



BIHAR STATE POWER TRANSMISSION COMPANY LIMITED

MANUFACTURING QUALITY PLAN -- LA

	Equipment Manufacturer	Customer	VENDOR CODE	ITEM	M.Q.P.No.020	Valid from : 15.01.2016
		BSPTCL		Zinc Oxide Surge Arrester upto 400 kV system	Rev.No.00	
						Valid upto : Till Revision

CODE 1	Indicates place where testing is planned to be performed i.e. inspection location
A	At equipment manufacturers works
B	At component manufacturers works
C	At Authorised Distributors place
D	At Independent Lab
R	At Turn Key Contractors location
F	Not specified

CODE 2	Indicates Who has to perform the test i.e. Testing Agency
J	The Equipment Manufacturer
K	The Component Manufacturer
L	The Third Party
M	The Turnkey Contractor

CODE 3	Indicates who shall witness the tests i.e. Witnessing Agency
P	Component Manufacturer itself
Q	Component & Equipment Manufacturer
R	Component, Equipment Manufacturer & Contractor
S	Equipment Manufacturer itself
T	Equipment Manufacturer & Contractor
U	Equipment Manufacturer, Contractor & BSPTCL
V	Third Party itself

CODE 4	Review or Test Reports / Certificates
W	By Equipment Manufacturer
X	By Contractor during product inspection
Y	By BSPTCL during product inspection
Z	By Contractor &/or BSPTCL during product inspection

CODE 5	Whether specific approval of sub-vendor / Component make is envisaged ?
E	Envisaged
N	Not Envisaged

CODE 6	Whether test records required to be submitted after final inspection for issuance of CIP/MICC
Y	Yes
N	No

Notes

- The MQP should be read in conjunction with BSPTCL specification & shall deem to include additional tests if any required as per contract
- BSPTCL specification shall include provisions of letter of award, BSPTCL approved drg./technical data sheet / BOM /Test Schedule/Test procedure applicable to the specific contract
- In case of any contradiction between the manufactures plant standards, this MQP & BSPTCL specification following precedence shall be followed
a) BSPTCL Specification b) This Manufacturing Quality plan c) Manufacturings plant standards
- It is the responsibility of manufacture to ensure this document is readily available at their works, as well as the works of their sub vendors in order to avoid any delay at the time of inspection
- The manufacturer shall ensure that their as well as their sub vendors control, metering & testing instruments are duly calibrated & should have calibration certificates traceable to Indian / International standards. Calibration records should be available during inspection by BSPTCL. Key testing instruments will be calibrated only by NABL accredited lab
- In case of any tests being carried out at third party lab, such lab/ facility should be NABL accredited/accepted by BSPTCL
- Witnessing of Acceptance Tests by BSPTCL shall be on lower whole number of cube root. The contractor or equipment manufacturer will inform in Advance the Serial no. of items being offered for inspection, so that BSPTCL can inform in advance to keep the selected samples ready for witnessing.
- The manufacturer shall maintain the proper co-relation of test certificates from raw material stage to finished product stage & the records should be available during inspection by BSPTCL
- Manufacturer shall show the approval of BSPTCL engineering for all contract specific type tests, including specific type tests if any as per the BSPTCL specification at the time of final inspection
- All packing cases should be marked with BSPTCL LOA details, name of project, item description & CIP/MICC number (by which material has been cleared for dispatch)
- One copy of test report & Dispatch Instructions/Clearance by BSPTCL shall also be sent along with consignment
- Inspection of spare items ordered by BSPTCL shall be governed by the provisions of this MQP. Items if not governed under MQP shall be offered for inspection as per BSPTCL specification / relevant-Indian/International specification.
- The manufacturer shall align their quality system & that of their sub-vendors to the requirements of latest ISO 9000 Quality standards in a time bound manner
- BSPTCL may review the effective implementation of the processes during the product-inspection/process inspection. In case of any violation in process or process parameter are observed, the reason along with corrective & preventive measures shall be conveyed to BSPTCL within 2 weeks.



