



TRAVANCORE TITANIUM PRODUCTS LIMITED
Kochuveli, Thiruvananthapuram 695 021
email: contract@ttpltd.in

TTP/CD/CN/SC-37/ VFD _ cooling tower fan /24-25

12.03.2025

Sealed quotations are invited from experienced contractors of TTPL in prescribed format for the work “**Implementation of VFD in Cooling Tower Fan**”. The Tender Form can be had from the office of the undersigned between 9.00 a.m and 3.00 p.m on all working days except Saturdays on remitting the Tender Form cost. The Tender document can also be downloaded from our Website www.travancoretitanium.com and shall submit the Tender along with DD against the Tender Form cost & EMD in favour of Travancore Titanium Products Limited payable at Thiruvananthapuram. The bids will be opened at the date and time given below in the presence of the Tenderers present at that time.

The tender shall be enclosed in an envelope, sealed and super scribed with “Tender No. & date, due date and the name of work. The same shall then be forwarded to the **“the Head of Department(Commercial), Travancore Titanium Products Limited, Kochuveli P.O. Thiruvananthapuram, Kerala, Pin.695 021”**.”

Name of Work: “*Implementation of VFD in cooling tower fan*”

Tender Form Cost : ₹600/- + GST @ 18% (Total ₹708/-)

Earnest Money Deposit (EMD): ₹7,500/- (refundable)

(Tender Cost & EMD shall be remitted by DD)

Due date & Time **28.03.2025 at 12 Noon**

Bid Opening due & Time: **28.03.2025 at 2p.m**

For TRAVANCORE TITANIUM PRODUCTS LIMITED

Head of Department (Commercial)

Encl: Tender Notice



TRAVANCORE TITANIUM PRODUCTS LIMITED
Kochuveli, Thiruvananthapuram 695 021
Email: contract@ttpltd.in/purchasettp@gmail.com

Tender Notice

TTP/CD/CN/SC-37/VFD _ cooling tower fan/24-25

12.03.2025

Name of work: “Implementation of VFD in cooling tower fan

Due date: 28.03. 2025 up to 12 Noon.

1. Scope of Work

- 1.1 The vendor shall design ,supply, erection, testing and commissioning of VFD of 30 KW capacity and its control panel to operate 30 KW, 1500 rpm (4 pole) squirrel cage induction motor, which uses to drive the cooling fan in SAP cooling tower at different speed based on the feedback signal based on cooling tower sump temperature.
- 1.2 The drive shall be capable of driving the motor at different speeds and shall deliver the motor power and torque for the complete speed – torque characteristics of the load .
- 1.3 VFD shall inherently protect motor from high voltage stress, independent of cable length to motor. Output filter shall be an integral part of the VFD system and shall be housed inside the VFD panel.
- 1.4 Cable laying, glanding, and termination at motor end will be done by TTPL
- 1.5 Earthing of the system shall also be done by TTPL
- 1.6 The scope shall also include supply and installation of one KWH meter & one Hour meter to record the operating time at the input side of the VFD.
- 1.7 The scope of this specification is to define the minimum technical requirement for the design, manufacture, testing and supply of fully wired floor mounted 30 KW Variable Frequency Drive with input and output choke. The vendor shall be responsible for the engineering and functioning of the drive unit, meeting the intent and the requirement of this specification.

2. Pre-qualification Criteria

1. The bidder should possess experience of having successfully completed similar projects, the scope of work comprising of basic, and detailed engineering drawings, procurement, supply, construction, fabrication, erection and commissioning of similar works. Experience certificate in proof of executed similar type of work for the last three years and the bidder should have executed at least a single order value of not less than Rs. 2.4 Lakhs.
2. The bidder shall be an active authorized dealer of the maker of VFD, which is going to be supplied. Proof of same shall be submitted along with offer.

3. Guarantee & Furnishing of Document

The vendor shall assure 12 months guarantee from the date of completion of the work. If the drive supplied by the vendor fails at site due to manufacturing defects, during erection, commissioning or service (within guarantee period), the vendor shall repair and put back into successful operation at no extra cost to TTP and the guarantee period shall be suitably extended. The said guarantee condition is applicable for all the vendor supplied items.

