

INSPECTION OF ELECTRICAL POWER TRANSFORMERS

WORK INSTRUCTION

UIS-I-44

Introduction:

This work instruction is applicable for the pre shipping inspection of **distribution** power transformers (**low & medium voltage**), whether oil immersed, dry, outdoor, pole mounted, in housed or in a packaged sub station. Noting differences pertaining to each type.

An inspection program (Inspection Test Plan) should be agreed upon prior to starting of inspection, loading and shipping with the supplier's representative.

Hereafter an outline of main inspection steps, which **should** be followed to conduct a normal inspection for Electrical power transformers.

1 Documents Review

- 1.1 Review and abide by all safety instructions pertaining to production, testing and loading of transformers at the inspection site.
- 1.2 Review of inspector assignment and relevant documents (Contract, Purchase Order, L/C, Performa Invoice, and Technical Specifications / standards, **drawings** and any special instructions).
- 1.3 A meeting is to be held with the supplier representative at the inspection site in order to review together the documents needed and to **finalize** the **Inspection Test Plan (ITP)**.
- 1.4 Inspector is to be informed by the supplier on main quality aspects & standards applied for production and testing of relevant transformers.

- 1.5 Check test result records of routine tests by quality control personnel at production facilities on each batch or lot of transformers, and any other tests that may have been conducted by other party.
- 1.6 Review records and certificates for calibration of the instruments & devices to be used for testing to assure their accuracy.

2. Visual and Dimensional Inspection

- 2.1 Inspector shall visually examine the transformers and check for appearance, newness, and physical defects; such as rust or damage, oil leakage, broken or cracked bushing....etc (photos)
- 2.2 Check for availability of proper handling, lifting and mounting fixtures.
- 2.3 Representative sample should be checked for simple dimensional & key functions (indication of quality), see item 3.

3. Sampling & Testing (witnessing of tests if included in contract requirements of principle appointing UIS as Third Party Inspection Company)

- 3.1 Random sampling of transformer lots shall be conducted according to UIS procedure (UIS-P-10) or applicable standards.
- 3.2 Check of and recording of name plate data, this includes verification of some requirements of buyer such as year of manufacture, origin, ambient temperature of environment, rating, used oil type – if not a dry transformer,.....etc
- 3.3 According to international standards the following tests or checks are routinely carried out at production facility, Inspector shall witness transformer samples:
 - Check for oil leakage.
 - Bus bar, bushing, arc horn checked for tightness.
 - Low Voltage Resistance Test.
 - High Voltage Test (at the low side & at the high side)

- Continuity of tap changer position switch.
- Measurement of winding resistance.
- Measurement of short circuit impedance and load loss.

3.4 The results of tests carried out or witnessed should be checked to determine conformity with requirements & contract conditions. If a certain degree of non-conformity is detected, the technical department should be immediately informed and change of sampling plan and QAL maybe required according to UIS procedures and/or relevant international standards.

4. Packaging and Loading:

4.1 The inspector shall follow UIS common practice to supervise loading and sealing of container. **Quantity of loaded transformers to be checked during loading, along their rating and serial numbers to be documented.**

4.2 The inspector shall make sure that packaging and stuffing of transformers is suitable and gives adequate protection during transporting and handling.

4.3 Usually medium voltage transformer fixed on strong wooden pallets and stuffed onto container floor and properly lashed to prevent movement of transformers during transportation.

4.4 The inspector **shall** check for the availability of Operation & Maintenance manuals, spare part ref. ...etc.

4.5 The inspector shall verify quantity of transformers against the packing list.

5. Reporting to Technical Department

5.1 Daily reporting directly to Technical Department shall be made by the inspector on UIS-F-29 form each day of the inspection period, and should cover the day's inspection activities including progress of inspection, non-conformities and any other remarks.

- 5.2 Upon completion of any given inspection, final inspection reports should be forwarded to the Technical Department by fax or email, as soon as possible but not later than (24) hours of inspection completion, together with a packing list (signed by inspector), calibration certificates and any other document, signed, stamped and dated by the inspector.