

# Substation Transformers

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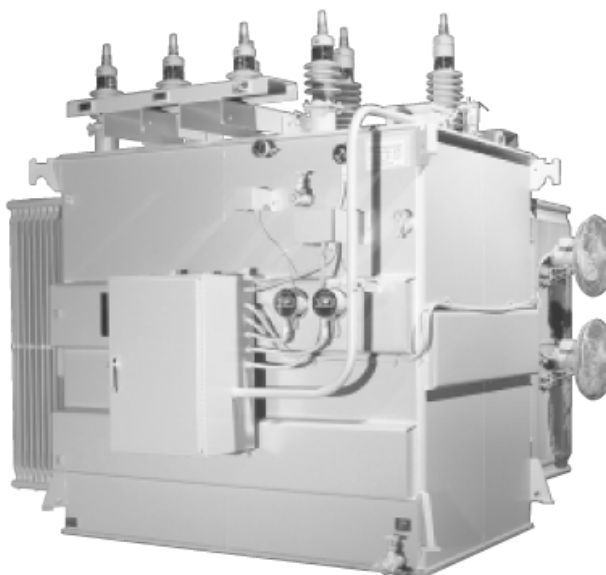
### Substation Transformers

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### Specifications

See Eaton's *Product Specification Guide*, available on CD or on the Web.

|                   |                |                  |
|-------------------|----------------|------------------|
| CSI Format: ..... | 1995           | 2010             |
|                   | Section 16322A | Section 26 12 13 |



*Substation Transformer—Liquid-Filled*

## General Description

## Substation Transformers



**Substation Transformers Feature Cover-Mounted Primary and Secondary Bushings and Can Be Provided with Load (LTC) Changers**

## Definition

A substation transformer is typically a standalone unit located at the front end of a campus, industrial site or large commercial project. The substation transformer is used to step down the utility service voltage.

Eaton's substation transformers use a rectangular core and coil design that is a distinguishing characteristic of Eaton small power liquid-filled transformers. This proven design provides excellent mechanical strength, dependability and space-saving economy needed for utility, industrial and commercial applications.

With most ratings, a choice of fluids including mineral oil (typically specified for outdoor applications), silicone (flammability concerns) and environmentally friendly fluids (flammability concerns, anywhere that an insulating fluid spill could require expensive cleanup procedures or where extended insulation life is desired) are all optional fluids.

**Note:** For additional information about transformer applications and types of insulating fluids, see **Tab 14**.

## Product Scope

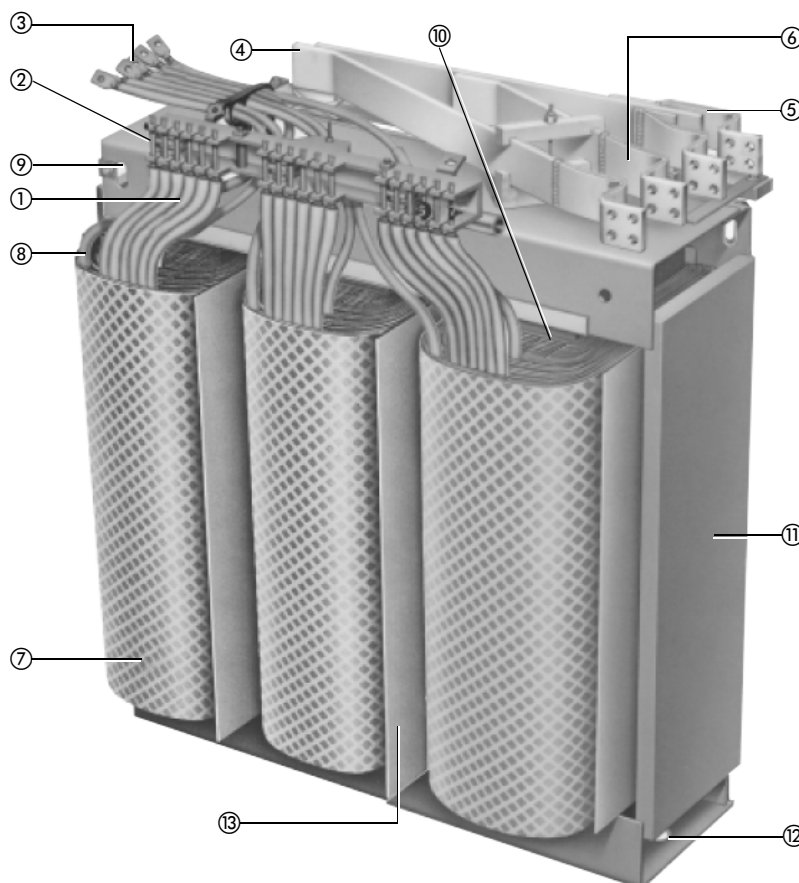
- 750–30,000 kVA
- Primary voltages: through 69 kV
- Secondary voltages: through 34.5 kV

## Available Fluids

- Mineral oil
- Silicone
- Environmentally friendly fluids

## Substation Benefits/Advantages

- Rectangular core/coil design:
  - Minimal size: space saving
  - Minimal weight: energy saving
- Insulation system for thermal upgrade and mechanical strength
- Turn insulation—superior adhesion, abrasion resistance and thermal stability
- High efficiency with the best combination of initial cost and low operating cost
- Preservation system—sealed gas blanket over fluid in tank



**Core and Coil Assembly**

## Core and Coil Items

- |                                  |                                  |
|----------------------------------|----------------------------------|
| ① Tap leads                      | ⑨ Core ground (removable)        |
| ② Tap changer                    | ⑩ Step-lap core                  |
| ③ High voltage leads             | ⑪ Side braces and support tie    |
| ④ Low voltage bus                | ⑫ Bottom support                 |
| ⑤ Low voltage bushing connection | ⑬ Inner phase barrier insulation |
| ⑥ Flexible bus                   |                                  |
| ⑦ Phase coil                     |                                  |
| ⑧ High voltage lead              |                                  |

## General Description

## Rectangular Core and Coil Process Design

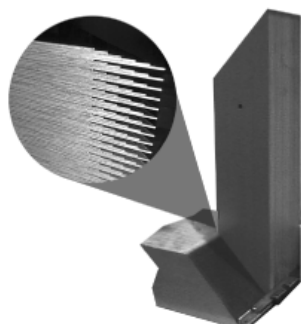
The rectangular design offers excellent mechanical strength that has been proven through years of service and in special testing.

Mechanical strength is achieved in multiple ways. One such process includes the use of a unique six-piece supporting structure. This supporting structure is assembled in a pressure jig around the core and coils, and arc welded to form a rigid structure.

The top and bottom pieces exert a clamping action on the yokes of the core to hold the laminations firmly in place and more importantly, to achieve optimum sound attenuation by using a pre-calculated pressure. Welding holds this preload for a permanently quiet core.

Steel end plates are pressed into position and welded to the top and bottom pieces to form a permanent framing. The thickness of the end plate is calculated for each design. The end plate's calculated thickness provides the beam strength required to minimize the tendency of the wide, flat part of the outside coils to "round out" during fault conditions.

## Core



**Step-Lap Mitered Core Joints are Used for Efficiency and Noise Reduction**

The rectangular core is a series of laminations made from high-quality, grain-oriented silicon steel.

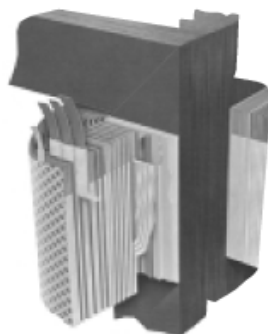
The stacked core provides a superior flux path by using a step-lap mitered core joint. The effective way in which the core is supported, as well as the efficient step-lap joint, have resulted in:

- Decreases in exciting current up to 40%
- Reductions in sound levels up to 3 dB
- Reductions in no load loss up to 10%

The rectangular-shaped core efficiently fills the correspondingly shaped opening

in the coil with a minimum of unused space. The short yoke between the core legs reduces the external path of the flux between active core leg material, resulting in an increase in efficiency. The rectangular shape of the core allows for more uniform and rigid support that prevents the shift of laminations and improves sound level characteristics.

## Coil



**The Core Efficiently Fills the Similar Shape Opening in the Coil to Minimize Unused Space**

Eaton coils feature aluminum or copper conductors in both high and low voltage windings. The low voltage winding is accomplished on a constant tension machine and consists of a full-width or part-coil sheet conductor extending the full height of the coil.

The advantage of the low voltage sheet is a continuous cross-section of conductor that allows the electrical centers of high and low voltage windings to easily align themselves, virtually eliminating the vertical component of short-circuit force.

The high voltage windings use wire conductors and are wound directly over the low voltage winding on a constant tension traversing machine. The high voltage conductors are typically insulated with the DuraBIL turn insulation.

## Turn Insulation



**DuraBIL Turn Insulation**

Traditional crepe paper or Nomex<sup>®</sup> tape is used in some design considerations. However, DuraBIL, which is a tough, flexible and inert turn insulation, is used in most designs. It reduces the most prevalent cause of transformer failure: deterioration of turn insulation.

DuraBIL is a single layer of epoxy powder deposited electrostatically and baked on the wire conductor. The process is closely controlled and monitored to ensure a continuous, uniform coating. The result is a compact turn insulation with superior characteristics, including adhesion, flexibility, abrasion resistance, and thermal and chemical stability.

DuraBIL will not degrade and contaminate the transformer fluid with moisture. Beyond the chemical attributes, DuraBIL maintains dimensional stability and the coil's structural integrity.

## Insuldur Insulation

Insuldur insulation thermally upgraded craft paper is typically used for layer and high to low insulation.

The Insuldur system of chemical stabilizers thermally upgrades cellulose insulating materials to permit a 12% higher load capacity. Insuldur can be used with all fluids offered with Eaton small power transformers.

Chemical stabilizers retard insulation breakdown under elevated temperature conditions. Additionally, dimensional changes in the insulating materials are minimized to ensure a tighter structure. The result is greater strength and coil integrity throughout the life of the transformer.

The Insuldur system allows a unit rated at 55 °C rise to be operated at a 10 °C higher temperature, with a 12% increase in kVA capacity. Generous oil ducts extend the height of the coil to provide cooling in the winding. The staggered, diamond epoxy bonds help to ensure free oil flow through the winding.

## Tank Construction

The transformer tank is designed to withstand a pressure 25% greater than the maximum operating pressure. The carbon-steel plate used to form the tank is reinforced with external side wall braces, and tank seams are continuously welded.

Each cooler assembly is individually welded and receives a pressurized check for leaks prior to assembly on the tank. After the coolers are attached to the tank, the completed tank assembly is leak-tested before shipment.

