TS 05268:1.0

SPG 1010, CRN SE 035

Standard

Cables for Railway Signalling Applications

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Document information

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Document history

Revision	Effective date	Summary of changes
1.0	23 June 2025	First issue as TS 05268, superseding SPG 1010, SPG 1011, SPG 1012, SPG 1014, SPG 1015, SPG 1016, SPG 1017, SPG 1018, SPG 1019, CRN SE 035 and TD 00057.Version numbering recommenced as 1.0.

Preface

This standard is the first issue as TS 05268 and supersedes:

- TS 05268:0.0 (SPG 1010, Version 1.2) *Cables for Railway Signalling Applications – General Requirements*
- TS 05269:0.0 (SPG 1011, Version 1.1) *Cables for Railway Signalling Applications – Multi Core Signalling Cables*
- TS 05270:0.0 (SPG 1012, Version 1.1) *Cables for Railway Signalling Applications – Single and Twin Conductor Cables*
- TS 05271:0.0 (SPG 1014, Version 1.1) *Cables for Railway Signalling Applications – Traction Return Bonding and Track Connection Cables*
- TS 05272:0.0 (SPG 1015, Version 1.1) *Cables for Railway Signalling Applications – High Frequency Screened Track Circuit Cables*
- TS 05273:0.0 (SPG 1016, Version 1.1) *Cables for Railway Signalling Applications – Fire Safe High Frequency Screened Track Circuit Cables*
- TS 05274:0.0 (SPG 1017, Version 1.1) *Cables for Railway Signalling Applications – Fire Safe Multi-conductor Cables*
- TS 05275:0.0 (SPG 1018, Version 1.1) *Cables for Railway Signalling Applications – Fire Safe Single and Twin Conductor Cables*
- TS 05276:0.0 (SPG 1019, Version 1.1) *Cables for Railway Signalling Applications – Fire Rated Twin Conductor Power Cables for Emergency Services*
- TS 01333:1.0 (CRN SE 035) *Cables for Railway Signalling Applications*
- Technical Direction – TD 00057:2024 *Cables for railway signalling applications – Quad core cables*.

The changes from previous versions include:

- consolidation of CRA and MRA requirements into one document
- addition of cables required for ETCS equipment
- addition of quad cables for axle counter equipment
- addition of multi-pair twisted cables for CBI and other signal applications
- updated references to other documents and standards
- the requirements for signal wire (single core) for safety applications which was in Appendix B.2 of TS 05258:1.0 (T HR SC 01000 SP) *Common Signals and Control Systems Equipment Requirements* has been brought back into this new document to consolidate the cable requirements in one document.

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1 Scope

This standard specifies the requirements for railway signal cables and signal wire that are used in the heavy rail signal system.

Signal cables and single core signal wires are used to connect signal equipment items together to make the signalling system. Compliance with the requirements of this standard contributes to the functional safety of the signalling system.

This document covers signal cables of the following types: power cables, multi-core cables, twisted pair cables, track connection cables, traction bonding cables, high frequency track circuit cables, quad core axle counter cables and single signal wire for internal wiring.

This document does not cover aerial cables or SSI (solid state interlocking) cables, which are no longer used for new installations.

This document does not cover optical fibre cables.

This document does not cover communications cables used outside of railway signal equipment and signal system applications.

This document does not cover cable terminations, cable jointing or installation methods.

This document does not cover building wire used for low voltage 240 V installations.

2 Application

This document applies to new and altered signal cables on the TfNSW metropolitan heavy rail network in the MRA and the TfNSW-owned heavy rail network in the CRA. The signal cables and signal wires addressed in this document form part of the signal safety system.

This document applies to fire safe signal cables which are installed in enclosed or tunnel areas.

This document applies to temporary or staged cables.

This document applies to temporary single signal wire for internal wiring.

This document is intended to be used by designers, project managers, installers, testers, approvers and maintainers.

3 Referenced documents

The following documents are cited in the text. For dated references, only the cited edition applies. For undated references, the latest edition of the referenced document applies.

