

Government of India

Ministry of Railways

Research Designs and Standards Organization

Manak Nagar, Lucknow-226011

NOTICE FOR EXPRESSION OF INTEREST

Motive Power Directorate of Research, Designs & Standards Organization (RDSO), Lucknow, under the Ministry of Railways (MOR), is interested in developing specifications and supply of 50 Nos. emission kits for achieving US EPA Tier 0+ emission norms in existing high horse power (HHP) diesel locomotives fitted with EMD 16-cylinder 710G3B Engines, by retro fitment of emission kits, along with necessary Engineering support. Firms interested in development of specification and supply of the kits along with necessary Engineering support, are requested to see the details on RDSO website www.rdso.indianrailways.gov.in at HOME PAGE in Vendor interface tab under 'Expression of Interest (EOI)'.

The interested firms are requested to submit details in the prescribed format to the concerned officer as mentioned in the 'Expression of Interest (EOI)'.

**Executive Director
Motive Power Directorate
RDSO/ Lucknow-226011**

Instructions / Guidelines for the firms expressing their interest against Expression of Interest (EOI) for development of specifications and supply of 50 Nos. emission kits for achieving US EPA Tier 0+ emission norms in existing HHP diesel locomotives fitted with EMD 16-cylinder 710G3B Engines, by retro fitment of emission kits, along with necessary Engineering support.

1. DISCLAIMER:

Motive Power Directorate of Research, Designs & Standards Organization (RDSO), Lucknow, under the Ministry of Railways (MOR), has prepared this document to give interested parties background information of the product/ system. While RDSO has taken due care in preparation of information contained herein and believes it to be accurate, neither RDSO nor any of its officers, employees gives any warranty or make any representations, express or implied as to the completeness or accuracy of the information contained in this document or any information which may be provided in association with it. The information is not intended to be exhaustive. Interested parties are required to make their own inquiries and respondents will be required to confirm in writing that they have done so. The information is provided on the basis that it is non-binding on RDSO or any of its officers, employees or advisors.

RDSO reserves the right not to proceed with the project, at a later stage or to change the process or procedure to take the project forward. In such eventualities, RDSO will not be held responsible. It also reserves the right to decline to discuss the project further with any party expressing interest. No reimbursement of cost of any type will be paid to persons, or entities, expressing interest.

2. PURPOSE OF INVITING THE EOI

The present EOI is being invited to identify experienced firms for the purpose of interacting with them in the process of developing specifications and supply of 50 Nos. emission kits for achieving US EPA Tier 0+ emission norms in existing high horse power (HHP) diesel locomotives fitted with EMD 16-cylinder 710G3B Engines, by retro fitment of emission kits, along with necessary Engineering support.

To facilitate the potential respondents, a preliminary Functional Requirement Specification (FRS) has been drawn up by the Motive Power Directorate and interested firms can view the same in **Annexure-1**.

3. METHOD OF SHORTLISTING OF FIRMS:

The selection criteria for short-listing of firms is defined in **Annexure- 2**.

The top three short listed respondent of EOI (or as deemed necessary based on the no. of responses received) as per the above selection criteria of EOI will be selected for development of above specifications and supply of emission kits along with necessary engineering support. Successful product development cost shall be borne by the firm. Specification shall be finalized after successful product development.

4. SUBMISSION OF EOI BY INTERESTED FIRMS

Interested firms are requested to submit their response in the prescribed "Format for Letter of Response" given in **Annexure-3** within a month from the date of publication of this EOI.

Response may be sent to Director General/ Motive Power, Research Designs and Standards Organization, Manak Nagar, Lucknow- 226011, UP (India)

Contact Details for any assistance:

S. P. Govil, Jt. Director

Motive Power Directorate,

Room No. 105, Annexe-1

Manak Nagar, Lucknow, UP, India

Pin Code: 226 011

Telephone No. +91522-2465729

Email: <mp.directorengine@gmail.com>/<sanjai.govil@gov.in>

Functional Requirement Specification (FRS) for Up-gradation of Existing High Horse Power (HHP) Diesel Locomotives to US EPA Tier 0+ Emission Norm by Retro-fitment of Emission Kit on EMD 710 Engines along with necessary Engineering supports.

