

Reasoned documents for the comments

Sub: Reason document for draft specification of Current Transformer (uploaded on RDSO's website for comments)

1. The Draft specification of Current Transformer was uploaded on RDSO website on 24.12.2020 for comments (for 30 days). Same was emailed to CORE a approved Current transformer manufacturers and Zonal Railways.
2. The comments have been received from Three (03) manufacturers on draft specification.
3. As per clause no.4.4 of RDSO ISO Document no. QO-D-8.1-2 Ver. 1.2, "The concerned personnel of directorate shall prepare a document containing all suggestions and comments and also record reasons for accepting / rejecting the same. Based on the accepted changes, the draft specification shall be modified. Such specifications shall be watermarked FINAL DRAFT on every page, to prevent the same from being used inadvertently."
4. As per clause no. 4.5 of RDSO ISO Document no. QO-D-8.1-2 Ver. 1.2, "The copy of the Final draft specification and the reasoned document shall be put up on the website, after approval of the directorate head, for at least 15 days. The final draft specification displayed on website shall also be emailed to all the existing approved sources for comments and suggestion."

Based on the comments received and accepted changes thereon, the draft specification is to be modified. Comments along with reason for accepting / rejecting are tabulated below

Clause No.	Description	suggestions and comments			reasons for accepting / rejecting
		M/s Lamco	M/s Mehru	M/s Vidyut Control	
4.1.8	iii. Protection of 220/127/110/66 kV transmission lines.	iii. Protection of 220/132/110/66 kV transmission lines.			May be accepted Typographical error
5.1 (ii)	Primary – Two	Primary - One/Two/Three			May be accepted Order may be placed depending upon requirement
5.1 (xvi)	2. Minimum creepage distance (in mm.) of the porcelain housing for 110 kV- 2075mm 11 kV – 1300 mm	3075 mm		300mm Creepage The same may be distance is adequate for 11kV ratings. corrected	Changes suggested may be accepted (Typographical error) 3075 mm- for 110 kV 300 mm – for 11 kV
6.10	The CT shall also be provided with a standard 10 A test winding	To be removed		10A testing tap is not being used currently, Please review & connect the same accordingly	May not be accepted Railways are using this winding for Tan Delta measurement. It is applicable for HV CT only
2.1 (6)			IS Standard: IS has also now been revised old IS 2705 for CTs & IS 3156 for PTs stands withdrawn. & the new IS 16227 has been imposed		Accepted IS 2705 exist, whereas IS 16227 also mentioned in table
5.1 (vi)			Ratio Change: In multi ratio CT's the ratio must be achieved by changing tap in the secondary winding almost all utilities prefer secondary taps only. Ratio changing on primary side, though cheap is dangerous as high voltage/high current connections have to be made every time ratio is changed.		Not Accepted In our system there is one secondary, hence the change in ratio cannot be achieved by changing tap in the secondary winding.
6.4	The CT shall be of sealed construction with nitrogen gas above the insulating oil and shall be adequately protected against any leakage of nitrogen gas or oil and ingress of moisture.		Nitrogen Gas Sealing: Nitrogen above oil is not safe to provide as both have different coefficient of expansion so it is better to use S.S. bellow		Not Accepted Nitrogen above oil is being used since long back, nothing adverse has been here from Railways on this account
New Test suggested			Internal Arc Test: CTs of 132kV & above should be type tested for internal arc test as per clause no 6.9 of IEC		Not Accepted Internal arc fault protection class is not

