

# TECHNICAL PROCUREMENT SPECIFICATION

*for*

## EHV OUTDOOR CURRENT TRANSFORMERS AND VOLTAGE TRANSFORMERS

### FACT-UC

TPS NO. : SPEC-FACT-UC-EHV-CT-VT-001

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## 1. INTRODUCTION

- 1.1. This specification gives minimum user requirements for a new EHV Outdoor Current Transformers (CTs) and Inductive Voltage Transformers (VTs), to be provided in the 110 KV Substation, FACT-UC.
- 1.2. Fertilisers And Chemicals Travancore (FACT) is a Government of India Enterprise engaged in manufacture of fertilizer, chemical & petrochemical products, engineering consultancy and engineering fabrication. FACT-Udyogamandal Complex (FACT-UC) is a division of FACT located at Udyogamandal, Kochi, Kerala that manufactures intermediates and products like sulphuric acid, oleum, ammonia, ammonium phosphate, ammonium sulphate, caprolactum etc.
- 1.3. Vendor's scope shall include design, material, manufacture, testing, supply and commissioning supervision of the CTs and VTs, as further described in sections that follow.
- 1.4. The workmanship and the entire construction shall be in accordance with IS/IEC.
- 1.5. The vendor shall provide guarantee as specified in section 10 herein.
- 1.6. This is a two part enquiry. The offer shall be submitted strictly as specified in Annexure II. An unpriced copy of the price bid shall be attached with the technical bid for technical evaluation.
- 1.7. Only offers that comply with the requirements as specified in the bid documents and specification shall be considered for further evaluation. If the vendor however finds some deviation unavoidable, such deviations shall be clearly mentioned in the compliance and deviation statement in the specified format with proper justification. The purchaser reserves the right to reject or accept the offer with such deviations.

## 2. PERIOD OF COMPLETION

- 2.1. The vendor shall complete the supply of the CTs and VTs within a period of 12 weeks from date of final drawing review/approval. The drawings for review/approval shall be submitted within 10 days from the date of LOI. Revised final drawings for final approval, after incorporating the all comments/ changes from Purchaser, if any, shall be submitted within 10 days from date of intimation of comments/ changes in drawing from Purchaser.
- 2.2. Time is of the essence of this contract. The vendor shall complete the supply of the CTs and VTs within the time specified above.
- 2.3. All drawings and documents as per Vendor Data Requirement shall be supplied as specified.

### 3. SCOPE OF SUPPLY

Bidder's scope shall include:

- 3.1. Design, material, manufacture, testing, documentation, packing, dispatch and supply of CTs and PTs as specified herein.
- 3.2. Furnishing all drawings and documents as per section 9, 'Vendor Data Requirements'.
- 3.3. Inspection and tests as per section 7.
- 3.4. All necessary accessories including, mounting bolts, nuts and washers etc. Support structure is not in the scope of bidder.

### 4. STANDARDS

Requirements laid down in the latest revisions of the following Indian Standards and other relevant standards & regulations shall be strictly adhered to:

- 4.1. IS:2705-1 : Current Transformers-Part 1: General Requirements
- 4.2. IEC 61869-1: Instrument transformers - Part 1: General requirements
- 4.3. IEC 61869-2: Instrument transformers - Part 2: Additional requirements for current transformers
- 4.4. IEC 61869-3: Instrument transformers - Part 3: Additional requirements for inductive voltage transformers
- 4.5. IEC 61869-100: Instrument transformers - Part 100: Guidance for application of current transformers in power system protection.
- 4.6. IS 4201: Application Guide for Current Transformer
- 4.7. IS 4146: Application guide for Voltage Transformers
- 4.8. IS 3156 : Voltage Transformers specification

### 5. GENERAL REQUIREMENTS OF EHV CURRENT TRANSFORMERS

- 5.1. The Current Transformers (CT) shall be suitable for outdoor service (Electrically exposed).
- 5.2. The CTs shall be suitable for the environment and power system that specified in the data sheet.
- 5.3. The CTs shall comply with the data provided in the Data sheet.
- 5.4. Oil filling plug, drain plug and oil level indicators as per manufacture standards shall be provided.
- 5.5. CTs shall be provided with polarity markings adjacent to terminals both for primary and secondary as per IS /IEC.

