

Manufacturer:
Furse
(Part of A.B.B. Group of Companies)

Issue : 1
Valid From : 11-12-2015

Earthing Products

Product Description

A range of earthing products to provide suitable safety earthing for signalling power supply installations in accordance with NR/L2/SIGELP/27418 Issue 1 – Design, Installation and Testing of Earthing in Signalling Power Systems.
Products are suitable for new installations and for improvement or alteration of existing installations.

Product range includes:

- Conductors and tapes
- Earth electrodes and mats
- Inspection housings
- Earth electrode clamps
- Bonds and clamps
- Earth bar
- Earthing enhancing compounds
- Installation accessories

Product Image



Scope of Acceptance

Full Acceptance

Earthing products in accordance with NR/L2/SIGELP/27418 Issue 1 – Design, Installation and Testing of Earthing in Signalling Power Systems; for use in new or altered signalling power distribution systems.

Earthing materials in accordance with this certificate are also suitable for use in lightning protection earthing and functional earthing systems.

Refer to Manufacturers and Users conditions for further information and constraints of use.

Network Rail Acceptance Panel (NRAP) hereby authorises the product above for use and trial use on railway infrastructure for which Network Rail is the Infrastructure Manager.
Authorised by:

Vanessa Cumine
Product Acceptance Specialist

Nigel Edwards
Head of Power Distribution HV/LV

Manufacturer:
Furse
(Part of A.B.B. Group of Companies)

Issue : 1
Valid From : 11-12-2015

Specific Conditions

The following Conditions are specific to the approved product/s contained within this Certificate. These conditions must be adhered to in addition to the Network Rail General Conditions contained within the "General Terms and Conditions" section. Failure to adhere to these conditions may result in the withdrawal or suspension of Acceptance of some, or all of the items contained within the accepted configuration.

Manufacturer

- 1) Every product **shall** be identified by manufacturer's part number and/or Network Rail PADS number.
- 2) Every product **shall** be accompanied by a certificate of conformity.
- 3) Copper bonded steel electrodes (Part number RB205-NR) **shall** have a copper thickness of at least 330µm. This **shall** be confirmed on the accompanying product certificate of conformity.
- 4) Accessories for use with Copper bonded steel electrodes (Part number RB205-NR) **shall** have a copper thickness of at least 330µm. This **shall** be confirmed on the accompanying product certificate of conformity.
- 5) COSHH information and Material Safety Data Sheet **shall** be supplied with Earthing enhancing compounds, oxide inhibiting compounds and moisture barrier tapes.
- 6) Installation instructions **shall** be available and **shall** be supplied for every product.

User



- 1) Earthing **shall** be selected and installed in accordance with the constraints set out in NR/L2/SIGELP/27418.
Please note installations that are precluded from the use of earthing systems.
- 2) Suitable Earth electrodes (Stainless, Copper bonded steel or solid copper as applicable) **shall** be selected in accordance with ground conditions as set out in NR/L2/SIGELP/27418.
- 3) Inspection housings **shall** be provided for every electrode.
- 4) Copper conductors **shall** normally be used. In theft prone areas, aluminium conductors may be used.
- 5) Where copper and aluminium conductors are to be connected, bimetallic or, copper tinned connectors **shall** be used.
- 6) Aluminium **shall not** be used for earthing conductors that are in direct contact with the ground or where unintentional contact with the ground is a possibility over its asset life.
- 7) Instructions and handling precautions as, described in COSHH information and Material Safety Data Sheets accompanying Earthing enhancing compounds, oxide inhibiting compounds and tapes **shall** be adhered to.
- 8) Conductors, Part number TC030, TA030 and TA105 are for use **above ground** only.
- 9) Bonds and clamps, Part number CT105-H, BN115, BN005, BN010 and CN910 are for use **above ground** only.
- 10) Earth bars, series LK207 are for use as a main earth terminal (MET) within FSP assembly, Relay room, REB or similar.
- 11) Oxide inhibiting compound, Part number CM005 is for use **above ground** only.
- 12) All products **shall** be used, installed and combined within an earthing system strictly in accordance with manufacturer's instructions.

