INFORMATION FOR BIDDERS

1. **Introduction of the RFP**

Bids are invited from original equipment manufacturer (OEM) /authorized dealer for Supply and installation of 3 Phase 500 KVA Distribution Transformer Test Bench and associated testing equipment's for testing of Distribution Transformers up to 500 KVA at the Testing Laboratory, Transformer Repairing Workshop MePDCL, Sumer.

2. **Name of work:** Supply and installation of Distribution Transformer Test Bench and associated testing equipment's for evaluation of overall losses of Distribution transformers up to 500KVA as per relevant IS/IEC/EU and their latest amendments at Testing Laboratory, Transformer Repairing Workshop MePDCL, Sumer.

3. **Scope of Work**

i. Design, Manufacture and Supply of Distribution Transformer Test Bench and associated testing equipment's along with all the necessary spares and accessories for testing of Distribution Transformers up to 500KVA at Testing Laboratory, Transformer Repairing Workshop MePDCL, Sumer and in strict adherence to the terms and conditions of this bid.

ii. The successful bidders shall confirm that the Transformer Test Bench must be as per Technical Specifications and GTP of this bid document.

iii. Submission of technical specification (BIS, GTP/Test Certificate/Drawings etc. of Transformer Test Bench & Associated Equipment's).

iv. Video Conference inspection & witnessing of testing at manufacturer's factory by officer(s) deputed from MePDCL for this purpose. The inspection call shall be intimated at least 7 days in advance. The supplier shall ensure that pre-dispatch inspection for Transformer Test Bench is intimated only when the Transformer Test Benches and other Associated Equipment's are completely ready for inspection. On due date of inspection, if it is found that Transformer Test Bench are not ready in required quantities, all expenditures incurred on deployment of various inspecting officials along with a fine @ 1% shall be recovered from bills of the supplier.

v. Site delivery, loading, unloading, and handling of the transformer test bench and all its related accessories supplied up to the delivery location along with arrangement of verification by MePDCL field officials shall be the sole responsibility of supplier.

vi. Arrange demonstration of the transformer test bench at venues mutually agreed with the owner.

vii.Site delivery, unloading, loading, and handling of the transformer test bench up to the delivery location shall be the sole responsibility of supplier.

4. **Submission of bid:**

The bid shall be in two parts, i.e. (i) Techno commercial bid, (ii) Price bid

i. **Techno-commercial bid**

In the techno commercial bid, the bidders are required to submit PAN, GST registration, Annual Turn Over certified by C.A for last 3 years, Order executing details of similar work, vendor's company credentials, registration details,

A set of the above documents must be sequentially submitted for techno-commercial evaluation failing which shall be treated as non-responsive.

ii. Price Bid

The Price Bid shall be the offer price for supply of Transformer Test Bench and Associated Equipment's as per BOQ and inclusive of all costs. Submission of Price Bid Schedule with all quantities and prices shall be filled up as per annexure provided in the detail bid document. **All quoted rates shall be inclusive of GST and all taxes as applicable as per the prevailing rate.**

Note:

a) In case of any difference found between the rates in figures and in words, a minimum of the two shall be considered. If the bidder does not accept the correction of the errors as above, his bid shall be rejected, and the amount of bid guarantee/security shall be forfeited.

b) The rates quoted shall be inclusive of all taxes, carriage, supply, insurance, loading, unloading etc.

c) No separate declaration offering a discount on price shall be allowed. Offered price in the price schedule shall be considered final for evaluation.

d) Bidders shall upload their most competitive rates. It may please be noted that incomplete tenders shall not be accepted.

5. **Important Timeline**

Description	Date & Time
RFP document extension date	05.12.2025
Bid Submission start date and time	07.12.2025 - 00:00 Hrs

Bid submission end date and time	10.12.2025 – 13:00 Hrs
RFP document Opening Date & time	10.12.2025 – 15:00 Hrs

The date of opening of Price Bids shall be intimated subsequently to the Techno-Commercially qualified Bidders.

6. **All queries may be submitted to ced.ez.mepdcl@meghalaya.gov.in**

7. Guarantee/Warranty.

Warranty from the manufacturer shall be produced along with manufacturer's test certificate for all equipment/ materials covered under Manufacturer's warranty.

The Supplied items should comply with the standard guarantee and warranty is One Year. Upon the expiry of guarantee and warranty, the Annual Maintenance Contract (AMC) may be executed for 12 months and may be extended subjected to satisfactory performance. Guarantee and Warranty will commence from the date of commissioning of supplied system/ items.

8. Eligibility Criteria and Basic Qualifying Requirements:

8.1. Technical

1.The OEM/Authorized dealer shall have valid and relevant manufacturing facility in India. Documentary evidence must be furnished with this bid.