## General Description

**Micafil™ Low Frequency Heating Insulation Drying Process**

- The insulation is dried in its own tank and is never exposed to the atmosphere once it dries
- The windings are heated uniformly, so the insulation deep in the coils reaches a temperature that promotes moisture removal during the vacuum cycle
- The moisture level of the air in the vacuum exhaust is monitored constantly to ensure that the insulation is dry when the process is completed

**Fluid Preservation Systems****Sealedaire Standard on Units >2500 kVA or ≥250 kV BIL**

The Sealedaire preservation system uses a sealed gas space above the fluid that prevents breathing under normal conditions. An automatic pressure-vacuum relief valve assembly is factory-set to keep internal pressure within the limits of 6.5 pounds per square inch pressure or vacuum.

**Intertaire Optional**

The Intertaire Fluid Preservation System prevents oxygen and moisture from being drawn into the transformer tank when vacuum conditions exist. This system consists of a nitrogen cylinder and necessary controls to maintain positive nitrogen pressure in the gas space.

**Conservator Optional**

The Conservator, or Expansion-Tank System, seals the fluid from the atmosphere in the main tank by using an auxiliary tank partially filled with transformer fluid and connected to the main tank by piping. The system allows the transformer tank to remain full, despite expansion or contraction of the fluid due to temperature changes.

**Transformer Fluids****Mineral Oil**

Mineral oil is primarily used in outdoor applications.

Eaton offers transformers designed with less flammable fluids—silicone, Envirotemp FR3—that can be used to meet the National Electrical Code® 450.23 for indoor applications, environmental superiority and extended transformer insulation performance and life. Tests have shown Envirotemp FR3 will extend transformer insulation life 5–8 times longer than insulation in mineral oil.

**Silicone**

Silicone is a less flammable dielectric coolant for transformer applications and features heat stability, material compatibility, low flammability and low toxicity. Silicone's high fire point of 340 °C qualifies it as a less flammable fluid, which is UL® listed and factory mutual approved for indoor and outdoor use. It's a good choice in areas where potential fire hazards exist and special fire-suppressant systems are installed.

**Envirotemp FR3**

Envirotemp FR3 is a new, fully biodegradable, environmentally friendly dielectric fluid. In a 21-day period, Envirotemp FR3 has been tested to be 99% biodegradable.

Envirotemp FR3 is Factory Mutual approved and UL certified when installed in a transformer per the listing restrictions of the fluid to meet NEC 450.23. Envirotemp FR3 is suitable for application indoors and in areas of heightened environmental sensitivity where any insulating fluid spill could require expensive clean-up procedures.

**Note:** FR3™ and Envirotemp™ are licensed trademarks of Cargill, Incorporated.

**Quality Assurance Testing**

The following tests are made on all transformers unless noted as an exception. The numbers shown do not necessarily indicate the sequence in which the tests will be made. All tests will be made in accordance with the latest revision of IEEE C57.12.90 Test Code for Transformers.

1. Resistance measurements of all windings on the rated tap and on the tap extremes on one unit of a given rating on a multiple unit order.
2. Ratio Tests on the rated voltage connection and all tap connections.
3. Polarity and Phase-relation Tests.
4. No-load loss at rated voltage.
5. Excitation current at rated voltage.
6. Impedance and load loss at rated current on the rated voltage connection of each unit and on the tap extremes on one unit of a given rating on a multiple unit order.
7. Applied Potential Tests.
8. Induced Potential Test.
9. Mechanical Leak Test.

**Optional Tests**

The following additional tests can be made on any substation transformer. All tests are made in accordance with the latest revision of IEEE Standard Test Code C57.12.90.

1. IEEE Impulse Test.
2. Quality Control Impulse Test.
3. IEEE Front-of-Wave Impulse Test.
4. Temperature Test.
5. Sound Test.
6. Octave Band Sound Test.
7. Insulation Resistance (Meggar) Test.
8. Corona (Partial Discharge) or Radio Influence Voltage (RIV) Tests.
9. Short-Circuit Capability Calculations in lieu of Short-Circuit Test.
10. Insulation Power Factor Test.
11. Zero-Phase Sequence Impedance Test.
12. Seismic Certificate available.
13. Quality Assurance Documentation.
14. Witness or Inspection.

**Standards Compliance**

- IEEE C57.12.00
- IEEE C57.12.10 C57.12.36 (≤10 MVA)
- IEEE C57.12.90
- ISO® 9001
- CSA®-C88
- Substation transformers have successfully passed IEEE short-circuit tests
- Substation transformers are manufactured in an ISO 9001 certified factory

**Seismic Qualification**

Refer to **Tab 1** for information on seismic qualification for this and other Eaton products.

## General Description

## General Description

- Self-cooled power rating (kVA): 750–20,000
- Primary voltage (kV): Up through 69
- Secondary voltage (kV): Up to 34.5
- Available fluids: Oil, silicone and Envirotemp FR3
- Load tap changers: 2500 kVA and larger

## Standard Electrical Features

- Two windings, without reconnectable windings
- Four high voltage winding full-capacity taps with a total tap range of 10%
- Standard impedance as shown in **Table 16.0-3**
- Frequency of 60 Hz
- Sound levels as shown in **Table 16.0-1**
- Standard BIL levels as shown in **Table 16.0-2**
- Excitation limits defined by IEEE C57.12.00:
  - Unit will deliver rated kVA at 5% above rated secondary voltage without exceeding the limiting temperature rise provided the load power factor is 80% or higher and the frequency is at least 95% of rated value
  - Unit can be energized at 10% above rated secondary voltage at no-load without exceeding the limiting temperature rise
- 65 °C average temperature rise

## Optional Electrical Features

- Series multiple windings
- Delta-wye connection—changing the internal connections on the HV or LV windings (three-phase only)
- Nonstandard HV taps and tap range
- Nonstandard phase relationship
- Low-loss, high-efficiency designs
- Frequency other than 60 Hz
- Special impedances
- Design to withstand IEEE front-of-wave impulse test
- Special sound level
- Special BIL level
- Over excitation
- 55 °C / 65 °C average temperature rise
- 55 °C / 75 °C average winding rise
- Special ambient temperatures
- Operation at altitudes above 3300 ft (1000 m)
- Motor-starting duty or dedicated motor loads

## Standard Electromechanical Features

- Aluminum windings
- Tap changer for de-energized operation with the handle brought out through the tank wall
- Rubber-jacketed multi-conductor control wiring

## Optional Electromechanical Features

- Copper windings
- Tap changer mechanical key interlock
- Provisions only for tap changer mechanical key interlock
- Flexible conduit for control wiring
- Rigid conduit for control wiring
- Special control wiring size or insulation
- Core ground lead brought to test point located inside tank adjacent to bolted handhole
- Electrostatic shields
- Internally-mounted bushing current transformer

## Standard Tank Features

- Corrosion-resistant steel hardware
- Lifting hooks for complete unit
- Lifting loops for tank cover
- Welded main tank cover
- Welded handhole on cover, or bolted handhole when access to tank interior is required
- Tank grounding provisions
- Transformer base that permits rolling in directions parallel to the base center line
- Provisions for jacking

## Optional Tank Features

- Special hardware
- Bolted handhole
- Bolted manhole
- Ground connector and pad
- Skid mounting

## Standard Gauges and Fittings

- Dial-type thermometer with alarm contacts
- Pressure-vacuum gauge:
  - Units rated 200 kV BIL and below
  - Units rated 2500 kVA and below
- Pressure-relief device (no alarm contacts):
  - Silicone filled
  - Oil filled

## Optional Gauges and Fittings

- Magnetic liquid-level gauge with alarm contacts
- Dial-type thermometer with alarm contacts
- Pressure-vacuum gauge (no alarm contacts—primary units +/<2500 only)
- Pressure-vacuum gauge with alarm contacts
- Pressure-relief device (no alarm contacts):
  - Silicone filled (excluding primary units >2500)
  - Oil filled (excluding primary units >2500)
- Top filter-press connection-valve
- RTD coil for use with remote temperature indicator

## Optional Cooling System

- Tank design pressure: 15 psig without rupturing
- Fluid preservation system:
  - Sealedaire on units ≤2500 kVA
  - Intertaire
  - Conservator
- Removable coolers
- Provisions only for future fans (FFA) excluding secondary units >500 kVA
- Complete forced air cooling systems (FA):
  - 15% added capacity units rated ≤2500 kVA
  - 25% added capacity units rated >2500 kVA
  - 33% >10 MVA

## General Description

**Standard Tank Finish**

- Special paint color
- Paint system process:
  - Standard system: 5 mils total thickness
  - Optional: zinc chromate epoxy primer and intermediate coat, oven cure, air spray aliaphatic polyurethane, ambient cure, 5–7 mils
  - Optional: zinc-rich primer, epoxy coat, oven cure and air dry, 7 mils minimum (only available with panel coolers)

**Optional Tank Finish**

- Special paint color
- Paint system process:
  - Standard system: 5 mils total thickness
  - System I: zinc chromate epoxy primer and intermediate coat, oven cure, air spray aliaphatic polyurethane, ambient cure, 5–7 mils
  - System II: zinc-rich primer, epoxy coat, oven cure and air dry, 7 mils minimum (only available with panel coolers)
- Tank undercoating

**Standard High and Low Voltage Components**

- Bushings: cover-mounted porcelain with copper conductor

**Optional High and Low Voltage Components**

- Bushings:
  - Special cover-mounted porcelain bushings
  - Extra creep bushings
  - Transformer-breaker-interchangeable (TBI) bushings
- Bushing terminal connectors
- Cover-mounted bus duct throat
- HV and LV surge arresters
- External fuses (HV only)

**Special Options**

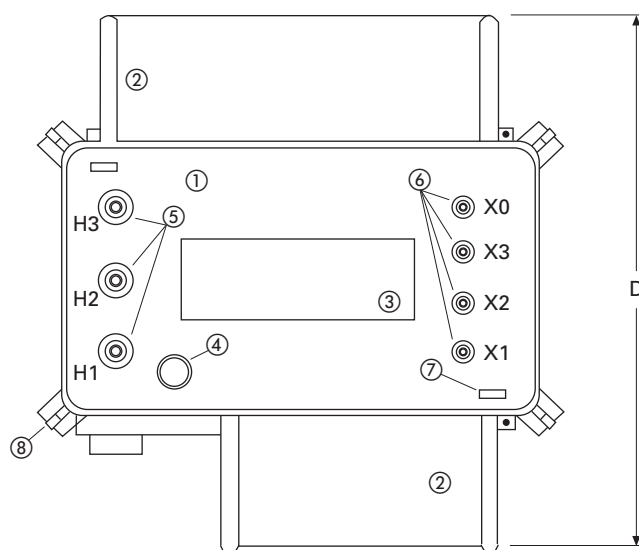
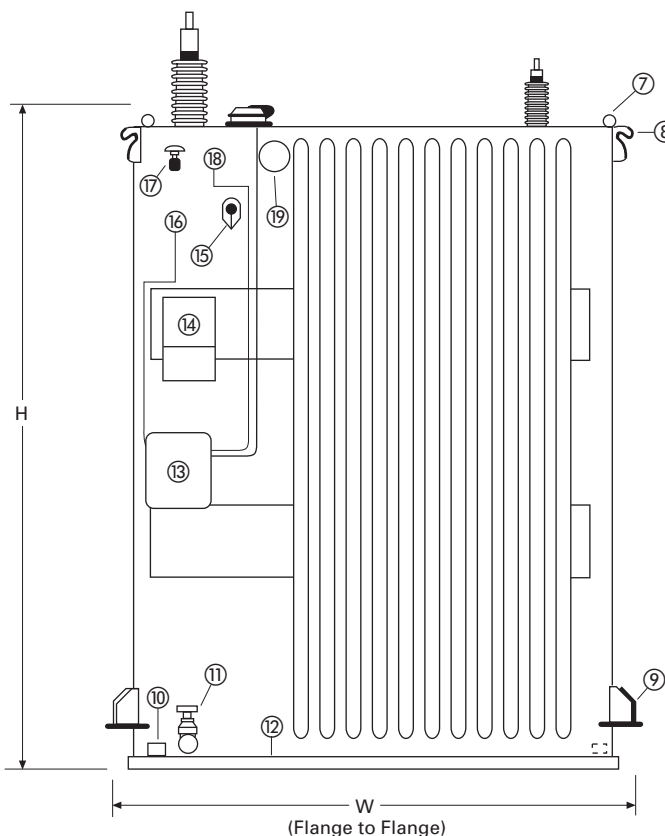
- Operation in hazardous locations (qualification of externally attached equipment such as wiring, conduit, fans, cabinets, alarm contacts and relays)
- Receptacle or light in control cabinet
- Space heater with thermostat in control cabinet
- Reusable gaskets on bushings, handhole and devices
- Special dimensions

