

Revised incorporating Pre-bid meeting replies.

Qualification Criteria

Eligibility/Qualification Criteria for participating in the tender:

1. Following are the essential requirements to be fulfilled by the vendors as a pre-requisite for submitting quotations: - (The supporting documents to be submitted along with *Technical Bid*)

Table: 1

Sl. No	Qualification Criteria	Supporting Documents to be enclosed with Technical Bid
1.1	The Firm participating in the tender must be in the field of Manufacturing, Supplying, Installation and Commissioning of Engine Testing Dynamometers of 400 kW or more capacity. The firm must be OEM (Original Equipment Manufacturer / Subsidiary of OEM) for Engine Testing Dynamometer.	Copy of any of the following certificates to demonstrate that the firm is OEM / subsidiary of OEM for Engine testing Dynamometer. a) Introduction about your firm, location, contact details etc., b) Certificate/Document evidencing that the firm is OEM/ Subsidiary of OEM for Engine testing Dynamometer. Subsidiary Certificate issued by the OEM, has to be submitted by the Subsidiary firm. c) The firm must provide details about their design capabilities, infrastructure for manufacturing, testing of Dynamometers and after sale service support.
1.2	The firm must have supplied the Engine Testing dynamometers to reputed Automotive manufacturers in India.	The firm must provide the list of customers and the Engine testing dynamometers supplied to them from year 2012 onwards.
1.3	The firm must have supplied min. Two Nos. of 400 kW or more capacity Hydraulic Engine Testing Dynamometer / Engine testing Dynamometer in India from the year 2012 onwards.	Copy of Two relevant purchase orders executed in India for 400kw or more capacity Engine Testing Hydraulic Dynamometers/ Engine Testing Dynamometers from the Year 2012 onwards with installation certificate from the customer/MOM for successful completion of the work.
1.4	The firm must have a established spares and service support center in India for the Dynamometer & Accessories.	Details of spares and service support in India, like service centre location /Service personnel etc.,
1.5	The firm shall produce satisfactory proof that the firm is financially in a position to fulfill the contractual obligations offered to be undertaken by the firm.	The firm shall submit Copies of three years audited annual financial report (FY 2016-17 onwards) indicating profits and losses.

2. BEML reserves the right to verify the performance credentials of the equipment supplied by the firm from their customers from the list provided by the firm.
3. The quotations meeting the above qualification/eligibility with supporting documents criteria will only be considered for evaluation.

4. Note:

- 4.0.1 The dynamometer and accessories to be installed and commissioned at Engine Testing department, Engine division, BEML Ltd – Mysuru.
- 4.0.2 The firm shall quote for the complete scope of supply. The firm shall give point to point compliance to points in **Revised Annexure-1 & S** by indicating 'Accepted'/ Values wherever applicable in the last column, clearly indicating deviations if any to facilitate evaluation. The columns left blank will be treated as incomplete quotations.
- 4.0.3 The TWO BID system indicated below must be strictly adhered to.
- 4.0.4 Wherever makes are indicated, firm to quote for the same.
MAKES for the major items are given in newly added table at point No.26 in Revised Annexure – 1. Firm can quote one or more makes from the list and same to be supplied on order placement.
- 4.0.5 For the items where the makes are not indicated the firms must quote for the reputed make items which are known for performance and widely used in Engine Test Cell applications.
- 4.0.6 The firm should enclose Product catalogues, General lay out drawings indicating the space requirement and other Technical documents relevant to the item quoted along with the technical bid.
- 4.0.7 The firm shall provide adequate input/ output ports and channels for interfacing and integration of accessories to Test cell automation system for logging, display and controlling.
Note: The firm has to provide adequate no. of ports and channels for interfacing and integration for all the instrumentation required to conduct the 5 types of test cycles wherever data logging/control are required under automation.
- 4.0.8 The scope of this tender to be executed as a turnkey project. The firm is responsible for Supply, Installation, Commissioning and Performance proves out of all the items in the scope. **All the supplies and services in the scope are covered under two years warranty.**
- 4.0.9 Any item which is not indicated in the tender but required for working of the system to be quoted and supplied by the firm.
- 4.0.10 All cables, hoses, pipes should be neatly routed with proper identification.
- 4.0.11 Name plates/Labeling/Caution/ Warning plates to be displayed at appropriate locations on the equipment.
- 4.0.12 The power supply in the test cell area is of industrial grade conforming to industrial grade 230 V +/- 10 % , 50 Hz AC Single Phase and 415V + / - 10%, 50 Hz AC Three Phase. All the equipment supplied by the firm should be compatible for the above power supply.
- 4.0.13 The pneumatic air supply at 5 ~ 6 bar of industrial quality will be made available at the installation site. If compressed air of specific quality like humidity, dryness are required for the operation of any equipment supplied, the necessary conditioners to maintain the air quality to be supplied by the firm.

