

# Pits and Turning Chamber requirements for Signalling Applications

ESA-11-04

## Applicability

ARTC Network Wide

## Publication Requirement

Internal / External

## Primary Source

ESA-12-01, ESA-11-02

## Document Status

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1.0	21 Apr 26	Engineering Services	Principal Signalling Engineer	Manager Engineering Services 08/05/2026

## Amendment Record

Amendment Version #	Date Reviewed	Clause	Description of Amendment
1.0	21 Apr 26		Updates to cable pit requirements, including the introduction of smaller pit sizes permitted under defined conditions within ETS-13-02. Document renumbered from ESA-12-01.

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## **1 Introduction**

### **1.1 Purpose**

The purpose of this specification is to describe the requirements for High-Density Polyethylene (HDPE) and GRP (Glass Reinforced Plastic) pits/turning chambers used for main cable routes and local cable routes for signalling and communication system to be supplied and installed for Australian Rail Track Corporation (ARTC).

### **1.2 Scope**

This specification covers minimum requirements for HDPE and GRP pits/turning chambers and covers to be used on the ARTC network.

### **1.3 Document Owner**

The Head of Engineering Standards is the document owner. Queries should be directed to [standards@artc.com.au](mailto:standards@artc.com.au) in the first instance.

### **1.4 Responsibilities**

The applicable Project Manager (for projects) or Responsible Asset Manager/Signal engineer is accountable for implementation of this specification.

The manufacturer/supplier is responsible for compliance and confirmation to this specification.

The Project Manager (for projects) or Responsible Asset manager are responsible for consultation and agreement with the relevant local Signal Maintenance Engineer. This is necessary to ensure consistency, maintainability and reliability of the Signalling System.

### **1.5 Reference Documents**

The following documents support this specification:

ETS-13-02 – Construction of Cable Route and Associated Civil Works

AS 3996 – Access Covers and Grates

AS 4586 – Slip Resistance Classification of New Pedestrian Surface Materials

AS 7664 – Railway Signalling cables, routes, cable pits and foundations

AS/NZS 4131 – Polyethylene compounds for pressure pipes and fitting

ANSI/SCTE 77 – Specification for underground closure integrity

## 1.6 Definitions

The following terms and acronyms are used within this document:

<b>Term or acronym</b>	<b>Description</b>
ARTC	Australian Rail Track Corporation Ltd.
HDPE	High-Density Polyethylene
WHS	Work Health and Safety
GRP	Glass Reinforced Plastic

## 2 Specifications

### 2.1 Standard Compliance

Manufacturer shall be able to demonstrate the compliance to relevant standard/s from section 1.5. All test reports shall be provided for pits/turning chamber by the manufacturer to ensure the compatibility with this specification.

### 2.2 General Requirements

Pits and turning chambers shall be easy enough to cut on site to allow conduit entry without affecting the overall strength.

Pits and turning chambers should have structure ribbing to allow security in the ground and to provide additional structural strength.

Pits and turning chambers shall be tested with load rating as per ANSI/SCTE 77 Tier 22 or equivalent test in laboratory. Manufacturer shall provide test reports and results to demonstrate the compliance with ANSI/SCTE 77 Tier 22 or equivalent.

All pits and turning chambers shall be manufactured with UV stabilised material.

All pits and turning chambers should be compliant with the requirements of ANSI/SCTE 77 TIER 22 Section 6 – Environmental Tests or equivalent.

### 2.3 Covers

All pits and turning chambers shall be provided with removable covers in compliance with AS 3996.

In platforms, other paved areas, sealed or unsealed roads and pathways 'Gatic' covers or covers of similar construction shall be used and shall be rated for the vehicular or pedestrian load applicable to the location in accordance with ANSI/SCTE 77 or AS 3996 as applicable.

Covers on all other pits and turning chambers shall be capable of carrying incidental live loads of 1.5Kpa and shall be sectioned as necessary to limit the maximum weight of each section to 45kg.

Gatic or similar covers shall be provided with recessed sockets or eyes for lifting with appropriate tools. All other covers shall be provided with recessed or retractable handles so that the cover can be removed without tools.

Except for covers in platforms, paved areas, sealed or unsealed roadways and pathways, covers shall be secured to pits and turning chambers with padlocks or similar to guard against theft and vandalism. For pad-lockable pits and turning chambers, the mechanism holding the padlock shall be enclosed.

### 2.4 Size

Cable pit sizes shall be compliant with the below table.

**Table 1: General Minimum Pit/Turning Chamber Dimensions**

TYPE OF PIT	MINIMUM INTERNAL DIMENSIONS OF PITS	
	Depth up to 1500mm	Depth over 1500mm
Round	900mm	1200mm

Square	1000mm *1000mm	1200mm*1200mm
Rectangular	1200mm*700mm	1450mm*850mm

The internal size of all pits and cable turning chambers shall provide for the minimum bending radius of the largest cable to be installed in them.