Australian standards

AS 3569 *Steel Wire Ropes – Product Specification*

AS/RISSB 7663 *Railway signal cables*

AS/NZS 1125 *Conductors in insulated electric cables and flexible cords*

AS/NZS 3808 *Insulating and sheathing materials for electric cables*

AS/NZS 5000.1 *Electric cables – Polymeric insulated – Part 1: For working voltages up to and including 0.6/1 (1.2) kV*

AS/NZS ISO 9001 *Quality management systems – Requirements*

Transport for NSW standards

TS 00026 *Ambient Environmental Conditions*

4 Terms, definitions and abbreviations

The following terms, definitions and abbreviations apply in this document.

ac alternating current

BoPET biaxially-oriented polyethylene terephthalate; a polyester film made from stretched polyethylene terephthalate

CBI computer-based interlocking

core the inner conductor of the cable

CRA country rail area; that part of the NSW rail network not within the metropolitan rail area (Source: *Transport Administration Act 1988* (NSW))

dc direct current

ETCS European train control system

ETFE ethylene tetrafluoroethylene; a plastic material sometimes known as ‘Teflon’

MRA metropolitan rail area; area bounded by Newcastle (in the north), Richmond (in the northwest), Bowenfels (in the west), Macarthur (in the southwest) and Bomaderry (in the south), and all connection lines and sidings within these areas, but excluding private sidings. (Source: Order under Section 99D(2) of *Transport Administration Act 1988* (NSW), as gazetted on page 3132 of NSW Government Gazette of 28/6/2013)

PE polyethylene

PVC polyvinyl chloride

signal cable a cable that could be single core or multi-core, and that is suitable for installation in external locations. Signal cables are used to connect external signal equipment to equipment locations or to connect signal locations together

signal wire a single core wire that connects internal equipment (for example, terminals, modules and relays)

> Note: Signal wire is only installed inside an equipment room, in an apparatus case or inside equipment. Signal wire is not sufficiently robust to install in external locations.

TfNSW Transport for NSW

UV ultraviolet

5 Environmental conditions

5.1 General

Signal cables and the signal equipment connected with the signal cables shall be able to operate when exposed to the ambient environmental conditions described in TS 00026.

In addition to the environmental conditions described in TS 00026, railway-specific signal cables are subject to direct UV light in outdoor environments, pollution in tunnel environments, vibration, termite damage and rodent damage.

During installation, the signal cables are exposed to abrasion and tension while being installed in buried conduits, troughing and cable trays.

Signal cables shall be able to operate effectively in temperatures between –10°C and 75°C.

5.2 Signal cables installed in external locations

5.2.1 Laid in buried conduits and laid in surface ducting

All signal cables, except for fire safe cables, shall be suitable to be laid in buried conduit or laid in surface ducting made of steel, concrete or composite materials. They shall be capable of withstanding the following without the cable being damaged or degraded:

- direct UV exposure
- direct immersion in water that is salty or acidic down to a pH level of three.

Fire safe cables shall not be used for these installations.

5.2.2 Laid directly on the ground or ballast

Signal cables with insulation shall be able to be laid directly on the ground or track ballast.

Signal cables that are laid directly on the ground or track ballast shall be able to operate when subjected to any of the following:

- vibration from trains
- mechanical abrasion from rubber-tyred machinery and vehicles
- oils and fuels from trains and trackside equipment
- insecticides and herbicides sprayed in the rail corridor.

5.3 Signal cables and signal wires installed in internal locations

Signal cables and signal wire shall be able to be laid in cable trays and ducts made of steel, concrete or composite materials.

Signal cables and signal wires used in internal locations may have only a single layer of insulation due to the installation methods used and the nature of their environment.

5.4 Fire safe signal cables

In railway tunnels, only fire safe signal cables shall be installed. Other installations may specify the use of fire safe signal cables.

Fire safe cables shall have low flame propagation, low smoke emission and zero halogen emissions in fire conditions.

Fire safe signal cables using X-90 XLPE insulation for the cores and HFS-90-TP insulation for the cable sheaths meet the requirements of this document and AS/NZS 5000.1 for fire safe cables.

Fire safe signal cables shall be coloured red.

Fire safe signal cables shall not be buried in the ground either directly or in conduits. Fire safe cables shall not be used in permanently wet locations.

6 Operating voltages

With the exception of quad core cables and multi-pair cables, signal wire and signal cables shall be rated to greater than 600 V core to earth and 1 kV core to core.

Quad core cables shall be rated to greater than 300 V core to earth and 500 V core to core.

7 Conductors

Conductor materials for signal cables and signal wire shall be annealed, untinned (except for the ETFE single signal wire), high conductivity copper, unless another metal is specified for the conductor in Section 10.

Conductors shall be multistrand, consisting of seven or more wires. Solid conductors shall not be used.

8 Insulation of cores

Each core shall be insulated. Each core shall comply with the requirements set out in AS/NZS 5000.1 for radial thickness. Insulation shall comply with the requirements for the specified materials, in accordance with AS/NZS 3808.