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Sr.No.	Components / Operations & Description of test	Type of Check	Quantum of Check/Sampling with basis	Reference Document for testing	Acceptance Norms	Format Of RECORD	Applicable Code						Remark
							1	2	3	4	5	6	
Equipment Manufacturer							Valid from : 15.01.2016						
Customer							Valid upto : Till Revision						
VENDOR CODE													
ITEM							Zinc Oxide Surge Arrester upto 400 kV system						
M.Q.P.No.020							Rev.No.00						
BSPTCL													
5	FRP Rod										E		
	Specific Gravity		One sample/lot	BSPTCL Specs	CMTC	B	K	P	W		N		
	water Absorption				CMTC	B	K	P	W		N		
	Glass Content				CMTC	B	K	P	W		N		
	Visual		5 sample/lot EM/100% supplier		CMTC	B	K	P	W		N		
	Dielectric Strength and Di-Pentartion		Once in six month		CMTC	B	K	P	W		N		
	Dimension		5 sample per lot EM & supplier		CMTC	B	K	P	W		N		
6	Spring											E	
	Chemical Composition		One sample/lot	BSPTCL Specs	CMTC	B	K	P	W		N		
	Diameter				CMTC/EMTC	B	K	P	W		N		
	Height				CMTC/EMTC	B	K	P	W		N		
	Load				CMTC	B	K	P	W		N		
	Permanent Set				CMTC	B	K	P	W		N		
7	Gasket											E	
	Shore Hardness		One sample/lot	BSPTCL Specs	CMTC	B	K	P	W		N		
	Tensile Strength				CMTC	B	K	P	W		N		
	Elongation				CMTC	B	K	P	W		N		
	Compression Permanent test				CMTC	B	K	P	W		N		
	Ozone resistance test				CMTC	B	K	P	W		N		
8	Pressure Relief Plate											N	
	Visual		5 sample per lot, EM/100% supplier	BSPTCL Specs	CMTC/EMTC	B	K	P	W		N		
	Dimension				CMTC/EMTC	B	K	P	W		N		
	Thickness				CMTC/EMTC	B	K	P	W		N		
	Pressure test		One sample/lot		CMTC	B	K	P	W		N		
9	Insulating Base											N	
	Electrical Test		One sample/lot	BSPTCL Specs	CMTC	B	K	P	W		N		
	Compression test				CMTC	B	K	P	W		N		
	Dimension		5 sample per lot EM and supplier		CMTC	B	K	P	W		N		
10	Terminal Assy											N	
	Coating thickness in HDG item		1 sample per lot EM/supplier 5 sample	BSPTCL Specs	CMTC	B	K	P	W		N		
	Visual		100%		CMTC	B	K	P	W		N		
	Dimension		1 sample per lot EM & SUPPLIER		CMTC	B	K	P	W		N		



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Equipment Manufacturer	Customer	VENDOR CODE	ITEM	M.Q.P.No.020	Valid from : 15.01.2016							
				Rev.No.00	Valid upto : Till Revision							
11	Surge Counter	BSPTCL	Zinc Oxide Surge Arrester upto 400 kV system	BSPTCL Specs	CMTC/EMTC	B	K	P	W	N	E	
	Calibration setting at 2mA											
	Counter operation test											
	Water dip test											
	Visual											
Dimension	One sample/lot											
12	Hardware	5 sample per lot	BSPTCL Specs	CMTC/EMTC	B	K	P	W	N	E		
Coating thickness												
13	Base Plate	1 sample per lot EM/supplier 5 sample	BSPTCL Specs	CMTC	B	K	P	W	N	N		
	Coating thickness in HDG item											
	Visual											100%
	Dimension											1 sample per lot EM & supplier
14	Grading Ring	one sample/lot	BSPTCL Specs	Third party report	B	K	P	W	N	E		
	Chemical Composition											
	Dimension											1 sample per lot EM/supplier 5 sample
	Visual											1 sample per lot EM/supplier 100%
15	ZnO Blocks a) Aging Test & Wattloss & Thermal Stability b) Energy Capability Test c) Residual voltage d) Reference Voltage e) Visual f) dimension	a) 3Sample/lot b) 100% c) 100% d) 5 Sample/lot e) 100% f) 5 sample/lot		CMTC/EMTC	B	K	P	W	E	N		

B	In-Process Inspection										
1	Powder Processing	BSPTCL Specs		EMTC	A/B	J/K	P/S	W		N	
2	Furnace Area	BSPTCL Specs		EMTC	A/B	J/K	P/S	W		N	
3	ZnO Block Inspection										
	Physical	Visual	BSPTCL Specs & EM Drg.	EMTC	A/B	J/K	P/S	W		N	
	Dimension	Visual	BSPTCL Specs & EM Drg.	EMTC	A/B	J/K	P/S	W		N	
	Parallality	Visual	BSPTCL Specs & EM Drg.	EMTC	A/B	J/K	P/S	W		N	
	Residual Voltage Test	Electrical	BSPTCL Specs & IEC 60099-4	EMTC	A/B	J/K	P/S	W		N	
	Short Duration Aging Test	Electrical	BSPTCL Specs & BSPTCL Specification	EMTC	A	J	U	W/Z		Y	
	Thermal stability test & energy capability test on ZnO Blocks	Electrical	BSPTCL Specs & BSPTCL Specification / IEC 60099-4 (2 L.D. impulses of 2 msec Duration)	EMTC	A	J	U	W/Z		Y	Sample should be from on going production irrespective of contract. U shall be P for Distribution Class (CIP)
	Wattloss test on ZnO Blocks	Electrical	BSPTCL Specs & BSPTCL Specification	EMTC	A	J	U	W/Z		Y	