4.0.14 Raw water will be made available for cooling tower sumps.

4.0.15 BEML- Engine Division, Mysore is having Engine Test set up with similar arrangement. **Firm's representative should mandatorily visit the site with prior appointment before or on pre-bid meeting day to understand the scope before submitting the quotations. The quotation submitted by any firm without visiting the site to understand the scope of work, will be rejected.**

Note: In view of the COVID Restrictions the firms who have already visited Engine Division – BEML Ltd., for technical discussion on the project and entered into NDA (Non disclosure agreement) need not visit as part of clause 4.0.15, if no further clarification/site visit is required by the firms.

Table No. 1

4.0.16 The firm should engage expert/licensed agency for execution of the following work:

SI No	Description	Requirement	Documents to be submitted along with the Technical Bid.	Documents to be submitted along with Commercial B	Documents to be submitted after PO.	Time of submission
01	Fire Extinguisher system design and layout	Competent consultancy for the design of complete fire detection alarm and suppression system considering the proposed set-up of TC-10, submit design details with drawings, Bill of quantity with specification. Also, to take up execution work.	General layout, Bill of Quantity, Make of the Items and other relevant technical details along with the Technical Bid	Price for supply & execution work based on the Bill of quantity with specification.	Authenticated Detailed design drawing with seal & signature of the consultant duly vetted by 3 rd party expert (for designs) and submission of design details, drawings, with specifications.	Before commencement of the activity

02	Pump and Pipe line work, Water distribution system	Competent consultancy for the design of complete pumps and water distribution lines to maintain the specified flow and pressure. Submit the design details with drawings, Bill of quantity with specification. Also, to take up execution work.	General layout, Bill of Quantity, Make of the Items and other relevant technical details along with the Technical Bid	Price for supply & execution work based on the Bill of quantity with specification.	Authenticated Detailed design & layout drawing with seal & signature of the consultant (for designs) and submission of design details, drawings, with specifications.	Before commencement of the activity
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4.0.17 Painting: All structures, pipelines, items in general are to be neatly painted with appropriate color as per instructions from BEML Engineer in-charge after necessary pre-treatment (as decided during DAP).

4.0.18 The Non-ferrous materials like cables, electrical fittings, Lights etc used inside the test cell and console room should be of fire-retardant material. **Fire retardant certificate for the items to be furnished along with the supplies.**

4.0.19: The firm shall deploy a competent Engineer/ Experienced to plan and monitor day to day activities in co-ordination with BEML representative during execution of the project.

The firm should submit activity plan & monitor and control the activities daily.

4.0.20: The Enclosure Drawings / Schematic diagram given along with this tender are to be considered as a guidance for over all activities. The firm is required to assess the exact scope of work during the visit before the submission of quotation.

4.0.21: This is a time bound project with high importance for reliability and timely completion of the project. The firm must make the schedule and position the resources to avoid any delays.

4.0.22: The firm must necessarily indicate the Make/Model of all major/ performance oriented items in the scope in the Technical bid and same to be supplied after order placement.

4.0.23: The Accessories like crane hoist, roof extractor fan, Cooling tower fans, Pumps, Diesel tank, Fire system Etc should have their control panel with the necessary cable work from the equipment to the control panel as per the Electrical scope of work. The cable work between the control panel and the PDB / Electrical panel is also the responsibility of the firm.

4.0.24: The firm shall submit material test certificate for ERW class - C pipes supplied under the contract.