All Test Certificates, operation and maintenance manuals, drawings & soft copy shall be furnished along with item/equipment.

3. Work completion period

The work should be completed in all respects within **two months** from the date of issue of order. The date of trial run of the offered system or the date of complete commissioning/handing over the system whichever is later will be considered as the date completion.

4. Terms of Payment

90 % of the contract amount shall be paid on completion of testing, trial run and handing over the system, subject to clause on penalty for late delivery.

10 % of the contract amount shall be paid on satisfactory commissioning of all the work included in the scope of the contract and issue of the final completion certificate against a performance bank guarantee of an equal amount for 12 months from date of acceptance and final completion of the entire supplies & installation work under contract and further.

All the payments are made, after deducting there from income tax and other amounts as may be deductible or recoverable in terms of the contract or the laws in force.

5. General requirement

- a. The equipment shall comply with the requirement of latest revision of codes and standards listed under part –II of this specification.
- b. The AC drive shall be designed to operate under site condition as specified in this specification. De-rating if any required for service in ambient condition shall be clearly specified.
- c. Input voltage; 415Volts, 3 phase, 50Hz with a voltage variation of +10% on voltage and + 5% on frequency.
- d. Ambient temperature with rated output shall be: 50 deg. Celsius.
- e. The device shall be designed with sufficient current available at starting to meet the starting torque requirement consistent with acceleration time permitted within thermal withstand characteristics of motor.
- f. The drives shall be suitable for a 3 phase 3 wire supply system. Hence bidder shall provide for a control transformer of suitable rating.
- g. The drive shall be suitable for a non VFD grade motor, which is located about 100 mts away from the MCC. The bidder must provide class H output chokes, to protect the motor from the dangerous surge voltages generated during switching.

h. Basic Features

The drive shall be energy efficient, provide very high reliability, high power factor, low harmonic distortion, wear and noise.

The drive shall be designed to deliver the motor power and torque for the complete speed – torque characteristics of the load. It shall be capable of withstanding the thermal and dynamic stress resulting from short circuit.

The controller output overload capacity shall be 150 % of rated current of motor for one minute. If the motor load exceeds the limit, the drive shall automatically reduce the frequency and voltage to the motor so as to guard against overload.

Fault diagnostic feature shall be built into the system to supervise the operation and failure of the system.

All necessary control gear for switching should be provided inside the panel in wired condition

6. Equipment Specification

a. Power Converter

Drive shall be 6 pulses or 12 pulses as specified in the data sheet.

Normally for all output short circuits, the inverter shall interrupt the current before any semi conductor fuse blows.

All the power transistors, thyristors and diodes shall be protected with high speed semiconductor grade fuses.

The rating of the converter's semi- conductor components shall not be less than 120% of the nominal current flowing through the element at full load of the VFD throughout the complete speed range.

The power converter circuit shall be designed so that motor can be powered at its full nameplate rating continuously without exceeding its rated temperature rise due to harmonic current generated by the inverter operation.

The cooling system of the electronic components, if provided, shall be monitored and alarm shall be generated before occurrence of any consequential damage to the power control devices.

b. Harmonics

Harmonics at the supply side of the drive shall be restricted to the maximum allowable levels of current and voltage distortion as per recommendation of the latest IEEE-519 .The values of percentage voltage and current harmonics at the input point of drive as the point of common coupling shall be furnished.

c. DC link / AC line Reactor / Output filter

Smoothing reactors for the DC link shall be designed for sufficiently decoupling the rectifier and the inverter portion of the converter and to limit fault currents in this circuit. AC line reactors shall be provided and the same shall be suitable for harmonic suppression and fault current limitation.

The reactor shall be dry type, air cooled, and located within the panel.