EM:Equipment Manufacturer
CM:Component Manufacturer

TC:Test Certificate
ZPLM : Zinc Oxide Lightning Arresters plant manufacturing standard

DPS:Design process specification

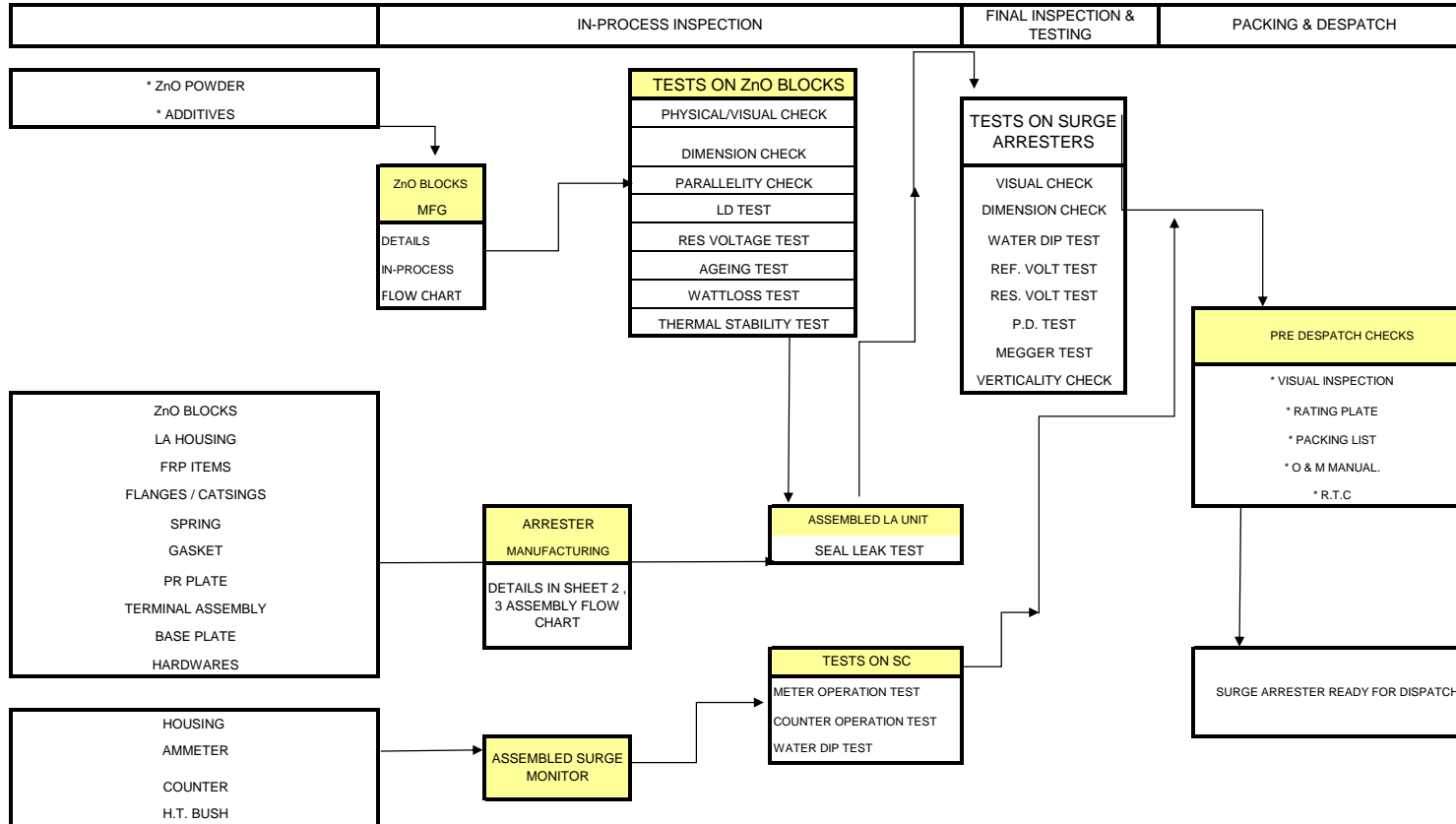


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PROCESS FLOW DIAGRAM FOR SURGE ARRESTER