Each core shall be individually insulated with V-90 or X-90 insulation.

Where fire safe cables are specified, each core shall be individually insulated with X-HF-90 insulation.

All insulation shall be UV stabilised.

9 Cable sheaths

9.1 Inner sheaths

For cables with more than one core, an inner concentric sheath that conforms to AS/NZS 5000.1 shall be wrapped around the cores. The inner sheath should be a minimum of 5V-90 PVC and coloured black.

For fire safe cables, the inner sheath shall be of type HFS-90-TP and coloured red.

A non-hygroscopic binder tape compatible with the insulation may be applied prior to the inner sheath.

The minimum average radial thickness of the inner sheath shall meet the requirements of AS/NZS 5000.1 but have a minimum thickness of 1.8 mm.

9.2 Termite barriers (nylon)

With the exception of fire safe cables, all signal cables for installation in external locations shall have termite barriers.

The termite barrier shall be a type 12 black UV-stabilised nylon polymer (polyamide) covering. The termite barrier shall be applied evenly and tightly enclose the inner sheath of the cable.

For cables with an overall diameter less than or equal to 25 mm, the termite barrier shall have a thickness of 0.4 mm ± 0.05 mm.

For cables with an overall diameter greater than 25 mm, the termite barrier shall have a thickness of 0.5 mm ± 0.05 mm.

Fire safe cables shall not have a termite barrier.

9.3 Sacrificial outer sheaths

Power cables, multi-core signal cables and multi-pair signal cables shall be fitted with a sacrificial outer sheath. The sacrificial outer sheath shall be made of 5V-90 PVC or equivalent of radial thickness 1 mm ± 0.1 mm. This sacrificial outer sheath shall be applied tightly over the termite barrier (if a termite barrier is fitted).

The sacrificial outer sheaths of power cables operating at 120 V or less and multi-pair signal cables shall be coloured black. For power cables operating above 120 V, the outer sheath shall be coloured orange.

Fire safe cables shall not have a sacrificial outer sheath.

10 Specific cable types

10.1 Single core signal wires (used in internal locations)

10.1.1 General

Single core signal wire is used as internal wire for safety applications.

The copper conductor shall be between 0.75 mm^2 and 1.5 mm^2.

The single core signal wire shall operate in conditions of up to 90°C.

The conductors shall be class 2 (stranded conductors) or class 5 (flexible conductors) in accordance with AS/NZS 1125.

The conductor strand size shall be greater than or equal to 0.2 mm in diameter.

The insulation shall be flexible with high abrasion resistance to withstand physical damage during installation.

The outside of the wire shall be black. Other colours, such as white and yellow, may be specified for temporary and staging wiring.

There are two types of single core signal wire that have been type approved for internal wire applications. One type is nylon-jacketed PVC wire, which is used for relay-based interlockings and in general use for computer-based interlockings. The second type is the ETFE-insulated wire, which is used for CBI applications.

10.1.2 Nylon-jacketed PVC wire

Nylon-jacketed PVC wires are legacy wires used on the MRA and CRA networks.

The conductor shall consist of 7 x 0.4 mm plan annealed copper conductors.

The insulation shall be PVC-V90HT with a flame retardant incorporated.

The nylon jacket shall consist of nylon 12.

The PVC insulation and nylon jacket shall be considered a combined insulation.

The overall insulated cable diameter shall be between 1.9 mm and 3.0 mm. The overall insulated cable diameter should be 2.6 mm where possible.

The radial thickness of the combined insulation shall not be less than 0.8 mm.

The radial thickness of the nylon jacket shall be 0.15 mm (with an allowance of +0.15 mm or –0.05 mm).

The formulation of the nylon 12 insulation shall ensure no plasticiser will seep out of the cable ends. Storing the cable at temperatures above 40°C can trigger the leaking of plasticiser.

Where used in normal installations, single core signal wires shall have insulation coloured white or off-white, with a black nylon jacket.

Where used as special temporary wiring and special stage work wiring, the insulation should be coloured yellow, with a clear nylon jacket.

The signal wire shall be supplied on drums with a nominal length of 1000 m ± 10 m.

The PVC insulation shall be labelled every 150 mm with the manufacturer’s name or identification, the year and ‘TfNSW’, prior to the fitting of the nylon covering.

10.1.3 Internal wires using ETFE insulation

For CBI systems, and other items such as axle counters and object controllers, the terminal spacing and positioning makes it difficult to use the nylon-jacketed PVC wiring described in Section 10.1.2 due to the outside diameter size of the signal wire or the limited flexibility.

