VIRGINIA TRANSFORMER CORP

Individual solutions | from a global perspective

Dry Type Transformers
Virginia Transformer Commitment to our Customers

• Industry’s Shortest Production Lead Times
• Industry’s Shortest Turnaround Times on Drawings
• On Site Sales and Application Engineering for Efficient Communication
• Full Range of Utility and Industrial Applications Served
• Three Manufacturing Facilities in North America
• Complete Testing Capabilities
• Complete Service After Delivery with Field Service, Installation and Testing
The dry type transformers have been made in the USA since the 1950’s using NOMEX high temperature insulation from DuPont. The development of this technology was aimed at the improvement of safety, reliability, and the life of transformers for industrial and commercial applications. The varnishes and processing technology for achieving the highest level of reliability and long life was developed in the 1960’s. VTC started manufacturing dry type transformers using 220 °C insulation systems in the early 1970’s. Over the years, design and processing technology at VTC has been developed to manufacture transformers up to 15,000 kVA up to 35 kV class. VTC’s dry type transformers have been manufactured for applications in buildings, airports, hotels, public buildings, and industrial plants such as automobile, steel, textile, paper, mines and data centers.

In Mexico, VPI dry type transformers are marketed by Virginia Transformer under the trademarked logo Silver Star®. VTC designs each transformer for the given specification and application presented by the customer. Various parameters of the design are optimized to produce the most efficient and cost effective design. VTC dry type transformers are self extinguishing and non polluting. These are the GREEN transformers.

LEADERSHIP THRU ENGINEERING

Virginia Transformer Corp has established the benchmark for insulation standards for dry type transformers where the environment has corrosive, particle laden gasses, and high humidity. The dry type designs are made to handle harmonics in drive applications, induction furnaces, and similar tough industrial applications. Transit, hospital and computer applications are designed with special coil processing to deliver transformers of the highest reliability in the industry. VTC’s insulation for all these applications is UL* listed for applications up to 15 kV class for 20 years of life. The enclosure systems are developed to withstand outdoor rain and snow conditions and those that isolate the transformers completely from the environment around it. Our systems meet and exceed the American standards requirements per ANSI -C57.

Over the years, Virginia Transformer Corp has developed the process and the technology to use aluminum conductor in the coils. This produces a lower cost than copper windings with the same performance. The aluminum conductors are joined with TIG welding to assure high reliability and long life. Coils are wound in environmentally controlled winding rooms to maintain the highest performance level of the coils. The core is cut on automatic specially designed core cutting machines, in a temperature controlled environment to produce the lowest core loss performance.

*UL File Numbers – For Dry-type E124008
**Processing for Coil Protection:**

**VPI:** The coils are dried, and then sealed with thermoset polyester varnish under vacuum conditions. This quality is achieved at the factory, results in a completely sealed coil. The process requires proprietary processing of vacuum temperature and pressure.

**VPI End Cap:** The ends of the coils are sealed with special formulations of resins to provide rigid support to withstand axial impact found in industrial applications.

**Unidip:** A proprietary process used to seal the coils with a thick resilient coating. This coating is impervious to moisture, thus it will keep moisture from diffusing into the coils. The construction enhances the life of the transformer in all applications.

**UNIClad**: The coils are totally impregnated with a resin mixture that is filled with compounds to fill the smallest crevices in the coil under vacuum. The result is void free coils in which the turns are supported solidly to withstand the worst industrial mechanical impact due to the application and handling. The life expectancy of the coils increases progressively with improved processing. The UNIClad coils are designed to last 40 years.

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**ALLOWABLE OVERLOAD OF VTC TRANSFORMERS**

<table>
<thead>
<tr>
<th>Average Temp Rise at AA rating</th>
<th>Overload* Rating with fans</th>
<th>Overload* Rating without fans</th>
</tr>
</thead>
<tbody>
<tr>
<td>150 ºC</td>
<td>33%</td>
<td></td>
</tr>
<tr>
<td>115 ºC</td>
<td>15%</td>
<td>50%</td>
</tr>
<tr>
<td>80 ºC</td>
<td>35%</td>
<td>80%</td>
</tr>
</tbody>
</table>

