

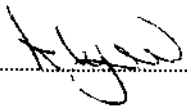
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Business Process Document

Specification for 25 kV booster transformers for a.c. electrified lines

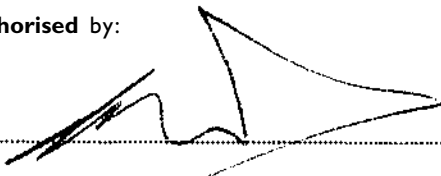
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Endorsed by:



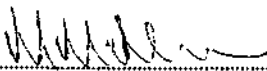
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2	December 2005	Re-issued as a SAF3 Business Process Document

Implementation

3 December 2005

Compliance

This Network Rail specification is mandatory and must be complied with by Network Rail and its contractors from 3 December 2005.

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 fixed plant has stipulated otherwise in the accompanying briefing note.

Where the head of electrification and fixed 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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1 Purpose

This specification states the requirements for the design, manufacture and testing of outdoor type 25 kV booster transformers for use as part of a return conductor system for the suppression at source of electromagnetic interference on A.C. Electrified Lines in order to reduce the level of interference induced into adjacent signalling and communication circuits.

The document is to be read in conjunction with the relevant procurement specification.

2 Scope

This specification applies to all new booster transformers for new and existing suppression systems utilising return conductors installed on A.C. Electrified Lines.

3 Reference documentation

OLEMI	Network Rail standard, overhead line equipment master index
RT/E/S/21033	Network Rail specification for the welding of transformer tanks and conservators during manufacture
BS 5378	Safety signs and colours
EN 60076	Power transformers
BS 171	
BS 148	Specification for unused mineral oil for transformers and switchgear
IEC 296	
BS 223	Bushings for alternating voltages above 1000 V
IEC 137	

4 Definitions

For the purpose of this specification the following definitions shall apply:

British Standard	A standard published by the British Standards Institution. Its alphanumeric identity is prefixed by BS.
Equipment	The complete protective relay installation at a specified location, including all relays, component parts, accessories and software.
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.
International Standard	A standard published by the International Electrotechnical Commission. Its alphanumeric identity is prefixed by IEC.
Network Rail Company Standards	A collective term for a specification or procedure published by a directorate of Network Rail.

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Procurement Specification

The contract specific Network Rail documentation, such as, Invitation to Tender or Technical Workslope.

SCADA

Supervisory control and data acquisition.

5 General clauses

5.1 Safety

All apparatus and connections for the safe and satisfactory operation, control and protection of the equipment concerned, shall be provided whether or not specifically mentioned.

The equipment shall be adequately provided with locking facilities, earthed, insulated, screened, enclosed etc.. Safe and appropriate access shall be provided for operation and maintenance purposes.

The supplier shall provide recommendations for training in safe operation and maintenance of the equipment.

5.2 Design, manufacture and workmanship

All material shall be of the quality and of the type most suitable for working under the conditions specified for the full service life of the equipment.

5.3 Spare parts and consumables

The supplier shall make recommendations to the purchaser for holdings of spare parts and consumables based on estimated replacement rates and delivery periods to ensure that the equipment complies with this specification throughout its specified service life. The supplier shall indicate the extent of commonality with equipment previously supplied.

5.4 Drawings

Drawings of the equipment covering each of the following aspects shall be submitted to the purchaser for scrutiny:

- a) general arrangement (internal and external);
- b) static and dynamic loadings, fixing arrangements and, when specified in the procurement specification, foundation requirements in the special case of transformers to be installed at ground level;
- c) schematic and/or circuit diagrams;
- d) diagram and rating plates;
- e) details of cable entries and terminations;
- f) detailed wiring diagram or schedules;

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- g) curve showing the magnetising current at all values of primary current up to the short circuit value.

All drawings shall be of good, legible quality. Four copies of each drawing or as varied by the procurement specification shall be provided.

Where it is essential for clear understanding of the circuits, block or circuit diagrams shall include details of components which exist or are not being provided by the supplier. Wiring diagrams shall include any unused wires, contacts, plugs, sockets, terminals and the like.

As an alternative to separate circuit and wiring diagrams, combined diagrams may be provided. In this case, the position of each wire termination shall be indicated either on the drawing or by means of a schedule of terminations.

A short description of each revision shall be provided under consecutive revision letters or numbers together with the date.

Wherever feasible, some means shall be used to identify the location of the most recent revision, for instance by circling the locations.

All drawings shall be brought up to date as necessary, to provide a permanent as-fitted record and shall be supplied in the software format specified in the procurement specification.

5.5 Instruction manual

The supplier shall produce a comprehensive and specific instruction manual covering all aspects of installation, operation and maintenance and eventual disposal, and shall supply the number of copies stated in the procurement specification. The manual shall provide guidance to enable all work to be carried out safely and efficiently. The manual shall contain only relevant information and shall include:

- a) a description of the construction, installation, functioning and rating of the equipment;
- b) operating instructions, including safety and isolation procedures;
- c) routine maintenance including any special precautions, fault finding and major overhaul procedures and periodicity;
- d) full details of recommended adjustments and settings for the equipment and its protective devices where appropriate;
- e) instructions for eventual disposal including safety and handling precautions and recommendations;