

**Annexure- 8: Switchyard Site Testing and Commissioning**

<b>CLAUSE NO. FEATURES</b>	<b>TECHNICAL REQUIREMENTS</b>
1.00.00	<p><b>INTRODUCTION</b></p> <p>An indicative list of tests is given below. Contractor shall perform any additional test based on specialties of the items as per the field QP/ instructions of the equipment supplier or Owner without any extra cost to the Owner. The Contractor shall arrange all instruments required for conducting these tests along with calibration certificates and shall furnish the list of instruments to the Owner for approval.</p>
2.00.00	<p><b>GENERAL CHECKS</b></p> <ul style="list-style-type: none"> <li>a) Check for physical damage.</li> <li>b) Visual examination of zinc coating/ plating</li> <li>c) Check from name plate that all items are as per order/ specification.</li> <li>d) Check tightness of all bolts, clamps and connecting terminals using torque wrenches.</li> <li>e) For oil filled equipment check for oil leakage, if any. Also check oil level and top up.</li> <li>f) Check ground connections for quality of weld and application of zinc rich paint over weld joint of galvanized surfaces.</li> <li>g) Check cleanliness of insulator and bushings.</li> <li>h) All checks and tests specified by the manufactures in their drawings and manuals as well as all tests specified in the relevant code of erection.</li> <li>i) Check for surface finish of grading rings (corona control ring.)</li> <li>j) Pressure test on all pneumatic lines at 1.5 times the rated pressure shall be conducted.</li> </ul>
3.00.00	<p><b>CIRCUIT BREAKERS</b></p> <ul style="list-style-type: none"> <li>a) Insulation resistance of each pole.</li> <li>b) Check adjustments, if any, suggested by manufacturer.</li> <li>c) Breaker closing and tripping time.</li> <li>d) Trip free and anti pumping operation.</li> <li>e) Contact resistance.</li> <li>f) Functional checking of compressed air plant and all accessories</li> <li>g) Functional checking of control circuits, interlocks, tripping through protective relays and auto-reclose operation.</li> <li>h) Insulation resistance of control circuits, motor etc.</li> <li>i) Resistance of closing and tripping coils.</li> </ul>
4.00.00	<p><b>ISOLATORS</b></p> <ul style="list-style-type: none"> <li>a) Insulation resistance of each pole</li> <li>b) Manual and electrical operation on interlocks</li> <li>c) Insulation resistance of control circuits and motors.</li> <li>d) Ground connections</li> <li>e) Contact resistance</li> <li>f) Proper alignment to minimise the vibration to the extreme possible during operation.</li> <li>g) Measurement of operating torque for isolator and Earth switch</li> <li>h) Resistance of operating and interlocking coils.</li> </ul>

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5.00.00	<b>CURRENT TRANSFORMERS</b>  a) Insulation Resistance Test b) Polarity test. c) Ratio identification test-checking of all ratios on all cores by primary injection of current. d) Magnetising characteristics test. f) Capacitance and Tan-Delta measurement
6.00.00	<b>VOLTAGE TRANSFORMERS</b>  a) Insulation resistance test b) Polarity test c) Ratio test
7.00.00	<b>SURGE ARRESTER</b>  a) Grading leakage current b) Resistance of ground connection.
8.00.00	<b>WAVE TRAP</b>  a) Insulation resistance test. b) Visual check.
9.00.00	<b>PHASING OUT</b>  The phasing out of all supplies in the station system shall be carried out.
10.00.00	<b>STATION EARTHING</b>  a) Check soil resistivity b) Check continuity of grid wires c) Check earth resistance of the entire grid as well as various sections of the same. d) Check for weld joint and application of zinc rich paint on galvanised surface. e) Dip test on earth conductor prior to use.
11.00.00	<b>CONDUCTOR STRINGING AND POWER CONNECTORS</b>  a) Physical check for finish b) Electrical clearance check c) Testing of torque by torque wrenches on all bus power connectors and other accessories. d) Milli volt drop test on all power connectors. e) Sag and tension check on conductors.
12.00.00	<b>INSULATORS</b> Visual examination for finish damage, creepage distance, etc.