



Specification for
Earthing and Bonding of Separate Screening
Conductors and Associated Lineside
Telecommunications Equipment in D.C.
Electrified and Non – Electrified Areas

British Railways Board



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AMENDMENTS

AMD. NO.	DATE	TEXT AFFECTED

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BR SPECIFICATION NO. 1820 FOR EARTHING AND BONDING OF SEPARATE SCREENING CONDUCTORS AND ASSOCIATED LINESIDE TELECOMMUNICATIONS EQUIPMENT IN D.C. ELECTRIFIED AND NON-ELECTRIFIED AREAS.

FORWARD

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1. REFERENCES

British Standard. 6004 - PVC - insulated cables (non armoured) for electric power and lighting.

BR Specification. 859 - Sheath gaps in metallic sheathed telecommunications cables.

1817 - Separate screening conductors for telecommunications cables.

1818 - Installation and jointing of separate screening conductors for telecommunications cables.

Where this specification requires reference to British Standards and BR specifications the latest issue shall apply, unless specially stated.

2. SCOPE

This specification covers the installation and testing of the earthing and bonding system for screening conductors and associated lineside telecommunications equipment in d.c. electrified and non-electrified areas.

3. DEFINITIONS

3.1 Earthing and Bonding System

An earthing and bonding system is any arrangement used in connection with telecommunications cables and associated lineside equipment for one or more of the following purposes:-

- 3.1.1 To ensure effective and rapid operation of protective equipment in the event of earth fault currents in an electrical supply system which might otherwise cause fire and to protect against danger to life from shock due to non-current carrying equipment and metal work being maintained at a dangerous potential relative to earth.

3.1 (Cont'd.)

3.1.2 To provide a means for the earthing of separate screening conductors in order to provide electromagnetic screening by the inductive generation of screening currents.

3.1.3 To provide a direct connection with earth for discharge tubes, lightning protectors, etc.

3.2 Earth Electrode System

An earth electrode system consists of one or more earth electrodes providing an effectual connection, of the required resistance, with the general mass of earth.

3.3 Fast Transient Earth Electrode System (F.T.E.)

A Fast Transient Earth Electrode System (F.T.E.) consists of one earth electrode providing an effectual connection with the general mass of earth for the operation of discharge tubes and lightning protectors, etc.

3.4 Earth Electrode

An earth electrode is a number of earth rods screwed together, driven into and providing an effectual connection with the general mass of earth.

3.5 Earth Rod

An earth rod is a metal rod as specified in 6.3.1

3.6 Earth Continuity Conductor

An earth continuity conductor is a conductor, including any clamps, interconnecting various earth electrodes.

3.7 Master Earth Electrode

The master earth electrode is the final earth electrode to which the earth continuity conductor and the earthing lead are connected.

3.8 Earthing Lead

The earthing lead is the final conductor by which the connection to the earth electrode system is made. Electrical installation testing of the earth electrode system shall be carried out from the end of the earthing lead remote from the earth electrode system.

3.9 Cable Sheath Continuity Bond

A cable sheath continuity bond is the conductor which provides electrical continuity of a metallic cable sheath across a cable joint closure, see 8.1 and 8.2.

3.10 Equipment Bond

An equipment bond is the conductor which provides electrical continuity between the equipment to be earthed and the earth terminal inside a lineside apparatus case or repeater housing.

3 (Cont'd.)

3.11 Earth Terminal

An earth terminal is the terminal on the frame of a piece of equipment for the purpose of making a connection to earth.

3.12 Separate Screening Conductor

A separate screening conductor is a PVC sheathed stranded aluminium conductor to BR specification No. 1817. This conductor carries induced screening currents for the purpose of reducing the levels of interference induced on the conductors of other parallel cables, see figure 1.

4. EARTHING OF SEPARATE SCREENING CONDUCTORS (Figure 1)

- 4.1 An earth electrode system shall be provided for earthing of separate screening conductors at nominal intervals of 1 km.
- 4.2 Earth electrode systems shall not be installed within 100 m of Electricity Board generating stations, British Rail sub-stations and track-parallel huts.
- 4.3 Earth electrode systems shall not be installed within 50 m of relay rooms, telecommunications rooms or any location containing active telecommunications equipment.
- 4.4 Earth electrode systems installed for the purpose of earthing separate screening conductors, shall have a maximum earthing resistance of 4 ohms.
- 4.5 In exceptionally difficult conditions where the provision of 4.4 cannot be met, the mean earthing resistance taken over any 10 km of separate screening conductor shall be required to meet the specified maximum figure of 4 ohms.

This relaxation shall only be adopted with the agreement of the Chief Signal and Telecommunications Engineer or his appointed representative.

- 4.6 The separate screening conductor shall be installed in the same troughing route as the cable to be screened or within 100 mm of any directly buried cable in accordance with BR specification No. 1818.
- 4.7 Separate screening conductors shall be continuous throughout and shall not enter any relay room, telecommunications room or lineside apparatus case.

5. EARTHING OF LINESIDE FIXED EQUIPMENT (Figure 1)

5.1 Lineside Apparatus Cases

- 5.1.1 Where a lineside apparatus case contains no active telecommunications equipment, the case shall not be earthed. No deliberate or accidental connections shall be made to the cable sheath, the cable or separate screening conductor earthing system or to any other earthing system, (e.g. traction return rail).