

INFRASTRUCTURE ENGINEERING

**PROCUREMENT
SPECIFICATION**

Specification For True RMS Digital Multimeter

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Transnet Freight Rail - Infrastructure

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1. General Requirements

- 1.1 This specification outlines the requirements of a portable, heavy duty true rms digital multimeter.
- 1.2 The digital multimeter shall be ergonomically designed for maximum operator productivity and safety.

2. Operating Conditions

- 2.1 The digital multimeter will be operated in all weather conditions at altitudes varying from sea level to 1850m above sea level, relative humidity of 10% to 90% and atmospheric conditions which vary from heavily saline to dry and dusty.
- 2.2 Ambient air temperatures ranging from -20° C to 50° C.
- 2.3 Vibration and shock shall be as per MIL-PRF_28800 for class 2 instruments.
- 2.4 Dust and dip proof shall be as per IP67.
- 2.5 EMC compatibility shall be as per EN61326-1
- 2.6 LCD display must not be affected by light rail and damp conditions.

3. Qualifications

- 3.1 The design of the digital multimeter is to be that of the manufacturer, but must be of robust construction in order to meet sustained heavy duty demands, yet it must be light and easy handled by one operator.
- 3.2 The digital multimeter will be acceptable in standard factory production finish and colour. Details to be furnished.

4. Performance

- 4.1 The actual design and service life of the digital multi-meter is to be stated.
- 4.2 The digital multi-meters are to be easily and economically maintained with standard workshop/calibration tools and equipment. Details of maintenance/service/calibration firms(locally) that can perform such services are to be supplied at the time of tendering. Minimum of three (3) centres in South Africa.

5. Technical Requirements

5.1 General Description

- 5.1.1 A heavy duty, portable and digital multi-meter capable of performing electrical test measurements on signal equipment within Transnet freight rail.
The multi-meter will be used for a wide range of tests and measurements: from simple spot checks to timed tests and breakdown tests.
- 5.1.2 The equipment must come in a lockable case capable of storing all accessories furnished with the device.

5.2 Operational requirements

- 5.2.1 The digital multi-meter shall be capable of performing measurements as set out below:

Function	Range	Accuracy
Voltage DC	50.000 mV to 1000.0V	0.025 %
Voltage AC	50.000 mV to 1000.0V	0.4 %(true-rms)

Current DC	500.00 μ A to 10.000 A	0.06 %
Current AC	500.00 μ A to 10.000 A	0.6% (true-rms)
Temperature (excluding probe)	-200.0 °C to 1350.0 °C (- 328.0 °F to 2462.0 °F)	1.0 %
Resistance	1.00 Ω to 500.0 M Ω	0.05 %
Capacitance	1.000 nF to 100.00 mF	1.0 %
Frequency	99.999 Hz to 999.99 kHz	0.005% + 5
Additional functions/features	Multiple on-screen displays	required
	True-rms AC bandwidth	100 kHz
	DBV/dBm	required
	Conductance	50.00nS
	Continuity beeper	required
	Current inputs	Fuse protected
	Peak	250 μ S
	Elapse time clock	required
	Time of day clock	required
	Min-Max-Avg	required
	Pulse width	0.025 ms, 0.25 ms, 2.5 ms, 1250.0 ms
	Auto and manual ranging	required
	Reading memory	required
	Log to PC	required

The measuring ranges shall be specified in terms of full scale values, where wide ranges are specified the instrument shall include a suitable number of intermediate ranges.

5.3 Power supply requirements

5.3.1 Main power source shall be from a pack of rechargeable and a backup pack of batteries shall also be provided incase the main source run out. Battery life of 800 hours is required.

5.3.2 The batteries shall have a maximum 3 hours recharge time, automatic cut-off shall also be provided. The battery packs shall be fully protected against overcharge and over-discharge.

5.3.3 The charge source shall be of 220V AC, 50Hz of a normal South African electrical socket.

5.4 Preferred mass and housing

5.4.1 The mass of the unit shall not exceed 2 kg.

5.4.2 The housing for the units making up this device shall be of robust construction to sustain heavy duty demands under the service conditions as stated in clause 2 of this specification.

5.5 Additional requirements

- 5.5.1 An operator's handbook, calibration chart and spare parts list must be supplied with each device in order to ensure that the device is operated in accordance to the manufacturer's instructions.
- 5.5.2 Sufficient training must be given to all operators of these devices when necessary.
- 5.5.3 All devices and equipment must be supplied complete with essential tools and consumable items as necessary including but not limited to:

- Measuring test leads
- Test probes – slim reach
- Alligator clips for use with test leads
- Safety grip – wide jaw alligator clips
- Soft carry case

Details to be furnished for any specialised tools required for a start-up of this device.

5.6 Safety

- 5.6.1 IEC61010 - Measurement category III, 1000V, pollution degree 2
- 5.6.2 IEC61010 - Measurement category IV, 600V, pollution degree 2
- 5.6.3 IEC61010-2-31 – Safety requirements for hand held probe assemblies

5.7 Documentation

- 5.7.1 Detailed user manual.
- 5.7.2 Calibration certificate from accredited SANAS laboratory.
- 5.7.3 Guarantee certificate.

6. Data Plate

- 6.1.1 The insulation tester must come with a data plate.
- 6.1.2 The brand, model and serial number of the insulation tester must clearly shown.
- 6.1.3 The actual weight in kilograms (kg) of the insulation tester must be shown on the machine
- 6.1.4 The actual dimensions of the insulation tester must be indicated in millimetres (mm).

7. Quality Control

- 7.1 All meters 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.
- 7.2 Meters 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 equipment to comply with the requirements of the SANS, IEC 61010-1/1990 and other specification(s)/standards applicable to test instruments and safety.
- 8.2 The information as requested by the various clauses in this specification is to be supplied in form of technical data, pamphlets and/or drawings. If this is not complied with, offers may be overlooked. Offers which include deviations of a minor nature from the terms of this specification will be considered at the discretion of Transnet Freight Rail (Train Authorisation systems)
- 8.3 Transnet Freight Rail reserves the right to verify the information as supplied by the tenderer. Digital multi-meters not already in service with Transnet Freight Rail must be made available for testing/evaluation during the adjudication of the tender. Tests will be at Transnet Freight Rail laboratory or on site unless the tenderer's premises can accommodate for the tests required for the approval process.
- 8.4 All digital multi-meters are to be guaranteed for a minimum period of 24 months against faulty material and workmanship - fair wear and tear excluded. Full details of guarantee are to be submitted.
- 8.5 Maintenance/service/calibration centres for this type of device shall be available locally. Full details of such organisations are to be submitted at tendering stage.

END OF SPECIFICATION