



Expression of Interest (EOI) for Engineering ,
procurement, testing, erection & commissioning and
proving of load testing (motoring and braking mode) of 3
phase AC motors for traction application

Ref No: TPTN/EOI/TEST/001/rev00

EXPRESSION OF INTEREST

FOR

**Engineering, Procurement, Testing, Erection & Commissioning & Proving of
Load Testing (Motoring & Braking Mode) of 3phase AC Motors For
Traction Application**

Issued by:

**TTM Division, Bharat Heavy Electricals Limited, Piplani
Bhopal-462021**



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All information contained in this EOI provided / clarified are in good interest and faith. The information contained in this Expression of Interest document or subsequently provided to Applicant(s), whether verbally or in documentary or any other form, by or on behalf of BHEL, is provided on the terms and conditions set out in this EOI and such other terms and conditions subject to which such information is provided.

The purpose of this EOI is to provide interested parties with information that may be useful to them in the formulation of their application for qualification and subsequent selection pursuant to this EOI. This EOI is not an offer by BHEL to the prospective Applicant(s) or any other person. This EOI is neither intended nor shall it be construed as creating or requiring any ongoing or continuing relationship or commitment with any party or person. This is not an offer or invitation to enter into an agreement of any kind with any party.

Though adequate care has been taken in the preparation of this EOI document, the interested firms shall satisfy itself that the document is complete in all respects. The information is not intended to be exhaustive. Interested Agencies are required to make their own enquiries and assumptions wherever required. Intimation of discrepancy, if any, should be given to the specified office immediately. If no intimation is received by this office by the date mentioned in the document, it shall be deemed that the EOI document is complete in all respects and firms submitting their interest are satisfied with the EOI Document in all respects.

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The Applicant shall bear all its costs associated with or relating to the preparation and submission of its Application including but not limited to preparation, copying, postage, delivery fees, expenses associated with any demonstrations or presentations which may be required by BHEL or any other costs incurred in connection with or relating to its Application. All such costs and expenses will remain with the Applicant and BHEL shall not be liable in any manner whatsoever for the same or for any other costs or other expenses incurred by an Applicant in preparation or submission of the Application, regardless of the conduct or outcome of the EOI.



1.0 INTRODUCTION

This Expression of Interest (EOI) seeks response from interested parties for designing, integration, supply and commissioning of load test facility (in both, motoring & braking mode) of induction motors up to 1200 KW, with variable voltage and frequency.

2.0 ABOUT BHEL

Bharat Heavy Electricals Limited (BHEL) is a Central Public Sector Enterprise, wherein Government of India is holding 63.17% of its equity. It is an integrated power plant equipment manufacturer and one of the largest engineering and manufacturing companies of its kind in India having a turnover of about USD 5 billion. The company is engaged in the design, engineering, manufacture, construction, testing, commissioning and servicing of a wide range of products and services for the core sectors of the economy, viz. Power, Transmission, Industry, Transportation, Renewable Energy, Oil & Gas and Defence with over 180 product offerings to meet the needs of these sectors.

Since its inception in 1964, BHEL has been the solid bedrock of evolution of India's Heavy Electrical Equipment industry. BHEL has a mammoth 20,000 MW per annum capability for manufacturing of power generation equipment. A widespread network of 17 manufacturing units, 2 repair units, 4 regional offices, 8 service centres, 1 subsidiary, 4 overseas offices, 6 joint ventures, 15 regional marketing centres and current project execution at more than 150 project sites across India and abroad corroborates the humongous scale and size of its operations.

With key focus on project execution, the worldwide installed base of power generating equipment supplied by BHEL has exceeded 178 GW. BHEL's equipment that account for about 60% of the country's total generation from thermal utility sets (coal based), stand a testimony to its valuable contribution towards nation building. BHEL's global competitiveness has established its footprint in all the inhabited continents with references in 82 countries.

The high level of quality & reliability of BHEL products is a testimony to its adherence to international standards by acquiring and adapting some of the best technologies from leading companies in the world including General Electric, Siemens AG, Mitsubishi Heavy Industries Ltd. etc., together with technologies developed in its own R&D centres. BHEL invests more than 2.5% of turnover on R&D and innovation.

BHEL has been designing and manufacturing rolling stock for rail and urban transportation. BHEL has also been manufacturing Motors, Power electronics and Controllers for various transportation applications at its various factories. BHEL also has a Battery Packaging facility for space applications.

In transportation sector, BHEL is into the manufacture of complete electric and diesel electric locomotives and electrical assemblies/components including traction motors, traction transformers, power & auxiliary converters and controls, gear wheels etc.

