TRANSNET
freight rail

# INFRASTRUCTURE MAINTENANCE

# SPECIFICATION

## Specification For A Hydraulic Power Supply Unit



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# Contents

## 1. Scope

1.1 This specification outlines the requirements of a diesel engine driven, wheel mounted, hydraulic power unit that will be used for the maintenance of railway infrastructure.
1.2 The unit must supply two Type 1 System outputs, which will be used at the same time, and one Type RR System output, as per HTMA performance standards.
1.3 At any given time, either Type 1 systems or Type RR system will be in use.

## 2. Operating Conditions

2.1 Machines will be operated in all weather conditions at altitudes varying from sea level to 1850 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 -5° C to 45° C.

2.3 The machines 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 Power supply units must be compatible with hydraulic tools that operate on the "Open Centre Circuit" hydraulic system.

3.3 A "no-tool" adjustment machine is preferred.

3.4 Only products proven in service will be considered. A list of users, both South African and international, is to be submitted.

## 4. Performance

4.1 A service life of not less than 7 years is expected from each machine. The actual design life of the machines is to be stated.

4.2 The machines are to be easily and economically maintained with standard workshop tools and equipment.

4.3 The power supply unit must be compatible with hydraulic oil of viscosity grades 46 and 68 – details as per SANS 1218:2005 (Hydraulic Oil – Anti-wear Type).

## 5. General Requirements

5.1 The power unit must be a heavy-duty wheel mounted machine.
5.2 The machine must be complete with hydraulic manifold.
5.3 It should be manoeuvrable by one man.
5.4 The unit must have guidance wheels for use on rail.
5.5 The unit must use a high efficiency hydraulic oil pump/s complete with cooler and return line filter operating on a continuous basis and a suitable tank size to comply to the conditions of this specification.

## 6. Detailed Requirements

## 6.1 Duty Cycle

6.1.1 The machine must be rated for 100% duty cycle.

## 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 the hydraulic requirements at the highest altitude level. Due cognisance must be given to the life requirement of the machine.
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 or overheating.
6.2.4 The engine must be air cooled.

## 6.3 Battery

6.3.1 The unit must have a sealed lead acid battery of adequate capacity for electric starting.
6.3.2 The battery must be secured against theft.

## 6.4 Fuel Tank

6.4.1 The capacity of the fuel tank must not be less than 15 litres.

## 6.5 Hydraulic System Requirements

6.5.1 Details of the hydraulic manifold circuit must be furnished.
6.5.2 The power unit must have a suitably sized hydraulic oil tank to comply to the conditions of this specification
6.5.3 Flush fitted 12mm ($^1/_2$") fixed male and female quick release, flat-face fittings that comply to HTMA standards must be used.
6.5.4 The quick release fittings must be fitted with dust caps.
6.5.5 The hydraulic system must have sufficient heat rejection capacity to limit the maximum oil temperature to 60 °C at 100% duty cycle and maximum expected ambient temperature – see clause 2.2.
6.5.6 Should a hydraulic oil cooler be fitted, it must automatically switch on and off as and when required and it must be properly protected with a steel grid or plate.
6.5.7 System relief valves should be adjusted for cracking pressure as per HTMA requirements.
6.5.8 All adjustments must be sealable and tamper proof.

