



A Division of Transnet Limited

TECHNOLOGY MANAGEMENT

SPECIFICATION

SELF-CONTAINED BATTERY AND CHARGER UNITS FOR ELECTRIC LIGHT AND POWER SUBSTATIONS

Appendix A – Schedule of requirements – to be filled in by Transnet freight rail

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Transnet Freight Rail
Capital projects

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Specification Change Summary

Title: Self-contained Battery and Charger units for electric and power

Scope: This specification covers the manufacture of self-contained low capacity battery and battery charger units, housed in steel cabinets, for providing direct supplies for high voltage switchgear closing and tripping.

Changes made to Specification

1. Converted the old SABS specifications to new SANS specification in the reference section in the document.
2. Tendering procedure was changed to new format and does not make reference to old document.
3. Service operating conditions was updated to new environmental conditions.
4. The inspection to be performed changed to Technology Management staff in the electrical section.
5. The entire document was reformatted in the new TFR format.
6. All reference to Spoornet was changed to Transnet Freight Rail.
7. CEE 0012 was replaced with Method of tendering in the document.

1.0. SCOPE

This specification covers Transnet Freight Rail's requirements for the supply and manufacture of self-contained low capacity battery and battery charger units, housed in steel cabinets, for providing direct supplies for high voltage switchgear closing and tripping.

2.0. STANDARDS AND PUBLICATIONS

The latest version of the following standards and publications are referred to herein.

2.1. SOUTH AFRICAN STANDARDS (SANS)

SANS 10064	: Code of practice for the preparation of steel surfaces for coatings.
SANS 1091	: National colour standard for paint
SANS 1274	: Coatings applied by powder coatings process
SANS 1652	: Battery charger- Industrial type
SANS 60335-2-29	: General purpose battery chargers
SANS 60623	: Secondary cells and batteries containing alkaline or other non-acid electrolyte – vented nickel-cadmium prismatic rechargeable single cells

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CEE.0045	: Specification for painting of steel components of electrical equipment.
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3.0. APPENDICES

The following appendices form an integral part of this specification and shall be read in conjunction with it.

3.1 Appendix A: – “**SCHEDULE OF REQUIREMENTS**”- (To be filled in by Transnet freight rail).

This appendix details Transnet Freight Rail's specific requirements as required for a specific installation.

3.2. Appendix B – “**TECHNICAL DATA SHEET**”

This appendix calls for specific technical information to be furnished with tenders.

4.0. TENDERING PROCEDURES

4.1. The tenderers shall indicate clause by clause compliance with this specification. This shall take the form of a separate document listing all specification clause numbers indicating the individual statement of compliance or non-compliance.

4.2. The tenderer shall motivate a statement of non-compliance.

4.3. Tenderers shall complete appendix 2. “Technical Data Sheet”.

4.4. Tenderers shall submit descriptive literature consisting of detailed technical specifications, general constructional details and principal dimensions, together with clear illustrations of the equipment offered.

4.5. Failure to comply with clauses 4.1, 4.2, 4.3 and 4.4 could preclude a tenderer from consideration.

5.0. SERVICE CONDITIONS

5.1. The equipment shall be designed and rated for installation and continuous operation under the following conditions:

- Altitude : 0 to 1800m above sea level.
- Ambient temperature : -10°C to +50°C
- Relative humidity : 10% to 90%
- Lightning Conditions : 12 ground flashes per square kilometre per annum
- Pollution : Heavily salt laden or polluted with smoke from industrial sources.

6.0. GENERAL REQUIREMENTS

6.1. BATTERY AND BATTERY CHARGER CABINET

- 6.1.1. The cabinet shall be 1.6mm thick, sheet steel of rigid design and construction forming a self-contained unit and shall be designed for floor standing with the back of the cabinet against the wall.
- 6.1.2. The cabinet shall be painted in accordance to Transnet freight rail specification CEE.0045, the preparation for the coating surfaces shall be in accordance to SANS 10064, and coated in accordance to SANS 1274.
- 6.1.3. The finishing colour shall be Dove Grey in accordance to SANS 1091, under column colour name in Annexure B, Normative, table B.1.
- 6.1.4. The cabinet shall be adequately ventilated to eliminate heat built up and all possibility of hazardous conditions due to accumulation of gas.
- 6.1.5. The battery charger shall be housed in the same cabinet as the sealed batteries but in separate compartment.
- 6.1.6. The arrangement of the battery cell terminals in the battery compartment shall be readily visible and accessible from the front of the cabinet for inspection and maintenance.
- 6.1.7. Battery cells shall not be in physical contact or in close proximity to any component which is liable to generate heat.

6.2. BATTERY

- 6.2.1. The battery shall be as specified in APPENDIX 1 and shall comply with SANS 60623.
- 6.2.2. Nickel-Cadmium batteries shall be mounted on stepped shelves in the bottom of the charger cubicle. The shelves shall be painted with an alkaline resistant polyurethane paint.
- 6.2.3. The battery shall be capable to discharge and charge cycles without detrimental effects to its life.
- 6.2.4. The charging for battery types shall be in accordance with table 2 of SANS 1652.
- 6.2.5. The terminal posts must be clearly and indelibly marked to indicate their polarity.

