

PI- 240962157

PQR, Rev-00- (Indoor Resin Cast Current Transformers)

Annexure-1

1) Technical Experience: -

The OEM should have manufactured and supplied enquired type of CT any Central / State Govt Organization / PSU / Public Listed Company within last 2 Years before the bid opening date.

Document required: - Bidder to furnish Purchase Orders or Invoice(s) as proof of supply.

2) Past Performance: -

The OEM should have supplied enquired type of CT of product at least 10% of bid quantity, in any one of the three financial years before the bid opening due date to any of Central/ State Gov./ PSU/Public listed company.

Document required: - Bidder to furnish Purchase Orders or Invoice(s) as proof of quantity.

3) Organizational Capability: - The Bidder shall have after sales service support set-up for providing product repair/ rectification, testing and commissioning support.

Document required: - Bidder to furnish set-up details along with an undertaking in respect of above or vendor registration details at BHEL.

4) Bidder should be OEM

Documents Required: - Self certified OEM declaration Certificate.

5) Average annual turnover of FY2022-23, FY2023-24 and FY2024-25 should not less than Rs.2 Cr.

Documents Required: - CA Certificate for average annual turnover details for relevant period. Document must have UDIN number.



PRODUCT STANDARD

SWITCHGEAR ENGINEERING DIVISION

SG12917 REV.08
Modified for PSPCL/PSTCL

PAGE 1 OF 3

ANNEXURE-A

ANNEXURE-A TO PURCHASE INDENT NO. FOR RATE CONTRACT

REV.NO. 00

BHEL | Technical Spec. of CTs |
Bhopal |-----
SWE | PI no. :_240962157 | Enq. No: | PO No:

W.O. Nos. : For rate contract

FOR DETAILED TECHNICAL SPECIFICATION, REFER PRODUCT STANDARD SG12917 REV.07

TABLE: 1

CLAUSE NO.	DESCRIPTION	BHEL'S REQUIREMENT		BIDDERS CONFIRMATION/COMMENTS
1.0	TECHNICAL PARAMETERS	Upto 11kV	20kV & 33kV	
1.1	System Voltage (3Phase, 50 Hz) kV	11		
1.2	Insulation level			
1.2.1	System highest voltage kV	12		
1.2.2	Power freq. withstand voltage (primary) kV Power freq. withstand voltage (secondary) kV	28 2.5		
1.2.3	Lightening Impulse withstand voltage kVp	75		
1.3	Insulation class kV/kVrms/kVp	12/ 28/75		
1.4	STC Rating / duration kA/sec	25 KA for 3 sec		
1.5	Instrument safety factor for all metering cores (The ISF shall be as low as practicable and should be less than 10. In case of multi ratio CTs, the highest ratio core shall have ISF less than 20.)			
1.6	Continuous Overloading Capacity	125%		
1.7	Neutral Earthing	SOLID		
1.8	Insulation class of CTs	B or better		
1.9	Secondary. Term. & Rating Plate on P1/P2 Side	P2 side		
1.10	Characteristics and magnetizing curves of the CTs should be positively submitted before dispatch of equipment	Compliance required		

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PRODUCT STANDARD

SWITCHGEAR ENGINEERING DIVISION

SG12917 REV.08
Modified for PSPCL/PSTCL

PAGE 2 OF 3

TABLE: 2
11kV, 3 Phase, 50 Hz.

IT. NO.	CT RATIO	SLOT/ WOUND/ BAR/ MOTOR	ACCURACY / BURDEN		Vendor's drg.ref.	Remarks
			CORE-I	CORE-II		
001	400-200/5-5A (for outgoing feeder)	BAR	VA=10, Class 5P, ALF=20 (for O/C & E/F protection).	VA=10, Class 0.2S, ISF less than 5 at lower tap (for metering).	Ref.cl.5. 0 of Ann-I	Refer Annexure-03 DRG.NO.35210 052565 R03, VAR-00
Bidders confirmation / Comments						
002	100/5-5A (for station transformer feeder)	BAR	VA=10, Class 5P, ALF=20 (for O/C & E/F protection).	VA=10, Class 0.2S, ISF less than 5 at lower tap (for metering).	Ref.cl.5. 0 of Ann-I	Refer Annexure-03 DRG.NO.35210 052565 R03, VAR-00
Bidders confirmation / Comments						
003	600-300/5-5A (for capacitor feeder)	BAR	VA=15, Class 5P, ALF=20 (for O/C & E/F protection).	VA=15, Class 0.2S, ISF less than 5 at lower tap (for metering).	Ref.cl.5. 0 of Ann-I	Refer Annexure-03 DRG.NO.35210 052565 R03, VAR-00
Bidders confirmation / Comments						
004	400-200/5-5A (for capacitor feeder)	BAR	VA=15, Class 5P, ALF=20 (for O/C & E/F protection).	VA=15, Class 0.2S, ISF less than 5 at lower tap (for metering).	Ref.cl.5. 0 of Ann-I	Refer Annexure-03 DRG.NO.35210 052565 R03, VAR-00
Bidders confirmation / Comments						
005	1200-600/5-5A (for incomer & bus coupler feeder)	BAR	VA=10, Class 5P, ALF=20 (for O/C & E/F protection).	VA=10, Class 0.2S, ISF less than 5 at lower tap (for metering).	Ref.cl.5. 0 of Ann-I	Refer Annexure-03 DRG.NO.35210 052565 R03, VAR-01
Bidders confirmation / Comments						

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TABLE :

4.0	CLIMATIC CONDITIONS	<u>VENDOR CONFIRMATION</u> <u>/COMMENTS</u>
4.1	Ambient Air Temp. - -5°C (min) & 50°C (max.)	
4.2	Relative humidity - 10% (min) & 95% (max)	
4.3	Height above MSL - ≤ 1000 meters (consider suitable Altitude correctio factor in Impulse withstand for height more than 1000 mtrs)	
4.4	Pollution Severity - Heavily polluted (with coal dust & Fly ash) & Highly corrosive environment.	
4.5	Seismic Coefficient - 0.3g	
4.6	Design Ambient Temp.- 50 Deg.C	



PRODUCT STANDARD

SWITCHGEAR ENGINEERING DIVISION

SG12917 REV.08

PAGE 1 OF 12

Annexure-I

General Technical Specification & Format for Offers 3.3kV to 33kV Indoor Resin Cast Current Transformers

GENERAL :

Resin cast CTs are used in indoor metal clad switchgears for metering and protection purposes. This product standard is intended to cover the general technical requirement common to all indoor resin cast current transformers.

