

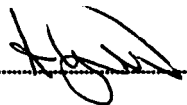
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Issue	2
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Business Process Document

25 kV rotating post type isolators

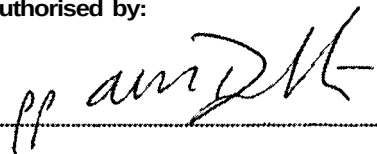
Endorsement & Authorisation

Endorsed by:



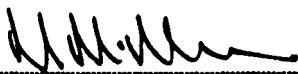
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Issue record

Issue	Date	Comments
2	April 2006	Re-issued as a SAF3 Business Process Document (<i>formerly RT/E/S/27184</i>)

Implementation

1 April 2006

Compliance

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

When this product 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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1 Purpose

Not used

2 Scope

This Specification is for the design, manufacture and testing, of outdoor overhead line isolators and associated equipment for isolating and sectioning the 25 kV 50 Hz single phase overhead conductor system.

3 Reference documentation

B.E.B.S.-S6

B.E.B.S. - S18

BS 729 Specification for hot dip galvanized coatings on iron and steel articles
BS 1387 Specification for screwed and socketed steel tubes and tubulars and for plain end steel tubes suitable for welding or for screwing to BS 21 pipe threads

BS 3297 Post insulators of ceramic material or glass for nominal voltages greater than 1000 V

BS 4360 Specification for weldable structural steels

BS 4848 Hot-rolled structural steel sections

BS 5253 Specification for alternating current disconnectors and earthing switches

4 Definitions

Not used

5 Tender description and drawings

The tender shall include a full description of the equipment and such general arrangement and detailed drawings as are necessary to show clearly what is proposed.

6 Departures from specification

If, in the opinion of the Manufacturer, modification of any detailed point contained in this Specification is desirable, the Manufacturer shall submit full particulars of all such departures from the Specification to Network Rail for discussion and/or approval.

If the Manufacturer does not avail himself of this facility, Network Rail will deem the Manufacturer to be entirely satisfied as to what is required and will insist on the isolators complying absolutely with the terms of this Specification.

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7 Alternative tenders

Alternative tenders may be submitted provided each is described in full. All such tenders shall comply with this Specification except insofar as variations therefrom are listed for each alternative tender.

8 Samples

Samples of equipment, in whole or in part, produced in accordance with the requirements of this Specification, shall, as required, be made available to Network Rail for inspection and/or test, either prior to or after the granting of a contract for the manufacture and supply of such equipment.

9 Description of system

The 50 Hz single phase railway electrification system on which the overhead line isolators are to be used, is one in which the electrical energy is supplied to trains by means of an overhead conductor system comprising a contact wire and a supporting catenary which are normally energised at a nominal system voltage of 25 kV to earth. Under normal operating conditions, this voltage may rise to 10% above its nominal value.

Traction current drawn from the overhead contact wire is returned to the supply point through the running rails, except where this would give rise to unacceptable interference, when it is returned through the running rails and return conductors. This latter arrangement may include booster transformers.

The system earth will be provided by connecting the neutral of the supply transformers at supply points to the running rails, thus effectively producing a multiple earthing system with a total resistance of less than 1 ohm.

Power for operating the electrified railway system is obtained from the Electricity Authorities.

10 Service conditions

The overhead system is designed for sparkless current collection at normal train speeds, but under abnormal conditions, a limited degree of sparking or arcing may occur, and the isolators shall be capable of withstanding the transient effects.

Owing to exposed nature of the system, frequent short-circuits of varying severity are likely to occur. The isolators shall withstand the effects of any short-circuits up to the maximum value.

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All isolators shall be capable of functioning in atmospheric conditions to be expected on, or adjacent to, lines over which some diesel traffic will pass, without being inspected or serviced more frequently than once every six years, except in situations subject to unusually severe pollution where more frequent cleaning may be necessary.

The ambient temperature range shall be taken as - 18°C to + 38°C.

11 Contract drawings

The Manufacturer shall provide all necessary drawings which must indicate major dimensions, construction details and material specifications. Catalogue numbers and certain fixed dimensions shown on the drawings attached to this Specification shall be recorded on the Manufacturer's drawings.

12 Instruction books

The Manufacturer shall prepare Instructions outlining the construction and functioning of the equipment, its rating and characteristics, and detailing the operating, routine maintenance and major overhaul procedure; it shall include drawings and illustrations enabling all component parts and any special tools to be readily identified for ordering purposes.

13 Design, manufacture and workmanship

The equipment shall be designed and manufactured in accordance with the best modern practice to the approval of the Engineer. The Engineer's representative shall have access to the Manufacturer's works to inspect and approve components where this is deemed necessary.

14 British Standard specifications

The latest editions of the appropriate British Standards, current at the time of tendering shall apply to this Specification except as modified herein, in which case this Specification shall over-rule the British Standard.

15 Interchangeability

All like equipment made by one Manufacturer shall be interchangeable as a whole and also as regards to its parts. Jigs shall be used where necessary to achieve this facility.

Major components of different Manufacturers are required to be interchangeable, and the dimensions given in this Specification are to enable this to be achieved.

16 Safety

All equipment shall be adequately earthed or insulated as may be appropriate to ensure the protection of the equipment and the safety of those concerned in its operation and maintenance.

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The equipment shall comply with the requirements of all relevant Statutory Acts, Rules, Regulations and Orders.

17 Galvanising

All ferrous parts, including nuts, bolts and washers shall be galvanised in accordance with BS 729.

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Section 2 - Isolators and equipment for manual operation

18 Location and arrangement of isolators

The isolator will be supported on angles clamped on a structure provided for the support of the overhead conductor system, and will be directly above its operating gear.

Isolators shall be of the rotating post type. Drawing No. I/121/44/A3 shows the different arrangements which shall be available by simple re-arrangement of the same non-handed components. Unless otherwise stated on the Order, isolators shall be supplied broken down into major assemblies.

19 Isolators (Drawing No. I/121/44/A3)

19.1 Design

The design shall be such that the requirements of BS 5253 are met under the following conditions:

Rated Normal Current: 800 A
Rated Short Time Current : 8 kA for 1s

The rated insulation level shall be for 52 kV r.m.s. 3-phase systems, (List I), except that the rated lightning impulse withstand voltage to earth shall be 200 kV.

The following dimensional requirements shall apply:

Between the centres of the rotating and fixed insulators, or between the centres of the rotating insulator and earth post: 813 mm.

Angular movement, 2 position: 45°
Angular movement, 3 position: 90°

The torque required to operate the isolator under the worst conditions shall not exceed 200 Nm. The isolators shall withstand a torque of 600 Nm without damage in the event of contacts and blades being firmly iced up.

The isolators shall be capable of making and breaking a line charging current of 6 A r.m.s. at a power factor of 0.35 leading, with a recovery voltage of 27.5 kV, without damage.