**General Description**
**Standard Features—  
Liquid-Filled Transformer**

- ① Cover—welded to tank
- ② Cooling tubes (radiators)
- Note:** Radiator position and number of radiators will vary based upon design.
- ③ Bolted handhole on cover
- ④ Automatic resealing mechanical pressure relief device
- ⑤ HV bushing, three total, located in ANSI Segment 2
- ⑥ LV bushing, four total (wye connected), located in ANSI Segment 4

**Note:** HV and LV bushings may be cover mounted or left/right orientation may be reversed.

- ⑦ Lifting loops—two for lifting cover only
- ⑧ Lifting hooks—four for lifting complete unit
- ⑨ Jacking provisions on tank or base
- ⑩ Ground pad—two total
- ⑪ Drain valve—for combination lower filter press connection and complete drain with sampler
- ⑫ Base (may be flat or formed)
- ⑬ Control cabinet for alarm lead termination
- ⑭ Diagram instruction nameplate with warning nameplate
- ⑮ De-energized tap changer with padlock provisions
- ⑯ Liquid temperature indicator with maximum indicating hand
- ⑰ Upper valve for upper filter press connection
- ⑱ Magnetic liquid level gauge
- ⑲ Vacuum pressure gauge with air test and Sealedaire valve


**Top View**

**Front View**
**Figure 16.0-1. Liquid-Filled Primary Unit Substation Transformer with Wall-Mounted High Voltage and Low Voltage Bushings**

**Note:** See Pages 16.0-12 through 16.0-14 for dimensions and weights.

## Technical Data

**Table 16.0-1. Standard Sound Levels**

| Self-Cooled (OA)<br>Equivalent Two-Winding (kVA) | NEMA <sup>®</sup><br>Average DB-OA | NEMA<br>Average DB-FA |
|--------------------------------------------------|------------------------------------|-----------------------|
| 6001–7500                                        | 67                                 | 69                    |
| 7501–10,000                                      | 68                                 | 70                    |
| 10,001–12,000                                    | 69                                 | 71                    |
| 12,001–15,000                                    | 70                                 | 72                    |
| 15,001–20,000                                    | 71                                 | 73                    |

**Table 16.0-2. Standard Basic Impulse Levels**

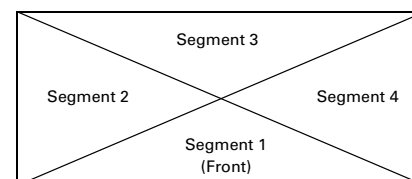
| kV<br>Class          | Induced Test<br>180 Hz–7200 Cycles | kV<br>BIL | Applied Test<br>60 Hz-kV |
|----------------------|------------------------------------|-----------|--------------------------|
| 1.2                  | Twice<br>Normal<br>Voltage         | 45        | 10                       |
| 2.5                  |                                    | 60        | 15                       |
| 5.0                  |                                    | 75        | 19                       |
| 8.7                  |                                    | 95        | 26                       |
| 15.0                 |                                    | 110       | 34                       |
| 25.0 (Ground Y only) |                                    | 125       | 40                       |
| 25.0                 |                                    | 150       | 50                       |
| 34.5 (Ground Y only) |                                    | 150       | 50                       |
| 34.5                 |                                    | 200       | 70                       |
| 46.0                 |                                    | 350       | 95                       |
| 69.0                 |                                    | 250       | 140                      |

**Table 16.0-3. Percent Impedance at Self-Cooled Ratings (ONAN / KNAN) (IEEE C57.12.10)**

| High-Voltage BIL (kV) | Without LTC | With LTC |
|-----------------------|-------------|----------|
| ≤110                  | 5.5         | —        |
| 150                   | 6.5         | 7.0      |
| 200                   | 7.0         | 7.5      |
| 250                   | 7.5         | 8.0      |
| 350                   | 8.0         | 8.5      |
| 450                   | 8.5         | 9.0      |
| 550                   | 9.0         | 9.5      |
| 650                   | 9.5         | 10.0     |
| 750                   | 10.0        | 10.5     |

## ANSI Segment Identification for HV and LV Bushings

The plan view, below, shows the ANSI segments used to identify the location of both the HV and LV bushings.


**Figure 16.0-2. Front (Nameplate, Gauges, etc.)**

HV: Segment 2 is standard for wall-mounted bushings (optional Segment 4).  
 Segment 3 is standard for cover-mounted bushings.

LV: Segment 4 wall-mounted is standard (optional Segment 2).

## Technical Data

Table 16.0-4. Liquid Filled 5 kV Primary 55 °C Temp. Rise

| kVA    | No Load at 75 °C Ref. Temp. (Watts) | Load Loss at 100% Load and 75 °C Ref. Temp. (Watts) | Total Losses at 100% Load and 85 °C (Watts) | 60 kV HV BIL Total Losses at 50% Load and 55 °C LL Ref. Temp. and 20 °C NL Ref. Temp. per DOE (Watts) |
|--------|-------------------------------------|-----------------------------------------------------|---------------------------------------------|-------------------------------------------------------------------------------------------------------|
| 750    | 1777                                | 9984                                                | 11,761                                      | 4270                                                                                                  |
| 1000   | 2254                                | 12,613                                              | 14,867                                      | 5410                                                                                                  |
| 1500   | 3161                                | 17,178                                              | 20,339                                      | 7460                                                                                                  |
| 2000   | 4004                                | 20,820                                              | 24,824                                      | 9210                                                                                                  |
| 2500   | 4784                                | 23,538                                              | 28,322                                      | 10,670                                                                                                |
| 3000   | 4310                                | 23,584                                              | 27,894                                      | 10,210                                                                                                |
| 3750   | 6359                                | 27,990                                              | 34,349                                      | 13,360                                                                                                |
| 5000   | 8070                                | 34,991                                              | 43,061                                      | 16,820                                                                                                |
| 7500   | 11,343                              | 47,722                                              | 59,065                                      | 23,270                                                                                                |
| 10,000 | 14,419                              | 58,758                                              | 73,177                                      | 29,110                                                                                                |

Table 16.0-5. Liquid Filled 15 kV Primary 55 °C Temp. Rise

| kVA    | No Load at 75 °C Ref. Temp. (Watts) | Load Loss at 100% Load and 75 °C Ref. Temp. (Watts) | Total Losses at 100% Load and 85 °C (Watts) | 95 kV HV BIL Total Losses at 50% Load and 55 °C LL Ref. Temp. and 20 °C NL Ref. Temp. per DOE (Watts) |
|--------|-------------------------------------|-----------------------------------------------------|---------------------------------------------|-------------------------------------------------------------------------------------------------------|
| 750    | 1795                                | 10,085                                              | 11,880                                      | 4320                                                                                                  |
| 1000   | 2277                                | 12,741                                              | 15,018                                      | 5460                                                                                                  |
| 1500   | 3193                                | 17,352                                              | 20,545                                      | 7530                                                                                                  |
| 2000   | 4045                                | 21,031                                              | 25,076                                      | 9300                                                                                                  |
| 2500   | 4833                                | 23,776                                              | 28,609                                      | 10,780                                                                                                |
| 3000   | 5364                                | 23,823                                              | 29,187                                      | 11,320                                                                                                |
| 3750   | 6424                                | 28,273                                              | 34,697                                      | 13,490                                                                                                |
| 5000   | 8152                                | 35,345                                              | 43,497                                      | 16,990                                                                                                |
| 7500   | 11,458                              | 48,205                                              | 59,663                                      | 23,510                                                                                                |
| 10,000 | 14,565                              | 59,352                                              | 73,917                                      | 29,400                                                                                                |

Table 16.0-6. Liquid Filled 25 kV Primary 55 °C Temp. Rise

| kVA    | No Load at 75 °C Ref. Temp. (Watts) | Load Loss at 100% Load and 75 °C Ref. Temp. (Watts) | Total Losses at 100% Load and 85 °C (Watts) | 150 kV HV BIL Total Losses at 50% Load and 55 °C LL Ref. Temp. and 20 °C NL Ref. Temp. per DOE (Watts) |
|--------|-------------------------------------|-----------------------------------------------------|---------------------------------------------|--------------------------------------------------------------------------------------------------------|
| 750    | 1812                                | 10,183                                              | 11,995                                      | 4360                                                                                                   |
| 1000   | 2299                                | 12,865                                              | 15,164                                      | 5520                                                                                                   |
| 1500   | 3224                                | 17,521                                              | 20,745                                      | 7600                                                                                                   |
| 2000   | 4084                                | 21,236                                              | 25,320                                      | 9390                                                                                                   |
| 2500   | 4879                                | 24,008                                              | 28,887                                      | 10,880                                                                                                 |
| 3000   | 4396                                | 24,055                                              | 28,451                                      | 10,410                                                                                                 |
| 3750   | 6486                                | 28,549                                              | 35,035                                      | 13,620                                                                                                 |
| 5000   | 8231                                | 35,690                                              | 43,921                                      | 17,150                                                                                                 |
| 7500   | 11,569                              | 48,676                                              | 60,245                                      | 23,740                                                                                                 |
| 10,000 | 14,707                              | 59,933                                              | 74,640                                      | 29,690                                                                                                 |

