

MANUFACTURING QUALITY PLAN -- VCB

/anufacturer's	Manufacturer's Name & Address	Customer	Vendor's Code:	Item:	M.Q.P. No.	011	Valid From:	15.01.2016			
EM		BSPTCL		Indoor H.T panel with VCB & Outdoor vacuum ckt.breakers	Rev. No. Date:	00	Valid Upto:	Till Revisior			
Code 1	Indicates place where testing is plan	ned to be performed i.e. Inspection location	Code 2	Indicates who has to	o perform the te	ests i.e. Testina	Agency				
A	At Equipment Manufacturer's works		J	The Equipment Man		J	5				
В	At Component Manufacturer's works		ĸ	The Component Mar							
С	At Authorised Distributor's place		L	The Third Party							
D	At Independent Lab		М	The Turnkey Contrac	ctor						
E	At Turn Key Contractor's location			,							
F	Not specified										
Code 3	Indicates who shall witness the tests	i.e. Witnessing Agency	Code 4	Review of Test Repo	orts/Certificates						
Р	Component Manufacturer itself		W	By Equipment manua	facturer						
Q	Component Manufacturer and Equipm		Х	By Contractor during							
R	Component Manufacturer, Equipment	Manufacturer and Contractor	Y	By BSPTCL during p	•						
S	Equipment Manufacturer itself		Z	By Contractor and/or	 BSPTCL during 	product/proces	s inspection				
Т	Equipment Manufacturer and Contract										
U	Equipment Mannufacturer, Contractor	and BSPTCL									
V	Third Party itself										
					•	submitted after fi	nal inspection for issua	nce of Dispatch			
Code 5	Whether specific approval of sub-vend	or / Component make is envisaged?	Code 6	Instructions/Clearand	ce?						
E	Envisaged		Y	Yes							
Ν	Not Envisaged		N	No							

Notes:

1. The MQP should be read in conjunction with BSPTCL specification and shall deem to include additional tests if any required as per the contract.

2. BSPTCL specification shall include provisions of letter of Award , BSPTCL approved drawings /technical data sheet / BOM / test schedule / test procedure applicable to the specific contract.

3. In case of any contradiction between the manufacturer's plant standards, this MQP and BSPTCL specification following precedence shall be followed :-

- a) BSPTCL specification .
- b) This Manufacturing Quality plan.
- c) Manufacturer's plant standards .

4. It is the responsibility of the manufacturer to ensure that this document is readily available at their works, as well as at the works of their sub vendors in order to avoid any delay at the time of inspection.

5. The manufacturer shall ensure that their as well as their sub vendors control, metering & testing instruments are duly calibrated and 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 laboratories.



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6. In case of any tests being carried out at third party lab, such lab / facility should be NABL accredited / accepted by BSPTCL.

7. Witnessing of Acceptance Tests by BSPTCL shall be on 25% of the number of samples for acceptance test. The Contractor or Equipment Manufacturer will inform in advance the serial number of equipment/items being offered for inspection, so that BSPTCL can inform in advance to keep the selected samples ready for witnessing.

8. The manufacturer shall maintain the proper co-relation of test certificates from raw material stage to finished product stage and the records should be available during inspection . by BSPTCL.

9. 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.

10. All packing cases should be marked with BSPTCL LOA details , name of project , item description and DESPATCH INSTRUCTION/CLEARANCE (by which material has been cleared for dispatch) .

11. One copy of test report , DESPATCH INSTRUCTION/ CLEARANCE shall also be sent along with consignment .

12. Inspection of spare items ordered by BSPTCL shall also be governed by the provisions of this MQP. Items if not governed under MQP shall be offered for inspection as per BSPTCL specifications / Relevant-Indian / International Specification.

13. Any material rejected during BSPTCL inspection shall be disposed off with approval of BSPTCL. In case the material is to be returned to the component Manufacturer, all such items shall be indebly marked (to prevent mixing) at the works of the manufacturer and offered to BSPTCL inspection engineer for verification of marking.

14. The manufacturer shall align their quality system and that of their sub-vendors to the requirements of latest ISO 9000 quality standards in a time bound manner .

15. The list of component manufacturers for which sub-vendor approval are envisaged is enclosed herewith.

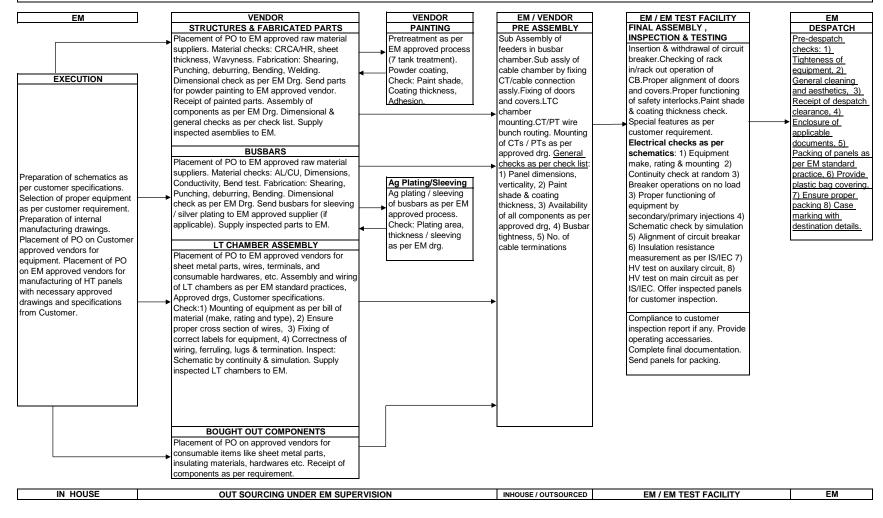
17. BSPTCL may review the effective implementation of the processes during the product-inspection / process-inspection. In case any violation in process or process parameters are observed, the reason along with corrective & preventive measures shall be conveyed to BSPTCL within 2 weeks.

 EM : Equipment Manufacturer
 CM : Component Manufacturer
 TC : Test Certificates

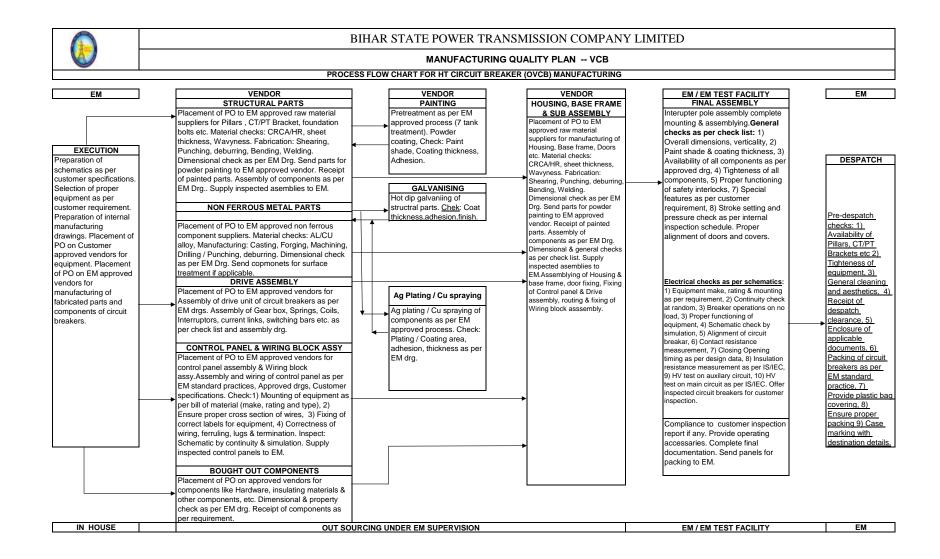


MANUFACTURING QUALITY PLAN -- VCB

PROCESS FLOW CHART FOR HT PANEL MANUFACTURING



		MANUFACTURING QU	ALITY PLAN VCB	
	PROCESS FLOW CHART FOR	HT CIRCUIT BREAKER (IVCB) M	ANUFACTURING	
EM	VENDOR CASINGS, TRUCKS_SUB-ASSLY	VENDOR	EM	
EXECUTION Preparation of schematics as per customer specifications. Selection of proper equipment as per customer requirement. Preparation of internal manufacturing drawings. Placement of PO on Customer approved vendors for equipment. Placement of PO on EM approved vendors for manufacturing of fabricated parts and components of circuit breakers.	CASINGS, IRUCKS SUB-ASSLY Placement of PO to EM approved material suppliers for Casings, Trucks, Bus PT, Earthing trucks & contactor trollies. Material checks: CRCA/HR, sheet thickness, Wavyness. Fabrication: Shearing, Punching, deburring, Bending, Welding. Dimensional check as per EM Drg. Assembly of components as per EM Drg. Dimensional & general checks as per check list. Supply inspected asemblies to EM. NON FERROUS METAL PARTS Placement of PO to EM approved non ferrous component suppliers. Material checks: AL/CU alloy, Manufacturing: Casting, Forging, Machining, Drilling / Punching, deburring. Dimensional check as per EM Drg. Send copmonets for sufface treatment if applicable. Supply inspected parts to EM / Sub-vendor for sub-asembly. WIRING BLOCK ASSEMBLY Placement of PO to EM approved vendors for Wiring block assemblies.Wiring block assembly consists of wires, terminals, and consumable hardwares, etc. manufactured as per EM standard practices, Approved drgs, Customer specifications. Check: 1) Mounting of equipment as per bill of material (make, rating and type), 2) Ensure proper cross section of wires, 3) Fixing of correct labels for equipment, 4) Correctness of wiring, ferruling, lugs & termination. Inspect: Schematic by continuity & simulation. Supply inspected control panels to EM. BOUGHT OUT COMPONENTS Placement of PO on approved vendors for	PAINTING Pretreatment as per EM approved process (7 tank treatment). Powder coating, Check: Paint shade, Coating thickness, Ag Plating / Cu spraying of components as per EM approved process. Check: Plating / Coating area, adhesion, thickness as per EM drg.	FINAL ASSEMBLY, INSPECTION & TESTING Assembly of circuit breakers as per EM drgs and customer requirement. Assembly of Gear box, Springs, Coils, Interruptors, current links, switching bars etc. as per check list and assembly drg. Tightening of current carrying parts as per EM standard practices. Identification of components. General checks as per check list: 1) Overall dimensions, verticality, 2) Paint shade & coating thickness, 3) Availability of all components as per approved drg, 4) Tighteness of all components, 5) Proper functioning of safety interlocks, 7) Special features as per customer requirement, 8) Stroke setting and pressure check as per inspection schedule. Electrical checks as per schematics: 1) Equipment make, rating & mounting as per requirement, 2) Continuity check at random, 3) Breaker operations on no load, 3) Proper functioning of equipment, 4) Schematic check by simulation, 5) Alignment of circuit breakar, 6) Contact resistance measurement, 7) Closing Opening timing as per disgin data, 8) Insulation resistance measurement as per IS/IEC, 0) HV test on auxilary circuit, 10) HV test on main circuit as per IS/IEC. Offer inspected circuit breakers for rustomer inspection Compliance to customer	DESPATCH Pre-despatch checks: 1) Final dressing of wires, covers etc, 2) Tighteness of equipment, 3) General cleaning and aesthetics, 4) Receipt of despatch clearance in case of external customer 5) Enclosure of applicable documents, 6) Packing of circuit breakers in case of external customer 7) Provide plastic bag covering, 8) Ensure proper packing 9) Case marking with destination details.
	components like sheet metal parts, insulating materials, hardwares, springs, etc. Dimensional & property check as per EM drg.		inspection report if any. Provide operating accessaries. Complete final documentation.	