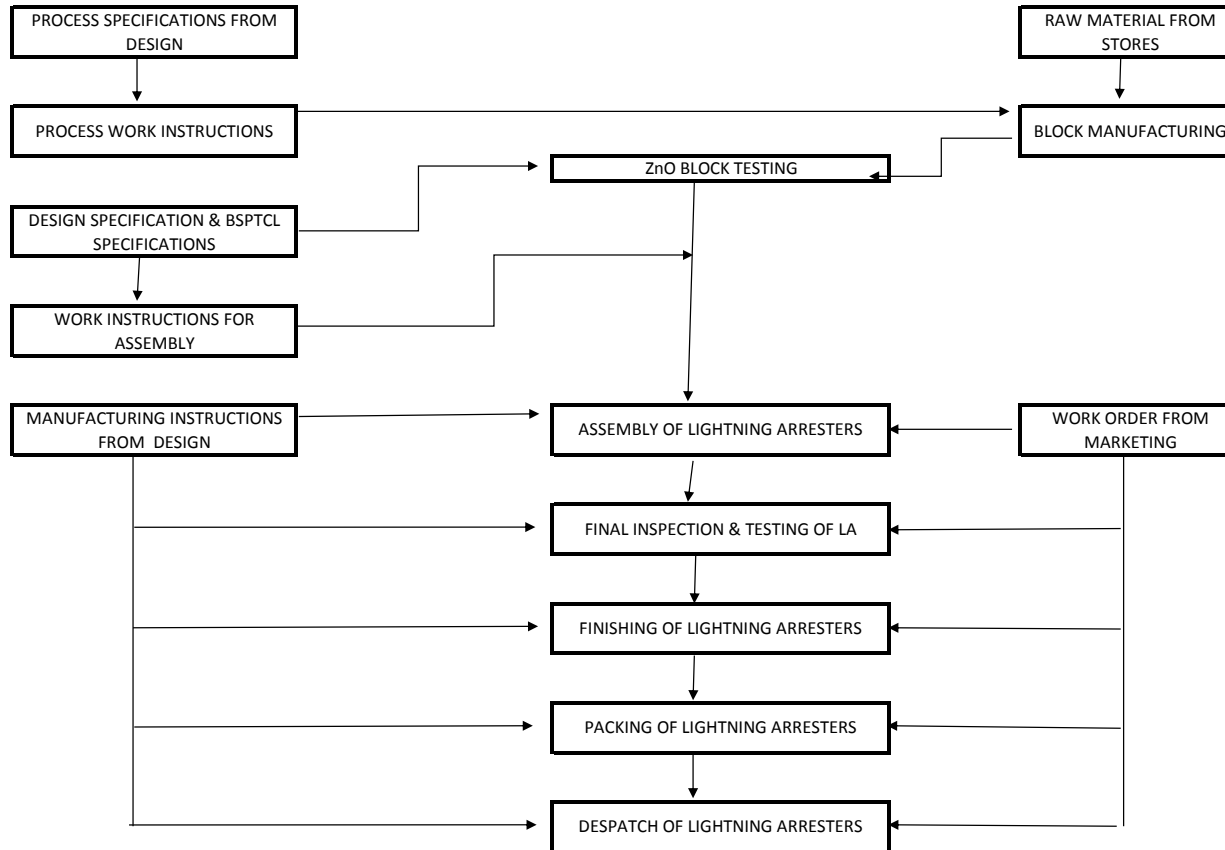



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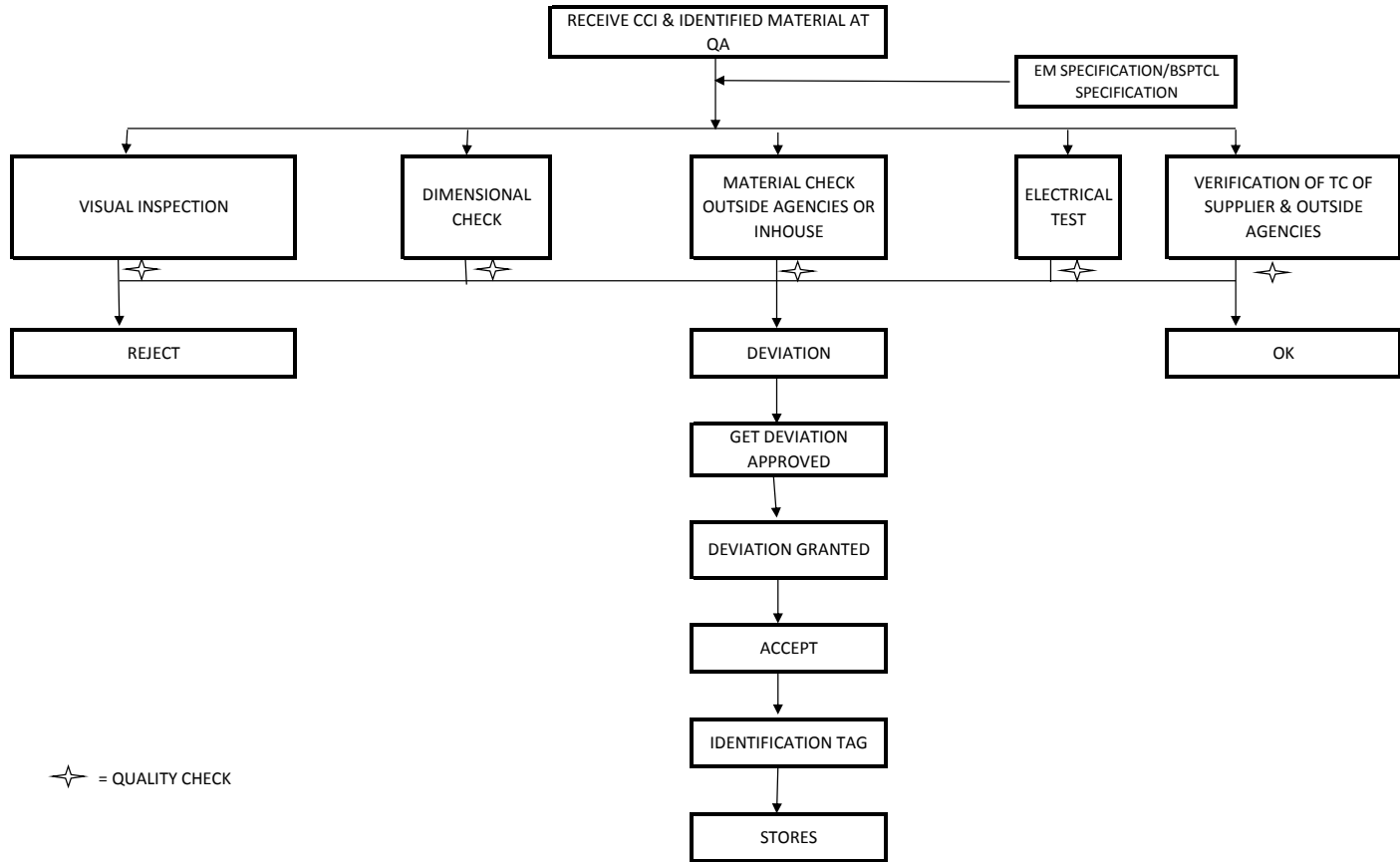
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ARRESTER MANUFACTURING FLOW CHART



 BIHAR STATE POWER TRANSMISSION COMPANY LIMITED					
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RAW MATERIAL INSPECTION



