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P.Sarvaharana
Assistant Registrar(Project Purchase)

Ref: BLDC Fan/IIT Madras
Date: 03.07.2015

Tender No: ELE/ASHO/001/2015

Due Date: 27.07.2015, 3.00pm

Dear Sir/Madam,

On behalf of the Indian Institute of Technology, Madras (IITM) tenders are invited for supply of **100,000 numbers of "DC powered Brushless Direct Current (BLDC) fan operating at 48V DC and controlled by a specified remote", hereinafter referred to in this document and Annexure as "PRODUCT".**

1. The technical specifications for the PRODUCT are given in Annexure 1.
2. Annexure 2 gives the Performance table which needs to be filled out and submitted along with the bid (benchmark performance criteria).
3. Annexure 3 gives the list of other technical papers / reports that need to be submitted along with the bid.
4. Annexure 4 gives the Supplier Product Quality Assurance Requirements.
5. Annexure 5 provides the tentative delivery schedule as well as sites where the shipments are to be delivered.
6. Annexure 6 gives the Schedule of Events for this tender.

Pre-bid Meeting: A pre-bid meeting is scheduled to be held at 9:00 AM on July 10, 2015 at CSD Conference Hall, Room No. 308 in the Department of Electrical Engineering, IIT Madras, Chennai 600036, to clarify queries, if any, with respect to this tender. No further queries will be entertained after the pre-bid clarification meeting.
At the pre-bid meeting bidders will be provided with two numbers of the specified remotes, for testing their product samples using the given remotes, prior to submission.

Instructions to the Bidder

1. The tender documents may be downloaded from website or obtained as email attachment from the undersigned. Payment of cost of tender documents of Rs. 1975/- in the form of crossed demand draft in the name of "The Registrar, Indian Institute of Technology, Madras" from any scheduled commercial bank and payable at Chennai shall

be submitted along with the tender. This price is inclusive of the cost of the 2 remotes being provided to the bidder for testing purposes.

2. The due dates for submission of various components of this tender are specified in the "Schedule of Events" given in Annexure 6. The tenders shall be submitted not later than 3.00PM on due date.

3. Bidders Eligibility Criteria:

3.1. The bidder has to be a company as defined under the Companies Act.

3.2. The bidder should have prior experience in the manufacture of at least 500 DC powered BLDC fans, and should have deployed at least 100 such fans in the field for a period not less than 3 months.

3.3. The PRODUCT, as per specifications given in Annexure 1, should be designed and manufactured in India.

4. Preparation of Bids:

4.1. The tenders should be submitted under two-bid system (i.e.) Technical bid and Financial bid in separate envelopes, and submitted as per the schedule of events specified in Annexure 6.

4.1.1. **Technical Bid:** The technical bid should contain the following:

- Three (3) samples as per specifications given in Annexure 1.
- Proof of submission of 3 samples along with all the technical documents and details as given in Annexure 2 and 3.
- A comprehensive report giving complete details of the production facility and other resources to demonstrate ability to meet the delivery schedule as specified in Annexure 5.
- Audited annual reports of the company for the last 3 years.
- A copy of the tender document, duly signed on each page with seal, must be enclosed. Each page of the document shall be signed and affixed with the seal of the bidder. The tender must be signed by authorized person/persons.
- A copy of the masked financial bid.

In addition to the above, Bidders should also provide as part of the technical bid, supporting documents for bidder's eligibility criteria

4.1.2. **Financial bid**

- The Financial bid should provide the following details
  - Final delivered price, at the project locations mentioned in Annexure 5, per unit as well as total for 100,000 units, inclusive of

basic price, insurance, logistics, transportation and sales tax. The sales tax rate should be specified.

- Other taxes like octroi/ entry tax etc. if applicable. Obtaining necessary road permits applicable etc is the responsibility of supplier.
- Other costs, if any, with explanations.

➢ The purchase by IITM is for R&D Pilot and is eligible for excise duty exemption. Necessary certificate will be issued by purchaser on demand.

4.2. Financial bid should be accompanied by Earnest Money Deposit (EMD) for 2 % of total quoted value of the tender in the form of Demand Draft drawn in the name of "The Registrar, Indian Institute of Technology, Madras", or a Bank Guarantee for the same amount.