Manufacturer:
 Furse
 (Part of A.B.B. Group of Companies)



Issue : 1
Valid From : 11-12-2015

Product Configuration

Copper Conductors – Suitable for earthing, bonding and lightning protection purposes. To be used to connect installed equipment to earthing system. (E.g. Connection of an apparatus housing to an earth electrode).

| Part No. | Description | Image | Catalogue No. |
|----------|---|---|---------------|
| TC030 | 1 x 25M coil of Unsheathed Copper Tape; Copper dimensions 25x3mm; Weight 0.67kg/M; For use above ground only. |  | 0057/052476 |
| TC110 | 1 x 25M coil of Copper Tape with Black PVC sheath; Copper dimensions 25x3mm; Weight 0.77kg/M; For use above or below ground. |  | 0057/052441 |


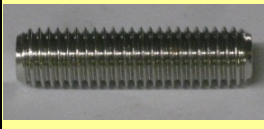






Aluminium Conductors – Suitable for earthing, bonding and lightning protection purposes. To be used to connect installed equipment to earthing system. (E.g. Connection of an apparatus housing to an earth electrode). Note: For use above ground only.

| Part No. | Description | Image | Catalogue No. |
|----------|---|--|---------------|
| TA030 | 1 x 50M coil of Unsheathed Aluminium Tape; Aluminium dimensions 25x3mm; Weight 0.21kg/M; For use above ground only. |  | 0057/052440 |
| TA105 | 1 x 50M coil of Aluminium Tape with Black PVC sheath; Aluminium dimensions 25x3mm; Weight 0.30kg/M; For use above ground only. |  | 0057/052477 |

Manufacturer:
Furse
(Part of A.B.B. Group of Companies)

Issue : 1
Valid From : 11-12-2015




Earth Electrodes and Connectors – Driven earth rods for earthing and lightning protection purposes.

| Part No. | Description | Image | Catalogue No. |
|----------|---|--|---------------|
| RS005 | 1 x Stainless Steel Earth Electrode; Dimensions 16mm diameter x 1.2M long; Weight 1.87kg; For use in areas with high corrosion risk (Marine and Coastal); For use with soil conditions not suited to Copper electrodes. (Embankment ash and Cinders). |  | 0057/052442 |
| CG005 | 1 x Coupling Dowel; Weight 0.02kg. For coupling RS005 electrodes. |  | 0057/052443 |
| RB205-NR | 1 x Copper Bonded Steel Earth Electrode; Dimensions 14.2mm diameter x 1.2M long; Weight 1.53kg; Copper thickness of 330µm; For use in areas without high corrosion risk. |  | 0057/052444 |
| CG270-NR | 1 x 15mm Coupling; Weight 0.08kg; For coupling RB205-NR electrodes. |  | 0057/052445 |
| RC010 | 1 x Copper Earth Electrode; Dimensions 15mm diameter x 1.2M long; Weight 1.88kg; For use in areas with high corrosion risk; Not to be installed into hard ground. |  | 0057/052446 |
| RC011 | 1 x Copper Earth Electrode; Dimensions 15mm diameter x 1.5M long; Weight 2.35kg; For use in areas with high corrosion risk; Not to be installed into hard ground. |  | 0057/052447 |
| RC012 | 1 x Copper Earth Electrode; Dimensions 15mm diameter x 3.0M long; Weight 4.70kg; For use in areas with high corrosion risk; Not to be installed into hard ground. |  | 0057/052448 |
| CG013 | 1 x Coupling Dowel; Weight 0.02kg. For coupling RC series of electrodes. |  | 0057/052449 |





Manufacturer:
Furse
(Part of A.B.B. Group of Companies)

Issue : 1
Valid From : 11-12-2015

Driving Studs and Spikes – for earth electrodes.

| Part No. | Description | Image | Catalogue No. |
|----------|--|---|---------------|
| ST010 | 1 x Driving Stud 15mm; Weight 0.02kg. For use with RS005 and RC series of electrodes. |  | 0057/052450 |
| ST200 | 1 x Driving Stud 15mm; Weight 0.08kg. For use with RB205-NR electrodes. |  | 0057/052451 |
| SP010 | 1 x Hardened Steel Driving Spike 15mm; Weight 0.02kg; For use with RS005 & RC series electrodes. |  | 0057/052452 |



Earth Mats and Plates – buried earth mats and plates for earthing and lightning protection purposes. Mats and plates shall be buried to a minimum depth of 1M.

