



EXPRESSION OF INTEREST

(Ref No: TME/EOI/GDA/002)

Dated: 24.06.2024

FOR

“DESIGN OF GEAR DRIVE ASSEMBLY FOR TRAINSET APPLICATION”

Issued by:

Traction Machines Engineering Division,
Bharat Heavy Electricals Limited, Piplani, Bhopal,
Madhya Pradesh-462022, INDIA

Registered office at

Bharat Heavy Electricals Limited, having registered office at
BHEL House, Siri Fort New Delhi-110049

(Hereinafter referred to as 'BHEL')



DISCLAIMER

All information contained in this Expression of Interest (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.

The issue of this EOI does not imply that BHEL is bound to select and shortlist applicant(s) for next stage or to enter into any agreement(s) with any Applicant(s). BHEL reserves all right to reject any applications submitted in response to this EOI document at any stage without assigning any reasons thereof. BHEL also reserves the right to withhold or withdraw the process at any stage. Neither BHEL nor its employees and associates will have any liability any loss, expense or damage which may arise from or be incurred or suffered in connection with anything contained in this EOI document or any matter deemed to form part of this EOI document, the information and any other information supplied by or on behalf of BHEL. BHEL accepts no liability of any nature whether resulting from negligence or otherwise howsoever caused arising from reliance/use of any statements/information contained in this EOI by the applicant. BHEL is not making any representation or warranty, express or implied, as to the accuracy or completeness of any information/statements made in this EOI.

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 Designer/Design consultant agencies/ Original Equipment Manufacturer (OEMs) who are involved in designing and have past experience of designing of Gear drive assembly for Fully Suspended Traction Motors (Operational speed 160 kmph or above) for Rolling Stock.

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 3 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. 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 9000HP 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 centres in the country.

More details about the entire range of BHEL's products and operations can be obtained by visiting our web site: <https://www.bhel.com/>

3.0 PURPOSE

- 3.1 Indian Railway is on a rapid expansion and modernisation drive for its rolling stock to increase the average speed of operations and to enhanced safety and comfort of passengers. In this regard, they are switching over from existing EMU stock having operation speed potential of 120 kmph (nose suspended traction motors) to train-sets having operational speed potential of 160 kmph with fully suspended traction motors.
- 3.2 BHEL is a regular supplier of traction propulsion equipment to Indian Railways production units for manufacturing of EMUs by them. In line with agreement with Indian Railways, BHEL is required to provide 2688 nos. gear drive assembly along with fully suspended traction motors mounted on motor coach bogie with operational speed of upto 160 kmph and test speed of 180 kmph.
- 3.3 The intent of this Expression of Interest hereinafter referred to as the “EOI” is to:

3.3.1) Invite applications from interested organizations / companies [Designer/ Design consultant/ OEM] who are willing to partner with BHEL for designing, manufacturing, assembly, testing & supply of Gear drive assembly to Indian Railways, wherein designing and assistance for manufacturing, assembly, testing (including assistance for setting up of facility) shall be in the scope of selected partner(s).

3.3.2) Finalization of technical specification in discussions with selected party(ies) and subsequently seek formal techno-commercial proposal through a separate tender from the shortlisted/ selected party(ies).

- 3.4 It is envisaged that the selected partner(s) shall fulfil the requirement of submission of design documents of gear drive assembly for the said high-speed fully suspended traction motor. The chosen partner(s) shall also be required to provide due assistance to BHEL for manufacturing, assembly, testing of these gear drive assembly (including setting up of facility). Deliverables expected from selected partner(s) shall be:

3.4.1) Providing detailed calculation of gear drive assembly along with half coupling (including geometry calculation based on inputs of bogie primary suspension movement, bearing selection and calculation, strength calculation, shrink fits calculation, height adjustment calculation of gear drive assembly with motor for alignment of coupling after lowering of coach etc.).

3.4.2) Providing technical specification and detailed manufacturing drawings (in form of pdf and .dwg AutoCAD format) of individual component/sub-assemblies/assemblies of gear drive assembly along with half coupling required in order to manufacture these gear drive assembly by BHEL.

3.4.3) Providing 3-D model of complete gear drive assembly along with half coupling in editable format.

3.4.4) Providing finite element analysis (FEA) report for structural analysis, dynamic simulation, fluid analysis, thermal analysis, acoustic analysis (whichever is applicable) by separately defining the inputs, boundary condition, load conditions, output etc. for individual analysis.

3.4.5) Providing detailed step-by-step procedure for manufacturing of individual components of gear drive assembly.

3.4.6) For manufacturing of gear drive assembly:

- a) Identification of machines for manufacturing of individual components of gear drive assembly.
- b) Providing drawings and technical specifications of special tools, fixtures, gauges, templates in order to allow manufacture/procurement of same.

3.4.7) Providing detailed step-by-step procedure for assembly, disassembly, maintenance and overhauling (minor and major) of gear drive assembly indicating usage of consumables/standard tools/special tools/fixtures and including inspection procedures in between.

3.4.8) Providing quality assurance plan of complete gear drive assembly including gear and pinion.