GENERAL TERMS AND CONDITIONS:

1.0 TECHNICAL BID:

The following documents **duly Signed with Firm's seal to be UPLOADED with Technical Bid**

Sl. No	Description of document
1.1	Documents in support of qualification criteria
1.2	Revised Annexure -1 and Annexure -S to be filled and submitted as Technical Compliance Statement. Any deviation from scope specification and scope of supply to be clearly indicated.
1.3	<u>Dynamometer selection criteria:</u> The dynamometer Torque & Power Graphs with BEML Engine N-P-T values plotted, Selection criteria and mounting details and other relevant technical details.
1.4	Engine mounting plan with Dynamometer, Engine mounting bed, Center height, Cardon shaft Etc.,
1.5	<u>Over head Diesel Tank:</u> General arrangement / schematic layout showing all the major elements.
1.6	<u>Fire extinguisher System:</u> General arrangement / schematic layout showing all the major elements, BoQ.
1.7	<u>Combustion Air Handling Unit:</u> Overall dimensions, Installation plan including ducting.
1.8	Compliance to points in Table -1 above.
1.9	The <u>validity of the quotation, delivery time, installation and commissioning time</u> to be indicated.
1.10	Firms Acceptance to L.D clause, submission of Security BG, Performance Bank guarantee, Payment terms Etc.
1.11	The relevant product catalogues and other Technical Details for all the items.
1.12	Scanned copy of Integrity Pact, Non-Disclosure Agreement, Copy of EMD - DD as applicable.
1.13	Acceptance /Reply to relevant points in Revised Annexure-2. Scanned and signed copy of Revised Annexure -2 to be enclosed as a token of acceptance to the terms and conditions of the tender.

No price details to be given in the Technical Bid. Technical Bid which includes pricing will summarily be rejected.

2.0 PRICE BID (COMMERCIAL BID)

The rates are to be entered in the BEML SRM system only in the '**Item Data**'. The format given below is to be referred and the rates are to be entered in the system against the respective item in the '**Item Data**' of the system only.

Precaution: Please do not upload any Price Details in the Technical Bid in collaboration folder.

The system is configured to accept prices in INR, USD, EURO, JPY currency. In case the firm wants to quote other than indicated currency. Contact Email : zmn@beml.co.in , Telephone : 0821-2400277 for necessary changes.

2.1 The **Price Quote** for the scope of supply is in the following format in SRM. The firm to quote accordingly.

Sl. No	Description	Qty.	Unit Price (Rs)	Total Price in (Rs)
	Material:			
2.1.1	Scope (CVZPF0193010): Design , Manufacturing and Supply of Power Absorption Type Hydraulic Dynamometer for Testing of 1500 hp Diesel Engine along with Digital Controller, Instrumentation and Accessories, PC based Test Cell Automation System , Data acquisition & Display , Video Recording & Monitoring, Cardon Shaft, ECU Interface, Exhaust Back Pressure Controller, Adaptor Plates, Safety System etc.,	1 Set	The details to be entered in Item Data of Commercial Bid of SRM only	The details to be entered in Item Data of Commercial Bid of SRM only
2.1.2	Scope (CVZPF0193012) : Elevated structural platform for installation of Diesel Tank, complete pipe line work and accessories.	1 set		
2.1.3	Scope (CVZPF0193013): Design , Manufacturing and Supply of Electric Engine Cranker for starting of Engine.	1 No		
2.1.4	Scope (CVZPF0193014): Design , Manufacturing and Supply of FRP Cooling Tower.	2 Nos		
2.1.5	Scope (CVZPF0193015) : Design , Supply and Execution of Pumps and Pipe Line work for Cooling Tower, Engine Test Cell and Water distribution system.	1 Set		
2.1.6	Scope (CVZPF0193018) : Design , Manufacturing and Supply of Engine Exhaust gas conveying system.	1 Set		
2.1.7	Scope (CVZPF0193019) : Design , Manufacturing and Supply of 5T SWL Electric wire rope hoist.	1 No		
2.1.8	Scope (CVZPF0193020) : Design , Manufacturing and Supply of Roof extractor fans and allied ducting work.	1 Set		
2.1.9	Scope (CVZPF0193022) : Design , Manufacturing and Supply of Fresh air filters and louvers for Engine Test Cell.	1 Set		
2.1.10	Scope (CVZPF0193024) : Design, Manufacturing and Supply of Fire detection, Alarm and Fire Suppression system for Engine Test Cell.	1 Set		
2.1.11	Scope (CVZPF0193023) : Electrical accessories, Wiring, Electrical fixtures, Test Cell Lighting and allied work.	1 Set		

