

5.2.5.7 Functioning of impact recorder(s) at their works before installing on the tank.

5.3 Inspection and Testing at Site

The Contractor/Manufacturer shall carry out a detailed inspection and testing programme for field activities covering areas right from the receipt of material stage upto commissioning stage. An indicative programme of inspection as envisaged by the Employer is given below and in the document No. D-2-01-03-01-01 (or latest revision) (Pre commissioning Procedures and Formats for substation bay equipment), which will be available in the respective sites and shall be referred by the contractor. However, it is contractor's responsibility to draw up and carry out such a programme duly approved by the Employer. Testing of oil sample at site shall be carried out as per CI 3.4 above

5.3.1 Receipt and Storage Checks

5.3.1.1 Check and record condition of each package, visible parts of the transformer for any damage etc.

5.3.1.2 Check and record the gas pressure in the transformer tank as well as in the gas cylinder. Measure and record the dew point of dry air /nitrogen in the transformer tank .

5.3.1.3 i) Check the direction of rotation of fans and pumps.

ii) Check the bearing lubrication.

5.3.1.4 Check and record reading of impact recorder at receipt and verify the allowable limits as per manufacturer's recommendations

5.3.2 Installation Checks

5.3.2.1 Inspection and performance testing of accessories like tap changers, cooling fans, oil pumps etc.

5.3.2.2 Visual check for wedging of core and coils before filling up with oil and also check conditions of core and winding in general.

5.3.2.3 Check whole assembly for tightness, general appearance etc.

5.3.2.4 Oil leakage test

5.3.2.5 Capacitance and tan delta measurement of bushing before fixing/connecting to the winding, contractor shall furnish these values for site reference.

5.3.2.6 Leakage check on bushing before erection.

5.3.2.7 Measure and record the dew point of nitrogen/dry air in the main tank before assembly. Manufacturer shall submit dew point acceptable limits along with temperature correction factor and shall form part of instruction manual. In case dew point values are not within permissible limit suitable drying out process shall be applied for dry out of active part in consultation with the Manufacturer.

5.3.2.8 Oil filling.

- 5.3.2.8.1 Oil impregnation or drying under vacuum at site shall be done with the transformer and oil at a temperature not exceeding 70 deg C.
- 5.3.2.8.2 The duration of the vacuum treatment shall be demonstrated as adequate by means of water measurement with a cold trap or other suitable method but shall generally not be less than 72 hours. The vacuum shall be measured on the top of the transformer tank and should be less than 1mbar.
- 5.3.2.8.3 Vacuum shall not be broken until the transformer is oil filled up to the Buchholz relay. Whenever the active insulation or any paper insulated HV connections, especially those from the windings to the bushings are exposed, these shall be re-impregnated under vacuum along with the complete transformer. For this purpose the transformer shall first be drained to expose all insulation material.
- 5.3.2.8.4 The minimum safe level of oil filling (if different from the Buchholz level) to which the transformer shall be oil filled under vacuum, shall be indicated in the manual.
- 5.3.2.8.5 Procedures for site drying, oil purification, oil filling etc shall be submitted for approval and complete instructions shall form part of the manual.
- 5.3.2.8.6 The Ultra High Vacuum type oil treatment plant of suitable capacity (preferably 4500 to 6000 litres per hour) suitable for treatment of oil in EHV class transformer shall be used in order to achieve properties of treated oil. The plant shall be capable of treatment of new oil (as per IEC 60296 and reconditioning of used oil (as per IEC: 60422 for oil in service) at rated capacity on single pass basis as follow :
 - (i) Removal of moisture from 100 ppm to 3 ppm (max.)
 - (ii) Removal of dissolved gas content from 10% by Vol. To 0.1% by vol.
 - (iii) Improvement of dielectric strength breaks down voltage from 20 to 70 KV.
 - (iv) Vacuum level of degassing chamber shall be less than 0.15 torr/0.2 mbar at rated flow and at final stage. Machine shall have minimum of two degassing chambers and these should have sufficient surface areas to achieve the final parameters.
 - (v) Filter shall be capable of removing particle size more than 0.5 micron in the filtered oil.
 - (vi) Processing temperature shall be automatically controlled and have a adjustable range from 40°C to 80°C.

5.3.3 Commissioning Checks

- 5.3.3.1 Check the colour of silicagel in silicagel breather.
- 5.3.3.2 Check the oil level in the breather housing, conservator tanks, cooling system, condenser bushing etc.