



A Division of Transnet SOC Limited

RAIL NETWORK

ELECTRICAL DEPARTMENT

SPECIFICATION

EARTH RESISTANCE TESTER

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Transnet Freight Rail - Infrastructure

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1. GENERAL REQUIREMENTS

- 1.1. This specification outlines Transnet Freight Rail's requirements for the supply and delivery of an Earth Resistance Tester (K4106 or similar).
- 1.2. The Earth Resistance Tester shall be ergonomically designed for maximum operator productivity and safety.
- 1.3. The instrument shall be of robust nature and designed to withstand the rough conditions of the railway environment.

2. OPERATING CONDITIONS

- 2.1. The Earth Resistance Tester will be operated in all weather conditions as well as salt laden and industrial atmosphere.

Altitudes: From sea level to 2000m above sea level.

Relative humidity: 10% to 95%

Atmospheric conditions: May vary from heavily saline to dry and dusty conditions.

Ambient air temperatures: -10° C to 50° C. (daily average +30° C)

3. QUALIFICATIONS

- 3.1. The design of the Earth Resistance Tester 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 Earth Resistance Tester 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 Earth Resistance Tester is to be stated.
- 4.2. The Earth Resistance Tester 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.

5. TECHNICAL REQUIREMENTS

5.1. General Description

- 5.1.1. A portable and digital display Earth Resistance Tester capable of testing ground stake (earth spikes) and soil resistivity. The instrument must be a four pole.

5.2. Operational requirements

- 5.2.1. The instrument is easy to use with a large rotary selector switch and one-press test button, both of which permit operation with gloved hands.
- 5.2.2. The instrument must enable true stakeless measurements to be made in situations where driving stakes is not practical.
- 5.2.3. The digital ground tester must be powered from rechargeable AA cells and must come with a built-in battery charger and the instrument must be supplied with an AC/DC adaptor.
- 5.2.4. The instrument must provide all the functions required for ground system testing: variable frequency 2 pole, 3 pole, 4 pole, Attached Rod Technique (ART), Stakeless, leakage current and ground noise voltage measurement.
- 5.2.5. The instrument must be equipped with digital LCD that shows detailed measurement data.
- 5.2.6. It must be supplied with all test leads, four stainless steel earth spikes, and a hammer suitable to drive the spikes into the ground.
 - 5.2.6.1. The length of each earth spike should not be less than 30cm and the diameter should be adequate to avoid bending when being driven into the ground. The head of the spike should be designed in such a way that it can be uprooted from the ground effortlessly.
 - 5.2.6.2. Four flexible 2.5mm² leads should be provided. Each shortest lead should not be less than 20m in length, with the longest not more than 50m. Each lead should be equipped with a crocodile clip on one end and the other end, with a banana plug and it shall be supplied on a PVC roller.
- 5.2.7. The earth tester should have a tough carry case which has space to accommodate it and its accessories. A separate carry case should be provided for the earth spikes, cables, and the hammer to avoid damage to the instrument during damage.

5.3. Power supply requirements

5.3.1. Battery type and charger:

- 5.3.1.1. The instrument shall be equipped with a built-in rechargeable battery with a battery charge or NiMH high quality cells.

5.3.2. Ground current range with clamp and accuracy.

- 5.3.2.1. 0.5 mA to 19.9 A

- 5.3.2.2. 5% ± 3 digits

5.3.3. Ground voltage range and accuracy.

- 5.3.3.1. 0 to 100 V AC or more

- 5.3.3.2. 2% ± 2 V

5.3.4. Resistance Ranges and accuracy.

- 5.3.4.1. 2, 3, 4 pole: 0.01 Ω to 200k Ω

- 5.3.4.2. ART: 0.01 Ω to 200k Ω

- 5.3.4.3. Stakeless: 0.01 Ω to 200k Ω

5.3.5. Resistance Accuracy.

- 5.3.5.1. 2P measurement: 2% ± 3 digits

- 5.3.5.2. 3P measurement: 2% ± 3 digits

- 5.3.5.3. 4P measurement: 2% ± 3 digits

6. DATA PLATE

- 6.1. The Earth resistance tester must come with a data plate.
- 6.2. The brand and model number of the insulation tester must clearly be shown.
- 6.3. The actual weight in kilograms (kg) of the insulation tester must be shown on the machine.
- 6.4. The actual dimensions of the insulation tester must be indicated in millimetres (mm).

7. COMPLIANCE AND CERTIFICATION

- 7.1. The earth resistance tester must compliance with relevant international and national standards.
- 7.2. It must be supplied with calibration certificates traceable to national standards.
- 7.3. It must come with a minimum of 1 year warranty where the supplier shall take full responsibility in repairing or replacing the faulty unit and component unless it has been proven to be negligence on the side of the end user.

8. TECHNICAL EVALUATION

- 8.1. The information as requested by the various clauses in this specification is to be supplied in the form of technical data, pamphlets and/or drawings. If this is not complied to, offers may be overlooked.
- 8.2. The data sheet for the earth spikes and the test leads should be supplied separately if the ones that come with the earth tester do not meet the required standard.