



CENTRE OF PROPULSION TECHNOLOGY (CoPT)
INDIAN INSTITUTE OF TECHNOLOGY MADRAS
CHENNAI – 600036, INDIA

Ref No: ASE/MUAY/156/SRCH/026

Proj. No. ASE/1819/156/MUAY/SRCH

Date: 03.09.2019

Item name: Supply of Air Ejector-1 No.

Due Date: 23.09.2019

1. Quotations are invited in **two-bid system** for the item described overleaf (in Annexure I). The offers /bids should be submitted as Technical bid and Financial bid separately. 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 words "Tender for supply of Air Ejectpr" should be written on the left side of the Outer bigger cover and sealed.
2. **Earnest Money Deposit:** Earnest money deposit of Rs.30,000 payable by Demand Draft drawn on any Nationalised Bank of India favouring "Registrar, IIT Madras" is to be submitted along with the technical bid. Waiver of EMD for vendors with valid MSME/MSE certificate is permitted.
3. The quotations should be valid for sixty days from the due date and the period of delivery required should also be clearly indicated.
4. The total cost of the equipment in terms of CIP Chennai should be clearly mentioned .
5. Terms of warranty and guarantee should be explicitly mentioned.
6. Packing and delivery charges, customs and clearance duty should be clearly stated.
7. Goods shall not be supplied without an official supply order.
8. Local firms : Quotations should be for free delivery to this institute. If quotations are for ex-godown, delivery charges should be indicated separately.
9. 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.
10. If the required good is to be imported, delivery with CIP upto Chennai airport must be made. All relevant documents for customs clearance and other import formalities have to be provided well in advance.
11. IIT Madras is eligible for concessional rate of GST 5%(for purchase of equipments, parts and consumables used in research). Concessional GST certificate will be issued after issue of purchase order.
12. 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.
13. Payment :Payment is after delivery of goods. Every attempt will be made to make payment within 30 days from the date of receipt of bill / acceptance of goods, whichever is later. Advance payment will be considered only in special cases.
14. IIT Madras is eligible for concessional rate of customs duty. Necessary certificate will be issued on demand.
15. 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.



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The sealed quotation may be sent to
The Purchase Manager,
CoPT OFFICE, NCCRD Building
Behind Aerospace Engineering Dept., IIT Madras,
Chennai – 600036, Ph. (O) +91-44-22579863

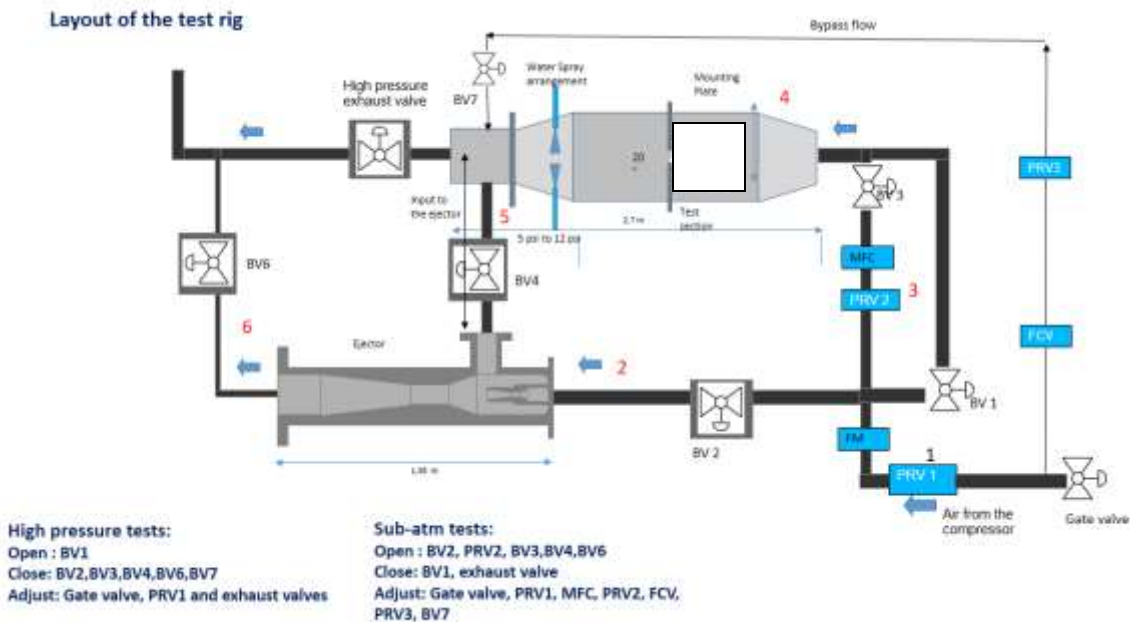
ANNEXURE-1

Requirement of Air ejector

1. Introduction

A high pressure combustion rig and a sub-atmospheric facility is under development at NCCRD, IIT Madras to test gas-turbine combustors. The sub-atmospheric facility is planned to incorporate an ejector to create the required vacuum flow inside the combustor.