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EM					Indoor H.T panel with VCB & Outdoor vacuum ckt. breakers	Rev. No. Date:	00			Valid	Upto:		Till Revision
	Commonanto / Onomitiono 8	Turne of check	Quentum of Choole /	Defense de coment				A 10	uliaak				Demerica
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	1	Ар 2	3	le Coo 4	5	6	Remarks
Α.	Raw Material Inspection												
1	Sheet steel CRCA/Hot rolled										Е		Review of
	1.1 Dimensions including this langes	Management	d comple / let		IS 513 - CRCA	СМ ТС	В		Р	14/		N	CMTC/EMTC
	1.1 Dimensions including thickness 1.2 Surface finish & waviness	Measurement Visual	1 sample / lot 100%	IS 513 - CRCA IS 1079 - HR	IS 513 - CRCA IS 1079 - HR	CIVITC	B	K K	<u>Р</u> Р	W		N N	during final inspection by
	1.3 Physical properties	Mechanical	1 sample / lot	13 10/9 - HK	13 10/9 - HK		B	ĸ	<u>Р</u> Р	W		N	BSPTCL
	1.4 Chemical composition	Chemical	1 sample / lot				B	K	P	W		N	DOI TOL
2	Non Ferrous metals										N		
	Cu / Al used in busbars												
	2.1 Dimensions	Measurement	1 sample / lot	IS 5082 - AL	IS 5082 - AL	CM TC	В	к	Р	W		Ν	
	2.2 Surface finish & waviness	Visual	1 sample / lot	IS 613, 1897 - Cu	IS 613, 1897 - Cu		В	K	Р	W		Ν	
	2.3 Conductivity	Mechanical	1 sample / lot				В	K	Р	W		N	
	2.4 Chemical composition	Chemical	1 sample / lot				В	K	Р	W		Ν	
3	Sheet metal fabricated parts										Е		
	3.1 Dimensional check	Measurement	10% / lot	EM Drawing	EM Drawing	CM TC	В	К	Р	W		N	
	3.2 Appearance	Visual	10% / lot	g			B	ĸ	P	W		N	
4	Resin cast insulators										Е		
	4.1 Dimensions	Measurement	2 samples / lot	IEC 660.	IEC 660.	СМ ТС	В	К	Р	W		N	
	4.2 Surface finish	Visual	2 samples / lot	EM Drawing	EM Drawing		В	K	P	W		N	
	4.3 Cantilever force	Mechanical	2 samples / lot				В	K	Р	W		Ν	
	4.4 HV test	Electrical	2 samples / lot				В	K	Ρ	W		Ν	
5	Non ferrous metal parts i.e Cu , Al used for busbars										Ν		
	5.1 Dimensions	Measurement	10% / lot	EM Drawing	EM Drawing	СМ ТС	В	К	Р	W		N	
	5.2 Finish	Visual	10% / lot				B	ĸ	P P	W		N	
6	Springs										Е		
	6.1 Dimensions	Measurement	10% / lot	EM Drawing	EM Drawing	СМ ТС	В	К	Р	W		N	
	6.2 Finish	Visual	10% / lot				B	ĸ	<u>Р</u> Р	W		N	
	6.3 Properties	Mechanical	10 Samples / lot				B	K	<u>-</u> Р	W		N	



V					ALITY PLAN VCB						
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EM					Indoor H.T panel with VCB & Outdoor vacuum ckt. breakers	Rev. No. Date:	00			Valid Upto:	Till Revision
	Components / Operations &	Type of check	Quantum of Check /	Reference document				٨٣	nliaah	le Codes	Remarks
Sr. No.	Description of Test	туре от спеск	Sampling with basis	for Testing	Acceptance Norms	Format of Record	1	2	3	4 5 6	Remarks
7	Fastners (screws, nuts, washers)									N	
	7.1 Dimensional check	Measurement	10% / lot	IS 1363, 1364, 1367,	IS 1363, 1364, 1367,	СМ ТС	В	К	Р	W N	Review of
	7.2 Appearance	Visual	10% / lot	2016, 2389	2016, 2389	(For high tensile)	B	ĸ	P	W N	CMTC/EMTC
	7.3 Torque test	Mechanical	4 samples / lot	EM spec.	EM spec.		В	K	P	W N	during final
	(For high tensile fastners)			BSPTCL spec.,	BSPTCL spec.,			i v			inspection by
8	Porcelain Insulators									E	BSPTCL
		Magazina	400/ / 1-1		Annual Drawing	014 70	_	K			-
	8.1 Dimensional ckeck	Measurement	10% / lot	Approved Drawing	Approved Drawing	CM TC	B	K	P	W N	_
	8.2 Appearance	Visual	10% / lot	EM spec.	EM spec. IS 5621/IEC233	CM TC	B	K	P	W N	-
	8.3 Dielectric strength	Electrical	1 sample / lot	IS 5621/IEC233	IS 5621/IEC233	CM TC	В	K	P	W N	-
	8.4 Temp Cycle Test	Physical	1 sample / lot	IS 5621/IEC234		CM TC	В	K	P	W N	-
	8.5 Porosity test	Physical	1 sample / lot	IS 5621/IEC235	IS 5621/IEC235	CM TC	В	K	P	W N	-
9	8.6 Bend Test Name plate	Physical	1 sample / lot	IS 5621/IEC236	IS 5621/IEC236	CM TC	В	K	Р	W N	-
-											
	9.1 Dimensional check	Measurement	1 sample / type / lot	BSPTCL spec.,	BSPTCL spec.,	-	В	К	Р	- N	
	9.2 Appearance	Visual	10% / lot	EM spec.	EM spec.		B	K	P	- N	
10	PVC insulated flexible wires									N	
10	(ISI marked)										
	10.1 Diameter check	Electrical	1 sample / lot	IS 694,	IS 694,	СМ ТС	В	K	P	W N	
	10.2 Resistance check	Measurement	1 sample / lot	BSPTCL spec.,	BSPTCL spec.,	CIVITC	B	K	P	W N	
	10.3 Thicknes of insulation	Measurement	1 sample / lot	EM spec.	EM spec.		B	K	P	W N	
	10.4 Flammability test	Burning	1 sample / lot				B	K	P	W N	
	10.5 Water immersion test	Electrical	1 sample / lot				B	K	P	W N	
11	Rubber Gasket									E	
	11.1 Visual check	Visual	1x sample / lot	EM Drawing	EM Drawing	СМ ТС	В	K	Р	W N	
	11.2 Dimensional check	Measurement	1x sample / lot				B	K	P	W N	
	11.3 Flammability check	Burning	1x sample / lot				B	K	P	W N	
В.	Bought-out Components										
1	Measuring, Indicating & Recording									E	
•	type panel mounted instruments										