4.3. Covers containing the technical and financial bids must be individually sealed and superscribed respectively as "_____ Technical Bid" and _____ Financial Bid". The Technical bid should consist of all the details specified in 4.1.1 above ONLY. The Financial bid should contain all commercial aspects as detailed in 4.1.2 above. Any commercial details enclosed in the technical bid will result in the disqualification of the bidder.

4.4. The Technical Bid and the Financial Bid should be duly signed by the bidder/ authorized representative of the bidder.

5. Delivery of the tender:

5.1. The tender shall be sent to the below-mentioned address either by post or by courier so as to reach this office before the due date and time specified in the Schedule of Events in Annexure 6. The offer/bids can also be dropped in the tender box on or before the due date and time specified in the schedule. The tender box is kept in the office of the "Assistant Registrar, Project Purchase" 2nd floor, IC & SR Building, I.I.T. Madras, Chennai – 600 036, which is also the address for communication. In the event of the specified date for the submission of the Tender being declared as a holiday by the Employer, the Tenders will be received up to the appointed time on the next working day. Any tender or its component, received after the deadline specified in Annexure 6 will be returned unopened to the bidder.

6. Opening of the tender:

6.1. The Technical Bids will be opened by the officer inviting this tender or his duly appointed assistant at 4.00PM on the last day specified in Annexure 6 for submission of Technical bids, in the presence of the bidder or his authorized agent.

6.2. Financial Bids will be opened at 4:00PM on the last day specified for the submission of Financial bids. The officer inviting tender or his duly appointed assistant will open the financial bids in the presence of the bidder or his authorized agents.

7. Evaluation of bids.

7.1. The bids received from the bidders will be evaluated by a Committee constituted by the Institute.

7.2. The evaluation process to identify the successful bidder is based on a combined techno-commercial evaluation. The eligibility criteria stipulated in Section 3 above, must be adhered to and failure of the same will result in disqualification of the bid. The technical criteria set out for evaluation of the technical bid is given below.

Sl. No.	Description	Max. Score	Min. Score
1	Product performance vis-à-vis specifications	50	45
3	Product Superiority	15	5
4	Bidder's ability to meet delivery requirements	20	15
4	Bidder's ability to meet quality requirements and after sales service	15	10
	Overall Score	100	75

7.3. Any bidder whose technical score is less than the minimum score in any category or has a total score of less than 75 overall will be rejected.

7.4. For bidders, whose technical score is above the minimum specified in every category above as well as overall, will be considered for further evaluation. The following criteria will be used for evaluation of the combined techno-commercial bid.

Sl. No.	Description	Weightage
1	Technical Score	30%
2	Price and commercial terms	70%

8. The bidders are requested to go through all the terms & conditions detailed in this document, before filling out the tender. Agreeing to the terms and conditions of the tender document (by signing all pages of the copy of a tender document) is a mandatory requirement.

9. IIT Madras reserves the full rights to reject any tender at any stage without assigning any reason.

Yours Sincerely,

P.SARVAHARANA

ASSISTANT REGISTRAR

(Project Purchase)

IC&SR, I.I.T. Madras

OTHER TERMS AND CONDITIONS

1 **Validity:** The tender for supply shall remain open for acceptance for a period of twenty seven days from the date of opening of tender. Any bidder who withdraws his tender before the said period or issue of acceptance, whichever is earlier, or makes any modification in the terms and conditions of the tender which are not acceptable to the Institute, will forfeit 50 % of the said EMD aforesaid to IIT Madras without prejudice to any other right or remedy. Further the bidder who withdraws or makes modifications, which are not acceptable, shall not be allowed to participate in the future tenders of IITM.

2 The offer price of the bidder shall be valid for the entire supply duration indicated in Annexure 5.

3 IITM will have the option to place an additional PO of the PRODUCT, on the successful bidder for up to 25,000 nos, over and above the current specified quantity of 100,000 nos, at the same commercial terms quoted by the bidder

4 Warranty/Guarantee and Service

4.1 Warranty services for the PRODUCT will be valid for a period of 24 months from the date of installation. The warranty shall be limited to repair of the unit/replacement by a similar unit.