For signal installations requiring a smaller outside diameter for the signal wire or better flexibility than the single core, signal wire shall be ETFE insulated. ETFE insulation performs well at higher temperatures and cannot leak plasticiser.

ETFE-insulated single core signal wires are suitable for termination at general terminals, CBI multiway connectors and Q relay crimps.

One of the following sizes and types of ETFE-insulated single core signal wire shall be used:

- 19/29 AWG, 1.23 mm^2. The ETFE cable (wire) shall be in accordance with USA Mil-W-22759/16-16, ETFE-insulated, 600 V, medium weight, tin-coated copper conductors, 150°C
- 19/34 AWG, 0.4 mm^2. The ETFE cable (wire) shall be in accordance with USA Mil-W-22759/16-22, ETFE-Insulated, 600 V, medium weight, tin-coated copper conductors, 150°C.

This ETFE-insulated wire is also available as a black and white twisted pair twisted at greater than 15 twists per metre. Black insulation shall be used for one wire and white insulation shall be used for the other wire in the twisted pair.

10.2 Single core and two core power cables

The copper conductors for single core and two core power cables should be in one of seven standard sizes:

- 4 mm^2 7/0.85 mm^2
- 16 mm^2 7/1.70 mm^2
- 25 mm^2 19/1.35 mm^2
- 35 mm^2 19/1.53 mm^2
- 50 mm^2 19/1.78 mm^2
- 95 mm^2 37/1.78 mm^2
- 120 mm^2 37/2.03 mm^2.

Each conductor shall be individually insulated to the requirements of Section 8.

The core insulation colours should be black for negative and red for positive.

Single core power cables shall have the single PVC insulated core sheathed in an inner PVC sheath in accordance with Section 9.1. Two core power cables shall have the two PVC insulated cores bundled and wrapped in a PVC inner sheath in accordance with Section 9.1.

Except for fire safe cables, the power cable’s inner sheath shall be wrapped in a nylon termite barrier and a sacrificial outer sheath in accordance with Section 9.2 and Section 9.3.

For 120 V or lower applications, the sacrificial outer sheath shall be coloured black.

For voltage applications higher than 120 V, the sacrificial outer sheath shall be coloured orange.

10.3 Quad core cables

The quad core cable requirements in this document are designed for axle counter applications, but they may be used for other applications.

Quad core cables are available in configurations of 1 x quad core cable, 3 x quad core cable, 5 x quad core cable and 10 x quad core cable.

The quad core cables shall be designed to provide sufficient flexibility and robustness for installations over distances more than 3 km.

Quad core cables for axle counter use may operate at dc and ac voltages up to 130 V and at frequencies in the range of 0 kHz to 5 kHz. The insulation material and the cable construction used can affect the mutual capacitance.

The mutual capacitance between any pair of the quad core cable shall be less than 50 nF per kilometre when measured at a frequency in the range of 800 Hz to 1000 Hz.

Quad core cable conductors are available in two sizes: 0.9 mm^2 and 1.4 mm^2.

The conductors of the quad core cable shall consist of seven strands per conductor.

The thickness of the insulation for each core should be 0.9 mm ± 0.1 mm.

The core colours shall be brown, white, yellow and green. Brown and yellow cores shall be placed diagonally opposite each other, and the white and green cores shall be placed diagonally opposite each other.

Each quad core shall be individually wrapped with polyester tape and filled with any necessary fillers to ensure tightness of the cable cores.

Each quad core bundle shall be surrounded by a BoPET-backed aluminium tape of 0.05 mm thickness, giving 100% coverage at the cables' designed minimum bending radius.

A tinned copper drain wire of 7 strands of 0.25 mm^2 shall be provided along the quad core bundle cable length. This copper drain wire shall maintain contact with the aluminium tape continuously along the cable.

3 x quad core cable, 5 x quad core cable and 10 x quad core cable bundles shall have a polyester tape wrapped around the bundle of quad cores to maintain structural integrity.

The inner sheath should be PE and have a thickness of 1.0 mm ± 0.1 mm. The inner sheath shall be coloured black.

The quad cable shall have a termite barrier (nylon) sheath as specified in Section 9.2.

Quad cables should not be fitted with a sacrificial PE outer sheath.

10.4 Multi-core signal cables

10.4.1 General

Multi-core signal cables are used with legacy relay interlockings. They are generally used in the configuration of 6 core, 15 core, 25 core and 50 core signal cables.