2.Manufacturer's Authorization: The Bidder must be either be an OEM (Original Equipment manufacturer) or an authorized dealer/distributor/ representative of manufacture, documentary evidence to this effect shall be furnished by the bidder along with bid.

3.The bidder must have at least 05 (five) years' experience of manufacturing, supply, installation, and commissioning of similar testing benches/components/equipment of the test bench in various state/ central PSU/ reputed private utilities/ Nationalized testing laboratories like CPRI/ERDA (or NABL accredited labs) in India as on the date of bid opening. Necessary supporting documents have to be furnished along with the bid.

4.Items supplied by the bidder must have valid relevant Certification

5.The bidder shall have to demonstrate the performance of the offered item(s) at a mutually agreed venue with the owner. Offered equipment that fails to meet the requirements of the bidding document to the satisfaction of the MePDCL engineers present during field demonstration shall not be accepted.

6. The organization reserves the right to accept or reject any or all quotations without assigning any reason.

8.2 Financial.

1.Average annual turnover of the bidder for the last three consecutive financial year should be 2 Crore and the annual turnover must be certified by a registered Chartered Accountant. This shall be supported by the copy of the income tax return submitted by the firm for the last three years.

2.The bidder shall compulsorily submit audited balance sheet certified by a registered Chartered Accountant for the last three financial years

4.The bidder shall furnish GST registration certificate, etc. (wherever applicable).

5.The bidder shall furnish a copy of their Pan Card. The card must be in the name of the firm if the bidder is a firm.

9.Submission of documents with technical bids

i) All documents in support of Eligibility Criteria and Basic Qualifying Requirements (8.1- Technical and 8.2- Financial) shall be submitted with the proposal/bid.

ii) Detail list of makes/brand with catalogues, technical specification, type tests certificate, of the test bench/components/equipment to be submitted.

iii) Certificates and testimonials in support of credentials of the bidder's organization.

iv) Details of past experience with performance certificates and present supply orders in hand with awarded amount and progress report.

v) Any other information, the bidder may feel facilitative in evaluating the bid.

vi) Certificate from Registered Charted Accountant in support of Audited Annual turn-over.

vii)Guaranteed Technical Particulars (GTP) of components of the test bench as per bid requirements shall invariably be submitted along with Price bid shall be with the tender otherwise tender is liable to be rejected. The GTP must also be submitted along with the requisite test certificates as per applicable standards.

viii) Bidders have to provide a list of projects completed by them in the last five years

Bids submitted without anyone of the above documents shall be rejected outright.

10. Evaluation and Award of work:

a) The evaluation of bids shall be carried out, first of techno-commercial bid and thereafter opening the price bid of only those bidders who qualify and meet the technical requirements.

b) Supply shall be started from the date stated in the work order, failing which order shall be cancelled without further

correspondence.

c) Work may be allotted to more than one responsive bidder at L1 rate.

11. Period of completion:

35 days (Thirty Five Days) from the date of issue of supply order / LOA with technical Documentation Clearence

12. Terms of Payment:

Payment will be made after satisfactory delivery/installation and submission of bills.

13. BILL OF QUANTITY

Supply and installation of 500KVA Distribution Transformer Test Bench for evaluation of overall losses of Distribution transformers up to 500KVA and Associated Equipment's as per standards.

Sl No	PARTICULAR	Make	UNIT	QUANTITY
1.	Temperature rise test facilities - 1 numbers a) Test Source of 800V 40 A – 1 nos Having Auto Transformer (415 V / 415-470V) & Intermediate Transformer (415 V / 800V). b) Power Analyser – 1 nos. c) 8 channel Temperature scanner – 1 numbers d) Temperature sensor - Thermocouples T type – 10 numbers of 10 meters each, one end shall be brazed. (Or as per requirement)	Reputed Make/ TS	No	1
2.	Routine test facility – 1 no. a) Winding resistance meter – 1 no. b) Turns Ratio meter – 1no. c) Test Source of 800V 40 A – 1 no Having Auto Transformer (415 V / 415-470V) & Intermediate Transformer (415 V / 800V). d) Insulation resistance meter – e) HV Bench of 40 kV 200mA – 1no. f) Motor Generator set 30 kVA , 1000V , selectable at 100Hz – 1 no. ~~No load loss upto 500 V, 50 Hz~~ Induced voltage test upto 1000V 100Hz g) Compressor – 1.5 HP : 1 no. h) 1000V 10 A Multimeter – 1 no. & Digital Thermometer - 1no. for cross verification of readings		No	1

Price Bid Format(To be filled up by the bidder)