1. Introduction:

- 1.1 Indian Railway intends for up gradation of emission standard of their existing high horse power (HHP) diesel locomotives fitted with EMD 710G3B Engines to US EPA Tier 0+ emission norms by retro fitment of emission kit along with necessary engineering support.
- 1.2 Based on measurement of emission level on approximately 50 HHP diesel locomotives, the observed emission level range on Indian Railway HHP Diesel locomotives are given below:

	NO_x	PM	HC	CO
Ranges of emissions level observed (g/bhp-hr)	4.59-16.17	0.05-1.14	0.13-2.82	0.16-3.34

- 1.3 Intended emission level as per US EPA Tier 0+ (in gm/BHP-hr) emission standard is given below:

NO_x	PM	HC	CO
8.0	0.22	1.0	5.0

2. Purpose:

Development of specification for up gradation of emission standard of existing HHP diesel locomotives, fitted with EMD 710G3B Engines, of Indian Railways to US EPA Tier 0+ emission norm by retro fitment of emission kit along with necessary engineering support.

3. Methodology of Development:

- 3.1 Framing of draft specification

- 3.2 Retrofitment of one emission kit on engine test bed at RDSO and performance testing. The firm shall help set a test protocol that includes baseline emissions testing before the upgrade and performance results after the upgrade.
- 3.3 Fitment of one emission kit on HHP Diesel Locomotives at Alambagh (AMV) diesel shed/ Lucknow after necessary test, tweaking and trial based on performance testing on test bed at RDSO to meet US EPA Tier 0+ standards.
- 3.4 Test on Diesel Locomotives after fitment of one emission kit and field trial.
- 3.5 RDSO will be the certifying agency for emission standards on Diesel Loco in India and for issuing all necessary certificates in this regard.

4. General Information about 16 cylinder-710G3B Engines

Engine Model	710G3B
Number of Cylinders	16
Engine Type	Two-Stroke, Turbocharged Diesel Engine
Cylinder Arrangement	45° "V"
Compression Ratio	16:1
Displacement per Cylinder	11 635 cm ³ (710 Cu in)
Cylinder Bore	230.19 mm (9-1/16")
Cylinder Stroke	279.4 mm (11")
Rotation (Facing Flywheel End)	Counter clockwise
HP at Rated RPM	4500 HP at 954 RPM
Normal Idle Speed	270 RPM
Low Idle Speed	200 RPM
Fuel injection	Mechanical Unit Injector (MUI)

5. Technical Requirements:

- 5.1 The kit shall be designed as an emission control system for Retrofitment on existing HHP diesel locomotives fitted with EMD 710 G3B engines to achieve emission level of US EPA Tier 0+ emission norms or better.

- 5.2 The components of the emission kit shall be fitted with in the existing envelope/ assembly replacing the original one. The fitment of proposed emission kit shall be carried out without disturbing other sub-assemblies and components to the extent possible. Weight addition, if any, should preferably be limited to 300 kg.
- 5.3 There should not be adverse effect w.r.t. duty cycle, Specific fuel consumption (SFC) and notch wise delivered BHP and rpm. For this purpose at the stage of prototype testing on the engine test bed the SFC and BHP level of engine fitted with conventional power assembly and SFC and BHP level after retro-fitment of the emission kit on the same engine shall be compared as per sheet given in Annexure-i.
- 5.4 Average lube oil consumptions at rated output should not be higher than 0.5% of the fuel oil consumption of the engine.
- 5.5 HHP diesel locomotives of IR are fitted with M/s EMD or M/s Medha or M/s Siemens make loco computer control system. The emission kit shall be compatible to any of the above loco computer control system without any need of change in their software. In any case, if there is a need to fine tune the LCC software as a result of retro-fitment of the emission kit, it shall be responsibility of the kit supplier to get it done without any cost impact on Indian Railways.

6. Scope of Work:

- 6.1 The suppliers shall be responsible for finalization of the design of the emission kit in consultation with RDSO to meet US EPA Tier 0+ emission norm.
- 6.2 If the supplier intends to make minor modification or replace some item, other than components of emission kit, he will have to take prior permission of RDSO, duly explaining contribution of the modification/change of the item. The expenses towards such modifications/replacement of items shall be borne by the supplier.
- 6.3 One prototype emission kit will be fitted on the engine test bed at RDSO for performance testing. The testing shall be carried out jointly with the representatives of firm and RDSO team.
- 6.4 After successful testing of the kit, the prototype emission kit will be fitted on relatively younger HHP locomotive of Indian Railway for checking the upgraded emission standard and three months of field performance

monitoring. Supply of Balance kits will be cleared after successful field performance of stipulated period.

