

TECHNICAL SPECIFICATION OF RING TYPE (TAPE WOUND (SPIRALLY WOUND)/RESIN CAST) LT CURRENT TRANSFORMERS

MATERIAL SPECIFICATION CELL

TECHNICAL SPECIFICATION

OF

RING TYPE (TAPE WOUND (SPIRALLY WOUND)/RESIN
CAST) LT CURRENT TRANSFORMERS OF RATING

50/5A, 100/5A, 150/5A, 200/5A, 300/5A, 400/5A,
600/5A & 1000/5A

TECHNICAL SPECIFICATION OF RING TYPE (TAPE WOUND (SPIRALLY WOUND)/RESIN CAST) LT CURRENT TRANSFORMERS

Table of Contents

CLAUSE NO.	CONTENTS	PAGE NO.
1	Scope	3
2	System Particulars	3
3	Service Conditions	3
4	Applicable Standards	4
5	Specific Technical requirement	4
6	Design & Construction	5
7	Acceptance & routine Tests	5
7.1	Type Tests	5
8	Documentation	6
9	Rejection	6
10	Testing facilities	6
11	Submission of Routine Test Certificate	6
12	Inspection	6
13	Quality Assurance	6
14	Qualifying Requirement	7
15	Performance Guarantee	7
16	Schedules	7
Annexure-I	Principle Technical Parameters	8
Schedule 'A'	Guaranteed Technical Particulars	9

TECHNICAL SPECIFICATION OF RING TYPE (TAPE WOUND (SPIRALLY WOUND)/RESIN CAST) LT CURRENT TRANSFORMERS

1.0 SCOPE

- 1.1. This specification covers design, manufacturing, testing and delivery of Single Phase Ring Type (Tape Wound (Spirally Wound)/Resin Cast) LT Current Transformers of 0.5 S class of rating 50/5A, 100/5A, 150/5A, 200/5A, 300/5A, 400/5A, 600/5A and 1000/5A for metering purpose to be installed in LT CT operated metering cabinet installed at DTCs in MSEDCL Distribution System 433V, 50 Hz.
- 1.2. The equipment offered shall be complete with all parts necessary for their effective and trouble-free operation. Such parts will be deemed to be within the scope of the supply irrespective of whether they are specifically indicated in the commercial order or not.
- 1.3. It is not the intent to specify herein complete details of design and construction. The equipment offered shall conform to the relevant standards and be of high quality, sturdy, robust and of good design and workmanship complete in all respects and capable to perform continuous and satisfactory operations in the actual service conditions at site and shall have sufficiently long life in service as per statutory requirements.
- 1.4. The design and constructional aspects of materials shall not withstanding any anomalies, discrepancies, omissions, in-completeness, etc. in these specifications and will be subject to good engineering practice in conformity with the required quality of the product, and to such tolerances, allowances and requirements for clearances etc. as are necessary by virtue of various stipulations in that respect in the relevant Indian Standards, IEC standards, I.E. Rules, I.E. Act and other statutory provisions.
- 1.5. The Bidder/Supplier shall bind himself to abide by these considerations to the entire satisfaction of the purchaser and will be required to adjust such details at no extra cost to the purchaser over and above the tendered rates and prices.
- 1.6. The Current Transformers shall be marked with ISI mark.

2.0 SYSTEM PARTICULARS

The LT Current Transformers shall be suitable for installation with following system particulars & they should be suitable for service under fluctuations in supply voltage as permissible under Indian Electricity Rules.

- 2.1. Nominal System Voltage: 433V
- 2.2. Basic Insulation Level: 3 kV rms
- 2.3. Rated Frequency: 50 Hz
- 2.4. Number of phases: 1
- 2.5. Voltage Variation: +/-10%
- 2.6. Frequency Variation: +/-3%

3.0 SERVICE CONDITIONS

- 3.1. Equipment supplied against the Specification shall be suitable for satisfactory operation under the following tropical conditions:-
 - a) Maximum ambient temperature 50⁰ C
 - b) Maximum ambient temperature in shade 45⁰ C
 - c) Minimum temperature of air in shade 35⁰ C

TECHNICAL SPECIFICATION OF RING TYPE (TAPE WOUND (SPIRALLY WOUND)/RESIN CAST) LT CURRENT TRANSFORMERS

d) Relative Humidity	10 to 100 %
e) Maximum Annual rainfall	1450 mm
f) Maximum wind pressure	150 kg/Sq.m.
g) Max. altitude above mean sea level	1000 mtrs
h) Isoceraunic level (days/year)	50
i) Seismic level (Horizontal acceleration)	0.3 g.
j) Climatic Conditions	Moderately hot and humid tropical climate conducive to rust and fungus growth

3.2. The climatic conditions are prone to wide variations in ambient conditions and hence the LT Current Transformer shall be of suitable design to work satisfactorily under these conditions.