GENERAL REQUIREMENT & GUIDELINES TO VENDORS:

SL. NO.	BHEL'S REQUIREMENT	BIDDERS CONFIRMATION / COMMENTS
1	OFFERS SUBMITTED IN THIS SPECIFIED FORMAT (ANNEXURE-I) ONLY SHALL BE EVALUATED. OFFERS IN ANY OTHER FORMAT MAY NOT BE CONSIDERED FOR EVALUATION. SOFT COPY OF THE FORMAT SHALL BE MADE AVAILABLE TO SUPPLIERS ON DEMAND.	
2	Offers shall be opened in single bid only. Incomplete offers in any respect will be rejected without any correspondence/clarification with/from the vendor.	
3	The specification 'Annexure-A' and indent remarks given alongwith the enquiry document will be overriding in case of difference.	
4	For all PS class CTs, suppliers to indicate estimated values of V_k & I_e (based on formula as well as calculated value from the magnetization curve) in the table-7 , as per estimated magnetization curve of the offered CTs. Actual magnetization curves are required at order stage.	
5	To have similar magnetizing characteristics, switchgear end CTs & respective motor end CTs for differential protection of motors shall be procured in pair, from any one vendor on technically clear & L1 basis.	
6	Supplier shall affix green sticker on all motor end CTs for easy identification.	
7	Mounting plate shall be rigidly fixed with CT using suitable inserts and shall be zinc plated.	
8	Clear space for fixing the mounting plate in switchgear with pneumatic tool shall be provided.	
9	10% extra secondary terminal covers shall be provided with each order.	
10	1 complete set of loose rating plates shall be provided for all CTs.	
11	Any deviation with respect to specification is to be indicated strictly in 'Annexure-D'. Deviations indicated elsewhere shall not be considered. IF NO DEVIATION IS MENTIONED IN THIS ANNEXURE THEN IT WILL BE CONSIDERED AS TOTAL COMPLIANCE TO OUR SPECIFICATION.	

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PRODUCT STANDARD

SWITCHGEAR ENGINEERING DIVISION

SG12917 REV.08

PAGE 2 OF 12

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CLAU E NO.	DESCRIPTION	BIDDERS CONFIRMATION/ COMMENTS
1.0	TECHNICAL PARAMETERS - AS PER ANNEXURE-A.	
2.0	CT RATIO, ACCURACY AND BURDEN - AS PER ANNEXURE-A.	
3.0	APPLICABLE STANDARDS : IS:2705 / IEC:186 for CTs. IS:11322 / IEC:44 for Partial Discharge Test	
4.0	CLIMATIC CONDITIONS - AS PER ANNEXURE-A.	
5.0	DIMENSIONS For CT dimensions, suppliers to follow the following BHEL drgs for various ratings & type of CTs -	
5.1	All CTs with ratio 500A and above shall be SLOT TYPE only. Also refer Table-6 part-A	
	For SLOT CT (upto 11kV)	Drg.No. 35210051517 REV.06 Window size as under -
i	For CT primary above 2500A & upto 3500A	105x55 mm, OD - 250 mm max is acceptable. Remaining dimensions as per Drg.No. 35210051517 REV.06.
ii	For CT primary from 1000A upto 2500A	105x40 mm
iii	For CT primary below 1000A -	Preferably 105x40 mm only. However, in case it is not possible to meet technical parameters requirement with this slot size, suppliers may offer a slot size of 80x40 mm. Offers should clearly indicate such case(s).
5.2	All CTs below 500A ratio shall be WOUND TYPE only. For WOUND CT (upto 11kV) drg. no. 35210051516 REV.04. Also refer Table-6 part-B.	
5.3	For BAR CT (upto 11kV) drg. no. 35210052565 Rev.03. Also refer Table-6 part-C.	
5.4	For MOTOR end differential CTs drg. no. 34022240026 rev00. Also refer Table-6 part-D.	
5.5	All CTs with ratio 500A and above shall be SLOT TYPE only. For SLOT CT (20kV and 33kV) drg. no. 45226001513 Rev.01. Window size - 110x40 mm Also refer Table-6 part-E	
5.6	All CTs below 500A ratio shall be WOUND TYPE only. For WOUND CT (20kV and 33kV) drg. no. 45226001506 Rev.01. Also refer Table-6 part-F	



PRODUCT STANDARD

SWITCHGEAR ENGINEERING DIVISION

SG12917 REV.08

PAGE 3 OF 12

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6.0	DESIGN AND CONSTRUCTION	
6.1	The current transformer cores shall be made of suitable grade non-ageing cold rolled grain oriented silicon steel of low hysteresis loss and permeability to ensure accuracy at both normal and over voltages of 110 percent of the rated voltage and currents of 120 percent of the normal current. There shall be no saturation under service conditions.	
6.2	The current transformer shall be designed to withstand the indicated climatic conditions without temperature rise exceeding beyond permissible limits and CT shall be designed to withstand the thermal and mechanical stresses due to rated short circuit condition. Ambient temp. of 50°C shall be considered for design purpose.	
6.3	The primary conductor / secondary winding layer should be insulated with polyester film tape. Transparent cover shall be provided over secondary terminal.	
6.4	The CTs shall be completely encapsulated and terminal marking shall be properly & legibly provided without any requirement to interfere with wiring connections.	
6.5	The resin to be used in construction shall be high grade, mixed under high vacuum and poured also in vacuum to prevent any void remaining in the casting.	
6.6	The CTs should be cured properly so that the final product is non hygroscopic.	
6.7	Equi-potential lug of 0.25mtr length shall be provided for slot CTs in line with respective drawings.	
6.8	In case of wound CT's, the primary winding must be joined to primary terminals by either brazing process or bolted or clamped. Making a temporary joint is not acceptable.	
7.0	Q.A. PLAN	
	As per BHEL's standard Q.A. plan ref. QAQC/SCR/15/052 enclosed. Suppliers to specifically confirm adherence to this Q.A. plan in their offers.	
8.0	INSPECTION	
	CTs shall be tested & inspected at supplier's works by BHEL/BHEL's customer/BHEL's authorized representative in line with above Q.A. plan. Supplier shall give 2 weeks advance intimation.	