Table 16.0-7. Liquid Filled 35 kV Primary 55 °C Temp. Rise

| kVA    | No Load at 75 °C Ref. Temp. (Watts) | Load Loss at 100% Load and 75 °C Ref. Temp. (Watts) | Total Losses at 100% Load and 85 °C (Watts) | 200 kV HV BIL Total Losses at 50% Load and 55 °C LL Ref. Temp. and 20 °C NL Ref. Temp. per DOE (Watts) |
|--------|-------------------------------------|-----------------------------------------------------|---------------------------------------------|--------------------------------------------------------------------------------------------------------|
| 750    | 1902                                | 10,692                                              | 12,594                                      | 4580                                                                                                   |
| 1000   | 2413                                | 13,508                                              | 15,921                                      | 5790                                                                                                   |
| 1500   | 3385                                | 18,397                                              | 21,782                                      | 7980                                                                                                   |
| 2000   | 4288                                | 22,298                                              | 26,586                                      | 9860                                                                                                   |
| 2500   | 5122                                | 25,208                                              | 30,330                                      | 11,420                                                                                                 |
| 3000   | 4615                                | 25,257                                              | 29,872                                      | 10,930                                                                                                 |
| 3750   | 6810                                | 29,976                                              | 36,786                                      | 14,300                                                                                                 |
| 5000   | 8642                                | 37,474                                              | 46,116                                      | 18,010                                                                                                 |
| 7500   | 12,147                              | 51,109                                              | 63,256                                      | 24,920                                                                                                 |
| 10,000 | 15,442                              | 62,929                                              | 78,371                                      | 31,170                                                                                                 |

Table 16.0-8. Liquid Filled 5 kV Primary 65 °C Temp. Rise

| kVA    | No Load at 85 °C Ref. Temp. (Watts) | Load Loss at 100% Load and 85 °C Ref. Temp. (Watts) | Total Losses at 100% Load and 85 °C (Watts) | 60 kV HV BIL Total Losses at 50% Load and 55 °C LL Ref. Temp. and 20 °C NL Ref. Temp. per DOE (Watts) |
|--------|-------------------------------------|-----------------------------------------------------|---------------------------------------------|-------------------------------------------------------------------------------------------------------|
| 750    | 1928                                | 10,832                                              | 12,760                                      | 4640                                                                                                  |
| 1000   | 2445                                | 13,685                                              | 16,130                                      | 5870                                                                                                  |
| 1500   | 3429                                | 18,638                                              | 22,067                                      | 8090                                                                                                  |
| 2000   | 4344                                | 22,589                                              | 26,933                                      | 9990                                                                                                  |
| 2500   | 5190                                | 25,538                                              | 30,728                                      | 11,570                                                                                                |
| 3000   | 4676                                | 25,584                                              | 30,260                                      | 11,070                                                                                                |
| 3750   | 6899                                | 30,369                                              | 37,268                                      | 14,490                                                                                                |
| 5000   | 8755                                | 37,965                                              | 46,720                                      | 18,250                                                                                                |
| 7500   | 12,307                              | 51,778                                              | 64,085                                      | 25,250                                                                                                |
| 10,000 | 15,644                              | 63,752                                              | 79,396                                      | 31,580                                                                                                |

Table 16.0-9. Liquid Filled 15 kV Primary 65 °C Temp. Rise

| kVA    | No Load at 85 °C Ref. Temp. (Watts) | Load Loss at 100% Load and 85 °C Ref. Temp. (Watts) | Total Losses at 100% Load and 85 °C (Watts) | 95 kV HV BIL Total Losses at 50% Load and 55 °C LL Ref. Temp. and 20 °C NL Ref. Temp. per DOE (Watts) |
|--------|-------------------------------------|-----------------------------------------------------|---------------------------------------------|-------------------------------------------------------------------------------------------------------|
| 750    | 1947                                | 10,942                                              | 12,889                                      | 4680                                                                                                  |
| 1000   | 2470                                | 13,823                                              | 16,293                                      | 5930                                                                                                  |
| 1500   | 3464                                | 18,826                                              | 22,290                                      | 8170                                                                                                  |
| 2000   | 4388                                | 22,818                                              | 27,206                                      | 10,090                                                                                                |
| 2500   | 5243                                | 25,796                                              | 31,039                                      | 11,690                                                                                                |
| 3000   | 5819                                | 25,847                                              | 31,666                                      | 12,280                                                                                                |
| 3750   | 6970                                | 30,676                                              | 37,646                                      | 14,640                                                                                                |
| 5000   | 8844                                | 38,349                                              | 47,193                                      | 18,430                                                                                                |
| 7500   | 12,431                              | 52,302                                              | 64,733                                      | 25,510                                                                                                |
| 10,000 | 15,803                              | 64,396                                              | 80,199                                      | 31,900                                                                                                |

**Note:** Losses offered are typical only, not guaranteed. Losses based on aluminum windings. Losses based on LV rating of 2-5 kV.

## Technical Data

**Table 16.0-10. Liquid Filled 25 kV Primary 65 °C Temp. Rise**

| kVA    | No Load at 85 °C Ref. Temp. (Watts) | Load Loss at 100% Load and 85 °C Ref. Temp. (Watts) | Total Losses at 100% Load and 85 °C (Watts) | 150 kV HV BIL Total Losses at 50% Load and 55 °C LL Ref. Temp. and 20 °C NL Ref. Temp. per DOE (Watts) |
|--------|-------------------------------------|-----------------------------------------------------|---------------------------------------------|--------------------------------------------------------------------------------------------------------|
| 750    | 1966                                | 11,048                                              | 13,014                                      | 4730                                                                                                   |
| 1000   | 2494                                | 13,958                                              | 16,452                                      | 5980                                                                                                   |
| 1500   | 3498                                | 19,010                                              | 22,508                                      | 8250                                                                                                   |
| 2000   | 4431                                | 23,041                                              | 27,472                                      | 10,190                                                                                                 |
| 2500   | 5293                                | 26,048                                              | 31,341                                      | 11,810                                                                                                 |
| 3000   | 4769                                | 26,099                                              | 30,868                                      | 11,290                                                                                                 |
| 3750   | 7037                                | 30,875                                              | 37,912                                      | 14,760                                                                                                 |
| 5000   | 8930                                | 38,735                                              | 47,665                                      | 18,610                                                                                                 |
| 7500   | 12,552                              | 52,813                                              | 65,365                                      | 25,760                                                                                                 |
| 10,000 | 15,957                              | 65,027                                              | 80,984                                      | 32,210                                                                                                 |

**Table 16.0-11. Liquid Filled 35 kV Primary 65 °C Temp. Rise**

| kVA    | No Load at 85 °C Ref. Temp. (Watts) | Load Loss at 100% Load and 85 °C Ref. Temp. (Watts) | Total Losses at 100% Load and 85 °C (Watts) | 200 kV HV BIL Total Losses at 50% Load and 55 °C LL Ref. Temp. and 20 °C NL Ref. Temp. per DOE (Watts) |
|--------|-------------------------------------|-----------------------------------------------------|---------------------------------------------|--------------------------------------------------------------------------------------------------------|
| 750    | 2063                                | 11,600                                              | 13,663                                      | 4960                                                                                                   |
| 1000   | 2618                                | 14,656                                              | 17,274                                      | 6280                                                                                                   |
| 1500   | 3672                                | 19,960                                              | 23,632                                      | 8660                                                                                                   |
| 2000   | 4652                                | 24,193                                              | 28,845                                      | 10,700                                                                                                 |
| 2500   | 5557                                | 27,350                                              | 32,907                                      | 12,390                                                                                                 |
| 3000   | 5007                                | 27,403                                              | 32,410                                      | 11,860                                                                                                 |
| 3750   | 7388                                | 32,523                                              | 39,911                                      | 15,520                                                                                                 |
| 5000   | 9376                                | 40,659                                              | 50,035                                      | 19,540                                                                                                 |
| 7500   | 13,179                              | 55,453                                              | 68,632                                      | 27,040                                                                                                 |
| 10,000 | 16,754                              | 68,277                                              | 85,031                                      | 33,820                                                                                                 |

**Table 16.0-12. Environmentally Friendly Fluid 5 kV Primary 55 °C Temp. Rise**

| kVA    | No Load at 75 °C Ref. Temp. (Watts) | Load Loss at 100% Load and 75 °C Ref. Temp. (Watts) | Total Losses at 100% Load and 85 °C (Watts) | 60 kV HV BIL Total Losses at 50% Load and 55 °C LL Ref. Temp. and 20 °C NL Ref. Temp. per DOE (Watts) |
|--------|-------------------------------------|-----------------------------------------------------|---------------------------------------------|-------------------------------------------------------------------------------------------------------|
| 750    | 1756                                | 9491                                                | 11,247                                      | 4130                                                                                                  |
| 1000   | 2235                                | 11,822                                              | 14,057                                      | 5190                                                                                                  |
| 1500   | 3156                                | 15,576                                              | 18,732                                      | 7050                                                                                                  |
| 2000   | 4028                                | 18,115                                              | 22,143                                      | 8560                                                                                                  |
| 2500   | 4851                                | 19,441                                              | 24,292                                      | 9710                                                                                                  |
| 3000   | 5246                                | 21,540                                              | 26,786                                      | 10,630                                                                                                |
| 3750   | 6286                                | 24,712                                              | 30,998                                      | 12,460                                                                                                |
| 5000   | 8004                                | 29,717                                              | 37,721                                      | 15,430                                                                                                |
| 7500   | 11,380                              | 38,675                                              | 50,055                                      | 21,050                                                                                                |
| 10,000 | 14,675                              | 46,227                                              | 60,902                                      | 26,230                                                                                                |

**Table 16.0-13. Environmentally Friendly Fluid 15 kV Primary 55 °C Temp. Rise**

| kVA    | No Load at 75 °C Ref. Temp. (Watts) | Load Loss at 100% Load and 75 °C Ref. Temp. (Watts) | Total Losses at 100% Load and 85 °C (Watts) | 95 kV HV BIL Total Losses at 50% Load and 55 °C LL Ref. Temp. and 20 °C NL Ref. Temp. per DOE (Watts) |
|--------|-------------------------------------|-----------------------------------------------------|---------------------------------------------|-------------------------------------------------------------------------------------------------------|
| 750    | 1774                                | 9587                                                | 11,361                                      | 4170                                                                                                  |
| 1000   | 2258                                | 11,942                                              | 14,200                                      | 5240                                                                                                  |
| 1500   | 3188                                | 15,734                                              | 18,922                                      | 7120                                                                                                  |
| 2000   | 4069                                | 18,298                                              | 22,367                                      | 8640                                                                                                  |
| 2500   | 4900                                | 19,638                                              | 24,538                                      | 9810                                                                                                  |
| 3000   | 5299                                | 21,758                                              | 27,057                                      | 10,740                                                                                                |
| 3750   | 6350                                | 24,962                                              | 31,312                                      | 12,590                                                                                                |
| 5000   | 8085                                | 30,018                                              | 38,103                                      | 15,590                                                                                                |
| 7500   | 11,495                              | 39,066                                              | 50,561                                      | 21,260                                                                                                |
| 10,000 | 14,824                              | 46,694                                              | 61,518                                      | 26,500                                                                                                |