-	Manufacturer's Name & Address	Customer	BSPTCL	NUFACTURING QUA	T	M.Q.P. No.	011			Valid	From		15.01.2016
	Manufacturer's Name & Audress	Customer	BSPICE	venuor s coue.	Item:								
EM					Indoor H.T panel with VCB & Outdoor vacuum ckt. breakers	Rev. No. Date:	00			Valid	Upto		Till Revision
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	1	Ар 2	plicat 3	ole Coo 4	des 5	6	Remarks
	(Voltmeter, Ammeter, Wattmeter,												
	Varmeter, Frequency meter)												
							_		_				
	1.1 Make, Rating & Type	Visual	100%	IS 1248 part 2-5,	IS 1248 part 2-5,	CM TC	B	K	P	W		N	
	1.2 Apperance & finish	Visual	2 samples / type / lot	IEC 51,	IEC 51,		B	K	P	W		N	
	1.3 Calibration test	Electrical	100%	BSPTCL spec.,	BSPTCL spec.,		В	K	P	W		N	Deviewert
	1.4 Functional test	Electrical	100%	EM spec.	EM spec.		В	K	Р	W		N	Review of
2	Control / Coloctor switches										-		CMTC/EMTC
2	Control / Selector switches						+				E		during final
	2.1 Make, Rating & Type	Visual	100%	IS 13947 part 1-5,	IS 13947 part 1-5,	СМ ТС	В	К	Р	W		N	inspection by BSPTCL
		Visual	2 samples / type / lot	IEC 60947,	IEC 60947,	CMITC	B		P	W		N	BSPICE
	2.2 Apperance & finish 2.3 Mechanical operation test	Mechanical	2 samples / type / lot 100%	BSPTCL spec.,	BSPTCL spec.,		B	K K	P	W		N	
	2.4 Continuity check for contacts	Electrical	100%	EM spec.	EM spec.		B	ĸ	P	W		N	
	•	Electrical	100%	EIM Spec.	Elvi spec.		D	n	Р	vv		IN	
	in different positions									-			
3	MCB										E		
0	MCD										L		
	3.1 Make, Rating & Type	Visual	5 samples / lot	IS 8828, IEC 60898	IS 8828, IEC 60898	EM Record	Α	J	S	-		N	
	3.2 Functional check	Electrical	5 samples / lot	BSPTCL spec.,	BSPTCL spec.,	LINITCOOL	A	J	s	-		N	
	3.3 HV test	Electrical	5 samples / lot	EM spec.	EM spec.		A	J	S	-		N	
		Liootiioai						Ŭ					
4	HRC control fuse link										E		
	4.1 Make, Rating & Type	Visual	100%	IS 13947 part 1-5,	IS 13947 part 1-5,	EM Record	Α	J	S	-		Ν	
	4.2 Continuity test	Electrical	100%	IEC 60947,	IEC 60947,		Α	J	S	-		Ν	
5	Space Heater										E		
	5.1 Make, Rating & Type	Visual	5 samples / lot	BSPTCL spec.,	BSPTCL spec.,	CM TC	Α	J	S	W		Ν	
	5.2 Functional test	Electrical	5 samples / lot	EM spec.	EM spec.		Α	J	S	W		Ν	
	5.3 HV test	Electrical	5 samples / lot				Α	J	S	W		Ν	
6	Thermostat										E		
	6.1 Make Pating & Type	Visual	5 complex / let	BSPTCL spec.,	BSPTCL spec.,	CM TC	^	1	c	W		N	
	6.1 Make, Rating & Type 6.2 Functional test	Electrical	5 samples / lot 5 samples / lot	EM spec.	EM spec.		A	J J	S S	W		N N	
	6.3 HV test			EW Spec.	Eivi spec.		A	J	S	W		N	
		Electrical	5 samples / lot				A	J	3	VV		IN	
				-							I	L	



			MA	NUFACTURING QU	ALITY PLAN VCB								
	Manufacturer's Name & Address	Customer	BSPTCL	Vendor's Code:	Item:	M.Q.P. No.	011			Valid	From		15.01.2016
EM					Indoor H.T panel with VCB & Outdoor vacuum ckt.	Rev. No. Date:	00			Valid	Upto:		Till Revision
					breakers								
Sr. No.	Components / Operations & Description of Test	Type of check	Quantum of Check / Sampling with basis	Reference document	Acceptance Norms	Format of Record	1	Ap 2	plicab 3	le Coo 4	des 5	6	Remarks
7	Control Terminal Block			U							Е		
	7.1 Visual check	Visual	10% / lot	IS 13947 part 1-5,	IS 13947 part 1-5,	EM Record	Α	J	S	-		Ν	
	7.2 Continuity check	Electrical	10% / lot	IEC 60947,	IEC 60947,		Α	J	S	-		Ν	
	7.3 HV test	Electrical	10% / lot	BSPTCL spec.,	BSPTCL spec.,		Α	J	S	-		Ν	
				EM spec.	EM spec.								
8	Plug socket and switch (ISI marked)										Ν		
	8.1 Make, Rating & Type	Visual	10% / lot	BSPTCL spec.,	BSPTCL spec.,	EM Record	A		S	-		N	Review of
	8.1 Make, Rating & Type	visual	10% / 10t			EIVI Record		J					CMTC/EMTC
				EM spec.	EM spec.		A		S	-		N	
							A	J	S	-		Ν	during final inspection by
9	Push button with element										Е		BSPTCL
	9.1 Visual check	Visual	100%	BSPTCL spec.,	BSPTCL spec.,	EM Record	Α	J	S	-		Ν	
				EM spec.	EM spec.		Α	J	S	-		Ν	
10	Indicating lamp assembly										E		
			10001	DODTO	DODTO								
	10.1 Visual check	Visual	100%	BSPTCL spec.,	BSPTCL spec.,	EM Record	A	J	S	-		N	
				EM spec.	EM spec.		A	J	S	-		Ν	
11	Transducer										Е		
	11.1 Visual check (Rating)	Visual	100%	BSPTCL spec.,	BSPTCL spec.,	СМ ТС	В	К	P	W		N	
	11.2 Accuracy	Electrical	100%	EM spec.	EM spec.		В	K	Р	W		Ν	
	11.3 HV test	Electrical	100%	· ·	•		В	Κ	Р	W		Ν	
	11.4 Operational test	Electrical	100%				В	K	Р	W		Ν	
12	Current transformer										E		
	12.1 Visual check	Visual	100%	BSPTCL spec.,	BSPTCL spec.,	CM TC	В	Κ	Р	W		Ν	
	12.2 Polarity check	Electrical	100%	EM spec.	EM spec.		В	Κ	Р	W		Ν	
	12.3 Ratio check	Electrical	100%				В	K	Р	W		Ν	
	12.4 Accuracy class	Electrical	100%				В	K	Р	W		Ν	
	12.5 HV test	Electrical	100%				В	K	Р	W		Ν	
13	Voltage transformer										Е		



EM 57. No. 13.1 13.2 13.2 13.2 13.2 13.2 13.5	Anufacturer's Name & Address Components / Operations & Description of Test Collarity check Carried Col	Customer Type of check Visual Electrical Electrical Electrical Electrical	BSPTCL Quantum of Check / Sampling with basis 100% 100%	Vendor's Code: Reference document for Testing BSPTCL spec., EM spec.	Item: Indoor H.T panel with VCB & Outdoor vacuum ckt. breakers Acceptance Norms	M.Q.P. No. Rev. No. Date: Format of Record	011 00 1	Ap 2	plicab 3	Valid Valid Die Coo 4	Upto les		15.01.2016 Till Revision Remarks
Sr. No. 13.1 13.2 13.3 13.4 13.5	Description of Test .1 Visual check .2 Polarity check .3 Ratio check .4 Accuracy class .5 HV test	Visual Electrical Electrical Electrical	Sampling with basis 100% 100%	for Testing BSPTCL spec.,	& Outdoor vacuum ckt. breakers Acceptance Norms	Date:				ole Coo	des		Till Revision Remarks
Sr. No. 13.1 13.2 13.2 13.3 13.4 13.5	Description of Test .1 Visual check .2 Polarity check .3 Ratio check .4 Accuracy class .5 HV test	Visual Electrical Electrical Electrical	Sampling with basis 100% 100%	for Testing BSPTCL spec.,	•	Format of Record	1					6	Remarks
13.2 13.3 13.4 13.5	2.2 Polarity check 2.3 Ratio check 3.4 Accuracy class 3.5 HV test	Electrical Electrical Electrical	100%	· · ·								-	
13.2 13.3 13.4 13.5	2.2 Polarity check 2.3 Ratio check 3.4 Accuracy class 3.5 HV test	Electrical Electrical Electrical	100%	· · ·	BSPTCL spec.,	СМ ТС	В	K	P	w		N	
13.3 13.4 13.5	a.3 Ratio check a.4 Accuracy class a.5 HV test	Electrical Electrical			EM spec.		B	K	P	W		N	
13.4 13.5	.4 Accuracy class .5 HV test	Electrical	10070				B	K	P	W		N	
13.5	5.5 HV test		100%				B	K	P	W		N	
14 Ann	nnunciators (including window)		100%				B	K	P	W		N	
14 Anr	inunciators (including window)										E		
1											E		
14.1	.1 Visual check (inscription, size)	Visual	100%	BSPTCL spec.,	BSPTCL spec.,	CM TC	В	К	Р	W		N	
		Electrical	100%	EM spec.	EM spec.		B	K	P	W		N	
		Electrical	100%				B	K	P	Ŵ		N	
	.4 HV test	Electrical	100%				B	K	P	W		N	Review of
15 Mim	enie stein (If samlischie)										N		CMTC/EMTC
	mic strip (If applicable)										IN		during final inspection by
15.1	.1 Visual check for colour	Visual	1x Random sample	BSPTCL spec.,	BSPTCL spec.,	INSP REPORT	Α	J	S	-		N	BSPTCL
	and symbol		•	EM spec.	EM spec.								
		Measurement	1x Random sample		•		Α	J	S	-		Ν	
16 Sen	emaphore indicators / Hooter / Bell /										Е		
	izzer / Test terminal block /										<u> </u>		
	por switch												
16 '	5.1 Visual check (Type, Rating)	Visual	1x Random sample	BSPTCL spec.,	BSPTCL spec.,	СМ ТС	В	K	P	W		N	
		Electrical	100%	EM spec.	EM spec.		B	K	P	W		N	
		Electrical	100%				B	K	P	W		N	
17 Curr	urrent operated relay										E		
17.1		Visual	100%	IS 3231, IS 8686,	IS 3231, IS 8686,	CM TC	В	к	Р	W		N	
17.2	.2 Functional check	Electrical	100%	IEC 60255	IEC 60255		В	K	Р	W		Ν	
17.3	7.3 HV test	Electrical	100%	BSPTCL spec.,	BSPTCL spec.,		В	K	Р	W		Ν	
				EM spec.	EM spec.								
18 Volt	oltage operated relay										Е		
40.	1 Viewel abook (Time Dation)	Viewel	1000/		10 2024 10 0000					14/		NI	
	3.1 Visual check (Type, Rating)	Visual	100%	IS 3231, IS 8686, IEC 60255	IS 3231, IS 8686, IEC 60255	CM TC	B	K	P	W		N	
	3.2 Functional check 3.3 HV test	Electrical Electrical	100% 100%	BSPTCL spec.,	BSPTCL spec.,		B	K	P P	W		N N	