*150º c Average Temperature rise at overload rating

**IMPEDEANCE**

<table>
<thead>
<tr>
<th>kV Class</th>
<th>Impedance*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.2</td>
<td>5.75</td>
</tr>
<tr>
<td>2.5</td>
<td>5.75</td>
</tr>
<tr>
<td>5</td>
<td>5.75</td>
</tr>
<tr>
<td>8.7</td>
<td>5.75</td>
</tr>
<tr>
<td>15</td>
<td>5.75</td>
</tr>
<tr>
<td>25</td>
<td>6.25</td>
</tr>
<tr>
<td>34.5</td>
<td>6.25</td>
</tr>
</tbody>
</table>

* VTC standard (other impedance are optional)

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**COIL OPTIONS**

**Coil Shape**
- Rectangular
- Circular

**Coil Winding**
- Barrel
- Disc

**Coil Conductors**
- Aluminum
- Copper

**Coil Configurations**
- Delta-Wye
- Zig-Zag
- Wye-Wye
- Delta-Delta
- Phase Shifters

**Coil Sealing**
- Polyester varnish VPI
- VPI and epoxy end caps
- Unidip
- **UNIClad**

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**Typical Applications**

- Subway & rapid transit
- Hospitals, hotels & schools
- Utilities & power plants
- Chemical Plants
- Mining operations
- Paper & steel mills
- Oil & gas refineries
- Office & shopping complexes
- Manufacturing plants
- Airport terminals
- Water treatment plants
- Research facilities

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**Enclosures:**

- **NEMA 101**: Clean indoor applications
- **NEMA 103R**: Outdoor applications per ANSI standards C57.12.55
- **NEMA 103 R – Coastal Applications per ANSI Standard C57.12.59**
- **TENV – Totally Enclosed Non Ventilated** – Indoor/Outdoor Application where corrosive gasses, high dust and other contaminants are present. This meets the requirements of NEMA 12 without the welding.

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The application engineers at our National Sales Office will offer assistance in assuring the best process and enclosure for your application.
TRANSFORMER FEATURES

**Range** - Up to 15/20 MVA, 35 kV voltage class, 150 kV BIL

**Loading** - Designed to deliver rated current and MVA in all tap positions

**Service** - Outdoor or Indoor

**Basic Impulse Level (BIL)** - Per ANSI standard

**Coils** - Aluminum or copper conductor, circular or rectangular construction, disc or barrel wound

**Coil Sealing** - Vacuum Pressure Impregnated (VPI)

**Insulation** - 220 °C Insulation system

**Enclosure** - NEMA 101/103R:, Complete breakdown crowned roof for water shedding base suitable for lifting, jacking and skidding

**Paint** - ANSI 61 enamel on phosphatide cleansed surface

**Nameplate** - engraved stainless steel for outdoor use, metallized mylar adhesive for indoor application

**Stainless steel ground pads**

**12/18 month standard warranty**

**Options**
- Electronic temperature monitor
- Load break switches
- Matching to all OEM switchgears
- Drive/Rectifier duty up to 36 pulse

**4 Paint Systems Available**

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**APPLICABLE STANDARDS**

**ANSI** - American National Standards Institute

**IEEE** - Institute of Electrical and Electronic Engineers

**C57.12.01** - General Requirements for Dry Type Transformers

**C57.12.51** - Requirements for Ventilated Dry Type Power Transformers 501 kVA and Larger, Three Phase, with High Voltage 601 to 34,500 Volts, Low Voltage 208Y/120 to 4160 Volts

**C57.12.52** - Requirements for Sealed Dry Type Power Transformers 501 kVA and Larger, Three Phase, with High Voltage 601 to 34,500 Volts, Low Voltage 208Y/120 to 4160 Volts

**C57.12.91** - Test Code for Dry Type Distribution and Power Transformers

**C57.94** - Practice for Installation, Application, Operation and Maintenance of Dry Type General Purpose Distribution and Power Transformers

**C57.96** - Guide for Loading Dry Type Distribution and Power Transformers

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**AUDIBLE SOUND LEVELS**

<table>
<thead>
<tr>
<th>kVA</th>
<th>Less than 1.2 kV (ST20)</th>
<th>Self Cooled Ventilated (TR1)</th>
<th>Forced Air Cooled Ventilated (TR1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>301-500</td>
<td>60</td>
<td>60</td>
<td>67</td>
</tr>
<tr>
<td>501-700</td>
<td>62</td>
<td>62</td>
<td>67</td>
</tr>
<tr>
<td>701-1000</td>
<td>64</td>
<td>64</td>
<td>67</td>
</tr>
<tr>
<td>1001-1500</td>
<td>65</td>
<td>65</td>
<td>68</td>
</tr>
<tr>
<td>1501-2000</td>
<td>66</td>
<td>66</td>
<td>69</td>
</tr>
<tr>
<td>2001-3000</td>
<td>68</td>
<td>68</td>
<td>71</td>
</tr>
<tr>
<td>3001-4000</td>
<td>-</td>
<td>70</td>
<td>73</td>
</tr>
<tr>
<td>4001-5000</td>
<td>-</td>
<td>71</td>
<td>74</td>
</tr>
<tr>
<td>5001-6000</td>
<td>-</td>
<td>72</td>
<td>75</td>
</tr>
<tr>
<td>6001-7500</td>
<td>-</td>
<td>73</td>
<td>76</td>
</tr>
</tbody>
</table>