**Table 16.0-14. Environmentally Friendly Fluid 25 kV Primary 55 °C Temp. Rise**

| kVA    | No Load at 75 °C Ref. Temp. (Watts) | Load Loss at 100% Load and 75 °C Ref. Temp. (Watts) | Total Losses at 100% Load and 85 °C (Watts) | 150 kV HV BIL Total Losses at 50% Load and 55 °C LL Ref. Temp. and 20 °C NL Ref. Temp. per DOE (Watts) |
|--------|-------------------------------------|-----------------------------------------------------|---------------------------------------------|--------------------------------------------------------------------------------------------------------|
| 750    | 1791                                | 9680                                                | 11,471                                      | 4210                                                                                                   |
| 1000   | 2279                                | 12,058                                              | 14,337                                      | 5290                                                                                                   |
| 1500   | 3219                                | 15,887                                              | 19,106                                      | 7190                                                                                                   |
| 2000   | 4108                                | 18,477                                              | 22,585                                      | 8730                                                                                                   |
| 2500   | 4948                                | 19,829                                              | 24,777                                      | 9910                                                                                                   |
| 3000   | 5350                                | 21,970                                              | 27,320                                      | 10,840                                                                                                 |
| 3750   | 6411                                | 25,206                                              | 31,617                                      | 12,710                                                                                                 |
| 5000   | 8164                                | 30,311                                              | 38,475                                      | 15,740                                                                                                 |
| 7500   | 11,607                              | 39,448                                              | 51,055                                      | 21,470                                                                                                 |
| 10,000 | 14,968                              | 47,150                                              | 62,118                                      | 26,760                                                                                                 |

**Table 16.0-15. Environmentally Friendly Fluid 35 kV Primary 55 °C Temp. Rise**

| kVA    | No Load at 75 °C Ref. Temp. (Watts) | Load Loss at 100% Load and 75 °C Ref. Temp. (Watts) | Total Losses at 100% Load and 85 °C (Watts) | 200 kV HV BIL Total Losses at 50% Load and 55 °C LL Ref. Temp. and 20 °C NL Ref. Temp. per DOE (Watts) |
|--------|-------------------------------------|-----------------------------------------------------|---------------------------------------------|--------------------------------------------------------------------------------------------------------|
| 750    | 1880                                | 10,164                                              | 12,044                                      | 4420                                                                                                   |
| 1000   | 2392                                | 12,660                                              | 15,052                                      | 5560                                                                                                   |
| 1500   | 3379                                | 16,681                                              | 20,060                                      | 7550                                                                                                   |
| 2000   | 4313                                | 19,400                                              | 23,713                                      | 9160                                                                                                   |
| 2500   | 5195                                | 20,820                                              | 26,015                                      | 10,400                                                                                                 |
| 3000   | 5617                                | 23,068                                              | 28,685                                      | 11,380                                                                                                 |
| 3750   | 6731                                | 26,466                                              | 33,197                                      | 13,350                                                                                                 |
| 5000   | 8572                                | 31,826                                              | 40,398                                      | 16,530                                                                                                 |
| 7500   | 12,187                              | 41,420                                              | 53,607                                      | 22,450                                                                                                 |
| 10,000 | 15,716                              | 49,507                                              | 65,223                                      | 28,090                                                                                                 |

**Note:** Losses offered are typical only, not guaranteed. Losses based on aluminum windings. Losses based on LV rating of 2–5 kV.

## Technical Data

**Table 16.0-16. Environmentally Friendly Fluid 5 kV Primary  
65 °C Temp. Rise**

| kVA    | No Load<br>at 85°C<br>Ref. Temp.<br>(Watts) | Load Loss<br>at 100%<br>Load and<br>85 °C Ref.<br>Temp.<br>(Watts) | Total Losses<br>at 100%<br>Load and<br>85 °C (Watts) | 60 kV HV BIL<br>Total Losses<br>at 50% Load<br>and 55 °C LL<br>Ref. Temp.<br>and 20 °C NL<br>Ref. Temp. per<br>DOE (Watts) |
|--------|---------------------------------------------|--------------------------------------------------------------------|------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|
| 750    | 1905                                        | 10,297                                                             | 12,202                                               | 4480                                                                                                                       |
| 1000   | 2424                                        | 12,826                                                             | 15,250                                               | 5630                                                                                                                       |
| 1500   | 3424                                        | 16,899                                                             | 20,323                                               | 7650                                                                                                                       |
| 2000   | 4370                                        | 19,654                                                             | 24,024                                               | 9280                                                                                                                       |
| 2500   | 5263                                        | 21,093                                                             | 26,356                                               | 10,540                                                                                                                     |
| 3000   | 5691                                        | 23,370                                                             | 29,061                                               | 11,530                                                                                                                     |
| 3750   | 6820                                        | 26,812                                                             | 33,632                                               | 13,520                                                                                                                     |
| 5000   | 8684                                        | 32,242                                                             | 40,926                                               | 16,740                                                                                                                     |
| 7500   | 12,347                                      | 41,962                                                             | 54,309                                               | 22,840                                                                                                                     |
| 10,000 | 15,922                                      | 50,156                                                             | 66,078                                               | 28,460                                                                                                                     |

**Table 16.0-17. Environmentally Friendly Fluid 15 kV Primary  
65 °C Temp. Rise**

| kVA    | No Load<br>at 85 °C<br>Ref. Temp.<br>(Watts) | Load Loss<br>at 100%<br>Load and<br>85 °C Ref.<br>Temp.<br>(Watts) | Total Losses<br>at 100%<br>Load and<br>85 °C (Watts) | 95 kV HV BIL<br>Total Losses<br>at 50% Load<br>and 55 °C LL<br>Ref. Temp.<br>and 20 °C NL<br>Ref. Temp. per<br>DOE (Watts) |
|--------|----------------------------------------------|--------------------------------------------------------------------|------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|
| 750    | 1924                                         | 10,401                                                             | 12,325                                               | 4520                                                                                                                       |
| 1000   | 2449                                         | 12,957                                                             | 15,406                                               | 5690                                                                                                                       |
| 1500   | 3458                                         | 17,071                                                             | 20,529                                               | 7730                                                                                                                       |
| 2000   | 4414                                         | 19,853                                                             | 24,267                                               | 9380                                                                                                                       |
| 2500   | 5316                                         | 21,307                                                             | 26,623                                               | 10,970                                                                                                                     |
| 3000   | 5749                                         | 23,607                                                             | 29,356                                               | 11,650                                                                                                                     |
| 3750   | 6889                                         | 27,083                                                             | 33,972                                               | 13,660                                                                                                                     |
| 5000   | 8772                                         | 32,569                                                             | 41,341                                               | 16,910                                                                                                                     |
| 7500   | 12,472                                       | 42,386                                                             | 54,858                                               | 23,070                                                                                                                     |
| 10,000 | 16,084                                       | 50,662                                                             | 66,746                                               | 28,750                                                                                                                     |

**Table 16.0-18. Environmentally Friendly Fluid 25 kV Primary  
65 °C Temp. Rise**

| kVA    | No Load<br>at 85 °C<br>Ref. Temp.<br>(Watts) | Load Loss at<br>100% Load<br>and 85 °C<br>Ref. Temp.<br>(Watts) | Total Losses<br>at 100%<br>Load and<br>85 °C (Watts) | 150 kV HV BIL<br>Total Losses<br>at 50% Load<br>and 55 °C LL<br>Ref. Temp.<br>and 20 °C NL<br>Ref. Temp. per<br>DOE (Watts) |
|--------|----------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| 750    | 1943                                         | 10,502                                                          | 12,445                                               | 4570                                                                                                                        |
| 1000   | 2472                                         | 13,082                                                          | 15,554                                               | 5740                                                                                                                        |
| 1500   | 3492                                         | 17,237                                                          | 20,729                                               | 7800                                                                                                                        |
| 2000   | 4457                                         | 20,047                                                          | 24,504                                               | 9470                                                                                                                        |
| 2500   | 5368                                         | 21,514                                                          | 26,882                                               | 10,750                                                                                                                      |
| 3000   | 5804                                         | 23,837                                                          | 29,641                                               | 11,760                                                                                                                      |
| 3750   | 6955                                         | 27,348                                                          | 34,303                                               | 13,790                                                                                                                      |
| 5000   | 8857                                         | 32,887                                                          | 41,744                                               | 17,080                                                                                                                      |
| 7500   | 12,593                                       | 42,801                                                          | 55,394                                               | 23,290                                                                                                                      |
| 10,000 | 16,240                                       | 51,157                                                          | 67,397                                               | 29,030                                                                                                                      |

**Table 16.0-19. Environmentally Friendly Fluid 35 kV Primary  
65 °C Temp. Rise**

| kVA    | No Load<br>at 85 °C<br>Ref. Temp.<br>(Watts) | Load Loss<br>at 100%<br>Load and<br>85 °C Ref.<br>Temp.<br>(Watts) | Total Losses<br>at 100%<br>Load and<br>85 °C (Watts) | 200 kV HV BIL<br>Total Losses<br>at 50% Load<br>and 55 °C LL<br>Ref. Temp.<br>and 20 °C NL<br>Ref. Temp. per<br>DOE (Watts) |
|--------|----------------------------------------------|--------------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| 750    | 2039                                         | 11,027                                                             | 13,066                                               | 4800                                                                                                                        |
| 1000   | 2595                                         | 13,736                                                             | 16,331                                               | 6030                                                                                                                        |
| 1500   | 3666                                         | 18,098                                                             | 21,764                                               | 8190                                                                                                                        |
| 2000   | 4679                                         | 21,049                                                             | 25,728                                               | 9940                                                                                                                        |
| 2500   | 5636                                         | 22,589                                                             | 28,225                                               | 11,280                                                                                                                      |
| 3000   | 6094                                         | 25,028                                                             | 31,122                                               | 12,350                                                                                                                      |
| 3750   | 7303                                         | 28,715                                                             | 36,018                                               | 14,480                                                                                                                      |
| 5000   | 9300                                         | 34,531                                                             | 43,831                                               | 17,930                                                                                                                      |
| 7500   | 13,222                                       | 44,940                                                             | 58,162                                               | 24,460                                                                                                                      |
| 10,000 | 17,051                                       | 53,715                                                             | 70,766                                               | 30,480                                                                                                                      |

**Note:** Losses offered are typical only, not guaranteed. Losses based on aluminum windings. Losses based on LV rating of 2–5 kV.

## Layout Dimensions

For special 55 °C rise units, bus duct throats and air terminal chambers, see **Notes** at bottom of page for dimensions that should be added to the table dimensions.