| Part No. | Description | Image | Catalogue No. |
|----------|---|--|---------------|
| PE110 | 1 x lattice Copper Earthing Mat; Dimensions 0.6 x 0.6M; Weight 3.98kg, Constructed from 25 x 3mm Copper Tape; For use in areas without high corrosion risk. |  | 0057/052453 |
| PE120 | 1 x lattice Copper Earthing Mat; Dimensions 0.9 x 0.9M; Weight 7.2kg, Constructed from 25 x 3mm Copper Tape; For use in areas without high corrosion risk. |  | 0057/052454 |
| PE010 | 1 x Solid Copper Earthing Plate; Dimensions 0.6 x 0.6M; Weight 9.74kg, Constructed from 3mm Copper Plate; For use in areas without high corrosion risk. |  | 0057/052455 |
| PE020 | 1 x Solid Copper Earthing Plate; Dimensions 0.9 x 0.9M; Weight 21.74kg, Constructed from 3mm Copper Plate; For use in areas without high corrosion risk. |  | 0057/052456 |



Manufacturer:
 Furse
 (Part of A.B.B. Group of Companies)

Issue : 1
Valid From : 11-12-2015

Inspection Housings – to protect and allow access to electrodes for periodic inspection and test. Inspection pits shall be installed flush with ground level.

| Part No. | Description | Image | Catalogue No. |
|----------|--|---|---------------|
| PT205 | 1 x lightweight composite earth inspection housing; Rated for heavy duty usage (5000kg); Weight 1.8kg, |  | 0057/052457 |
| PT005 | 1 x concrete earth inspection housing; Rated for light duty usage (3500kg); Weight 30kg, |  | 0057/052458 |




Earthing Enhancing Compounds – ground enhancing, conductive aggregates to improve the asset life and performance of the earth electrode installation. To be used on installation of the earth electrode or mat assembly where ground conditions do not allow for a reliable low resistivity value.

| Part No. | Description | Image | Catalogue No. |
|----------|---|---|---------------|
| CM025 | 1 x bag of FurseCem conductive aggregate; Weight 25kg. |  | 0057/052459 |
| CM015 | 1 x bag of Bentonite conductive, moisture retaining clay; Weight 25kg. |  | 0057/052460 |

Manufacturer:
Furse
(Part of A.B.B. Group of Companies)

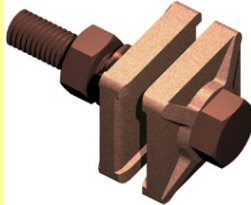



Issue : 1
Valid From : 11-12-2015

Bonds and Clamps – for connecting electrodes, conductors and other equipment.



| Part No. | Description | Image | Catalogue No. |
|----------|--|--|---------------|
| CR105 | 1 x Earth electrode clamp 15mm; Weight 0.15kg; For connecting 25 x 3mm Copper Tape to 15mm earth electrodes. |  | 0057/052461 |
| CR305 | 1 x Earth electrode U-bolt clamp 15mm; Weight 0.20kg; For connecting 25 x 3mm Copper Tape to 15mm earth electrodes. |  | 0057/052462 |
| CR700 | 1 x Earth electrode U-bolt cable clamp; Weight 0.39kg; For connecting 16-96mm ² earth cable to 15mm earth electrodes or, 16-70mm ² earth cable to 17.2mm earth electrodes. |  | 0057/052463 |
| CR705 | 1 x Earth electrode U-bolt cable clamp; Weight 0.39kg; For connecting 70-185mm ² earth cable to 17.2mm earth electrodes. |  | 0057/052464 |
| CT105-H | 1 x Square Tape clamp; Weight 0.12kg; For joining 25 x 3mm Copper or Aluminium Tape, to create joints, crossovers or T junctions. For use above ground only. |  | 0057/052465 |

Manufacturer:
Furse
(Part of A.B.B. Group of Companies)