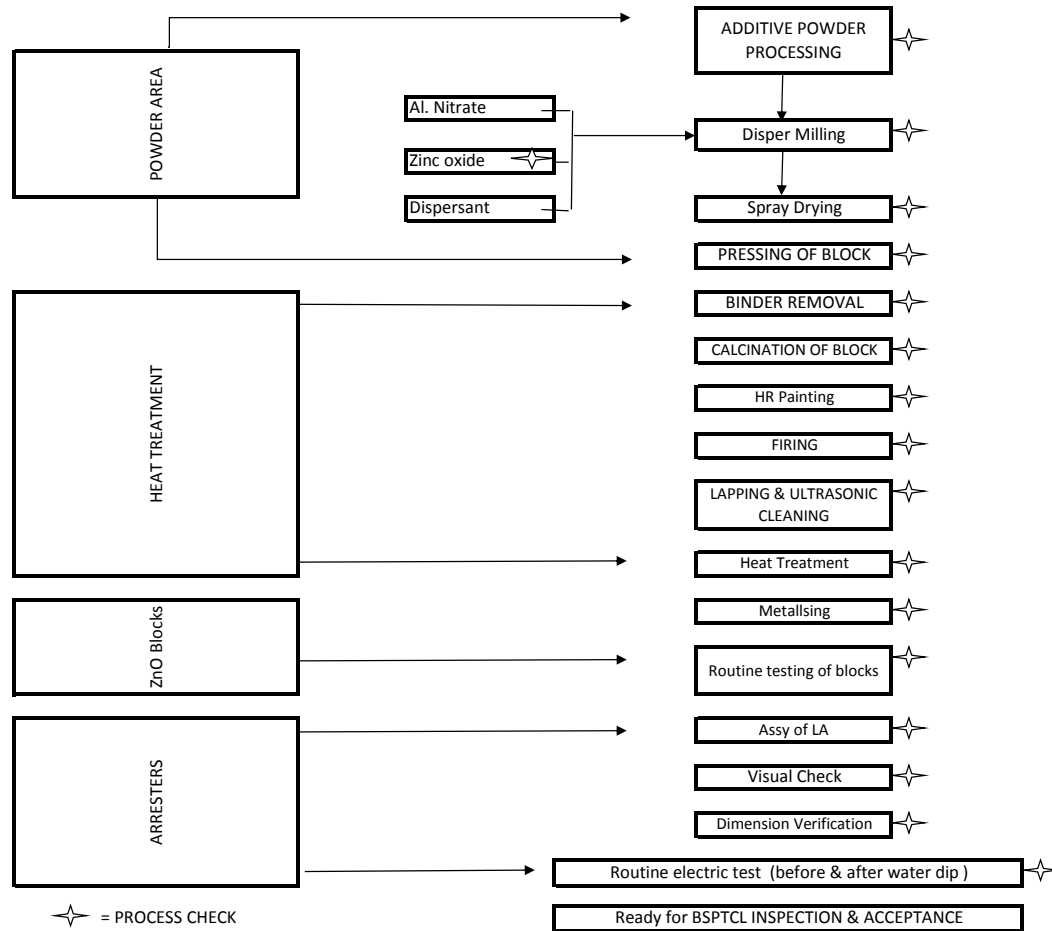


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ZnO BLOCK MFG. / INSPECTION IN PROCESS FLOW CHART



