Section-IV (Technical Specification)

BHARAT HEAVY ELECTRICAL LIMITED, CSU, JAGDISHPUR, U.P.- 227817, INDIA

Design, Manufacture, Supply, Testing & Commissioning at Site, of: Automatic Computerized Testing facility with all standard accessories (as applicable) **for determining Specific Core Loss using Epstein frame method, A.C. Magnetization properties & Anisotropy of losses in Electrical Steel Sheets/Strips (CRNGO, CRGO, or any other form of ETS)**

SUPPLIER:

CONTACT PERSONS:	
ADDRESS:	
TELEPHONE NOs:	
MOBILE NOs:	
FAX NOs:	
E-MAIL ADDRESS:	

1. Supplier must submit complete information against all clauses.
2. The "Offered" Column and where applicable, the "Deviations" & "Remarks" Column of this format shall be filled in by the Supplier and submitted along with the offer, Inadequate / incomplete, ambiguous, or unsustainable information against any of the clauses of the specifications/ requirements shall be treated as non-compliance.

SPECIFICATIONS:

Sl.No.	Description for BHEL Requirement	Offered	Deviations	Remarks
1.1	Manufacturer Name & Address			
1.2	Model No.			
1.3	Full Confirmation to latest International Standards: IS649, DIN50462, IEC60404 & ASTM - A343			
1.4	Standard Size of Specimen : (30±0.1)mm X (min.280~305)±0.8mm			
1.5	Specimen thickness range: 0.27mm to1mm			
1.6	Minimum no. of strips : 12No's for 1mm, 16No's for 0.5 & 0.65mm,20No's for 0.27 &0.35mm			
1.7	Total Specimen weight : up to 1Kg (Density7.55~7.85g/cm^3) (As per IS649 in any case it shall not be less than 400g)			
1.8	Power frequency range for conducting the test: 25Hz to 400Hz (Vendor to specify frequency range with least count to which instrument can be set for testing). As per IS649 commercial power frequency of 50Hz shall be used for the specific core loss test.			

1.9	Testing Induction Range: 0.1mT to 2.0T with Nominal value adjustment better or as 0.1% (As per IS649 for the specific core loss test values of 1.5T CRNGO & 1.8T for CRGO are to be used)			
1.10	Range of Core Loss Testing: from 0.01 to 50 Watts/kg			
1.11	Range of Peak Magnetizing force: 0 to15000A/m			
1.12	Source: Adjustable A.C. Voltage of pure Sinusoidal Waveform			
1.13	Epstein Frame type: Square type, Four-arm 25cm coil system (i.e. the C/L of solenoids of Epstein frame on the opposite sides of the square 250±0.3mm for 25cm double lap joint core with corner setting) with exciting & measuring coils.			
1.14	No. of turns for solenoid windings of Epstein frame: 700turns each for both primary & secondary			
1.15	Computerized Test Results(Printable & disk saved documentation) shall include determination of: 1) Core loss (W/Kg) 2) Specific Exciting power, VoltAmperes (VA/Kg) 3) RMS Exciting Current (A) 4) Peak Exciting Current (A) 5) Impedance A.C. Permeability 6) Peak A.C. Permeability 7) Flux Voltage(V) 8) RMS Voltage(V) 9) Form Factor 10) Peak Flux Density(T) 11) RMS Flux Density(T) 12) RMS Magnetizing Force (A/m) 13) Peak Magnetizing Force(A/m) 14) & other related properties (vendor to specify) Shall also be able to display following test parameters in the printable report: 1) Information of Assumed Eddy Current loss 2) Test Temp.(°C) 3) Test Frequency(Hz) 4) Test Induction (T) 5) Test magnetic Field Strength 6) Power Factor 7) Form Factor Correction used in “Yes” Or “No” 8) Peak Current Measuring Device 9) Primary & Secondary Turns 10) Sample parameters: Like Weight, Density, Sample Size, No. of strips, Type of material etc.			

	11) Comments 12) Any other relevant data that is important for appearing in the report Further the software shall be able to plot the following graphs: 1) Flux density Vs Iron loss (B / VA) 2) Flux density Vs A.C. Magnetizing Force (B / Hac) 3) Flux Density Vs Peak Magnetizing Force (B / Hpeak) 4) Flux density Vs Peak permeability (B / Pperm) etc.			
1.16	Measurement accuracy should be at par or better than recommended by International Standards: IS649, DIN50462, IEC60404 & ASTM - A343			
1.17	Repeatability of results:0.2% or better			
1.18	The system shall be capable for connection with other measuring coil systems (at least of the same manufacturer's)			
1.19	Level of automation: Everything e.g. input of parameters for test simulation, interpretation & computation of results, printable/ disk saved test data presenting etc. (Exceptions are sample cutting, loading/unloading, Sample weighing only).			
1.20	Memory Capacity (In Measurement Sets): ≥10-20 Sets(non volatile)			
1.21	Measurement Programs: Automatic & Manual Modes.			
1.22	Calibration Certificate : Vendor to provide (From any International Accredited laboratory)			
1.23	Display Type: VFD (Vacuum Fluorescent Diodes)/LCD with Backlight Preferred			
1.24	Interface: RS-232C/USB			
1.25	Operating Temp.: 5°-55°C less than 85%RH			
1.26	Communication Software: Latest updated Software (without any bugs) compatible With Windows XP OS & higher versions. Any future software upgrades/patches shall be provided from time to time by the vendor & shall remain free of cost.			
1.27	Acceptance Criteria of the instrument: Satisfactory commissioning at CSU,BHEL, Jagdishpur with test results. Two sets of Aged*/Un-Aged Test samples shall be provided each for two different sheet thicknesses by BHEL, **Either** 1) With Known Magnetic properties, that are pre-checked & certified by NABL accredited lab. The results of the measuring system shall match with them within the acceptable limits.			

	Or 2) With Unknown Magnetic properties (Random Selection of Material present at CSU, for testing). In this case the test results generated by the instrument shall be verified by any third party NABL accredited Indian laboratory (e.g. ERDA, Vadodra; NPL, New Delhi etc.). The results shall be within acceptable limits (laboratory variations). Tests for checking the Repeatability shall also be done on these samples. Final acceptance of the instrument shall be done based upon the above criterias only. *Ageing method- Specimen shall be heated in Electrical Oven for 24Hrs at 225±3°C			
1.28	Installation, Starting Up & training at BHEL, CSU, Jagdishpur, Distt Amethi,Uttar Pradesh, India 227817			
1.29	Power: AC 200V~240V, 50Hz Supply			
1.30	Standard Samples: Vendor may provide for scheduled checking of the instrument measurements (weekly, fortnightly or monthly checking- that vendor has to specify)			
1.31	Standard Accessories: As Applicable (vendor to specify in a separate sheet)			
1.32	Spares: Vendor to recommend spares and offer them as optional items, for at least three years of satisfactory service of the instrument after expiration of the warranty period.			
1.33	Operating Manual and onsite training to be provided by the vendor.			
1.34	Suitable for Checking Specific Core Loss, A.C. Magnetization properties & Anisotropy of losses in Electrical Steel Sheets/Strips (CRNGO, CRGO, or any other form of ETS)			
1.35	Delivery time: 3 months from the date of P.O.			
1.36	Onsite Warranty: Minimum ten years from the date of satisfactory commissioning.			
1.37	List of Authorized Service Centers in India with service terms & conditions			