4.2 During the warranty period, the bidder shall be fully responsible for any malfunction in the product.

4.3 The bidder will make arrangements to rectify/replace the dysfunctional product, at the customer premises, within 3 working days of the complaint being raised during the warranty period.

4.4 Beyond the warranty period, for a period not less than 3 years from the date of expiry of warranty, the bidder will make arrangements to have a service center at each of the delivery locations to cater to the service requirements of the customers at these locations.

5 **Termination of contract:** IITM reserves the right to terminate the contract, if during the supply period, the products fail to stay within the tolerance limits for delays and quality as specified below

5.1 Tolerance for poor quality – The total failures and replacements of the product will not exceed 1% of the total delivered products. Of this, Dead on Arrivals shall not exceed 20% (0.2% of shipment); infantile mortalities (within 3 months) shall not exceed 50% (0.5% of shipment). In the event of failures exceeding specified percentages, detailed Root Cause Analysis of the faults will be carried out to analyze the nature of faults observed and corrective and preventive action

necessary to prevent similar failures will be provided. If the purchaser is not convinced of the measures or the product performance, he reserves the right to reject the supplies/cancel all outstanding orders on account of poor product quality.

5.2 Tolerances for delays: IITM reserves the right to terminate the contract, on account of delay in product shipments of more than 1 week for more than 2 occasions. The expected delivery schedule is specified in Annexure 5.

6 Disputes and Jurisdiction - Any legal disputes arising out of any breach of contract pertaining to this tender shall be settled in the court of competent jurisdiction located within the city of Chennai in Tamil Nadu.

7 All Amendments, time extension, clarifications etc., will be uploaded on the website only and will not be published in newspapers. Bidders should regularly visit the website https://tenders.iitm.ac.in/ to keep themselves updated. No extension in the bid due date/time shall be considered on account of delay in receipt of any document by mail.

Acknowledgement: - It is hereby acknowledged that the bidder has gone through all the conditions mentioned above and agrees to abide by them.

SIGNATURE OF TENDERER
ALONG WITH THE SEAL OF THE COMPANY WITH DATE

Annexure 1

Technical Specifications for DC powered Brushless Direct Current (BLDC) fan operating at 48V DC and controlled by a specified remote

Parameter	Specifications
Colours	White, Brown or Ivory
Type of fan	External rotor
Type of motor	PM BLDC
Fan size (Sweep)	1200 ±5 mm
Nominal Operating Voltage	48 V DC
Operating Voltage Range	45-51 V DC
Power input	32 W Max
Max Speed	340 – 360 RPM
Air delivery at max speed	220 m^3/min
Motor controller	Sensor less control strategy
Remote control operation	The fan shall work with a remote supplied by IIT Madras
ON/OFF and speed control operation	(i) With built-in remote (IR) Sensor for external remote control. Sensor shall be located for signal sensing through the center of the fan motor bottom cover. (ii) With Three button remote control for ON/OFF, Speed Increase and Speed Decrease
Multiple speed settings	From 170 RPM to max speed in near equal steps from remote.
Starting	Fan shall start and run at 45 V to 51 V DC
Start up at all speeds	Smooth starting with a maximum of 180 degree (mechanical) reverse rotation, if any.
Memorising last set speed	After power OFF, the Fan controller shall turn ON at the last set speed set, at the time of Power ON
Insulation resistance	5 M Ohm @ 600 V DC
Winding Temperature rise	70 ◦ C
Type of blades	Aluminum sheet
Protection features	Blocked Blade, Reverse polarity, Over voltage and Over Current.
Operating noise at maximum speed	Less than 65 dBA
Motor construction	Totally enclosed type

