



Drive Duty Transformer Specification

Virginia Transformer Corp.

Power Up!

Selecting the Right Transformer

This document contains sample specifications for

Liquid-Filled Type

Drive Transformers

You may use this information in whole or in part to complete your requests for bids and/or quotes.



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1.0 General (Circle choice or indicate specific information as appropriate.)

- 1.1 This specification covers three-phase liquid-filled drive transformers for **indoor/outdoor** applications.
- 1.2 The transformer shall be designed to operate in Seismic Zone **1/2/3/4**.
- 1.3 Ambient: 0 Deg C Min, 30 Deg C average over 24 hr, 40 Deg C Maximum.
- 1.4 The transformers will be designed, assembled and tested in accordance with the latest applicable ANSI, NEMA and IEEE standards.
- 1.5 The transformer will be manufactured by Virginia Transformer Corp. or manufacturer with 20 years experience in similar application.

2.0 Construction

- 2.1 Basic ordering data shall be as follows:
 - 2.1.1 KVA rating _____ **OA, OA/FFA, OA/FA**
 - 2.1.2 Overload Duty Class _____
 - 2.1.3 Temperature Rise _____ Deg C.
 - 2.1.4 Primary voltage _____ volts **delta/ wye**
 - 2.1.5 Primary BIL rating _____ kV

Recommended BIL, Temp. Rise Data:

Voltage Class	Recommended BIL
1.2 KV	30 KV
2.5 KV	45 KV
5.0 kV	60 KV
8.7 KV	75 KV
15.0 KV	110 KV
25.0 KV	150 KV
34.5 KV	200 KV
46.0 KV	250 KV

Duty Class	Long time rating	RMS Duty Cycle	Allowed Temp. Rise Deg C
T1	100 %	1.00	65
T2	125% for 2 hours	1.00	65
T3	125% for 2 hours	1.08	60
T4	125% for 2 hours	1.18	55



2.1.6 Primary terminal arrangement ANSI segment **1/2/3/4 Cover Mounted/ Sidewall Mounted with bottom/ top/ side entry and for Full Height/ Partial Height Air Terminal Chamber or Close coupled to primary switch or Busduct flange**

2.1.7 Primary taps _____ $\pm 2 \times 2.5\%$ full capacity

2.1.8 Impedance _____ % (ANSI tolerances) on **Full KVA/ 1/2 KVA Basis**

2.1.9 Secondary voltage _____ volts **delta/wye ; delta & wye**

2.1.10 Secondary BIL _____ kV

2.1.11 Conductor Material **copper / aluminum**

2.1.12 Secondary terminal arrangement ANSI segment **1/2/3/4 Cover Mounted/ Sidewall Mounted with bottom/ top/ side entry and for Full Height/ Partial Height Air Terminal Chamber or Close coupled to low voltage panel or Busduct flange**

2.1.13 Electrostatic Shield **Yes / No**

2.1.14 Application **Steel Plant / Power Plant / Paper Plant / Cement Plant / Other Process Industry / Induction Furnace/ Traction**

2.1.15 K-Factor _____

2.2 Windings will be **aluminum/copper**

2.3 The unit will be filled with one of the following fluids: **mineral oil/silicone fluid*/RTemp fluid*/Beta fluid***. (*High flash point liquid for indoor applications)

2.4 The transformer will be capable of continuous operation with average winding temperature rise not exceeding 55°C at 100 percent KVA or 65°C at 112 percent KVA loading with no decrease in normal transformer operating life. Temperature rise to be measured by resistance method.

2.5 The transformer will be capable of operation at rated KVA at 3300 feet altitude (1000 meters) without exceeding temperature limits, provided the maximum temperature of the cooling air not exceed 40°C and the average temperature of cooling air for any 24-hour period does not exceed 30°C.