	Manufacturer's Name & Address	Customer	BSPTCL	Vendor's Code:	Item:	M.Q.P. No.	011			Valid	From	:	15.01.2016
EM		Cuctomor	201102		Indoor H.T panel with VCB	Rev. No.	00				Upto:		Till Revision
			1		& Outdoor vacuum ckt. breakers	Date:	00			Vana			
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	1	Ар 2	plicat 3	ole Coo 4	les 5	6	Remarks
				EM spec.	EM spec.								
											_		
19	Numerical relay										E		
	19.1 Visual check (Type, Rating)	Visual	100%	IEC 60255	IEC 60255	CM TC	В	К	Р	W		N	
	19.2 Power Consumption	Electrical	100%	BSPTCL spec.,	BSPTCL spec.,		B	K	P	W		N	
	19.3 Pick-up values & Tolerances	Electrical	100%	EM spec.	EM spec.		B	K	P	W		N	
	19.4 Pick-up time & Tolerances	Electrical	100%				B	ĸ	P	W		N	
	19.5 Operating time & Tolerances	Electrical	100%				B	ĸ	P	W		N	
	19.6 Binary Inputs & Outputs	Electrical	100%				В	K	P	W		N	
	19.7 Isolation Test	Electrical	100%				В	K	P	W		N	
							_						
20	Lamp Holder / Flurocent /										Ν		
	Incadescent Lamp (ISI marked)												
	20.1 Visual check	Visual	100%	BSPTCL spec.,	BSPTCL spec.,	EM Record	Α	J	S	-		Ν	Review of
				EM spec.	EM spec.								CMTC/EMTC
				·	·								during final
21	Vacuum Interrupter										Е		inspection by
	1												BSPTCL
	21.1 Rating & Type	Visual	100%	Relevant IS / IEC	Relevant IS / IEC	EM Record	Α	J	S	-		Ν	
	21.2 Appearance & Finish	Visual	100%	EM spec.	EM spec.		Α	J	S	-		Ν	
		Electrical	100%	BSPTCL specs/manufa	cturers specs	CM TC	В	Κ	Р	W		Ν	
	21.4 Rated power freq withstand	Electrical	100%	BSPTCL specs/manufa	•	CM TC	В	Κ	Р	W		Ν	
	voltage	Electrical		BSPICE specs/manula	clurers specs								
	21.5 Rated lighting impulse withstand	Electrical	100%	BSPTCL specs/manufa	aturara anaga	CM TC	В	Κ	Р	W		Ν	
	voltage	Liectrical		BOF TOL Specs/manuta	clurers specs								
	21.6 Last measurement of internal	Mechanical	100%	BSPTCL specs/manufa	cturors space	CM TC	В	Κ	Р	W		Ν	
	pressure	INICOLIAITICAL		BOF ICL Specs/manula	ciuleis specs								
22	Isolators / Earthing Switch										Ν		
				10.0004	10 0004	01170			_				
	22.1 Rating & Type	Visual	100%	IS 9921 - Isolator	IS 9921 - Isolator	CM TC	B	K	P	W		N	
	22.2 Appearance & Finish	Visual	100%	IEC - 62271-8 - ESW	IEC - 62271-8 - ESW		В	K	P	W		N	
	22.3 Mechanical operations	Mechanical	100%	EM spec.	EM spec.		В	K	P	W		N	
	22.4 Routine Tests	Elec. & Mech.	100%				В	К	Р	W		Ν	
											_		
23	Vacuum Contactor										Е		



V			MAI	NUFACTURING QUA	LITY PLAN VCB								
	Manufacturer's Name & Address	Customer	BSPTCL	Vendor's Code:	Item:	M.Q.P. No.	011			Valid	From	:	15.01.2016
EM					Indoor H.T panel with VCB & Outdoor vacuum ckt.	Rev. No.	00			Valid	Upto:		Till Revision
			1		breakers	Date:							
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	1	Ap 2	oplicab 3	le Coc 4	les 5	6	Remarks
	23.1 Rating & Type	Visual	100%	IEC 60470	IEC 60470	CM TC	В	К	P	W		N	
	23.2 Appearance & Finish	Visual	100%	EM spec.	EM spec.		B	K	P	Ŵ		N	
	23.3 Routine Tests	Elec. & Mech.	100%				B	K	P	W		N	
24	Surge Arrestors										Е		
	24.1 Rating & Type	Visual	100%	IS 3070-3	IS 3070-3	CM TC	В	K	Р	W		Ν	
	24.2 Appearance & Finish	Visual	100%	IEC 6099-4	IEC 6099-4		В	Κ	Р	W		Ν	
	24.3 Routine Tests	Electrical	100%	EM spec.	EM spec.		В	K	Р	W		Ν	
C.	In Process Inspection												
											_		
	Shearing, Punching, Bending, Deburring, Nibbling, Welding etc.										E		
	1.1 Visual check	Visual	1x Random sample	EM Drawing	EM Drawing		В	К	Р	-		Ν	
	1.2 Dimensional check	Measurement	1x Random sample				В	K	Р	-		Ν	
	1.3 Type of weld	Visual	1x Random sample	EM Drawing	EM Drawing		В	K	Р	-		Ν	
	1.4 Weld Location	Measurement	1x Random sample				В	K	Р	-		Ν	
	1.5 Weld Dimensions	Measurement	1x Random sample				В	K	Р	-		Ν	
	1.6 Finish of Weld	Visual	1x Random sample				В	K	Р	-		Ν	
	Surface Treatment for all panels												
2	Pretreatment by 7 tank process										E		
	2.1 Degreasing		100%	EM spec.		Log book,	В	К	P	W		N	1) Review of
	Bath pointage	Chemical titration	Daily	PTD-M/PMC/PNT/4.09	80-100 for P-20	Lab test records	D	N		~~		IN	records on
	Dain pointage		Dully	1 10 10/1 100/1 101/4.09	50-70 for S-398								surveillance
	Bath temperature		Every four hour		75-85 °C								basis by SL
	2.2 Water rinsing at ambient		100%		Oil layer		В	К	Р	W		N	2) Process
	temperature		10070		should be removed				'				validation on
	2.3 Derusting at ambient temperature		100%				В	К	Р	W		N	yearly basis
	Bath pointage	Chemical titration	Daily		20-26								by SL
	2.4 Water rinsing at ambient		100%		Derusting solution		В	К	Р	W		N	5y 0L
	temperature				should be removed at 7% iron content				1	VV		IN	
	2.5 Phosphating		100%				В	K	Р	W		N	



V			MAI	NUFACTURING QUA	LITY PLAN VCB							
	Manufacturer's Name & Address	Customer	BSPTCL	Vendor's Code:	Item:	M.Q.P. No.	011			Valid From	:	15.01.2016
EM					Indoor H.T panel with VCB & Outdoor vacuum ckt.	Rev. No. Date:	00			Valid Upto:	:	Till Revision
			1		breakers	Date.						
• • •	Components / Operations &	Type of check	Quantum of Check /	Reference document				Ap	plicab	le Codes		Remarks
Sr. No.	Description of Test		Sampling with basis	for Testing	Acceptance Norms	Format of Record	1	2	3	4 5	6	
	Bath pointage	Chemical titration	Daily		20-24							
	Bath temperature		Every four hour		65-70 °C							
	2.6 Water rinsing at ambient		100%		Sluge should		В	Κ	Р	W	Ν	
	temperature				be removed							
	2.7 Passivation		100%				В	Κ	Р	W	Ν	
	Bath pointage	pH measurement	Daily		2-4 pH							
	2.8 Hot air drying		100%		Should show whitish		В	Κ	Р	W	Ν	
	Scratch test by blunt knife	Scratch test	Once / batch		streak							
3	Powder Coated Painting									E		
-	3											
	3.1 Paint shade	Visual	100%	BSPTCL spec.,	BSPTCL spec.,	INSP REPORT	В	К	Р	W	Ν	
	3.2 Surface finish		Random samples	EM spec.	EM spec.		B	K	P	W	N	
	3.3 Coating thickness	Measurement	Random samples	PTD-M/PMC/PNT/4.09			B	ĸ	P	Ŵ	N	
		Modouromont	every hour		9x readings on each							
					plain surface							
	Structural Assembly											
4	Structural sub-assembly									N		
	Structural Sub-assembly											
	4.1 Visual check	Visual	100%	EM Drawing	EM Drawing	INSP REPORT	В	K/J	P/Q	W	N	Review of
	4.2 Dimensional check	Measurement	100%				B	K/J	P/Q	W	N	CMTC/EMTC
												during final
	Structure pillars for OVCB			BSPTCL Spec/ EM spec		CM TC						inspection by
	4.4 Visual & dimentional check	Visual/measurement					В	Κ	Р	W	Ν	BSPTCL
	4.4 Uniformality of galvanizing	Visual					В	Κ	Р	W	Ν	
	4.5 Thichness of galvanizing	Measurement					В	Κ	Р	W	Ν	
	4.6 Mass of Zinc coating	Measurement					В	Κ	Р	W	Ν	
5	Structural final assembly									N		
<u> </u>												
	5.1 Correctness of assembly	Visual	100%	EM Drawing	EM Drawing	INSP REPORT	В	K/J	P/Q	W	N	
	5.2 Dimensions	Measurement	100%				B	K/J	P/Q	Ŵ	N	
	Circuit Breakers											
6	Electrical Functions									N		
	6.1 Rating of coils, motor	Visual	100%	Order instruction sheet	Order instruction sheet	INSP REPORT	A	J	S		N	



