

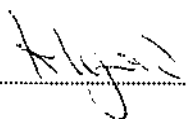
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Issue	2
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Business Process Document

Ancillary equipment enclosures for 25 kV structure mounted outdoor switchgear

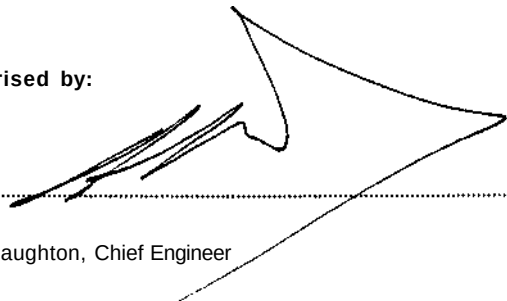
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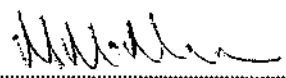
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Issue record

Issue	Date	Comments
2	February 2006	Re-issued as a SAF3 Business Process Document (<i>formerly RT/E/S/27189</i>)

Implementation

4 February 2006

Compliance

This Network Rail product specification is mandatory and must be complied with by Network Rail and its contractors from 4 February 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

Ancillary equipment enclosures are used to house low voltage electrical ancillary equipment for 25 kV structure mounted outdoor switchgear (SMOS). These enclosures are to be fitted out with a domestic electrical installation comprising of lighting, heating and power and an electrical ancillary equipment installation before being transported to site by road or rail and positioned on prepared concrete bases.

2 Scope

This specification covers the requirements for the design, manufacture and installation of these types of enclosures together with the preparation of associated drawings, manuals, provision of certain electrical fittings and their installation.

3 Reference documentation

Network Rail Standards

[NR/SP/ELP/21028](#) Ancillary wiring of electrical distribution equipment on a.c. and d.c, electrified lines

[NR/SP/ELP/27186](#) The installation of switching station slab foundation bases

British Standards

[BS 88](#) Part 2 Cartridge fuses for voltages up to and including 1000 V a.c. and 1500 V d.c.

[BS 476](#) Fire tests on building materials and structures

[BS 1363](#) Specification for 13A plugs, switched and unswitched socket outlets and boxes

[BS 4618](#) Impact behaviour

[BS 4800](#) Specification for paint colours for enclosure purposes

[BS 5486](#) Low voltage switchgear and control gear assemblies

[BS 5499](#) Graphical symbols and signs. Safety signs, including fire safety signs. Specification for geometric shapes, colours and layout

[BS 7671](#) Requirements for electrical installations: IEE Wiring Regulations

[BS CP3](#) Loading: Code of basic data for the design of enclosures

European Standards

[EN 60529](#) Specification for degrees of protection provided by enclosures (IP code)

[EN 60617](#) Graphic symbols for diagrams

For the purpose of this product 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 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. 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 Standard	A collective term for a Network Rail documents published by a directorate of Network Rail PLC. Its alphanumeric identity is prefixed by NR/, followed by a unique reference.
Procurement specification	Network Rail's contract specific documentation, such as, Invitation to Tender or Technical Workslope.

4 General clauses

4.1 General description of enclosure

The enclosure shall have no windows and have one door for staff & equipment access on one end wall.

Cables will enter the enclosure at two locations, one for connections to the switchgear and the other for the incoming electrical supplies, incoming feeder pilot cables (feeder station only) and supervisory pilot cables.

4.2 Safety

At all times the equipment shall be safe. Measures shall be taken to ensure 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 concerned, shall be provided whether or not specifically mentioned.

4.3 Design, manufacture and workmanship

The equipment shall be designed and manufactured in accordance with best practice, taking cognisance of the system in which it will operate. 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.

4.4 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 product specification throughout its specified service life. The supplier shall indicate the extent of commonality with equipment previously supplied.

4.5 British Standard and other specifications

Except where specifically stated otherwise, equipment supplied to this specification shall comply with the requirements of all relevant British Standards whether or not reference is made to them. Except where stated otherwise the relevant editions are those current at the date of the tender.

Where reference is made to other specifications, the editions current at the date of the tender are intended.

4.6 Interchangeability

All like equipment shall be interchangeable as a whole and also as regards its parts. Any such change or replacement shall not reduce the capability of the equipment to conform to the requirements of this product specification.

5 Equipment requirements

5.1 Dimensions

The enclosure dimensions shall be as specified in the procurement specification.

The enclosure external profile (end view) must not exceed the Network Rail standard loading gauge shown in Appendix B assuming the base of the enclosure to be 762mm above rail level. Allowance must be made for packing and securing tackle used during transport. External fittings which protrude from the enclosure sides such as the cable entry guards which infringe the loading gauge shall be fitted after delivery to site where delivery is by rail.

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5.2 General layout

The general layout of the enclosure, including positions of the domestic and ancillary equipment shall be as specified in the procurement specification.