**Table 16.0-20. 65 °C Rise, Oil-Filled**  
**HV 6900D, 75 BIL**  
**LV 2400Y, 45 BIL**

| kVA Rating | Weight Lb (kg) | Gallons (Liters) Liquid | Dimensions in Inches (mm) |           |           |
|------------|----------------|-------------------------|---------------------------|-----------|-----------|
|            |                |                         | Height                    | Width     | Depth     |
| 500        | 4520 (2050)    | 120 (454)               | 92 (2337)                 | 56 (1422) | 56 (1422) |
| 750        | 4750 (2155)    | 150 (568)               | 92 (2337)                 | 56 (1422) | 56 (1422) |
| 1000       | 5590 (2536)    | 170 (644)               | 92 (2337)                 | 59 (1499) | 59 (1499) |
| 1500       | 7380 (3348)    | 210 (795)               | 92 (2337)                 | 67 (1702) | 67 (1702) |
| 2000       | 8890 (4032)    | 240 (908)               | 92 (2337)                 | 70 (1778) | 70 (1778) |
| 2500       | 10,060 (4563)  | 260 (984)               | 92 (2337)                 | 70 (1778) | 70 (1778) |
| 3000       | 11,110 (5039)  | 290 (1098)              | 95 (2413)                 | 70 (1778) | 70 (1778) |
| 3750       | 13,200 (5987)  | 340 (1287)              | 95 (2413)                 | 73 (1854) | 73 (1854) |
| 5000       | 18,020 (8174)  | 620 (2347)              | 113 (2870)                | 74 (1880) | 74 (1880) |

**Table 16.0-21. 65 °C Rise, Oil-Filled**  
**HV 13800D, 95 BIL**  
**LV 2400Y, 45 BIL**

| kVA Rating | Weight Lb (kg)  | Gallons (Liters) Liquid | Dimensions in Inches (mm) |            |            |
|------------|-----------------|-------------------------|---------------------------|------------|------------|
|            |                 |                         | Height                    | Width      | Depth      |
| 750        | 4840 (2195)     | 160 (606)               | 92 (2337)                 | 56 (1422)  | 79 (2007)  |
| 1000       | 5720 (2595)     | 180 (681)               | 92 (2337)                 | 59 (1499)  | 78 (1981)  |
| 1500       | 7370 (3343)     | 210 (795)               | 92 (2337)                 | 65 (1651)  | 92 (2337)  |
| 2000       | 8760 (3973)     | 230 (871)               | 92 (2337)                 | 68 (1727)  | 114 (2896) |
| 2500       | 9940 (4509)     | 260 (984)               | 92 (2337)                 | 68 (1727)  | 125 (3175) |
| 3000       | 11,650 (5284)   | 350 (1325)              | 95 (2413)                 | 70 (1778)  | 127 (3226) |
| 3750       | 13,330 (6046)   | 390 (1476)              | 95 (2413)                 | 72 (1829)  | 127 (3226) |
| 5000       | 16,640 (7548)   | 480 (1817)              | 95 (2413)                 | 75 (1905)  | 131 (3327) |
| 7500       | 30,300 (13,744) | 1220 (4618)             | 114 (2896)                | 113 (2870) | 138 (3505) |
| 10,000     | 34,830 (15,799) | 1230 (4656)             | 114 (2896)                | 118 (2997) | 139 (3531) |

**Table 16.0-22. 65 °C Rise, Oil-Filled**  
**HV 13800D, 95 BIL**  
**LV 4160Y, 60 BIL**

| kVA Rating | Weight Lb (kg)  | Gallons (Liters) Liquid | Dimensions in Inches (mm) |            |            |
|------------|-----------------|-------------------------|---------------------------|------------|------------|
|            |                 |                         | Height                    | Width      | Depth      |
| 750        | 5120 (2322)     | 170 (644)               | 92 (2337)                 | 57 (1448)  | 79 (2007)  |
| 1000       | 5980 (2712)     | 180 (681)               | 92 (2337)                 | 62 (1575)  | 81 (2057)  |
| 1500       | 7280 (3302)     | 210 (795)               | 92 (2337)                 | 63 (1600)  | 100 (2540) |
| 2000       | 8700 (3946)     | 230 (871)               | 92 (2337)                 | 65 (1651)  | 108 (2743) |
| 2500       | 10,290 (4667)   | 270 (1022)              | 92 (2337)                 | 70 (1778)  | 114 (2896) |
| 3000       | 11,860 (5380)   | 320 (1211)              | 95 (2413)                 | 73 (1854)  | 127 (3226) |
| 3750       | 13,410 (6083)   | 360 (1363)              | 95 (2413)                 | 73 (1854)  | 129 (3277) |
| 5000       | 17,030 (7725)   | 520 (1968)              | 99 (2515)                 | 75 (1905)  | 131 (3327) |
| 7500       | 29,720 (13,481) | 1140 (4315)             | 109 (2769)                | 113 (2870) | 140 (3556) |
| 10,000     | 35,790 (16,234) | 1310 (4959)             | 116 (2946)                | 117 (2972) | 143 (3632) |

**Table 16.0-23. 65 °C Rise, Oil-Filled**  
**HV 22900D, 150 BIL**  
**LV 2400Y, 45 BIL**

| kVA Rating | Weight Lb (kg)  | Gallons (Liters) Liquid | Dimensions in Inches (mm) |            |            |
|------------|-----------------|-------------------------|---------------------------|------------|------------|
|            |                 |                         | Height                    | Width      | Depth      |
| 750        | 5650 (2563)     | 220 (833)               | 92 (2337)                 | 59 (1499)  | 81 (2057)  |
| 1000       | 6400 (2903)     | 220 (833)               | 92 (2337)                 | 61 (1549)  | 87 (2210)  |
| 1500       | 8020 (3638)     | 250 (946)               | 92 (2337)                 | 64 (1626)  | 101 (2565) |
| 2000       | 9500 (4309)     | 280 (1060)              | 92 (2337)                 | 68 (1727)  | 101 (2565) |
| 2500       | 10,550 (4785)   | 300 (1136)              | 92 (2337)                 | 70 (1778)  | 107 (2718) |
| 3000       | 12,000 (5443)   | 330 (1249)              | 95 (2413)                 | 73 (1854)  | 127 (3226) |
| 3750       | 14,350 (6509)   | 450 (1703)              | 95 (2413)                 | 73 (1854)  | 128 (3251) |
| 5000       | 19,110 (8668)   | 700 (2650)              | 117 (2972)                | 74 (1880)  | 129 (3277) |
| 7500       | 30,880 (14,007) | 1210 (4580)             | 117 (2972)                | 102 (2591) | 140 (3556) |
| 10,000     | 39,080 (17,726) | 1600 (6057)             | 124 (3150)                | 106 (2692) | 145 (3683) |

**Table 16.0-24. 65 °C Rise, Oil-Filled**  
**HV 22900D, 150 BIL**  
**LV 4160Y, 60 BIL**

| kVA Rating | Weight Lb (kg)  | Gallons (Liters) Liquid | Dimensions in Inches (mm) |            |            |
|------------|-----------------|-------------------------|---------------------------|------------|------------|
|            |                 |                         | Height                    | Width      | Depth      |
| 750        | 5660 (2567)     | 210 (795)               | 92 (2337)                 | 58 (1473)  | 83 (2108)  |
| 1000       | 6640 (3012)     | 230 (871)               | 92 (2337)                 | 62 (1575)  | 87 (2210)  |
| 1500       | 8000 (3629)     | 250 (946)               | 92 (2337)                 | 64 (1626)  | 107 (2718) |
| 2000       | 9350 (4241)     | 290 (1098)              | 92 (2337)                 | 66 (1676)  | 107 (2718) |
| 2500       | 10,860 (4926)   | 310 (1173)              | 92 (2337)                 | 71 (1803)  | 107 (2718) |
| 3000       | 12,400 (5625)   | 340 (1287)              | 95 (2413)                 | 73 (1854)  | 130 (3302) |
| 3750       | 14,500 (6577)   | 430 (1628)              | 95 (2413)                 | 74 (1880)  | 130 (3302) |
| 5000       | 19,510 (8850)   | 720 (2725)              | 118 (2997)                | 74 (1880)  | 132 (3353) |
| 7500       | 30,270 (13,730) | 1120 (4240)             | 118 (2997)                | 101 (2565) | 143 (3632) |
| 10,000     | 38,140 (17,300) | 1500 (5679)             | 124 (3150)                | 105 (2667) | 146 (3708) |

**Table 16.0-25. 65 °C Rise, Oil-Filled**  
**HV 22900D, 150 BIL**  
**LV 12470Y, 95 BIL**

| kVA Rating | Weight Lb (kg)  | Gallons (Liters) Liquid | Dimensions in Inches (mm) |            |            |
|------------|-----------------|-------------------------|---------------------------|------------|------------|
|            |                 |                         | Height                    | Width      | Depth      |
| 750        | 6630 (3007)     | 250 (946)               | 92 (2337)                 | 65 (1651)  | 64 (1626)  |
| 1000       | 7510 (3406)     | 280 (1060)              | 92 (2337)                 | 66 (1676)  | 78 (1981)  |
| 1500       | 9040 (4100)     | 290 (1098)              | 92 (2337)                 | 69 (1753)  | 88 (2235)  |
| 2000       | 10,110 (4586)   | 290 (1098)              | 92 (2337)                 | 70 (1778)  | 96 (2438)  |
| 2500       | 11,670 (5293)   | 330 (1249)              | 92 (2337)                 | 73 (1854)  | 106 (2692) |
| 3000       | 12,760 (5788)   | 350 (1325)              | 95 (2413)                 | 74 (1880)  | 130 (3302) |
| 3750       | 15,280 (6931)   | 440 (1666)              | 95 (2413)                 | 75 (1905)  | 133 (3378) |
| 5000       | 19,370 (8786)   | 650 (2461)              | 107 (2718)                | 76 (1930)  | 136 (3454) |
| 7500       | 30,850 (13,993) | 1180 (4467)             | 114 (2896)                | 100 (2540) | 139 (3531) |
| 10,000     | 38,320 (17,382) | 1450 (5489)             | 122 (3099)                | 104 (2642) | 143 (3632) |

- Notes:**
1. Dimensions are APPROXIMATE. Refer to the transformer's outline drawing for actual dimensions for construction.
  2. For 55 °C units, add 5.00 inches (127.0 mm) to "W" dimension and 10.00 inches (254.0 mm) to "D" dimension.
  3. Add 9.00 inches (228.6 mm) to "W" dimension for each bus duct throat.
  4. Add 22.00 inches (558.8 mm) to "W" dimension for each 15 kV air terminal chamber.
  5. Add 25.00 inches (635.0 mm) to "W" dimension for each 27 kV air terminal chamber.
  6. Add 35.00 inches (889.0 mm) to "W" dimension for each 34.5 kV air terminal chamber.

## Layout Dimensions

For special 55 °C rise units, bus duct throats and air terminal chambers, see **Notes** at bottom of page for dimensions that should be added to the table dimensions.