PRODUCT STANDARD

SWITCHGEAR ENGINEERING DIVISION

SG12917 REV.08

PAGE 4 OF 12

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9.0	TESTS	
9.1	TYPE TESTS	
9.1.1	Preferably TYPE TESTED design of CTs shall be offered. Type test reports for STC, Impulse and temperature rise shall be furnished for all varieties of CTs. Date of type tests conducted should not be more than the duration indicated as per Annexure-A clause-14(1).	
9.1.2	In case, type test report is not directly applicable to the offered CT(s) the applicability justification of STC, Impulse test certificate & temperature rise for each variety of CTs shall be submitted in format as per Annexure-A, Table-5 .	
9.1.3	Wherever the type tests have not been carried out, the offer should indicate clearly such cases and the party should specifically mention in the offer itself to 'conduct and clear' the type tests required at a govt. approved independent test laboratory without any extra charges or delivery repercussions.	
9.1.4	It may be required to repeat the TYPE TESTS, if so desired by our customer. In such a case, separate charges shall be quoted for TYPE TEST.	
9.2	ROUTINE TESTS	
	As per above QA plan.	
9.3	SPECIAL TESTS	
	Temperature rise test, shall be conducted free of cost on one CT of each lot and report to be furnished to BHEL.	
10.0	PACKING AND SHIPPING	
10.1	Identification marking on CTs shall be as per Annexure-A	
10.2	The equipment is to be transported adequately sealed against water ingress. They shall be packed and security clamped against movement in robust, non returnable packing cases to ensure safe transit in rough terrain, cross country road conditions and in heavy rains from the manufacturer's works to the specified destinations.	
10.3	It shall be the responsibility of the supplier to make good the damage caused due to insufficient packing.	
10.4	Each packing case shall be indelibly marked with the following :- Individual serial number. Purchaser's name. P.O. number/date. Destination. Manufacturer's name. Customer/Project name	
10.5	Each crate or container of the case to show TOP and BOTTOM positions.	



PRODUCT STANDARD

SWITCHGEAR ENGINEERING DIVISION

SG12917 REV.08

PAGE 5 OF 12

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11.0	DOCUMENTS	
11.1	Documents to be furnished along with the offer -	
11.1.1	1 copy of offer in the format as per Annexure-I.	
11.1.2	1 copy of technical parameters of offered CTs as per Annexure-A, Table-1, 2, 3 & 4.	
11.1.3	3 copies of dimensional drawings for approval.	
11.1.4	1 copy of STC test certificates.	
11.1.5	1 copy of impulse test certificates.	
11.1.6	1 copy of temperature rise test report.	
11.1.7	Applicability of type test certificates as per Annexure-A, Table-5.	
11.1.8	Signed copy of BHEL's standard Q.A. plan ref. QAQC/SCR/15/052, rev-00.	
11.1.9	For all class PS CTs, 1 copy of estimated magnetization curves and knee point voltage & magnetizing current calculations to be filled and submitted in Table-7 .	
11.1.10	Schedule of deviations as per Annexure-D duly filled.	
11.1.11	Dimensional details as per Table-6 part-A, B, C, D, E & F	
11.2	Documents to be furnished at the time of delivery	
11.2.1	2 copies of routine test certificates alongwith the consignment and 1 copy along with the dispatch document.	
11.2.2	Actual magnetization curves for PS class CTs.	
12.0	PERFORMANCE GUARANTEE	
12.1	The supplier shall guarantee the satisfactory performance of the CTs for a period of 24 months from the date of receipt at BHEL Bhopal or 18 months from the date of commissioning, whichever is later.	
12.2	For suppliers, supplying these types of CTS to BHEL for the first time, guarantee for satisfactory performance shall be 5 ½ yrs from the date of receipt at BHEL Bhopal or 5 yrs from the date of commissioning, whichever is later.	
12.3	Alongwith offer, the supplier shall also submit the proof of supplying indoor CTs to BHEL for last 5 orders failing which performance guarantee will be changed to 5 years.	
13.0	ACCEPTANCE CRITERIA	
13.1	BHEL/BHEL's authorized representative's report for adhering to BHEL's standard QA Plan during manufacturing process.	
13.2	Visual checks for crack and surface finish.	
13.3	Rating plate as per specification parameters.	
13.4	Dimensions as per approved drawing.	
13.5	Availability of all routine test certificates.	
13.6	Availability of 10% extra secondary terminal covers.	
13.7	1 complete set of loose rating plates for all CTs	
13.8	Packing case identification as per specification cl.10.4.	



PRODUCT STANDARD

SWITCHGEAR ENGINEERING DIVISION

SG12917 REV.08

PAGE 6 OF 12

TABLE-5

(FORMATS TO BE FILLED BY SUPPLIERS FOR EACH ITEM)

9.0	TYPE TESTS										
9.1	APPLICABILITY OF TYPE TESTS										
PART A FOR APPLICABILITY OF STC TEST CERTIFICATE											
IT. NO.	STC TEST REPORT NO.	DATE OF TEST	DETAILS OF TESTED CT				DETAILS OF OFFERED CT				REMARKS / DEVIATION
			STC RATING / I ² t	NO. OF PRIM. TURNS / AREA SQMM	CURRENT DENSITY AMP / SQMM	DYNAMIC AMP-TURNS	STC RATING / I ² t	NO. OF PRIM. TURNS / AREA SQMM	CURRENT DENSITY AMP / SQMM	DYNAMIC AMP-TURNS	
001											
002											

PART B FOR IMPULSE TEST CERTIFICATE JUSTIFICATION									
IT. NO.	IMPULSE TEST REPORT NO.	DATE OF TEST	DETAILS OF TESTED CT			DETAILS OF OFFERED CT			REMARKS / DEVIATION
			IMPULSE TEST IN KV PEAK	CREEPAGE	DRG. NO.	IMPULSE TEST IN KV PEAK	CREEPAGE	DRG. NO.	
001									
002									

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PRODUCT STANDARD

SWITCHGEAR ENGINEERING DIVISION

SG12917 REV.08

PAGE 7 OF 12

TABLE-6
(FORMATS TO BE FILLED BY SUPPLIERS FOR EACH ITEM)

(TABLE-6 PART-A)
REFER SPEC.CLAUSE 5.1 FOR UPTO 12kV SLOT CTS TO DRG.NO.35210051517
REV.06 AND CONFIRM FOLLOWING (DEVIATIONS TO BE INDICATED AGAINST
RESPECTIVE ITEM)

SL. NO.	REQUIREMENT	VENDOR TO CONFIRM DIMENSION					
		It. No.	It. No.				It. No.
1.	Mounting dimension of offered CT shall be 200±1(along depth)X 140±1(along width) mm						
2.	Mounting plate dimension of offered CT shall be 230±2(along depth) X170±2(along width)mm (MAX.)						
3.	Slot/Window dimension of offered CTs shall be (as per cl.5.1)						
4.	Overall height from bottom of mounting plate shall be 292.5 mm max.						
5.	Height of center of slot to bottom of mounting plate shall be 177.5±2mm.						
6.	Width of CT shall be (as per cl.5.1)						
7.	Depth of CTs shall be 230mm max.						
8.	Mounting (plate) slot dimension shall be 12Wx18L mm.						

