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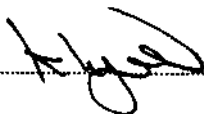
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| Issue | 2               |
| Date  | October 2005    |

# Business Process Document

## Product Specification for Standby Diesel Generators for Signalling Supplies

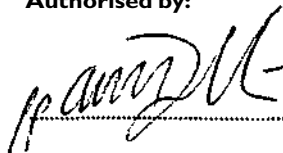
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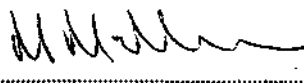
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## Issue record

| Issue | Date         | Comments                                      |
|-------|--------------|-----------------------------------------------|
| 2     | October 2005 | Re-issued as a SAF3 Business Process Document |

## Implementation

1 October 2005

## Compliance

This Network Rail Specification is mandatory and must be complied with by Network Rail/Contractors from 1 October 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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## I Purpose

This product specification states the minimum requirements for diesel generating sets installed as fixed installations in order to provide standby power supplies for signalling equipment on Network Rail's operational infrastructure.

## 2 Scope

This product specification states the requirements for the design, manufacture, testing at both supplier premises and at site, delivery and commissioning of the generating set, together with the preparation and supply of associated documentation, drawings and manuals. This document will be utilised to specify the requirements for generating sets other than those for signalling supplies where stated by the purchaser. The diesel engine set shall comprise the following components:-

- a) Diesel engine complete with governor, control and instrumentation.
- b) Directly coupled alternator and associated automatic voltage regulator.
- c) Complete cooling system for the engine and alternator.
- d) Starting and control cubicle.
- e) Fuel tank.
- f) Lubricating oil system.
- g) Exhaust and silencer system.
- h) Starting batteries and charger.
- i) Anti vibration mountings.

The accommodation for the generating set will consist of one of the following:

- a) Relocatable equipment building
- b) Plant room
- c) ISO container
- d) Weatherproof enclosure

This product specification does not state the requirements to be met by equipment associated with the generating set such as changeover panels or the requirements for the accommodation such as ISO containers, Plant Rooms or Relocatable Equipment Buildings.

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### 3 Performance Requirements

The diesel generating set shall be designed and constructed so as to provide safe (in accordance with the following requirements) and reliable operation throughout the working life of the equipment. All appropriate measures shall be taken to ensure the safety of persons concerned in its construction, operation, maintenance, repair and eventual disposal. All equipment necessary for the safe and satisfactory operation, control and protection of the set shall be chosen appropriately.

The generating set shall be adequately provided with facilities for both external and internal interlocking, padlocking, earthing, insulating, screening, access and enclosing. Safe and appropriate access shall be provided for both operation and maintenance purposes dependant on the type of accommodation the set is to be installed in.

The generating set shall comply with the requirements of all relevant Statutory Instruments, Regulations and Orders, and take cognisance of relevant documents, including, but not limited to:

- a) The Health and Safety at Work etc. Act 1974;
- b) The Electricity at Work Regulations 1989;
- c) Supply of Machinery (Safety) Regulations 1992;
- d) Pressure Vessel (Safety) Regulations 1991;
- e) The Control of Substances Hazardous to Health Regulations (COSHH) 1999;

This information is not necessarily exhaustive and does not modify the legal obligations of the supplier.

The supplier shall provide recommendations for training for all aspects associated with the operation and maintenance of the generating set. As a minimum, the supplier shall provide basic training to the maintenance staff during commissioning.

For all materials used both in the construction of the generating set and for subsequent maintenance purposes, which are considered as falling within the scope of the COSHH Regulations 1999, the supplier shall provide a risk assessment report for these materials for the life of the equipment and its eventual disposal.

#### 3.1 Detailed Performance Requirements

The generating set shall be designed with acknowledgement for both the safety of the maintainer, and for minimum maintenance requirements.

All main components as listed in section 2.0, shall as far as reasonably practicable, be safely and adequately maintainable. Measures shall be incorporated for avoidance of any procedures for maintenance purposes, which could cause disruption to Network Rail infrastructure and the railway-operating environment.

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The generating set shall be constructed so as to minimise the Mean Time To Repair on site.

Facilities shall be provided to allow safe maintenance of electrically segregated and isolated parts of the diesel generator whilst other sections may be electrically energised.