**VARIABLE FREQUENCY DRIVE
PART – II**

General	01	Make of VFD	ABB/ SIEMENS/YASKAWA/ SCHNIEDER/ Fuji / Equivalent
	02	Application	Cooling Tower Fan motor
	03	Motor	3 phase induction motor/Non VFD grade
	04	Rating	30 KW
	05	Design ambient temp	50 deg C
	06	De-rating required for the design ambient temp.	Shall be complied
	07	Panel location	Indoor
	08	All PCB Control card protection	Shall have Conformal coating, 3C2 original from the manufacturer, Also its certificate shall be submitted
Codes and standards	09	Semiconductor converters	IEC-146- 1,4,5,6
	10	General requirement of switchgear and control gear	IS 4237 and IS 13947
	11	Electromagnetic compatibility	IEC 61000-4-7
	12	Harmonics	IEEE 519
Input data	13	Voltage and variation	415 Volts, 3 phase +/- 10%
	14	Frequency and variation	50 Hz +/- 5 %
	15	Power factor at full load	Min 0.85 at full load
	16	THD (Current) fed back to source	As per IEEE limits
	17	Input/Output side choke to reduce harmonics	Required
	18	Type of isolating device in VFD panel	MCCB
Inverter data	19	Type of Inverter	Voltage Source inverter, Sine wave PWM
	20	Control performance	V/F or Space vector control
	21	Devices used for construction	IGBT (Third generation)

Signature of bidder:

	22	Overload capacity	150 % of rated full load current for 1 minute
Control characteristics	23	Slip compensation	Required
	24	Switching frequency (2 -16 KHz)	*
	25	Frequency accuracy (min 0.1 Hz)	*
	26	Starting torque	Min 150% of the rated value
	27	Jump frequency	Required
	28	Torque boost	Required
Protection	29	Thermal overload and short circuit protection	Required
	30	Over and under voltage	Required
	31	Single phasing/ unbalance /stall	Required
	32	Cooling system failure	Required
	33	DC link over voltage	Required
	34	VFD module internal failure	Required
	35	Incoming line surge protection	Required
Metering and diagnostics	36	Remote HMI panel mounted	Required
	37	Display and diagnostics including KW,PF, Amp, Volt, RPM, elapsed KWh	Required (With Modbus RTU RS-485 communication)
	38	Indicating lamps (LED) for Run, Stop, fault, mains on	Required
Control	39	Speed Set from panel,	<ul style="list-style-type: none"> The speed of the motor shall vary depends on the feedback from sump water temperature 4-20 ma signal. Shall have provision to programme the motor speed at any desired speed with in the speed limit of the motor whenever required
	40	Digital input	Two (Min)
	41	Digital output, Relay	Two(Min)
	42	Analog output 4-20 mA	One(min)

Cabinet	43	Type	Floor mounted type with hinged doors
		Make	Rittal/ Siemens/ Elsteel/BCH
	44	Degree of protection	IP 54
	45	Cable entry	Bottom withremovable undrilled gland plates
	46	Sheet steel material CRCA	3 mm Thick for load bearing area and 2 mm for non load bearing area
	47	Local ON /OFF pushbuttons	Required
	48	Provision for remote ON / OFF	Required
	49	Busbar	Copper
	50	Bus bar Size	*
	51	AC power switch socket inside panel	Required
	52	Overall dimensions	*
Make of Misc items	53	Panel Cooling	* (Provide min two no of cooling fans)
	56	Push Buttons , SFU/MCCB	Siemens Make
	57	Isolator, selector switch, Contactors, OLR,	Siemens Make, with coil voltage 415V
Documents	58	Terminal blocks	Phoenix / Wago Make
	59	Schematic, and wiring diagram	Required – 3 Nos
	60	Literature and catalog of all components	Required – 1 No
	61	Operation and maintenance manual	Required – 1 No
	62	Test certificates	Required – 1 No
Site tests	63	Inspection test procedure	*
	64	Functional tests	*
	65	Load test with actual load	*
	66	Harmonic measurement THD V & I	*
	67	Current limit / over current test	*

Signature of bidder:

GENERAL TERMS AND CONDITIONS:

1. Details of ESI & PF registration
 - i. ESI Registration number:
 - ii. PF Registration number.....
 - iii. If the bidder is not under PF act , a self-declaration to be submitted along with the tender .**
 - iv. If the bidder is not under ESI act, the bidder has to submit CAR (contractors all risk) policy for the entire period of contract for the employees engaged for the work before awarding the work order to be submitted. Self-declaration to be submitted along with the tender.**
2. The bidder shall submit Tender document duly filled and signed along with the enclosures mentioned in the tender document within the time stipulated in the tender notice. Bids should bear the signature of the bidder in all pages.
3. The bidder shall remit the tender form cost and EMD as given in the tender document. The bids without remitting tender form cost and EMD will be rejected.
4. The rate quoted shall be exclusive of GST and the GST applicable should be mentioned at the space provided in the Price format. If the bidder is below the threshold limit of GST that should be mentioned in the price format and a self declaration shall be submitted with the tender.
5. The tender must be firm for a period of three months from the date of opening of the tender or till the tender is decided, whichever is earlier during which period the bidder will not be free to withdraw the tender. Any such withdrawal will be entailed to forfeiture of the Earnest Money Deposit(EMD) and also result in the tenderer being made liable for the losses and damages sustained by the company in rearranging the work.
6. It is no binding on the company to accept the lowest offer. The company reserves the right to cancel/postpone the tender or to reject any or all offers without assigning any reason.
7. The tenderer should remit the Earnest Money Deposit (EMD)mentioned in this document in cash/DD and proof of thereof should be enclosed along with the tender. Other mode of remittance will not be accepted.
8. If any irregularity or fraudulent behavior is noticed on part of the contractor / his agents / representatives or the crew of the vehicle engaged by the contractor for the performance of the contract, the company reserves the right to take all suitable action deemed fit against the contractor and those concerned.
9. The Contractor will be responsible for meeting all the requirements of the various labour enactments applicable from time to time and should indemnify and keep indemnified the company against all losses and damages sustained by the company in this regard at all times.
10. The Contractor should comply with all relevant formalities under contract labour (Regulation and Abolition) Act 1971, such as display of rate of wages, date, place and time of payment of wages, date of payment of unpaid wages etc. they should also intimate the time, date and place of disbursement of wages to the supervisory Officer nominated under the above act for certification of payment to contract workers.
11. The Contractor should strictly adhere to the Safety Rules prevailing in the company failing which penalty as decided will be imposed. The Company is in no way responsible for any injury, disability or death of contractor's workmen due to non-compliance of safety regulations. TTPL will not pay any compensation in this regard.
12. The workers engaged by the contractor shall wear the ID cards provided from the Main gate Security persons and displayed same while on work.
13. The Contractor should fix a display board on the materials of their own kept within the Company premises indicating the names of the contractor and Work Order No.
14. The work should be completed within the time limit given by the Officer in charge of the work.

Signature of bidder:

15. The Company reserves the right to cancel the work order forfeiting security deposit if the work is not started within the time stipulated in the work order and also to terminate the contract at any time if the work is not done with proportionate progress to the satisfaction of the company officials and in all such cases the company will be at liberty to get the work done in any manner that the company thinks fits and all losses and damage sustain by the company in this regard will be recovered from contractor and his assets.
16. Company reserve the right to accept/reject any of the tender after evaluation with or without assigning reason no matter whether a Tenderer has quoted the lowest rate. All questions/disputes arising out of in connection with this shall be decided by the Managing Director of the company and his decision thereof shall be final and binding to all tenderers.
17. **Jurisdiction:** Any dispute or questions relating to or arising out of the finalization of this tender, if remains, shall be subject to the executive jurisdiction of the courts at Thiruvananthapuram.
18. **Agreement:** The liability of contractor/bidder under this contract will commence on the date specified in the letter of Intent/ Work order. The successful bidder shall be required to execute an agreement with TTPL if the contract value is above Rupees One lakh, within 15 days from the date of issue of work order for carrying out the work according to the terms and conditions of the contract given along with work order. The agreement shall be executed on Rs. 200/-Stamp paper and shall be in the proforma as specified by TTP. The provision contained in tender papers and other documents exchanged between the Bidder and TTP shall form part of the contract. The Earnest Money Deposit is liable to be forfeited in case the contractor fails to execute the Agreement within the stipulated period as mentioned above.
19. **Security deposit:** The successful tenderer shall provide a Security Deposit equal to 5% of the contract value within 15 days from the date of issue of work order for the due performance of the contract. The EMD of the successful tenderer shall be adjusted against the Security Deposit. Balance amount, if any, shall be remitted by means of a Demand Draft payable at Thiruvananthapuram or as Bank Guarantee from a nationalized /scheduled bank. The Security deposit shall not bear any interest and shall be released only after successful completion of all contractual obligations including guarantee period.
20. **Liquidated damages:** In case of any delay in the execution of the Order beyond the stipulated date of work schedule including any extension permitted in writing, the TTPL reserves right to recover from the contractor a sum equivalent to 0.5% of the total value of the delay for each week of delay and part thereof subject to a maximum of 10% of the total value of the Order. Alternatively, the Company reserves the right to execute the work from elsewhere at the sole risk and cost of the contractor and recover all such extra cost incurred by the company in execution of work by the above procedure.

