

GOVERNMENT OF INDIA



MINISTRY OF RAILWAYS

TI/STR/016

(Revision-1 2)

Schedule of Infrastructure Requirements

for

Approval of Vendors for supply, manufacture, testing and quality control

Of

AUXILIARY TRANSFORMERS

CONNECTED TO 25000 Volts AC traction system.

(Specification No. ETI/PSI/15(08/2003) and Specification No. ETI/PSI/15A(07/82)  
with A&C Slip No. 1 TI/SPC/PSI/AT/0200)

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**1.0 GENERAL:**

- a) This schedule covers technical requirements and essential facilities for manufacture, testing and quality control and supply of auxiliary transformers for use in 25 kV single phase AC traction system on Indian Railways.
- b) The manufacturer shall be registered as transformer manufacturer of single phase, oil filled, 25 kV /240 Volts, 5/10/25/50/100 KVA ratings as per RDSO specification No. ~~ETI/PSI/15(08/2003)~~ and ~~Specification No. ETI/PSI/15-A (7/82)~~ with A&C slip No. 1 **TI/SPC/PSI/AT/0200**.
- c) The different terminology used as manufacturer, supplier, firm and vendor in this STR shall be same and meaning as manufacturer.
- d) Adequate power supply must be sanctioned to the firm for the production of the auxiliary transformers along with back up DG set.
- e) The environment in the manufacturer's premises should be clean and pollution free.
- f) The manufacturer must have the items like fire extinguishers, safety warning board. Shock treatment charts and medical first aid kit in the premises.
- g) **The 'Make in India' policy of 'Government of India' shall be applicable**

**2.0 PERSONNEL:**

The design engineer and production engineer at the manufacturer's works should be graduate/diploma engineer. They shall be fully conversant with the following-

- a) Indian Electricity Act/Rules
- b) RDSO specification No. ~~ETI/PSI/15(08/2003)~~ and ~~specification No. ETI/PSI/15-A (7/82)~~ with A&C slip No. 1 **TI/SPC/PSI/AT/0200** and also IS: 2026.
- c) Workshop practice for manufacturing of electric equipment and safety.
- d) Testing procedures.

The artisan staff shall be trained in the required skills for manufacturing activities and record of same shall be kept. The manufacturer should organize regular training programs for up gradation of the knowledge and skills of the employees.

**3.0 ISO & DOCUMENTATION, DESIGN/DRAWINGS OFFICE:**

- a) The manufacturer should have acquired ISO- 9000 series certificate for the product for which approval is sought and it should be broadly covered in the scope of the certification for manufacture and supply.
- b) Documents and records should be maintained as per ISO norms to indicate the easy traceability of the product from shearing stage to finished product stage.
- c) There should be a system of documentation in respect of rejection at customer end and warranty replacement.
- d) A design/ drawing cell equipped with CAD facility in the premises of the manufacturer for dealing the design/drawing of all equipment/components used in the manufacture of auxiliary transformers is essential.

- e) The manufacturer should keep record on "work instructions" for different activities/processes undertaken in manufacture of auxiliary transformers.

#### 4.0 STORAGE AND MATERIAL HANDLING:

- a) Manufacturer should have adequate covered accommodation and appropriate storage facilities for raw material, in process items, insulating materials and finished product.
- b) Manufacturer should keep the required tools to be used by artisan staff in manufacture of auxiliary transformers.
- c) Rejected / expired materials should be stored in separate area to avoid its mixing.
- d) Winding material including copper, insulating tapes and varnishes should be stored in dust free and dry area.
- e) Transformer oil should be stored in barrels /tanks in a separate area and protected from fire etc.
- f) Suitable material handling equipment's like fork lift, crane and trolley etc should be there for proper movement of materials.

#### 5.0 MANUFACTURING FACILITIES:

The manufacturing area should be dust free with suitable ventilation arrangements Manufacturer should have the following plants/ machines/ equipment of suitable capacity/rating required for manufacturing of the Auxiliary transformers in different stages as per RDSO specification in its works.