SN	Name of item	Qty	Unit	Rate inclusive of F&I	GST rate per unit	Total Amount for Door delivery inclusive of loading, unloading, forward stacking, Freight & Insurance
		(A)		(B)	(C)	(D=B+C)
1	Temperature rise test facilities - 1 numbers	1	No			
a	Test Source of 800V 40 A – 1 nos Having Auto Transformer (415 V / 415-470V) & Intermediate Transformer (415 V / 800V).	**1**	**No**			
b	Power Analyser – 1 nos.	**1**	**No**			
c	8 channel Temperature scanner – 1 numbers	**1**	**No**			
d	Temperature sensor - Thermocouples T type – 10 numbers	**10**	**No**			
e	Winding resistance meter	**1**	**No**			
f	1000V 10 A Multimeter 1 No & Digital Thermometer – 1 No for cross verification of readings					
Routine test Equipment						
a	Power Analyser	**1**	**No**			
b	Turns Ratio meter	**1**	**No**			
c	Test Source of 800V 40 A Having Auto Transformer (415 V / 415-470V) & Intermediate Transformer (415 V / 800V).	**1**	**No**			
d	5 kV DC Insulation resistance meter –	**1**	**No**			
e	HV Bench of 40 kV 200mA	**1**	**No**			
f	Motor Generator set 30 kVA , 1000V, ~~selectable at~~ 100Hz – 1 no. Induced voltage test upto 1000V 100Hz	**1**	**No**			
g	Compressor – 1.5 HP : 1 no.	**1**	**No**			

h	~~Power Analsyer 1 Nos~~ Current Transformer 3.3 kV , 50/5 A , 0.1 s class	**3**	**Nos.**			

The quantity variation in each item is +/-100%

Payment clause: 90% of LOA cost on supply and final 10% of LOA cost on successful demonstration of test.
Bidders must furnish their Annual Maintenance cost if requested by purchase
Passing of the test equipment and the report being generated must comply the NABL accreditations requirements. This will be the sole responsibility of the bidder.

TECHNICAL SPECIFICATIONS OF TRANSFOMER TEST BENCH

Distribution Transformers up to 500KVA to Perform following Tests

Sr No	Test Name	Standard	Clause
Routine tests			
1.	Measurement of Winding Resistance	IS 1180 (Part-1) IS 2026 (part 1)	21.2 a) 10.2
2	No Load Test (Open Circuit Test)	IEC 60076-1 IS 1180 (Part-1) IS 2026 (part 1)	21.2 d) 10.5
3	Full Load Loss Test (Short Circuit Test)	IEC 60076-1 IS 1180 (Part-1) IS 2026 (part 1)	21.2 c) 10.4
4	AC High Voltage Withstand Test (HV Test)	IEC60076-3 IS 1180 (Part-1) IS 2026 (part 3)	21.2 g)
5	Induced Over-Voltage Test (DVDF Test)	IEC 60076-3 IS 1180 (Part-1) IS 2026 (part 3)	21.2 f)
6	Turns Ratio Test (Voltage Ratio Test and check of phase displacement)	IEC 60076-1 IS 1180 (Part-1) IS 2026 (part 1)	21.2 b) 10.3
7	Measurement of insulation resistance	IS 1180-1 / IS 2026 (part 1)	21.2 e)
8	Pressure test	IS 1180-1	21.2 h)
9	Oil leakage test	IS 1180-1	21.2 j)
Type test			
10	Temperature Rise Test	IEC 60076-2 IS 1180 (Part-1) IS 2026 (part 2)	21.3 b)

TECHNICAL SPECIFICATIONS OF TRANSFOMER TEST BENCH

1. SCOPE: -

a) Test Bench to perform No Load Test (OC Test), Full Load Test (SC Test) & Temperature Rise Test, to conduct test on 3-Phase Distribution Transformer 11KV / 433V ranging from 10KVA to 500 KVA rating along with 3-Phase Precision Power Analyzer of reputed make with ability to interface with computer, Oil Cooled 3-Phase Intermediate Transformer of 415V/800V & 40 Ampere Capacity, 3-Phase Motorized Oil Cooled Variac of **100 Amp** Capacity, 415 Volts Input & 0 – 415-470V Volt output, ,.

- 2 numbers

b) Test Bench for AC High Voltage Power Frequency test – 1 no.

AC High Voltage Oil Cooled Transformer of **40KV, 200 mA** Capacity with suitable switch gears, Panel meters & required accessories – 1no.

c) Test Bench for Induced voltage withstand test

DVDF Set of **30KVA, 1000 V** Motor- Generator along with suitable switch gears, Panel meters & required accessories – 1no.

d) Stand-alone Automatic Transformer Turns Ratio Meter for Voltage Ratio Test / Turns Ratio Test.

2) STANDARDS

Test Bench should be suitable to test Distribution Transformer as per all respects to the relevant Testing standards like **IS 2026/ IS 1180 / IEC 60076 with latest amendments**.