			61869 & clause no 6.9 of IS 16227. This test is very important to demonstrate the response of equipment under fault. CTs are security guard of a substation & they don't only have to withstand the fault, but correctly read it for the protection system, to protect all other substation equipment. Also this test is very critical to ensure safety of life due to failure in area adjoining to substation.		additionally specified in this draft spec, hence This requirements is not applicable.
New Test suggested			DGA Test: DGA is the only indicator of healthiness & transient response of instrument transformers. 100% DGA testing should be done both before and after routine dielectric tests. This will also serve as a benchmark for future DGA tests during service. IEC 60599 clearly states the acceptable valued of DGA in service.		May not be accepted This test is not specified in IS 16227 (the governing Indian Standard for CT)
New clause suggested			NABL Accreditation: NABL accreditation, ISO 17025 Certification is considered a gold standard for testing. Considering the critical nature of measuring equipment like CTs/PTs/CVTs, the test lab of manufacturer should be NABL accredited. It has been observed that test lab of many manufacturers do not have proper test equipment both with respect to accuracy class & quality of measuring equipment. NABL testing will not cause any price change , as the cost of NABL testing is very fractional as compared to cost of CT & PT. However, in long run it will ensure proper quality/testing & freedom from litigation/dispute or other problems arising due to improper accuracy.		Not Accepted test lab of manufacturers checked by competent authority before according approval to the firm during this stage it ensures that the firm should have proper test equipment with respect to accuracy class & quality of measuring equipment
5.1 of Annexure VIII			Impulse Voltage Test: Impulse Voltage test is important to adjudge the healthiness of insulation of CT & PT. Any one sample CT from each lot should be tested for Impulse voltage test and after the test oil should be tested for DGA. This will ensure quality check of Di-electric material of entire lot.		May not be accepted This test is not specified in IS 16227 (the governing Indian Standard for CT)
2.1				Transformer Oil IS No Not indicated - IS 335 to be indicated Hot dip galvanizing No. not indicated - IS 2693 to be indicated	May be accepted Transformer Oil IS No. to be indicated Not Accepted This No. IS is for power transmission - bush type flexible coupling
3.1	Altitude above mean sea level some of the place may be			Please define the altitude	Not Accepted It is the requirement of

	up to 2500 Mts			requirements uniformly (i.e.,2500 Mtrs)	some specific places only, for which it has already mentioned
5.1 xii	Power frequency withstand voltage. kV (rms)			Power frequency withstand voltage kV (rms) for One minute duration to be indicated	May be accepted Time should be mentioned for test
5.1 xvi	Terminal bushing			Hollow bushing insulators are used in manufacture of CT's. Hence the same is not applicable for CT's. Please remove the same	May not be accepted As the Item -Bushing has to be provided with CT. hence its voltage class and creepage distance details should be mentioned.
5.1 xvii	Minimum Knee Point Voltage (for PS Class)			VK not applicable for 5P core & hence the same may be removed.	May be accepted As it is not mentioned under Minimum requirements for class specification
7.6	The general construction of the CT and in particulars the relative positions of the primary terminals and their height above base, secondary terminal box, earthing terminals and the base mounting channel shall conform to sketch placed at Annexure III			Annex-III indicated only 25 KV CT and drawing is also not clear. Mounting dimensions of other ratings to be specified. Other dimensions may vary from Manufacturer to Manufacturer. Please review and indicate the required standard Mounting dimensions.	May be accepted Annex-III may be deleted as dimensions may vary from Manufacturer to Manufacturer and also depending upon ratings, hence the mounting dimensions may be given by Manufacturer.
7.9	These terminals shall be suitable for 30 mm diameter Aluminium tubular bus bar and for terminal pad of CT for horizontal take off.			May be corrected as "suitable for 50 mm dia aluminium tubular bus bar as per terminal connector drawings	May be accepted For 21.6 MVA transformer 50mm dia aluminium tubular bus bar is being used.
7.10	Primary and secondary bushings and terminal connectors shall be from RDSO's approved suppliers only.			Vendor list is provided along with test reports. Hence approved source may not be required. Else approved list vendors may be provided. Please review and correct accordingly	RDSO is not approving bushings and terminal connectors hence this clause may be deleted.
10	10.1 Polyvinyl Acetyl enamel or polyester enamel wire shall be used for secondary winding. Wires, gaskets and 'O' rings certified only by Bureau of Indian Standards (BIS) shall be used in the manufacture of Cr. 10.2 The successful firm/ manufacturer shall be			Approved vendors list and test reports in accordance with respective IS is provided. Hence BIS certificate may not be required. Please review and correct accordingly	Not acceptable BIS accords certificate after checking the product quality, hence it is required.

