

Letter of instruction

Information for users

The following document:

NR/L2/ELP/27239 Issue 2

has had changes made to it, most recently, with effect from **29 June 2005**.

Instructions for use

It is essential that you first read and understand each letter of instruction pertaining to the standard before proceeding to use the standard. You must then apply the requirements of each letter to the standard.

NR/SP/ELP/27239	Issue 2	01 June 2008	Proceed to standard ►
NR/BS/LI/026	Issue 1	29 June 2005	Proceed to letter ►

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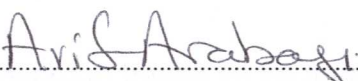
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Level 2

Maintenance Specification for Electrical Traction Distribution Equipment

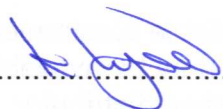
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Issue record

Issue	Date	Comments
1	October 2005	New standard
2	June 2008	Re-issued as a Phase 2A Business Process Document

Compliance

This Network Rail standard is mandatory and shall be complied with by Network Rail and its contractors if applicable from 26 August 2008.

When this standard is implemented, it is permissible for all projects that have formally completed GRIP Stage 4 to continue to comply with the Issue of any relevant Network Rail Standards current when GRIP Stage 4 was reached and not to comply with requirements contained herein, unless the designated Standard Owner has stipulated otherwise in the accompanying Briefing Note.

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1 Purpose

This specification states the Directorate's general requirements that apply to all maintenance undertaken on Network Rail's electrical traction distribution equipment.

The document is to be used in conjunction with Network Rail Work Instruction NR/WI/ELP/27240 and any other relevant, equipment specific, Network Rail maintenance standards.

2 Scope

This specification applies to all maintenance carried out Network Rail on maintenance contracts on electrical traction distribution equipment.

3 Reference documentation

Not used

4 Definitions

For the purpose of the maintenance manual the following definitions shall apply in general application:

British Standard	A standard published by the British Standards Institution. Its alphanumeric Identity is prefixed by BS.
Check	Determine a particular nominated condition before, during and after repair (e.g. completeness, security, position, electrical characteristics).
Clean	Remove all dirt and deposits.
Competent Person	A person who possesses sufficient technical knowledge or experience of the work activity concerned to prevent danger, or where appropriate, injury.
Danger	Risk of injury.
Dismantle	Take to pieces.
Equipment	Equipment 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. Its alphanumeric identity is prefixed by EN.
Examine	Determine the general condition e.g. completeness, security, position, wear, cracks, splits, leaks, scoring, corrosion, erosion, breaks, distortion, looseness, overheating and electrical tracking.

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Inspect	Determine the general condition i.e. conformity to required standards, drawings etc..
International Standard	A standard published by the International Electrotechnical Commission. Its alphanumeric identity is prefixed by IEC.
Maintenance	Work intended to see that equipment continues to perform satisfactorily in accordance with specified standards.
Network Rail Company Standards	A collective term for a specification or procedure published by a directorate of Network Rail.
Overhaul	Do what is necessary to equipment to restore performance to required standard, e.g. dismantle, strip, clean, examine, fit new parts, repair, reassemble, test and inspect as necessary.
Procurement Specification	The contract specific Network Rail documentation, such as, Invitation to Tender or Technical Work Scope.
Network Rail Electrical and Plant Equipment Maintenance Manual	The compiled suite of Network Rail standards specifying the minimum requirements for maintenance of Electrical and Plant equipment forming part of the railway infrastructure.
Network Rail Company Standards	A collective term for a specification or procedure published by a directorate of Network Rail.
Reasonably practicable	For full explanation refer to Electricity at Work Regulations 1989.
Reassemble	Put together.
Record	Put down in writing or maintain electronically a finding from examination, test, inspection or check.
Rectify	To set right.
Refit	Put back and reconnect.
Remove	Disconnect and take off.
Repair	Restore an original part to the required condition.
Test	Prove correct operation by trial.

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5 Requirements for maintenance

The standard of maintenance, including frequency, quality and content, shall be sufficient so that the equipment:

- a) maintains its full safe, operational and functional performance and reliability when required to be in service;
- b) achieves its design service life.

Work in accordance with best practice using staff having the appropriate level of competence.

5.1 Maintenance system

A documented maintenance system for equipment shall be maintained Network Rail. The system shall contain the following elements as a minimum:

- a) a list of assets to be maintained;
- b) a system that plans the maintenance tasks specified within this specification and the relevant equipment specific Network Rail maintenance standards;
- c) historical data that records details of all work undertaken.

5.2 Network Rail Standards

The maintainer shall comply with the requirements of this specification and the relevant equipment specific Network Rail maintenance work instructions.

Any conflict between specified requirements shall be referred to Network Rail E&P Engineer with recommendations for resolution.

Network Rail standards are revised at regular intervals and the latest editions are shown in the current issue of Company Standard CD-ROM.

5.3 Guidance and instruction manuals

Wherever appropriate to check the operating performance of the equipment or to prevent danger, the instructions detailed in the relevant manufacturers' maintenance manuals shall be followed unless modified by Network Rail maintenance standards.

5.4 Asset performance

Monitor and review asset performance, identifying where maintenance could be amended to improve safety, reliability or reduce costs. Proposals should be submitted to Network Rail E&P Engineer.

