

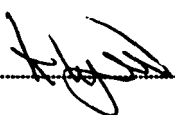
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Business Process Document

Electric track equipment layout design for d.c. electrified lines

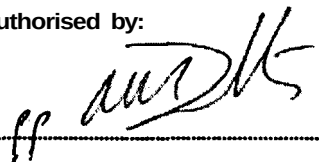
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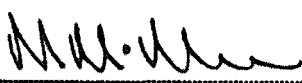
K. Lydford, Head of Electrification & Plant Engineering

Authorised by:



A. McNaughton, Chief Engineer

Accepted for issue by:



M. McManus, National Standards Manager

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2	April 2006	Re-issued as a SAF3 Business Process Document (<i>formerly RT/ELC/27021</i>)

Implementation

1 April 2006

Compliance

This Network Rail specification is mandatory and must be complied with by Network Rail and its contractors from 1 April 2006

When this specification is implemented, it is permissible for all projects, which have formally completed GRIP Level 4 to continue to comply with the Issue of any relevant Network Rail standards current when GRIP Level 4 was reached and not to comply with requirements contained herein unless the head of electrification and plant has stipulated otherwise in the accompanying briefing note.

Where the head of electrification and plant has specified that all projects will comply with the requirements, specific authority not to comply can be sought in the usual manner using the appropriate non-compliance authority processes described in Network Rail standard, [NR/SP/STP/045](#) *Managing the process for non-compliance authority* (formerly RT/LS/P/045).

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I Purpose

This guidance note states the best practice for electric track equipment layout design on Network Rail D.C. Electrified Lines including those which are designated 'standard current' and 'high current'.

This document is to be read in conjunction with the Electric Track Equipment drawings and [NR/SP/ELP/21104](#) 'Design and Installation of Electric Track Equipment for D.C. Electrified Lines'.

2 Scope

This guidance note applies to electric track equipment layout design including steel and aluminium/stainless steel composite conductor rail and negative bonding arrangements on D.C. Electrified Lines, including the requirements for new installations and alterations to existing equipment.

3 Reference documentation

GE/RT8025	Railway Group Standard - Electrical Protective Provisions for Electrified Lines
NR/SP/SIG/11752	Railway Group Standard - Minimum Requirements for the Bonding of Track Circuits
NR/SP/ELP/21104	Network Rail Business Process Document - Design and Installation of Electric Track Equipment for D.C. Electrified Lines
NR/SP/ELP/21131	Network Rail Business Process Document - Warning and Other Signs for A.C. and D.C. Electrified Lines
BS 7361-1	Cathodic protection. Code of practice for land and marine applications
BS 7671	Requirements for electrical installations. IEE Wiring Regulations

4 Definitions

For the purpose of this guidance note the following definitions should apply:

Auto-coupling impedance bonds	Auto-coupled impedance bonds are installed each end of a track circuit and connected to the rails by continuity bonds to form an electrical path around the insulated block joints in each rail for the free passage of traction return current whilst restricting the passage of alternating track circuit current.
British Standard	A standard published by the British Standards Institution. Its alphanumeric identity is prefixed by BS.

Electric Track Equipment	Equipment associated with the railway track used for the transmission and collection of electrical current for traction purposes.
Electric Track Equipment Drawings	A series of Network Rail Drawings prefixed by an alphanumeric identity RT/ETE which detail information related to the Electric Track Equipment. These are commonly referred to as ETE Drawings.
European Standard	A standard published by the European Committee for Standardisation or by the European Committee for Electrotechnical Standardisation. Its alphanumeric identity is prefixed by EN.
High current traction system	A d.c. system capable of supplying trains with a sustained peak total traction current of 6.8 kA and above.
Intermediate (Resonating) impedance bond	Intermediate (resonating) impedance bonds may be used where it is necessary that cross bond cables be provided at regular intervals to ensure maximum conductivity for the return traction current.
International Standard	A standard published by the International Electrotechnical Commission. Its alphanumeric identity is prefixed by IEC.
Procurement Specification	The contract specific Network Rail documentation, such as, Invitation to Tender or Technical Worksopce.
Standard current traction systems.	A DC system capable of supplying trains with a sustained peak total traction current below 6.8 kA.

5 Conductor rail layout design

5.1 General

A layout plan detailing the location and type of conductor rail and associated equipment and the track feeding arrangements required should be prepared in accordance with the appropriate specifications and standards.

The design should satisfy the requirements of the electrical system, which will be either for a 'standard current' or 'high current' railway.

5.2 Location of conductor rail

The conductor rail should be located as indicated on the conductor rail layout drawing in accordance with [NR/SP/ELP/21104](#).

5.3 Length of conductor rail sections

5.3.1 Steel conductor rail

The maximum total length of welded steel conductor rail should be as follows:

- | | | |
|-----|---|-------|
| (a) | straight or curved track above 600 m radius | 550 m |
| (b) | curved track between 400 m and 600 m radius | 365 m |
| (c) | curved track between 300 m and 400 m radius | 275 m |
| (d) | curved track less than 300 m radius | 185 m |

Where conductor rail comprises fish-plated joints or short lengths of welded rail not exceeding 54.9 metres and fish-plated to similar lengths, the overall length should not exceed 805 m. In tunnels where the temperature is constant, the these dimensions may be exceeded.

On main running lines the minimum length of conductor rail should be 36 m. Shorter lengths of conductor rail may be installed at points and crossings, sidings and other low speed areas to eliminate or minimise loss of collector shoe contact.

5.3.2 Aluminium/stainless steel composite conductor rail

The maximum continuous installed rail lengths (including ramps) on straight track or curved track with a radius greater than 300 m should be 310 m. On curved track with a radius less than 300 m the maximum continuous installed rail lengths should be 160 m.

On main running lines the minimum length of conductor rail should be 40 m. Shorter lengths of conductor rail may be installed at points and crossings, sidings and other low speed areas to eliminate or minimise loss of collector shoe contact.

The minimum length installed as a repair to damaged rail should be 2 metres in length.

5.4 Conductor rail gaps

Where conductor rail gaps are required for any of the following situations, the gap should be a minimum of 600 mm from ramp end to ramp end at full expansion of the conductor rails each side of the gap:

- a) separating electrical section;
- b) installation of hook switches;