6.3. BATTERY CONTAINER

- 6.3.1. Batteries containing liquid electrolyte, the cell containers shall be of transparent plastic.
- 6.3.2. Filter and vent plugs shall be provided to prevent spillage or creepage of electrolyte and allow easy exit of the gases during charging.
- 6.3.3. The normal electrolyte level and the recommended fully charged specific gravity shall be clearly embossed on the cell containers.

6.4. BATTERY CHARGER

- 6.4.1. The charger shall have a dual constant voltage characteristic for charging vented batteries and shall comply with SANS 60335-2-29.
- 6.4.2. The following facilities shall be provided:
- Automatic boost every 28 days
 - Earth fault alarm
 - Charge fail alarm
 - Low voltage alarm
 - High voltage alarm
 - Automatic battery discharge test every 10 hours
- 6.4.3. Two sets of potential free change-over contacts shall be provided for each alarm and be rated at 1 amp with a switching capacity of 30 watts.
- 6.4.4. The maximum current drain on the battery from the alarm under charge fail conditions shall not exceed 60mA.
- 6.4.5. At the lowest rate of charge the charger shall supply the battery with the charge necessary to:
- maintain the battery in full state of charge and,
 - re-charge the battery to 80% capacity within 8 hours after the battery has gone through the full discharge cycle as specified.
- 6.4.6. The higher rate of charge (output amps) shall not be less than 20% of the Ampere Hour (AH) capacity of the battery.
- 6.4.7. The charger shall incorporate the following features:
- A single phase, double wound, vacuum impregnated transformer, with an input voltage of 220/250V
 - A full wave, silicon rectifier, with surge suppression,
 - A flush mounted voltmeter to indicate battery voltage,
 - A flush mounted ammeter to indicate charging current,
 - A main switch, to isolate the AC input,
 - A switch, to isolate the DC output circuit,
 - A manual boost initiate, cancel pushbuttons and timer to reset to normal charging,
 - Positive and negative earth fault indications and alarm with a sensitivity of 10mA.
 - A charge fail alarm and indication,
 - A low voltage alarm and indication operating at 85% of nominal battery voltage,
 - A high voltage alarm initiated when the charging voltage exceeds 102% of float voltage for a period of 21 hours or instantaneously at 120% of nominal DC voltage,
 - An automatic test facility to test the battery internal resistance every 10 hours.
- 6.4.8. Automatic boost charging shall be initiated every 28 days and terminated automatically 10 hours after reaching the knee point of the battery voltage charging characteristic.
- Boost charging shall also be initiated by a low voltage condition which must also be restart 28 day boost cycle.
 - An override timer shall prevent boost charging for more than 21 hours.
 - A red LED for boost charge indication shall be provided.

7.0. SPARES

- 7.1. The following accessories shall be supplied with each complete battery:
- two spares intercell connectors complete with bolts,
 - one precision type hydrometer,
 - thermometers, range 0°C to 55°C, suitable for taking cell electrolyte temperature,
 - one portable type cell-testing voltmeter, with centre zero and range 3-0-3 volts.
- 7.2. The tenderer shall state whether a complete range of spares is held in stock by their local representatives for subsequent purchase by Transnet freight Rail as and when required,
- 7.3. A detailed description of each item including manufacturer's catalogue number where applicable shall be furnished.
- 7.4. The tenderer shall submit a separate quote for recommended spares for maintenance purposes,
- 7.5. The spares list shall be divided into two parts, one covering items likely to be used in a 12-month period and those to be used in a 10-year period.

8.0. PACKING

- 8.1. All equipment shall be packed in such a manner that it will be adequately protected against damage during handling and transport.

9.0. MAINTENANCE INSTRUCTIONS

- 9.0.1. A set of maintenance instructions for the battery including charged/discharged characteristics and wiring diagram of the equipment shall be packed with each unit and forwarded to TFR at no extra cost.

“SCHEDULE OF REQUIREMENTS”-
(To be filled in by Transnet Freight Rail)

- 1.0. Item no.:.....
- 2.0. Required for:.....
- 3.0. System Voltage:
- 4.0. Type of battery :
 - a) Open/Sealed Nickel Cadmium
 - b) Open/Sealed Lead Acid
- 5.0. Nominal battery voltage:.....
- 6.0. Power and time for closing per breaker:.....
- 7.0. Number of breaker to be tripped:.....
- 8.0. Special Requirements:.....

TECHNICAL DATA SHEET

(To be completed by tenderers and submitted as part of their tender)

- 1.0.** Item no.:.....
- 2.0. CABINET**
- 2.1. Mounting:.....
- 2.2. Dimensions:.....
- 2.3. Type and thickness of material:.....
- 2.4. Painting and protection against corrosion:.....
- 2.5. Details of ventilation:.....
- 3.0. BATTERY**
- 3.1. Type:.....
- 3.2. Number of cells:.....
- 3.3. Capacity at 5-hour rate:.....
- 3.4. Material and thickness of separators:.....
- 3.5. Type of plates:.....
- 3.6. Material of cell container:.....
- 3.7. Nominal battery voltage:.....
- 3.8. Expected battery span:.....
- 4.0. BATTERY CHARGER**
- 4.1. Lower rate of charge:.....
- 4.2. Higher rate of charge:.....