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भारत सरकार
रेल मंत्रालय

GOVERNMENT OF INDIA
MINISTRY OF RAILWAYS

अनुसंधान अभिकल्प एवं मानक संगठन
RESEARCH DESIGNS AND STANDARDS ORGANISATION

9 के०वी०ए०, 15 के०वी०ए०, 50 के०वी०ए०, 60 के०वी०ए०, 3 फेज वितरण ट्रांसफार्मर
एवं कोचिंग अप्लीकेशन में प्रयुक्त अन्य ट्रांसफार्मर के लिये तकनीकी आवश्यकताओं
की अनुसूची

SCHEDULE OF TECHNICAL REQUIREMENTS FOR
9 KVA, 15 KVA, 50 KVA, 60 KVA 3-PHASE DISTRIBUTION
TRANSFORMER AND OTHER TRANSFORMER FOR COACHING
APPLICATION

आर.डी.एस.ओ./पी.ई./एस. टी. आर./ए.सी./0036 - 2011 (परिशोधन.0)
STR No. RDSO/PE/STR/AC/0036-2011 (Rev '0')

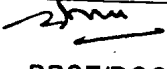

S.NO.	Details of Amendment	Revision	Page Number	Reasons for amendment
1.	Nil	0	Nil	Nil

अनुमोदित

APPROVED

Nasim 20.11.13

कार्यकारी निदेशक/पी एस एण्ड ई एम यू
ED/ PS & EMU

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SCHEDULE OF TECHNICAL REQUIREMENTS FOR 9 KVA, 15 KVA, 50 KVA, 60 KVA 3-PHASE DISTRIBUTION TRANSFORMER AND OTHER TRANSFORMER FOR COACHING APPLICATION

FOREWORD:

- 1.1 This Schedule of Technical Requirements (STR) specifies minimum essential machinery, plant & testing instruments required to manufacture 9 KVA, 15 KVA, 50 KVA, 60 KVA and other transformers for coaching application.
- 1.2 The firm should satisfy himself about having complied with the technical requirements of the specification and other infrastructures, testing facilities and eligibility criteria requirement as per STR before applying for registration as RDSO vendor.
- 1.3 The firm should have currently valid ISO-9001 certification including the subject item under its range of manufacture.
- 1.4 Existing firm shall comply this Schedule of technical requirements within Six months from the date of issue of this STR. Compliance of this STR shall be mandatory before renewal of firm.
- 1.5 The firm is advised to regularly visit RDSO website and get them selves updated on change being made from time to time in STR/specification.

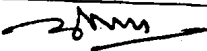
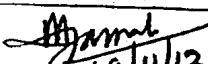
A. Plant and machineries

S.N	DESCRIPTION
1.	Machine for cutting and stacking of transformer lamination.
2.	Machine for slitting transformer sheets to smaller width.
3.	Sheet bending machines.
4.	Punching machine.
5.	Milling machine
6.	Lathe machine
7.	Drilling machine
8.	Pipe bending machine
9.	Hydraulic press
10.	Welding plant
11.	Shearing machine
12.	Power saw
13.	Bed plate

Note 'A': These plant and machineries are required if enclosure is fabricated by the manufacturer otherwise it can be outsourced to a firm having ISO certification.

B. WINDING AND ASSEMBLING SHOP

S.N	DESCRIPTION
1.	Vacuum Pressure Impregnation Plant
2.	Automatic Winding machine

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3.	Tension equipment for winding conductors
4.	Conductor wrapping machine
5.	Fixture for seasoning of coils
6.	Suitable size oven for drying the core coil
7.	Separate oven for drying the coils
8.	Clamping fixture for the winding
9.	Fixture for handling core assembly with top and bottom yokes
10.	Fixture for loading the winding conductors drum
11.	Fixture for loading and unloading winding drum and winding machines
12.	Fixture for keeping ready coils in vertical condition
13.	Fixture/handling equipment for making various connections to windings.
14.	Soldering brazing/crimping facilities
15.	Power press of adequate capacity

C. Testing Facilities

S.N	DESCRIPTION
1.	Testing transformer complete with all associated equipment for conducting power frequency tests.
2.	Harmonic analyzer
3.	Ratio meter
4.	Megger-500V, 1000V
5.	Ammeters, Watt meters and Voltmeters of various ranges.
6.	Noise level meter
7.	Power analyzer
8.	Digital, mercury thermometers and temperatures sensing strips
9.	Equipment for short circuit test
10.	Weighing machine
11.	Facilities for temperature rise test
12.	High Voltage tester
13.	Load for testing transformer
14.	Laser gun to measure temperature
15.	Facility for Induced overvoltage withstand test (double voltage-double frequency)

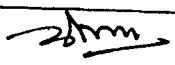
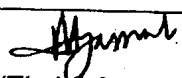
D. FORMAT FOR QUALITY ASSURANCE PLAN

1. R&D Organization:

The firm shall submit the organizational structure of their R&D wing along with qualification of the personnel. Firm should have at least one Electrical Engineering Graduate with experience of more than 5 years in the field of transformer manufacture.