The generating set must start on a minimum of 96 out of 100 requests whilst being operated and maintained in accordance with the supplier's instructions. The generating set must be able to achieve an average 400 hours operating time between failures whilst being operated and maintained in accordance with supplier's instructions.

All diesel generator equipment, which has been maintained in accordance with the supplier's instructions, excluding the battery system and other consumable items, shall be capable of performing its intended function, whilst meeting its reliability target, for a service life of a minimum period of 20 years.

## 4 General Clauses

### 4.1 Compliance with Standards

All work associated with the generating set shall comply with all relevant parts of European Standards, whether reference is made to them or otherwise, within the text of this Product Specification.

In the absence of relevant European Standards, International or National Standards having currency within the European Community shall apply, subject to the prior agreement of Network Rail.

Evidence shall be available to prove that the tests required in order to meet the relevant standards have been completed. Complete type test documentation shall be provided if requested by the purchaser.

Tabulated references to other documentation within this specification, including Drawings, Codes of Practice, Manuals, Guidance Notes and other product specifications may be found in Appendix A.

### 4.2 Design, Manufacture and Workmanship

The generating set shall be designed and manufactured in accordance with best available techniques not entailing excessive cost, and taking cognisance of the environment in which it will operate.

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All material shall be new, of current manufacture, and shall not have been in prior service except as required during testing. They shall be of the quality and type most suitable for working under the conditions specified for the service life of the generating set.

Where required, the supplier shall provide a safety case statement for equipment with novel or innovative features not previously used within the railway environment. The safety case statement shall quantify any risks and indicate how these risks are controlled.

The supplier shall confirm that the equipment supplied is drawn from standard ranges of equipment in regular production having proven operating experience in a similar environment. The supplier shall also identify the Type Tests on similar equipment that have been carried out to give assurance of the suitability of equipment.

A broad statement that any equipment being supplied is generally in accordance with this specification or any part of it shall not be acceptable. Failure to comply with any section of this specification will require a formal derogation to be raised and accepted before equipment is installed.

### 4.3 Documentation

The supplier shall prepare and supply comprehensive and specific documentation, drawings and O&M manuals, covering all aspects of safe handling, operation, maintenance, storage and eventual disposal of the generating set. The documentation shall include detailed, step-by-step written procedures for the starting-up, running, shutting down, re-fuelling, inspection, maintenance and repair of the set.

Where the equipment is controlled by a PLC or equivalent the software Functional Design Specification (FDS) shall be provided in addition to a complete commented software listing. The software required to re-load or modify the code or comments within the PLC or equivalent shall also be provided. A ladder logic listing without clear description of individual functionality shall not be acceptable.

Where the facility is provided to modify the AVR and Governor characteristics full details shall be provided.

The O&M manual shall include details of the electrical characteristics of the alternator including reactance. These figures shall be drawn from individual tests on the particular set or where these are not available from type tests for this specific design. The calculations required within section 4.1.1 shall be included in the manual.

Documentation shall include the list of spare parts and consumables as identified in section 4.4.

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A Schedule of all maintenance tasks and periodicity / condition triggering events shall be included with the documentation.

As a minimum, two paper copies of all associated documentation shall be provided and one electronic copy. The purchaser shall be provided with draft copy on which to provide comments in before the generating set is commissioned.

#### 4.4 Spare Parts and Consumable Items

The supplier shall make recommendations to Network Rail for holdings of spare parts and consumable items, based on estimated replacement rates and delivery periods, to ensure that the generating set complies with the requirements of this Product Specification throughout its service life.

The supplier shall indicate, where possible, the extent of commonality with equipment previously supplied to Network Rail.

#### 4.5 Electromagnetic Compatibility

The standby diesel generation shall comply with the requirements of the following for electromagnetic compatibility purposes:

- a) GM/RC1500;
- b) GM/RT1031;
- c) BS EN 50121 Part 4.

#### 4.6 Environmental Conditions

The generating set external environmental conditions shall be identified as being in accordance with BS EN 60721 Class 3k5 for normal service conditions, and as modified for the following special service conditions:

- a) for indoor equipment, the ambient air temperature is not below -5°C and not above +40°C, and not exceeding +35°C average over any 24 hour period, and +25°C average over any one year period;
- b) Maximum relative humidity (non-condensing) @ +20°C does not exceed 90%;
- c) The ambient air is polluted by the presence of airborne electrically conductive iron dust from train brakes.

The maximum altitude above sea level where the generating set shall operate is 1000m.