5.5 Asset records

Records of testing, modification, alteration of settings or redesign carried out shall be retained to enable the condition of equipment and effectiveness of maintenance to be monitored. Maintenance records shall include:

- a) test results;
- b) defects, faults and failures and remedial actions including , repairs and parts replaced;

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- c) preventive maintenance carried out;
- d) settings and support calculations where applicable;
- e) strategy and/or logic diagrams.

Records of faults, failures, outages and disruptions to operations shall include causes, extent of resulting effects, conclusions and proposals for remedial and preventive actions.

Alterations to computer held records shall be backed up, dated and labelled.

5.6 Drawings

The most current drawings available shall be worked to and maintained up to date.

5.7 Replacement parts

Only original supplier's or manufacturer's recommended replacement parts or Network Rail product accepted alternatives shall be used.

5.8 Test equipment

All test equipment used by the maintainer shall be fit for purpose and calibrated.

5.9 Certification

All certification required by Statute, British Standard or by Network Rail shall be complete and legible.

5.10 Disposal

Equipment for disposal shall be disposed of in a safe manner with environmental and legislative considerations.

Records of disposed equipment including drawings, test and design information shall only be disposed of if the records are obsolete and without any further technical value.

6 Requirements for safety

The standard of maintenance, including frequency, quality and content, shall be sufficient to prevent danger as prescribed in Network Rail Safety Documents.

6.1 Certification of maintenance personnel

Persons carrying out work shall be in possession of valid certificates of competence necessary to gain access to the worksite and for the maintenance task to be undertaken.

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Appendix A Maintenance of high voltage switchgear

A.1 Purpose

This specification states the Directorate's periodic maintenance requirements for high voltage switchgear in order to check the safety and reliability of the electrical distribution system.

A.2 Scope

This specification applies to all high voltage switchgear where Network Rail is Infrastructure Controller.

A.3 Maintenance requirements

A.3.1 Periodicity

The maintenance requirements specified in **A.3.2**, **A.3.3** and **A.3.4** shall be applied as appropriate, to each type of high voltage switchgear, at intervals not exceeding the periodicities specified on the chart in Appendix A.A

A.3.2 Maintenance requirements - A

Examine the switchgear for oil leaks and if necessary, overhaul.

Check all insulating oil levels where possible and top-up as necessary.

Examine and, if necessary, overhaul the switchgear operating mechanism for correct operation.

Examine and, if necessary, overhaul the equipment to check that:

- a) environmental conditions have not caused any significant deterioration in condition;
- a) environmental control equipment operates correctly;
- b) isolating and interlocking arrangements are functioning correctly;
- c) labels and locks relating to safety and operation are correct and visible;
- d) access and lighting conditions have not significantly deteriorated.

Carry out functional tests to check that the switchgear and associated control circuits, relays, contactors, indicators etc. operate correctly.

A.3.3 Maintenance requirements - B

Examine and, where necessary, overhaul those parts of the switchgear subject to deterioration caused by switching fault current.

Examine and overhaul the high voltage contact latching mechanism, on oil circuit breakers, to check for correct operation.

Take samples of insulating oil, test in accordance with appropriate standards and replace where necessary.

Check the integrity of vacuum interrupters, where designs use two interrupters connected in series, by testing in accordance with the appropriate standard.

Examine and, if necessary, overhaul air insulated chambers and, in the case of withdrawable circuit breakers the circuit breaker cubicle.

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Examine and overhaul connections so far as is reasonably practicable to check that the electrical and mechanical properties are satisfactory.

Examine and overhaul, without dismantling the equipment, conductor insulation, conductor supports, insulators, bushings and any means provided for preventing direct contact with circuit conductors to check that there is no significant reduction in adequacy.

Examine and overhaul the high voltage switchgear earthing system to check its integrity.

Check and, where necessary, overhaul the insulating medium in all high voltage compartments to check there is no significant reduction in adequacy.

Carry out functional tests to check that all circuit conductors, not normally energised during usual operation of the circuit breaker, are energised at normal working voltage.

A.3.4 Maintenance requirements - C

Examine/test and overhaul, by dismantling, main circuit insulation.

Appendix AA Cyclic periodicity chart

Periodicity Chart							
Type Of Switchgear	Maintenance Requirements						
	3 Months	12 Months	* 20 (17 for ASEA) Fault Operations	2 Years	* 30 Fault Operations	4 Years	6 Years
Single Phase Minimum Oil	A	A, B & C	A, B & C	n/a	n/a	n/a	n/a
Single Phase Bulk Oil	A	n/a	n/a	A, B & C	A, B & C	n/a	n/a
Single Phase Vacuum	n/a	A	n/a	A, B & C	n/a	n/a	n/a
Single Phase SMOS & Indoor OX	n/a	A	n/a	n/a	n/a	A, B & C	n/a
Three Phase Oil	n/a	n/a	n/a	A & B	n/a	A, B & C	n/a
Three Phase Vacuum/SF ₆	n/a	n/a	n/a	A	n/a	n/a	A, B & C

Abbreviations

n/a = not applicable

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SMOS = Structure mounted outdoor switchgear

OX = GEC OX type switchgear

SF₆ = Sulphur hexafluoride

- * For oil type switchgear, the number of fault operations determining the need for this examination shall be counted from the previous oil change. For Single Phase Minimum Oil circuit breakers, oil shall be changed at 20 Fault Operations.