

**WATER SUPPLIES DEPARTMENT**  
**STANDARD SPECIFICATION E-90-13**  
**DRAWING FOR POWER TRANSFORMERS**

1. **GENERAL**

This Specification is supplementary to WSD Standard Specification E-90-01 (Drawing for Electrical and Instrumentation Equipment). Drawings containing the following additional information shall be provided to form part of the manual:

- (a) Winding diagram;
- (b) Exterior layout;
- (c) Sectional details;
- (d) Thermal withstand characteristics curve; and
- (e) Cable box components arrangement.

2. **WINDING DIAGRAM**

Winding diagram shall show the following details:

- (a) Metallic material of conductors and core and their dimensions;
- (b) Insulation system of primary and secondary windings;
- (c) Winding connection and tapping details; and
- (d) Location of embedded temperature detectors, where fitted.

3. **EXTERIOR LAYOUT**

Drawing of exterior layout shall show the following details:

- (a) Front and side elevation of equipment fabrication details (e.g. weight, dimensions, material, paint finish, structural support, foundation and mounting details and lifting provision etc.); and
- (b) Installation arrangement (e.g. cable boxes, marshalling boxes, detectors, gauges, desiccator, ventilation system, pressure relief device, Buchholz relay, oil conservator tank, oil pipework and valves, key box and locks for enclosure doors of dry type transformer etc.).

4. **SECTIONAL DETAILS**

Drawing of sectional details shall show the following information:

- (a) Installation arrangement of internal earthing, tap changer, internal cooling circuit, cable box connection to winding leads, sensors, ventilation system;
- (b) Assembly and fixing details of components; and
- (c) A tabulated component list with parts details.

5. THERMAL WITHSTAND CHARACTERISTICS CURVE

The maximum permissible transformer current at overload or fault versus time without permanent damage for transformer at hot states shall be provided.

6. CABLE BOX COMPONENTS ARRANGEMENT

Drawing of cable box shall show the following details:

- (a) Metallic material and dimension of cable boxes;
- (b) Insulation material of terminals, supports, insulators, connectors and cables;
- (c) Sectional and side elevation in showing installation arrangement of phase segregation, clearance and creepage between phases and earth, pressure relief arrangement, cable glands and lugs;
- (d) Compound sealing, filling level and drain (if used);
- (e) Assembly and fixing details of components; and
- (f) A tabulated component list with parts details.