Each conductor shall consist of 7/0.5 mm^2 strands un-tinned plain-annealed copper conductor.

Each conductor shall be individually insulated with 0.6/1 kV grade PVC. The PVC insulation shall have a radial thickness as specified in AS/NZS 5000.1 and be:

- black in colour for all multi-core signal cables that are not fire safe cables
- white in colour for fire safe multi-core signal cables.

The insulation for each core shall be labelled every 200 mm in writing that is 2 mm high and is:

- yellow in colour for all multi-core signal cables that are not fire safe cables
- black in colour for fire safe multi-core signal cables.

Each core shall be numbered sequentially, commencing at the centre of the inner cable layer. Numbering shall commence at one, and be written as a numeral followed by a word (as in ‘1 one’).

Except for fire safe multi-core signal cables, multi-core signal cables shall have a nylon termite barrier sheath over the copper shield as specified in Section 9.2 and a sacrificial sheath over the nylon termite barrier as specified in Section 9.3.

10.4.2 Lay-up of cores

Except in the case of a single core (if any) placed in the centre of a multi-core signal cable, the cores shall be laid up helically into a tight cylindrical form. Adjacent layers shall alternate in lay direction. The length of lay shall differ by at least 15 mm. The cores shall be laid up sequentially starting from the centre of the cable. The numbering in all layers shall be in the same rotational sequence. The rotation of the numbers at the running end of the delivery drum shall be anti-clockwise from lowest to highest number.

Any necessary filling shall consist of soft black PVC or a non-hygroscopic material.

10.4.3 Copper shield

The bundle of cores shall be wrapped with a copper shield.

The copper shield shall consist of a PVC sheath around the bundle of cores, with a copper sheath over this PVC sheath, and a second outer PVC sheath placed over the copper sheath.

The copper sheath shall consist of two layers of copper tape, each 0.08 mm thick, with a gap of less than 10% of the width of the copper tape. The edges of the outer layer of copper tape shall

align with the centre of the inner layer of copper tape. This is to maintain a continuous copper shield. The width of the copper tape shall not exceed two times the outer diameter of the inner sheath and shall be within one to two times the outer diameter.

10.5 Multi-pair signal cables

Multi-pair signal cables are used with CBI interlockings and other electronic signal products, as the twisted pairs provide good electrical noise immunity and low resistance for long cable runs to the inputs and outputs.

They should generally be used in the configuration of 2 pair, 4 pair, 8 pair, 12 pair and 24 pair. The individual pairs shall be plain annealed copper conductors of size 1.5 mm^2 7/0.50 mm^2. Each conductor shall be insulated with PVC (V-90) that has a 0.4 mm nominal wall thickness.

For high current applications or to manage voltage drop, the signal design may specify a copper conductor larger than 1.5 mm^2. In these cases, the general configuration used should be 1 pair, 2 pair or 8 pair. Individual pairs of plain annealed copper conductors of size 4 mm^2 7/0.85 mm^2 shall be used.

Multi-pair signal cables should utilise instrumentation cable which has thinner insulation for each conductor and thus has a lower operating voltage. The instrumentation cable utilised shall have an operating voltage of 130 V ac or higher and a current rating of 13 A or higher.

Each twisted pair shall have a white-coloured insulated core and a black-coloured insulated core which are twisted together throughout the length of the signal cable. The pairs shall be twisted to a lay length of not more than 75 mm for single pairs. The lay lengths which each pair are twisted to may differ between adjacent pairs to minimise crosstalk.

The insulation of each core of each twisted pair shall be labelled every 200 mm in contrasting writing that is a minimum of 2 mm in height. Each core of the twisted pair shall be labelled with the word ‘pair’ followed by a number. Numbering shall start at ‘1’ to identify each twisted pair.

The laid-up bundle of twisted pairs shall be surrounded by a BoPET-backed aluminium tape (polyester-aluminium laminate tape) of 0.05 mm thickness giving 100% coverage at the cables’ designed minimum bending radius.

A tinned copper drain wire of seven strands of minimum 0.20 mm^2 7/0.2 mm^2 shall be provided along the cable length. This copper drain wire shall maintain contact with the aluminium tape continuously along the cable.

The bundle of pairs with the enclosing aluminium tape and drain wire shall be sheathed in PVC 5V-90 with a 1.4 mm nominal wall thickness.

The multi-pair signal cable shall have a nylon termite barrier sheath as specified in Section 9.2 and a sacrificial sheath over the nylon termite barrier shield as specified in Section 9.3.