(TABLE-6 PART-B)
REFER SPEC.CLAUSE 5.2 FOR UPTO 12kV WOUND CTS TO DRG.NO.35210051516
REV.04 AND CONFIRM FOLLOWING (DEVIATIONS TO BE INDICATED AGAINST
RESPECTIVE ITEM)

SL. NO.	REQUIREMENT	VENDOR TO CONFIRM DIMENSION					
		It. No.	It. No.				It. No.
1.	Mounting dimension of offered CT shall be 200±1(along depth) X 140±1(along width) mm						
2.	Mounting plate dimension of offered CT shall be 230±2(along depth)X 170±2(along width) mm (MAX.)						
3.	Centre to center distance between primary terminal shall be 90±1mm (along depth) & 40±0.5mm (along width)						
4.	Height of primary terminal from bottom of mounting plate shall be 300±2mm.						
5.	M16 Primary connection bolts provided as per drg.						
6.	Width of CT shall be 205mm max.						
7.	Depth of CTs shall be 310mm max.						
8.	Mounting (plate) slot dimension shall be 12Wx18L mm.						

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PRODUCT STANDARD

SWITCHGEAR ENGINEERING DIVISION

SG12917 REV.08

PAGE 8 OF 12

(TABLE-6 PART-C)

REFER SPEC.CLAUSE 5.3 FOR UPTO 12kV BAR TYPE CTS TO DRG.NO.35210052565
REV.03 AND CONFIRM FOLLOWING (DEVIATIONS TO BE INDICATED AGAINST
RESPECTIVE ITEM)

SL. NO.	REQUIREMENT	VENDOR TO CONFIRM DIMENSION					
		It. No.	It. No.				It. No.
1.	Mounting dimension of offered CT shall be 136±1(along depth) X 118±1(along width) mm						
2.	Mounting plate dimension of offered CT shall be 156±2(along depth) X150±2(along width) mm (MAX.)						
3.	Overall height from bottom of mounting plate shall be 322mm max.						
4.	Width of CT shall be 160mm max.						
5.	Depth of CTs shall be 270mm max.						
6.	Mounting (plate) slot dimension shall be 12Wx15L mm.						

(TABLE-6 PART-D)

REFER SPEC.CLAUSE 5.4 FOR UPTO 12kV MOTOR END CTS TO DRG.NO.
34022240026 rev.00 AND CONFIRM FOLLOWING (DEVIATIONS TO BE INDICATED
AGAINST RESPECTIVE ITEM)

SL. NO.	REQUIREMENT	VENDOR TO CONFIRM DIMENSION					
		It. No.	It. No.				It. No.
1.	Mounting dimension of offered CT shall be 300±1(along depth)X 157±1(along width) mm						
2.	Mounting plate dimension of offered CT shall be min.315±2(along depth) X 180±2(along width)mm (MAX.)						
3.	Overall height from bottom of mounting plate shall be 260mm max.						
4.	Width of CT shall be 180mm max.						
5.	Depth of CTs shall be 382mm max.						
6.	Mounting (plate) slot dimension shall be dia.11 mm.						

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PRODUCT STANDARD

SWITCHGEAR ENGINEERING DIVISION

SG12917 REV.08

PAGE 9 OF 12

(TABLE-6 PART-E)

REFER SPEC.CLAUSE 5.5 FOR UPTO 33kV SLOT CTS TO DRG.NO.45226001513
REV.01 AND CONFIRM FOLLOWING (DEVIATIONS TO BE INDICATED AGAINST
RESPECTIVE ITEM)

SLNO	REQUIREMENT	VENDOR TO CONFIRM/INDICATE DIMENSION					
		It. No.	It. No.				It. No.
1.	Mounting dimension of offered CT shall be 305±1(along depth)X 170±1(along width) mm						
2.	Mounting plate dimension of offered CT shall be 340±2(along depth)X 195±2(along width)mm (MAX.)						
3.	Slot/WINDOW dimension of offered CTs shall be 110X40 sqmm.						
4.	Overall height from bottom of mounting plate shall be 550mm max.						
5.	Height of center of slot to bottom of mounting plate shall be 390±2mm.						
6.	Width of CT shall be 350mm max.						
7.	Depth of CTs shall be 320mm max.						
8.	Mounting (plate) slot dimension shall be 12Wx18L mm.						

(TABLE-6 PART-F)

REFER SPEC.CLAUSE 5.6 FOR UPTO 33kV WOUND CTS TO DRG.NO.45226001506
REV.01 AND CONFIRM FOLLOWING (DEVIATIONS TO BE INDICATED AGAINST
RESPECTIVE ITEM)

SL NO	REQUIREMENT	VENDOR TO CONFIRM/INDICATE DIMENSION					
		It. No.	It. No.				It. No.
1.	Mounting dimension of offered CT shall be 305±1(along depth) X 170±1(along width) mm						
2.	Mounting plate dimension of offered CT shall be 340±2(along depth)X 195±2(along width) mm (MAX.)						
3.	Centre to center distance between primary terminal shall be 90±1mm (along depth) & 40±0.5mm (along width)						
4.	Height of primary terminal from bottom of mounting plate shall be 360±1mm.						
5.	M16 Primary connection bolts provided as per drg.						
6.	Width of CT shall be 220mm max.						
7.	Depth of CTs shall be 275mm max.						
8.	Mounting (plate) slot dimension shall be 12Wx18L mm.						

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PRODUCT STANDARD

SWITCHGEAR ENGINEERING DIVISION

SG12917 REV.08

PAGE 10 OF 12

TABLE-7

(FORMATS TO BE FILLED BY SUPPLIERS FOR ALL PS CLASS CTs)
REFER GENERAL REQUIREMENT NOTE-4 & SPEC.CLAUSE-11.1.9 FOR PS CLASS
CTS AND CONFIRM FOLLOWING (DEVIATIONS TO BE INDICATED AGAINST
RESPECTIVE ITEM)

ITEM NO.	REQUIREMENT (FORMULA)	VENDOR TO INDICATE ACTUAL VALUES OF V_k & I_e AS PER			
		V_k AS PER		I_e at $0.5V_k$ or $0.4V_k$ AS PER	
		Formula	Curve	Formula	Curve
1.					
2.					

ANNEXURE -D (SCHEDULE OF DEVIATIONS)

Current Transformers		Deviation in		
Item no.	CT Details	Technical Parameter s	Dimensional Drawing	Type Test
1.				
2.				