3) Detail Specification of Transformer Test Panel

Suitable for following Ambient condition

Ambient temperature	5 °C up to 40 °C
Altitude	2000 m above MSL
Relative humidity	10 to 85 % (non-condensing)
Seismic zone	suitable for Zone V

A. Control Panel: -

3 – Phase Precision Power Analyzer should have basic accuracy of ± 0.1% of Reading ± 0.1% of Range. It should be suitable for accurate measurement in the bandwidth DC to 100 kHz. It should have TRMS Voltage measurement range of **600V (Ph-N) & 1000V (Ph-Ph)** & AC Current measurement range of **40 Amp or Higher** (without External CT) with colour TFT Display inbuilt data storage memory. Suitable interface as well as USB Socket to communicate with Computer should be provided in Power Analyzer. Free Demo Software to make Report in Computer should be provided. Software should be such that editing of measured values becomes impossible. High speed data measurement mode to measure basic parameters in 0.5second, 0.2 second (approx.) or better should be provided in Power Analyzer. This Power Analyzer should be shock proof and vermin proof.

A. 3–Phase Motorized common Variac (Auto Transformer) 415V / 415-470V**, 100 Amp** Capacity Oil Cooled Type (**With Oil**) with zero limit switch will be a part of this Test Bench to perform all tests. Auto transformer shall have individual phase control as well as common control. Eight push buttons of standard make to operate this Variac should be provided in Panel.

B. 3-Phase **oil cooled** Intermediate transformer with input supply voltage of 415 V and output voltage 800 V, 40 Amp. Capacity should be provided with panel meters having output voltage and output current meters.

C. Double Voltage Double Frequency Test Set: - 30 KVA or Higher KVA Rating Motor - Generator Set with Bed, Coupler, Anti - Vibration Pad should be provided. Required Panel Meters, Over Current Relay protection, Timer & other switch gears for this set should be provided in Panel.

D. **High Voltage Transformer Set:-** High Voltage Oil Cooled Transformer of 230V Input & 40KV, 200mA output. (5Minute On, 10 Minute Off Duty). Only **Single Digital Panel meter** to show all 3 Parameters like kilo Volt meter, leakage current (mA) meter, Digital Timer along with Selector switch to select Leakage current **100, 150 & 200 mAmp** & Timer setting, Over current relay with CT & other required switchgears & accessories should be provided in Panel. Shall be possible to reduce the output to zero after starting the tests (by pressing start button) after set duration of 1 minute. Emergency stop button shall be provided. Zero interlock facility shall be provided.

E. Transformer Test Panel (Test Bench): - It should be proper powder coated, Desk Type with lifting hook.

F. 3 –Phase Suitable MCB/MCCB for input, 3 – Phase Suitable MCB/MCCB for output of OC/SC test over current protection, 2-Pole suitable MCB for control protection, Input & Output terminals for OC/SC, HV, DVDF, Indication Lamps for R, Y, B, & Test On/Off for all test, Dimmer Zero lamp, Emergency Stop Button with Indication, Test selector switch for OC-SC, to be provided. Separate test bench shall be provided for HV & DVDF test. These all Switchgears & Cables should be of **ISI** mark (Schneider / L&T or similar reputed make).

G. 3-Phase Mains input supply VAF meter (Selec / Rishabh or similar reputed make) with required CT should be provided in Panel.

H. Suitable Rating of Stabilizer for Control Supply & 3-Phase Over Under Voltage Relay for Control Wiring must be provided in Panel.

I. Hooter and Tower Light must be provided as Test On indication.

J. **ISI Marked** Intermediate Cables with suitable length & suitable cross section should be provided. 3 core of atleast 10-meter-long common Test Cable with Big Alligator Clips for OC-SC, DVDF Test should be provided.

K. Digital Temperature Measurement during Temperature Rise Test with RS-485. Temperature Scanner (8-Channel or higher) suitable for PT-100 and T type Thermocouple Sensor with 15 Meter wire for Temperature Measurement for Temperature rise Test.

L. Winding Resistance Meter shall be used during the temperature rise test to accurately measure LV/HV winding resistance and monitor resistance changes corresponding to winding temperature rise. Single mode/continuous mode and interval mode measurement shall be possible & Auto plotting of Hot Resistance Graph should be there.