	<p>required to furnish the following information with respect to the winding wires. Gaskets and 'O' rings:</p> <p>i) Source of supply</p> <p>ii) Reference to standard specification to which the material conforms.</p> <p>iii) Reports of type tests carried out in terms of the relevant Indian Standard specification.</p>				
12.1	<p>Parts, fitting and accessories shall be supplied with each CT VIII. Plain rollers. XIII. Adjustable arcing horns (if applicable)</p>			<p>These items may not required for CT, Hence please review and correct accordingly.</p> <p>May be indicated as an optional accessory</p>	<p>Not acceptable</p> <p>CTs are mounted at height on channel but they are supposed to pull from one place to another, hence rollers required.</p>
12.2	<p>The parts, fittings and accessories for the CT shall be only of those manufacturers approved by RDSO. If any items from fresh manufacturers/sources are proposed to be used, it shall have to be type tested in the presence of RDSO's representative and approval obtained before procuring the item for use.</p>			<p>Approved vendor list along with test reports are provided, For all materials RDSO approved sources are not indicated/available. The same may be corrected accordingly.</p>	<p>Not acceptable</p> <p>For materials, RDSO approved sources are not indicated/available, it shall have to be type tested</p>
14.3	<p>Routine Tests</p> <p>ix. Excitation current test.</p> <p>x. Measurement of minimum knee point voltage</p>			<p>ix. Excitation current test.</p> <p>x. Measurement of minimum knee point voltage is Applicable for PS core only & the same to be indicated</p>	<p>May be accepted</p> <p>As it is not mentioned under Minimum requirements for class specification</p>
14.3.5	<p>Measurement of resistance of the windings.: The resistance of each of the winding shall be measured and computed at 75 deg. C The secondary winding resistance shall not exceed 0.3 ohm.</p>			<p>to be corrected as The resistance of each of the winding shall be measured and computed at 75 deg. C The secondary winding resistance shall not exceed as per specified limits of clause no. 5.1.xiii</p>	<p>The secondary winding resistance should Not be greater than values declared by manufacturer in SOGP</p>
14.3.9	<p>Excitation current test: The excitation curve shall be drawn at the least up to that point where an increase of 10 % in voltage results in an increase of '100 % in current. The exciting current at the knee point voltage shall not exceed 250 mA.</p>			<p>To be indicated as PS cores only The exciting current at the knee point voltage shall not exceed 500 mA. As per clause No. 5.1.xviii</p>	<p>May be accepted</p> <p>This clause may be corrected as per value given at clause No. 5.1.xviii</p>

14.3.10	Measurement of minimum knee point voltage. :The minimum knee point voltage shall be measured in accordance with clause 6.2.1 of IS: 2705 (Part IV)			PS cores only	May be accepted As it is not mentioned under Minimum requirements for class specification
14.4.1	Porcelain housing:- The porcelain housing shall be tested in accordance with IS: 5821 and the certificates for compliance with the standard shall be furnished. The porcelain housing shall also meet the requirement of clause 7.3 of this specification.			IS No. to be corrected as IS 5621	Both Standards are not for Porcelain housing. Correct IS: 62155 has been updated. Although the Item- Bushing has been de-controlled from RDSO, the details of Bushings should be mentioned in Spec.
Annex viii 4.11	The current transformers shall be supplied complete with insulating oil conforming to IS: '12463 and railway requirements. The insulating oil shall be procured from the manufacturers approved by RDSO. The successful firm/ manufacturer shall submit test certificates as per IS: 12463 for oil			IS No to be corrected as IS 335	May be accepted Present standard for insulating oil is IS 335
Annexure vii.19	vi) Minimum knee point voltage Vii) Exciting current at knee point voltage			for PS core only	May be accepted As it is not mentioned under Minimum requirements for class specification
Annexure vii.20	vii) Rated short duration power frequency (wet) withstands voltage of primary			to be corrected as High voltage power frequency withstand test voltage on primary.	May be accepted 'power frequency withstands voltage of primary terminal' mentioned in IS 16227.
5.1 of Annexure viii	Type tests: 8. Thermal stability test 9. Thermal coefficient test i.e., measurement of tan delta as a function of temperature			Test procedure and acceptable norms to be indicated	These tests are not mentioned in relevant IS/IEC, hence may be deleted
5.2 of Annexure viii	Routine tests: 10. Partial discharge test (PD value shall be less than 5pc) 11. Capacitance and tan delta value measurement (tan delta shall be less than less than 0.005)			Test voltage to be indicated.	May be Accepted 1.For partial discharge test-As per Cl. No. 5.3.3.1 of IS 16227Pt-1 2.For Capacitance and tan delta –As per Cl. No. 7.4.3 of IS 16227Pt-1
				Note: Painting Scheme to be indicated specifically (either HDG or epoxy paint) for Coastal/other areas suitably.	As Per A & C No. 9 "All the external steel surfaces of the current transformer exposed to atmosphere including main tank, secondary terminal box & top metallic should be hot dip galvanized for proper protection against corrosive and coastal environments"