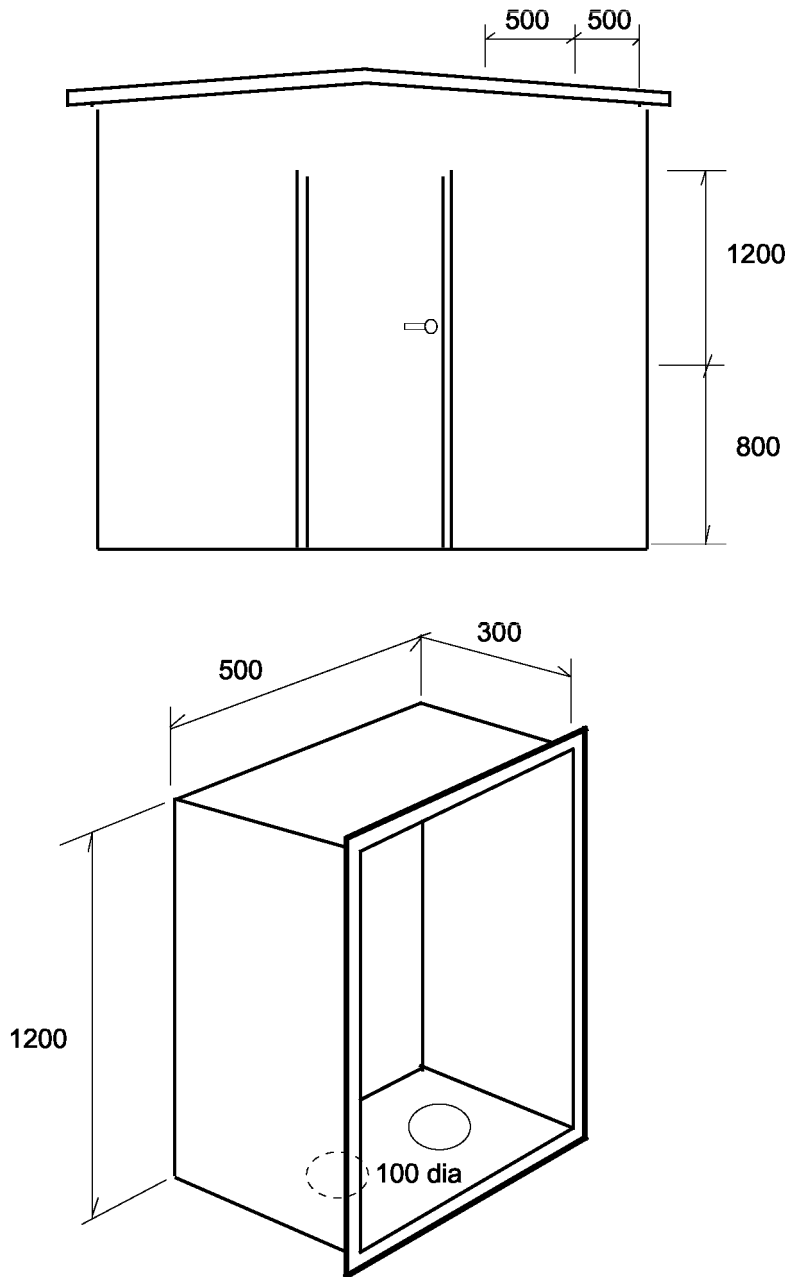
Drawing No 122000 / 01

Door Jamb and Lock Arrangement



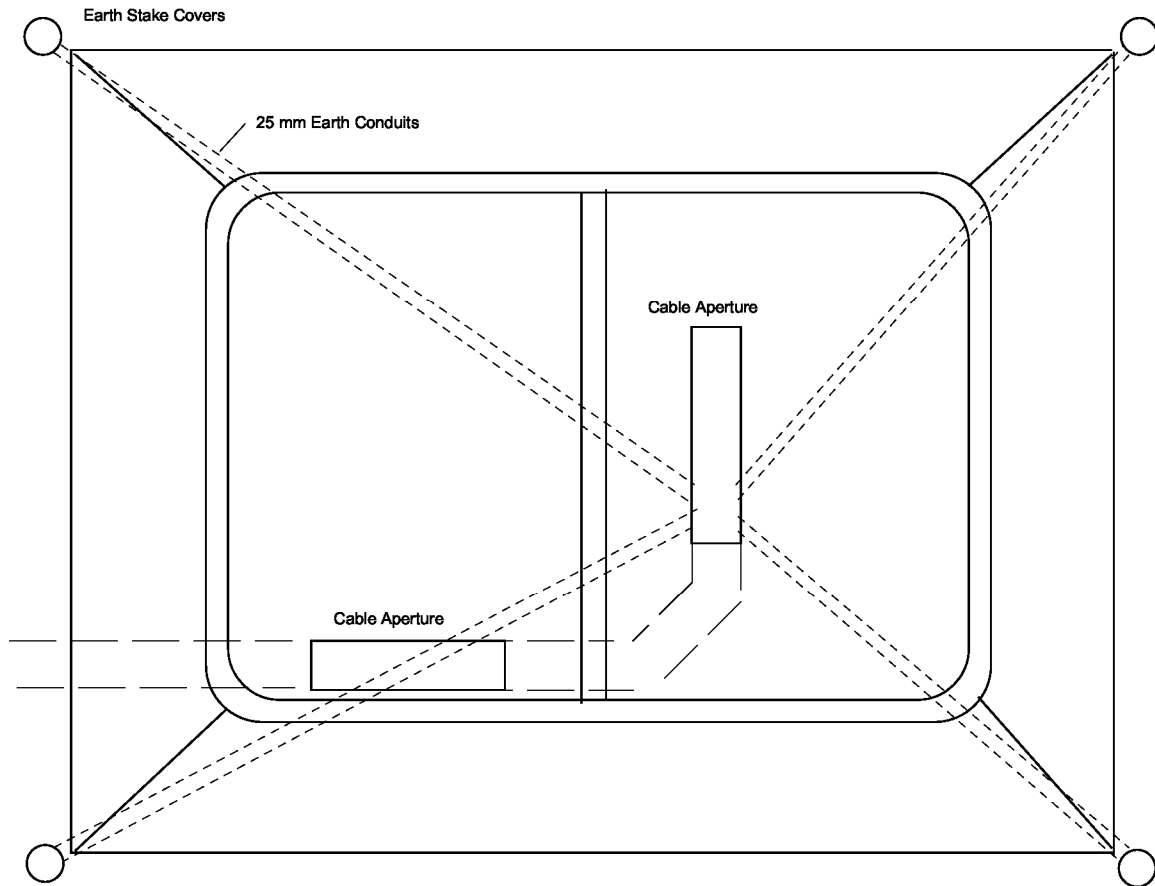
Drawing No 122000 / 02

Door Lock Guard & Handle



Drawing No 122000 / 03

Communications Hatch



Drawing No 122000 / 04

Cable Apertures and Earth Conduits

4. Location Cases, Termination Cases and General Purpose Cases

4.1. General

This part of the Standard Specification sets out the requirements for location cases, termination cases, and general purpose cases, including ESML boxes and track circuit equipment cupboards, to a maximum size of 2000mm high x 2250mm wide x 800mm deep and of free standing or post/wall mounted type.

For the purposes of this Specification, location cases are defined as free standing cases 1200 mm or more high.

Termination/distribution cases are defined as post or wall mounted cases less than 1200 mm high.

General purpose cases (including ESML boxes and track circuit equipment cupboards) are defined as cases up to approximately 600 mm high x 600 mm width.

4.2. Warranty

All location cases, termination cases and general purpose cases shall be warranted free of defect for a period of two (2) years from the time of installation.

4.3. Location Cases

4.3.1. Construction

Location cases shall be constructed such that the equipment rack within is supported directly by the location case foundation or base and does not rely on the sides or top of the case for stability. It shall be possible to remove the location case (except the base) without disturbing the equipment rack.

Doors shall be provided front and rear and the top of the case shall extend over the door(s) to form weather protection.

4.3.2. Materials

Location cases and termination boxes shall be manufactured from AS 1449 grade 304 stainless steel of 1.6 mm minimum thickness and 2B finish or from 3CR12 corrosion resistant steel of 1.6 mm minimum thickness and 2B finish or from aluminium alloy 5052-H32 of 2.5 mm minimum thickness.

Case sides, case top and doors shall be reinforced as required by "cross breaking" or by the addition of stiffeners to provide adequate rigidity.

4.3.3. Welding

Welding shall be carried out in accordance with AS 1665 for aluminium and with AS 1554.1 for steel.

4.3.4. Doors and Door Hardware

Swing doors shall be provided front and rear. The maximum width of a single door shall not exceed 1125 mm.

Doors up to 1500 mm high shall be hinged on two (2) 100 mm stainless steel fixed pin hinges. Doors over 1500 mm high shall be hinged on three (3) 100 mm stainless steel fixed pin hinges.

