

Level 2

Specification for 25-0-25 kV Traction
Autotransformer

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Issue record

Issue	Date	Comments
1	September 2009	New Network Rail product specification
2	September 2011	Changes to 8.6 , inclusion of diagram and change to through fault withstand current test period

Compliance

This Network Rail standard is mandatory and shall be complied with by Network Rail and its contractors if applicable from 03 December 2011.

When this standard is implemented, it is permissible for all projects that have formally completed GRIP Stage 3 (Option Selection) to continue to comply with the issue of any relevant Network Rail standards current when GRIP Stage 3 was completed and not to comply with requirements contained herein, unless stipulated otherwise in the scope of this standard.

Reference documentation

NR/SP/ELP/21028	Ancillary wiring of electrical distribution equipment on a.c. and d.c, electrified lines
NR/SP/ELP/21033	The welding of power transformer tanks and conservators during manufacture (formally RT/E/S/21033)
NR/SP/ELP/21041	Batteries and battery charging equipment for electrification applications (formally RT/E/S/21041)
NR/SP/SIG/50004	Methodology for the demonstration of Compatibility with DC (AC-immune) Track Circuits
NR/GN/ELP/27233	Characteristics of railway electrification traction supplies.
NR/L3/CIV/039	Specification RT98 – Protective treatments for Network Rail Infrastructure.
NR/GN/CIV/002	Application and reapplication of protective treatment to Network Rail Infrastructure.
BS EN 60296	Fluids for electrotechnical applications - Unused mineral insulating oils for transformers and switchgear
BS 88-2	Low-voltage fuses
BS 5499	Graphical symbols and signs. Safety signs, including fire safety signs. Specification for geometric shapes, colours and layout
EN 50124-2	Railway applications – Insulation coordination. Overvoltages and related protection
EN 50125-2	Railway applications - Environmental conditions for equipment - Part 2: Fixed electrical installations
EN 50163	Railway applications – Supply voltages of traction systems
EN 50180	Bushings Above 1 kV up to 36 kV and from 250 A to 3,15 kA

Ref:	NR/L2/ELP/27400
Issue:	2
Date:	03 September 2011
Compliance date:	03 December 2011

for Liquid Filled Transformers

EN 50329	Railway applications - Fixed installations - Traction transformers
EN 60076	Power transformers Part 1: General Part 2: Temperature rise Part 3: Insulation levels, dielectric tests and external clearances in air Part 5: Ability to withstand short circuit Part 10: Determination of sound levels (supersedes EN 60551)
EN 60529	Specification for degrees of protection provided by enclosures
EN 60617	Graphic symbols for diagrams
EN 60721-3-4	Classification of Environmental Conditions-Part 3: Classification of Groups of Environmental Parameters and their severities- Section 4: Stationary use at non-weatherprotected locations

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Ref:	NR/L2/ELP/27400
Issue:	2
Date:	03 September 2011
Compliance date:	03 December 2011

Contents

1 Purpose	6
2 Scope	6
3 Definitions	6
4 Abbreviations	6
5 General Clauses	7
5.1 Safety	7
5.2 Design, manufacture and workmanship	7
5.3 Drawings	7
5.4 Spare parts and consumables	7
5.5 Instruction manual	8
5.6 Delivery	9
6 Compliance with standards	9
7 General performance requirements	9
7.1 The AT Traction System	9
7.2 AT general description	10
7.3 Environmental conditions	10
7.4 Maintainability	11
7.5 Reliability and availability	11
7.6 Service life & reliability target	11
7.7 Interchangeability	11
8 Ratings	11
8.1 Voltage Rating	11
8.2 Nominal power rating	12
8.3 Cooling method	12
8.4 Neutral current transformer	12
8.5 Duty class	12
8.6 Through fault withstand	13
8.7 Temperature rise limits	13
8.8 Power losses	13
8.9 Short circuit impedance	13
8.10 Inrush current	12
8.11 Noise emission	12
8.12 Table 1 - Summary of ratings	13
9 Construction requirements	14
9.1 Finish and resistance to corrosion	14
9.2 Enclosures	14
9.3 Small wiring	14
9.4 Labels	15
9.5 Monitoring equipment	15
9.6 Auxiliary supplies	15
9.7 Protection of auxiliary circuits	15
9.8 Fittings	15
9.9 Insulating oil	16
9.10 Tank Covers, Flanges, Gussets, etc.	16
9.11 Gasket seals	16
9.12 Radiators	16
9.13 HV cable terminations	17
9.14 HV open-terminal terminations	17

Ref:	NR/L2/ELP/27400
Issue:	2
Date:	03 September 2011
Compliance date:	03 December 2011

9.15 Safety clearances	17
9.16 Special tools and equipment	17
10 Inspection and testing	17
10.1 Routine and Type tests	17
10.2 Site tests	17
10.3 Test certificates	18
11 Additional data	18
Appendix A Tests at place of manufacture	19
Appendix B Tests at site	20

Ref:	NR/L2/ELP/27400
Issue:	2
Date:	03 September 2011
Compliance date:	03 December 2011

1 Purpose

This product specification states the requirements for autotransformers for use on the 25-0-25 kV electrification system.

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

2 Scope

This specification applies to all new 25-0-25 kV autotransformers.

3 Definitions

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

British Standard

A standard published by the British Standards Institution. The alphanumeric identity is prefixed BS.

Equipment

The equipment covered by this specification, including all component parts and accessories.

European Standard

A standard published by the European Committee for Standardisation or by the European Committee for Electrotechnical Standardisation. The alphanumeric identity is prefixed EN.

International Standard

A standard published by the International Electrotechnical Commission. The alphanumeric identity is prefixed IEC.

Network Rail Standard

A collective term for a Network Rail documents published by a directorate of Network Rail. The alphanumeric identity is prefixed NR.

Procurement specification

Network Rail contract specific documentation such as an Invitation to Tender (ITT) or Technical Work Scope (TWS).

4 Abbreviations

AT	Autotransformer
ATF	Autotransformer Feeder
DNO	Distribution Network Operator
ESI	Electricity Supply Industry
OCS	Overhead Catenary System
OLE	Overhead Line Equipment
ONAN	Oil Natural Air Natural (cooling method)

Ref:	NR/L2/ELP/27400
Issue:	2
Date:	03 September 2011
Compliance date:	03 December 2011

ONAF Oil Natural Air Forced (cooling method)
SCADA Supervisory Control And Data Acquisition

5 General Clauses

5.1 Safety

At all times the equipment shall be safe. Measures shall be taken to so that the safety of persons concerned in its installation, operation, maintenance, repair and its eventual disposal. All equipment and connections for the safe and satisfactory operation, control and protection of the equipment, shall be provided whether or not specifically mentioned.

The equipment shall be designed to enable compliance with the requirements of all relevant statutory acts, rules, regulations and orders.

The equipment shall be adequately insulated, screened, enclosed and earthed in accordance with British and European standards. Safe and appropriate access shall be provided for operation and maintenance purposes. Where access doors or covers are provided to permit easy access to equipment or connections, padlocking facilities shall be provided to deter unauthorised access.

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

5.2 Design, manufacture and workmanship

The equipment shall be designed and manufactured in accordance with industry best practice, taking cognisance of the system in which it will operate. All material shall be new and of the quality and 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 so that the equipment complies with this product specification throughout the 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:

- General arrangement (internal and external)
- Static and dynamic loadings, foundation and fixing requirements
- Schematic/circuit diagrams
- Connection diagram and rating plates
- Details of cable entries and terminations
- Detailed wiring diagram or schedules