- 6.5 Necessary engineering support will be provided by supplier during the testing of kit on test bed, field testing and service.
- 6.6 Any statutory clearance related to the emission kit, if required, shall be taken by the emission kit supplier.

7. General Conditions:

- 7.1 The supplier should submit the details of the emission kit along with test results of the kit w.r.t. desired emission levels and other technical parameters for approval of RDSO. After approval of RDSO, one loco set prototype kit shall be offered for inspection at manufacturer premises from the point of view of compatibility with EMD 710 Engines.
- 7.2 One prototype kit, duly inspected by RDSO to be supplied to Engine Development Directorate, RDSO, Lucknow which shall be retro-fitted and tested on the engine test bed at Engine Development Directorate, RDSO, Lucknow.
- 7.3 Optimization of the emission kit and control settings to achieve US EPA Tier 0+ emission norm shall be the responsibility of the supplier.
- 7.4 Life of the kit items shall be equal to or higher than the present components / assemblies.
- 7.5 Manufacturer shall provide sufficient evidence of their capability in support of the technology for manufacturing of US EPA Tier 0+ emission kit.
- 7.6 The supplier shall have adequate experience in design, manufacture & supply of power assemblies & injectors for 710G3B (or similar) high horse power engines.

8. Deliverables

The following will have to be delivered:

- 8.1 Test certificates of the offered kit in support of achieving US EPA Tier 0+ emission norms on EMD 710 G3B engines along with the offer.
- 8.2 Drawing/ Part No. along with detailed bill of material (BOM) of relevant components which are part of emission kit along with the offer.
- 8.3 Details of modifications required for future up-gradation of locomotives along with the offer.

8.4 Detailed project report on effect of emission kit towards compliance of US EPA Tier 0+ emission norms based on test bed testing and field testing.

Annexure –i

Duty cycle

Notch	Duty cycle of WDP4 type diesel Locomotive	Duty cycle of WDG4 type diesel Locomotive
Idle	39	46.0
Coasting	20	17.0
1	5.5	6.0
2	4.0	4.0
3	3.5	3.5
4	3.0	3.5
5	3.0	3.5
6	4.0	3.5
7	3.5	3.0
8	12.5	4.5
DB	2.0	5.5

Notch Vs BHP

Notch	4000HP Engine		4500HP Engine	
	RPM	BHP	RPM	BHP
Low Idle	200±4	-	200±4	-
Idle	269±15	-	270±15	-
1	269±15	300	270±15	259
2	343±15	530	354±15	607
3	490±4	1110	486±4	1148
4	568±4	1440	572±4	1573
5	651±15	1840	675±15	1916
6	730±4	2290	764±4	2960
7	820±15	3680	863±15	3822
8	904±4	4080	954±4	4500

Annexure – 2**Expression of Interest (EOI) for development of specifications and supply of 50 Nos. emission kits for achieving US EPA Tier 0+ emission norms in existing HHP diesel locomotives fitted with EMD 16-cylinder 710G3B Engines, by retro fitment of emission kits, along with necessary Engineering support.****Selection criteria for short-listing of the firms****(Reference: RDSO ISO document No. QO-D-8.1-16 Version 1.1)**

S.No.	Item	Marks	Remarks
1	Turnover of the firm during last 3 years	20	Firm having maximum be given full marks and other as percentile.
2.	Details of supplies made in the field of item under Eol	30	This is the supplies in no. of loco set made in the field of item under Eol. The firm should submit documentary evidence. The firm having maximum be given full marks & other as percentile.
3.	Experience & expertise for item proposed under Eol	20	It is based on years of experience in such products & firm having maximum be given full marks & other as percentile. The firm should submit documentary evidence.
4.	Manpower & their qualification	10	No. of persons with profession qualification on firms direct role and percentile. Marks shall be considered as per the following gradation: Diploma or equivalent-01 Mark; BE or equivalent: 02 Marks; M.Tech or equivalent: 03 Marks; Ph.D: 4 Marks. Firm having maximum marks will be given full marks and other as percentile.
5.	Details of patent held & MoU/agreement with OEM	20	Firm having maximum number of Patent/ MoU/ Agreement will be given full marks and others as percentile.