In the case that the following specific conditions apply, smaller pits, although not preferable, may be used:

- **Space Constraints:** where the installation of a required pit is between two adjacent tracks less than 6m away from one another (measured from the outer faces of both closest rails) or in narrow corridors where the minimum 3m away from track cannot be achieved.
- **Cable Separation Requirements:** where cable carrying above 120V or cable joints are required to be isolated from signalling or cables carrying 120V or below.
- **Low Cable Volume:** where the pit is intended to accommodate less than 5 cables, including local cables with limited routing requirements.

Pits required in the specific conditions mentioned shall comply with the table below.

**Table 2: Conditional Minimum Pit/ Turning Chamber Dimensions**

TYPE OF PIT	MINIMUM DIMENSIONS OF PITS
Round	430mm
Square	600mm*600mm
Rectangular	900mm*600mm

Smaller pits should be designed for non-entry use, especially when housing cables carrying above 120V, to ensure technician safety and compliance with confined space regulations.

These pits are only suitable for installations involving less than 5 cables. They are not appropriate for high-density layouts or complex jointing.

Use of smaller pits should be limited to locations where standard pit sizes cannot be accommodated due to physical constraints, such as between rail tracks or near existing infrastructure.

## 2.5 WHS

Pits and turning chambers more than 1000mm deep shall be large enough so maintenance personnel can safely stand and work within the pit clear of cables.

Pits and turning chambers in excess of 750mm deep shall have rungs (minimum width 300mm constructed from 20mm diameter galvanised steel rod or other approved material) cast in to the wall at 300mm (maximum) centres, to permit safe and easy entry and exit from the pit or chamber. Alternatively, a galvanised steel ladder (or suitable length, with minimum width of 300mm and 20mm diameter rungs) fixed securely to the wall at the top and the bottom of the ladder, may be provided.

There shall be no sharp edges on any section of the pit.

## 2.6 Installation

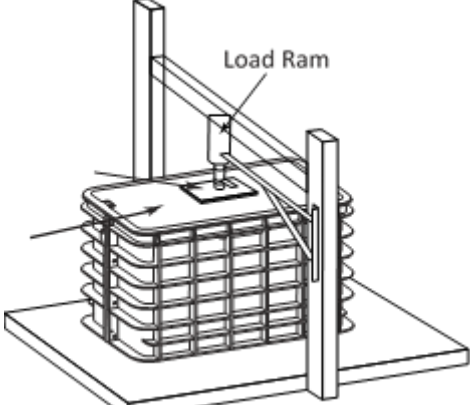
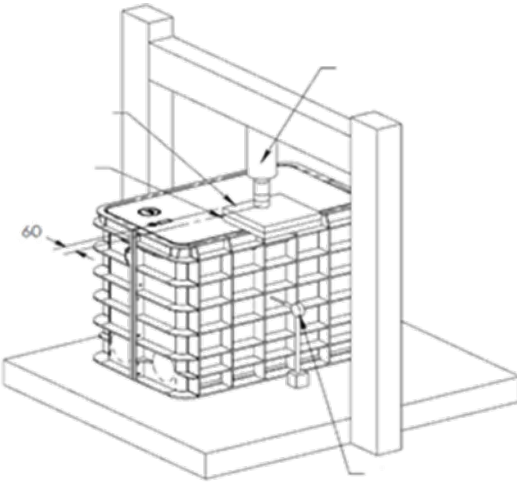
All pits/turning chambers and related installation shall be compliant to ETS-13-02 – Construction of Cable Route and Associated Civil Works. All pits/turning chambers shall be installed as per manufacturer guidelines.

Adequate drainage shall be provided as per ETS-13-02.

## 2.7 Testing Requirements

Below information is based on ANSI/SCTE 77 for guidance only. Refer to ANSI/SCTE 77 for full testing details.

**Table 3: Load Testing Requirements for Pits and Turning Chambers**

Test Description	Test Method
<p><b>Vertical Centre Load - 150kN (15 tons)</b></p> <p>The full magnitude of the cyclic load will be applied over the center of the plate for 5 seconds and then removed.</p> <p>The loading and unloading rate shall not exceed 5 kN per minute.</p> <p>This cycle is repeated 4 more times, after which the final (maximum) load is applied for 10 seconds and then removed.</p>	
<p><b>Vertical Sidewall Load - 150kN (15 tons)</b></p> <p>The full magnitude of the cyclic load will be applied over the center of the engaged portion of the plate for 5 seconds and then removed.</p> <p>The loading and unloading rate shall not exceed 5 kN per minute. This cycle is repeated 4 more times, after which the final (maximum) load is applied for 10 seconds and then removed.</p>	

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***Lateral Sidewall Vertical Load - 15kN (1.5 tons)***

The full magnitude of the cyclic load will be applied over the center of the engaged portion of the plate for 5 seconds and then removed.

The loading and unloading rate shall not exceed 5 kN per minute. This cycle is repeated 4 more times, after which the final (maximum) load is applied for 10 seconds and then removed.