## 6.6 Power Unit Mobility

6.6.1 A suitable power driven mechanism must be offered in order that one operator can move the machine, as specified in this section, under it's own power.
6.6.2 Notwithstanding clause 6.6.4, a free-wheel operation to allow for manual positioning of the machine must also be available.
6.6.3 The unit must have fully variable speed from 0 to the maximum speed..
6.6.4. The maximum speed of the machine is not to exceed that which can be managed by a pedestrian.
6.6.5 The hydraulic power unit must be permanently fitted with pneumatic rubber tyred wheels.
6.6.6 The wheels must be foam filled.
6.6.7 The wheels must not be less than 300mm diameter.
6.6.8 Tyres to be at least industrial type 4 ply rating.
6.6.9 A rail conversion, which allows the machine to be manually pushed along tracks, must be supplied.
6.6.10 The rail conversion will be used on track gauges of 1065 to 1105mm, with and without check rails
6.6.11 The rail conversion must be quickly and easily attached and detached.
6.6.12 A parking brake(s), effective on and off rail, must be fitted to the power unit.
6.6.13 A "dead man" feature must be fitted to the power pack i.e. should the operator let go of the controls, the machine must not move from any position.
6.6.14 It must be easy for the power pack to climb onto and off the rail.
6.6.15 The machine have not less than 70mm ground clearance.
6.6.16 A single man must be able to safely move the machine up and down on rough terrain and standard ballast inclines in free-wheel and powered mode either forwards or backwards.
6.6.17 The power unit must be stable while navigating standard ballast inclines.

## 6.7 Frame

6.7.1 The frame and components of the power 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.
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. They should also be retractable.
6.7.5 The grip on the handles must have a non-slip surface.
6.7.6 A lifting point must 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 power pack is lifted onto/over the rail.

## 6.8 Weight and Dimensions

6.8.1 The weight of the completed unit is not to exceed 280kg.
6.8.2 The length of the completed unit is not to exceed 1180 mm (handles folded).
6.8.3 The width of the completed unit is not to exceed 1020mm
6.8.4 The height of the integral lifting point, measured from ground level to the top of the lifting point, is not to exceed 990mm.
6.8.5 The total height of the power pack, measured from ground level, is not to exceed 990mm.

## 6.9 Component Markings

6.9.1 All hydraulic couplers, valves and other critical equipment on the power pack is to be clearly marked with respect to the capacities and type of fluid that is to be contained within that component.
6.9.2 Coupling points are also to indicate whether they are supply or return points.

## 6.10 Measuring Gauges & Indicators

6.10.1 The unit must be fitted with a well-protected and reliable electric hour meter and fuel gauge.
6.10.2 A hydraulic oil system level gauge and thermometer is to be included in the power unit design.
6.10.3 A light indicator for low engine fuel and oil level is to be included in the power unit design.
6.10.4 The gauges and light indicators must be positioned such that they are clearly visible.

## 6.11 Colour and Finish

6.11.1 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.

## 6.12 Safety And Protection

6.12.1 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.

## 6.13 Ergonomics

6.13.1 The power unit must be ergonomically designed for maximum operator productivity and safety.

## 6.14 Optional Extras

6.14.1 A support grid for two sets of 15m, 16mm (⅝" ) hydraulic hoses is to be offered as an optional extra.

6.14.2 The grid must be generally in accordance with drawing BBC1651 and must be adapted to suit the machine.

## 7. Quality Control

7.1 All machines must be manufactured in an environment that complies to the latest ISO 9000 to ISO 9004 or similar quality control standards. Details must be furnished.

7.2 Machines will be subject to a technical evaluation and the 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) and The Machinery Directive 98/37/EC.

8.2 The power pack 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 tools such as allen keys, spanners etc. in order to make essential adjustments as well as to fit or remove consumable items.

8.6 Suppliers of hydraulic machinery will be required to stock a full range of readily available spare parts required for the maintenance of these machines throughout their life span. Full details of service organisation is to be submitted.

8.7 Consumable items must be available locally and must be of standardised format in order to be used on equipment of more than one supplier.

8.8 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.

8.9 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.

8.10 Each machine purchased will be issued with a project number consisting of 20 characters which must be stamped or engraved directly onto the machine **or** on the manufacturer's data plate **or** a separate riveted plate on the particular machine.

8.11 Sufficient training must be given to all operators of these machines.

8.12 Machines not already in service with Transnet Freight Rail must be made available for testing/evaluation during the adjudication of the tender. Technical improvements on existing machines/equipment is to be substantiated by physical examples.