



**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: 28 July 2016

Due date: 18 August 2016

**Item name: EDDY CURRENT DYNAMOMETER FOR TESTING OFSI AND CI
ENGINE FOR COMBUSTION AND EMISSION RESEARCH (1 no.)**

1. Quotations are invited in duplicate for the items shown overleaf (in Annexure I). The quotations duly sealed and superscribed on the envelope with reference no. and due date, should be addressed to the undersigned so as to reach on or before the due date mentioned above.
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

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Annexure I

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**TECHNICAL SPECIFICATIONS OF EDDY CURRENT DYNAMOMETER FOR TESTING OF SI
AND CI ENGINE FOR COMBUSTION AND EMISSION RESEARCH**

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. IIT Madras will check/get a feedback from the previous buyer/s of such a dynamometer from vendor on regards of quality of the system and after sales service. Only if the vendor's quality and after sales service is found to be good by IIT Madras the vendor will qualify.	
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-sales 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.	

Scope of Supply:

Specification	Requirement	Check box
Dynamometer		
Requirement	An Eddy current dynamometer capable of testing engines with maximum power of 145kW @ 4000 rpm to 7500rpm and maximum torque of 425 Nm from 1600 rpm to 3200 rpm	
Maximum Permissible Speed	8000 rpm	
Maximum Permissible Torque	450 Nm	
Mass moment of inertia	$\leq 0.3 \text{ kgm}^2$	
Water Cooled	Yes	
Rotational Direction	Clockwise and Counter-Clockwise	



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Torque Measurement Accuracy	<= +/-0.5% F.S. Torque	
RPM Control Accuracy	<= +/- 3 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	



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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.

Electrical Connections:

Standard electrical connections/connectors will be provided for the dynamometer and controller by IIT Madras. 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 within 6 weeks after the 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:

Prof. A. Ramesh,

IC Engines Lab,

Department of Mechanical Engineering,

IIT Madras, Chennai - 600 036

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