**TOTAL COIL TEMPERATURE**

<table>
<thead>
<tr>
<th>Average Temp. Rise by resistance</th>
<th>150 °C</th>
<th>115 °C</th>
<th>80 °C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient Temp. (Maximum)</td>
<td>40 °C</td>
<td>40 °C</td>
<td>40 °C</td>
</tr>
<tr>
<td>Hotspot Temp. Allowance (est.)</td>
<td>30 °C</td>
<td>30 °C</td>
<td>30 °C</td>
</tr>
<tr>
<td>Total Temp. of Coil</td>
<td>220 °C</td>
<td>185 °C</td>
<td>150 °C</td>
</tr>
</tbody>
</table>

**FORCED AIR COOLING**

- Ambient Temp. 1.2 kV (ST20): 1.2 kV
- Ambient Temp. (Maximum): 40 °C
- Hotspot Temp. Allowance (est.): 30 °C
- Total Temp. of Coil: 220 °C

**APPLICABLE STANDARDS**

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**www.vatransformer.com**
### Dielectric Insulation levels for dry-type transformers used on systems with BIL ratings 200 kV BIL and below

<table>
<thead>
<tr>
<th>Nominal L-L system voltages (kV)</th>
<th>Low-frequency voltage insulation level (kV rms)</th>
<th>Basic lightning impulse insulation levels (BIL ratings) in common use kV crest (1.2 x 50 µs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.25</td>
<td>2.5</td>
<td>None</td>
</tr>
<tr>
<td>0.6</td>
<td>3</td>
<td>S(d) 1(e) 1(f)</td>
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<tr>
<td>1.2</td>
<td>4</td>
<td>S 1 1</td>
</tr>
<tr>
<td>2.5</td>
<td>10</td>
<td>S 1 1</td>
</tr>
<tr>
<td>5.0</td>
<td>12</td>
<td>S 1 1</td>
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<tr>
<td>8.7</td>
<td>19</td>
<td>S 1 1</td>
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<tr>
<td>15.0</td>
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<td>S 1 1</td>
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<td>2(e) S 1 1</td>
</tr>
<tr>
<td>34.5</td>
<td>70</td>
<td>2 S 1</td>
</tr>
</tbody>
</table>

### TYPICAL DIMENSIONS FOR DRY TYPE TRANSFORMERS

**Ventilated Enclosed**

<table>
<thead>
<tr>
<th>KVA</th>
<th>FA</th>
<th>H</th>
<th>W</th>
<th>D</th>
<th>Cu</th>
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<td>300</td>
<td>400</td>
<td>90</td>
<td>84</td>
<td>54</td>
<td>3.5</td>
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<tr>
<td>500</td>
<td>667</td>
<td>90</td>
<td>84</td>
<td>54</td>
<td>4.5</td>
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<tr>
<td>750</td>
<td>1000</td>
<td>90</td>
<td>84</td>
<td>54</td>
<td>5.6</td>
</tr>
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<td>1333</td>
<td>90</td>
<td>90</td>
<td>60</td>
<td>6.6</td>
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<tr>
<td>1500</td>
<td>2000</td>
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<td>90</td>
<td>60</td>
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<td>2000</td>
<td>2667</td>
<td>90</td>
<td>96</td>
<td>60</td>
<td>10.4</td>
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<tr>
<td>2500</td>
<td>3333</td>
<td>102</td>
<td>110</td>
<td>60</td>
<td>12.3</td>
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<td>3000</td>
<td>4000</td>
<td>102</td>
<td>110</td>
<td>60</td>
<td>16.5</td>
</tr>
<tr>
<td>3750</td>
<td>5000</td>
<td>120</td>
<td>124</td>
<td>60</td>
<td>19.5</td>
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<td>7500</td>
<td>10,000</td>
<td>124</td>
<td>148</td>
<td>72</td>
<td>32.0</td>
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<tr>
<td>10,000</td>
<td>13,333</td>
<td>130</td>
<td>148</td>
<td>72</td>
<td>40.0</td>
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<tr>
<td>15,000</td>
<td>20,000</td>
<td>136</td>
<td>156</td>
<td>80</td>
<td>55.0</td>
</tr>
</tbody>
</table>
Custom Design Means the Accessories You Want