B 3-PHASE PRECISION POWER ANALYZER

a. 3-Phase Precision Power Analyzer should have basic accuracy $\pm$ 0.1% of Reading $\pm$ 0.1% of Range , Band width: DC to 100 kHz, Suitable to the tests being conducted. Passing of the test equipment's and the report being generated must comply the NABL accreditation requirements. This will be the sole responsibility of the bidder.

b. It should be capable of performing accurate simultaneous measurements of TRMS Voltage, Current, Active Power, Apparent Power & Reactive Power, Frequency, Power Factor etc.

c. It should be capable to measure Mean value as well as Peak value of Voltage.

d. The fully floating isolated inputs shall have a high immunity against electrical disturbances, high dynamic common mode rejection and wide measuring ranges. Design of input terminal has to withstand momentary over load condition.

e. Current range should be minimum 40 A rms or Higher Capacity (Direct) without use of external CT.

f. Voltage range should be minimum **600V (Ph-N) & 1000V (Ph-Ph)** (Without need of external PT).

g. User should be able to set Measurement Speed (Update Rate) as 1 Sec (Slow), 0.5 Sec (Medium) & 0.2 Sec (Fast Speed).

h. It should have user-friendly features like TFT colour LCD displays / Legible bright display and push buttons to perform easy operations.

i. Mechanically, it should be designed to use in Rack/Panel mounting as well as table top without additional accessories. It should be made using aluminum sheet & extrusion with proper powder coated finish.

j. It should also have inbuilt memory storage facility and should be provided with one Ethernet RS 232 and USB / RS -485 Port to communicate with Computer.

k. A/D Converter shall have Simultaneous conversion of voltage and current input with at least 16 bit Resolution or more

l. Data Hold facility shall be available

m. Software should be provided with Power Analyzer to see all basic parameters simultaneously in Computer & to Print Test Report. It should have facility to save Test Report in MS-Excel Format for further calculation and to generate user's own test report of device under test.

n. Power Analyzer should be complying Safety Standard IEC 61010 (**Test Certificate must be attached with technical Bid**)

o. Calibration certificate carried out at any NABL accredited lab are to be supplied with instrument.

p. **Make:** Yokogawa / Hioki /Zimmer/Veer Electronics/ Reputed Make

GENERAL SPECIFICATIONS	
Warm-up time	30 minutes or less
Operating temperature	5° to 40° C
Operation humidity	20% to 80% RH (Non-Condensation)
Storage temperature	5° to 40° C
Input Impedance	Atleast 2 M Ω
Power Supply	230V ± 10% / 50 Hz.

CALCULATION FUNCTIONS			
	3 Wire (2-Watt Meter)	**V Phase to Phase (3-Watt Meter)**	**4 Wire (3-Watt Meter)**

Volt V	V=(V1 + V2)/2	V1 = √3 (V1+V2)/2 V2 = √3 (V2+V3)/2 V3 = √3 (V3+V1)/2 V = (V1 + V2 + V3)/3	V = (V1 + V2 + V3)/3
Current I	I = (I1 + I2)/2	I = (I1 + I2 + I3)/3	
Active Power P	P= (P1 + P2)	P= P1+P2+P3	
Power Factor PF	PF= (PFI+ PF2)/2	PF= (PF1 + PF2+PF3)/3	
Apparent Power	S1 = V1 X I1 S2 = V2 X I2 S = S1 + S2	S1 = V1 X I1 S2 = V2 X I2 S3 = V3 X I3 S = S1 + S2 + S3	
Reactive Power	Q = $\sqrt{S^2 - P^2}$		
Mean Volt	Vmean = 1.11072 X Voltage rectified		
Crest Factor	CF= Peak Value / RMS Value		
Form Factor	FF = RMS Value / Average Value		

MEASUREMENT FUNCTIONS	
Parameter	**Voltage / Current / Active Power/Power Factor/Apparent power/V rmean**
System	Digital sampling, sum of average methods
Accuracy of Power	Accuracy
	± (0.1% of Reading + 0.1% of Range)
Standard / Accessories	
1. Power Supply Cord 2. Current terminal with nut inbuilt 3 Ethernet interface cable/RS 232 and USB/RS -485 Cables 4. USB interface wire 5. Software CD 6. Operation Manual 7. Test & Calibration Certificate with NABL Traceability 8. Link for Neutral Terminals 9. Extra Fuse	

a. I) Variac/Dimmer/ Variable Voltage Auto Transformer

This Motorized Variac will be used to supply controlled power as per required test condition. It will be common for OC-SC, with individual phase control.

Current range shall be 100A.

a. Voltage range shall be 3-phase AC 415 Input / 0-415V -470V smooth Output.

b. It Must be **copper wound** & ONAN Cooling type.

c. Operating frequency : 50 Hz

d. The three-phase auto-transformer employs a centralized dimmer control mechanism, ensuring simultaneous and uniform voltage variation across all phases,. The unbalance in the output voltage in 3-phase simultaneous operation should not be more than 0.5% with respect to the input voltage

Make: AE/Veer/Seeco/Reputed make

e. The voltage shall compulsorily START from ZERO only during every start operation. This means whenever the auto transformer is switched OFF it should come to ZERO Position automatically. At the time of switching ON, if it is in non-zero position, auto transformer shall not be energized. Energization shall be possible only in zero positon.