NOTE: IF NO DEVIATION IS MENTIONED IN THIS ANNEXURE THEN IT
WILL BE CONSIDERED AS TOTAL COMPLIANCE TO OUR
SPECIFICATION

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PRODUCT STANDARD

SWITCHGEAR ENGINEERING DIVISION

SG12917 REV.08

PAGE 11 OF 12



QUALITY PLAN FOR INDOOR RESIN CAST CURRENT TRANSFORMERS (3.3kV TO 33kV)

QP NO. : QAQC/SCR/15/05

REV. : 00

REVIEWED BY

APPROVE

DATE:

10.08.04

PAGE: 01

OF 02

SL. NO.	COMPONENT & PROCESS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	FORMAT OF RECORD	AGENCY			REMARK
1	2	3	4	5	6	7	8	M	C	I	11
A. RAW MATERIALS :											
1.00	CORE	a) DIMENSION	C	M	10%	SUPPLIER'S SPEC.+++	T.C.	P	V	RR	
		b) MAGNETISING CURRENT	A	T	100%-M,10%-C		T.C.	P	P	RR	
2.00	ENAMELLED COPPER WIRE	a) WIRE SIZE	C	M	10%	IS4800/	T.R.		V	RR	
		b) ENAMEL COATING	B	T	10%	IS13730	T.R.		V	RR	
		c) ELECTRICAL PROPERTIES	A	T	10%		T.R.		V	RR	
3.00	COPPER SECTION	a) DIMENSION	C	M	100%-M,10%-C	SUPPLIER'S SPEC.+++	T.C./T.R.	P	P	RR	
		b) ELECTRICAL PROPERTIES	B	T	100%-M,10%-C		T.C./T.R.	P	P	RR	
4.00	RESIN HARDENER &	CHEMICAL	B	T	100%	SUPPLIER'S SPEC.+++	T.C.	P	RR	RR	
5.00	POLYESTER FILM	a) DIMENSION	C	M	100%-M,10%-C	SUPPLIER'S SPEC.+++	T.C.	P	RR	RR	
		b) ELECTRICAL PROPERTIES	B	T	100%-M,10%-C		T.C.	P	RR	RR	
B: MANUFACTURING PROCESS:											
1.00	MOULDING PROCESS	a) LEVEL OF VACUUM DURING POURING	A	M	FOR EACH BATCH	SUPPLIER'S SPEC.+++	P.R.		P	RR	
		b) CURING TEMPERATURE AND TIME	A	M			P.R.		P	RR	
2.00	EPOXY CASTING	SHAPE & SURFACE FINISH	B	V	100%	SHAPE: AS PER APPROVED DRG./FINISH : DEFECT FREE	O.S		V	RR	

LEGEND : A:CRITICAL,B:MAJOR,C:MINOR,M:MEASUREMENT,V:VISUAL,T:TEST,RR:RECORD REVIEW,P.R: PROCESS RECORD,T.C:TEST CERTIFICATE,T.R.;TEST REPORT,O.S:OBSERVATION SHEET; QA DOCUMENTATION ; M:MANUFACTURER/SUB CONTRACTOR, C: SUPPLIER,I:BHEL/INSPECTION AGENCY
(P:PERFORM,W: WITNESS & V: VERIFICATION AS APPROPRIATE,CHP :CUSTOMER'S HOLD POINT;+++ SUPPLIER'S SPECIFICATION TO APPROVED BY BHEL, ***SP (SAMPLING PLAN) AS PER IS:2500,PART I,AQL : 0.65, GENERAL INSPECTION LEVEL -II,SINGLE SAMPLING PLAN (REDUCED INSPECTION LEVEL)

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PRODUCT STANDARD

SWITCHGEAR ENGINEERING DIVISION

SG12917 REV.08

PAGE 12 OF 12



QUALITY PLAN FOR INDOOR RESIN CAST CURRENT TRANSFORMERS (3.3kV TO 33kV)

QP NO. : QAQC/SCR/15/052

REV. : 00

REVIEWED BY APPROVED

DATE:

09.08.04

PAGE: 02 OF

02

SL. NO.	COMPONENT & PROCESS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	FORMAT OF RECORD	AGENCY			REMARK
								M	C	I	
1	2	3	4	5	6	7	8		9		11
1.00	FINISHED CT	C. ROUTINE TESTS:									
		a) OGA DIMENSION	B	M	AS PER SAMPLING PLAN (SP)***	BHEL'S APPROVED DRAWING	O.S.	P	V		
		b) SIZE OF PRIMARY TERM.	B	T			O.S.	P	V		
2.00	ELECTRICAL TESTING	c) SIZE OF BASE PLATE	B	T			O.S.	P	V		
		a) TERMINAL MARKINGS & POLARITY	A	T	100%-C , SP-I	IS-2705 / IEC 186	T.R.	P	W	CHP	
		b) RATIO & PHASE ERROR	A	T	100%-C , SP-I		T.R.	P	W	CHP	
		c) COMPOSITE ERROR (ON PROTECTION CORE)	A	T	100%-C , SP-I		T.R.	P	W	CHP	
		d) HV TEST ON PRIMARY	A	T	100%-C , SP-I		T.R.	P	W	CHP	
		e) LV TEST ON SECONDARY	A	T	100%-C , SP-I		T.R.	P	W	CHP	
		f) INTER TURN TEST	A	T	100%-C , SP-I		T.R.	P	W	CHP	
3.00	ADDITIONAL TESTS FOR CLASS 'PS' CORE	g) PARTIAL DISCHARGE TEST	A	T	100%-C , SP-I		T.R.	P	W	CHP	
		a) SECONDARY WDG.RESISTANCE	B	T	100%-C , SP-I		T.R.	P	W	CHP	
		b) KNEE POINT VOLTAGE AND EXCITING CURRENT	A	T	100%-C , SP-I		T.R.	P	W	CHP	
		D. TYPE TESTS(AS PER BHEL'S P.O) :									
		a) SHORT TIME CURRENT	A	T			T.R.	P	W	CHP	
		b) IMPULSE	A	T			T.R.	P	W	CHP	
		c) TEMPERATURE RISE	A	T			T.R.	P	W	CHP	

LEGEND : A:CRITICAL,B:MAJOR,C:MINOR,M:MEASUREMENT,V:VISUAL,T:TEST,RR:RECORD REVIEW,P,R: PROCESS RECORD,T,C: CERTIFICATE,T.R.;TEST REPORT,O.S:OBSERVATION SHEET; QA DOCUMENTATION ; M:MANUFACTURER/SUB CONTRACTOR, C: SUPPLIER,I:BHEL/INSPECTION AGENCY