2.1.12	Scope (CVZPF0193025): Supply of Engine Fuel consumption meter (SFC) and Conditioner	1Set		
2.1.13	Scope (CVZPF0193027) : Supply of Engine Blow by meter	1 No		
2.1.14	Scope (CVZPF0193028) : Supply of Engine Smoke meter	1 No		
2.1.15	Scope (CVZPF0193031) : Supply of Engine Air mass flow meter	1 No		
2.1.16	Scope (CVZPF0193029) : Supply Engine Coolant Conditioner for HT circuit	1 No		
2.1.17	Scope (CVZPF0193030): Supply of Engine Coolant Conditioner for LT circuit	1 No		
2.1.18	Scope (CVZPF0193032): Supply of Engine Combustion Air Handling Unit along with common chiller unit.	1 Set		
	Services :			
2.1.19	Services : Installation, Commissioning, Integration and Performance prove out of Dynamometer and all other items in the scope, Calibration, User training and Final acceptance of the system.	1 Activity Unit		
A	Subtotal (Material) - All items			
B	Subtotal (Services/ Labour) - All items			
C	Grand total (Material) + (Services/ Labour) - All items			

The above Total Price $C=(A+B)$ will be considered for arriving lowest commercial offer.

Note-1: The breakup prices of the items wherever possible to be given in Bidders Remarks ('My Notes 'under ITEM DATA' only).

Note-2: Firm is required to quote in INR only. If any imports are involved High sea sales (HSS) for the same is preferred. For HSS, firm is required to quote on DAP(Delivery At Port) basis in INR. BEML will bear the custom duty and GST and inland freight and insurance.

For the local items (sourced within India), the firm is required to quote price on door delivery basis. GST and other duties to be indicated separately.

In case a line item consists of both import and local items, the total price to be worked out as above and to be quoted for the above format. The details of the work sheet and Import & Local items considered are to be uploaded as a separate document sheet under attachments in the commercial bid.

Firm has to give break-up prices **if any**, requested by the BEML Ltd during the commercial evaluation of Bids.

3.0 PRICE:

The prices are to be indicated on **“FOR BEML Mysore”** basis and **inclusive** of Packing, Forwarding and Freight and insurance charges. Taxes and duties are to be indicated separately.

The prices for all items and their related works shall be inclusive of materials, labors, Consumables, scaffolding for high raise work, transportation, coverage of ESI & PF and other statutory coverages for labours etc., The prices shall be inclusive of all taxes & levies applicable except for GST which shall be extra as applicable.

The scope of supply and the breakup prices of all the items (For Equipment and Accessories) included therein should be clearly indicated.

As per Govt.of India rules Income Tax will be deducted at source against services provided in India.

The quoted prices should be **firm throughout the period of contract**, B.E.M.L, Mysore (i.e Delivery to our stores including Packing, Forwarding, Freight, Insurance etc.)

4.0 BANK GUARANTEE (BG):

The firm should submit a Bank Guarantee as per BEML approved format as coverage for the following and BG should be provided during the period as indicated below.

SL	COVERAGE FOR	BG should be submitted	BG Validity
4.1	10% of the P.O value towards liquidated damages for delivery & risk of purchase, prove out of performance.	Within 1 Month from the receipt of PO.	Up to Prove out and final acceptance of the Dynamometer and control system with accessories at BEML + 3 Months claim period.
4.2	10% of the P.O value towards Performance guarantee during warranty period	In line with payment terms.	Valid for a period of 24 months + 3 Months claim period from the date of commissioning and final acceptance of the Dynamometer system.

PBG should be drawn on Nationalized Indian Bank.

5.0 Non-Disclosure Agreement (NDA):

The details pertaining to this project are sensitive and confidential in nature. In order to safeguard the confidentiality, the firm shall execute NDA (Non-Disclosure Agreement) in the BEML's prescribed format on Non-Judicial Stamp paper of value applicable to the state of the participating firm. The format is enclosed with the tender. The scanned copy of the duly filled, signed with sealed NDA to be submitted along with the technical bid.

The firms who have already executed NDA with BEML for the subject project need not submit again.

6.0 VALIDITY OF QUOTATION:

The quoted Prices should be valid for **Six months** from the tender opening date.

7.0 DELIVERY SCHEDULE:

The establishment of Engine Test Cell with Dynamometer and accessories is a time bound project planned to be completed on fast track. The following time schedules are to be considered by the suppliers when quoting.

