



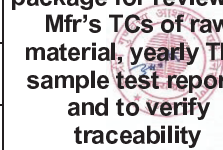




Manufacturer Name & Address <div> BHEL-BHOPAL</div>		Manufacturing Quality Plan for EHV Transformers up to 765 kV													
		Customer POWERGRID Corporation of India Ltd.		Vendor Code 3000000057	Item Description EHV Transformers up to 765 kV	MQP No. TXB 112	Rev 01	Date of issue 31.12.2020	Validity of MQP 31.12.2021						
SI No.	Components and Operations	Type of check	Quantum of check	Reference document	Acceptance norms	Form of record	Applicable Codes						Remarks		
							1	2	3	4	5	6			
1.3.12	Tear Index	Measurement			IEC 554-3-1	CMTC	B	K	P	W		N			
1.3.13	Water absorption (Capillary rise)	Measurement			IEC 554-3-1	CMTC	B	K	P	W		N			
1.3.14	Elongation at break	Measurement			IEC 554-3-1	CMTC	B	K	P	W		N			
1.3.15	substance (grammage)	Measurement			IEC 554-3-1	CMTC	B	K	P	W		N			
1.3.16	Degree of Polymerization	Measurement			IEC 554-3-1	CMTC	B	K	P	W		N			
1.4 A	PRECOMPRESSED PRESSBOARD- Note: BHEL shall ensure that samples of Pressboard are duly sealed annually (randomly on different sizes) by POWERGRID-RIO at the premises of transformer manufacturers/ Insulation cutter's/ PCB manufacturer & tested at third party lab.										E				
1.4.A1	Check for healthiness	Visual	One sample of each size per lot	BHEL Drg BHEL Spec. IEC 60641 IEC 60763	No visible defect	CMTC	A/B	J/K	S/P	W/Z		N	CIP on first lot of insulation item for each Transformer package on pressboards for review of: Mfr's TCs Yearly TPL sample test reports and to verify traceability. Balance record review on surveillance basis		
1.4.A2	Check for thickness	Measurement			Within Tolerance	CMTC	B	K	P	W/Z		N			
1.4.A3	Density	Measurement			IEC 60641	CMTC	B	K	P	W/Z		N			
1.4.A4	Oil absorption	Measurement			IEC 60641	CMTC	B	K	P	W/Z		N			
1.4.A5	Moisture Content	Measurement			IEC 60641	CMTC	B	K	P	W/Z		N			
1.4.A6	Shrinkage in air	Measurement			IEC 60641	CMTC	B	K	P	W/Z		N			
1.4.A7	Tensile strength a) Machine Direction b) Cross Direction	Measurement			IEC 60641	CMTC	B	K	P	W/Z		N			
1.4.A8	Elongation a) Machine Direction b) Cross Direction	Measurement			IEC 60641	CMTC	B	K	P	W/Z		N			
1.4.A9	Compressibility in air a) Compressibility b) Reversible compressibility	Measurement			IEC 60641	CMTC	B	K	P	W/Z		N			
1.4.A10	Dielectric strength (Air & Oil)	Measurement			IEC 60641	CMTC	B	K	P	W/Z		N			
1.4.A11	Ash content	Measurement			IEC 60641	CMTC	B	K	P	W/Z		N			