Issue : 1
Valid From : 11-12-2015

| Part No. | Description | Image | Catalogue No. |
|----------|--|--|---------------|
| BN115 | 1 x Square Tape bonding clamp; Weight 0.12kg; For bonding 25 x 3mm Copper Tape, to pipes, handrails and similar structures. For use above ground only. |  | 0057/052466 |
| BN005 | 1 x Square Tape flat bonding clamp; Weight 0.06kg; For bonding 25 x 3mm Aluminium Tape, to flat surfaces. For use above ground only. |  | 0057/052467 |
| BN010 | 1 x Square Tape bonding clamp; Weight 0.07kg; For bonding 25 x 3mm Aluminium Tape, to pipes, handrails and similar structures. For use above ground only. |  | 0057/052468 |
| CN910 | 1 x Bi-metallic connector and mounting clip; Weight 0.19kg; For connecting 25 x 3mm Copper Tape to 25 x 3mm Aluminium Tape. For use above ground only. |  | 0057/052469 |





Installation Accessories – Miscellaneous supporting products

| Part No. | Description | Image | Catalogue No. |
|----------|---|--|---------------|
| TD005 | 1 x 10M roll of 50mm wide moisture barrier (Denso) tape; Weight 0.76kg; Use for wrapping underground joints and clamps to protect against corrosion. |  | 0057/052470 |
| CM005 | 1 x bottle of Oxide Inhibiting compound; Weight 0.23kg; To be used on <u>ALL</u> Aluminium conductors, clamps, fittings and terminations to protect against corrosion. For use above ground only. |  | 0057/052471 |

Manufacturer:
 Furse
 (Part of A.B.B. Group of Companies)

Issue : 1
Valid From : 11-12-2015

Earth Bars – tinned Copper earth bars with twin disconnect links mounted on insulated polymer channel. Earth bars can be used as a MET (Main Earthing Terminal) in accordance with NR/L2/SIGELP/27410 Issue 2. Fix via 6 x 8.5mm diameter holes (typical) in base assembly.

| Part No. | Description | Image | Catalogue No. |
|------------|---|--|---------------|
| LK207-6-T | 1 x Earth Bar assembly from Tinned Copper Bar; Weight 2.8kg; Dimensions 550 x 50 x 6mm; Twin disconnect links and 6 off M10 x 35mm termination screws at 50mm centres; For use within FSP assembly, Relay room, REB or similar. |  | 0057/052472 |
| LK207-8-T | 1 x Earth Bar assembly from Tinned Copper Bar; Weight 3.2kg; Dimensions 650 x 50 x 6mm; Twin disconnect links and 8 off M10 x 35mm termination screws at 50mm centres; For use within FSP assembly, Relay room, REB or similar. |  | 0057/052473 |
| LK207-10-T | 1 x Earth Bar assembly from Tinned Copper Bar; Weight 3.8kg; Dimensions 800 x 50 x 6mm; Twin disconnect links and 10 off M10 x 35mm termination screws at 50mm centres; For use within FSP assembly, Relay room, REB or similar. |  | 0057/052474 |
| LK207-12-T | 1 x Earth Bar assembly from Tinned Copper Bar; Weight 4.2kg; Dimensions 900 x 50 x 6mm; Twin disconnect links and 12 off M10 x 35mm termination screws at 50mm centres; For use within FSP assembly, Relay room, REB or similar. |  | 0057/052475 |

Manufacturer:
Furse
(Part of A.B.B. Group of Companies)