**Table 16.0-26. 65 °C Rise, Oil-Filled  
HV 34400D, 200 BIL  
LV 2400Y, 45 BIL**

| kVA Rating | Weight Lb (kg)  | Gallons (Liters) Liquid | Dimensions in Inches (mm) |            |            |
|------------|-----------------|-------------------------|---------------------------|------------|------------|
|            |                 |                         | Height                    | Width      | Depth      |
| 750        | 7000 (3175)     | 330 (1249)              | 115 (2921)                | 67 (1702)  | 66 (1676)  |
| 1000       | 7720 (3502)     | 350 (1325)              | 115 (2921)                | 67 (1702)  | 79 (2007)  |
| 1500       | 9880 (4481)     | 380 (1438)              | 115 (2921)                | 69 (1753)  | 98 (2489)  |
| 2000       | 11,300 (5126)   | 410 (1552)              | 115 (2921)                | 71 (1803)  | 112 (2845) |
| 2500       | 12,880 (5842)   | 450 (1703)              | 115 (2921)                | 71 (1803)  | 122 (3099) |
| 3000       | 13,760 (6241)   | 460 (1741)              | 115 (2921)                | 72 (1829)  | 130 (3302) |
| 3750       | 16,030 (7271)   | 520 (1968)              | 115 (2921)                | 85 (2159)  | 136 (3454) |
| 5000       | 19,780 (8972)   | 660 (2498)              | 117 (2972)                | 100 (2540) | 138 (3505) |
| 7500       | 30,270 (13,730) | 1070 (4050)             | 129 (3277)                | 124 (3150) | 138 (3505) |
| 10,000     | 39,290 (17,822) | 1480 (5602)             | 136 (3454)                | 127 (3226) | 140 (3556) |

**Table 16.0-27. 65 °C Rise, Oil-Filled  
HV 34400D, 200 BIL  
LV 4160Y, 60 BIL**

| kVA Rating | Weight Lb (kg)  | Gallons (Liters) Liquid | Dimensions in Inches (mm) |            |            |
|------------|-----------------|-------------------------|---------------------------|------------|------------|
|            |                 |                         | Height                    | Width      | Depth      |
| 750        | 7230 (3279)     | 340 (1287)              | 115 (2921)                | 68 (1727)  | 67 (1702)  |
| 1000       | 8040 (3647)     | 360 (1363)              | 115 (2921)                | 68 (1727)  | 80 (2032)  |
| 1500       | 9920 (4500)     | 390 (1476)              | 115 (2921)                | 69 (1753)  | 94 (2388)  |
| 2000       | 11,700 (5307)   | 430 (1628)              | 115 (2921)                | 71 (1803)  | 116 (2946) |
| 2500       | 13,120 (5951)   | 460 (1741)              | 115 (2921)                | 73 (1854)  | 124 (3150) |
| 3000       | 14,400 (6532)   | 500 (1893)              | 115 (2921)                | 76 (1930)  | 128 (3251) |
| 3750       | 16,210 (7353)   | 540 (2044)              | 115 (2921)                | 77 (1956)  | 136 (3454) |
| 5000       | 20,490 (9294)   | 740 (2801)              | 124 (3150)                | 95 (2413)  | 139 (3531) |
| 7500       | 31,470 (14,275) | 1190 (4505)             | 133 (3378)                | 122 (3099) | 140 (3556) |
| 10,000     | 36,390 (16,506) | 1190 (4505)             | 132 (3353)                | 125 (3175) | 145 (3683) |

**Table 16.0-28. 65 °C Rise, Oil-Filled  
HV 34400D, 200 BIL  
LV 13800Y, 95 BIL**

| kVA Rating | Weight Lb (kg)  | Gallons (Liters) Liquid | Dimensions in Inches (mm) |            |            |
|------------|-----------------|-------------------------|---------------------------|------------|------------|
|            |                 |                         | Height                    | Width      | Depth      |
| 750        | 9110 (4132)     | 410 (1552)              | 115 (2921)                | 72 (1829)  | 63 (1600)  |
| 1000       | 9370 (4250)     | 390 (1476)              | 115 (2921)                | 72 (1829)  | 70 (1778)  |
| 1500       | 10,760 (4881)   | 410 (1552)              | 115 (2921)                | 72 (1829)  | 93 (2362)  |
| 2000       | 12,210 (5538)   | 450 (1703)              | 115 (2921)                | 72 (1829)  | 108 (2743) |
| 2500       | 13,600 (6169)   | 470 (1779)              | 115 (2921)                | 74 (1880)  | 109 (2769) |
| 3000       | 14,990 (6799)   | 510 (1931)              | 115 (2921)                | 77 (1956)  | 125 (3175) |
| 3750       | 16,590 (7525)   | 540 (2044)              | 115 (2921)                | 77 (1956)  | 137 (3480) |
| 5000       | 20,480 (9290)   | 710 (2688)              | 122 (3099)                | 94 (2388)  | 138 (3505) |
| 7500       | 32,220 (14,615) | 1050 (3975)             | 125 (3175)                | 123 (3124) | 139 (3531) |
| 10,000     | 38,460 (17,445) | 1350 (5110)             | 135 (3429)                | 124 (3150) | 148 (3759) |

- Notes:**
1. Dimensions are APPROXIMATE. Refer to the transformer's outline drawing for actual dimensions for construction.
  2. For 55 °C units, add 5.00 inches (127.0 mm) to "W" dimension and 10.00 inches (254.0 mm) to "D" dimension.
  3. Add 9.00 inches (228.6 mm) to "W" dimension for each bus duct throat.
  4. Add 22.00 inches (558.8 mm) to "W" dimension for each 15 kV air terminal chamber.
  5. Add 25.00 inches (635.0 mm) to "W" dimension for each 27 kV air terminal chamber.
  6. Add 35.00 inches (889.0 mm) to "W" dimension for each 34.5 kV air terminal chamber.

**Table 16.0-29. 65 °C Rise,  
Silicone/Environmentally Friendly Fluid  
HV 6900D, 75 BIL  
LV 2400Y, 45 BIL**

| kVA Rating | Weight Lb (kg) | Gallons (Liters) Liquid | Dimensions in Inches (mm) |           |            |
|------------|----------------|-------------------------|---------------------------|-----------|------------|
|            |                |                         | Height                    | Width     | Depth      |
| 750        | 4930 (2236)    | 160 (606)               | 87 (2210)                 | 48 (1219) | 76 (1930)  |
| 1000       | 5940 (2694)    | 180 (681)               | 87 (2210)                 | 52 (1321) | 92 (2337)  |
| 1500       | 7690 (3488)    | 220 (833)               | 87 (2210)                 | 59 (1499) | 95 (2413)  |
| 2000       | 9270 (4205)    | 250 (946)               | 87 (2210)                 | 62 (1575) | 107 (2718) |
| 2500       | 10,630 (4822)  | 280 (1060)              | 87 (2210)                 | 62 (1575) | 112 (2845) |
| 3000       | 12,280 (5570)  | 340 (1287)              | 87 (2210)                 | 63 (1600) | 121 (3073) |
| 3750       | 14,540 (6595)  | 380 (1438)              | 87 (2210)                 | 67 (1702) | 122 (3099) |
| 5000       | 18,620 (8446)  | 580 (2196)              | 98 (2489)                 | 68 (1727) | 123 (3124) |

**Table 16.0-30. 65 °C Rise,  
Silicone/Environmentally Friendly Fluid  
HV 13800D, 95 BIL  
LV 2400Y, 45 BIL**

| kVA Rating | Weight Lb (kg)  | Gallons (Liters) Liquid | Dimensions in Inches (mm) |            |            |
|------------|-----------------|-------------------------|---------------------------|------------|------------|
|            |                 |                         | Height                    | Width      | Depth      |
| 750        | 5010 (2272)     | 160 (606)               | 87 (2210)                 | 48 (1219)  | 79 (2007)  |
| 1000       | 6090 (2762)     | 180 (681)               | 87 (2210)                 | 53 (1346)  | 82 (2083)  |
| 1500       | 7730 (3506)     | 220 (833)               | 87 (2210)                 | 55 (1397)  | 116 (2946) |
| 2000       | 9270 (4205)     | 250 (946)               | 87 (2210)                 | 59 (1499)  | 118 (2997) |
| 2500       | 10,510 (4767)   | 270 (1022)              | 87 (2210)                 | 61 (1549)  | 119 (3023) |
| 3000       | 12,100 (5488)   | 310 (1173)              | 87 (2210)                 | 65 (1651)  | 119 (3023) |
| 3750       | 14,380 (6523)   | 390 (1476)              | 87 (2210)                 | 65 (1651)  | 121 (3073) |
| 5000       | 18,490 (8387)   | 560 (2120)              | 97 (2464)                 | 68 (1727)  | 122 (3099) |
| 7500       | 32,180 (14,597) | 1020 (3861)             | 98 (2489)                 | 112 (2845) | 131 (3327) |
| 10,000     | 46,580 (21,128) | 1760 (6662)             | 119 (3023)                | 120 (3048) | 131 (3327) |

**Table 16.0-31. 65 °C Rise,  
Silicone/Environmentally Friendly Fluid  
HV 13800D, 95 BIL  
LV 4160Y, 60 BIL**

| kVA Rating | Weight Lb (kg)  | Gallons (Liters) Liquid | Dimensions in Inches (mm) |            |            |
|------------|-----------------|-------------------------|---------------------------|------------|------------|
|            |                 |                         | Height                    | Width      | Depth      |
| 750        | 5340 (2422)     | 180 (681)               | 87 (2210)                 | 49 (1245)  | 79 (2007)  |
| 1000       | 6120 (2776)     | 190 (719)               | 87 (2210)                 | 51 (1295)  | 82 (2083)  |
| 1500       | 7660 (3475)     | 220 (833)               | 87 (2210)                 | 56 (1422)  | 116 (2946) |
| 2000       | 9080 (4119)     | 250 (946)               | 87 (2210)                 | 59 (1499)  | 118 (2997) |
| 2500       | 11,180 (5071)   | 290 (1098)              | 87 (2210)                 | 64 (1626)  | 119 (3023) |
| 3000       | 12,470 (5656)   | 310 (1173)              | 87 (2210)                 | 66 (1676)  | 115 (2921) |
| 3750       | 14,590 (6618)   | 360 (1363)              | 87 (2210)                 | 68 (1727)  | 121 (3073) |
| 5000       | 18,330 (8314)   | 540 (2044)              | 93 (2362)                 | 68 (1727)  | 122 (3099) |
| 7500       | 31,330 (14,211) | 970 (3672)              | 98 (2489)                 | 111 (2819) | 131 (3327) |
| 10,000     | 39,050 (17,713) | 1230 (4656)             | 101 (2565)                | 114 (2896) | 131 (3327) |

## Layout Dimensions

For special 55 °C rise units, bus duct throats and air terminal chambers, see **Notes** at bottom of page for dimensions that should be added to the table dimensions.

