TRANSFORMER / REACTOR

22.4. **Inspection and Testing at Site**

The Contractor shall carry out a detailed inspection and testing programme for field activities covering areas right from the receipt of material stage up to commissioning stage. An indicative programme of inspection as envisaged by the Purchaser is given below. However, it is contractor's responsibility to draw up and carry out such a programme duly approved by the Purchaser. Testing of oil sample at site shall be carried out as per specification.

22.5. **Receipt and Storage Checks**

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

22.5.2. Check and record the gas pressure in the transformer tank as well as in the gas cylinder.

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

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

22.6. **Installation Checks**

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

22.6.2. Check the direction of rotation of fans and pumps and Check the bearing lubrication.

22.6.3. Check whole assembly for tightness, general appearance etc.

22.6.4. Oil leakage test

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

22.6.6. Leakage check on bushing before erection.

22.6.7. Measure and record the dew point of gas in the main tank before assembly.

22.7. **Commissioning Checks**

22.7.1. Check the colour of silicagel in silicagel breather.

22.7.2. Check the oil level in the breather housing, conservator tanks, cooling system, condenser bushing etc.

22.7.3. Check the bushing for conformity of connection to the lines etc.,

22.7.4. Check for correct operation of all protection devices and alarms/trip :

i. Buchholz relay
ii. Excessive winding temperature
iii. Excessive oil temperature
iv. Low oil flow
v. Low oil level indication
vi. Fan and pump failure protection

22.7.5. Check for the adequate protection on the electric circuit supplying the accessories.

22.7.6. Check resistance of all windings on all steps of the tap changer. Insulation resistance measurement for the following:

i) Control wiring
ii) Cooling system motor and control
iii) Main windings
iv) Tap changer motor and control

22.7.7. Check for cleanliness of the transformer and the surroundings

22.7.8. 2 kV for 1 minute test between bushing CT terminal and earth.

22.7.9. Phase out and vector group test

22.7.10. Ratio test on all taps

22.7.11. Magnetising current test

22.7.12. Capacitance and Tan delta measurement of winding and bushing

22.7.13. Frequency response analysis (FRA). FRA equipment shall be arranged by purchaser.

22.7.14. DGA of oil just before commissioning and after 24 hours energisation at site.

22.7.15. Gradually put the transformer on load, check and measure increase in temperature in relation to the load and check the operation with respect to temperature rise and noise level etc.

22.7.16. Continuously observe the transformer operation at no load for at least 24hours.

22.7.17. Contractor shall prepare a comprehensive commissioning report including all commissioning test results as per Pre-Commissioning Procedures forward to Purchaser for future record.

ANNEXURE - O

Oil sampling bottles

Oil sampling bottles shall be suitable for collecting oil samples from Transformers and shunt Reactors, for Dissolved Gas Analysis. Bottles shall be robust enough, so that no damage occurs during frequent transportation of samples from site to laboratory.

Oil sampling bottles shall be made of stainless steel having a capacity of 1litre. Oil Sampling bottles shall be capable of being sealed gas-tight and shall be fitted with cocks on both ends.

The design of bottle & seal shall be such that loss of hydrogen shall not exceed 5% per week.
An impermeable oil-proof, transparent plastic or rubber tube of about 5 mm diameter, and of sufficient length shall also be provided with each bottle along with suitable connectors to fit the tube on to the oil sampling valve of the equipment and the oil collecting bottles respectively.

The scope of oil sampling bottles shall be included in the bid price as per the quantity indicated in the bid price schedule.

Oil Syringe (

the glass syringe of capacity 50ml (approx) and three way stop cock valve shall be supplied. The syringe shall be made from Heat resistant borosilicate Glass. The material and construction should be resistant to breakage from shock and sudden temperature changes, reinforced at luer lock tip Centre and barrel base.

The cylinder-Plunger fitting shall be leak proof and shall meet the requirement of IEC-60567. Plunger shall be grounded and fitted to barrel for smooth movement with no back flow. Barrel rim should be flat on both sides to prevent rolling and should be wide enough for convenient finger tip grip. The syringe shall be custom fit and uniquely numbered for matching. The syringe shall be clearly marked with graduations of 2.0 ml and 10.0 ml and shall be permanently fused for life time legibility.