	Manufacturer's Name & Address	Customer	BSPTCL	Vendor's Code:	Item:	M.Q.P. No.	011			Valid	From	:	15.01.2016
EM		Customor	201102		Indoor H.T panel with VCB	Rev. No.	00			Valid	Unto		Till Revision
					& Outdoor vacuum ckt. breakers	Date:	00			Valia	opto		THI REVISION
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	1	Ap 2	plicab 3	le Coo 4	les 5	6	Remarks
	6.2 Auxiliary switch	Electrical	100%	EM Drawing	EM Drawing		Α	J	S			Ν	
	6.3 Wiring Correctness	Electrical	100%				Α	J	S			Ν	
7	Mechanical Functions										N		
		Marshania al	4000/		EN4				0				
	7.1 Functioning of Gear box and	Mechanical	100%	EM spec.	EM spec.	INSP REPORT	A	J	S			N	
	Spring charging motor	Machanical	4000/				^					NI	
	7.2 CB opening & closing 7.3 Stroke adjustments	Mechanical Mechanical	100% 100%				A	J	S			N	
	7.3 Stroke adjustments 7.4 Contact pressure	Mechanical	100%				A	J	S S			N N	
							A	J					
	7.5 Spring checking for any abnormalit		100%				A	J	S			N	
	Switchboards												
8	Busbar, feeder connection and										N		
	cable termination assembly												
	8.1 Material	Visual	100%	Order instruction sheet	Order instruction sheet	INSP REPORT	A/B	J/K	Р	W		N	
	8.2 Size	Measurement	100%	EM Drawing	EM Drawing		A/B	J/K	Р	W		Ν	
	8.3 Arrangement	Visual	100%				A/B	J/K	Р	W		Ν	
	8.4 Tightening of joints	Measurement	Random samples				A/B	J/K	Р	W		Ν	
	8.5 Phase identification marking	Visual	100%				A/B	J/K	Ρ	W		Ν	
9	Equipment mounting & connections										Е		
	9.1 Type & Details	Visual	100%	Order instruction sheet	Order instruction sheet	INSP REPORT	В	K	Р	W		N	Review of CMTC/EMTC
	9.2 Damages / defects	Visual / Functional	100%	EM Drawing	EM Drawing		B	K	P	W		N	during final
	9.3 Layout & mounting	Visual	100%				B	K	P	Ŵ		N	inspection by
	9.4 Alignment	Visual / Functional	100%				B	K	P	W		N	BSPTCL
	9.5 Electrical connections	Visual / continuity	100%				B	K	P	Ŵ		N	DONTOL
	9.6 Ferrules / sleeves on wires	Visual	Random samples				B	K	P	W		N	
	9.7 Earthing	Visual / continuity	100%				B	K	P	Ŵ		N	
	9.8 Operation	Functional	100%				B	K	P	Ŵ		N	
10	Final assembly / General points										N		
	10.1 Overall dimensione	Magguramant	Dandam aamala	Order instruction chart	Order instruction chart	INSP REPORT			Р	W		N	
	10.1 Overall dimensions	Measurement	Random sample	Order instruction sheet		INOP REPORT	A/B	J/K					
	10.2 Paint shade	Visual	100%	EM Drawing	EM Drawing		A/B	J/K	P	W		N	
	10.3 Surface finish	Visual	100%				A/B	J/K	P	W		N	
	10.4 Door alignment	Functional	100%				A/B	J/K	Р	W		N	



EM

BIHAR STATE POWER TRANSMISSION COMPANY LIMITED

MANUFACTURING QUALITY PLAN -- VCB Manufacturer's Name & Address M.Q.P. No. 011 Valid From: 15.01.2016 BSPTCL Vendor's Code: Customer Item: Indoor H.T panel with VCB Rev. No. Valid Upto: 00 **Till Revision** & Outdoor vacuum ckt. Date:

	Components / Operations & Type of chec			breakers Date:									
		nponents / Operations & Type of check Quantum of Check / Refe	Reference document			۸n	nlicah	ole Coo	105		Remarks		
Sr. No.	Description of Test	Type of check	Sampling with basis	for Testing	Acceptance Norms	Format of Record	1	2	3	4	5	6	Keinarks
	10.5 Gaskets	Visual	100%				A/B	J/K	Р	W		Ν	
	10.6 Wire dressing	Visual	100%				A/B	J/K	Р	W		Ν	
	10.7 Interchangeability	Functional	Random sample				A/B	J/K	Р	W		Ν	
	10.8 Nameplates	Visual	100%				A/B	J/K	Р	W		Ν	
-	10.9 Identification marks	Visual	100%				A/B	J/K	Р	W		Ν	
	10.10 General aesthetics	Visual	100%				A/B	J/K	Р	W		Ν	
	10.11 Order related features	Visual / Functional	100%				A/B	J/K	Р	W		Ν	
D.	ROUTINE TESTS												
1	Routine Tests for Circuit Breaker										N		
	1.1 Spring charging	Electrical	100%	IS 12729, 13118	IS 12729, 13118	INSP REPORT	A	J	S	W		N	
	1.2 CB operation timings	Electrical	100%		IEC 60694, 622271-100		Α	J	S	W		N	
	1.3 Resistance of main circuit	Electrical	100%	EM spec.	EM spec.		Α	J	S	W		Ν	
	1.4 HV test on auxiliary circuit	Electrical	100%		(IEC 694, 56 for Indoor		Α	J	S	W		Ν	
	1.5 HV test on main circuit	Electrical	100%	CB above 12kV)	CB above 12kV)		Α	J	S	W		Ν	
	1.6 Alignment & disengagement of tension spring after 100 operations	Visual	100%			Routine Test Certificate	A	J	S	W		Y	
	Routine tests for switchboard and Bre	aker											
	all tests as per acceptance tests		100%										
	mentioned below												
2	Switchboard routine test										N		
	2.1 Electrical connections	Visual	100%	IS 12729, 3427	IS 12729, 3427	INSP REPORT	Α	J	S	W		Ν	
	2.2 Operation tests on no load	Elec. & Mech.	100%	IEC 60694, 62271-200			A	J	S	W		Ν	
	by simulation of circuit			(IEC 694, 298 for	(IEC 694, 298 for								
	2.3 Insulation resistance test	Electrical	100%		switchboards above		Α	J	S	W		Ν	
	2.4 HV test on main circuits	Electrical	100%	12kV)	12kV)		Α	J	S	W		Ν	
	2.5 HV test on aux. Circuit	Electrical	100%	Order instruction sheet			Α	J	S	W		Ν	
				EM Drawing	EM Drawing								
E.	FINAL INSPECTION & TESTING												
1	Circuit Breakers												
	1.1 Spring Charging / Check for spring disengagement	Elec. & Mech.		IS 12729, 13118	IS 12729, 13118	Routine Test Certificate	A	J	U	Y		Y	C.I.P



V			MA	NUFACTURING QUA	LITY PLAN VCB								
	Manufacturer's Name & Address	Customer BSPTCL Vendor's Code: Iten	Item:	tem: M.Q.P. No.	011		Valid From:		:	15.01.2016			
EM					Indoor H.T panel with VCB & Outdoor vacuum ckt.	Rev. No.	00			Valid Upto			Till Revision
					breakers	Date:							
Sr. No.	Components / Operations & Description of Test	Type of check	Quantum of Check / Sampling with basis	Reference document	Acceptance Norms	Format of Record	1	Ap 2	oplicab 3	le Coo 4	les 5	6	Remarks
	1.2 CB Closing & Opening on no load	Flec. & Mech.			IEC 60694, 622271-100		Α	J	U	Y		Y	C.I.P
	1.3 Resistance of main circuit	Electrical		EM spec.	EM spec.		A	J	Ŭ	Ý			C.I.P
	1.4 CB operation timings with	Electrical			(IEC 694, 56 for Indoor	INSP REPORT	A	J	U	Ý			C.I.P
	speed curves	Licothoai					~	0				· ·	0.1.1
	1.5 HV test on aux. Circuit	Electrical		CB above 12kV)	CB above 12kV)		Α	J	U	Y		Y	C.I.P
	1.6 HV test on main circuit	Electrical		BSPTCL spec.	BSPTCL spec.		A	J	U	Y			C.I.P
		Liectrical		DOI TOL Spec.	DOI TOL Spec.			5	0	1			0.1.1
2	Switchboards												
	2.1 Visual check of electrical conn./ BOM check & Dimentional check	Visual / measuremen	Random samples	BSPTCL spec.	BSPTCL spec.,		A	J	U	Y		Y	C.I.P
	2.2 Paint finish & coating thickness	Measurement	Random samples	EM spec.	EM spec.		Α	J	U	Y		Y	C.I.P
	<u> </u>		•	PTD-M/PMC/PNT/4.09									
					9x readings on each								
					plain surface								
	2.3 Operation test on no load	Elec. & Mech.		IS 12729, 3427	IS 12729, 3427		Α	J	U	Y		Y	C.I.P
	2.4 Insulation resistance test	Electrical			IEC 60694, 62271-200		A	J	U	Ŷ			C.I.P
	2.5 HV test on aux. Circuit	Electrical		(IEC 694, 298 for	(IEC 694, 298 for		A	J	U	Ŷ			C.I.P
	2.6 HV test on main circuit	Electrical		switchboards above	switchboards above		A	J	Ŭ	Y			C.I.P
	2.7 Order related features	Visual / Functional		12kV)	12kV)		A	J	U	Y			C.I.P
		riodal, r difetional			Order instruction sheet			0				-	0.1.1
				EM Drawing	EM Drawing								
				BSPTCL spec.	BSPTCL spec.								
3	Structural Assembly												
	4.4 Visual & dimentional check	Visual/maasuramont	Random samples	Approved drawing			A	J	U	Y		V	C.I.P
	4.4 Uniformity of galvanizing	Visual	Random samples				A	J	U	Y			C.I.P
	4.5 Thichness of galvanizing	Measurement	Random samples	86 microns min/ BSPTC	L Specs		A	J	U	Y			C.I.P
F.	Packing and Despatch												
1	Pre-despatch checks												
	1.1 Packing worthyness	Visual	100%	BSPTCL spec.,	BSPTCL spec.,	EM's Records	A	J	S	-	E	N	
	1.2 Identification marking on	Visual	100%	Approved drawings,	Approved drawings,		A	J	S	-	E	N	
	packed cases	visual	10070	EM spec.	EM spec.		~	J	5	-		IN	
	1.3 Despatch destination marking	Visual	100%				^		S		Е	N	
			100%				A	J		-		N	
							A	J	S S	-	E		
	1.5 Enclosure of applicable	Visual	100%				A	J	5	-	E	Ν	
	documents, Sr. No. Records of												