Issue : 1
Valid From : 11-12-2015

Assessed Documentation

| Reference | Title | Doc. Rev. | Date and Applies to Cert. issue No. | |
|---|--|------------|-------------------------------------|---|
| TSC-0808 | Furse Earthing and Lightning Protection Catalogue | 2008 | 03/12/2015 | 1 |
| Manufacturers Evidence Folder (44 files) | Certificates of Conformance for all products as applicable; <ul style="list-style-type: none"> • BS EN 13601 • IEC 62561 • BS 7430 • BS EN 50164 | Various | 03/12/2015 | 1 |
| RE PA05 6530 - Furse | E-Mail from Michael Watt - Quality Assurance strategy. | 17/11/2015 | 03/12/2015 | 1 |
| Test Reports Folder (18 files) | Supporting product test reports | Various | 03/12/2015 | 1 |
| Images Folder (25 files) | Supporting product images | Various | 03/12/2015 | 1 |
| PE120-C | Drawing – Copper lattice earth mat | 5 | 03/12/2015 | 1 |
| PE 110-C | Drawing – Copper lattice earth mat | 5 | 03/12/2015 | 1 |
| PE Drawing-C | Drawing - Solid Earthing Plate Copper All Sizes | 0 | 03/12/2015 | 1 |
| LK207-XX-T_CD_01 | Drawing – Tinned Copper earth bars | 0 | 03/12/2015 | 1 |
| TD005_DS_01_1 | Datasheet - Denso Tape | 2005 | 03/12/2015 | 1 |
| TD005_Denso_Tape_C | Material Safety Data Sheet – Denso Tape | C | 03/12/2015 | 1 |
| CM025_MSDS_01_2_ (FurseCEM) | Material Safety Data Sheet – FurseCEM | 2010 | 03/12/2015 | 1 |
| CM005_Oxide_Inhibitor_C | Material Safety Data Sheet – Contax Oxide Inhibiting Compound | 09/11/2009 | 03/12/2015 | 1 |
| RB205-NR_CC_01_0_ (BS7430 2011+A11 2015) | Furse Statement of Compliance, 330 micron radial copper thickness. | 26/11/2015 | 03/12/2015 | 1 |
| 06530 – Product Acceptance Document Furse | Manufacturers compliance statements | N/A | 03/12/2015 | 1 |
| Additional Comments for Acceptance Requirements | Further Manufacturers compliance commentary | N/A | 03/12/2015 | 1 |
| REACH Letter-Customers-Amended | Manufacturers letter – European Regulation on Chemicals | 15/11/2008 | 03/12/2015 | 1 |

Certificate of Acceptance

PA05/06530

Manufacturer:
Furse
(Part of A.B.B. Group of Companies)

Issue : 1
Valid From : 11-12-2015

Manuals and Training Materials

| Reference | Title | Doc. Rev. | Date and Applies to Cert. issue No. | |
|---------------|---|-----------|-------------------------------------|---|
| CM025_DS_01_2 | FurseCEM – Aggregate application, installation and mixing procedures | 2011 | 03/12/2015 | 1 |
| CM015_DS_01_2 | Bentonite - Aggregate application, installation and mixing procedures | 2011 | 03/12/2015 | 1 |
| | | | | |

Certificate History

| Issue | Date | Issue History |
|-------|------------|------------------------|
| 1 | 11/12/2015 | First accepted for use |
| | | |
| | | |

Contact Details

Manufacturer

Jonathan Booler
Sales Engineer
Furse (A.B.B.)
Wilford Road,
Nottingham
NG2 1EB
jonathan.booler@gb.abb.com
Tel: 07771 922033

Sponsor

Tahir Ayub
Principal Engineer (M & E)(Distribution)
Safety, Technical & Engineering
The Quadrant: MK
Elder Gate
Milton Keynes
MK9 1EN
Tahir.Ayub@networkrail.co.uk
Tel: 07801 775504

Lead Reviewer

Adrian Dante
Principal Engineer (M & E)(Distribution)
Safety, Technical & Engineering
The Quadrant: MK
Elder Gate
Milton Keynes
MK9 1EN
Adrian.Dante@networkrail.co.uk
Tel: 07780 836624

Manufacturer:
Furse
(Part of A.B.B. Group of Companies)

Issue : 1
Valid From : 11-12-2015

General Terms & Conditions

1) General

- 1) This certificate can only be amended by Network Rail Technology Introduction Group. Any alterations made by a different person will invalidate the entire certificate.
- 2) Failure to abide by the requirements in this Certificate of Acceptance may invalidate the certificate, thereby restricting the right to operate the product and / or limiting the future supply and deployment of the product on the infrastructure.
- 3) Upon the review date this certificate and the product it relates to is invalid and not accepted for use. Manufacturers are to make an application for a review prior to the review date.

