



**NATIONAL CENTER FOR COMBUSTION RESEARCH
AND DEVELOPMENT (NCCRD)
INDIAN INSTITUTE OF TECHNOLOGY MADRAS
CHENNAI – 600036, INDIA**

Ref. No. ICS/11-12/013/DSTX/TSUN

Date: 25 Nov. 2016

Due date: 16 Dec. 2016

Item name: Eddy Current Dynamometer for Testing GDI Engine (1 set)

1. Quotations are invited in a **two bid system** for the items shown overleaf (in Annexure I). The offers / bids should be submitted as Technical bid and Financial bid. The Technical bid should consist of all technical details / specifications only. The Financial bid should indicate item-wise price for each item and it should contain all Commercial Terms and Conditions including Taxes, transportation, packing & forwarding, installation, guarantee, payment terms, pricing terms etc. The Technical bid and Financial bid should be put in separate covers and sealed. Both the sealed covers should be put in a bigger cover. The Tender for supply of “_____” should be written on the left side of the Outer bigger cover and sealed.
2. The quotations should be valid for sixty days from the due date and the period of delivery required should also be clearly indicated.
3. The total cost of the equipment in terms of CIP Chennai should be clearly mentioned.
4. Terms of warranty and guarantee should be explicitly mentioned.
5. Packing and delivery charges, customs and clearance duty should be clearly stated.
6. Goods shall not be supplied without an official supply order.
7. Local firms : Quotations should be for free delivery to this institute. If quotations for ex-godown delivery charges should be indicated separately.
8. Firms outside Chennai: Quotations should be for F.O.R. Chennai. If F.O.R. consignor station, freight charges by passenger train / lorry transport must be indicated. If ex-godown, packing, forwarding and freight charges must be indicated.
9. The rate of sales / general taxes and the percentage of such other taxes legally leviable and intended to be claimed should be distinctly shown along with the price quoted. Where this is not done, no claim for sales / general taxes will be admitted at any stage and on any ground whatsoever. The taxes leviable should take into consideration that we are entitled to have Concessional Sales Tax (CST) applicable to non-government educational institutions run with no profit motive for which a concession sales tax certificate will be issued at the time of final settlement of the bill.
10. Payment : Specify the mode of payment and if advanced payment has to be made. Every attempt will be made to make payment within 30 days from the date of receipt of bill / acceptance of goods, whichever is later.
11. IIT Madras is exempt from payment of excise duty and is eligible for concessional rate of customs duty. Necessary certificate will be issued on demand.
12. IIT Madras has the right to accept the whole or any part of the tender or portion of the quantity offered or reject it in full without assigning any reason.
13. The sealed quotation may be sent to

Prof. S. R. Chakravarthy

NCCRD Office

No. 201, Rarefied Gas Dynamics Lab (Behind Aerospace Engineering Dept.)

Chennai – 600036, Ph. (O) +91-44-22575025



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Annexure I

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**TECHNICAL SPECIFICATIONS OF AN EDDY CURRENT DYNAMOMETER FOR
TESTING A GDI ENGINE FOR ACADEMIC AND RESEARCH PURPOSE**

Supply Quantity: One set

Pre-Qualification Requirements	Check box
The vendor must have supplied at least 10 systems of similar model of base equipment which includes the sensors and all relevant electronics and indication system in reputed automotive research and development laboratories of government funded institutions or research and development divisions of leading automobile industries worldwide during the past 2 years. The vendor should provide the details of organizations where such systems have been supplied.	
The vendor should be the manufacturer of the system supplied. If the manufacturer is a company outside India then the vendor should be the sole subsidiary of the manufacturer in India and due proof of the same has to be enclosed with the quotation. No agents/representatives will be accepted.	
The vendor should have their Service Centre in India and trained personnel for after-sale service. Vendor has to submit the complete details of the service set up.	
The vendor should clearly indicate the terms of warranty along with their quote.	
The whole system should be supplied to	

Scope of Supply:

Item/Specifications	Requirements	Check box
Dynamometer:		
Requirement	An eddy current dynamometer capable of testing engines with maximum power of about 150 kW @ 6000 rpm and maximum torque of 200 Nm @ 1400 to 4500 rpm	
Maximum Permissible Speed	10000 rpm (approx.)	
Maximum Permissible Torque	250 Nm (approx.)	
Mass moment of inertia	$\leq 0.3 \text{ kgm}^2$	
Water Cooled	Yes	



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Rotational Direction	Clockwise and Counter-Clockwise	
Torque Measurement Accuracy	$\leq \pm 0.5\%$ FS Torque	
Speed Control Accuracy	$\leq \pm 1$ rpm	
Torque Measurement	Load cell principle	

Drive Shaft:		
Quantity	One shaft suitable for coupling with engines as specified in the dynamometer requirement	
Shaft Guard:		
Feature	Guard should have removable cover and quick release mechanism	
Cabinet:		
Type	19" rack	
Safety	Necessary safety features complying to relevant standards to be provided	
Dynamometer Controller:		
Feature	Controller should allow the dynamometer to work in both directions	
Type of controller	PID controller	
Control Modes	Constant speed control	
	Constant torque control	
	External torque control via analog / digital interface or input	
Signal Output	(i) Analog/Digital output of operating torque	
	(ii) Analog/Digital output of operating speed	
	(iii) Analog/Digital output of alarm outputs of Over Torque, Over speed, Over current, Over Temperature and shortage of water supply	
Safety Protection	Over Torque, Over speed, Over current, Over Temperature, shortage of water supply	

NOTE: Please copy the above and mark your compliance with the specifications in the check boxes provided and include this in your quote. This is essential.



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Electrical Connections:

Standard electrical connections/connectors will be provided for the dynamometer and controller by IITMadras. The vendor will be responsible for connections to the dynamometer from this standard electrical connector which will be at a maximum distance of 8 m.

Documentation:

Vendor should provide required instruction manuals for operating and maintenance of the system in English language. This will include the descriptions and drawings required for operation and control of the equipment supplied. The user manual must also include procedure for calibration and PID tuning of the system.

Time Schedule:

The system should be supplied, installed and commissioned within 3 months after acceptance of technically clear Purchase Order.

Warranty:

The vendor should provide a warranty for at least 24 months from the date of commissioning of the setup.

After Sales Support:

The vendor should have well trained engineers for after sales support in India to service the installation at IIT Madras. Software upgrades should be provided as and when available free of cost.

For any technical clarifications, please contact:

Dr. J. M. Mallikarjuna

IC Engines Lab

Department of Mechanical Engineering

IIT Madras, Chennai – 600 036

Mobile: 9444931941 (any time)

Landline: 044-22574698 (9 to 5 pm)

email: jmallik@iitm.ac.in

Note: The following terms and Conditions to be added to others while issuing PO

1. The dynamometer system as a whole should be delivered to the following address (“Integrator”) who will integrate it with the engine.

KC Engineers Pvt. Ltd.

96,HSIIDC Industrial Estate

Ambala Cantonment– 133001

Haryana

Tel: 98887-13285, 0171-2699475

2. Your scope includes the supply of all the necessary items related to dynamometer system as per the above specifications and their correct functioning after integration. The integrator will only integrate the supplied system and any assistance required should be provided to them at the above address.



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3. Please clearly specify the external interface requirements related to water, electricity, etc., which are in the scope of the integrator. The frame is also in the scope of integrator. The drawing of the frame required for the assembly with the engine is to be provided (in consultation with the integrator).
4. You should assist to integrate the dynamometer controller with the dynamometer and demonstrate the features/ correct functioning of all the modes at the site of the integrator. All the necessary wiring, sensors, tools are to be supplied by the dynamometer system supplier.
5. After the dispatch of the system from the site of integrator to IIT Madras, any assistance required for the reassembly of the system should be provided.