##### Winding Shop

- i. HV coil winding machine
- ii. LV coil winding machine
- iii. Winding formers
- iv. Coil stands of different sizes.
- v. Welding/Brazing/crimping machine

##### Core coil Assembly shop

- i. Core building fixture
- ii. Coil pressing fixture
- iii. Brazing set
- iv. Crimping tools
- v. Hoist/crane
- vi. Electric oven
- vii. Air compressor

##### Workshop & Maintenance

- i. Lathe machine
- ii. Vertical drill machine
- iii. Welding machine

##### Insulation shop

- i. Circle cutting machine
- ii. Board cutter
- iii. Power press
- iv. Drill machine
- v. Shearing machine

##### Tanking shop

- i. Platform trolley
- ii. Dry air blower
- iii. Vacuum drying chamber
- iv. Vacuum pump
- v. Hoist/Crane
- vi. Oil filter machine
- vii. Air compressor

##### Power Supply

Suitable power must be sanctioned to the firm for the production of the Auxiliary transformer along with back up DG set.

#### 6.0 TESTING FACILITIES:

The manufacturer should have the following testing and measuring equipment. These instruments should be calibrated with the standard master instruments

accountable to National Physical Laboratory or a NABL accredited agency. Each instrument should have a valid calibration certificate.

- i. Voltage regulator
- ii. Intermediate transformer
- iii. High voltage testing transformer
- iv. HV current and Voltage transformer
- v. Ammeter, Voltmeter
- vi. Wattmeter
- vii. Ratio meter
- viii. Oil testing set
- ix. Wheatstone bridge.
- x. Digital micro ohm meter
- xi. Motorised insulation tester
- xii. Test control panel

### 7.0 Q.A. Programme & Customer feedback:

- a) Manufacturer should have quality system to ensure that product conforms to the requirements of RDSO specification No. ~~ETI/PSI/15(08/2003)~~ and specification No. ~~ETI/PSI/15A (7/82)~~ with A&C slip no. ~~1~~ **TI/SPC/PSI/AT/0200** and also as per IS: 2026.
- b) Quality manual of the manufacturer for IS- 9000 should clearly indicate at any stage the control over manufacturing and testing of the said railway product.
- c) Quality Assurance plan for the product should include various aspects like-
  - i) Organisational chart
  - ii) Flow process chart
  - iii) Stage inspection details
  - iv) Various parameters to be maintained to ensure control.
  - v) Policy of disposal of rejected material should be implemented and record is maintained for documentary evidence.
- d) The manufacturer should have a system of monitoring the complaints for supplied products. The complaints made by the customer should be identifiable to the various manufacturing stages of the product and linking the complaint for corrective and preventive action of the product.

### 8.0 Inspection Facility:

The manufacturer should have an effective inspection system to monitor quality of

- i) Inward raw material.
- ii) Stage inspection at various stages.
- iii) Inspection of the final assembled product to confirm adherence to the requirement/specification.

Documentation of the following should be maintained.-

- i) Incoming raw material with TC reference of supplier as well as internal test/ audit checking from outside agency.
- ii) Ensure that details regarding stage inspection and test results are available.

- iii) Ensure that a system exists for calibration of testing & measuring equipment and record is maintained.

#### 9.0 Revalidation:

- a) ~~RDSO will issue vendor approval for two years. This can be extended on the firm's request and based on the performance of the equipment and manufacturer. RDSO can conduct quality audit/ inspection of the firm at any time during this period or at the stage of giving extension of vendor approval.~~
- b) ~~Prototype shall be approved after successful tests as per RDSO specification and it will be valid for two years. Subsequent extension of prototype can be done based on performance of equipment/ test as desired by RDSO. The type tests will be repeated at an interval of every five years for revalidation.~~

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