

PART 2: EMPLOYER'S REQUIREMENTS
CHAPTER 11C: AUXILIARY
NETWORK TEST SHEETS

Note: These specifications are the bare minimum requirement, PST Contractor must verify the design and should fulfil while selecting system/equipment/component & executions. The final requirements of the specifications will depend upon the simulation studies and based upon that the PST contractor has to provide the material over and above to these specifications which shall be finally approved by Engineer / Employer.

1. 33kV CIRCUIT BREAKER (IEC 62271-1, IEC 62271-200)

1.1 Part fixed & Moving

List of Tests to be performed				
	Type	Routine	Acceptance	On Site
Dielectric Test	✓	✓	✓	
Radio interference voltage test	✓	✓	✓	
Measurement of resistance of the main circuit	✓	✓	✓	✓
Temperature rise Tests	✓	✓		
Short time with stand current and peak with stand current	✓	✓		
Tightness tests	✓	✓	✓	✓
EMC test	✓			
Mechanical operation test at ambient Temperature	✓	✓	✓	✓
Short circuit current making breaking tests	✓			
Capacitive current switching test-Line charging current	✓			
Capacitive current switching test-Cable charging current	✓			
Verification of the degree	✓			
Low & high temperature test	✓			
Static terminal Load test	✓			
Pressure tests of gas filled compartment	✓			
Internal Arc Test	✓			
Interlocking			✓	✓
Visual inspection/physical			✓	✓
Measurement of operation time			✓	✓
Insulation resistance Test			✓	✓
Contract Resistance test			✓	✓

@ The mechanical operation test to be done as a Routine test shall comprise of five opening and five closing operations at each of the rated, maximum and minimum control voltages. The contact travel characteristics shall be recorded for each closing and tripping operation and operation test (110%, 100%, 85% & 70% of control supply).

These FAT & On-Site tests are indicative and subject to change as required by Engineer In-charge.

2. 33kV INTERRUPTER (IEC 62271-1, IEC 62271-200)**2.1 Fixed & Moving Part**

List of Tests to be performed				
	Type	Routine	Acceptance	On Site
Dielectric Test	✓	✓	✓	
Radio interference voltage test	✓			
Measurement of resistance of the main circuit	✓	✓	✓	✓
Temperature rise Tests	✓	✓		
Short time with stand current and peak with stand	✓	✓		
Tightness tests	✓	✓	✓	✓
EMC test	✓			
Mechanical operation test at ambient Temperature	✓	✓	✓	✓
Short circuit current making breaking tests	✓			
Capacitive current switching test-	✓			
Capacitive current switching test-	✓			
Verification of the degree	✓			
Low & high temperature test	✓			
Static terminal Load test	✓			
Pressure tests of gas filled compartment	✓			
Internal Arc Test	✓			
Interlocking			✓	✓
Visual inspection/physical			✓	✓
Measurement of operation time			✓	✓
Insulation resistance test			✓	✓
Contract Resistance test			✓	✓

The mechanical operation test to be done as a Routine test shall comprise of five opening and five closing operations at each of the rated, maximum and minimum control voltages. The contact travel characteristics shall be recorded for each closing and tripping operation and operation test (110%, 100%, 85% & 70% of control supply).

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3. 33kV CURRENT TRANSFORMERS

List of Tests to be performed				
	Type	Routine	Acceptance	On Site
Temperature rise	✓			
Lightning impulse withstand	✓			
Short circuit withstand	✓			
Test of accuracy	✓			
EMC	✓			
Primary windings Voltage withstand at 50 Hz		✓	✓	
Secondary windings Voltage withstand at 50 Hz		✓	✓	
Between section Voltage withstand at 50 Hz		✓	✓	
Transformer ratio		✓	✓	✓
Terminal marking		✓	✓	✓
Visual inspection		✓	✓	✓
Polarity test				✓
Continuity Test				✓
Insulation resistance test			✓	✓

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4. 33kV VOLTAGE TRANSFORMERS