TEMPERATURE MONITORING
Temperature monitoring is available by selecting digital or analog temperature gauges for one or three phases with multiple NC or NO contacts. SCADA interface is also available. An NC or NO Over Temperature Thermostat can be located in the center coil or in all three coils and wired to a terminal board.

COOLING
Dry-type transformers can be self-cooled through ventilation in the enclosure (AA). An automatic fan cooling package (FA), complete with temperature gauge will increase the KVA rating by 25 or 33 percent to handle overloads. Packages to increase KVA up to 50 percent are available with either an internal or external power source. Fans also can be added at a later date (FFA).

Terminations
A wide variety of termination arrangements are available. HV can be on the right or left as required, while voltage taps are accessible from the front via a removable panel. Special flanged throats and flexible connectors to external bus also are available.

Dry Transformer Benefits
- Located closer to electrical load than liquid units
  - Reducing cost of low voltage cabling
- Weighs less than liquid units reducing installation costs
- Self Extinguishing
- Environmentally safe
  - No risk of oil leak
- Shorter lead times
- Minimal downtimes for maintenance/inspection
Totally Enclosed, Non-Ventilated (TENV)

THE TENV SOLUTION, DESIGNED FOR YOUR APPLICATION

For nearly two decades, Virginia Transformer Corp (VTC) has been bringing its customers the best of both worlds: cost-effective solutions for difficult environments. Our customers often turn to conventional dry type transformers for low cost, safety and reliability. But in environments where the ambient air is subject to contamination, conventional ventilated dry type transformers are prone to dielectric problems. For these situations, VTC offers a superior solution: Totally Enclosed, Non-Ventilated (TENV) transformers. Since the 1980s, we’ve manufactured these units for both the United States and international customers for a variety of applications in corrosive environments.

VTC offers a full range of custom designed TENV transformers up to 5 MVA and 34.5 kV class, for both indoor and outdoor applications. We also design these units for rectifier duty (harmonic loading), special overloads, special BIL level, and other unique requirements.

Non-Ventilated

DESIGNED FOR THE JOB AT HAND

Our TENV transformer enclosures are not ventilated, thereby preventing the core and coil from coming into contact with contaminants in the ambient air. Our designs ensure adequate heat dissipation, a critical factor for this type of transformer. Heat transfer takes place in two stages in our TENV units: first from the core and coil to the internal air, and then from the internal air to the outside atmosphere through the walls of the enclosure. Since the enclosure is not ventilated, the interior temperature is higher than ambient. To prevent overheating of the core and coil, we design our TENV transformers for low temperature rise. We also design our enclosures to be larger than those for conventional ventilated, dry type transformers to ensure sufficient surface area for radiant heat exchange. If required, we can extend the enclosure surfaces for additional cooling. We’ve even built TENV units with stainless steel enclosures, which are resistant to most corrosive environments and are practically maintenance-free.
SUPERIOR MATERIALS, SUPERIOR CONSTRUCTION

VTC engineers design to minimize core losses. We design and construct coils appropriate to the kVA rating of the transformer. After winding, we dry and preheat our coils to remove moisture, then move them into our VPI tank where a high vacuum enables polyester resin to flow into the coil, filling voids. We then use positive pressure to drive resin into the coil. After impregnation we bake the coils to cure the resin and form a solid mass. VTC can also provide TENV transformers with our premium UNI/Clad® core and coil assembly.

VTC terminates HV and LV windings inside the enclosure or within full or partial height air terminal chambers. Where the application demands it, we provide bushings similar to those provided with liquid filled transformers. All of our TENV transformers come with a winding temperature gauge as a standard accessory. We also offer surge arrestors, current transformers (CTs) and potential transformers (PTs) as optional accessories.

ADVANTAGES

Totally enclosed, non-ventilated construction ensures that ambient contamination never contacts the 220 ºC rated core & coil assembly.