(P:PERFORM,W: WITNESS & V: VERIFICATION AS APPROPRIATE,CHP :CUSTOMER'S HOLD POINT;+++ SUPPLIER'S SPECIFICATION BE APPROVED BY BHEL, ***SP (SAMPLING PLAN) AS PER IS:2500,PART I,AQL : 0.65, GENERAL INSPECTION LEVEL -II,SINGLE SAMPLE PLAN (REDUCED INSPECTION)

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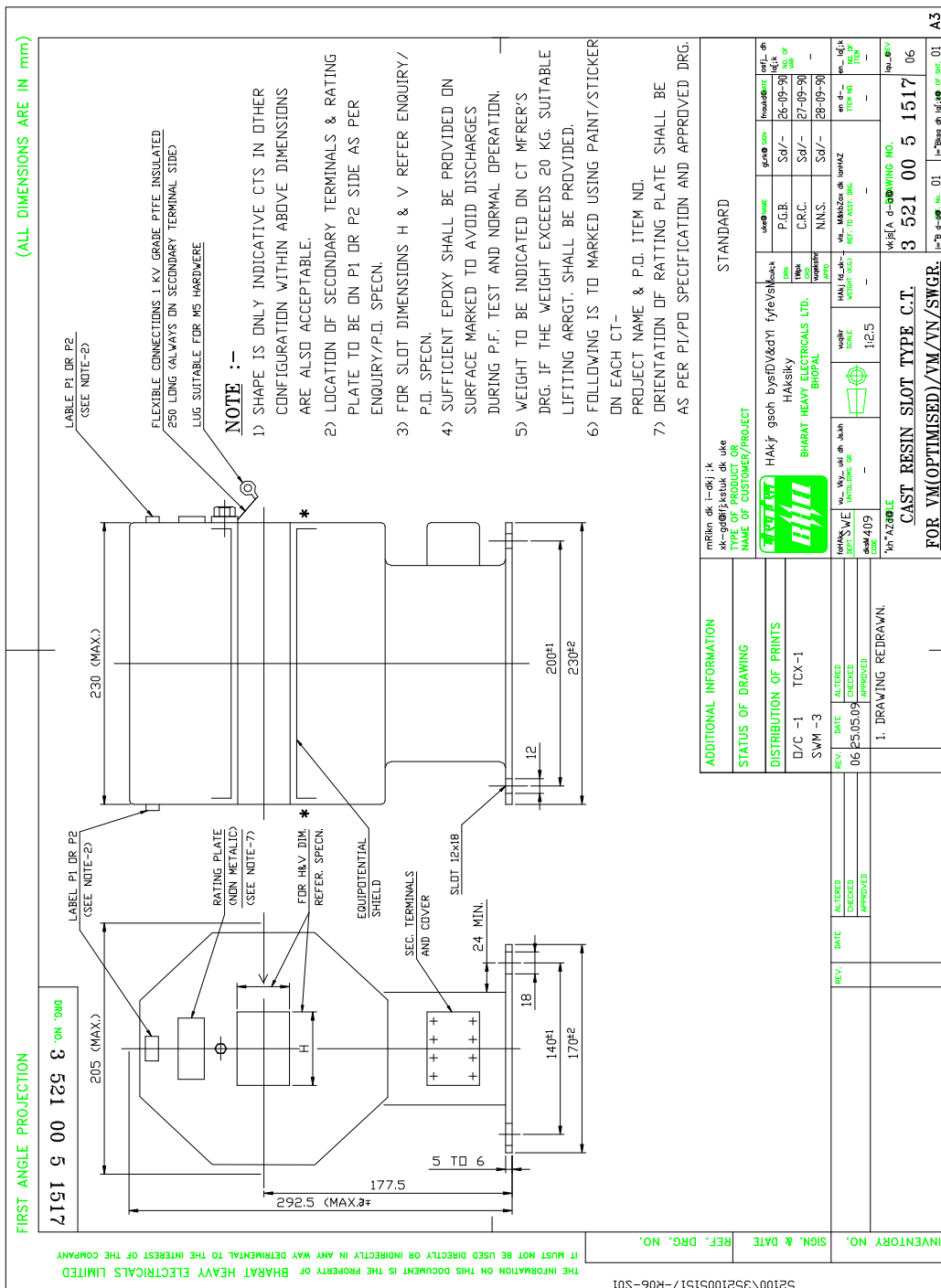


PRODUCT STANDARD
SWITCHGEAR ENGINEERING DIVISION

SG12917 REV.08

PAGE 1 OF 1

ANNEXURE-1





PRODUCT STANDARD
SWITCHGEAR ENGINEERING DIVISION

SG12917 REV.08

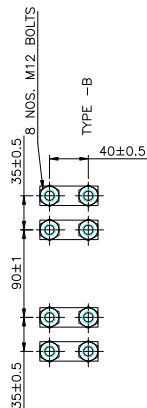
PAGE 1 OF 1

ANNEXURE-2

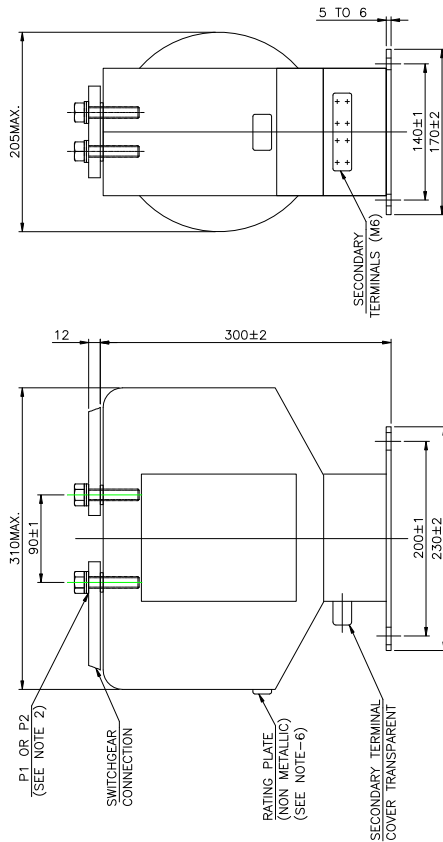
ALL DIMENSIONS ARE IN mm.

NOTES:—

1. SHAPE IS INDICATIVE CTS IN OTHER CONFIGURATION WITH IN ABOVE DIMENSION ARE ALSO ACCEPTABLE.
2. LOCATION OF SECONDARY TERMINALS & RATING PLATE TO BE ON P1 OR P2 SIDE AS PER ENQUIRY/P.O. SPECN.
3. IN CASE 2 PAIRS OF H.V. TERMINALS ARE USED THEIR RELATIVE LOCATION & SIZE SHALL BE AS BELOW.



