



A Division of Transnet SOC Limited

INFRASTRUCTURE MAINTENANCE

SPECIFICATION

Specification For A Singe Phase 7kVA Diesel Generator

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Transnet Freight Rail - Infrastructure

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1. Scope

- 1.1 The generator is required to perform as a power supply for power tools in case of absence of power.
- 1.2 The generator required by Transnet Freight Rail shall comply with the characteristics set out in this Specification. This document may therefore be used for item purchasing and approval.
- 1.3 The complete plant and equipment shall be suitably protected to operate in all weather conditions.
- 1.4 The generator shall fully comply with the requirements of SANS 1007:2010

2. Operating Conditions

- 2.1 Machine will be operated in all weather conditions at altitudes varying from sea level to 2000 m above sea level, relative humidity 10% to 90% and atmospheric conditions which vary from heavily saline to dry and dusty.
- 2.2 Ambient air temperatures ranging from -10° C to 40° C.
- 2.3 The machine will be used on and around railway tracks and on loose ballast.

3. Qualifications

- 3.1 The design of the machine is to be that of the manufacturer, but must be of robust construction in order to meet the sustained heavy-duty demands of railway infrastructure maintenance.
- 3.2 Bidders shall state the extent and location of technical support services country wide.

4. Performance

- 4.1 A service life of not less than 10 years is expected from each machine. The actual design life of the machines is to be stated.

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- 4.2 The machines are to be easily and economically maintained with standard workshop tools and equipment.
- 4.3 Power output and safe operation performance shall be as in this specification and relevant SANS standards.

5. Tests

- 5.1 The tests prescribed in clause 6 of **SANS 1007:2010** and SANS 60335:2007 shall be carried out on the equipment offered.
- 5.2 Type test certificates in respect of the design of the generator shall be submitted at time of tendering. Machines for which type test certificates are not available, are not acceptable.
- 5.3 Notwithstanding the successful completion of tests or the submission of test results, the bidder shall still be responsible for the satisfactory operation of the machine.
- 5.4 Transnet Freight Rail reserves the right to verify the information as supplied by the bidder. This will be done by means of actual testing of the generator at a Transnet Freight Rail laboratory or/and site. The generator may be tested at the bidder's premises if the test facilities can accommodate the tests required. Sample generators shall be available for testing if required.

6. Technical Requirements

6.1 Power output

- 6.1.1 The machine with a 7kVA rating, 240V at 50Hz-single phase is required. See scope of requirements per specific procurement.

6.2 Engine

- 6.2.1 The machine must be diesel engine driven.
- 6.2.2 The engine must have sufficient power to comfortably meet requirements of this specification.

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- 6.2.3 The engine must be fitted with an automatic shut-down in event of either low engine oil level, low oil pressure level and overheating.
- 6.2.4 The engine must be air cooled and naturally aspirated.
- 6.2.5 The machine shall be of a 12V electric starting system design.

6.3 Fuel Tank

- 6.3.1 The capacity of the fuel tank must be such that the generator can be operated for 5 hours at full load without the need to refill.

6.4 Switchboard

- 6.4.1 The switchboard shall be of the totally enclosed type with removable panel to give ready access to all internal equipment.
- 6.4.2 The switchboard shall be fully wired internally with wire and cable of adequate capacity and having high grade insulation suitable for service conditions as per CLAUSE 2.
- 6.4.3 The switchboard shall have sufficient protection against splashing water with a rating of IP54 as per SANS 60529 rating.
- 6.4.4 The following equipment shall be provided on the switchboard:
- A suitably rated circuit breakers for the outgoing supply.
 - 3 X 15A all-weather output socket that complies with SANS 164 and fitted with on/off switches. The three sockets must work independently at rated output.
- 6.4.5 All switches, circuit breakers, etc., shall be clearly marked in English to indicate their purpose. Labels shall be of the metal/plastic engraved type, screwed or riveted in position. Dynotape labelling will not be acceptable.

6.5 Documentation

- 6.5.1 A service manual, spare parts lists and operator's handbooks are required (including the engine) for each machine purchased or delivered.
- 6.5.2 Guarantee certificate shall be issued.

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- 6.5.3 The successful tenderer shall submit prints of the wiring and schematic diagrams for the entire machine.

6.6 Generator Unit Mobility

- 6.6.1 The machine must be as light as possible and fitted with a 2 or 3 wheels to allow for manoeuvrability by one person.

6.7 Frame

- 6.7.1 The frame and components of the generator unit must be robust.
- 6.7.2 The unit must be well protected against rust.
- 6.7.3 The unit must have a compact design with manoeuvring arms and handles. No component shall be located outside the main frame of the machine.
- 6.7.4 The arms and handles must be designed and positioned in a manner that would allow the unit to be manoeuvred safely and easily. Handles shall not be positioned below 70% of the machine height.
- 6.7.5 The grip on the handles must have a non-slip surface.
- 6.7.6 A lifting point must be fitted and situated such that the unit is balanced when lifted.
- 6.7.7 The machine must be designed and manufactured in a manner that would prevent accidental damage and damage when the generator is lifted onto/over the rail.

6.8 Measuring Gauges & Indicators/alerts systems

- 6.8.1 The unit must be fitted with a well-protected and reliable electric hour meter.
- 6.8.2 An indicator/alert system for low engine fuel, low oil level and overload is to be included in the machine design.
- 6.8.3 The meters and indicators must be positioned such that they are clearly visible.

6.9 Colour and Finish

- 6.9.1 Machine frame and components will be accepted in standard factory finish and colour. Due cognisance must be given to the life requirement of the machine.