- 5.6. Primary Terminals shall be mounted on insulated Bushings
- 5.7. Porcelain (or equivalent) insulators shall confirm to IS/IEC.
- 5.8. Pressure relief mechanism and expansion system shall be as per the manufacture standards
- 5.9. Earthing terminals shall be provided as per IS 2705 (Part 1)/IEC
- 5.10. Lifting lugs shall be provided.
- 5.11. Rating plate conforming to IS: 2705 (Part 1)/IEC shall be provided.
- 5.12. The secondary terminal boxes shall be equipped with a detachable, undrilled gland plate, which on installation can be drilled for cable entry. The secondary terminals shall be suitable for connecting 2.5 Sq.mm copper cables.

## 6. GENERAL BUSBARS REQUIREMENTS OF EHV INDUCTIVE VOLTAGE TRANSFORMERS

- 6.1. The Inductive Voltage Transformers (VT) shall be suitable for outdoor service (Electrically exposed).
- 6.2. The VTs shall be suitable for the environment and power system that specified in the data sheet.
- 6.3. The VTs shall comply with the data provided in the Data sheet.
- 6.4. Oil filling plug, drain plug and oil level indicators as per manufacture standards shall be provided.
- 6.5. VTs shall be provided with polarity markings adjacent to terminals both for primary and secondary as per IEC.
- 6.6. Primary Terminals shall be mounted on insulated Bushings
- 6.7. Porcelain (or equivalent) insulators shall confirm to IS/IEC.
- 6.8. Pressure relief mechanism and expansion system shall be as per the manufacture standards.
- 6.9. Earthing terminals shall be provided as per IEC.
- 6.10. Lifting lugs shall be provided. Rating plate conforming to IEC shall be provided.
- 6.11. The secondary terminal box shall be equipped with a detachable, undrilled gland plate, which on installation can be drilled for cable entry. The secondary terminals shall be suitable for connecting 2.5 Sq.mm copper cables.

## 7. INSPECTION AND TESTS

- 7.1. Comprehensive Inspection and Testing Plan for CTs & VTs shall be submitted by the bidder including

testing, inspection & witnessing required by the Purchaser. The Comprehensive Inspection and Testing Plan shall be approved by the Purchaser.

- 7.2. Type Test certificates from NABL accredited LAB shall be submitted along with technical Bid.
- 7.3. The routine tests shall be done at NABL accredited LAB, in the presence of Purchaser.
- 7.4. Routine tests shall be as per IS/IEC.
- 7.5. Bidder shall bear the cost of all the tests.
- 7.6. Bidder shall give 15 days advance intimation to Purchaser for inspection and witnessing of routine tests.

8. **DATA SHEET**

<b>1</b>	<b>Service conditions</b>	
1.1	Location	Udyogamandal, Cochin
1.2	Humidity Min.	64 %
1.3	Humidity Max.	93 %
1.4	Humidity Design	100 % at 40 Degree Celsius
1.5	Ambient Temperature °C - Min.	19.2
1.6	Ambient Temperature °C - Max.	34.3
1.7	Ambient Temperature °C - Design	40
1.8	Rainfall – Max. recorded in an hour	Data shall be collected from Purchaser, If required
1.9	Rainfall – Max. recorded in 24 hours	Data shall be collected from Purchaser, If required
1.10	Altitude	Data shall be collected from Purchase, If required
1.11	Environment	Tropical atmosphere + Corrosive Chemical Plant atmosphere
1.12	Indoor/Outdoor	Outdoor
<b>2</b>	<b>Power System Details</b>	
2.1	Voltage (kV) & Variation (± %)	110 + 10% to -12.5%
2.2	Frequency (Hz)	50, (Variations as permitted by CEA)
2.3	No. of phases	3
2.4	No. of wires	3
2.5	Fault Level (MVA)	6000
2.6	Method of neutral earthing	SOLID
<b>3.0</b>	<b>Current Transformer</b>	
3.1	Type/installation	Single Phase, Oil Impregnated, Hermetically Sealed, Outdoor, Live Tank Type
3.2	Standards	IS 2075/IEC 61869
3.3	Highest System Voltage (Phase to Phase) (RMS)	123 kV
3.4	Rated Frequency	50 Hz

