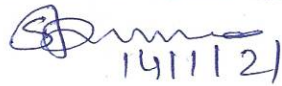


**GOVERNMENT OF INDIA
MINISTRY OF RAILWAYS**



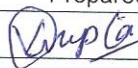
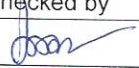
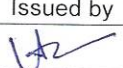
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**SCHEDULE TECHNICAL EQUIREMENT (STR)
FOR MANUFACTURE OF AIR COMPRESSOR
FOR ELECTRIC LOCOMOTIVES**

Approved By	Signature
PEDSE	 14/11/21

ISSUED DATE : JANUARY 2021

**ELECTRICAL DIRECTORATE
RESEARCH DESIGNS & STANDARDS ORGANISATION
MANAK NAGAR , LUCKNOW**

Prepared by	Checked by	Issued by
		

**Schedule of Technical Requirements (STR) for
Air Compressors for Electric Locomotives**

1. General:

This schedule of technical requirements covers the minimum requirement of facilities for development and manufacturing of Air Compressors for use on 25 kV AC Electric Locomotive.

2. Minimum Facilities :

2.1 List of M&P required shall be as per Annexure-I. The list does not specify the capacity and quantity of various M&P which may vary according to the manufacturing capacity of the individual vendor.

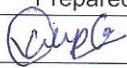
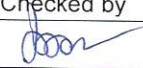

2.2. List of measuring equipments and gauges required in vendors premises shall be as per Annexure-II. The accuracy and capacity of the measuring equipment shall be adequate to meet the requirements.

2.3 The measuring equipments/gauges shall be duly calibrated and the validity of calibration should be verified by checking the calibration certificate issued by the Government Approved Calibration Agency from whom it was calibrated.

2.4 Testing and Other Facilities are mentioned in Annexure-III.

2.5 R&D Facilities :

The vendor should have R&D facilities to investigate into the various types of failures and evolve necessary remedial measures to avoid failures in future. The vendor should have the design details for their compressors which will include their own drawings with permissible tolerances, material specifications, treatment details etc. The vendor will also have their own drawing for various assemblies and sub-assemblies.

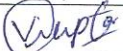
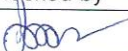

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ANNEXURE-I

Manufacturing Facilities:

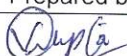
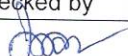

Following minimum Machinery and Plants are required.

Sl. No.	Details Of Machine
1.	Lathe Machine
2.	Milling Machine
3.	Boring Machine
4.	Vertical drilling Machine
5.	Tapping tools
6.	Grinding Machine
7.	Surface Table
8.	Cranes
9.	Welding Machine
10.	Weighing machine
11.	Honing machine

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ANNEXURE – II**Measuring Equipment/Gauges**

Sl. No.	Details Of Equipments/Gauges.
1.	Barometer.
2.	Outside Caliper.
3.	Inside Caliper.
4.	Vernier Caliper.
5.	Dial Bore Gauge.
6.	Dial Compass.
7.	Dial Indicator.
8.	Combination Set.
9.	Bevel Protector.
10.	Spring Tester.
11.	Thermometer.
12.	Manometer/ Air Flow Meter.
13.	Psychrometer.
14.	Presser Gauges.
15.	Standard Nozzles.
16.	Ammeter.
17.	Volt Meter.
18.	Watt Meter.
19.	Frequency Meter.
20.	Tongue Tester.
21.	Tachometer
22.	Torque Wrench.
23.	Reservoir.
24.	Stop Watch.
25.	Gauge Block.
26.	Hour Meter.
27.	Filler Gauges.
28.	Radius gauge
29.	Depth gauge
30.	Ring gauge
31.	Groove caliper
32.	Slip gauge
33.	Hardness tester

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Annexure-III**Testing Facilities :**

1. Facilities for balancing and alignment checking of crank shaft and connecting rod.
2. Facilities for checking the surface and internal defect on piston pins, crank pin pump sheet and pistons etc. such as magnaflux crack detector or ultrasonic testing or die penetration testing etc.
3. Facilities for hydraulic testing of intercoolers, manifolds, cylinders, and cylinder heads etc.
4. Test rigs and fixtures for testing of piston rings for flatness, square ness, tension, light leakage and axial distribution tests.
5. Pressure gauges and manometers for measurement of pressure/vacuum. and pressure drop testing.
14. High Environmental Testing Facility.
15. Tilted Condition Testing Facility.(If applicable)

Other Facilities :

1. Surface Treatment Facility
2. Painting & cleaning facilities.
3. Fabrication facilities
4. Proper storage Facility for Incoming Material.
5. Proper storage facility for finished products.
6. Stand By Power Generator Facility.

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