V			MAI	NUFACTURING QUA	LITY PLAN VCB								
	Manufacturer's Name & Address	Indoor H.T panel with VCB Rev. N		M.Q.P. No.	011			Valid	From	:	15.01.2016		
EM						Rev. No.	00			Valid	Upto	:	Till Revision
					& Outdoor vacuum ckt. breakers	Date:							
Sr. No.	Components / Operations &	Type of check	Quantum of Check /	Reference document	Acceptance Norms	Format of Record		Ap 2	oplicat 3			6	Remarks
	Description of Test		Sampling with basis	for Testing			1	2	3	4	5	6	
	components mounted on panel												
2	Check for healthyness of packing	Visual	100%	EM spec.	EM spec.		A	J	S	-	E	N	
-		Viodal	10070					- U					
3	Verification of CIP/MICCC reference	Visual	100%	EM spec.	EM spec.	EM's Records	Α	J	S	-	Е	Ν	
	on packing cases												
	Witness of Samples												
	•												
	S - Equipment Manufacturer		100%										
	EM												
	T/U - Turnkey Contractor shall												
	witness 75% and												
	BSPTCL shall witness												
	25% of offered lot												

Sr.no.	Category	Name of Vendor	Address	E-mail
		PRAGATI ELECTRICALS P LTD. (HT	R-230,TTC,MIDC	vishal.borse@praga
1	Current Transformer/Potential transformer	CT, PT, CBCT, Control trafo)	INDUSTRIAL AREA, RABALE, NAVI MUMBAI, 400701	tielectricals.com
2	Current Transformer/Potential transformer	Electrical Controls & Systems (ECS) (HT CT, PT, CBCT, Control trafo, Close/Trip coils for HT circuit breakers)	Plot No 866/2 G.I.D.C. Makarpura, Vadodara, 390010,	amit@epoxyhouse. com
3	Current Transformer/Potential transformer	KAPPA ELECTRICALS (HT CT, PT, CBCT, Control trafo)	5/3 CART TRACK ROAD, MADUVANKARAI, CHENNAL 600042	KAPPA@VSNL.CO M
4	Current Transformer/Potential transformer	GEMINI INSTRATECH PVT. LTD. (HT CT, PT, CBCT, Control trafo)	H 43, MIDC, AMBAD, NASHIK, 422010	manojp@geminiinst ratech.com
5	Miscellaneous panel items	SHUBHADA POLYMERS PRODUCTS PVT LTD (HT earthing switches, CVD, Busbar joint shrouds, Insulating materials, Switching bars, 12/36kV HT bushings)	CTS 111,OPP.L&T GATE NO.5, SAKI VIHAR ROAD POWAI, MUMBAI, 400072	gfp@bom5.vsnl.net. in
6	Miscellaneous panel items	Raychem Rpg Ltd (HT surge arrestors for indoor HT panels)	1/62 MG Rd, Off Western Express, Highway, Near BHP, Post Sativali, Vasai, Thane, 401208	sraman@raychemr pg.com
7	Fabricated Busbars / HT busbar sleeves	Raychem RPG Ltd (HT busbar insulating sleeve, Fabricated busbarsfor HT panels)	CEAT Mahal Annexe, 463, Dr. Annie Besant Rd., Mumbai, 400025	
8	PVC Wires	RR KABEL LTD (Control wires/cables of various size & type for HT panel)	RAM RATNA HOUSE,OASIS COMPLEX, KAMLA MILL COMP., S.B.MARGLOWER PAREL, MUMBAI, 40042	RAMRATNA@BOL NET.IN
9	PVC Wires	Rolliflex Industries (Control wires/cables of various size & type for HT panel)	202, Sangam Arcade, V.P. Road, Opposite Station Vile Parle (W), Mumbai 400056	ROLLIFLEX@VSN L.COM
10	PVC Wires	Polycab Wires (Control wires/cables of various size & type for HT panel)	HICO House, 1st floor, Pandit Satawalekar Marg, Mahim(W), Mumbai- 400016	nrkhush@polycab.c om
11	IVCB components	INSULE PRODUCTS (Busbar support insulators, Breaker pole insulators)	19 ANJU SHOPPING CENTRE, TILAK ROAD, SANTACRUZ WEST, MUMBAI, 400054	GFP@BOM5.VSNL .NET.IN
12	Miscellaneous panel items	Mascasts (Busbar support insulators)	14/15 Apurva Indl Estate Makwana Rd, Marol Naka Andheri, Mumbai, 400059	mascasts@satyam. net.in
13	Miscellaneous panel items	INDIA INSULATORS (Busbar support insulators, Breaker pole insulators)	NEAR MARATHE MILLS, MIRAJ, MAHARASHTRA, 416410	SAN_PRECAST@ SANCHARNET.IN
14	Miscellaneous panel items	Multi Crafts (Insulating materials, Busbar joint shrouds)	Shed No 81-B/6 MIDC, General Block Bhosari, Pune, 411026	MULTICRAFTS@V SNL.COM
15	Miscellaneous panel items	GLASSFIBRE & ALLIED INDUSTRIES (Insulating materials & auxillary s/w)	SUN CHAMBERS, NEXT TO CANARA BANK, GOREGAON EAST, MUMBAI, 400063	GLASSFIBRE@VS NL.COM

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	[Liberty Moulding Works (Nulon	Unit No 4 Raut Ind	nradaan kumaran
16	IVCB components	Liberty Moulding Works (Nylon moulded parts for HT breakers, Contact arms for HT breakers)	Estate, Senapati Bapat Marg, Mahim, Mumbai, 400016	pradeep_kumaran @hotmail.com
17	Sheet metal fabricators	SHRI SWASTIK ENGINEERS PVT LTD (Sheet metal fabricated structural parts and sub-assembly)	W- 395M.I.D.C.RABALE, NAVI MUMBAI, 400701	sseplw395@yahoo. com
18	Sheet metal fabricators	Manik Industrial Engineering Ltd (Sheet metal fabricated parts)	Lakhi Ind House, L.B.S. Marg, Bhandup (W), Mumbai, 400078	DKM@MANIKINDI A.COM
19	Sheet metal fabricators	GWS ENGINEERS & FABRICATORS PVT (Sheet metal fabricated structural parts and sub-assembly)	A-512 MAHAPE ,MIDC,TTC INDL AREA, OFF THANE BELAPUR ROAD, NAVI MUMBAI,	GWSENGINEERS @REDIFFMAIL.CO M
20	Discontinued	DHANASHREE METALS PVT. LTD. (Sheet metal fabricated parts)	PLOT NO.55 NCZ,MIDC TALOJA, NAVI MUMBAI, 410206	NP_DEO@REDIFF MAIL.COM
21	Discontinued	UNIVERSAL WIRE INDUSTRIES —— (Sheet metal fabricated structural parts and sub-assembly)	PLOT NO.347,TTC INDL.AREA, MIDC, RABALE, NAVI MUMBAL 400602	UWI@VSNL.COM
22	Sheet metal fabricators	SPRING STEEL PRODUCTS (Sheet metal fabricated structural parts and sub- assembly)	PLOT NO.A-298,ROAD Z, OFF ROAD 16 WAGLE ESTATE, THANE, 400604	SPRINGSTEEL@V SNL.NET
23	Sheet metal fabricators	SUWINKA ENGINEERING PVT. LTD. (Sheet metal fabricated structural parts and sub-assembly)	R-803 T.T.C.INDUSTRIAL ESTATE, RABALE, NAVI MUMBAI, 400701	SUWINKA@VSNL. NET
24	Sheet metal fabricators	Symatic Engg. Pvt Ltd. (Sheet metal fabricated structural parts and sub- assembly)	Plot no EL-127/128, TTC , Electronic Zone, Mahape, Navi Mumbai- 400710	
25	Sheet metal fabricators	Jyotitech Industries (Sheet metal fabricated structural parts and sub- assembly)	R-607, TTC Industrial area, Rabale, Navi - Mumbai - 400 701	
26	IVCB components	Refair Industries (Non ferrous components for HT breakers,)	Unit 57 Block A Nand Jyot Ind Est, Near IBM Andheri East, Mumbai, 400072	refairind444@yaho o.co.in
27	IVCB components	Refair Industries (Contact arms for HT breakers)	R444 TTC Indl Area, Rabale, Navi Mumbai, 400701	REFAIRIND444@Y AHOO.CO.IN
28	Fabricated Busbars	Cen-Mech Industries. (Fabricated busbars for HT panels)	R-365 , TTC , MIDC, Rabale, Navi Mumbai, 400701	centralengineering @rediffmail.com
29	Powder Coater	M J ENTERPRISES (Sheet metal pre-treatment and powder coating, Zinc metalising, Copper spraying)	A- 448,MIDC,MAHAPE,O FF THANE BELAPUR ROAD, NAVI MUMBAI, THANE, 400701	MJENT@BOM7.VS NL.NET.IN
30	Powder Coater	M.J.COATERS PVT.LTD (Sheet metal posder coating)	A-474,TTC INDUSTRIAL AREA, MIDC,MAHAPE, NAVI MUMBAL 400701	MJCOATERS@VS NL.NET
31	OVCB components	NEW UNITED METAL AND ENGG WORKS (Non ferrous metal parts like aluminium flanges for HT breakers)	PLOT 52-B SCHEME 56, SION DHARAVI, MUMBAI, 400017	REYNOLDP@GIAS BM01.VSNL.NET.I N