3.5	Type of Insulation	Class A ( Oil Impregnated Paper)
3.6	Rated System Voltage ( Phase to Phase)(RMS)	110 kV
3.7	No. of Cores	2
3.8	Rated Primary Current	80 A
3.9	Rated Secondary Current	1 A
3.10	Core 1 – Accuracy Class	0.2S
3.11	Core 2 – Accuracy Class	5P20
3.12	Core 1 - Burden	15 VA
3.13	Core 2 –Burden	30 VA
3.14	Core 1 – Instrument Security Factor (ISF)	≤ 5
3.15	Core 2 – Accuracy Limit Factor (ALF)	10
3.16	Rated Continuous Current Rating	120 % of rated current
3.17	Rated Short Time withstand Current (RMS) & Duration	31.5 KA for 1 Sec
3.18	Rated Dynamic Current (Peak)	78.75 KA
3.19	One Minute Power Frequency Withstand Voltage on Primary (RMS)	230 kV
3.20	Lightning Impulse Withstand Voltage (Peak)	550 kV
3.21	One Minute Power Frequency Withstand Voltage on Secondary (RMS)	3kV
3.22	Total Creepage Distance	3075 mm (25 mm/KV)
3.23	Primary Terminal details	To be supplied with suitable terminal connectors.
3.24	Secondary Terminal Boxes	Two Separate Terminal box (Lock and Sealable)
3.25	Ingress Protection of Terminal Box	IP 54
3.26	Primary & Secondary Terminal Markings	As per Standards
3.27	Oil	Shall Comply with IS 335 & latest Amendments.
3.28	Material of Tank/Housing	Mild steel
3.29	Painting	As per Standards
4.0	<b>Inductive Voltage Transformer</b>	
4.1	Type/installation	Single Phase, Oil Impregnated, Hermetically Sealed, Outdoor, Inductive Voltage Transformer
4.2	Standards	IEC 61869 1 &3
4.3	Highest System Voltage (Phase to Phase) (RMS)	123 kV
4.4	Rated Frequency	50 Hz
4.5	Type of Insulation	Class A ( Oil Impregnated Paper)
4.6	Rated System Voltage ( Phase to Earth)(RMS)	110/√3 kV
4.7	No. of Cores	1
4.8	Rated Primary Voltage	110 kV/ √3
4.9	Rated Secondary Voltage	110 V/√3
4.10	Secondary Core – Accuracy Class	0.2
4.11	Secondary Core - Burden	50 VA
4.12	Rated Voltage Factor	1.2 Continuous , 1.5 for 30 Sec
4.13	System Earthin	Effectively Earthed Neutral System
4.14	Rated Short Time withstand Current (RMS) & Duration	31.5 KA for 1 Sec
4.15	Rated Dynamic Current (Peak)	78.75 KA
4.16	One Minute Power Frequency Withstand Voltage on Primary (RMS)	230 kV
4.17	Lightning Impulse Withstand Voltage (Peak)	550 kV
4.18	One Minute Power Frequency Withstand Voltage on Secondary (RMS)	3kV
4.19	Total Creepage Distance	3075 mm (25 mm/KV)

4.20	Primary Terminal details	To be supplied with suitable terminal connectors.
4.21	Secondary Terminal Box	Lock and Sealable
4.22	Ingress Protection of Terminal Box	IP 54
4.23	Primary & Secondary Terminal Markings	As per Standards
4.24	Oil	Shall Comply with IS 335 & latest Amendments.
4.25	Material of Tank/Housing	Mild steel
4.26	Painting	As per Standards

