

GOVERNMENT OF INDIA
MINISTRY OF RAILWAYS



सत्यमेव जयते

TI/STR/004
(Revision-1)

SCHEDULE OF infrastructure **TECHNICAL** REQUIREMENTS
FOR
~~manufacturing & testing facilities and Quality Control requirements~~
Approval of Vendors for Supply of
Air Cooled Series Reactors for Shunt Capacitor Banks for Traction Sub-
Stations of Indian Railways

~~[Specification No. ETI/PSI/67(11/96) or latest]~~

[SPECIFICATION NO. TI/SPC/PSI/FC&SR/0100 OR LATEST]

ISSUED BY

TRACTION INSTALLATION DIRECTORATE,
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	Prepared By	Checked By	Approved by
Signature			
Designation			

1.0 SCOPE

This schedule covers the technical requirement **to assess the manufacturing capability of vendor** for manufacture and supply of Series Reactor for Shunt Capacitor Banks for use in 25 kV single phase AC traction system on Indian railways.

2.0 GENERAL INFRASTRUCTURE AND MANUFACTURING FACILITIES

2.1 The ~~manufacturer~~ **Vendor** should have adequate covered accommodation for the purpose of effective storage of inward raw material, and the finished product awaiting dispatch and prototype / routine inspection and testing. The ~~manufacturer~~ **Vendor** should have an effective quality control system to monitor quality of the

- Inward raw material
- Stage inspection at various assembly/manufacturing stages.
- Inspection of the final assembled product to conform adherence to the requirements of the specification.

2.2 **The relations with the workers should be harmonious and regular employee training programs should be scheduled by the management for regular up gradation of the knowledge and skills of the employees.**

2.3 The ~~manufacturer~~ **Vendor** should have a proper drawing office with AutoCAD to support the designs/ development of product. The company should have a clean and pollution free environment, should be taking adequate safety precautions during the production. The company must have items like fire extinguishers, safety warning board, shock treatment charts and medical first aid kit in their premises.

3.0 MACHINERY AND PLANT

The following machinery and plant of suitable capacity should be ~~generally~~ available at the firm's premises for the manufacturing of the Air Cooled Series Reactor:

- 3.1 EOT crane for moving the reactors
- 3.2 Vacuum chamber
- 3.3 Electric drying oven with closed air circulation
- 3.4 Hydraulic trolley
- 3.5 Heavy/medium light duty winding machines
- 3.6 Toroidal duty winding machines
- 3.7 Heavy duty assembly trolleys
- 3.8 Insulation cutting and preparation machines
- 3.9 Power press, lathe, drilling machines, cutting machines etc.*
- 3.10 Tig welding equipment
- 3.11 Electric arc welding machine
- 3.12 Air compressor
- 3.13 Hand tools.

***The activity at para 3.9 above i.e. Power press, lathe, drilling machines, cutting machines etc may be outsourced subject to stringent quality control by Vendor. The Vendor has to provide detail information regarding this in the Quality Assurance Plan (to be approved by RDSO) and also ensure that the Power press, lathe, drilling machines, cutting machines etc**

shall be essentially available at the premises of the firm from where this facility is outsourced.

4.0 QUALITY CONTROL REQUIREMENTS

- 4.1 The Vendor should possess valid ISO 9001 certificate for manufacture of same/similar item at his works address. ~~The firm should have acquired ISO 9000 series certification for the product broadly for which approval is being sought and it should be broadly covered in the scope of the certification for manufacture and supply.~~
- 4.2 Quality manual of the vendor for ISO- 9001 certificate should clearly indicate at any stage the control over manufacturing and testing of the product.
- 4.3 ~~There should exist a~~ The system of easy tractability of the product from the raw-material stage to the finished product stage ~~should be available.~~
- 4.4 The ~~manufacturer~~ Vendor should have a system of monitoring the supplied product complaints. 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.
- 4.5 Quality assurance plan for the product ~~detailing following aspect should be available in accordance with RDSO's guideline should be available with the firm. Quality assurance plan (QAP) shall be approved by RDSO.~~
- ~~Organization chart.~~
 - ~~Process flow chart.~~
 - ~~Stage inspection details.~~
 - ~~Various parameters to maintain the control over the manufacturing.~~
 - ~~Policy of disposal of rejected material and its record for documentary evidence.~~
- 4.6 ~~There should exist a~~ quality manual of the firm indicating the extent of control over production and testing ~~should be available.~~
- 4.7 ~~At least~~ Diploma holder must be the head of the inspection / testing / final control section with 5 years experience in the relevant field.
- 4.8 ~~There should exist a~~ System of documentation in respect of rejection at the customer and its warranty replacement ~~should be available.~~
- 4.9 System should exist for documentation of the following.
- Incoming raw material with **Test Certificate (TC)** ~~the~~ reference of suppliers as well as internal test/ **audit checking from outside agency.**
 - Details regarding stage inspection and test results.
 - Details regarding the final testing and dispatch to the customer in proper packed condition.
 - System for timely calibration of testing and measuring instruments.
- 4.9 ~~Quality assurance plan (QAP) shall be approved by RDSO.~~

5.0 INSPECTION AND TESTING FACILITIES

The firm should ~~generally~~ have the following testing and measuring instruments / equipments. These instruments should be calibrated with standard master instruments accountable to national Physical Laboratory or a similar reputed international/national agency. Each instrument should have a valid calibration certificate.

- 5.1 Impulse Generator or induced voltage test set up
- ~~5.2 PD measuring equipment~~
- 5.3 High voltage testing equipment
- 5.4 Bridge for resistance measurement (Kelvin/Double frequency)
- 5.6 High/Low voltage 1 ϕ load balancing capacitor
- ~~5.7 Transformer oil test kit~~
- 5.8 1/2.5/5 kV megger
- 5.9 LPF watt meter
- 5.10 HV CTs & PTs
- 5.11 Electronic test bench
- ~~5.12 Hydraulic test bench~~
- 5.13 Digital LCR meter
- 5.14 Analog LCR meter
- ~~5.15 Hydraulic pressure pump~~
- 5.16 Digital/Analogue voltmeter, Ammeter & watt meter
- 5.17 Multi-meter
- 5.18 CRO