At our Jhansi plant, we manufacture complete Electric Locomotives upto 6000 HP rating for mainline application of Indian Railways, Diesel Electric Locomotives from 350 HP to 3100 HP rating. Till date, we have supplied more than 370 nos. of main line electric locomotives Indian Railways and more than 250 nos. of diesel electric locomotives for shunting operations to different industries. We are currently executing an order for manufacture of complete Electric Locomotive of 6000 HP. Our Jhansi plant with an installed capacity of 75 nos. locomotives per year. At Jhansi, we have complete state-of-the-art facilities for manufacturing, fabrication and testing of bogies, loco shells, under frames and other mechanical components of locomotives.



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We have recently developed India's first state-of-the-art WAG7 Electric Locomotive with regenerative capabilities. We have also developed India's first Traction Motor for 9000HP Electric Locomotives.

Among electrical propulsion equipment, we manufacture and supply traction motors, traction transformers, power converters(IGBT/GTO) & controls, auxiliary converters (IGBT/GTO) and vehicle control units for electric locomotives, diesel electric locomotives, EMUs, DEMUs & and metros trains of Indian Railways. Our manufacturing range includes conventional DC drive, IGBT based 3-phase drive equipment upto 6000HP rating. BHEL has also been in the forefront of providing maintenance and spares/replacement support to Indian Railways for their locomotive fleet. We have full-fledged service department located at major centers in the country.

More details about the entire range of BHEL's products and operations can be obtained by visiting our website.

3.0 PURPOSE

To seek response from interested parties for designing, integration, supply and commissioning of load test facility (in both, motoring & braking mode) of induction motors up to 1200 KW, with voltage up to 2200 Volt and frequency till 210 Hz, speed up to 6300 RPM. Details of the proposed facility and test to be conducted are specified in annexure-02. Proposed facility shall be installed at BHEL Bhopal premises.

4.0 INSTRUCTION TO APPLICANTS:

- 4.1 Reputed business entities may submit their application as per Annexure -1 (along with supporting documents for PQR) by Post / e-mail so as to reach us on or before 30th April'2023 at the following address:

The Deputy General Manager
Block-9, Shop Floor cross-Bay
TPTN testing Group(TTM)
Bharat Heavy Electricals Limited
Piplani, Bhopal - 462021
India.

Email: harendrasgurjar@bhel.in, kunald@bhel.in,
raghuveer@bhel.in

Phone: +91 755 2505290 / 3259.

- 4.2 The details submitted by the Applicant(s) shall be complete in all respects and BHEL may seek clarifications/additional information as considered necessary. Such clarifications/additional information must be provided within 5 days of BHEL request.
- 4.3 The EOI process involves seeking willingness of interested parties and soliciting their application in response to this EOI.
- 4.4 Any request for further information or clarification on the EOI document may be submitted to Deputy General Manager, Bharat Heavy Electricals Limited – TTM Division within 07 days from date of issue of EOI.



- 4.5 Responses to EOI are to be submitted in English only. Supporting documents, as required, should also be in English language. In case of some documents being available in languages other than English, the Applicant shall necessarily provide duly authenticated translated version of the same in English.
- 4.6 Duly authorized representative of the Applicant(s) shall sign on each page of the document. Response to EOI should be prepared in such a way so as to provide a straight forward, concise description of Applicant's capabilities.
- 4.7 Notwithstanding anything contained in this EOI, BHEL reserves the right to accept or reject any Application and to annul the EOI Process in whole or part, at any time without any liability or any obligation for such acceptance, rejection or annulment, and without assigning any reasons thereof.
- 4.8 BHEL reserves the right to verify all statements, information and documents submitted by the Applicant in response to the EOI. Any such verification or lack of such verification by BHEL shall not relieve the Applicant of his obligations or liabilities hereunder nor will it affect any rights of BHEL.
- 4.9 The EOI process shall be governed by, and construed in accordance with, the laws of India and the Courts at Bhopal shall have exclusive jurisdiction over all disputes arising under, pursuant to and/ or in connection with the EOI process.
- 4.10 All costs incurred for participation in the EOI shall be borne by the Applicant (s).

5.0 Pre-Qualifying Criteria (PQR):

The prospective partner/ respondent must meet the following pre-qualification requirement supported with relevant documents/ credentials/ certificates for further consideration:

This Expression of Interest (EOI) seeks response from interested parties who have past experience of designing, integration, supply and commissioning of load test facility (in both, motoring & braking mode) of induction motors above 100 KW at different voltages and frequencies.

- 5.1 Must have past experience of designing, integration, supply and commissioning of test facility of induction motors above 100 KW at different voltages and frequencies.

Applicant's Response (meeting the above criteria): Yes/ No.