		UNITY ENGINEERS (Sheet	16 PUNJANI	
32	Sheet metal fabricators	UNITY ENGINEERS (Sheet metal fabricated parts, HT outdoor circuit breaker structural parts)	INDUSTRIAL ESTATE, POKHRAN ROAD NO 1, KHOPAT, THANE,	UNITYENG@BOM 7.VSNL.NET.IN
33	Sheet metal fabricators	REVATHI ENTERPRISES (Sheet metal fabricated parts, Sub-assemblies for HT circuit breakers)	400601 UNIT NO 10, BUILDING NO 4, AGARWAL UDYOG NAGAR, SATIVALI ROAD, VASAI(E), THANE 401202	hctawde@mtnl.net.i n
34	Sheet metal fabricators	SHETH FABRICATORS PVT LTD (Sheet metal fabricated parts, Sub-assemblies for HT circuit breakers)	R-676 TTC MIDC BEHIND PIPE LINE, THANE BELAPUR ROAD RABALE, THANE 400601	SFPL@VSNL.COM
35	OVCB components	RASHMI ENTERPRISES (Structural parts for HT outdoor circuit breakers)	202, A WING, VERTAX VIKAS, 2nd FLOORM.V.ROAD, ANDHERI(EAST), MUMBAL 400069	ARVINDRATHOD @HOTMAIL.COM
36	IVCB / OVCB components	FAL INDUSTRIES LTD. (Spring charging motors for HT circuit breakers)	52,SIPCOT INDUSTRIAL COMPLEX, HOSUR 635126 TN, HOSUR, 635126	FAL@CHN.FAL.CO .IN
37	IVCB / OVCB components	MAGNA MOTORS (Spring charging motors for HT circuit breakers)		MAGNAMOT@MA NTRAONLINE.CO M
38	IVCB / OVCB components	Baroda Bushings & Insulators (Insulating parts for HT circuit breakers,insulating stud)	Epoxy House, 745/1-2, G.I.D.C. Estate, Makaroura Road, Vadodara, 390010	BBI@EPOXYHOUS E.COM
39	OVCB components	Utsav Electro-mech Pvt Ltd (Terminal connectors for HT outdoor circuit breakers)	202/1 G.I.D.C., Makarpura, Baroda, 390010	PENTIUM@PN3.V SNL.NET.IN
40	Rubber item	SUHEG RUBBER INDUSTRIES PVT.LTD. (Gaskets, O rings for HT circuit breakers)	W-49 B MIDC RABALE NEXT TO IPCL CATAD, THANA BELAPUR ROAD, NAVI MUMBAI, 400701	
41	Miscellaneous panel items	Sure Electronics (Space heaters for HT outdoor circuit breakers)	117/2 Manish Ind Estate, Navghar, Vasai Road (E), Thane, 401210	sure@sureelectroni cs.com
42	Miscellaneous panel items	SHREE SAI ELECTRICAL INDUSTRIES (Space heaters for HT panels)	SARAF KASKAR IND.ESTATE,GALA NO.B2, S.V.ROAD JOGESHWARI (W), MUMBAL 400102	MN SIDHWANI@HOT MAIL.COM
43	Miscellaneous panel items	APT CONTROLS & APPLIANCES PVT LTD (Thermostat for HT panels and outdoor circuit breakers)	120 & 121,BLDG.I,UDYOG VIHAR IND. ESTATE, VITHALWADI (W), ULHAS NAGAR, 421003	APT@BOM7.VSNL. NET.IN
44	Miscellaneous panel items	APT CONTROLS & APPLIANCES PVT LTD (Space heaters for HT panels)	120 & 121,BLDG.I,UDYOG VIHAR IND. ESTATE, VITHALWADI (W), ULHAS NAGAR, 421003	APT@BOM7.VSNL. NET.IN

		INSPROS ENGINEERS PVT	M/S ELECTRO	INSPROS@VSNL.
45	IVCB / OVCB components	(Close/Trip coils for HT circuit breakers, Fast triping coils)	TRANS, 42-B, DEVKARAN MANSION VITHALDAS RD, LOHAR CHAWL, MUMBAI, 400002	СОМ
46	IVCB / OVCB components	RAPSRI ENGG INDUSTRIES LTD. (Non ferrous metal parts for HT circuit breakers)	39/40-2, GOWDANAPALYA, SUBRAMANYAPURA PO, BANGALORE, 560061	RAPSRI@VSNL.C OM
47	OVCB components	W.S.INDUSTRIES(INDIA) LTD (Ceramic insulators for outdoor circuit breakers)	P.O.B NO.6 PORUR, CHENNAI, 600116	WSIPORUR@MD3. VSNL.NET.IN
48	OVCB components	JAIPUR GLASS & POTTERIES (Ceramic insulators for outdoor circuit breakers)	TONK ROAD, JAIPUR, 302018	JAIPUR.GLASS@D ATAINFOSYS.NET
49	OVCB components	Ravikiran Ceramics Pvt. Ltd. (Ceramic insulators for outdoor circuit breakers)	Station Road, P.O. Via Anand, Kanjari, 387325	INFO@RAVIKIRAN CERAMICS.COM
50	OVCB components	Birla Ngk Insulators Private Ltd. (Jayshree Insulators) (Ceramic insulators for outdoor circuit breakers)	PO Meghasar Taluka Halol, Dist Panchmahal, Gujarat, 389330	jsihdom@adityabirl a.com
51	IVCB / OVCB components	Precision Spring Works (Switch ON/OFF springs for HT circuit breakers)	Unit No 15 K C Industrial Est., Subash Road, Jogeshwari-E, Mumbai, 400060	precisionsprings@v snl.net
52	Control Panel assy/wiring	APEX INDUSTRIES (Control panel assembly)	EL 41,T.T.C.INDUSTRIAL AREA, M.I.D.C.MAHAPE, NAVI MUMBAI, 400705	apexind@rediffmail. com
53	Discontinued	JYOTI CONTROLS (Control panel- assembly, HT panel structural assembly)	R-554, RABALE MIDC IND AREA, NAVI MUMBAI, 400701	JYOTITECHINDUS TRIES@REDIFFM AIL
54	Control Panel assy/wiring	Jyotitech Industries (Control panel assembly, HT panel structural assembly)	R-419, TTC, Industrial Area, M G Road, Rabale, Navi Mumbai, 400701	JYOTITECHINDUS TRIES@REDIFFM AIL
55	Control Panel assy/wiring	JYOTI SWITCHGEARS PVT LTD (Control panel assembly,HT panel structural assembly)	R-456,TTC INDUTRIAL AREA, RABALE, NAVI MUMBAL 400701	
56	Control Panel assy/wiring	COMBINED DIGILOG SYSTEMS PVT.LTD. (Control panel assembly)	PLOT NO.EL- 111,ELECTRONIC ZONE, TC-MIDC IND AREA MAHAPE, NAVI MUMBAI, 400701	Comnilog@bol. Net.in
57	Control Panel assy/wiring	Maharashtra Electro Mechanical Work (Control panel assembly)	Plot No A-220 Opp Mahape Bus Depot, MIDC TTC Industrial Area, Mahape, Navi Mumbai, 400701	MEMWPVTLTD@H OTMAIL.COM
58	Control Panel assy/wiring	Symatic Engg. Pvt Ltd. (Control panel assembly, HT panel structural assembly)	128 MIDC TTC (Electronic Zone), Thane Belapur Road Mahape, Navi Mumbai, 400709	SYMATIC@BOM3. VSNL.NET.IN
59	Control Panel assy/wiring	CENTRAL ENGINEERING (Control panel assembly, HT panel structural assembly)	B-9,T.T.C.MIDC, DIGHE, NAVI MUMBAI, 400701	centralengineering @rediffmail.com

