

## **33 KV & 11 KV OUTDOOR OIL IMMERSSED CURRENT & POTENTIAL TRANSFORMERS**

### **(A) 33 KV & 11 KV Current Transformers**

1.1 **INTRODUCTION** : This specification covers the design, manufacture, assembly, testing at manufacturer's works, supply and delivery of 33 kV and 11 kV single phase, oil immersed Current Transformer suitable for outdoor service. Any other parts not specifically mentioned in this specification but otherwise required for proper functioning of the equipment should be included by the tenderer in the offer. The CTs should normally be installed above VCB. The VCB and CT should be installed on common mounting structure.

1.2 **APPLICABLE STANDARDS:** Unless otherwise modified in this specification, the Current Transformer shall comply with the latest version of relevant standards (IS 2165, IS 2705(I-IV), IS2099, IS 5621, IS2071, IS335, IS 13947(part I), IEC 185, IEC 270 IEC44(4), IEC 171, IEC 60, IEC 8263, IEC 815, Indian electricity Rules 2003) or better international standards. This list of standards is for guidance only. The tenderer shall be solely responsible to design and manufacture the CT suitable for 33 kV and 11 kV systems.

1.3 **CLIMATIC CONDITIONS:** The CT supplied against these specifications shall be suitable for satisfactory continuous operation under the tropical conditions. The detailed conditions are mentioned in General Terms & Conditions of Purchase (Clause-32 of Annex.-B).

### 1.4 **SYSTEM PARTICULARS**

a)	Nominal System Voltage	33 kV & 11 kV
b)	Highest System Voltage	36 kV & 12 kV
c)	Rated Frequency	50Hz & 50Hz
d)	No of phases	Three & Three
e)	System neutral earthing	-Solidly Earthed-
f)	One minute Power Freq. Withstand voltage (rms)	70 kV & 28 kV
g)	Lighting Impulse withstand voltage	170 kVp & 75 kVp
i)	System fault level	-25 kA for 3 sec-

### 1.5 **TECHNICAL PARAMETERS OF CT**

a)	Type	Single phase, dead tank, outdoor, oil filled & hermetically sealed	
b)	Type of mounting	Pedestal type	
c)	Rated primary current	200-100A	300-150A, 200-100A
d)	Rated Continuous thermal current Primary	120% of rated Current	
e)	Rated short time withstand Requirement of Sec. Winding	As per IS 2705 Pt. I	
f)	Rated Short time withstand Current	25 KA(RMS) for 3 Sec.	
g)	Rated dynamic withstand Current(KAprms)	62.5	
h)	Max temp rise	As per IEC-185 / IS 2705	
i)	Minimum creepage distance of porcelain housing (mm)	25 mm / kV	
j)	One minute power frequency withstand voltage between sec. terminal & earth	3 kV	
k)	Detail of Secondary Cores	Metering	Protn.
	Current ratio	5-5A	5-5A
	Accuracy class	0.5	5P10
	Burden (VA)	10	15
	Instrument security Factor	≤5	-
	Accuracy Limit Factor	-	=10

1.6 **PORCELAIN HOUSING:** It shall be single piece of homogeneous, vitreous porcelain of high mechanical & dielectric strength. It will be glazed with uniform Brown or Dark brown colour with smooth surface finish. The creepage distance for the porcelain housing shall be at least 25 mm per kV.

1.7 **WINDING**

**1. PRIMARY WINDING:** It shall be made of high conductivity rigid copper wire. The primary winding current density shall not exceed the limit of 1.6 Amp.per sq. Mm for normal rating.

The design current density for short circuit current as well as conductivity of metal used for primary winding shall be as per IS 2705. The calculation for the selection of winding cross section shall be furnished by tenderer.

The primary terminal shall be of standard size of 30 mm dia x 80 mm length of heavily tinned (min. Thickness 15 micron) electrolytic copper of 99.9% conductivity.

**2. SECONDARY WINDING:** It shall be made of insulated copper wire of electrolytic grade. Type of insulation used shall be described in the offer. For multi ratio design, the multi ratio will be achieved by reconnection of the primary winding or secondary winding. The excitation current of the CT shall be as low as possible. The tenderer shall furnish the magnetization curves for all the cores.

The terminal box shall be dust free and vermin proof. The size of the terminal box shall be big enough to enable easy access and working space with the use of normal tools.

The secondary terminal studs shall be provided with at least 3 nuts and two plain washers, these shall be made of brass duly nickel plated. The min. Stud outer dia shall be 6 mm & length 15 mm. The min. spacing between the centres of the adjacent studs shall be 1.5 time the outer dia of the stud.

**3. POLARITY:** The polarity shall be marked on each CT at the primary and secondary terminals.

1.8 **TANK & HARDWARES:** The CT will be dead tank type. The tank shall be fabricated of MS steel of min. 3.15 mm for sides and 5 mm for top & bottom. The tank will be finished with min. 2 coats of zinc rich epoxy pain externally. The inner surface shall be painted with oil resistance white enamel paint.

All ferrous hardware, exposed to atmosphere shall be hot dipped galvanized.

1.9 **INSULATION OIL:** The first filling of oil in CT shall be in tenderer's scope. The oil shall be as per IS 335.

**To ensure prevention of oil leakage, the manufacturer will give following details supported by drawings:**

i) Location of emergence of Primary & Secondary terminals.

ii) Interface between porcelain and metal tanks.

iii) Cover of the secondary terminal box.

Any nut & bolt and screw used for fixation of the interfacing porcelain bushing for taking out the terminals shall be provided on flanges cemented to the bushings & not on the porcelain.

If gasket joints are used, Nitrite Butyl Rubber gasket shall be used. The grooves shall be machined with adequate space for accommodating gasket under pressure.

The CT shall be vacuum filled with oil after processing. It will be properly sealed to eliminate breathing & to prevent air & moisture from entering the tank. The sealing methods / arrangement shall be described by the tenderer & be approved by the owner.

1.10 **OIL LEVEL INDICATOR:** The CT shall be fitted with prismatic type oil sight window at suitable location so that the oil level is clearly visible with naked eye to an observer standing at ground level.

To compensate oil volume variation due to temperature variation, Nitrogen cushion or the stainless steel bellows shall be used Rubber diaphragms are not permitted for this purpose.

1.11 **EARTHING:** Two earthing terminals shall be provided on the metallic tank of size 16 mm dia & 30 mm length each with one plain washer & one nut for connection to the station earth mat.

1.12 **LIFTING & MOUNTING ARRANGEMENT:** The CT shall be provided with two lifting eyes to lift the CT. This shall be so positioned so as to avoid any damage to the CT using lifting for installation or transportation purpose. This shall be detailed in General Arrangement drawing.

The CT shall be of pedestal mounting type suitable for outdoor installation on steel / cement concrete structures. All the clamps, bolts nut and washers etc. Required for mounting the CT on the structure shall be supplied along with the CT and shall be galvanized. The tenderer shall supply all the terminal connectors etc. required for connection to the CT.

1.13 **TESTING:** All type and Routine Tests shall be as per relevant IS and / or IEC.

—————\*\*\*\*\*—————