3.3. The LT Current Transformer shall be for use in moderately hot and humid tropical climate conducive to rust and fungus growth.

4.0 APPLICABLE STANDARD

4.1. The design, manufacture and performance of the LT Current Transformer shall comply with all currently applicable statutes, regulations and safety codes. Nothing in this Specification shall be construed to relieve the bidder off his responsibilities.

4.2. The LT Current Transformers shall conform to IS: 16227 (Part-1) & (Part-2) 2016 amended up to date or other International Standards for equal or better performance. Unless otherwise modified in this Specification the LT Current Transformers shall comply with the Indian Standard Specification IS: 16227 (Part-1) & (Part-2) 2016 amended up to date, IEC Standards & in particular, to the following:--

4.3. The applicable standards are as follows :

Sr. No.	Standard Ref. No.	Title
1.	IS-2165 amended upto date	Insulation co-ordination of highest voltages for equipments
2.	IS: 16227 (Part-1) & (Part-2) 2016 amended upto date	Current Transformers
3.	IEC-185 amended upto date	Current Transformers
4.	IEC-44(4) amended upto date	Instrument Transformer measurement of PDs
5.	IS 4800 amended upto date	Super Enameled Copper Wire

4.4. In case of conflict arising out due to variations between the applicable standard and the Standards specified herein the provisions of this Specification should prevail.

5.0 SPECIFIC TECHNICAL REQUIREMENT

5.1. The Ring Type LT Current Transformers shall be Tape wound (spirally wound type) / Resin Cast suitable for metering purpose & shall meet the Technical requirements listed in **Annexure - I**.

5.2. Standard Ratings:

The standard ratings for LT Current Transformer shall be 50/5A, 100/5A, 150/5A, 200/5A, 300/5A, 400/5A, 600/5A, & 1000/5A.

TECHNICAL SPECIFICATION OF RING TYPE (TAPE WOUND (SPIRALLY WOUND)/RESIN CAST) LT CURRENT TRANSFORMERS

- 5.3. Temperature Rise:
Temperature rise for LT Current Transformer should be in accordance with IS-16227 (Part-1) & (Part-2) 2016 amended upto date.

6.0 DESIGN & CONSTRUCTION

- 6.1. Core : The Core material of CTs shall be high grade non ageing electric low loss core of superior CRGO.
- 6.2. Internal diameter of CT shall be suitable for accommodating rated PVC/ XLPE Cable. Inner diameter shall not be less than 30 mm and outer diameter shall be suitable to place in the metering box safely.
- 6.3. Winding:- Material of conductor shall be copper wire (spirally wound Type) of Electrolytic Grade/Super Enameled as per IS 4800.
- 6.4. Secondary leads shall be terminated with Tinned Copper rose contact.
- 6.5. Polarity marking shall be clearly visible such as S_1 as +ve & S_2 as -ve.
- 6.6. LT Current Transformer characteristic shall be such as to provide satisfactory performance for burdens ranging from 25 % to 100% of rated burden over a range of 5 % to 120% of rated current.
- 6.7. The current density shall not exceed the limit 1.6 A/Sq.mm.
- 6.8. Insulation material :
Insulation Class shall be 'B' for Current Transformer. Insulation shall be cotton/electrical grade Polyester Tape for Tape wound (spirally wound type) CT & Epoxy/Resin Cast for Resin cast CT and shall be so designed that the insulation shall have higher electrical withstand Capability.
- 6.9. Mounting Arrangement :
Fixing arrangement (Base/Mounting plate with legs) will have to be provided along with the Current Transformer.
- 6.10. Name Plate Details:
The CT shall be provided with non-corrosive aluminium anodized , legible Nameplates, with the information such as Name of manufacturer, type, ratio , accuracy class & insulation level.
The Nameplate should be fixed on the CT in such a way that the same cannot be peeled off without damaging the CT or any part of it.