A brief layout of the test facility is shown in the below Figure. Hot gases from the combustor will be cooled by a water spray unit in the collection section and the mixture which contains water vapour and exhaust gases will be directed to the ejector. The exit of the ejector is to be connected to the exhaust line. Considering the experimental purpose, a range of vacuum flow conditions need to be simulated inside the combustor. Required motive air flow will be supplied from the main air compressor line and the bypass valves to the main combustor line will be adjusted to achieve different test conditions.





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2 . Detailed technical specifications and range of test conditions

S/no	Specifications	Details
1	Maximum available motive air flow	1.6 Kg/s @ 9 bar
	Motive air flow temperature	30 ~ 40 deg C
2	Motive and combustor supply tube line size	4 inch
3	Minimum suction pressure inside combustor	3.42 psia
4	Minimum suction air flow rate inside combustor @ min suction pressure	0.22 pps
5	Maximum suction pressure inside the combustor	12 psia
6	Maximum suction air flow rate inside combustor	0.6 pps
7	Max allowable temperature of the suction gases	700 Deg.C
8	Ejector discharge pressure	Discharge pressure should be 2-3% above atmospheric. Vendor should provide necessary calculations
9	Material of Construction	Stainless Steel
10	Design Temperature	750 deg C
11	Motive Size	4" – Flanged as per ASME B 16.5
12	Suction Size	10" – Flanged as per ASME B 16.5
13	Discharge Size	10" – Flanged as per ASME B 16.5
14	Allowable length of the ejector	< 3m
16	Previous supply details to reputed organizations	To be furnished by the vendor
17	Warranty	Min. 1 Year
18	Acoustic noise levels without acoustic insulation	< 82 db
19	Provisions for acoustic and thermal insulation	To be provided by the vendor
20	Installation and commissioning	Under vendor supervision
21	Minimum Vacuum Pressure	To be communicated by vendor



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22	Ejector vendor to ensure that all materials (raw material, sealing, bolting) to be able to withstand the design temperature.	
23	Nozzle should be replaceable.	
24	Ejector vendor to provide pressure and temperature chart for hydrotest.	
25	Vendor should support installation at IITM and demonstrate intended performance of the ejector	

3. Proposed Ejector exit conditions

All the below operating points to be satisfied by the ejector. Vendor to also account for trace soot quantity in suction flow.

Suction Temperature	Suction pressure	Suction flow rate (Air + Water vapor)
[deg C]	[psia]	Pps
700	3.42	0.22
700	5.88	0.32
700	7.05	0.44
700	7.35	0.44
700	11.25	0.52



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5. Documents submission

Document and Data Submission			
Sr no	Data / Document	With bid	On receipt of order
1	Ejector vendor to provide the gas properties and Molecular weight of the gas mixture at ejector discharge.	●	
2	Ejector vendor to submit operating curve for Motive flow vs Motive Pressure	●	
3	Ejector vendor to submit operating curve for Suction Flow vs Suction Pressure	●	
4	Ejector vendor to submit the details of Pressure and Temperature variation inside the ejector.	●	
5	Ejector vendor to provide details for insulation.	●	
6	Schematic Sketch/Drawing indicating dimensions, parts and nozzle sizes	●	
7	Ejector vendor to provide general arrangement drawing mentioning the dimensions, nozzle sizes, flange ratings, allowable nozzle loads, support requirements, installation requirements.		●
8	Ejector vendor to advise the straight pipe lengths at connection points.	●	
9	Ejector vendor to review control philosophy and suggest any modifications if required for ejector operation.		●
10	Mass Flow Rate of Motive Flow for each suction flow case given above.	●	



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11	Material of Construction for each part/component of Ejector	●	
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Contact person for technical clarifications:

Dr.K.P.Shanmugadas

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