7.1 Supply of material: **Before May' 2022 ?**

7.2 Installation, Commissioning and performance prove out of the Dynamometer system with 520 Kw trial Engine provided by BEML Ltd. : **Three months from the date of handing over site by BEML Ltd. (August 2022)**

7.3 Performance prove out of the Dynamometer system with 1500 hp Engine and Final acceptance.: **Feb/March 2023**

However, the firms are requested to indicate the best possible delivery from the date of ordering and time required for installation and commissioning.

Note: The items can be supplied at once or line wise in accordance with the installation schedule and GRN (Goods Receipt Note) will be done accordingly.

8.0 LD CLAUSE:

The Equipment complete in all respects shall be delivered as per schedule indicated in the purchase order. Goods Receipt (GRN) formalities will be done only against receipt of all the items as per PO.

The price and delivery quoted would be the major factors in considering and evaluating the offers.

The firm should indicate Time required for Commissioning and Prove out of items at site. Delayed Delivery prove out due to reasons whatsoever, beyond the agreed schedules will attract L.D. clause as follows.

Liquidated damages (LD) and not by way of penalties will be recovered at the rate of 0.5% per week of delayed period beyond stipulated delivery, prove out period subjected to a maximum of 5% of value of purchase order.

However, LD is not applicable for the period as indicated below:

- 8.1 Delay in approval of DAP by BEML Ltd
- 8.2 Delay in deployment of BEML team for PDI.
- 8.3 Delay in handing over the site by BEML Ltd.
- 8.4 Delay in availability of the engine for trial and performance prove out.

9.0 PRE-DESPATCH INSPECTION:

The firm has to offer the items for pre-dispatch inspection by BEML personnel before dispatch from its works. The scope of PDI includes verifying the in-house test reports, product specifications, features, scope of supply as per the Purchase Order, functional test, quality checks etc., For Dynamometer and control system the test should include part load test, spin test etc., as per the prevailing widely accepted industrial practice relevant to Dynamometers and to ensure that the system complies with the specification in the P.O. The test procedures should be adequate to qualify the Dynamometer and accessories for its designed performance. The firm must provide details about the pre-dispatch test procedures in the tender. If the items are sourced from a different location, the firm must arrange PDI at the respective works and firm representative must associate during the visit.

If any corrective actions are suggested by BEML during PDI, the same to be carried out by the firm before dispatch to BEML.

The firm must intimate BEML sufficiently advance to depute BEML engineers to witness the acceptance test before dispatch of the dynamometer with accessories to BEML. The supplies are to be dispatched only after obtaining clearance from BEML for dispatch.

As far as possible minimum PDI locations are preferable by BEML. Further BEML will bear the charges towards deputation of BEML PDI team. However, the necessary arrangements for smooth conduct of PDI and documentation, liaisoning are part of the scope.

10.0 PACKING:

The items in the scope should be neatly packed for safe transportation. The supplies should accompany packing list.

11.0 MATERIAL RECEIPT AT BEML AND JOINT INSPECTION AND IDENTIFICATION OF PARTS:

The firm should provide detailed packing list with the supplies. The firm should depute their personnel for identification of the parts at the time of opening of the boxes at BEML, Mysuru. The receipt and verification of the material as per the scope of supply to be jointly certified by Firm and BEML Ltd.

12.0 INSTALLATION COMMISSIONING AND TRIAL ENGINE PROVEOUT:

The scope should include Erection and commissioning of the total system at BEML Engine division and prove the system for its performance and shall be completed within the period indicated in the P.O.

12.1 GENERAL POINTS TO BE COMPLIED DURING INSTALATION AND COMMISSIONING

- 12.1.1 Safety and Compliance of statutory requirements like wage, ESI, PF, Personnel Protective devices of the personnel deputed by the firm, compliance of statutory labor regulation and COVID -19 protocol (latest version) for installation and commissioning of the above system is the responsibility of the firm. Any Accident / Damages happening during the installation & commissioning is sole responsibility of firm.
- 12.1.2 To engage laborer covered under ESI and PF for Installation and commissioning activities. Firm must produce ID cards, Aadhar Number, ESI, and PF number for the personal deputed and remittance bills for the same.
- 12.1.3 The firm must depute the experienced personnel for installation & commissioning work.
- 12.1.4 The Covid - 19 protocols prevailing at the time of execution work to be strictly adhered to.
- 12.1.5 The general layout of the test cell is generally as per the lay out in Annexure-L. The firm to plan, quote and supply the required materials accordingly. Any minor variation may happen during the commissioning stage due to site conditions and firm to complete the project without additional charges to BEML.
- 12.1.6 The firm shall bring all requisite tools, Tackles, Handling ropes, Welding machines, Gas cutting equipment, Consumables Etc for the execution of the work without depending on the BEML.
- 12.1.7 The roof extractor fans and ducts are to be lifted to the top of the building at a height of 9 meters from G/L. The firm has to make necessary arrangement like mobile crane etc without depending on BEML Ltd.