7.0 ACCEPTANCE & ROUTINE TESTS:

Following Acceptance & routine tests shall be performed as per IS-16227 (Part-1) & (Part-2) 2016 amended upto date.

- Verification of terminal marking & Polarity
- Inter-turn overvoltage Test
- Tests of accuracy

7.1. TYPE TESTS:

As per IS-16227 (Part-1) & (Part-2) 2016 the following shall constitute the Type Tests:

- Temperature rise Test
- Short Time Current Test
- Tests of accuracy

- 7.2. The Type Tests as per Clause No. 7.1 above shall be successfully carried out at laboratories accredited by National Accreditation Board for Testing and Calibration Laboratories (NABL) in accordance with IS 16227 (Part-1) & (Part-2) 2016 as amended from time to time and Technical Specifications, within the last 7 (seven) years prior to the date of offer.

TECHNICAL SPECIFICATION OF RING TYPE (TAPE WOUND (SPIRALLY WOUND)/RESIN CAST) LT CURRENT TRANSFORMERS

- 7.2.1 The Type Test reports should be submitted and got approved from the Chief Engineer (Testing Cell) as per Tender Conditions.
- 7.2.2 In respect of the successful bidder, the purchaser reserves the right to demand repetition of some or all the Type Tests in presence of the purchaser's representative. In case the unit fails in the Type Tests, the complete supply shall be rejected.

8.0 DOCUMENTATION

- 8.1. A set of following documents & drawings with all dimensions shall be submitted by the Bidder along with the offer :
- 8.2. List of drawings and documents :
- a) General outline and assembly drawings of the equipments.
 - b) Arrangement of secondary terminal box and details of connection studs provided.
 - c) Name plate.
 - d) Type Test reports
 - e) Test reports, literature, pamphlets of the bought out items, and raw material.
 - f) Bill of material and packing list.
- 8.3. The successful bidder shall submit complete set of drawings as listed above to CE (Testing Cell) & get it approved as per Tender Conditions.

9.0 REJECTION:

- 9.1. Apart from rejection due to failure of the L T Current Transformer to meet the specified Test requirements the LT Current Transformer shall be liable for rejection on any one of the following reasons.
- i) Type Test are not carried out as per clause No. 7.1 & 7.2 of the specification
 - ii) Drawings are not submitted as per clause no. 8.0 of the specification
 - iii) GTP not submitted as per clause No. 16.0 of the specification.

10.0 TESTING FACILITIES:

The bidder should have adequate testing facility for all routine and acceptance tests & details of which will be enumerated in the Tender.

11.0 SUBMISSION OF ROUTINE TEST CERTIFICATE:

The successful bidder shall submit the routine Test Certificate along with documentary evidence for having paid the statutory/mandatory taxes applicable for the raw materials viz. conductor materials, insulating materials, core materials at the time of routine testing of the fully assembled LT Current Transformer.

12.0 INSPECTION

- 12.1. The inspection may be carried out by the MSEDCL at any stage of manufacture. The successful bidder shall grant free access to the MSEDCL's representative at a reasonable time when the work is in progress. Inspection and acceptance of any equipment under this specification by the MSEDCL, shall not relieve the supplier of his obligation of furnishing equipment in accordance with the specification and shall not prevent subsequent rejection if the equipment is found to be defective. The supplier shall keep the MSEDCL informed in advance, about the manufacturing programme so that arrangement can be made for inspection.

13.0 QUALITY ASSURANCE :

- 13.1. The bidder shall invariably furnish following information along with the offer failing to which the offer will be rejected.

TECHNICAL SPECIFICATION OF RING TYPE (TAPE WOUND (SPIRALLY WOUND)/RESIN CAST) LT CURRENT TRANSFORMERS

- 13.2. Statement giving list of important raw materials.
 - a) Conductor
 - b) Insulation (Cotton/Electrical Grade Polyester Tape/Resin Cast)
 - c) Core
- 13.3. Names of the supplier for the raw material, list of Standard accordingly to which the raw materials are tested, list of tests normally carried out on raw materials. Copies of Type Test Certificates to be furnished.
- 13.4. List of manufacturing facilities available.
- 13.5. Level of automation achieved and list of areas where manual processing still exists.
- 13.6. Special features provided in the equipments to make it maintenance free.
- 13.7. List of testing equipment available with the bidder for final testing of LT Current Transformers and Test plant limitation, if any, vis-à-vis the Type, acceptance and routine Tests specified in the relevant Standards and the present Specification.
- 13.8. The successful bidder shall submit the Routine Test Certificate along with documentary evidence having paid the statutory/mandatory taxes applicable for the raw materials viz. conductor material, insulating materials, Core materials at the time of routine Testing of the fully assembled LT Current Transformer.

