

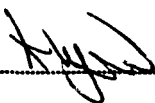
Ref	NR/GN/ELP/27022
Issue	2
Date	April 2006

Business Process Document

Design and installation of negative bonding and associated equipment on d.c. electrified lines

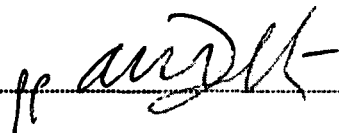
Endorsement & Authorisation

Endorsed by:



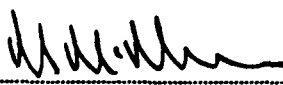
K. Lydford, Head of Electrification & Plant Engineering

Authorised by:



A. McNaughton, Chief Engineer

Accepted for issue by:



M. McManus, National Standards Manager

This document is the property of Network Rail. It shall not be reproduced in whole or part nor disclosed to a third party without the written permission of the Standard Owner.

© Copyright 2006 Network Rail

Uncontrolled copy once printed from its electronic source.

Published & Issued by: Network Rail 40 Melton Street, London NW1 2EE



Ref:	NR/GN/ELP/27022
Issue:	2
Date:	April 2006

Issue record

Issue	Date	Comments
2	April 2006	Re-issued as a SAF3 Business Process Document (<i>formerly RT/E/C/27022</i>)

Disclaimer

In issuing this document for its stated purpose, Network Rail makes no warranties, express or implied, that compliance with all or any documents it issues is sufficient on its own to ensure safe systems of work or operation. Users are reminded of their own duties under health and safety legislation.

Supply

Copies of documents are available electronically, within Network Rail's organisation. Hard copies of this document will be available to Network Rail employees on request to the document controller and to other organisations from IHS Technical Indexes (01344 404409)

Contents

1	Purpose	5
2	Scope	5
3	Reference documentation	5
4	Definitions	6
5	Negative bonding - general	7
6	Negative cable and bonds	7
7	Cable and bond terminations	7
8	Cable joints	7
9	Longitudinal track bonding	8
9.1	Connections to the running rail	8
9.1.1	Holes in running rails	8
9.1.2	Pin drive and bush/bolted running rail connectors	9
9.2	Rail head bonding	9
9.3	CWR expansion switches	9
9.4	Redundant insulated rail joints	10
9.5	Longitudinal negative reinforcement using redundant rail	10
10	Track cable routing	10
10.1	General	10
10.2	Routes between sleepers	11
10.3	Cables adjacent to lineside buildings and apparatus cases	11
10.4	Crossing of cable routes	11
10.5	Buried cable routes	12
10.6	Routes through authorised walkways	12
10.7	Risers	12
10.8	Cables adjacent to AWS track magnets	12

Ref:	NR/GN/ELP/27022
Issue:	2
Date:	April 2006

II	Safety requirements	13
II.1	General	13
II.2	Depot cranes	13
II.3	Gas point heater and associated bottles	13
II.4	Signal and telecommunication equipment	13
II.5	Dynamic and electrical clearances	14
Appendix A	Recommended torque settings for steel bolts securing aluminium fittings	15
Appendix B	Identification of running rail types	16



Ref:	NR/GN/ELP/27022
Issue:	2
Date:	April 2006

I Purpose

This specification states the best practice for the design, manufacture, installation and testing of negative bonding and associated equipment on Network Rail D.C. Electrified Lines including those which are designated 'standard current' and those designated '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 the design and installation of negative bonding and associated equipment on D.C. Electrified Lines, including the requirements for new installations and alterations to existing equipment.

The interfaces between negative bonding and track circuit bonding are dealt with in other standards.

3 Reference documentation

NR/SP/ELP/27224	Network Rail Business Process Document - Specification for Installation of Cable Routes, Cable Laying, Testing and Jointing of Cables Forming Part of the Traction Distribution System
NR/SP/TRK/008	Network Rail Business Process Document - Saw and Disc Cutting and Drilling of Rail
NR/SP/CIV/044	Network Rail Business Process Document – Design and construction of Undertrack Crossings
NR/GN/ELP/27021	Network Rail Business Process Document - Electric Track Equipment Layout Design for D.C. Electrified Lines
NR/SP/ELP/21104	Network Rail Business Process Document - Design and Installation of Electric Track Equipment for D.C. Electrified Lines
BS 11	Specification for railway rails
BSC 90	
BS 113A	
BS 95	

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.
Bond head	A steel sleeve attached to the end of a bond and welded to a running rail to form an electrical connection.
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 in excess of 6.8 kA.
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 Workslope.
Standard current traction systems.	A d.c. system capable of supplying trains with a sustained peak total traction current below 6.8 kA.