

ANNEXURE-1

Supply, Installation and Commissioning of Short circuit and over charger test bench at GARC

Global Automotive Research Centre (GARC)
Plot E1, SIPCOT Industrial Growth Centre, Oragadam, Mathur Post,
Sriperumputhur Taluk, Kanchipuram Dist-602105, Tamil Nadu, India

Technical Requirements

Scope of work

The scope of work shall be supply, installation, commissioning and testing of Short circuit and over charger test bench as per **AIS - 048**.

A1 Requirements

A1.1 -Short Circuit Testing

It is required to have Test Bench to test the Battery Cell or Battery Module or Battery Pack for Short Circuit Test. The Test Bench shall be a PLC or automation controlled based testing Test Bench with provision to test one of the Battery Cell or Battery Module or Battery Pack one at a time.

The Test Bench should have Test Station with provisions to load the Battery Cell or Battery Module or Battery Pack one at a time on the Test Bench. With the Battery at nominal operating temperature as specified by the manufacturer, fully charged condition at test room temperature not exceeding 30°C, apply a hard short in less than one second to the Battery with a conductor of $\leq 5\text{m}\Omega$ for 10 minutes, or until another condition occurs which prevents completion of the test (i.e., component melting, etc.), or for systems with less than $\leq 0.9 \text{ m}\Omega/\text{V}$ system voltage $\pm 0.1\text{m}\Omega$ internal resistance, a conductor of 1/10 of the minimum resistance of the cell/module shall be used. The size of conductor shall be such that, it shall be able to withstand the short circuit current during the test duration. If the multiple module is available, test a module that has been removed from its standard container. If more than one module is tested, increase the resistance to minimum extent required, in order to apply reduced short circuit currents, to avoid burn-out of cell interconnects within the test article. The load resistance chosen for such testing depends on rated voltage of the modules in question.

This test will be performed with integrated, passive short circuit protection devices operational (e.g., integrated devices that require no external input). All non-passive protective devices shall be disabled prior to this test. Continue observation for an additional two-hour period

At the end of the test, there shall be no:

- a) Physical damage to the casing or other mechanical parts.
- b) Melting of components.
- c) Fire or explosion.

It is acceptable for the battery to become dry at the end of the test.

A2. -Overcharging Testing

With the battery at its designed operating temperature as specified by the manufacturer, fully charged (100% SOC), contained at ambient temperature at 27+50C. The battery is to be overcharged at a constant charging current of 0.1(C10) A value for a test duration of ten hours is reached.

At the end of the test, there shall be no:

- a) Physical damage to the casing or other mechanical parts.
- b) Melting of components.
- c) Fire or explosion.

The Test Bench will have Test Station with provisions to load the Battery Cell or Battery Module or Battery Pack one at a time on the Test Bench. One set of Charging Cable will be provided with the Bench.

The scope of work/supply should meet the above requirement covers the following major activities / elements:

Design, Manufacture, Supply of

1. Test Bench will be delivered with all deliverables as compliance AIS-048.
2. Installation of the Test Bench at site
3. Training the concerned engineer/supervisor of the Machine.
4. The Test Bench will have necessary mistake-proof (Poka-yoke) arrangements to avoid any mistakes to the maximum extent possible.
5. The Test Bench will have suitable interlocks to ensure operator safety.
6. The Test chamber should be made of MS section not less than 10mm base to withstand the explosion and contains of exhaust system.
7. Manuals: A set of system operating manuals should be supplied.
8. Warranty: 24 Months.

ACCEPTANCE TEST PROCEDURE

VISUAL INSPECTION: The System shall be inspected for:

- a) Physical damage
- b) Model / Part No. Verification.
- c) Presence of authentic logo / hologram of the Manufacturer.

PERFORMANCE TESTING OF:

The unit shall be checked for compliance of AIS – 048 subject standard of testing

CERTIFICATE VERIFICATION

- a) I&C certificate shall be verified
- b) Warranty certificate shall be verified

These above-mentioned Tests and Verifications will complete the Acceptance Test Procedure.