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											POWERGRID Corporation of India Ltd.	3000000057	EHV Transformers up to 765 kV	TXB 112	01	31.12.2020
SI No.	Components and Operations		Type of check	Quantum of check	Reference document	Acceptance norms	Form of record	Applicable Codes						Remarks		
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1.4.B10	Oil absorption (%)		Physical	-do-	13	As per IEC 60763-3-1	CMTC	B	K	P	W/Z		N	Record review on surveillance basis		
1.4.B11	Ash Content (%)		Physical	-do-	14	As per IEC 60763-3-1	CMTC	B	K	P	W/Z		N			
1.4.B12	Contamination of Dielectric liquids	Neutralization Valve (MgKOH/g)	Physical	-do-	15	As per IEC 60763-3-1	B	K	P	W/Z		N				
		Sludge Content (Mg/l)	Physical	-do-	15	As per IEC 60763-3-1	B	K	P	W/Z		N				
		Dissipation factor	Physical	-do-	15	As per IEC 60763-3-1	B	K	P	W/Z		N				
1.4.B13	Conductivity of aqueous extract (mS/m)		Physical	-do-	16	As per IEC 60763-3-1	CMTC	B	K	P	W/Z		N			
1.4.B14	PH of aqueous extract		Physical	-do-	17	As per IEC 60763-3-1	CMTC	B	K	P	W/Z		N			
1.5	MOULDED INSULATION COMPONENTS (raw material) Note: - BHEL shall ensure that samples made from Wet Material(raw material) of moulding components duly sealed annually by POWERGRID-RIO at the premises of transformer manufacturers/ Insulation cutter's/ PCB manufacturer & tested at third party lab.											E				
1.5.1	Check for healthiness		Visual	One sample per lot	BHEL Drg BHEL Spec. IEC 60641	No visible defect	CMTC	B	K	P	W/Z		N	CIP on first lot of moulding components for each Transformer package for review of Mfr's TCs of raw material, yearly TPL sample test reports and to verify traceability  Balance record review on surveillance basis		
1.5.2	Check for thickness		Measurement			Within Tolerance	CMTC	B	K	P	W/Z		N			
1.5.3	Apparent Density		Measurement			BHEL Drg BHEL Spec. IEC 60641	CMTC	B	K	P	W/Z		N			
1.5.4	Shrinkage: Machine direction and Cross machine direction		Measurement				CMTC	B	K	P	W/Z		N			
1.5.5	Shrinkage thickness		Measurement				CMTC	B	K	P	W/Z		N			
1.5.6	Moisture Content		Measurement				CMTC	B	K	P	W/Z		N			
1.5.7	Conductivity aqueous extract		Measurement				CMTC	B	K	P	W/Z		N			
1.5.8	PH value of aqueous extract		Measurement				CMTC	B	K	P	W/Z		N			
1.5.9	Oil absorption		Measurement				CMTC	B	K	P	W/Z		N			

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							1	2	3	4	5	6			
1.5.10	Dielectric strength in oil at 90±2°C	Measurement				CMTC	B	K	P	W/Z		N			
1.6	UNIMPREGNATED DENSIFIED LAMINATED WOOD- Note: BHEL shall ensure that samples of densified laminated wood are duly sealed annually (randomly on different sizes) by POWERGRID-RIO at the premises of transformer manufacturers/ DL wood cutter's/DL wood manufacturer & tested at third party lab.										E				
1.6.1	Check thick, width & length	Measurement	One sample of each size per lot	BHEL Spec IEC 61061	Dimension within Tolerance	CMTC	A/B	J/K	S/P	W		N	Record review on surveillance basis		
1.6.2	Flatness	Measurement			IEC 61061	CMTC	A/B	J/K	S/P	W		N			
1.6.3	Flexural strength perpendicular to the laminations	Measurement			IEC 61061	CMTC	A/B	J/K	S/P	W		N			
1.6.4	Apparent modulus of elasticity in flexure perpendicular to the laminations	Measurement			IEC 61061	CMTC	A/B	J/K	S/P	W		N			
1.6.5	Compressibility perpendicular to the laminations C C rev	Measurement			IEC 61061	CMTC	A/B	J/K	S/P	W		N			
1.6.6	Impact strength	Measurement			IEC 61061	CMTC	A/B	J/K	S/P	W		N			
1.6.7	Shearing strength test for glue line bond	Measurement			IEC 61061	CMTC	A/B	J/K	S/P	W		N			
1.6.8	Electric strength perpendicular to the laminations	Measurement			IEC 61061	CMTC	A/B	J/K	S/P	W		N			
1.6.9	Breakdown voltage, parallel to the laminations	Measurement			IEC 61061	CMTC	A/B	J/K	S/P	W		N			
1.6.10	Apparent density	Measurement			IEC 61061	CMTC	A/B	J/K	S/P	W		N			
1.6.11	Moisture content	Measurement			IEC 61061	CMTC	A/B	J/K	S/P	W		N			
1.6.12	Shrinkage after drying Direction A Direction B Thickness	Measurement			IEC 61061	CMTC	A/B	J/K	S/P	W		N			
1.6.13	Oil absorption	Measurement			IEC 61061	CMTC	A/B	J/K	S/P	W		N			