12.2 Installation, Commissioning and Performance prove out of One number 520 Kw trial Engine.

- 12.2.1 Installation, Commissioning and Performance prove out of all the items in the scope of the Purchase Order.
- 12.2.2 The integration of the accessories in the scope to work as an integrated system is the responsibility of the firm.
- 12.2.3 During development test, Engine to be started and run at 35° inclination without loading on the test bed. (No connection with Dyno). To facilitate the tilting of the engine, flexible water and exhaust connections to be given.
- 12.2.4 Installation of Engine mounting bed by BEML.
- 12.2.5 Installation of Dynamometer with Control system, in cell interface, Transducer box, Temperature sensors, starting circuit, controlling and stopping of the Engine etc.,
- 12.2.6 Installation, commissioning, integration and performance prove out of overhead diesel tank, fuel system, engine cranker, cooling tower etc.,
- 12.2.7 Installation of Pumps, Pipeline work and water distribution system.
- 12.2.8 Fabrication and installation of Exhaust gas conveying system.
- 12.2.9 Installation of the crane hoist, Load testing and certification by the statutory authority.

- 12.2.10 installation and commissioning of roof extractor fans, complete with duct working and bird mesh at the entry and exit point,
- 12.2.11 Fresh air filters and louvers
- 12.2.12 Complete Electrical work as per the relevant electrical standard.
- 12.2.13 Fire detection alarm and suppression system for test cell -10 and console room.
- 12.2.14 Commissioning, interfacing and prove out of Fuel flow meter and conditioner, Smoke meter, Blowby meter, Air mass flow meter and Coolant conditioners.
- 12.2.15 Installation, Commissioning, ducting & all piping arrangement of Engine Combustion Air Handling Unit with common chiller.
- 12.2.16 Interfacing of chiller unit to the Engine cooling circuit (for Thermal Durability cycle).
- 12.2.17 Interfacing of LT, HT & Chiller cooling circuit to Automation system for automatic running of engine test cycles.
- 12.2.18 The firm must do the programming for automated testing of all the cycles in the tender. customize computer displays and report generation as per BEML requirement.
- 12.2.19 The firm must demonstrate all the features and functions of the Dynamometer, accessories and controls indicated in the Purchase Order to the BEML requirement.
- 12.2.20 Performance proving of the dynamometer, Test cell accessories and control system shall consist of trial testing of Mechanical Engine supplied by BEML, Low speed (2100 rpm) and low power (520 Kw approx.) for all types of cycles in the scope of the tender.
- 12.2.21 Commissioning should be done to the requirement of the user department, Maintenance and Quality engineering department of BEML.
- 12.2.22 Firm has to carry out minor wall openings, restoration work and finishing, Etc.,
- 12.2.23 After completing all the activities as per the Scope of PO, the unused/ Left out/excess material which is outside the scope of PO will be returned to Firm. The Firm has to make their own arrangement to take out the material.
- 12.2.24 The Utilities like water, Fuel and Compressed Air will be provided by BEML during the installation & commissioning prove out of the system
- 12.2.25 The working personal of the firm during I&C activities can avail the canteen facility for Lunch/Dinner at cost as per the provision.
- 12.2.26 In case mobile cranes/any special material handling equipments are required for unloading/ during installation activities the same to be arranged by the firm.
- 12.2.27 Equipment like 3/5 TON fork lift can be provided by BEML.

It is the responsibility of the firm to do the Installation, Commissioning and Performance prove out of all the Test cell accessories covered in the scope of purchase order.

12.3 Programing & Performance prove out of 1500hp Engine and Final Acceptance of the System.:

The final acceptance of the total supplies will be given after completion of the following with respect to testing of 1500 hp Engine.