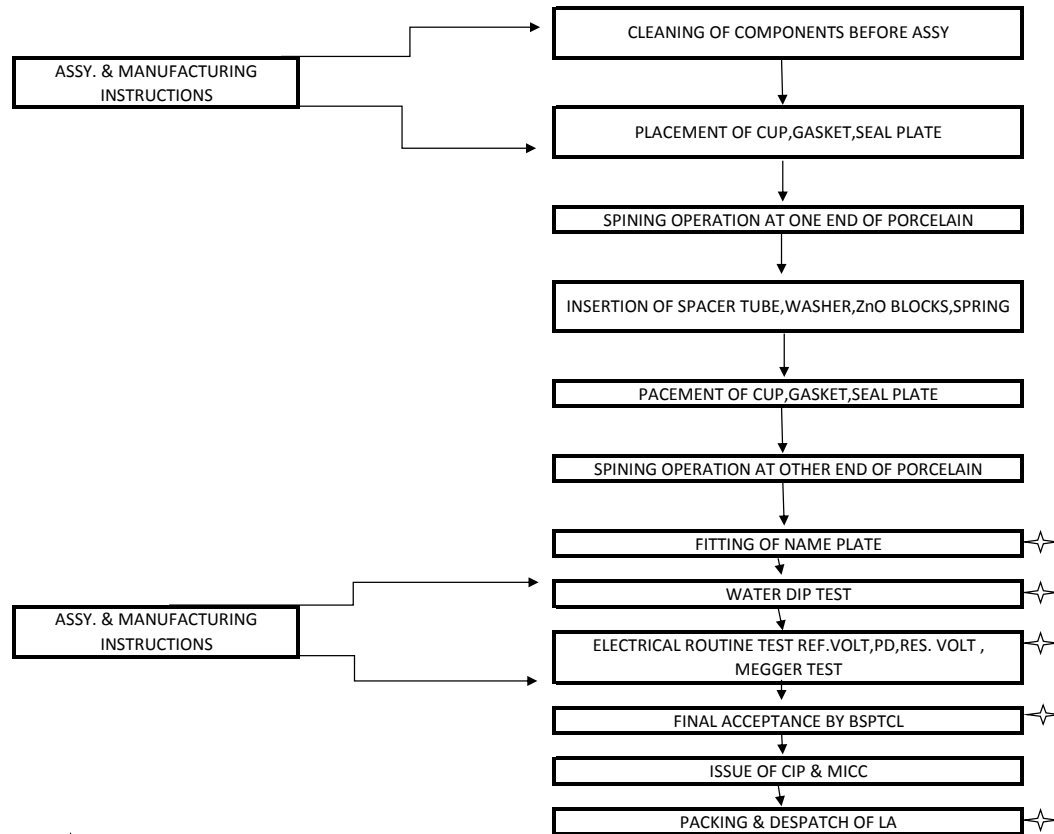



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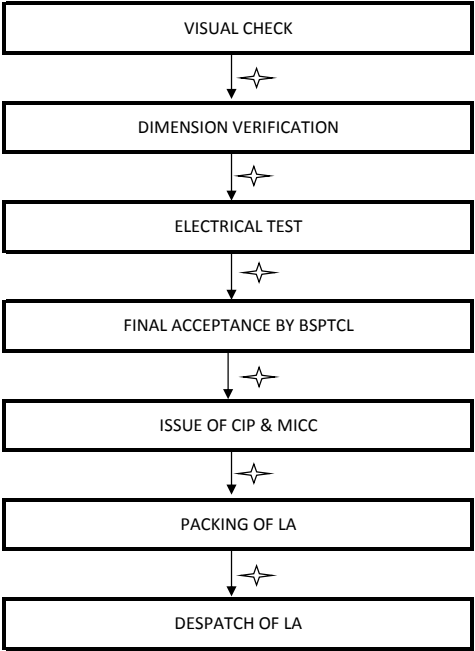
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MANUFACTURING FLOW CHART OF DISTRIBUTION CLASS ARRESTERS



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FINAL INSPECTION & ACCEPTANCE FLOW CHART



★ = QUALITY CHECK



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Equipment Manufacturer		Customer		VENDOR CODE	ITEM	M.Q.P.No.020	Valid from : 15.01.2016						
		BSPTCL			Zinc Oxide Surge Arrester upto 400 kV system	Rev.No.00	Valid upto : Till Revision						
4A Routine Test on Arrester: Station class Arresters													
1	Physical	Visual	100%	IEC 60099-4 / BSPTCL Specs	Free from Visual defect	EMTC	A	J	S	W		Y	
2	Dimension	Visual	100%	Approved Drg	As per Approved Drg.	EMTC	A	J	S	W		Y	
3	Leak Test	Mechanical	100%	IEC 60099-4 / BSPTCL Specs	Evacuate & hold vacuum for 30 min. There shall be no leakage	EMTC	A	J	S	W		Y	
4	Water Dip Test	Mechanical	100%	IEC 60099-4 / BSPTCL Specs	Imersion in water for 30 min	EMTC	A	J	S	W		Y	
5	Reference Voltage test	Electrical	100%	IEC 60099-4 / BSPTCL Datasheet	IEC 60099-4 / BSPTCL datasheet. Before & After water Dip at 1.5 meter depth, 30 min	EMTC	A	J	S	W		Y	
6	Partial Discharge Test	Electrical	100%			EMTC	A	J	S	W		Y	
7	Residual Voltage Test	Electrical	100%			EMTC	A	J	S	W		Y	
8	Megger Test	Electrical	100%			EMTC	A	J	S	W		Y	
9	Verticality Check	Visual	1 No / lot	BSPTCL Specs.	BSPTCL Specification	EMTC	A	J	S	W		Y	

4B Routine Test on Arrester: Distribution class Arresters												
1	Physical	Visual	100%	IEC 60099-4 / BSPTCL Specs	Free from Visual defect	EMTC	A	J	S	W		Y
2	Dimension	Visual	100%	Approved Drg	As per Approved Drg.	EMTC	A	J	S	W		Y
4	Water Dip Test	Mechanical	100%	IEC 60099-4 / BSPTCL Specs	Imersion in water for 30 min	EMTC	A	J	S	W		Y
5	Reference Voltage test	Electrical	100%	IEC 60099-4 / BSPTCL Datasheet	IEC 60099-4 / BSPTCL datasheet. Before & After water Dip at 1.5 meter depth, 30 min	EMTC	A	J	S	W		Y
6	Partial Discharge Test	Electrical	100%			EMTC	A	J	S	W		Y
7	Residual Voltage Test	Electrical	100%			EMTC	A	J	S	W		Y
8	Megger Test	Electrical	100%			EMTC	A	J	S	W		Y