2) Manufacturer

The Manufacturer shall:

- 1) Ensure that all products supplied comply with the standards defined in the Acceptance Requirements or otherwise documented as part of the assessment, including meeting the reliability requirements included in the Acceptance Requirements and in any deed of warranty for the relevant certificate number.
- 2) Notify Network Rail Technology Introduction Group:
 - a. Within 48 hours, of any deficiencies affecting the quality, functionality or safety integrity of the product (including corrective action undertaken or proposed).
 - b. Of any intended change to the accepted product; changes include:
 - i. a change to the product configuration (to the actual product or its application);
 - ii. a variation to or addition of manufacturing locations or processes;
 - iii. a change in the name or ownership of the manufacturing company;
 - iv. any changes to the ability or intention to support with technical services, spares or repairs.
- 3) The Manufacturer shall provide Network Rail Technology Introduction Group at least 12 (twelve) months notice of its intention to discontinue supply or to provide such notice as is reasonable if such discontinuance is outside its control and will offer the opportunity of a Last Time Buy to Network Rail together with date for last order placement and supply of the parts affected. The introduction of proposed alternative products shall be communicated to the Network Rail Technology Introduction Group.
- 4) Provide further copies of operating and maintenance manuals to purchasers / users of the product as necessary (including certificates of conformance, calibration etc).
- 5) Provide further copies of training manuals and an appropriate level of training to purchasers or users of the product as necessary.
- 6) Where applicable, specialist technical support, repairs and servicing of the product shall be carried out by the Original Equipment Manufacturer (OEM) or authorised agent only.
- 7) Network Rail may request information from the manufacturer to prove product compliance with clauses 1 and 2 above and reserve the right to suspend and/or withdraw any application where information is not forthcoming within a reasonable timeframe.
- 8) In accordance with Network Rail's Quality Assurance Policy Statement 2011, where the specification and/or Product Acceptance Certificates specify quality assurance classifications (QA1 to QA5) for the products, the manufacturer shall comply with the specified level of quality assurance for each product and allow Network Rail access to carry out its quality assurance checks.
- 9) The manufacturer shall give Network Rail's representatives access at all reasonable times to its premises and allow them to inspect its quality systems and production methods and, if requested, to inspect, examine and test the products both during and after their manufacture and the materials being used in their manufacture.

3) Conditions of Use

Specifiers, installers, operators, maintainers, etc. using the product shall:

- 1) Comply with the certificate conditions. If a condition is not understood guidance must be sought from Network Rail Technology Introduction Group.
- 2) Check that the application of use complies with the relevant certificate's scope of acceptance.
- 3) Report any defect if it is a design or manufacturing fault likely to affect performance and/or the safe operation of the railway in writing to Network Rail Technology Introduction Group.
- 4) Inform Network Rail Technology Introduction Group in writing of a change to the product configuration (or to the actual product or its application).
- 5) Operate, maintain and service the product in accordance with Network Rail standards and Operation and Maintenance manuals as appropriate.
- 6) Be appropriately trained and authorised for the installation, maintenance and use of the product.
- 7) Only send products for repair or reconditioning to the Original Equipment Manufacturer (OEM) or authorised agent.
- 8) Users are to be aware that Product Acceptance is not a substitute for design approval.

Manufacturer:

Furse
(Part of A.B.B. Group of Companies)

Issue : 1

Valid From : 11-12-2015

4) Compliance

Railways and Other Guided Systems (ROGS) Regulations

1) Where the product is to be used in areas where Network Rail is not the Infrastructure Manager (e.g. leased stations), the sponsor shall additionally obtain formal consent from the Infrastructure Manager for the locality where the equipment is to be installed. This may include a requirement for additional safety verification. The decision of that Infrastructure Manager is binding, and cannot be overridden by Network Rail except by the escalation processes established in the ROGS regulations

2) As required in Railway Group Standard GE/RT8270, at each use of this product the project or group responsible for installation and commissioning shall be required to demonstrate compatibility with:

- a. All rail vehicle types that have access rights over the area affected by the change
- b. Infrastructure managed by others
- c. Neighbours.

Railway Interoperability Regulations

3) For interoperable constituents of systems the project or group responsible for installation and commissioning shall be required to demonstrate compliance with the relevant Technical Specifications for Interoperability (TSI) where appropriate.

4) An authorisation from the national safety authority (i.e. the Railway Safety Directorate of the Office of Rail Regulation) is required before the equipment is to be used in revenue earning service.

5) Supply Chain Arrangements

1) Certificates of acceptance do not imply any particular quantity of supply nor any exclusivity of supply.

2) Products may be purchased by Network Rail or its agents, suppliers or contractors.

3) Manufacturers should note that it is not necessary to enter into any exclusive supply arrangements with resellers or other suppliers