2. Laboratory:

The manufacture shall have a well-equipped Laboratory to carry out various tests on the raw material, stage inspection and inspection of the finished product.

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Manufacturers shall elaborate the procedure being followed for ensuring traceability of critical components used, in house test performed on each critical components, sub assembly & complete equipments individually.

3. Handling /Storage/Delivery:

The manufacture shall have proper facilities for handling and storage of raw material and finish product.

4. Documentation:

The manufacturer shall maintain all necessary documents and data that will help him to have consistency in producing quality product.

5. Purchase of raw material:

Raw material/equipments shall be procured only from well-proven sources, conforming to relevant standards. Critical components shall be procured from reputed OEM or their accredited agents/ RDSO approved source.

6. Quality Control-Process:

Screening of critical components shall be carried out as a part of in-process quality control. Method adopted should be clearly explained.

7. Inspection and Testing:

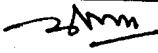
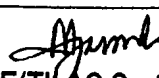
- (i) The manufacturer shall ensure that incoming material is not used for processing until it has been inspected or otherwise verified as conforming to specified requirements. Verification shall be in accordance with quality plan or laid down documented procedures.
- (ii) The supplier shall carryout all final tests and inspection in accordance with the quality plan or documented procedures evolved on the basis of RDSO's specification and specified standard to complete the evidence of conformances of the finished product.

8. Testing / Measuring Instruments:

The instrument and equipment used for testing and inspection shall be of the required accuracy and got calibrated periodically by the NABL accredited laboratory. The calibration record should be maintained and shall be produced at the time of inspection & shall be included in QAP document/test reports.

9. Service requirement:

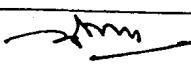
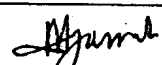
Firm should either have its own website through which complaint can be logged or it should have 24x7 contact no. on which complaint can be lodged.

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DISTRIBUTION

CHIEF ELECTRICAL ENGINEER:	
1	Northern Railway, Baroda House, New Delhi – 110 001.
2	Central Railway, 2 nd Floor, Parcel office, CST Mumbai – 400 001.
3	Eastern Railway, Fairlie Place, Kolkata – 700 001.
4	South Eastern Railway, Garden Reach, Kolkata – 700 043
5	Southern Railway, Park Town, Chennai – 600 003.
6	Western Railway, Churchgate, Station Building Mumbai – 400 020.
7	South Central Railway, Rail Nilayam, Secunderabad – 500 371.
8	East Central Railway, Dighi, Distt- Vaishali, Hajipur, Bihar- 844 101.
9	North Central Railway, Subedarganj. Allahabad- 211033.
10	South Western Railway, 1 st Floor, DRM Office, Hubli 580 020
11	South East Central Railway, Bilaspur.495004
12	North East Frontier Railway, Maligaon, Guwahati - 781001
13	North Eastern Railway, Gorakhpur – 273001
14	North Western Railway, Jaipur – 302006
15	West Central Railway, Jabalpur - 482001
16	East Coast Railway, Bhuvneshwar, Orissa – 751016
17	Konkan Railway, Belapur Bhavan, Sector-11, Belapur, Mumbai - 400614
18	Metro Railway, 33 /1 J.L. Nehru road, Kolkata- 700071
19	Integral coach factory, Perambur, Chennai - 600038
20	Rail Coach Factory, Kapurthala (Punjab) – 144 602
CHIEF WORKS MANAGER:	
1	Matunga Workshop, Central Railway, Mumbai 400 019.
2	Liluah Workshop, Eastern Railway, Howrah
3	C&W Workshop , Northern Railway, Alambagh, Lucknow-226 05
4	C & W Workshop,N. Rly., Jagdhari – 135 002
5	Mechanical Workshop, NER, Gorakhpur – 273 012
6	Carraige Workshop, Southern Railway, Perambur, Ayanavaram, Chennai – 600023.
7	SCR, Lallagudda Workshop, Lallaguda, Secunderabad - 500017
8	Carriage Workshop, Western Railway, Lower Parel, Mumbai-400013
9	CRWS, W. C. Railway, Nishatpura, Bhopal-462010
10	Carriage Workshop, NW Rly., Ajmer - 305001
11	Carriage Repair Workshop, Gadag Road, SWR, Hubli – 580 020
12	Carriage Workshop, S.W. Railway, Mysore Vishwanath.
13	Carriage Workshop, SE Rly., Kharagpur - 721301
14	New Bongaigaon, Railway Workshop, Dangtal, Distt. Bongaigaon, Assam-783380
15	Carriage and Wagon Workshop, N. C. Rly., Jhansi – 248003
16	Carriage and Wagon Workshop, WC Rly., Kota - 324002
17	Carriage and Wagon Workshop, Eeastern Rly., Liluha - 711204
18	Carriage and Wagon Workshop, W. Rly., Pratap Nagar, Vadodara - 390004
19	Carriage and Wagon Workshop, N Rly., Amritsar - 143001
20	Central Workshop, Golden Rock, S. Rly., Trichi - 620004

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