All doors shall be secured with a three point locking system (top, bottom and centre) and the door handle shall be recessed when in the locked position.

Door handles shall be secured with the ARTC standard padlock, samples of which are available on request.

Doors shall be provided with automatic latching top and bottom stays to support the door in the open position (which shall generally be approximately 135) in wind speeds up to 45 m/sec. The stays shall be secured to door and case such that the method of securing is stronger than the stay.

Door sealing shall be with synthetic rubber or PVC foam material securely and permanently attached to either case or door.

4.3.5. Ventilation

All location cases shall be ventilated. Vents may be located in doors or case or both and shall be covered with metallic fly screen mesh to prevent insect entry. All vents shall be waterproof and shall be filtered to minimise dust entry. A minimum of 2 vents shall be provided in 'single' locations and a minimum of 4 vents shall be provided in double locations. Each vent shall have a minimum size of 0.03 square metres and shall be distributed to achieve maximum air flow through the location.

4.3.6. Lighting

All lights in location cases shall be fed from the 120 volt signalling supply.

A 120v 18-20 w single fluorescent fitting shall be provided in each location case behind each door (alternatively in cases over 1350 wide a single 36-40w fitting may be used front and back). These fittings shall be double insulated and not earthed.

Cut-out switches shall be provided to ensure that lights are out when the case is closed.

4.3.7. Communications Compartment

Where required a separate compartment with a door in one end of the location case shall be provided for a communications cable head.

4.3.8. Storage of Maintenance Record Documents

Pockets shall be provided for storage of track circuit history cards either on doors or in the case. If on the door(s), the pocket shall be provided with a waterproof cover and a drain hole. History cards are approximately 160mm wide x 200 mm long.

4.4. Termination/Distribution Cases

4.4.1. Construction

Termination/distribution cases shall be constructed such that the back or base of the case forms the support for the termination rack within. The back of the case shall be of sufficient strength or sufficiently stiffened to support the case and rack without distortion when bolted or clamped to a single steel post 150 mm or less wide.

Generally termination cases should not exceed 900 mm in width and 450 mm in depth

4.4.2. Materials

Termination/distribution cases shall be manufactured from the materials specified in Clause 4.3.2.

4.4.3. Welding

Welding shall be carried out in accordance with AS1665 for aluminium and with AS1554.1 for steel.

4.4.4. Door and Door Hardware

Termination/distribution cases shall include a single front door hinged on two 100 mm stainless steel fixed pin hinges.

Alternatively, cases less than 900 mm in height may be fitted with a vertical sliding door. This door shall not be readily removable and shall be provided with an automatic latch which holds the door in the raised position. (The door shall open to within 150 mm of the top of the case)

Hinged doors shall be provided with two point fastening up to 900 mm high and three point fastening over 900 mm high. The handle shall be recessed when closed and provision shall be made to accept the ARTC standard padlock.

Sliding doors over 600 mm wide shall be provided with a two point locking system with handle recessed when closed and locked.

Sliding doors less than 600 mm wide may be locked directly by the ARTC standard padlock and exclude any other locking system and handle.

4.4.5. Ventilation

Unless stipulated otherwise in the Particular Specification, ventilation is not required.

4.4.6. Lighting

Lighting is not normally required. If specified it shall be a single 120v 18-20w double insulated fluorescent fitting installed in accordance with subclause C3.6.

4.5. General Purpose Cases

4.5.1. Material

General purpose boxes may be manufactured from AS 1449 grade 304 stainless steel of 1.6mm minimum thickness, stainless steel grade 3CR12 1.2 mm thick or aluminium grade 5052 H32 2.0 mm thick.

4.5.2. Door and Door Hardware

General purpose cases shall include a single front door either hinged on two 100mm stainless steel fixed pin hinges or vertically sliding. The door shall be effectively weather sealed either by shape or by synthetic rubber or PVC foam seals.

Single point locking is required to accept the ARTC standard padlock.

4.6. C5.3 Ventilation

Ventilation is not required.

4.6.1. C5.4 Lighting

Lighting is not required.

4.6.2. Special Application - ESML Boxes

Where a general purpose case is an ESML box or an EOL box, the door shall be constructed such a manner that it cannot be closed and locked until the switch machine emergency crank handle or key has been restored to the normal position in the ESML lock or switch.

Door locking in this application shall be with the ARTC "SL" padlock which has a bow 16 mm wide x 6 mm thick.

4.7. Installation

Location cases, termination/distribution cases and general purpose cases shall be installed on foundations constructed in accordance with Specification SCP 21.