7.0 Valuation of variation:

If the Contractor has been asked to execute any such item/work in course of contract for which the tender rates have not been quoted, he must undertake such work. The Purchaser and contractor shall determine the rates for such additional work by mutual negotiations, however, prior to commencement of extra work.

- 8.0 The contractor shall follow all safety regulations within the company as per the safety standards. The contractor shall be completely responsible for any mishap / accident happened to the contractor or to his employees at worksite within TTPL.
- 9.0 All questions, disputes or differences arising under, out of or in connection with this tender shall be decided by the Managing Director (MD) of the company and his decision shall be final and binding.
- 10.0 The Company reserves the right to reject any or all tender or to accept any tender partly or wholly without assigning any reason.

Conditional tenders will not be accepted.

21. Documents to be submitted along with the tender

- a. Proof of Tender fee and EMD remittance
- b. Tender document duly signed by the bidder in all pages
- c. Copy of GST, MSME registration(if applicable)
- d. Copy of PF registration/Self declaration
- e. Copy of ESI registration/self declaration
- f. Self Declaration as per **Annexure A** to be submitted in the bidder's letter head.
- g. Document of proof having successfully completed similar projects as per pre-qualification criteria 2(1).
- h. Certificate as an authorized dealer of the maker of VFD, as required under pre-qualification criteria 2(3), in the tender document.

Tender Form Cost: ₹600/- + GST @ 18% (Total ₹708/-)

Earnest Money Deposit (EMD): ₹7,500/- (refundable)

Exemption in Tender Form Cost and EMD is as per Govt. rules.

Due date of Submission of tender: 28.03.2025 upto 12.00 noon and will be opened at 2.00 p.m. on the same day in the presence of those tenderers who are present at that time.

for TRAVANCORE TITANIUM PRODUCTS LIMITED



Head of Department (Commercial)

PARTICULARS OF TENDERER

1. Name of the Bidder:
2. (a) Registered office address of the Bidder:
(b) Address for correspondence:
3. Mobile Nos.:
4. E-mail address:
5. Status of the tenderer (Individual, Prop. firm, Partnership, Ltd. Company, Co-operative Society, Other):
6. Registration No.:
7. Year of establishment:
8. Permanent Account No. (PAN issued by Income Tax Dept.):
9. GST Registration No:
10. ESI Registration No:
11. PF Registration No:
12. MSME Registration No.(if applicable):
13. Name and address of Proprietor/ Partners/ Directors:

DECLARATION

We confirm that we have read and understood all tender conditions and we accept all tender conditions in its entirety.

Date:

Signature:

Name of Person signing:

Tenderer's Name and address with seal:

Signature of bidder:

SELF DECLARATION

Date:

From

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.....
.....

To

TheHead of Department (Commercial)
Travancore Titanium Products Limited
Kochuveli, Thiruvananthapuram,
Kerala – 695 021.

Sir,

Sub: Tender for Implementation of VFD in cooling tower fan

Ref: Tender No **TTP/CD/CN/SC-37/ VFD _ cooling tower fan /24-25dated 12.03.2025**

1. I/We have carefully studied the terms and conditions of the tender vide your **Tender No.TTP/CD/CN/SC-37/ VFD _ cooling tower fan /24-25 dated 12.03.2025**
2. I/We hereby certify that we have never been banned/black listed/suspended by any of the State/UT/Central Government/ PSU organizations.
3. In the event of any such information pertaining to the aforesaid matter found at any given point of time either during the course of the contract or at the bidding stage, my bid/contract shall be liable for truncation/cancellation/termination without any notice at the sole discretion of the company.

Yours faithfully,

Signature and Address of the Contractor.