List of Tests to be performed				
	Type	Routine	Acceptance	On Site
Temperature rise	✓			
Impulse voltage withstand test on primary terminals	✓			
Short circuit withstand	✓			
Test of accuracy	✓			
Electromagnetic Compatibility (EMC)	✓			
Partial discharge measurement		✓		
Short circuit withstand capability test	✓			
Primary windings Voltage withstand at		✓	✓	
Secondary windings Voltage withstand at 50 Hz		✓	✓	
Between section Voltage withstand at		✓	✓	
Transformer ratio		✓	✓	
Terminal marking		✓	✓	✓
Visual inspection		✓	✓	✓
Measurement of capacitance and dielectric dissipation factor		✓	✓	
Internal arc fault test		✓		
Insulation resistance test			✓	✓

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5. 33kV AUXILIARY TRANSFORMERS

List of Tests to be performed				
	Type	Routine	Acceptance	On Site
	✓			
Lightning impulse withstand Voltage	✓			
Environment, Climate & Fire	✓			
Separate- source voltage with stand	✓	✓	✓	✓
Measurement of winding resistance		✓	✓	✓
Measurement of voltage ratio and check of phase displacement		✓	✓	✓
Measurement of no load loss and		✓	✓	✓
Short circuit impedance load losses		✓	✓	✓
Induced AC withstand Voltage test		✓	✓	✓
Partial discharge		✓	✓	✓
Visual inspection		✓	✓	✓
Sound level		✓	✓	✓
Transformer ratio			✓	✓

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6. 110V DC BATTERY CHARGER

List of Tests to be performed				
	Type	Routine	Acceptance	On Site
Temperature rise*	✓			
Rated short duration power frequency withstand voltage		✓	✓	
Floating operation mode test		✓	✓	✓
Equalization operation mode		✓	✓	✓
Direct operation mode test		✓	✓	✓
Protection devices operation		✓	✓	✓
Setting test		✓	✓	✓
Visual inspection		✓	✓	✓

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7. 110V DC BATTERIES

List of Tests to be performed				
	Type	Routine	Acceptance	On Site
Electrical specifications checking (on one cell)	✓			
Visual inspection		✓	✓	✓
Capacity measurement			✓	✓
Endurance test			✓	✓
Overload aptitude test				✓

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8. AC AND DC AUXILIARY CABINETS

List of Tests to be performed				
	Type	Routine	Acceptance	On Site
Rated Short duration power frequency withstand voltage test		✓	✓	
Operation checking		✓	✓	✓
Visual inspection		✓	✓	✓
Insulation resistance test			✓	✓

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9. 33kV LIGHTNING ARRESTOR

List of Tests to be performed				
	Type	Routine	Acceptance	On Site
Insulation with stand tests on the arrester housing	✓	✓		
Residual Voltage test	✓	✓	✓	
Test to verify long term stability under continuous	✓	✓	✓	
Repetitive charge transfer with stand	✓	✓		
Heat dissipation behaviour verification	✓	✓		
Operation duty test	✓	✓		
Power frequency voltage versus time	✓	✓		
Short- circuit tests	✓	✓	✓	
Environmental tests	✓			
Test to verify the dielectric withstand of the internal	✓	✓	✓	
Test of internal grading	✓	✓		
Polluted housing test	✓			
Partial Discharge test	✓		✓	
Insulation Resistance			✓	✓
Measurement of reference		✓	✓	
Visual inspection		✓	✓	✓
Leakage current test		✓	✓	
Surge Counter reading			✓	✓
Checking of healthiness			✓	✓

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10.33 kV CABLE XLPE

List of Tests to be performed				
	Type	Routine	Acceptance	On Site
Test voltage Value				
Tests and Sequence of tests	✓			
Bending test	✓			
Partial discharge tests	✓			
Tan 6 measurement	✓			✓
Heating cycle voltage test	✓		✓	
lightning impulse voltage test	✓		✓	
Water penetration test	✓	✓	✓	
Test under fire conditions	✓	✓	✓	
Test on PVC over sheaths (ST1 and ST2) at low temperature	✓	✓	✓	
Hot set test EPR, HEPR and XLPE	✓	✓	✓	
Terminal marking Pressure test at high temperature on over	✓	✓	✓	
Resistivity of semi conducting	✓	✓	✓	
Measurement of electrical resistance of conductor and	✓	✓	✓	
Measurement of thickness of cable insulation and over	✓	✓	✓	
Hi pot test			✓	✓
Measurement of cable insulation			✓	✓

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