II) 3-Phase Intermediate Transformer

For measurement of no-load and full load losses of the transformer, the Intermediate Transformer is to be supplied with suitable voltage as per requirement of Testing. This intermediate transformer will be used to supply stable power input as per the specified test condition.

a. Voltage shall be 415V Input / 800V Output

b. It should be. Copper wound. Material, CRGO core.

c. Secondary Current shall be 40 Amp.

d. Cooling :ONAN

e. Vector group : YnYn0

f. Operating frequency : 50 Hz

g. Percentage Impedance at 75 deg. C : less than 4.5 %

Variac and Intermediate Transformer :

An emergency switch shall be provided on the control desk

Maximum oil and Winding temperature rise shall not exceed 35 deg c and 40 deg.c respectively at rated voltage and rated current output. All the Three phases to be brought out and Incoming and outgoing to be properly marked for ease of connection Core Made from High Grade CRGO Silicon Steel & Winding 99.9% pure Copper Provision of Increase and Decrease of Voltage control shall be made manual/Motorised and remotely control from panel

The core of the transformer shall be high grade M4 CRGO laminations only. The core shall have low loss and good grain properties. The Operating Flux Density should be 1.6-1.7 Tesla. The core should be coated with hot oil proof lamination insulation, bolted together and to the frame firmly to prevent undue vibration or noise. The complete design of the core must ensure permanency of the core losses with continuous working of the transformer. The operational flux density of the transformer shall be such as to provide a over-fluxing of 112.5% as per standard.

Maximum current Density of the winding : < 2A / sq.mm

b. AC High Voltage Transformer for HV Withstand Test

AC High Voltage Transformer specially designed for testing of insulation of Transformer.

a. Output: 40KV – 200mA

b. Input: 230V

c. Winding: Cu Wdg, Oil Cooled

d. Duty cycle : **HV Test Transformer shall be rated for short-time duty cycle (typically 5 min ON / 10 min OFF), suitable for 1-minute AC HV Withstand Test as per IS 2026(Part-3) / IEC 60076-3.**

e. Single Digital Panel meter to display kV meter, leakage current (mA), Digital Timer with Selector switch to select Leakage current as 50%-75%-100% in Panel.

f. Test ON Indication, over current relay with CT, & other required switchgears & accessories should be provided in Panel. Hooter shall be provided

c. Induced Over Voltage (DVDF) Test Motor – Generator Set

Induced Over Voltage Test Set (DVDF Test) is used to perform Induced Over voltage test on the Transformer. This Test Set up is a combination of 3-Phase Induction Motor & Generator. It provides continuously variable output voltage at double frequency to test the insulation between turns of coils, layer to layer windings in Transformer.

a. KVA Rating: 30 KVA Generator Output of Motor-Generator Set with Bed, Coupler, Anti Vibration Pad

b. Output Voltage & Frequency: **1000V** and **100 Hz** (Hz = Input Hz X 2)

c. Output Frequency ~~50 HZ and~~ 100 Hz ~~selectable~~

d. Output Current: 17.32A or higher

e. Input voltage: 415V

f. **AC Motor:** Squirrel cage induction motor should be of suitable power rating & speed, **Input:** 415 V + /- 5%, 3 phase, 50 Hz to carry out the testing.

g. Required Panel Meters like **VAF Meter** for Voltage & Current meter and Frequency meter along with Timer should be provided in Common Control/Power Panel (Selec / Rishabh or similar reputed Make).

h. Over Current Relay protection & other switch gears for this set should be provided in Common Control/Power Panel.

i. **Make:** Kirloskar/Veer/Anand Engineering / Reputed make

j. ~~It shall be suitable to measure the No load loss at 433 V 50 Hz on Transformer rating upto 500 kVA~~

- Not required considering being provided in separate panel.

d. Temperature Rise Test:

To determine the temperature, rise of transformer windings and top-oil under rated load as per **IS 2026 (Part-2)**. The test ensures the transformer can safely operate at its nameplate rating without excessive heating.

For Temperature & Resistance monitoring:

a. Digital Temperature Measurement during Temperature Rise Test with RS-485. Temperature Scanner (8-Channel or higher)

b. 8Nos. suitable for PT-100 Sensor and T type Thermocouple with 15 Meter wire For Temperature Measurement for Temperature rise Test for **top oil, bottom oil, ambient, winding hotspot points.**

c. **Digital Micro Ohm Meter:**

Measurement range: 0.1 µΩ to 1.9999 kΩ

Resolution: 0.1 µΩ (on lowest range)

Basic accuracy: ± 0.05% of reading

Test Currents (DC): Typical modes — 10 A or more.

PC interface (via RS232 / USB adapter) and compatibility with software for Heat-Run testing & data analysis / storage.