6.10 Safety And Protection

6.10.1 It must be easy to stop the machine in an emergency. If the normal shutdown device is not readily accessible for this purpose, additional emergency shutdown must be fitted.

6.10.2 The generator set shall comply with the following SANS code and Relevant standards:

- **SANS 164:** *Plugs and socket-outlet systems for household and similar purposes for use in South Africa.*
- **SANS 8528:** *Reciprocating internal combustion engine driven alternating current generating sets*
- **SANS 60034-1:** *Rotating electrical machines – rating and performance*
- **SANS 60309-1:** *Plugs, sockets and couplers for industrial purposes – general requirements*
- **SANS 60335-1:** *household and similar appliances safety*
- **SANS 60906:** *Degrees of protection provided by enclosures(IP Code)*
- **SANS 1007:2010** – *RICE driven alternating-current low power generating sets*

6.11 Ergonomics

6.11.1 The generator unit must be ergonomically designed for maximum user operation and safety.

6.12 Assembly and handing over

6.12.1 The bidders price must include the cost of assembling, handing over in working order and training personnel in the care and use of the alternator at the final point of delivery.

7. Quality Control

7.1 All machines must be manufactured in an environment that complies to the latest ISO 9001 to ISO 9004 or similar quality control standards. Details must be furnished.

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- 7.2 Transnet Freight Rail shall where necessary subject machines to a technical evaluation and testing, final decision will, amongst others, be based on these findings.

8. Legal and Operational

- 8.1 All machines must comply with the requirements of the Machinery and Occupational Safety Act, (Act 85 of 1993 – General Machinery Regulations), relevant SANS codes and The Machinery Directive 2006/42/EC.
- 8.2 The petrol generator unit must be completely assembled and filled with lubricants and ready for service in all respects.
- 8.3 Where grease nipples are fitted these are to be to DIN 71412 in easily accessible positions. Full details of lubrication applicable to machines on offer to be submitted.
- 8.4 An operator's handbook, service manual and spare parts list must be supplied with each machine in order to ensure that the machine is operated in accordance to the manufacturer's instructions.
- 8.5 All machines and equipment must be supplied complete with essential/specialized tools such as Allen keys, spanners etc. in order to make essential adjustments where necessary.
- 8.6 Full details of technical support organisation is to be submitted. A minimum of 9 technical support organizations of such equipment within the geographical borders of the RSA as set out in the Constitution of RSA ACT 200 of 1993.
- 8.7 All machines and equipment is to be guaranteed for a minimum period of 12 months against faulty material and workmanship - fair wear and tear excluded. Full details of guarantee is to be submitted.
- 8.8 The information as requested by the various clauses in this specification are to be supplied in the form of technical data, pamphlets and/or drawings. If this is not complied to, offers may be overlooked.

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- 8.9 All machines shall come with data plate indicating the relevant information as set out in section 8 of SANS 1007:2010.
- 8.10 Notwithstanding the requirements as set out above, all bidders shall adhere to the requirements of the standard terms and conditions for supply of goods and services or other terms and condition as provided in the tender.

ANNEXURE A

TECHNICAL DATA SHEET (To be completed by bidders)

1. ENGINE

1.1 Maker's name and type number:

1.2 Rated output (continuous) at rated speed in kW at sea level and 30⁰ C ambient temperature:

1.3 Output at 5 % derating : _____ (Natural aspirated) kW output at 10 %
derating : _____

(Exhaust gas turbo charge kW with or without charge air cooler)

1.4 Fuel consumption in l/ kW/h at :

1.4.1 100 % alternator output: _____

1.4.2 50 % alternator: _____.

1.5 Fuel tank capacity in litres: _____.

1.6 Rated speed in R.P.M: _____.

1.7 Maximum change of speed on suddenly taking off or throwing on the rated load:

1.7.1 Temporary change as percentage of rated speed:

1.7.2 Permanent change as percentage of rated speed:

1.8 Guaranteed cyclic irregularity

1.9 Turbo charger – boost pressure (where offered)

1.10 Dry mass of engine (including flywheel) in kg:

1.11 Is engine still in production?

1.12 By what year is it anticipated that this engine will be out of production?

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- 1.13** State number of year's spare parts will be freely available after production of the engine offered has been discontinued:

- 1.14** The maximum load that can be suddenly applied to the engine while it is running at full rated speed, no load, and at normal running temperature:

- 1.15** The transient and permanent speed changes that will result from the application of this load

- 1.16** The transient and permanent speed rise resulting from full load being thrown off

- 1.17** The transient and permanent speed change resulting from a change of load, both off and on by any step of 25 % of the rated full load

- 1.18** The steady load speed band and recovery time to this speed band from all conditions stated above:

2. Alternator

- 2.1** Maker's name and type number:

- 2.2** Rated output:

- 2.3** Maximum output:

- 2.4** Temperature rise of windings at rated output not more than.....degrees centigrade.
- 2.5** Voltage, frequency and no. of phases

- 2.6** Guaranteed voltage regulation
_____.
- 2.7** Efficiency at: 100 % load.

at: 50 % load

- 2.8** Speed in R.P.M.

- 2.9** Mass of alternator in kg:

- 2.10** Maker's name and number of bearings :

ANNEXURE B

LUBRICATION ANNEXURE

LUBRICATION AND SERVICE

a)	Units	Capacity (l)	Specification	Drain at (hrs)
	Engine			
	Alternator			

b)	Filters	Clean (hrs)	Replace (hrs)	Part No.
Engine :	By-pass			
	Full flow			
	Crankcase breather			
	Fuel filters			
	Engine air cleaner			
	Other (specify)			