• Install TENV indoors - or outdoors.
• TENV offers all the advantages of dry type transformers - lower cost, ease of installation and maintenance.
• With TENV, there is none of the environmental of fire risk inherent with liquid filled units

APPLICATIONS

TENV transformers are an excellent choice for:

• Chemical plants
• Cement plants
• Environments with contaminants such as:
  • Gases, including chlorine and sulfur
  • Solids such as coal dust, metal dust and textile fibers
  • Fumes and vapors in industrial plants
  • Salt-laden air

<table>
<thead>
<tr>
<th>kVA</th>
<th>H (inches)</th>
<th>W (inches)</th>
<th>D (inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>300</td>
<td>90</td>
<td>72</td>
<td>54</td>
</tr>
<tr>
<td>500</td>
<td>90</td>
<td>90</td>
<td>54</td>
</tr>
<tr>
<td>750</td>
<td>108</td>
<td>90</td>
<td>54</td>
</tr>
<tr>
<td>1,000</td>
<td>108</td>
<td>96</td>
<td>60</td>
</tr>
<tr>
<td>1,500</td>
<td>124</td>
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<td>60</td>
</tr>
<tr>
<td>2,000</td>
<td>124</td>
<td>124</td>
<td>60</td>
</tr>
<tr>
<td>5,000</td>
<td>158</td>
<td>122</td>
<td>86</td>
</tr>
</tbody>
</table>

Data is for estimating purposes only and should never be used for construction. Contact factory for actual dimensions, weights.
Since 1983 Virginia Transformer Corp (VTC) has offered a superior encapsulated dry type transformer that withstands the toughest environments. We call it UNIClad®. Our customers know it as the system that offers unmatched design integrity and strength compared to traditional cast coil products. UNIClad® is simply the best choice for your applications with high humidity, contaminated conditions, short-circuit loading and impact loading. And you will spend less for UNIClad® than a conventional unit because we design exactly what you need. With VTC, you never have to overbuy simply because what you need isn’t standard.

VTC unveiled UNIClad® in the early 1980’s to address the growing need for a product that could outperform traditional systems. Standard cast coil construction can withstand short-circuit forces, but its brittle epoxy construction is prone to cracking from thermal, mechanical and electrical forces. This cracking allows moisture and corrosion to attack the coil causing failure. Our UNIClad® coils withstand thermal cycling forces, short-circuit shock and operating core vibration without cracking, thanks to our unique encapsulation and sealing process. We completely seal UNIClad® coils with a 220ºC-rated, flexible polyester varnish applied under vacuum and pressure.

UNIClad®’s 220 ºC insulation system and 115 ºC temperature rise design provides a continuous overload capability of approximately 15%. Even under overload conditions UNIClad® will maintain temperatures within the insulation rating. The solid filling or our coils improves thermal conductivity, allowing the coils to run cooler and resulting in longer unit life. On average, the life expectancy of a UNIClad® is 40 years at a constant rated load, subject to proper application, protection, maintenance and duty cycle.

This tough, flexible cladding material is also highly chemical and moisture resistant. Besides our vacuum sealing process, VTC uses NOMEX on UNIClad® coils to ensure flexibility of the insulation system and highest thermal rating for the longest life. UNIClad® can even withstand total water immersion for 24 hours with no
**UNICLAD® CUSTOM DESIGNS SAVE MONEY**

VTC custom designs all UNIClad® units, resulting in significant dollar savings to you. We simply don’t believe in forcing customers to choose from pre-determined molds, designs, or specifications. Such one-size-fits-all product offerings often force customers to “size-up” their unit, wasting money and taking up extra space at their site.

With UNIClad®, you’ll pay only for what you need. And you can expect delivery of your UNIClad® system in about half the time needed for standard cast coil units thanks to our commitment to global sourcing.

**UNICLAD®: THE PREMIUM ENCAPSULATED DRY TYPE TRANSFORMER**

- Epoxy sealed coil (top and bottom) - evacuated resin system formulated to match the coefficient of thermal expansion of the coil.
- Flexible, polyester insulation system allows coils to withstand mechanical and thermal shocks
- UL listed 220 ºC rated insulation system for turn and layer protection
- Vacuum and pressure processed coils reduce operating temperature and corona level
- Tough, flexible polyester cladding assures reliable operation in contaminated and humid environments
- Circular coil construction for best short-circuit and impact-loading strength

**UNICLAD®: THE COST-EFFECTIVE SOLUTION**

- Epoxy sealed coil (top and bottom, does not contact the conductor)
- A flexible insulation system allow coils to withstand mechanical and thermal shock without compromising coil protection
- NOMEX® 220 ºC insulation system for turn and layer protection
- Vacuum processed coils reduce operating temperature and corona level
- A tough cladding skin assures reliable operation for contaminated and humid environments
- Circular coils for short circuit protection

NOMEX® is a DuPont registered trademark
UNIClad® is a registered trademark of Virginia Transformer Corp
WHY HAVE CAST COIL RESIN WHEN YOU CAN HAVE UNICLAD®?