12.3.1 After successful functional test and performance demonstration of items in this scope.

12.3.2 Programming for all test cycles in the scope

12.3.3 Successful Test running of the following test cycles in the scope on 1500 hp engine.

a) Engine Performance test as per ISO 1585 (As per Annexure - C)

b) Driving cycle test (As per Annexure - D):.

c) Duty cycle test (As per Annexure - E):.

d) Accelerated durability test (As per Annexure - F):.

e) Resonance durability test (As per Annexure - G):

h) Thermal cycling durability Test (500 Cycles- (As per Annexure - W).

i) Other cycle in the scope

(The total duration may stretch for about 100 hrs.)

12.3.4 The two years warranty for all the items in the scope will start from the date of final acceptance.

13.0 INSPECTION REPORT:

In case of supplies each consignment shall be accompanied by a supplier's inspection report certifying that the Stores conform to the required specifications. However, the BEML reserves the right to inspect the stores when received at works and our inspection will be final.

14.0 DRAWINGS, FOUNDATION / CIVIL WORK DETAILS:

The following drawings to be submitted within 45 days from the PO date for BEML approval.

14.1 General layout drawing of the complete test cell and control room indicating the optimum positions of 17 items in the scope and Installation plan, Instrumental panel layout, Roof extractor and Duct work drawing, Cardon shaft + coupling drawing, CCTV layout, Cooling tower, Pump and water distribution layout, Fresh air filter installation layout, Installation layout of Fire suppression system, Installation drawing of CAHU with chiller unit, Exhaust pipeline work drawing, Crane hoist GA drawings, Overhead diesel tank and pipeline installation layout, Electrical cranker circuit diagram to be submitted for BEML approval.

14.2 The engine mounting bed installation details will be shared by BEML.

14.3 The firm has to design the foundation of the dynamometer considering engine-dyno mounting plan. The detailed foundation drawing for the dynamometer to be submitted by the firm.

- 14.4 BEML will execute the foundation work as per the requirement submitted by the firm. The necessary foundation template, foundation bolts and other hardware to be supplied by the firm in advance.
- 14.5 Firm has to depute their personnel during marking of the foundation work, trenches Etc., to avoid any possible errors.

15.0 WARRANTY:

The supplier shall warranty that the supplies made under the contract shall fully comply with the specifications laid out and shall provide Warranty for 24 months from the date of commissioning and final acceptance.

Warranty shall be applicable on the entire system including all the equipment, accessories and spares supplied by the firm against all defects arising out of bad design, workmanship and materials.

The firm shall also replace such defective parts free of cost at our works and incidental charges incurred if any for such replacement / rectifications and the services of Firms Engineers utilized for such purposes shall be without additional charges to BEML Ltd.

- 15.1 The firm during the warranty period shall depute their service engineer/s for **4 visits per annum** to verify and support for the trouble-free operation of the test cell system and for preventive maintenance, calibration, to checking proper functioning of the items supplied. Preferably once in three months and on call from BEML if needed.

The consumables like filters, O-rings, Seals are required during warranty period, to be supplied and replaced by the firm.

In summary, the replacement of defective parts, supply of consumables machine parts and calibration of the items supplied, mandatory service (4 visits per annum) is the scope of the firm.

- 15.2 During extensive testing of the 1500 hp Engine, if any support is required from the supplier the same to be made available with out additional charges during warranty period.

15.3 Guaranteed Equipment availability during warranty period:

15.3.1. The dynamometer system is intended for conducting extensive durability testing of engines as per the cycles indicated in Annexure A to G. over a period of Approximately 24 months after final acceptance of the system.

15.3.2. During this period availability of the dynamometer system is very essential.

15.3.3. The firm has to do all the necessary arrangements in terms of positioning the Resources (Spare and services) to ensure Equipment availability of 90% and Above during the warranty period as per the following conditions.

15.3.4. Guaranteed Availability Clause:

The Supplier shall guarantee that the availability of the equipment shall not be less than 90% for a period of 2 years during the warranty period. In the event that the Equipment fails to achieve the minimum 90% availability during this 2 years period, the Supplier shall be liable to pay BEML as Penalty as indicated below.

If the availability falls below,

15.3.4.1 90% (85 to 89% rounded off to nearest value), 0.5 % of the total P.O value will be recovered from the firm.

15.3.4.2. 85 %(84 and below, rounded off to nearest value) 1% of the total P.O value will be recovered from the firm. The maximum recoveries by the way of penalty shall not exceed 10% of the PO value.