2.5 If the KVA rating specified in article 2.1 above is OA/FFA, all current-carrying parts must be capable of handling the future current associated with the fan-rated KVA. If the KVA rating specified in article 2.1 above is OA/FA, the unit will be furnished with all necessary fans and equipment for automatic temperature-controlled forced-air cooling to obtain an additional capacity of 15 percent on units rated 750-2499 KVA, or an additional 25 percent capacity on units 2500 KVA and above. Fan motors will be rated 208-240 volt 60 hertz single-phase supply. (This supply to be furnished by the **purchaser**)



- 2.6 The transformer will be designed to carry short-time emergency overloads in accordance with ANSI C57.92 and NEMA TR 98 as applicable. Duration and magnitude of designed withstand capability will be as outlined in ANSI C57.12 and the latest IEEE short-circuit test code.
- 2.7 The transformer shall be designed to withstand mechanical axial and radial forces due to overloads. The transformer shall electrically designed to take care of the voltage and current harmonics adequately.
- 2.8 The transformer will be furnished with the following features and accessories:
- 2.8.1 Welded top cover with round **manhole/hand hold** in cover. Manhole/hand hold will be gasketed and clamp type. (Bolted flange type will not be accepted.)
 - 2.8.2 Provisions for jacking, skidding and lifting along directions of transformer centerlines.
 - 2.8.3 Diagrammatic nameplate per ANSI standards
 - 2.8.4 Two ground pads **copper faced/stainless steel** on base.
 - 2.8.5 Drain valve with sampler upper filter valve
 - 2.8.6 Deenergized tap changer with external operating handle brought out through tank wall at height convenient to the transformer design with provisions for padlocking and with a visible indication of position.
 - 2.8.7 Magnetic liquid level gauge **with/without** alarm contacts
 - 2.8.8 Dial-type top liquid thermometer **with/without** alarm contacts
 - 2.8.9 Pressure vacuum gauge **with/without** contact bleeder valve on pressure vacuum gauge (standard above 2500 KVA).
 - 2.8.10 Pressure relief **valve/device**. If device, **with/without** contacts. (Pressure relief device standard on units 2500 KVA and above and on all units filled with silicone, RTemp or Beta fluid.)
 - 2.8.11 Sudden pressure relay to operate external contacts. (Sudden pressure standard on units 2500 KVA and above)
 - 2.8.12 ___ KV **Distribution Class/ Intermediate Class/ Station Class** surge arrestors on HV.
 - 2.8.13 ___ Nos current transformers on HV with **SR/ MR** ratio / 5 amps.
 - 2.8.14 ___ Nos current transformers on HV with **SR/ MR** ratio / 5 amps
- 2.9 Unit will be designed for **sealed tank/inert gas/conservator** construction for preservation of the transformer oil and insulation.



- 2.10 The tank will be designed to withstand pressure 25 percent greater than the required operating design without permanent deformation. The operating pressure will be specified on the nameplate. Construction will consist of carbon steel plate reinforced with external side wall braces if required. All seams and joints will be welded.
- 2.11 The radiators will be **fixed/removable** with shut-off valves, constructed of minimum 18-gauge steel and pressure tested before installation on the tank. The complete tank assembly will be leak tested for eight hours minimum before shipment.
- 2.12 Transformer tank and radiators will be cleaned and primed followed by application of an intermediate coat of **enamel/epoxy** and final coat of **enamel/epoxy** ANSI color **61/70** for a total thickness of 3-5 mils before shipment.

3.0 Testing

- 3.1 The following tests will be performed on all units in accordance with the latest revision of ANSI test code C57.12.90 and/or NEMA TR1.
- 3.1.1 Resistance measurements of all windings on the rated voltage connection of each unit and at the tap extremes of at least one unit of a given rating.
- 3.1.2 Ratio test on the rated voltage connection and on all tap connections.
- 3.1.3 Polarity and phase-relation tests on the rated voltage connections.
- 3.1.4 No-load loss test at rated voltage on the rated voltage connection.
- 3.1.5 Exciting current test at rated voltage on the rated voltage connection.
- 3.1.6 Impedance and load loss tests at rated current on the rated voltage connection of each unit and on the tap extremes of at least one unit only of a given rating.
- 3.1.7 Applied and induced potential tests
- 3.1.9 Temperature test will be made on at least one unit unless results of an essentially duplicate design are available.
- 3.2 Results of the above tests including no load loss data will be submitted with final drawings.