FORMAT FOR LETTER OF RESPONSE

Respondents Ref No.:

Date:

Designation of officer to whom the respondent replies

Room No: ,

Building:

Research Designs & Standards Organization,

Ministry of Railways

Manak Nagar,Lucknow,

INDIA 226011

Dear Sir,

Subject: RESPONSE TO – EOI FOR PARTICIPATION _____

1. We, the undersigned, offer the following information in response to the Expression of Interest sought by you vide your Notification No.____, dated_____.
2. We are duly authorized to represent and act on behalf of _____(hereinafter the “respondent”)
3. We have examined and have no reservations to the EOI Document including Addenda No(s) _____.
4. We are attaching with this letter, the copies of original documents defining: -
 - a) the Respondent’s legal status;
 - b) its principal place of business;
 - c) its place of incorporation (if respondents are corporations); or its place of registration (if respondents are cooperative institutions, partnerships or individually owned firms);
 - d) Self-certified financial statements of Last three years, clearly indicating the financial turn over and net worth.
 - e) Copies of any market research, business studies, feasibility reports and the like sponsored by the respondent, relevant to the project under consideration
5. We shall assist MoR and/or its authorized representatives to obtain further clarification from us, if needed.
 - a) RDSO and/or its authorized representatives may contact the following nodal persons for further information on any aspects of the Response:

S. No.	Contact Name	Address	Telephone	E Mail
1				
2				

6. This application is made in the full understanding that:

- a) Information furnished in response to EOI shall be used confidentially by RDSO for the purpose of development of the project.
- b) RDSO reserves the right to reject or accept any or all applications, cancel the EOI and subsequent bidding process without any obligation to inform the respondent about the grounds of same
- c) We confirm that we are interested in participating in development of the project

7. We certify that our turnover and net worth in the last three years is as under:

Financial Year	Turn over	Net worth

8. In response to the EOI we hereby submit the following additional details annexed to this application.

- 8.1. Details of various items being manufactured/consultancy undertaken.
- 8.2. Details of customer(s) and supplies made in the field of item under Eoi.
- 8.3. Experience and expertise for the items proposed in EOI.
- 8.4. Details of man-power with their qualification and experience.
- 8.5. Detailed proposal for items proposed in EOI including alternative proposal, if any.
- 8.6. Details of Intellectual Property Rights (IPR) held, patent filed/held and MoU/agreementsigned.
- 8.7. Details of ISO certification
- 8.8. undertaking as per Annexure-A:

9. The undersigned declare that the statements made and the information provided in the duly completed application are complete, true, and correct in every detail. We also understand that in the event of any information furnished by us being found later on to be incorrect or any material information having been suppressed, RDSO may delete our name from the list of qualified Respondents. We further understand that RDSO will give first preference to the applicants considered relevant for the purpose10. Our response is valid till (date in figures and words): _____

Yours sincerely,

(Sign)
 NAME
 In the Capacity of
 Duly authorized to sign
 the response for and on
 behalf of
 Date

Annexure-A

(To be taken on non-judicial stamp paper of appropriate value as applicable in the respective state and duly notarised & witnessed)

UNDERTAKING

I, son of aged about Years resident of do hereby solemnly affirm as under

1. That the deponent is the Authorised signatory of *(Name of the Sole Proprietorship concern/Partnership Firm/ Registered Company/ Joint Venture)*.
2. That the deponent declares on behalf of *(Name of the Sole Proprietorship Concern/ Partnership Firm/ Registered Company/Joint Venture)* that:
 - a) In regard to matters relating to the security and integrity of the country, no charge sheet has been filed by an agency of the Government / conviction by a Court of Law for an offence committed by the ----- (name of the entity) or by any sister concern of the -- ----- --(name of the entity) would result in disqualification.
 - b) In regard to matters other than the security and integrity of the country, ----- (name of the entity) has not been convicted by a Court of Law or indicted / passed any adverse order by a regulatory authority against it or it's any sister concern which relates to a grave offence, or would constitute disqualification. Grave offence is defined to be of such a nature that it outrages the moral sense of the community.

DEPONENT

VERIFICATION

I declare that the contents of para 1 to 2 above are true as per my knowledge and nothing has been hidden.

DEPONENT