Corrosion resistance	Motor body and blades shall be corrosion resistant	
Ambient temperature	50 ◦ C maximum	
Max humidity	90 % RH	
Other fan accessories	Standard down rod, canopy and shackle clip	
Safety features	Compliance to mechanical safety of fan suspension system (clamp and down rod)	
Design and Manufacturing	India	
Remote control signals, commands and codes		
Communication Protocol	NEC derived custom protocol	
Carrier Frequency	38 ± 1 kHz	
Operating distance (line of sight)	3 m (with subtended angle of 45° between the axis of remote control and vertical axis)	
Feedback signal to user	Light signals to user for 1s whenever remote is operated. When fan is at maximum/minimum speed, depressing the increase/decrease button on remote shall not cause LED to blink.	
Control signals	Command	Hex Codes
Fan ON or OFF	F_ON_OFF	0x00FF42BB
Fan speed increase	F_UP	0x00FF52AA
Fan speed decrease	F_DN	0x00FF7888

Code description

Command	**Hex Code**	**Binary Codes (32 bits)**	**Reversal of binary digits in Hex Code**	**Decimal notation of the Code**
F_ON_OFF	0x00FF42BB	0b 0000 0000 1111 1111 0100 0010 1011 1011	DD42FF00	3712155392
F_UP	0x00FF52AA	0b 0000 0000 1111 1111 0101 0010 1010 1010	554AFF00	1430978304
F_DN	0x00FF7888	0b 0000 0000 1111 1111 0111 1000 1000 1000	111EFF00	287244032
Data reception		As per NEC protocol for communication		

(i) Total length of the data reception in one cycle in 32 bits.

- Logical '0' – a 562.5µs high signal followed by a 562.5µs low signal, with a total time of 1.125ms
- Logical '1' – a 562.5µs high signal followed by a 1.6875ms low signal, with a total time of 2.25ms.

(ii) Start sequence: A high signal of 9ms followed by a low signal of 4.5ms and thus making a total time of 13.5ms; bit sequence is modulating signal.

Annexure 2

Performance Table - DC powered Brushless Direct Current (BLDC) fan operating at 48V DC and controlled by a specified remote

Parameter	IITM Requirements	Vendor Specifications	Test Report (given under Annexure _)
Type of fan	External rotor		
Colours	White, Brown or Ivory		
Type of motor	PM BLDC		
Fan size (Sweep)	1200 ±5 mm		
Nominal Operating Voltage	48 V DC		Annexure No ___
Operating Voltage Range	45-51 V DC		Annexure No ___
Power input	32 W Max		Annexure No ___
Max Speed	340 – 360 RPM		Annexure No ___
Air delivery at max speed	220 m^3/min		Annexure No ___
Motor controller	Sensor less control strategy		
Remote control operation	The fan shall work with a remote supplied by IIT Madras		
ON/OFF and speed control operation	(i) With built-in remote (IR) Sensor for external remote control. Sensor shall be located for signal sensing through the center of the fan motor bottom cover. (ii) With Three button remote control for ON/OFF, Speed Increase and Speed Decrease		Annexure No ___
Multiple speed settings	From 170 RPM to max speed in near equal steps from remote		Annexure No ___
Starting	Fan shall start and run at 45V to 51 V DC		Annexure No ___
Start up at all speeds	Smooth starting with a maximum of 180 degree		Annexure No ___

	(mechanical) reverse rotation, if any.		
Memorising last set speed	Fan controller shall be capable of running at the last set speed, at the time of Power ON		Annexure No ___
Insulation resistance	5 M Ohm @ 600 V DC		Annexure No ___
Winding Temperature rise	70 ◦ C		Annexure No ___
Type of blades	Aluminum sheet		
Protection features	Blocked Blade, Reverse polarity, Over voltage and Over Current		Annexure No ___
Operating noise at full speed	Less than 65 dBA		Annexure No ___
Motor construction	Totally enclosed type		
Corrosion resistance	Motor body and blades shall be corrosion resistant		
Ambient temperature	50 ◦ C maximum		Annexure No ___
Max humidity	90 % RH		Annexure No ___
Other fan accessories	Standard down rod, canopy and shackle clip		
Safety features	Compliance to mechanical safety of fan suspension (clamp and down rod)		
Design and Manufacturing	India		
Remote Control Signals, Commands, Codes and Operation			
Communication Protocol	NEC derived custom protocol		
Fan operation commands and codes	Fan ON/OFF: 0x00FF42BB Fan speed increase: 0x00FF52AA Fan speed decrease: 0x00FF7888		

