



## **Invitation for Expression of Interest (EoI)**

**Sub: Supply of Exhaust After Treatment System (EATS) components for BEML engines.**

**Reference No. : GP/GP-1/Eoi/Catalysts/157**

**Due on : 16.06.2020**

**Issued by**  
M/s. BEML, Limited  
(Under Ministry of Defense)  
Engine Division, Belavadi post  
Mysore-570018

## **INTRODUCTION:**

BEML Limited (formerly Bharat Earth Movers Limited) was established in May 1964 as a Public Sector Undertaking for manufacture of Rail Coaches & Spare Parts and Mining Equipment at its Bangalore Complex. The Company has partially disinvested and presently Government of India owns 54 percent of total equity and rest 46 percent is held by Public, Financial Institutions, Foreign Institutional Investors, Banks and Employees. BEML Limited, a 'Miniratna-Category-1', plays a pivotal role and serves India's core sectors like Defence, Rail, Power, Mining and Infrastructure. The Company started with a modest turnover of Rs. 5 Cr during 1965 and today, thanks to its diverse business portfolio, the company has been able to achieve a turnover of more than Rs.3,500 Cr.

The Company operates under three major Business verticals viz., Mining & Construction, Defence and Rail & Metro. The three verticals are serviced by nine manufacturing units located at Bangalore, Kolar Gold Fields (KGF), Mysore, Palakkad and Subsidiary - Vignyan Industries Ltd, in Chikmagalur District. Each Business vertical is headed by a Director who reports to the Chairman & Managing Director of the company. For more details please visit [www.bemlindia.com](http://www.bemlindia.com).

BEML has charted out a program to optimize the 11L, 15.24L and 23L of BEML engines to meet BS-IV(CEV) norms by adopting EATS catalysts like,

- Diesel Oxidation Catalyst (DOC)
- Diesel Particulate Filter (DPF)
- Selective Catalytic Reduction (SCR) and
- Ammonia Slip Catalyst (ASC)

BEML has finalized the substrate size, chemical coating and canning requirements for the catalysts. BEML required manufacturer to **supply catalysts in complete canned condition** (coated substrate with canning) and ready to fit on the engine. BEML wants the catalysts systems that had been proven in Euro VI/ BS VI auto or TREM- IV, TREM- V / BS IV (CEV).

## **1.0 ENGINE DETAILS**

### **1.1 11 L ENGINE SPECIFICATION:**

Engine Type	In-line, 4 Stroke, Coolant Cooled, Direct Injection & Diesel engine
Bore X Stroke	125mm x 150 mm
Displacement	11.05 lit
No Of Cylinder	6
Aspiration System	Turbo Charged & Charge Air cooler
FIP	Mechanical FIP with Electronic Governor
Rated Power @ rpm	184 @ 1800
Maximum Torque	1069 @ 1400
Exhaust Flow, kg/h	1513 @ rated & 803 @ peak torque
Exhaust temperature, °C	439 @ rated & 471 @ peak torque

### **1.2 15.24 L ENGINE SPECIFICATION:**

Engine Type	In-line, 4 Stroke, Coolant Cooled, Direct Injection & Diesel engine
Bore X Stroke	140mm x 165 mm
Displacement	15.24 lit
No Of Cylinder	6
Aspiration System	Turbo Charged & Charge Air cooler
FIP	Mechanical FIP with Electronic Governor
Rated Power @ rpm	220 kW @ 2100 rpm
Maximum Torque	1256 Nm @ 1500 rpm
Exhaust Flow, kg/h	1680 @ rated & 1200 @ peak torque
Exhaust temperature, °C	460 @ rated & 471 @ peak torque

### **1.3 23 L ENGINE SPECIFICATION:**

Engine Type	In-line, 4 Stroke, Coolant Cooled, Direct Injection & Diesel engine
Bore X Stroke	170mm x 170 mm
Displacement	23.15 lit
No. Of Cylinder	6
Aspiration System	Turbo Charged & Charge Air cooler
FIP	Mechanical FIP with Electronic Governor
Rated Power @ rpm	522 kW @ 2100 rpm
Maximum Torque	2785 Nm @ 1400 rpm
Exhaust Flow, kg/h	3720 @ rated & 2148 @ peak torque
Exhaust temperature, °C	552 @ rated & 541 @ peak torque

Note: The existing engine out emission shall be shared during actual enquiry and shared to interested parties.

## **2.0 CATALYST GENERAL SPECIFICATIONS:**

- The below table provides general specification of substrate requirements for the individual catalysts.