14.0 QUALIFYING REQUIREMENT: As per Tender

15.0 PERFORMANCE GUARANTEE:

All LT Current Transformers supplied against this Specification shall be guaranteed for a period of 30 months from the date of receipt at site in good condition or 24 months from the date of commissioning, whichever is earlier.

16.0 SCHEDULES

- 16.1. The bidder shall fill in the following schedules which form part of the tender specification and offer. If the schedules are not submitted duly filled in with the offer, the offer shall be rejected.
Schedule `A' - Guaranteed Technical Particulars
- 16.2. The discrepancies between the Specification and the catalogs, Literatures and Indicative drawings which are subject to change, submitted as part of the offer, shall not be considered and representation in this regard will not be entertained.

TECHNICAL SPECIFICATION OF RING TYPE (TAPE WOUND (SPIRALLY WOUND)/RESIN CAST) LT CURRENT TRANSFORMERS

ANNEXURE - I

PRINCIPAL TECHNICAL PARAMETERS OF LT CURRENT TRANSFORMERS

(Metering)

Sr. No.	Item	Type
1.	Type of CT	Ring Type (Tape Wound (Spirally Wound) / Resin Cast)
2.	Suitable for system frequency	50 HZ
4.	Maximum Temperature rise limit	Within specified limit as per IS 16227 (Part-1) & (Part-2) 2016
5.	Rated Transformation Ratio	50/5A, 100/5A,150/5A, 200/5A,300/5A,400/5A, 600/5A, 1000/5A
6.	Rated Voltage	433V
7.	Accuracy class	0.5S
8.	Rated Burden (in VA)	5 VA at 0.8 P.F. lag.
9.	Short Time Current rating	5 kA for 1 Sec
10.	Current Density at rated primary current	1.6 A/Sq.mm (Max.)
11.	Instrument Security Factor	≤ 2.5
12.	Percentage Current ratio error & Phase displacement error in minutes	Within specified limit as per IS 16227 (Part-1) & (Part-2) 2016
13.	Basic Insulation level	3 kV rms
14.	Insulation Class	B

TECHNICAL SPECIFICATION OF RING TYPE (TAPE WOUND (SPIRALLY WOUND)/RESIN CAST) LT CURRENT TRANSFORMERS

Schedule `A'

GUARANTEED TECHNICAL PARTICULARS

Ring Type (Tape Wound (Spirally Wound)/ Resin Cast) LT Current Transformers of Rating 50/5A, 100/5A, 150/5A, 200/5A, 300/5A, 400/5A, 600/5A & 1000/5A		
Sr. No.	GTP Parameter	Type
1.	Manufacturers Name & Type	(Text)
2.	Manufacturers Type Designation	(Text)
3.	Whether Equipment is conforming to Standard	(Text)
4.	Rated Voltage	(Text)
5.	Ratio of CT	(Text)
6.	Accuracy Class	(Text)
7.	Rated Short Time Withstand Current for 1 sec. duration (kArms)	(Text)
8.	Basic Insulation Level (kVrms)	(Text)
9.	Mounting Details	(Text)
10.	Overall Dimension of LT CT	(Text)
11.	Dimensions in mm	
a.	Inner diameter of ring (mm)	(Text)
b.	Outer diameter of ring (mm)	(Text)
c.	Width of ring (mm)	(Text)
12.	Material used	
a.	Core	(Text)
b.	Conductor	(Text)
c.	Insulation	(Text)
13.	Insulation Class	(Text)
14.	Size of winding	(Text)
15.	Cross Section Area of winding	(Text)
16.	Current Density (max. 1.6 A/Sq.mm.)	(Text)
17.	Whether LT CT conforms to Temperature Rise limit applicable	(Text)
18.	Current Security Factor (ISF \leq 2.5)	(Text)