Operating distance (line of sight)	3 m (with subtended angle of 45° between the axis of remote control and vertical axis)		Annexure No ___
Feedback signal to user	A light signal to user for 1s whenever remote is operated. When fan is at maximum/minimum speed, depressing the increase/decrease button on remote shall not cause LED to blink.		Annexure No ____
Carrier frequency	38 ± 1 kHz		Data sheet of IR Receiver shall be kept as Annexure. Annexure No __

Note: Answering 'Yes', 'No' or 'Same as IITM Specs' under 'Vendor Specifications' column shall be avoided and inappropriate answering under this column may result in tender disqualification**.**

Date

Name and Signature of Authorised Signatory with company seal

Annexure 3

Technical papers / reports

1. Technical/Installation/Operation Manual of the Product.
    a. The document should contain all the safety precautions, product specifications, and step by step procedure for installing the product. A description of the operational features of the product and user oriented procedure for operating the product should be provided.
    b. The manual should also list out the elementary troubleshooting rules to facilitate correct feedback.
2. Test Reports,
3. Certification received, if any, and
4. Specifications of specific components used if any (like BLDC motor, IR receiver)

Annexure 4

Supplier Product Quality Assurance Requirements

1. Selected supplier/s shall provide test reports on five more samples to IITM as per the Performance Table given in Annexure 2 immediately on selection.

2. Routine tests at factory: This will be done by the vendor at his place. PRODUCTS which meet the specifications will be affixed with 'Tested Ok' sticker. All PRODUCTS will bear Serial Nos. and bar code stickers. Speed and power consumption at highest speed shall be recorded and the vendor should provide a test certificate for the units dispatched to IITM along with serial number and measured data in soft copy format.

3. Pre-dispatch Inspection shall be carried out before dispatch on sample basis (one in every 500 PRODUCTS) as given below. The reports shall be sent to the designated authority by e mail.

Pre-dispatch Inspection Report			
Supplier Name	P.O No	Quantity for delivery	Number of batches and quantity per batch
Batch No from which sample drawn	Sl.No of the sample	Place of inspection	Date of inspection
Tested by:		Inspected by:	
Test results			
Operating Voltage			
Maximum speed			
Current drawn@ Max speed			
Power drawn @ Max speed			
Minimum speed			
Current drawn@ Min speed			
Power drawn @ Min speed			
Minimum starting voltage			
Reverse rotation (in degree)at starting at Maximum speed, if any			

Blocked blade protection	
Reverse polarity protection	
Over voltage protection	
Memorising last set speed	
Max distance for remote operation	

4. Random Checks after delivery at sites: The purchaser reserves the right to draw samples from deliveries at sites, say one in every 1000 PRODUCTS delivered, for performance testing. The purchaser also reserves the right to be present when inspections are done at factory and draw samples to carry out the test at IITM as deemed necessary.

5. The purchaser reserves the right to reject lot/s, samples of which do not meet the requirements.

Annexure 5

THE EXPECTED DELIVERY SCHEDULE

1. Tentative Month wise requirement of DC powered Brushless Direct Current (BLDC) fan operating at 48V DC and controlled by a specified remote units is as under. This may be altered at the time of the issue of the PO.

Month	**Supply requirement (nos)**
30 Aug 2015	2000
30 Sep 2015	6000
31 Oct 2015	12000
30 Nov 2015	20000
31 Dec 2015	20000
31 Jan 2015	20000
29 Feb 2016	20000
Total supply	**100000**

2. Tentative Location wise Volumes are as under

Sr. No.	**State**	**Location**	**Quantity to be supplied(nos)**
1	Bihar	Likely to be Sasaram and nearby towns	91,000
3	Assam	Lakhimpur	5,000
4	Rajasthan	Jodhpur	4,000

Annexure 6

Schedule of Events

The tender document will be made available in the IIT Madras webpage from the date of release of the tender.

S.no	Description	Date
1	Release of Tender	July 03, 2015
2	Submission of queries (for Pre-bid clarification)	July 7, 2015
3	Pre-bid Clarification Meeting	July 10, 2015
4	Submission of Technical bids - on or before	July 20, 2015
5	Submission of Financial bids - on or before	July 27, 2015