4. WEIGHT TO BE INDICATED ON C.T. MANUFACTURED DRG. IF THE WEIGHT EXCEEDS 20 KG. SAPRARE LIFTING ARRGT. SHALL BE PROVIDED.
5. FOLLOWING IS TO MARKED USING PAINT/STICKER ON EACH CT: PROJECT NAME AND P.O. ITEM NO.
6. ORIENTATION OF RATING PLATE SHALL BE AS PER PI/PO SPECIFICATION AND APPROVED DRG.



4. SLOTS 12x18

20MIN.

4 NOS. M16 BOLTS

40±0.5

PRIMARY TERMINAL PAIDS OF COPPER (TYPE "A" (NOTE-1) "B" (NOTE-2) SEE NOTE-3)

LABELS P1, P2 (SEE NOTE-2)

ADDITIONAL INFO STATUS OF DRAWING

STANDARD

[illegible]



PRODUCT STANDARD

SWITCHGEAR ENGINEERING DIVISION

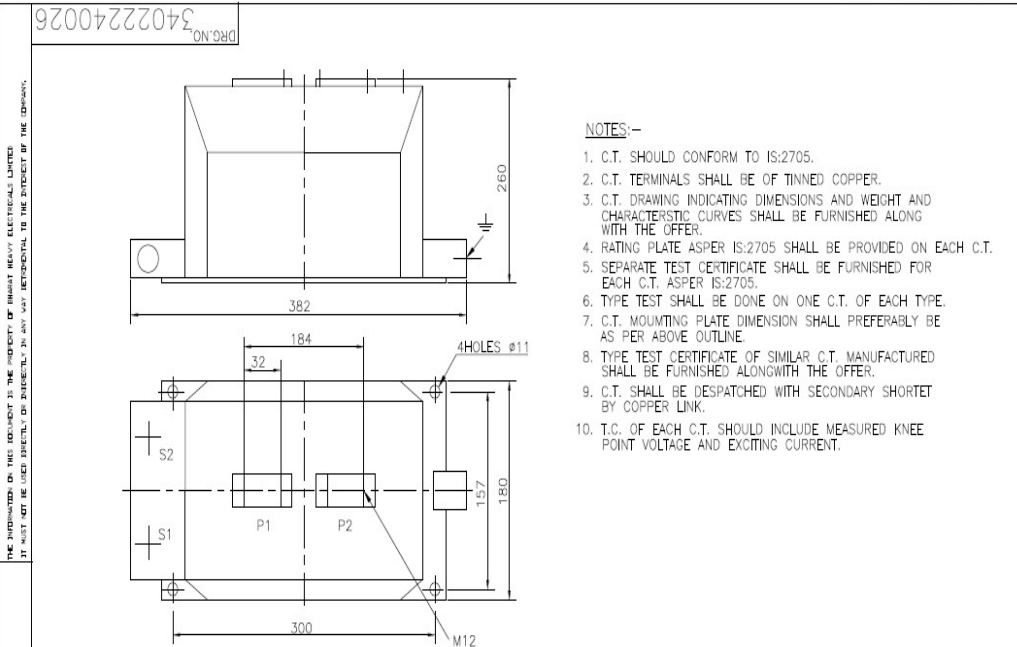
SG12917 REV.08

PAGE 1 OF 1

ANNEXURE-4

FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN MM.)



NOTES:-

1. C.T. SHOULD CONFORM TO IS:2705.
2. C.T. TERMINALS SHALL BE OF TINNED COPPER.
3. C.T. DRAWING INDICATING DIMENSIONS AND WEIGHT AND CHARACTERISTIC CURVES SHALL BE FURNISHED ALONG WITH THE OFFER.
4. RATING PLATE AS PER IS:2705 SHALL BE PROVIDED ON EACH C.T.
5. SEPARATE TEST CERTIFICATE SHALL BE FURNISHED FOR EACH C.T. AS PER IS:2705.
6. TYPE TEST SHALL BE DONE ON ONE C.T. OF EACH TYPE.
7. C.T. MOUNTING PLATE DIMENSION SHALL PREFERABLY BE AS PER ABOVE OUTLINE.
8. TYPE TEST CERTIFICATE OF SIMILAR C.T. MANUFACTURED SHALL BE FURNISHED ALONG WITH THE OFFER.
9. C.T. SHALL BE DESPATCHED WITH SECONDARY SHORTED BY COPPER LINK.
10. T.C. OF EACH C.T. SHOULD INCLUDE MEASURED KNEE POINT VOLTAGE AND EXCITING CURRENT.

REVISIONS		APPROVALS		DATE	
REV.	DATE	REV.	DATE	REV.	DATE
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SWITCHGEAR ENGINEERING DIVISION

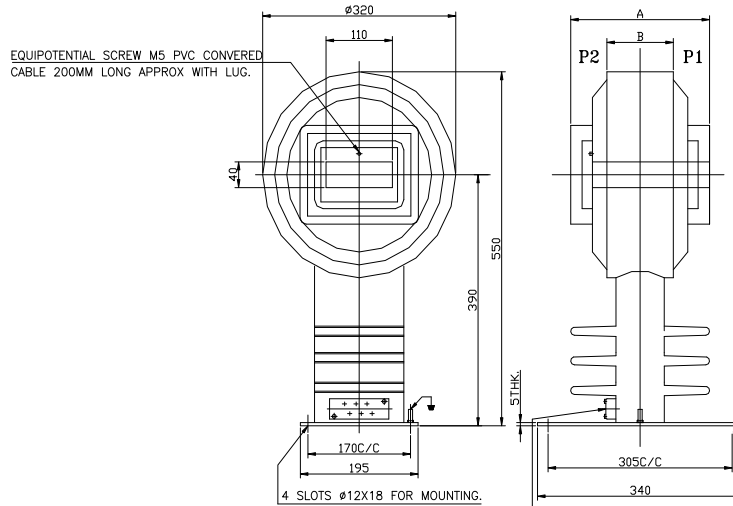
SG12917 REV.08

PAGE 1 OF 1

ANNEXURE-5

FIRST ANGLE PROJECTION (ALL DIMENSIONS ARE IN mm)

REV.	DATE	ALTERED	REV.	DATE	ALTERED	ADDITIONAL INFORMATION
01	18.06.09	CHECKED			CHECKED	STATUS OF DRAWING
						DISTRIBUTION □/C-1 SWM-3 OF PRINTS TCX-1



REVISION : CHANGED MOUNTING PLATE AND MOUNTING DIMENSIONS
(OUR REF. NO. : Q2710 DT. 17/01/2004.
REVISION : ADDED 'A' AND 'B' DIMENSIONS TABLE DT. 27/12/2003.
: CHANGED THE SLOT DIMENSION 110MM. PLACE OF
: 105 MM. DT. 27/12/2003.

