

Category 2 Standard

S2510 **Rail connection** (Formerly E7012) **systems for signal** **equipment cables**

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1 Purpose

- 1.1 This engineering standard defines the requirements, in terms of performance, of rail connection systems used to connect signal equipment cables to the running rails on London Underground.

2 Scope

- 2.1 The standard applies to the following types of rail connection:

a) **General**

- i) Continuity bonds;
- ii) Bonding in points areas;
- iii) Check rail bonding;
- iv) Delta Circuit rail connections;
- v) Trainstop earth connections;
- vi) Track Circuit earth bonds.

b) **Jointless Track Circuits**

- i) Termination bond connections;
- ii) Tuning Unit connections;
- iii) Track Termination Unit connections.

c) **Conventional and Coded Track Circuits**

- i) All rail connections.

- 2.2 This document replaces E7012 A2.

3 Requirements

3.1 Safety considerations

3.1.1 System safety

- 3.1.1.1 Effective bonding is essential for the safe and reliable operation of the safety signalling.

3.1.2 Safety of personnel

- 3.1.2.1 Methods of installations shall not infringe any statutory or London Underground regulations governing work on the railway, particularly in hazardous environments such as tunnels.

3.2 General requirements

3.2.1 Service life and reliability

- 3.2.1.1 The rail connection system shall have an operating life of fifteen years during which time the electrical resistance requirement described in Attachment 1 shall be complied with. The supplier shall be required to verify the life expectancy.
- 3.2.1.2 The user of this standard shall require the supplier to demonstrate that he has addressed all safety related issues where the proposed system involves the use of materials or procedures not previously used on the railway.

3.2.2 Installation requirements

- 3.2.2.1 Where attachment of the rail connection system requires the rail web to be drilled, this shall be undertaken in accordance with engineering standard 1-023 Infrastructure Protection. Single holes shall not exceed 22 mm in diameter. A minimum distance of 250 mm between centres shall apply to the drilling of another hole of the same size. Where the attachment requires two holes the diameter of each hole shall not exceed 13.5 mm, and the holes shall be at not less than 60 mm centres. Distance between centres may be relaxed to 40 mm if 9.5 mm diameter holes are utilised.
- 3.2.2.2 Where a rail connection is to be replaced then the existing hole may be utilised provided that the installation is treated as a new connection and the requirements of this standard are complied with.
- 3.2.2.3 The rail connection system shall be suitable for connection in the rail web to the following rail types of grade R260:
- a) 56E1 flat bottom rail to BS EN 13674-1;
 - b) 95lb/yd bull head rail (95RBH) to BS 11, metallurgically to BS EN 13674-1;
 - c) switch rails to BS EN 13674-2;
 - d) check rails to BS EN 13674-3.
- 3.2.2.4 Attachment of the rail connection system to the rail shall not cause a deterioration in the performance or condition of the rail such as to result in a subsequent failure of the rail in service.
- 3.2.2.5 The supplier shall be required to provide a detailed instruction manual covering all aspects of the system installation.
- ### **3.2.3 Commonalty of parts**
- 3.2.3.1 All like rail connection system individual fittings shall be interchangeable as a whole and also in terms of their parts. Compliance with this requirement shall be maintained throughout the operational service life of the system.