

DISTRIBUTION SUBSTATION TRANSFORMER SPECIFICATION:

1) SCOPE:

- 1.1) This specification defines general requirements for oil filled, sealed type, outdoor substation transformers with ratings of 500KVA to 10000KVA OA, 3 phase, 60 hertz, 65 degrees C rise with a high voltage up to and including 69KV, 350KV BIL.
- 1.2) The transformer will be two winding.
- 1.3) The high voltage will be provided with a no-load tap changer with full capacity taps, two 2½% below and two 2 ½% above rated voltage.
- 1.4) Insulation levels will be as follows:
 - 69KV – 350KV BIL
 - 46KV – 250KV BIL
 - 35KV – 200KV BIL
 - 25KV – 150KV BIL
 - 15KV – 110KV BIL
 - 5KV – 75KV BIL
 - 480V - 30KV BIL
- 1.5) The transformer will have standard impedance per ANSI and comply with appropriate sections of the latest editions of ANSI C57.12

2.0) CONSTRUCTION:

2.1) Core.

The rectangular core will be built with high grade; grain orientated silicon steel laminations. The core ground will be connected to a ground pad at a suitable position below the tank lid near a handhole. If transformer has two or more handholes, a label is required indicating below which handhole, the core ground is located.

2.2) Coils.

Coils will be aluminum or copper, rectangular, layer type. They shall be suitably bonded and braced to provide adequate short circuit strength verified by actual test and/or field experience or by industrially recognized design programs.

2.3) Tank and Radiators

The tank shall be free from oil leaks and hydraulically tested at 5 lb. for 24 hours. At insulation levels of 200KV BIL and higher, or at a base rating of 10000KVA, the tank will be designed to withstand full vacuum. Radiators will be flat panel design and welded to the tank. The tank lid will be welded to the tank. The tank will have a flat underbase.

3.0) BUSHINGS.

- 3.1) Bushing with insulation level of 350KV BIL will be of the draw lead type and have power factor taps.
- 3.2) Bushings with insulation level of 250KV BIL and below will be porcelain or epoxy without power factor taps.

- 3.3) Bushings will be ANSI, 70 light grey
- 3.4) Bushing connectors will not be provided

4.0) ACCESSORIES.

- 4.1) Magnetic liquid level gauge without contacts.
- 4.2) Dial type liquid temperature indicator without contacts.
- 4.3) Pressure vacuum gauge
- 4.4) Combination 2-inch drain/filter/sample valve and a 1-inch upper filter valve
- 4.5) Pressure/vacuum bleeder
- 4.6) Two ground pads, on diagonally opposite corners of the tank plus a ground pad for each neutral bushings provided.
- 4.7) Jacking and lifting facilities
- 4.8) Nameplate
- 4.9) Tapchanger will have padlocking facilities and visual indication of tap position without the need to remove the padlock
- 4.10) Pressure relief device with visual indicator and without contact

5.0) OIL

The transformer will be shipped with new inhibited oil, certified to be less than 1PPM of PCB's. At the time of shipment, the space above the oil level will be purged with dry nitrogen and sealed at a positive pressure.

6.0) GASKETS

Recessed gaskets made from reusable nitrile materials will be used on all manhole openings, bushing bosses or rises and other areas where bolting is necessary. As an alternative to recessed gaskets, correctly sized gasket stops are acceptable.

7.0) PAINT

- 7.1) The internal surface of the tank and underside of the lid will be shotblasted and painted white
- 7.2) The external surface of the tank will be shotblasted, primed and painted with ANSI No 70, light grey. The total dry film thickness of the paint will be 5 mils.
- 7.3) Touch up paint will be provided; one spray can of primer and one spray can of finish paint.

8.0) DRAWINGS

- 8.1) Outline and nameplate drawings will be provided within two weeks of the order.
- 8.2) Installation and maintenance manuals will be shipped with the transformer.

9.0) QUALITY SYSTEM AND TESTS

- 9.1) An approved quality system or ISO 9001 registration is required. Quality control records must be maintained for review on request. At any time during manufacture, access must be made available for in-process inspections and for witnessing the performance of tests. Seven days notice is required of testing dates.
- 9.2) Routine tests will be performed in accordance with ANSI requirements. A detailed test report must be submitted and approved before shipment.

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SALES NOTE: - The following is offered only as a reminder of some options available.

Ratings – OA/FA with fans contacts on oil temperature gauge plus control cabinet. Ratings as in ISO

Gauges – additional gauges e.g. winding temp gauge with contacts, rapid rise pressure relay/seal in relay,

Provision to mount L/A's – two standard bolt patterns will be provided if specific information is not provided.

Detachable rads with valves

Air terminal chambers

55/65 rise

Tests – temperature rise test – impulse – sound level

CT's

Alternative liquids

Skid underbase

Core ground brought out through tank lid.