NOTE:-

TOLERANCE WHEREVER NOT MENTIONED ± 0.1MM.

45226001513/R00/S01

SIGN & DATE	श्री. एच. डी. एन. 		BHATAT HEAVY ELECTRICALS LIMITED BHOPAL		NAME		SIGN.	DATE	NO. OF VAR
					DRN	S.U.SAVALE	SD/-	21.04.05	
					CHD	K.S.M.	SD/-	21.04.05	
					APPD	DIVYA	SD/-	21.04.05	
INVENTORY No.	DEPT. SWE	UN. TOL.DIM.GR.		SCALE	WEIGHT (Kg.)	REF. TO ASSY. DRG.		ITEM MO.	NO. OF ITEMS
	CODE 409								
TITLE						DRAWING No.			REV.
RESIN CAST RING TYPE						45226001513			01
CURRENT TRANSFORMER									
						SHEET NO. 01		NO. OF SHEETS	01

SIZE A4

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SG12917 REV.08

PAGE 1 OF 1

ANNEXURE-6

FIRST ANGLE PROJECTION				CALL DIMENSIONS ARE IN mm			
REV.	DATE	ALTERED	SUS	REV.	DATE	ALTERED	SUS
		CHECKED		01	11.05.09	CHECKED	DJ
DIMENSION 275 WAS 225 .				P1			
(DCA 28732)				ADDITIONAL INFORMATION			
				STATUS OF DRAWING			
				DISTRIBUTION □/C-1 SWM-3			
				OF PRINTS TCX-1			

P1	P2	4-M12 PRI TER BOLT/STUD. (SUPPLIER'S SCOPE).	
		275	140
		90C/C	40C/C
		25	65
		360	140
		5THK.	170C/C
		305C/C	195
		340	
		4 SLOTS #12X18 FOR MOUNTING.	

SEC. TER. WITH CAP.

*.PROVISION THIS SIDE TO BE MADE ONLY IF ABSOLUTELY NECESSARY

NOTE:-
TOLERANCE WHEREVER NOT MENTIONED ± 3MM.

INVENTORY No.	SIGN & DATE	45226001506/R00/S01		BHATAT HEAVY ELECTRICALS LIMITED BHOPAL	NAME	SIGN.	DATE	NO.OF VAR
					DRN	S.U.SAVALE	SD/-	21.04.05
					CHD	K.S.M.	SD/-	21.04.05
					APPD	DIVYA	SD/-	21.04.05
DEPT. SWE	UN. TOL.DIM.GR.	SCALE	WEIGHT (Kg.)	REF. TO ASSY. DRG.	ITEM MO.	NO.OF ITEMS		
CODE 409	M AA 0230208							
TITLE				DRAWING No.		REV.		
RESIN CAST WOUND TYPE CURRENT TRANSFORMER				45226001506		01		
				SHEET NO. 01		NO.OF SHEETS 01		

SIZE A4

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Cir. No.: IEEMA(PVC)/CTPT (R-1)/07/2026

July 2026

To: All members of Instrument Transformer division and respective PVC mailing list.
All utilities & listed purchasing organizations.

**Basic prices of raw materials, components used in the manufacture of Instrument Transformers prevailing
as on 1st working day of the month of July 2026
and all India average consumer price index number for May 2026**

This is for the application in IEEMA's Price Variation Clauses effective from 1st January 2021 as under:

- Instrument Transformers up to 72.5 KV using Polymer Insulator: IEEMA(PVC)/INST.TR_Polymer Insulator_upto 72.5 KV
- Instrument Transformers above 72.5 KV using Polymer Insulator: IEEMA(PVC)/INST.TR_Polymer Insulator_Above 72.5 KV
- Instrument Transformers up to 72.5 KV using Porcelain Insulator: IEEMA(PVC)/INST.TR_Porcelain Insulator_upto 72.5 KV
- Instrument Transformers above 72.5 KV using Porcelain Insulator: IEEMA(PVC)/INST.TR_Porcelain Insulator_Above 72.5 KV
- Capacitive Voltage Transformer: IEEMA(PVC)/INST.TR_CVT
- Dry type Instrument Transformers up to 72.5 KV : IEEMA(PVC)/INST.TR_Dry Type upto 72.5 KV

Sr. No.	Description	Price/Index	Variation over previous month
1.	LME ALUMINIUM : (AI) LME Average Settlement Price including Premium for Ingot for the month of July 2026	Rs. 3,69,091.00 /MT	(-) 27,341.00
2.	COPPER: (C) Average LME settlement price of copper wire bars for the month of June 2026 Average LME settlement price of copper wire bars for the month of July 2026	Rs. 13,66,071.00 /MT Rs. 13,58,414.00 /MT	(-) 2,359.00 (-) 7,657.00
3.	CRGO Electrical Steel Lamination (ES)	Rs. 6,13,082.00 /MT	+ 18,819.00
4.	WHOLESALE PRICE INDEX NUMBER (FE) * Wholesale price index number for 'Manufacture of Basic Metal' (Base:2022-23=100) for the Month May 2026	104.90	+ 1.40
5.	WHOLESALE PRICE INDEX NUMBER: (IN) * Wholesale price index number for 'Insulators' (Base: 2022-23=100) for the Month May 2026	122.50	+ 4.70
6.	Epoxy Resin Grade CT-5900 (ER)	Rs. 1,065.31 /Kg	+ 138.95
7.	Insulating Materials (IM) Pre-compressed pressboard of size 3mm thick C&F price converted into Indian Rupees	Rs. 1,447.75 /Kg	(-) 53.83
8.	TRANSFORMER OIL: (TO) Transformer Oil conforming to IS: 335-1993 supplied in drums (Ex-Refinery, Mumbai)	Rs. 2,16,212.00 /K.Ltr.	(-) 13,125.00
9.	CONSUMER PRICE INDEX NUMBER: (W) All India average consumer price index number for industrial workers (Base: 2016=100) for the month of May 2026	150.80	+ 0.90

* Refer Cir no.: 154/PVC/CLAR/02, dated 03 Jul 2026 for the change in base of WPI

QE/PVC/38 (R-06)
ISSUED DATE: 19.08.2026

Authorised Signatory

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