60	Control Panel assy/wiring	Vibha Mechano Electric India Pvt Ltd (Control panel assy, HT panel structural assy)	Plot no A-117 to A-120, MIDC Dombivli (E), Phase - I, Thane -412 201	narasimha.reddy@v ibhaindia.in
61	Miscellaneous panel items	REHAU AG + Co (Gasket for HT panel)	Ytterbium 4, Erlangen, 91058, Germany, PB 30 29.	Erlangen@REHAU. com
62	Miscellaneous panel items	Miscellaneous panel items Rehau Polymers Pvt. Ltd. Mumbai (Gasket for HT panel)		sanjay.gautam@reh au.co.in
63	Al Busbars			
64	Al Busbars	Hindalco Industries Ltd (Electrolytic grade aluminium busbars)	RENUKOOT 231217 B Wing 1st Floor Ahura Complex, 82 Mahakali Caves Road, Andheri (E), Mumbai, 400093	HINDALCO.BBY@ RMJ.SPRINGRPG. EMS.VSNL.NET.IN
65	Cu Busbars	SUNMET INDUSTRIES (Electrolytic grade copper busbars)	251, AGRASEN BHAVAN, THAKURDWAR ROAD, MUMBAI, 400002	sunmet@bom5.vsnl .net.in
66	Cu Busbars	Metal Gems (Electrolytic grade copper busbars)	Plot No. 113 to 120, Panchal Udyog Nagar Bhimpur, Daman, 396210	metal_gems@yaho o.co.in
67	Cu Busbars	Baroda Conductors Pvt Ltd (Electrolytic grade copper busbars)	G/2 Rushi Apartments, Near Visa Court Sayed Vasna Rd,	BCPL@BNPL.COM
68	Cu Busbars	D.C. METAL CORPORATION (Electrolytic grade copper busbars)	Baroda. 390015 B/5 & 6,PRAVASHI INDL EST. OFF AAREY ROAD GOREGAON (E),	KCCOPPER@SAT YAM.NET.IN
69	Miscellaneous panel items	PLASTO FORM PRODUCTS (Insulating materials)	MIIMBAL 400063 UNIT-12 SWASTIK IND EST, 178 VIDYANAGARI MARG KALINA, MUMBAI, 400098	plastoform@vsnl.ne t
70	Discontinued	PATEL AUTO ENGINEERING CO.INDIA (Sheet metal fabricated parts and sub- assemblies)	PLOT NO R-848,MIDC TTC INDUSTRIAL, AREA POST GHANSOLIRABALE, NAVI MUMBAI, 400701	NEEDHISH@VSNL .COM
71	OVCB components	Radiance(Al Flanges ,Non ferrous metal parts like aluminium flanges for HT breakers)	A 233, KAGAL- HATKANGALE, 5 Star MIDC, Kolhapur , Mabarashtra	<u>san koustug@sanc</u> <u>harnet.in</u>
72	OVCB components	Shree Shyam (Mech Housing (Sheet metal fabricated parts, Sub-assemblies for HT circuit breakers)	Plot no A-41, TTC Industrial Area, Off Thane Belapur Road, Pawne MIDC, Navi -	
73	OVCB components	Vishal Malleable (Insulator (Ceramic insulators for outdoor circuit breakers) & AL alloy - castings	Plot No: 100 & 102 /103, Rajpipla Road, Ankleshwar - 393002	info@vishalmalleab les.com
74	Rubber item	Precise Rubber (O ring Gaskets , O rings for HT circuit breakers) & Sealing (O ring & Gaskets)	3/01, Khurana Compound,Patel Road, Goregaon(E), Mumbai- 400063	
75	OVCB components	Prestine Metal Form Pvt Ltd.(Mechanism Housing)	C/347, TTC Indl Area, MIDC pawne village, Turbhe, navi-Mumbai, Thane ±400705	pristine mfpl@yaho o.com

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76	Json polymer (O ring Gaskets, O rings for HT circuit breakers) & Sealing (O ring & Gaskets)		5, Gopal House, I.B patel road, Goregaon(E), Mumbai- 400063	jsonpolymer@gmail .com
77	IVCB / OVCB components	Salzer (Breaker control switch)		
78	Cu Busbars	Metal Tubes & Rolling Mills (Copper triangular Busbars)	Marol Village , Andheri (E)	mtrm@copperzone. com
79	IVCB / OVCB components	Techno Fusion (current link)	48, Bindal Indl. Estate, off Andheri Kurla road, Sakinaka	technofusion@vsnl. net
80	IVCB / OVCB components	Panchal Electro Controls (current links)	208, Ruby Monarch Arcade, 2nd floor, Saki vibar road, Sakinaka	pepl@yahoo.com
81	OVCB components	CJI (ceramic Insulators)	Junction Rd.Khurja - 203131	
82	OVCB components	Jenith Technocast (Structural parts)	Plot E-2, MIDC, Rajanangaon, Sirur, Pune-412209	
83	IVCB / OVCB components	ECS (Close/Trip coils for HT circuit breakers, Fast triping coils)	Plot No 866/2 G.I.D.C. Makarpura, Vadodara 390010	
84	OVCB components	Shirke (Auxillary switch)		
85	Miscellaneous panel items	Connectwell (terminal block)	W-6, Phase-II, MIDC, Dombivali (E), Thane	
86	Miscellaneous panel items	Elmex (terminal block)	12,GIDC Estate, Makarapura Road, Vadodara-390010	navin@elmex.net
87	Miscellaneous panel items	Wago (terminal block)		
88	Miscellaneous panel items	MDS (Miniature ckt breaker)		
89	Miscellaneous panel items	Schnider (MCB's, indicating lamps)		
90	Miscellaneous panel items	Shirke (Breaker control switch)	L-25, MIDC Ambad, NASHIK	jiten@shirkeswitch. net; jshirke@gmail.com
91	Miscellaneous panel items	Technic (Indicating lamps)		
92	Miscellaneous panel items	Electromech (Operation counter)		
93	Miscellaneous panel items	Meyle-Germany (Limit s/ws)		
94	Miscellaneous panel items	Elmex (Limit s/ws)		

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	BIHAR STATE POWER TRAN	SMISSION COMPANY LIMITED	
	MANUFACTURING	QUALITY PLAN VCB	
	LIST OF SUPPLIERS F	OR SWITCHBOARDS	
S.NO.	DESCRIPTION	MAKE	
1	Current Transformer	Pragati, ECS, Kappa, Gemini	
2	Potential Transformers	Pragati, ECS, Kappa, Gemini	
3	Vacuum Circuit Breakers	Siemens	
4	Vacuum Contactors	Siemens	
5	Earthing Switch	Shubhada Polymers	
6	Isolators	Siemens	
7	Surge Arrestors	Raychem, Siemens	
8	Control Wires	RR Kables / Polycab / Rolliflex	
9	Resin cast Insulators	Insule Products, Mascasts, India Insulators	
10	Insulating Materials		
		Liberty Moulding	
11	Protection Relays - Numerical	Siemens, ABB, Areva	
12	Protection Relays Electromechanical	Easun Reyrolle, Areva, ABB, Ashida, JVS	
13	Auxilary Relays	Easun Reyrolle, Areva, Ashida,	
14	Meters and Instruments	AE, MECO, Enercon, Schneider	
15	Multifunction meter	AE, Enercon, Secure, L&T, Schneider	
16	Indicating Lamps	Siemens	
17	Push Buttons	Siemens	
18	Annunciators	Minilec, Alan	
19	Semaphore Indicators	DAV, Areva	
20	Terminal Blocks	Connectwell, Elmex, Wago	
21	Transducers	MECO, AE	
22	Control Switches	Switron, Kaycee	
23	Breaker Control Switch	Switron, Areva, Kaycee	
24	Ammeter / Voltmeter Selector Switch	Siemens, Switron, Kaycee	
25	Auxilary Contators	Siemens	
26	Control Fuses	Siemens	
27	MCBs	Siemens, MDS Legrand, Indo-kopp,Schneider	

	LIST OF SUPPLIERS FO	R SWITCHBOARDS
S.NO.	DESCRIPTION	MAKE
28	Buzzer / Hooter / Bell	Alan, Vaishno
29	Thermostat	APT Control
30	Space Heater	Shree Sai Electricals, Sure Electricals, APT controls
31	Plug-Switch & Socket	Anchor, Cona, CPL
32	Terminal test block	IMP, DAV, Areva
33	Limit Switch	Siemens, Kaycee
34	Illumination Lamp	Philips , Bajaj
35	Sheet Metal parts	Shree Swastik, Suwinka, GWS, Symatic , Jyotitech
36	Panel structure fabrication	Symatic Engineering, Jyotitech Industries, Spring Steel,
		Shree Swastik, GWS, Suwinka, Vibha Mechano
37	Control wiring	Apex Industries, Jyoti Tech, Jyoti Switchgears pvt Ltd.
		Maharashtra Electro., Symatic, Central Engg.,
		Combined Digilog
		Vibha Mechano Electric pvt Ltd
38	Busbar manufacturing	Raychem, Refair, Cen-Mech
39	Powder Coating	MJ Enterprises, MJ Coaters

	BIHAR STATE POWER T	RANSMISSION COMPANY LIMITED
	MANUFACTU	RING QUALITY PLAN VCB
	LIST OF SUPPLIER	RS FOR CIRCUIT BREAKERS
S.NO.	DESCRIPTION	MAKE
	Al alloy castings	New United Metal Works, Radiance, Vishal Malleable
	Sheet Steel Fabrication	Unity Engineers, Revathi Enterprises,
3	Switch cubicle Fabrication	Revathi Enterprises, Prestige Metal Works
	Machining	Unity Engineers, Revathi Enterprises, Pristine Metal forms Pvt Ltd
5	Structures	Unity Engineers, Rashmi Enterprises, Jenith technocast
6	Motor	FAL Industries, Magna Motors
7	Operating rod	Baroda bushings, Shubhada Polymers
8	Auxilary Switch	Shubhada Polymers
9	Terminal Connectors	Utsav Electromech
10	Control Cables	RR Kables / Polycab / Rolliflex
11	Sealing (O ring)	Suheg Rubbers, Precise rubber, Json polymer
	Hot dip Galvanising	Sigma Galvanisers, Five Star Galvanisers, Jenith Technocast
13	Close / Trip coil	Inspros Engg, ECS
	Rotary Switch	Switron Devices, Salzer
15	Space Heater	Shree Sai Electricals,Sure Electricals,APT controls
16	Operation Counter	Electromech
17	Insulators	WS, IEC, BHEL, Ravikiran Indu, Jaipur Potteries
18	Levers	Unideritend
19	Chromium Copper castings / Forgings	Rapsri Engg., Modison Metals
20	Main Arcing contact	Siemens Germany
21	Main Contact	Siemens Germany
22	Spring	Precision Springs
23	Terminal Block	Connectwell, Elemex, Wago
24	MCB	Siemens, Legrand, Indo-Kopp
25	Breaker Control Switch	Switron, Salzer, Shirke
	Control Fuses	Siemens
27	Indicating Lamps - if applicable	Siemens
28	Cubicle Lamp Holder	Philips , Bajaj, CPL, Cona, Anchor
	Illumination Lamp	Philips , Bajaj
29	Auxilary Contactor	Siemens
	Limit Switch	Siemens, Meyle-Germany
31	Switch for illumination Lamp	CPL, Cona, Anchor
	Switch for space heater	CPL, Cona, Anchor
33	Fast acting tripping release	Siemens

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