## 9. VENDOR DATA REQUIRMENTS

Sl. No.	Description	With offer		After LOI/PO		Final	
		No.of copies	Date	No.of copies	Date	No.of copies	Date
1	Duly filled in Technical Particulars of EHV Outdoor Current & Potential Transformer, as per Annexure I attached.	S	With tech bid				
2	Signed copy of Technical Procurement Specification (SPEC-FACT-UC-EHV-CT-VT-001)	S	With tech bid				
3	Dimensioned general arrangement drawing.	S	With tech bid	S	10 days from LOI	S	As per Clause 2.1
4	Type Test Certificates – Section 7	S	With tech bid				
5	Inspection and Testing Plan			S	10 days from LOI	S	As per Clause 2.1
6	Routine test certificates.					S/1P	Before Supply
7	Technical Catalogues -CT & VT	S	With tech bid				
8	Installation & Maintenance Manual					S/1P	Along with Supply
9	Duly filled and signed Compliance statement as per format attached. (Annexure IV)	S	With tech bid				
10	Unpriced copy of price bid.	S	With tech bid				

Notes:

- S : Soft copy P: Print Copy
- Vendor shall fill in proposed lead time if different from the required lead time.
- One hard copy of documents against Sl. No, 3 & 4 shall be submitted in a folder and folders shall be packed and dispatched with the equipment.



**10. GUARANTEE**

- 10.1. The vendor shall provide guarantee for the entire CT & VT and accessories, for a period of 12 months from the date of commissioning or 18 months from date of dispatch, whichever is earlier.
- 10.2. Vendor shall be fully responsible for proper design, manufacture, testing, packing, dispatch and supply of complete system including all accessories.
- 10.3. Equipment and its components shall be guaranteed against faulty design, defective / improper materials poor workmanship or failure from normal use during the guarantee period. The guarantee shall also cover all bought-out items by the vendor, for the same period of one year mentioned.
- 10.4. Vendor shall have full defect liability during the guarantee period. It shall be obligatory on the part of vendor to modify and/ or replace any hardware completely at vendor's cost, in case any malfunction is revealed during the guarantee period.
- 10.5. Other guarantee terms shall be as stated in the Terms and Conditions governing the Purchase Order.

**ANNEXURE I**  
**TECHNICAL PARTICULARS (TO BE FILLED BY VENDOR)**

<b>1.0</b>	<b>Current Transformer</b>	
1.1	Type/installation	
1.2	Standards	
1.3	Manufacture's Name	
1.4	Highest System Voltage (Phase to Phase) (RMS)	
1.5	Rated Frequency	
1.6	Type of Insulation	
1.7	Rated System Voltage ( Phase to Phase)(RMS)	
1.8	No. of Cores	
1.9	Rated Primary Current	
1.10	Rated Secondary Current	
1.11	Core 1 – Accuracy Class	
1.12	Core 2 – Accuracy Class	
1.13	Core 1 - Burden	
1.14	Core 2 –Burden	
1.15	Core 1 – Instrument Security Factor (ISF)	
1.16	Core 2 – Accuracy Limit Factor (ALF)	
1.17	Rated Continuous Current Rating	
1.18	Rated Short Time withstand Current (RMS) & Duration	
1.19	Rated Dynamic Current (Peak)	
1.20	One Minute Power Frequency Withstand Voltage on Primary (RMS)	
1.21	Lightning Impulse Withstand Voltage (Peak)	
1.22	One Minute Power Frequency Withstand Voltage on Secondary (RMS)	
1.23	Total Creepage Distance	
1.24	Primary Terminal details	
1.25	Secondary Terminal Boxes	
1.26	Ingress Protection of Terminal Box	
1.27	Primary & Secondary Terminal Markings	
1.28	Oil	
1.29	Material of Tank/Housing	
1.30	Painting	
1.31	Volume of Oil (Liters)	
1.32	Total Weight of Equipment (Kg)	
1.33	Mounting Details	
<b>2.0</b>	<b>Inductive Voltage Transformer</b>	
2.1	Type/installation	
2.2	Manufacture's Name	
2.3	Standards	
2.4	Highest System Voltage (Phase to Phase) (RMS)	
2.5	Rated Frequency	
2.6	Type of Insulation	
2.7	Rated System Voltage ( Phase to Earth)(RMS)	
2.8	No. of Cores	
2.9	Rated Primary Voltage	
2.10	Rated Secondary Voltage	
2.11	Secondary Core – Accuracy Class	
2.12	Secondary Core – Burden	