5.3 Foundations

The base, provided under a separate contract will be constructed generally in accordance with this specification and drawing I/89/802/A2 contained therein. The length and width of the base will differ from those shown on drawing I/89/802/A2 depending on the base fixture requirements of the enclosure. The supplier shall provide drawings that identify the enclosure dimensions and loading points. The base will be resin coated prior to erection of the enclosure.

5.4 Service conditions

The enclosure shall withstand ambient temperatures between the range of -25°C to +55°C., in addition, enclosures will be subject to the levels of air borne dust, vibration and magnetic fields experienced adjacent to a railway line.

The enclosure shall comply with BS CP3 wind loading, Chapter 5, Part 2 wind loads; with a maximum basic wind speed for mechanical strength of 54 metres/sec.

5.5 Ingress protection

Enclosures shall provide an overall level of protection to IP 44 from [EN 60529](#).

5.6 Internal environmental conditions

The enclosure shall be constructed and insulated so as to maintain an internal environment between the temperature range of +5 and +40°C for the external service conditions specified in 5.4, without the accumulation of moisture forming by condensation on the internal enclosure surfaces and ancillary equipment. The most cost effective method to achieve this environment shall be used; heaters where provided shall be thermostatically controlled.

5.7 Ventilation

Ventilation may be incorporated to meet the internal conditions specified.

5.8 Enclosure construction

5.8.1 General

The enclosure shall comprise of walls, door and roof only.

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The enclosure shall be capable of being lifted by crane when equipped with the domestic installation and transported by road or rail vehicle without damage or permanent distortion of the enclosure or equipment.

Suitable lifting points shall be incorporated in the enclosure design and lifting eyes, beams etc. shall be provided in sufficient quantity by the manufacturer to meet the delivery schedule.

The enclosure exterior shall be free of protruberances to protuberances make climbing onto the roof impossible. The manufacturers name and address, the enclosure serial number and date of manufacture shall be displayed on a permanent label in the interior of the enclosure adjacent to the door. There shall be no commercial identification or advertising on the enclosure exterior.

Station name plates shall be provided by the supplier, details of which are included in this specification. Warning signs will be provided by the purchaser for placement adjacent to the door.

The GRP outer surface shall allow easy removal of graffiti without permanent disfiguration.

5.8.2 Construction material

The enclosure wall, roof & door panels shall be constructed of a glass reinforced plastic sandwich combination which shall consist of as a minimum requirement resin bonded glassfibre inner and outer skins totally encapsulating a rigid 18mm weather & boilproof plywood core.

Large panels shall be stiffened by either box sectional steel or encapsulated wooden ribs. Door surrounds shall be reinforced with an encapsulated steel frame.

The method of overlapping adjacent panels and the method of fixing to the base shall exclude moisture and prevent corrosion. Impact resistance

The enclosure panels shall be capable of withstanding an impact test in accordance with the principles of [BS 4618](#) Part I Section 1.2 and shall withstand the following criteria:-

- a) A 13kg load concentrated over 300mm² so that a worst case is produced.
- b) A soft body impact due to a 50kg sand bag dropped from 2 metres.
- c) A hard body impact due to a 1kg steel ball dropped from 1 metre to the unsupported centre of a 1 metre square panel. The deflection should not exceed 1/2000 of the span of 1 metre.

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5.8.3 Fire resistance

Fire retardant resin shall only be used. Panels shall withstand as a minimum requirement a 0.5 hour fire rating (retention of stability, integrity and insulation) in accordance with [BS 476](#) parts 20 & 21 and shall not exceed class I (surface spread of flame) of [BS 476](#) Part 7.

Enclosure material should not give rise to any toxic gases etc. in the event of fire either internally or external to the enclosure.

5.8.4 Thermal insulation

The enclosure material shall have a thermal insulation value of not greater than 0.6 W/M² °C. Avoidance of cold bridges shall be made at all times and, if necessary, joints must be sealed to form a complete vapour barrier.

5.8.5 Walls

The walls shall be constructed so as to give maximum allowable protection against vandalism.

Details of any method used to protect the enclosure corners shall be provided by the manufacturer. Metallic components for this purpose are to be avoided. The walls excluding the door shall be capable of supporting ancillary electrical equipment in the interior by means of vertical unistrut channels spaced at a maximum of 1 metre apart.

Mounting blocks for the unistruts are to be provided where necessary in order to allow fixing screws of adequate length to be used and to ensure that ancillary equipment including metal trunking are sufficiently clear of any joining webs of the wall panels.

Approximate weights of individual items of ancillary equipment to be accommodated in the enclosure are given in Appendix A. The manufacturer shall stipulate the maximum loading which can be supported by each wall.

5.8.6 Roof

The roof shall be self supporting and be capable of supporting snow loading, maintenance staff and materials externally in addition to ducting, lighting fittings etc on the underside. Secure and robust water proofing and insulating arrangements are to be provided. Roofing materials shall be the same construction as the walls and shall be suitable for withstanding the effects of hot, cold and wet weather without maintenance. The method by which the roof is jointed to the walls and in the case of flat roofs, the amount of slope from front to back for the removal of water shall be clearly shown.