	<b>DOC</b>	<b>DPF</b>	<b>SCR + ASC</b>	<b>SCR Cu-Zeolite)</b>	<b>SCR Fe-Zeolite)</b>
<b>SUBSTRATE</b>					
<b>MATERIAL</b>	Cordierite	SiC	Cordierite	Cordierite	Cordierite
<b>DIAMETER, NOMINAL (mm)</b>	304.8 to 330.2 (13" ~ 12")	304.8 to 330.2 (13" ~ 12")	304.8 to 330.2 (13" ~ 12")	304.8 to 330.2 (13"~ 12")	304.8 to 330.2 (13"~ 12")
<b>LENGTH, NOMINAL (mm)</b>	152.4 (6")	330.2 (13")	177.8 (7")	152.4 (6")	152.4 (6")
<b>CELL DENSITY (cpsi)</b>	300 / 400	300	300 / 400	300 / 400	300 / 400
<b>WALL THICKNESS (Mil)</b>	4 ~ 6	9	4 ~ 6	4 ~ 6	4 ~ 6

(Mil : Also known as "Thou ")

- The total back pressure of the engine should not exceed 0.3 bar (DOC+DPF+SCR(2Nos)+ASC).
- The required wash coat and metal / precious metal coating to be selected with respect to the conversion requirement of catalysts to meet BS-IV (CEV) norms.

**Note:** The engine raw emission data and temperature map details (needed for deciding coating requirements) shall be shared after signing of NDA.

## **2.1 CATALYSTS REQUIREMENTS:**

- Catalyst has to withstand the engine vibration of 10 G level.
- Good Thermal stability. Engine out exhaust temperature is 650°C Max.

## **3.0 PROPOSED SCOPE OF SUPPLY:**

- Initial requirement will be for proto trial and the approximate production quantity requirement is given in the below table.

	<b>DESCRIPTION</b>	<b>Proto QTY</b>	<b>Serial Production / Year (All 3 series)</b>
1	DOC (WITH COATING & CANNING)	5 No	500 No's
2	DPF (WITH COATING & CANNING)	5 No	500 No's
3	SCR (Cu) (WITH COATING & CANNING)	5 No	500 No's
4	SCR (Fe) (WITH COATING & CANNING)	5 No	500 No's
5	SCR + ASC (WITH COATING & CANNING)	5 No	500 No's

- Proto supply requirement : Within 3 Months from P.O. release date
- Production support is required for minimum 10 years.
- Firm shall express their interest on supply of **coated catalyst with canned condition** (Circular flange type) and drawing shall be shared during commercial enquiry.

- Coating details shall be discussed mutually.
- The start of serial production will be April 2022.

#### **4.0 TARGET EMISSION VALUES:**

The engine must meet the BS-IV (CEV) emission norms with the test report (certificate) from Indian nodal testing agency with the following desired Emission values.

SL NO	Emission Parameters, g/kWh	BS-IV(CEV) Limit, g/kWh	D.F, %	BS-IV(CEV) Limit With D.F, g/kWh	Emission Limit with Manufacturing Tolerance, g/kWh
01	NOx	0.400	15	0.333	0.30
02	CO	3.500	30	2.925	1.75
03	HC	0.190	30	0.159	0.095
04	PM	0.025	05	0.02	0.01

#### **5.0 PRE REQUISITE OF VENDOR:**

1. Firm submitting their proposal should be Indian firm and have their manufacturing facilities for coating / canning within India.
2. Firm must have core expertise for minimum 3 years in the following areas of work:
  - a) Design and development of Catalyst for Diesel engines to meet Euro VI/ BS VI auto or TREM- IV, TREM- V / BS IV-(CEV)
  - b) Sourcing of components like Substrate / Coating / Canning
  - c) Quality assurance and testing

#### **6.0 GENERAL GUIDELINES:**

1. The firm should submit a detailed technical proposal comprising the following points, whichever is applicable to the contact details mentioned in this EOI Document:-
  - a) Development approach for the activities mentioned in scope of work.
  - b) Duration required by the firm for executing development work.
  - c) Financial background and stability including detailed audited financial statements for the last 3 years.
  - d) Details of warranty practices and services in after sales, number of years for which Spares and Service support offered to customers.
  - e) Supplier's base, leverage and relationship.

- f) Additional services the Company can offer.
  - g) Company flexibility for production of varied products and quantity.
  - h) Have the firm executed any joint development program to any customer?
2. The following details should be submitted along with EOI
- a) Company profile, giving details of current activities and management structure
  - b) The firm should have executed similar assignment with at least 3 year experience of similar work.
  - c) Highlight the infrastructure available / modalities to take up the project.
  - d) Any other relevant information considered necessary for successful implementation of the proposed scope of work.

**CONTACT DETAILS:**

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