2.13	Rated Voltage Factor	
2.14	System Earthing	
2.15	Rated Short Time withstand Current (RMS) & Duration	
2.16	Rated Dynamic Current (Peak)	
2.17	One Minute Power Frequency Withstand Voltage on Primary (RMS)	
2.18	Lightning Impulse Withstand Voltage (Peak)	
2.19	One Minute Power Frequency Withstand Voltage on Secondary (RMS)	
2.20	Total Creepage Distance	
2.21	Primary Terminal details	
2.22	Secondary Terminal Box	
2.23	Ingress Protection of Terminal Box	
2.24	Primary & Secondary Terminal Markings	
2.25	Oil	
2.26	Material of Tank/Housing	
2.27	Painting	
2.28	Volume of Oil (Liters)	
2.29	Total Weight of Equipment (Kg)	
2.30	Mounting Details	

**ANNEXURE II**  
**INSTRUCTIONS TO THE BIDDER**

- 1.0 Sealed bids under 'Two Bid' system (Part 1 – Unpriced technical bid and Part 2 – Priced commercial bid) are to be submitted by the vendor.
- 2.0 Bids complete in all respect shall be submitted as per format detailed herein. Bids submitted not in the manner detailed are liable to be rejected at the sole discretion of the purchaser.
- 3.0 Bids shall be kept valid for a minimum period of 3 (three) months from bid due date or extended bid due date.
- 4.0 The Part 1 termed as Un-priced Bid shall contain the following sections: -
  - SECTION – 1 : SYSTEM DETAILS
    - a) Dimensioned General Arrangement drawing
    - b) Duly filled in Technical Particulars as per format attached (Annexure-I)
    - c) Technical Catalogues CT-VT
  - SECTION – 2 : CONFORMITY TO TECHNICAL SPECIFICATION
    - a) Compliance Statement/ Deviation List (Annexure IV) indicating the relevant Section No. / Cl. No. of purchaser's TPS, for each deviation.
    - b) Type Test Certificates as per Section 7
    - c) Signed copy of Technical Procurement Specification (SPEC-FACT-UC-EHV-CT-VT-001)
  - SECTION - 3 : UNPRICED COPY OF PRICE BID
    - a) Unpriced copy of Price Bid for Supply
- 5.0 Part 2 termed as Priced bid shall contain quoted prices as per Price bid format given below (Annexure III) and shall indicate all commercial conditions, GST if any and discounts offered etc.
- 6.0 Bids and all correspondence, including but not limited to drawings, bill of materials shall be in the English language only.
- 7.0 Bidders are required to state in their bid the names of proposed manufacturers for every item or equipment which is not of bidder's own manufacture.
- 8.0 All weights and dimensions shall be in metric system only. All dimensions shall be shown in millimetres.

**ANNEXURE III**  
**PRICE BID FORMAT**

Sl.	Item	Quantity	Unit Price (Rs)	Total Price (Rs)
1	110/ 123 kV, 50Hz, Single Phase, Oil Impregnated, Hermetically sealed, Outdoor Current Transformer (LIVE Tank Type) complete with all other accessories as per the detailed specifications attached. (Ratio: 80/1/1, Two Core)	7 Nos	*	*
2	110/ 123 kV, 50Hz, Single Phase, Oil Impregnated, Hermetically sealed, Outdoor Inductive Voltage Transformer complete with all other accessories as per the detailed specifications attached. (110/ $\sqrt{3}$ kV / 110/ $\sqrt{3}$ V, single core Sec. Windings)	7 Nos	*	*
3	Supervision for Installation and Commissioning	LS	NA	*

## NOTE :

- Vendor to supply quantities to meet requirements as per specification
- IMPORTANT : Vendor to complete all the columns for each item separately.

**ANNEXURE IV**  
**COMPLIANCE STATEMENT**

ENQUIRY No : \_\_\_\_\_

We state that our Quotation No.....is in full compliance with the documents issued against the Enquiry No: -----except for the deviations listed below.

**LIST OF DEVIATIONS**

Sl. No	Description	Reason for deviation

Name of Vendor:

We have read, understood and accepted the terms and conditions of the enquiry as given in the Technical procurement Specification, Instructions to Bidders, Annexures, Terms and Conditions for Purchase attached with the tender documents, except for the deviations distinctively listed above.

Date:

Name & Designation

Seal & Signature