Dual-channel operation (i.e. can measure two windings or two resistances simultaneously)

Display: 4-line backlit large LCD (4½-digit resolution)

Make: Reytech/Prestige/Megger/reputed make

Shall have facility for Auto plotting hot resistance graph

e. Automatic Transformer Turns Ratio Meter

k. 3-Phase Automatic Transformer Turns Ratio Meter should have basic accuracy ± 0.1% Reading ± 0.1% of range (For HV-LV Voltages & Ratio).

l. It should be capable of performing accurate measurements of TRMS HV & LV Voltage, Excitation Current (HV Side), Turns Ratio of Transformer and check of phase displacement

m. It should be capable to measure Turns Ratio of Transformer up to 2000 Ratio.

n. It should be capable to calculate %Deviation of Measured Turns Ratio with Calculative Turns Ratio entered by User.

o. Both Voltage Channels shall have a high immunity against electrical disturbances, high dynamic common mode rejection and wide measuring ranges.

p. Excitation Current measurement should be up to 200mA.

q. Test Voltage must be approx. 55 V @ 230V Aux. Supply Voltage of Instrument.

r. **It should Auto Vector Group Detection Facility.**

s. It should have Vector Group Selection Facility & User should be able to set Measurement Mode as 1. Manual Mode of Testing 2. Auto Mode of Testing.

t. Hookup Error should be provided for YY Connections.

u. It should have user-friendly features like 20x 4 LCD Display, 16 Nos. of Push buttons to perform easy operations.

v. Mechanically, it should be designed in Carrying Case: ABS Plastic Bag for Easy Carrying.

w. It should also have inbuilt memory storage facility to store at least 200 or more nos. of readings.

x. It should be provided with RS-232/USB/RS-485 port to communicate with Computer.

y. Free Demo Software should be provided with Instrument to see Turns Ratio, %Deviations, Excitation Currents in Computer & to Print & save Test Report.

z. Tap Selection for Calculated Ratio Enter up to 25 Tap

aa. Safety Compliance as per IEC 61010-1 (**NABL Test Certificate should be submitted along with Tender only.**)

bb. **Make:** Reytech/Veer Electronics/Megger/reputed make

GENERAL SPECIFICATION		
S. N	**PARTICULARS**	**Specifications**
1	Warm-up time (For Specified Accuracy)	30 minutes or less
2	Operating temperature	5° to 40° C
3	Operating humidity	20 to 75% RH (Non Condensation)
4	Power Supply	AC 230V ± 10% @ 50 Hz

MEASURMENT FUNCTIONS		
S. N	**PARTICULARS**	**As. Reqd. vide Specifications**
1	Measuring & Calculative Parameters	Turns Ratio, % Deviation, Excitation Current, HV & LV side Voltages & Reverse Polarity
2	Resolution of Turns Ratio	5 Digits
3	Excitation Voltage	Approx. 55 V, 50 Hz @ 230 V Input Supply

4	Excitation Current Range & Resolution	Range Up to 200 mA, Resolution 0.1 mA
5	Accuracy: (within 1 year after Calibration)	± 0.1% rdg ±0.1% rng (For HV & LV Voltages & Ratio)
6	Ratio Range	1.0 – 2000.0
7	Connections	Y-Y, D-Y, Y-D, D-D
8	Vector Group Selection	Vector Group Selection facility **1-Phase**: Ph0, Ph6 **Y-Y**: Yy0, Yy6, Yyn0, Yyn6, YNy0, YNy6, YNyn0, YNyn6 **D-Y**: Dy1, Dy5, Dy11, Dyn1, Dyn5, Dyn11, **Y-D**: Yd1, Yd5, Yd11, YNd1, Ynd5, YNd11 **D-D**: Dd0, Dd6, Dd2, Dd8, Dd4, Dd10
9	Computer Interface	RS-232 / USB / RS-485 with Free Demo Software
10	Data Storage	Up to 200
11	Data Hold Facility	Using HLD Key with Hold Indication LED
12	Over range indication	For Voltage and Current
13	Over Current protection	Fuse as well as Range Overload Tripping should be provided.

ACCESSORIES	
S. N	**PARTICULARS**
1	15 Meter Long HV-LV Testing lead with Alligator clip with R, Y, B Color Code
2	RS-232 / USB / RS-485 Cable for Computer Interface
3	Mains Power Cord
4	Software CD
5	Accessories Bag
6	Documents File with Operational Manual & Test Certificate
7	Extra Fuse

Warranty : 1 Year from the date of successful installation at site for all equipment and instrument.

Calibration : Calibration report from NABL accredited laboratory shall be arranged for all measuring Instrument

The testing equipment's have to be designed, supplied and tested in accordance with the best international engineering practices under stringent quality control to meet the requirement stipulated in the technical specifications.

Test Source THD shall be $\leq$ 5% for no load loss, load loss , Temperature rise tests, Separate voltage withstand test (AC High voltage withstand test) and induced over voltage withstand test..