The availability calculation and the penalty recoveries will be calculated once in every completed year as mentioned below:

The formula for calculating Availability= (Total Hours - Break Down Hours)/ Total Hours. (Total hours = 24 Hrs/Day x Number of days in a year)

- i. Availability will be monitored on daily basis and once in month report will be sent to the firm for records.
- ii. For the purpose of guaranteed availability clause, the net availability will be computed at the end of each completed year and recoveries if any will be made.
- iii. The penalty shall be deducted from the submitted Performance Bank Guarantee/pending payment, if the penalty is not paid by the firm within 30days from the date of mutual consent on the availability.

16.0 SPARES:

Till the end of Warranty period, it is the responsibility of the firm to replace the spares required free of cost. All expenses incurred like CIF charges, Customs Duty, Inland transport, Insurance and any other incidental charges will be to the firm's account.

The firm shall enclose list of critical spare parts required for 2 years of operation beyond the warranty with price list along with the commercial bid. (In Bidders Remarks ('My Notes 'under ITEM DATA' only).

Firm is also required to quote for two years post warranty comprehensive AMC for Performance related items like Dynamometer, Controller, Automation system, Fire extinguisher, SFC meter, Fuel conditioner, Blow by meter, Air mass flow meter, LT-HT conditioner and CAHU.

The cost of spares and AMC is will not be considered for price comparison for arriving the lowest price bidder. BEML reserves the right to order in full/part/not to order the spares depending on the requirement.

Firm is required to indicate the lead time to supply the spares upon ordering.

17.0 SPARES & SERVICE SUPPORT:

The firm should guarantee the spares, service and software support for a period of minimum 15 years from the date of supply and acceptance of the equipment. The firm should have enough stock of spares and consumables required for the equipment supplied, so that in case of service call from BEML the firm should be able to attend to the problem within a short period of time both during warranty and post warranty period.

18.0 CALIBRATION CERTIFICATE:

The firm shall supply calibration certificates for all the instruments and measuring devices including dynamometer, load cell etc., at the time of commissioning. The firm has to indicate the frequency of calibration for all the instrument and has to carryout the calibration of such equipment during the warranty period as scope of the contract.

19.0 INSTRUCTION MANUALS: (Three sets hard prints in English + CD's)

Operation, Maintenance, Periodic calibration procedure manual, General layout drawing for the equipment including control system, error codes & diagnostic manual, wiring diagram and foundation lay out drawing, spare parts manuals and other relevant manual as requested by BEML should supplied in triplicate for all the items in the scope. The firm should provide adaptor plate drawings.

20.0 TRAINING:

The supplier shall impart necessary training to BEML personnel in the areas of Test cell operation, control system operation, accessories, programming, maintenance of mechanical, and Hydraulic, Electrical and Electronics systems during commissioning at BEML. This should be sufficient enough for BEML personnel to operate and maintain the system.

Necessary regular after sales service for the Dynamometer and accessories should be made available to us at short notice.

21.0 PAINTING:

The Dynamometer with accessories, water pipes etc., to be painted as per the color decided during PO.

22.0 PAYMENT TERMS:

Our payment terms are as follows:

22.1 Material:

- (a) 50 % of the Total Material value + 100% Taxes - 30 Days after receipt of the 100% material. **(After successful completion of the activity under point No. 11)**
- (b) 20% of the Total Material value - after installation, commissioning and performance prove out of dynamometer system on trial Engine of Lower power (520 kW Approx) and Lower speed (2100 rpm). **(After successful completion of the activity under point No. 12.2)**
- (c) 20% of the Total Material value – after performance prove out and final acceptance of newly developed 1500hp Engine and on submission of Performance Bank Guarantee for 10 % of total P.O value valid for (24+3) months from the date of final acceptance. **(After successful completion of the activity under point No. 12.3)**
- (d) Balance 10% of the Total Material value will be after one year from the date of performance prove out and final acceptance of 1500hp Engine.

22.2 Services:

- (a) 100% service charges + Taxes - after completion of installation, commissioning, performance prove out 1500hp Engine and final acceptance by BEML Ltd. **(After successful completion of the activity under point No. 12.3)**

In case supplier desires different payment terms, they should quote accordingly. However, all other things being equal BEML will prefer those accepting BEML payment terms.

23.0 BEML reserves the right to accept or reject any of the offers received either fully or partly without assigning any reasons for the same.

24.0 All the drawings, standards and check sheets enclosed with the enquiry are the BEMLs intellectual property and should not be used in any other way and should be returned along with the offer.