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Equipment Manufacturer		Customer		VENDOR CODE	ITEM	M.Q.P.No.020	Valid from : 15.01.2016						
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4C Final Acceptance & Testing													
1 Final Acceptance test on Arrester													
	Physical	Visual	³√Lot (Cu Rt of Qty)	IEC 60099-4 / BSPTCL Specs	Free from Visual defect	EMTC	A	J	T/U	W/Z		Y	
	Dimension	Visual		Approved Drg	As per Approved Drg.	EMTC	A	J	T/U	W/Z		Y	
	Reference Voltage Test	Electrical		IEC 60099-4 / BSPTCL Datasheet	IEC 60099-4 / BSPTCL datasheet.Post water dip at 1.5 meter depth,30 Mins	EMTC	A	J	T/U	W/Z		Y	
	Partial Discharge Test	Electrical				EMTC	A	J	T/U	W/Z		Y	
	Residual Voltage Test	Electrical				EMTC	A	J	T/U	W/Z		Y	
	Megger Test	Electrical				EMTC	A	J	T/U	W/Z		Y	
2 Final Acceptance test on Surge Counter													
	Counter Operation Test	Electrical	³√Lot (Cu Rt of Qty)	IEC 60099-4 / BSPTCL Specs	Shall increment at > 100 A 8/20 us	EMTC	A	J	T/U	W/Z		Y	
	Meter Operation Test	Electrical		IEC 60099-4 / BSPTCL Specs	Current meter calibration at 2mA (peak/V2)	EMTC	A	J	T/U	W/Z		Y	
4D Packing & Dispatch													
Packing Case													
	Physical	Visual	Ref.EM Doc.No. ZPLM-13			EMTC	A	J	S	W	N	N	
	Dimension	Visual				EMTC	A	J	S	W	N	N	



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LIST OF COMPONENT MANUFACTURERS

Sr.No.	Item	Supplier	Address			Remark
1	Porcelain Insulator	IEC Bhopal	1-8 New Indl. Area,Mandideep,Bhopal			
		CJI Porcelain Pvt.Ltd	Junction Road,Khurja (UP)			
		M/s Lilling Huaxin Porcelain	Sambu villege,pukou town,lilling city,Hunan			
2	Polymeric Insulator	Xian XD Hgh voltage Bushing Co.	No. 009 East section of shiji road,Xianyang,Shaanxi,P.R.China			
		Jiang Su Shenma Electric Co.	Jiangsu Shenma Electric Co., Ltd.,Rucheng Town,Rugao city,Nantong city,Jiangsu Prov.,China 226533			
		CTC Insulator Co. Ltd	15-1, Huayang Road, Lushun Economic Development Zone, Dalian,China			
3	Aluminium Flanges / Casting	ACMI Industries-Hyderabad	D-8 Phase-IV (Extn)IDA jeedimetia,Hyderabad			
		Sri Sai Casting-Tirupati	1-5-555,2nd Flr.Saisrinivas,Balaji colony,Tirupati			
		Exalt Engg-Mumbai	B-31,Nand Bhawan,Ind.Estate, Mahakali caves road,Andher(East) Mubai			
4	Spring	Star Spring-Nasik	Plot No.E-43,MIDC,Ind. Area,Ambad,Nashik			
5	Gasket	Blaze enterprises	J-42,MIDC,AMBAD-422010			
6	Insulating Base	Radiant Insulator-Vadodara	C1-351/2 GIDC Makarpura, Vadodara – 390 010,			
7	Grading Ring	Dalian Ceramic Technic Co. Ltd	A12-2 Dushi Haijing,2-12 Gangwan Street,Dalian,China			
		Tetra Engineers-Nasik	C1-900/2/A-29,MIDC Area,Ambad,Nashik			
		Samgor	Shanghai Jiuzhi electric co.ltd. No. 500,Remintang Road,Cauolo town,pudong ,Shanghai , china			
8	Galvanizing	Vir Electro-Nasik	XI-11,12,13 MIDC Ambad,Nashik			
9	HARDWARE	Make-NEXO INDUSTRIES, PANKAJ INTERNATIONAL, REMAX INDIA, DEEPAK FASTNERS (LUDHIANA)	Suryodaya Traders-Nasik ,312 Hanuman Bldg.Perin Narman street,Near Pydhone,Mumbai			
			Soham Industries-Mumbai ,50/54 Ground Flr,Kolsa Street,Near Pydhone-Mumbai			
			Ashish Enterprises ,s.kanihya so ganesh nagar Jail Road Nashik			
			Viniti Enterprises ,shop no. 9510 new ashoka vihar MIDC Ambad Nashik-10			
10	Surge Counter	Line Sieki	Japan			
11	FRP Rod/Tube		Shriram FG product pvt. Ltd	B-66 Dyavasandra Ind.Estate,Whitefield road,Banglore-560048		
			Chekkeny Composities Private Ltd	No.25,Opp Vivekananda inst. Of tech. kumbalgodkengari hobli,Banglore		
			Sunrise Fibre glass industries	48/A,58/A,4th cross thigalarap, balaji nagar, peenya 2 nd stage,Banglore		
			A-3 Corporation	E-39,MIDC Ind. Area,Ambad,Nashik		
12	Zno Block	Wenzhou Yikun Electric Co. Ltd	Hexiang Road,Aojiang,Pingyang,Wenzhou,325401,Zhejia ng,P.R.China			

* EM can procure material from other BSPTCL approved sources also not mentioned in the list