Built-in alarms for safe operation. Adequate safety margin with respect to thermal, mechanical, dielectric and electrical stress etc. are to be considered during design, selection of raw material, manufacturing process.The manufacturer shall take all necessary measures to ensure the safety of the test operator during the execution of the tests.

IMP Note:

1. Standard Warranty is 1 Year for above Complete Transformer Test Bench.
2. No warranty of any accessories & Cables
3. There must be a presence of proper ground at power supply system. Proper ground means 0-1 Volt Potential difference is required between Ground & Neutral Terminal of Supply Voltage. If present Earthing system is not effective then Purchaser will have to install New Powerful Earthing before Installation.
4. Mains Supply should be of 415V ± 1% (**Servo Stabilizer will be required if, input voltage is not Stable**)
5. Mains MCCB & Mains Cable as required by Purchaser must be ready at the time of Installation of Test Bench (It is in Purchaser's Scope).
6. Test Lab must be ready before Installation to carry out Installation in time.
7. Fresh Cooling / Insulating Oil for Variac (Variable Voltage Auto Transformer) must be ready at the time on installation as per IS-335. Oil filling procedure will be in Purchaser 's Scope.
8. Material unloading at Purchaser's Premises will be in Purchaser's Scope.
9. Material Handling Manpower & Machinery should be ready at the time of unloading of Material.

13. **Completeness of Equipment:**

Any fittings accessories or apparatus which may not have been specifically mentioned in this specification, but which are usually necessary in equipment of Transformer Test Bench shall be deemed to be included in the specification and shall be supplied by the bidder without extra charge. All plants and equipment shall be complete in all details whether such details are mentioned in the specification or not.

14. **Safety Aspect:**

i. Necessary arrangement for proper safety of all the workmen, material & equipment shall be incorporated in test lab by purchaser. All the equipment and system used for testing shall have emergency shutdown facility. Adequate firefighting equipment shall be deployed during the testing by purchaser.

ii. Since the above-mentioned equipment deals with high voltage supplies should take care of the safety aspect during design and manufacturing. Suppliers should provide the safety instruction to operator and clearly labelled on the equipment.

iii. Supplier shall provide emergency switch connection which shall be mounted on the Power supply unit to cut off the supply in case of emergency.

iv. During tests regulations for safety operation shall be observed, acc. to IEC61010.

15. **Warranty:**

The Test Bench supplied shall have a warranty for a period of 12 months from the date of installation. Bidders shall guarantee to repair or replace the test equipment's/bench, which are found to be defective/ inoperative at the time of installation or become inoperative/ defective during warranty period on supplier's cost. Replacements shall be effected within 1 month from the date of intimation.

16. **Inspection**

All tests and inspections shall be made at the place of the manufacturer unless otherwise especially agreed upon by the manufacturer and the purchaser at the time of purchase. Inspection and testing at manufacturer's factory shall be conducted by officer(s) deputed from MePDCL for this purpose. The inspection call shall be intimated at least 15 days in advance. The supplier shall ensure that pre-dispatch inspection for Transformer Test Bench are intimated only when the Transformer Test Benches are completely ready for inspection.

17. **Documentation**

One set of the following documents shall be supplied along with each test system.

- Operating manual of each component of test equipment like Power Analyzer, Operating Software, Current Transformer, etc.
- Wiring diagram
- NABL Calibration certificate for all measuring instruments
- Test certificate of complete test system.

18. **Test Certificates**

The test bench and all its components shall be supplied along with the test certificate/s of the of the complete testing system, as well as a calibration certificate of the Power analyzer and other components valid for at least 12 months from the date of calibration. The calibration certificate of the Power analyzer shall be issued by any NABL or international accredited laboratory, traceable to NABL Standards. The Manufacturer of Power Analyzer shall have in- house OEM level Service and Calibration Centre in India.

19. **Testing, Inspection & Commissioning**

The supplier shall be responsible for repairing or replace the defective part within the warranty period by free of cost, with no transportation or insurance cost to the Purchaser, up to destination. Subject to the condition that the defect is noticed within 36 months from the date of receipt of material.

20. **Demonstration & Training of Personnel**

The bidder shall install the system at the location specified by the MePDCL and arrange demonstration and training to the MePDCL Officials at the premises of each consignee on the efficient usage of the equipment to test the 3-phase distribution transformers regarding the full operational details and procedures and all the tests to be conducted through the test bench at the time of supply and commissioning.

21. **Recommended Spares**

The bidder shall furnish a list of recommended spares for the required for the satisfactory and trouble-free operation of the test benches for 3 years, indicating the item - wise price of each item of the spares in the offer. MePDCL reserves the right to order any or all the spares.

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AuthorizedSignatory
[Name&Designation]
[Seal of the Office]