3.4.9) Providing reliability prediction calculations (RAMS, LCC etc.) complying the tender requirements

3.4.10) For assembly, disassembly, maintenance, overhauling of gear drive assembly:

- a) Providing drawings and technical specifications of standard tools, fixtures, gauges, templates, equipments in order to allow manufacture/procurement of same.
- b) Providing drawings and technical specifications of special tools, fixtures, gauges, templates, equipments in order to allow manufacture/procurement of same.
- c) Providing technical specifications of consumables required for assembly, disassembly, maintenance, overhauling in order to allow procurement of same.

3.4.11) Providing detailed step-by-step procedure for type testing and routine testing of gear drive assembly indicating testing equipments to be used, test set-up, inputs supply, outputs etc.

3.4.12) For type testing and routine testing of gear drive assembly:

- a) Providing drawing and technical specification of test set-up and individual equipments including measuring devices in order to allow set-up of testing facility.
- b) Providing test schedule and test format for type and routine test (with acceptance limit of each parameter)

3.4.13) Providing maintenance manual for the gear drive assembly defining all minor and major overhauling activities and step by step procedure.

3.4.14) Providing assistance/ hand holding by way of supervision/ training etc. for manufacturing of gear drive assembly, assembly of gear drive assembly, testing of gear drive assembly, development of tools, fixtures, test set-up etc. as per the details mentioned in above clauses.

- 3.5 This EOI shall also serve to fulfil the requirements of designing/ manufacturing of Gear drive assembly for fully suspended traction motors for Electric Train-Sets complying the requirements of RDSO specification no. RDSO/PE/SPEC/EMU/0196-2019 (Rev.0) issued in November'19.

(https://rdso.indianrailways.gov.in/works/uploads/File/20191106%20With%20Cover_Page_Final_Trainset_propulsion_specification%20copy.pdf)



4.0 INSTRUCTION TO APPLICANTS:

- 4.1 Prospective partner/ respondent may submit their application by submission of Annexure 1 & Annexure 2 (along with supporting documents for PQR) by Post / e-mail so as to reach us on or before 31st July'2024 at the following address:

The Sr. Deputy General Manager
Block-9 Annexe, First Floor
Traction Machines Engg. (TME) Division
Bharat Heavy Electricals Limited
Piplani, Bhopal – 462022
India.

Email: a_sharma@bhel.in, abhishukla119@bhel.in, m.verma@bhel.in
Phone: +91 755 250-2021/ 2019/ 2382.

- 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.
- 4.3 Any request for further information or clarification on the EOI document may be submitted to Sr. Deputy General Manager, Bharat Heavy Electricals Limited – TME Division.
- 4.4 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.
- 4.5 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.
- 4.6 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.
- 4.7 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.
- 4.8 The EOI process shall be governed by, and construed in accordance with, the laws of India and the Courts at New Delhi shall have exclusive jurisdiction over all disputes arising under, pursuant to and/ or in connection with the EOI process.
- 4.9 All costs incurred for participation in the EOI shall be borne by the applicant (s).



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, Credit Rating, Market share (Domestic/International), Segmental Revenue in the applied category(ies).
 - c) Annexure 2 and other documents considered relevant to meet PQR and support evaluation criteria.
 - d) Clause by clause comments on clause 3 of this document, duly seal and signed.

(Sign & Company Seal)
Authorized signatory

Annexure 2

Pre-Qualifying Criteria (PQR)

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

1. Be a Designer/Design consultant/ OEM of Gear drive assembly for fully suspended traction motor having operational speeds of 160 kmph or above.

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

Supporting document attached: Yes/ No

2. Must have past experience of design, manufacturing & supply of 240 no. Gear drive assembly for fully suspended traction motors having operational speeds of 160 kmph or above, running successfully, in the last TEN (10) years from the date preceding submission of this EOI. Gear drive assembly supplied shall be with configuration wherein gear drive assembly is in between the wheels (of an axle) and coupling axis is parallel to axle centre line.

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

Following supporting information/ documents attached: Yes/ No

- a. Application for which Gear drive assembly is designed & manufactured
 - b. Maximum operational speed of designed Gear drive assembly
 - c. PO copy (if required price details may be hidden)
 - d. OGA drawing
 - e. Documents in support of supply of 240 nos. Gear drive assembly i.e. invoice (if required price details may be hidden) or performance certificate of minimum 240 nos. Gear drive assembly.
 - f. Name of place of manufacturing plant where Gear drive assembly has been manufactured.
 - g. Configuration drawing/photograph indicating gear drive assembly in between the wheels (of an axle) and coupling axis parallel to axle centre line.
3. Has own R&D with capabilities for design, development & validation of Gear drive assembly (>160 kmph) for fully suspended traction motors having operational speeds of 160 kmph or above.

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

Supporting document attached: Yes/ No



4. Has not been blacklisted / banned business dealings for Ministry of Railways or any Government Department of India.

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

Supporting document attached: Yes/ No

5. No previous contract has been terminated or part terminated due to bidder's failure.

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

Supporting document attached: Yes/ No

6. Has not suffered insolvency / bankruptcy.

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

Supporting document attached: Yes/ No

7. Respondent must meet following financial parameters:

- Having net positive worth
- Positive Net profit in one out of last three financial years (2021-22, 2022-23, 2023-24)

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

Supporting document attached: Yes/ No

**(Sign & Company Seal)
Authorized signatory**