10.6 Screened track circuit cables

For jointless and high-frequency track circuit applications, a twin twist shielded cable referred to as a ‘screened track circuit cable’ shall be used.

The screened track circuit cable shall consist of two PVC-insulated 1.5 mm^2 (7/0.50 mm^2) annealed high-conductivity copper conductors in a twisted pair with a lay length of 25 mm to 45 mm.

The conductor insulation shall be V75 or V90 PVC with a radial thickness of 0.8 mm ± 0.1 mm. The insulation for one conductor shall be coloured white, and the insulation for the other conductor shall be coloured black.

The twisted pair inner conductors shall be surrounded by a BoPET-backed aluminium tape of 0.05 mm thickness giving 100% coverage at the cables’ designed minimum bending radius.

A tinned copper drain wire of seven strands of 0.25 mm^2 shall be provided along the cable length. This copper drain wire shall maintain contact with the aluminium tape continuously along the cable.

Non-hygroscopic cable filler may be used.

The sheath of black-coloured V90 PVC insulation with a thickness of 2 mm ± 0.1 mm shall be applied.

The cable shall have a nylon termite barrier applied that meets the requirements set out in Section 9.2. No sacrificial outer sheath shall be fitted.

10.7 Traction return cables and tuning unit cables

10.7.1 General

Traction return cables are flexible aluminium alloy conductor cables used for heavy current dc traction return bonding. Tuning unit cables are flexible aluminium alloy conductor cables used to connect to track circuit tuning units of jointless track circuits.

For traction return cables and tuning unit cables, the number of strands of aluminium and the cable size specified in Section 10.7.2 and Section 10.7.3 are designed to match the approved crimp connectors and lugs used with these cables.

The insulation material for traction return cables and tuning unit aluminium cables shall meet the mechanical properties of AS/NZS 5000.1. The insulation shall be UV-stabilised to prevent colour fade. These aluminium cables are exposed to full sunlight.

The insulation thickness shall be 3.5 mm ± 0.1 mm. The insulation and the aluminium conductor core shall be separated by BoPET barrier tape.

Insulation materials used shall be chlorosulfonated polyethylene (CSPE).

Termite barriers are shall not be used for traction return cables and tuning unit cables.

10.7.2 Traction return cables

The required size for traction return cables shall be 300 mm^2 (1525/0.5 mm^2). The traction return cables shall be made of 1525 strands of 0.5 mm^2 aluminium alloy wire.

The insulation colour shall be orange.

10.7.3 Tuning unit cables

Tuning unit cables shall be 92 mm^2 (495/0.5 mm^2). Tuning unit cables shall be made of 493 strands of 0.5 mm^2 aluminium alloy wire.

The insulation colour shall be yellow.

10.8 Track circuit connection cables

Track circuit connection cables are used for connecting to individual rails. They carry control circuit current for train detection.

Track circuit connection cables have a conductor of copper or galvanised steel.

The diameter of the conductor and material specified for the track circuit cable is designed to match the 7 mm hole and tapered pin used to connect to rails.

For copper track circuit connection cables, the conductor shall be 84/0.3 mm^2 tinned copper.

For galvanised track circuit connection cables, the conductor shall be preformed 10 mm^2 (7/19/0.30 mm^2) drawn galvanised grade 1570 steel in accordance with AS 3569.

The conductor and the insulation shall be separated by a BoPET type barrier tape wound on the conductor. Insulation material shall be coloured orange. The insulation material and size shall be in accordance with AS/RISSB 7663.

11 Signal cable identification

Signal cables shall be identified on their outer sheath and have labelling for progressive length in accordance with the identification requirements set out in AS/RISSB 7663.

Signal cables less than 9 mm in diameter and traction return and tuning unit aluminium cables shall not require labelling for the progressive length of the cable.

12 Signal cable packaging

12.1 General

Signal cables are safety-critical items of infrastructure.

They shall be transported and stored in a way that ensures they are not damaged.

The packaging of the signal cable onto drums and drum labelling shall be in accordance with AS/RISSB 7663.

12.2 Signal cable quality assurance and testing

Signal cables and signal wire shall be manufactured and supplied by companies with AS 9001 quality accreditation.

Signal cables and signal wire shall be tested to the testing and certification requirements of AS/RISSB 7663. Quad core cables shall also undergo testing and certification to ensure that they meet the requirements set out in Section 10.3.

The supplier of the cable shall supply a test certificate as detailed in AS/RISSB 7663 with each cable drum supplied.