**Table 16.0-32. 65 °C Rise,  
Silicone/Environmentally Friendly Fluid  
HV 22900D, 150 BIL  
LV 2400Y, 45 BIL**

| kVA Rating | Weight Lb (kg)  | Gallons (Liters) Liquid | Dimensions in Inches (mm) |            |            |
|------------|-----------------|-------------------------|---------------------------|------------|------------|
|            |                 |                         | Height                    | Width      | Depth      |
| 750        | 5970 (2708)     | 230 (871)               | 87 (2210)                 | 52 (1321)  | 73 (1854)  |
| 1000       | 6820 (3093)     | 240 (908)               | 87 (2210)                 | 54 (1372)  | 91 (2311)  |
| 1500       | 8710 (3951)     | 280 (1060)              | 87 (2210)                 | 57 (1448)  | 95 (2413)  |
| 2000       | 10,140 (4599)   | 310 (1173)              | 87 (2210)                 | 58 (1473)  | 110 (2794) |
| 2500       | 11,890 (5393)   | 338 (1279)              | 87 (2210)                 | 62 (1575)  | 121 (3073) |
| 3000       | 13,480 (6114)   | 380 (1438)              | 87 (2210)                 | 66 (1676)  | 124 (3150) |
| 3750       | 15,820 (7176)   | 440 (1666)              | 87 (2210)                 | 68 (1727)  | 125 (3175) |
| 5000       | 19,250 (8732)   | 540 (2044)              | 87 (2210)                 | 70 (1778)  | 129 (3277) |
| 7500       | 32,700 (14,832) | 1090 (4126)             | 100 (2540)                | 99 (2515)  | 133 (3378) |
| 10,000     | 50,160 (22,752) | 2200 (8328)             | 120 (3048)                | 118 (2997) | 133 (3378) |

**Table 16.0-33. 65 °C Rise,  
Silicone/Environmentally Friendly Fluid  
HV 22900D, 150 BIL  
LV 4160Y, 60 BIL**

| kVA Rating | Weight Lb (kg)  | Gallons (Liters) Liquid | Dimensions in Inches (mm) |            |            |
|------------|-----------------|-------------------------|---------------------------|------------|------------|
|            |                 |                         | Height                    | Width      | Depth      |
| 750        | 6090 (2762)     | 230 (871)               | 87 (2210)                 | 52 (1321)  | 75 (1905)  |
| 1000       | 7110 (3225)     | 250 (946)               | 87 (2210)                 | 55 (1397)  | 91 (2311)  |
| 1500       | 8630 (3915)     | 280 (1060)              | 87 (2210)                 | 56 (1422)  | 102 (2591) |
| 2000       | 10,050 (4559)   | 310 (1173)              | 87 (2210)                 | 58 (1473)  | 107 (2718) |
| 2500       | 12,170 (5520)   | 350 (1325)              | 87 (2210)                 | 63 (1600)  | 114 (2896) |
| 3000       | 13,600 (6169)   | 380 (1438)              | 87 (2210)                 | 66 (1676)  | 116 (2946) |
| 3750       | 15,300 (6940)   | 420 (1590)              | 87 (2210)                 | 68 (1727)  | 126 (3200) |
| 5000       | 19,350 (8777)   | 580 (2196)              | 89 (2261)                 | 70 (1778)  | 129 (3277) |
| 7500       | 32,590 (14,783) | 1040 (3937)             | 94 (2388)                 | 98 (2489)  | 134 (3404) |
| 10,000     | 40,250 (18,257) | 1370 (5186)             | 109 (2769)                | 102 (2591) | 137 (3480) |

**Table 16.0-34. 65 °C Rise,  
Silicone/Environmentally Friendly Fluid  
HV 22900D, 150 BIL  
LV 12470Y, 95 BIL**

| kVA Rating | Weight Lb (kg)  | Gallons (Liters) Liquid | Dimensions in Inches (mm) |           |            |
|------------|-----------------|-------------------------|---------------------------|-----------|------------|
|            |                 |                         | Height                    | Width     | Depth      |
| 750        | 6930 (3143)     | 360 (1363)              | 87 (2210)                 | 56 (1422) | 66 (1676)  |
| 1000       | 7920 (3592)     | 300 (1136)              | 87 (2210)                 | 58 (1473) | 72 (1829)  |
| 1500       | 9370 (4250)     | 310 (1173)              | 87 (2210)                 | 59 (1499) | 90 (2286)  |
| 2000       | 11,240 (5098)   | 330 (1249)              | 87 (2210)                 | 62 (1575) | 104 (2642) |
| 2500       | 12,760 (5788)   | 370 (1401)              | 87 (2210)                 | 66 (1676) | 110 (2794) |
| 3000       | 14,260 (6468)   | 390 (1476)              | 87 (2210)                 | 69 (1753) | 111 (2819) |
| 3750       | 15,910 (7217)   | 420 (1590)              | 87 (2210)                 | 69 (1753) | 122 (3099) |
| 5000       | 19,830 (8995)   | 530 (2006)              | 89 (2261)                 | 71 (1803) | 130 (3302) |
| 7500       | 33,990 (15,418) | 1100 (4164)             | 94 (2388)                 | 97 (2464) | 139 (3531) |
| 10,000     | 39,610 (17,967) | 1280 (4845)             | 109 (2769)                | 99 (2515) | 139 (3531) |

**Table 16.0-35. 65 °C Rise,  
Silicone/Environmentally Friendly Fluid  
HV 34400D, 200 BIL  
LV 2400Y, 45 BIL**

| kVA Rating | Weight Lb (kg)  | Gallons (Liters) Liquid | Dimensions in Inches (mm) |            |            |
|------------|-----------------|-------------------------|---------------------------|------------|------------|
|            |                 |                         | Height                    | Width      | Depth      |
| 750        | 7600 (3447)     | 370 (1401)              | 107 (2718)                | 60 (1524)  | 68 (1727)  |
| 1000       | 8460 (3837)     | 390 (1476)              | 107 (2718)                | 60 (1524)  | 84 (2134)  |
| 1500       | 10,740 (4872)   | 420 (1590)              | 107 (2718)                | 62 (1575)  | 107 (2718) |
| 2000       | 12,260 (5561)   | 460 (1741)              | 107 (2718)                | 64 (1626)  | 115 (2921) |
| 2500       | 13,760 (6241)   | 490 (1855)              | 107 (2718)                | 64 (1626)  | 121 (3073) |
| 3000       | 15,020 (6813)   | 520 (1968)              | 107 (2718)                | 66 (1676)  | 121 (3073) |
| 3750       | 16,950 (7688)   | 570 (2158)              | 107 (2718)                | 78 (1981)  | 129 (3277) |
| 5000       | 20,270 (9194)   | 650 (2461)              | 109 (2769)                | 92 (2337)  | 132 (3353) |
| 7500       | 33,980 (15,413) | 1200 (4542)             | 120 (3048)                | 117 (2972) | 136 (3454) |
| 10,000     | 42,340 (19,205) | 1440 (5451)             | 129 (3277)                | 150 (3810) | 136 (3454) |

**Table 16.0-36. 65 °C Rise,  
Silicone/Environmentally Friendly Fluid  
HV 34400D, 200 BIL  
LV 4160Y, 60 BIL**

| kVA Rating | Weight Lb (kg)  | Gallons (Liters) Liquid | Dimensions in Inches (mm) |            |            |
|------------|-----------------|-------------------------|---------------------------|------------|------------|
|            |                 |                         | Height                    | Width      | Depth      |
| 750        | 7930 (3597)     | 380 (1438)              | 107 (2718)                | 61 (1549)  | 68 (1727)  |
| 1000       | 8840 (4010)     | 400 (1514)              | 107 (2718)                | 61 (1549)  | 81 (2057)  |
| 1500       | 10,710 (4858)   | 440 (1666)              | 107 (2718)                | 62 (1575)  | 95 (2413)  |
| 2000       | 12,530 (5684)   | 470 (1779)              | 107 (2718)                | 64 (1626)  | 117 (2972) |
| 2500       | 13,920 (6314)   | 500 (1893)              | 107 (2718)                | 66 (1676)  | 117 (2972) |
| 3000       | 15,620 (7085)   | 560 (2120)              | 107 (2718)                | 69 (1753)  | 127 (3226) |
| 3750       | 17,580 (7974)   | 610 (2309)              | 107 (2718)                | 71 (1803)  | 127 (3226) |
| 5000       | 20,980 (9516)   | 680 (2574)              | 108 (2743)                | 84 (2134)  | 132 (3353) |
| 7500       | 32,460 (14,724) | 1080 (4088)             | 119 (3023)                | 116 (2946) | 135 (3429) |
| 10,000     | 40,320 (18,289) | 1360 (5148)             | 129 (3277)                | 119 (3023) | 135 (3429) |

**Table 16.0-37. 65 °C Rise,  
Silicone/Environmentally Friendly Fluid  
HV 34400D, 200 BIL  
LV 13800Y, 95 BIL**

| kVA Rating | Weight Lb (kg)  | Gallons (Liters) Liquid | Dimensions in Inches (mm) |            |            |
|------------|-----------------|-------------------------|---------------------------|------------|------------|
|            |                 |                         | Height                    | Width      | Depth      |
| 750        | 9270 (4205)     | 400 (1514)              | 107 (2718)                | 65 (1651)  | 55 (1397)  |
| 1000       | 9900 (4491)     | 420 (1590)              | 107 (2718)                | 65 (1651)  | 67 (1702)  |
| 1500       | 11,620 (5271)   | 460 (1741)              | 107 (2718)                | 65 (1651)  | 96 (2438)  |
| 2000       | 13,160 (5969)   | 500 (1893)              | 107 (2718)                | 65 (1651)  | 117 (2972) |
| 2500       | 14,580 (6613)   | 530 (2006)              | 107 (2718)                | 67 (1702)  | 117 (2972) |
| 3000       | 16,090 (7298)   | 560 (2120)              | 107 (2718)                | 69 (1753)  | 123 (3124) |
| 3750       | 17,930 (8133)   | 600 (2271)              | 108 (2743)                | 77 (1956)  | 130 (3302) |
| 5000       | 21,410 (9711)   | 680 (2574)              | 110 (2794)                | 77 (1956)  | 131 (3327) |
| 7500       | 32,060 (14,542) | 1010 (3823)             | 114 (2896)                | 116 (2946) | 132 (3353) |
| 10,000     | 41,850 (18,983) | 1330 (5035)             | 122 (3099)                | 148 (3759) | 116 (2946) |

- Notes:**
1. Dimensions are APPROXIMATE. Refer to the transformer's outline drawing for actual dimensions for construction.
  2. For 55 °C units, add 5.00 inches (127.0 mm) to "W" dimension and 10.00 inches (254.0 mm) to "D" dimension.
  3. Add 9.00 inches (228.6 mm) to "W" dimension for each bus duct throat.
  4. Add 22.00 inches (558.8 mm) to "W" dimension for each 15 kV air terminal chamber.
  5. Add 25.00 inches (635.0 mm) to "W" dimension for each 27 kV air terminal chamber.
  6. Add 35.00 inches (889.0 mm) to "W" dimension for each 34.5 kV air terminal chamber.