Following supporting information/ documents attached: Yes/ No

- a. Application of supplied facility.
- b. Maximum power , voltage, speed and frequency of the supplied facilities.
- c. PO copy (if required price details may be hidden).
- d. SLD/Block diagram.

Applicant's Response (meeting the above criteria): Yes/ No.




Annexure 1

Information to be submitted by Applicant

1. Name of the Company:
2. Legal status of the Company:
3. Brief description of the Company including details of its business groups/subsidiaries/
affiliates:
4. Date of Incorporation:
5. Date of Commencement of Business:
6. Full address including Telephone nos. / Fax nos.:
Registered Office:
Head Office:
Address for communication:
Contact Details:
Office Address in India, if any:
7. Documents to be enclosed:
 - a) Technical Credentials – Relevant Product/System catalogues, Experience /Reference List, Copies of Customer Certificates, Engineering strengths, quality accreditations, etc.
 - b) Financial Credentials – Copies of Audited Financial statements (Annual Reports) for last 3 years.
 - c) Other documents considered relevant to meet PQR and support evaluation criteria.

(Sign & Company Seal)
Authorized signatory

| | | |
|---|--|--|
|  | BHARAT HEAVY ELECTRICAL LTD BHOPAL Test plant for testing of AC Traction Motors | Annexure-02 |
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1. Introduction :

BHEL' s testing group is engaged in factory acceptance test(FAT) of AC and DC Traction Motors (up to 1200 KW), Alternators and associated auxiliaries.

This document covers specification for proposed Type testing facility for 3 phase traction Motors. These machines are to be tested in both Motoring & Breaking mode throughout the entire speed range.

Proposals are sought from vendors for various options for accomplishing the proposed testing as detailed in this specification.

2. Rating of AC Machines proposed to be tested:


Tabulated below is the range of values for proposed test facility:

| S.N. | Type | Maximum values | | | | | |
|------|-------------------|----------------|-------|---------|-------|--------|-------|
| | | Voltage | Freq. | Current | Speed | Torque | Power |
| | | V | Hz | Amps | RPM | Nm | Kw |
| 1 | AC TRACTION MOTOR | 2200 | 210 | 500 | 6300 | 12000 | 1200 |
| S.N. | Type | Minimum values | | | | | |
| | | Voltage | Freq. | Current | Speed | Torque | Power |
| | | V | Hz | Amps | RPM | Nm | Kw |
| 1 | AC TRACTION MOTOR | - | 5 | --- | 100 | 100 | - |

3. Details of the tests to be Conducted:

Following tests are to be conducted on various kinds of motors.

1. Measurement of stator winding resistance.
2. Insulation resistance (IR) on stator winding.
3. Impedance measurement.
4. Polarization Index test on stator winding (IR of 10min/IR of 1min).
5. Verification of direction of rotation, Phase sequence & terminal marking.
6. Temperature rise tests:
 - (a) 15 second heat run test at 2x (twice) the continuous current.
 - (b) Half hour heat run test & hot resistance measurement at shut down.
 - (c) One-hour heat run test & hot resistance measurement at shut down.

| | | |
|---|--|---|
|  | <p style="text-align: center;">BHARAT HEAVY ELECTRICAL LTD BHOPAL</p> <p style="text-align: center;">Test plant for testing of AC Traction Motors</p> | <p>Annexure-02</p> |
| | | <p>Ref No: TPTN/EOI/TEST/001/rev00</p> |

(d) Continuous heat run test & hot resistance measurement at shut down.

7. Characteristics Test Load Measurement

(a) Motoring Mode

(b) Braking Mode

8. Locked rotor test (Conducted at full load current with rotor blocked).

9. No load test (rated voltage applied).

10. Over speed Test

11. Vibration measurement

12. Noise measurement

13. Insulation resistance before & after HV test.

14. High voltage test on stator winding to frame.

15. Phase sequence measurement

16. Tests on Accessories:

(a) Check of temperature sensor.

(b) Check of speed sensor.

4. Parameters of motor under test required to be recorded and to be logged in test certificate during testing.

1. Phase to Phase voltage of all three phases

2. Phase current of all three phases.

3. Electrical Power

4. Power factor

5. Shaft power

6. Voltage waveform capturing

7. Current waveform capturing

8. Torque

9. RPM.

10. Stator supply Frequency.

11. Air inlet temperature

12. Air outlet temperature

13. Stator frame temperature

14. Bearing Temperature.

15. Ambient Temperature.

16. Temperature through RTD: PT 100 available in machine RTD to be connected to measure winding temperature of machine.

17. Frequency of speed sensor fitted with motor to be measure