VTC developed UNIClad® to operate under demanding applications in increasingly harsh environments. Because it is designed to withstand industrial fumes and vapors, fibrous and particle contamination, high temperature and humidity, short-circuit forces, and electrical impulses, UNIClad® is the cost effective alternative to liquid filled or cast coil transformers. UNIClad®. For power, rectifier, drive isolation and generator exciters up to 15 MVA, 35 kV class.

### WHY HAVE CAST COIL RESIN WHEN YOU CAN HAVE UNICLAD®?

<table>
<thead>
<tr>
<th>Desired Features</th>
<th>UNIClad</th>
<th>Cast Coil</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Thermal Rating</td>
<td>Excellent-220º</td>
<td>Acceptable - 150º C – 185º C</td>
</tr>
<tr>
<td>Overload Capability</td>
<td>Very Good - 15% overload without fans</td>
<td>Limited - Fans necessary for overloading</td>
</tr>
<tr>
<td>Seal Integrity</td>
<td>Yes – Flexible insulation and cladding system eliminate coil cracking</td>
<td>No – Cracking of coils because of rigid casting and high thermal coefficient of expansion of epoxy</td>
</tr>
<tr>
<td>Void-Free Coil</td>
<td>Void density is low because of low varnish viscosity and vacuum/pressure process</td>
<td>Void density is higher because of high viscosity of epoxy resin</td>
</tr>
<tr>
<td>Superior Short Circuit Test Performance</td>
<td>Yes – Performed with 0% impedance change in a 4-second duration test, 60 times longer than required per ANSI standards</td>
<td>No – Passes standard ANSI test of 4 tests of 4 cycles (60 hz.) each, with less than 2% impedance change</td>
</tr>
<tr>
<td>High Percent Tensile Elongation of Coil Filling</td>
<td>&gt;20%</td>
<td>&lt;5%</td>
</tr>
<tr>
<td>Flexible Designs</td>
<td>Yes – All UNIClad® units are designed to customer specifications</td>
<td>No – Must choose from existing molds</td>
</tr>
</tbody>
</table>
| Design Tested*         | • Benchmark Testing – Basic performance parameters  
                          • Vibration Testing – 1.5 G @ 30 HZ for 1 hour – 108,000 cycles  
                          • Random Drop Test (Mechanical Shock) – 6 shocks of 30 G  
                          • Thermal Shock – Coil moved from 0º to 115º – temperatures maintained for 2 hours at each level before/after change  
                          • Moisture Resistance Test – 24 hour exposure to near 100% humidity at 32ºC  
                          • Water Immersion Test – 24 hour immersion in water  
                          • Internal Arcing Test – purposeful turn-to-turn and layer-to-layer short circuits were applied | Not available |
| Quick Delivery         | Yes – Typically 10 - 12 weeks        |                                            |
| Strong Warranty        | Yes – 3 years                       | No – Up to 26 weeks                        |
|                        |                                     | Limited – Typically 12 months             |
| Competitive Pricing    | Yes – Never need to “up-size”; UNIClad® units are designed exactly for customer applications | Sometimes – Choosing from pre-set molds can result in a 10-15% premium because any nonstandard designs may force customer to order larger size unit than actually needed |

* Aerospace Testing Corporation - Roanoke, VA  
Test Dates 6/93 - 1/94
Routine in-house tests per ANSI C57.12.91 include:
- Ratio
- Polarity
- Phase Relation
- No-Load Loss
- Excitation Current
- Impedance
- Load Loss
- Applied Voltage
- Induced Potential
- Resistance

*Witness testing is offered and arranged according to your schedule.

**UNICLAD® APPLICATIONS**
- Paper Mill
- Transit
- Steel Mill
- Mining
- Data Center
- Chemical Plants

**PRODUCTION TESTS**

**UNICLAD® ENCLOSEMENT DATA**

<table>
<thead>
<tr>
<th>kVA</th>
<th>Width (in.)</th>
<th>Height (in.)</th>
<th>Depth (in.)</th>
<th>Weight (lbs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>300</td>
<td>84 (2,130)</td>
<td>90 (2,290)</td>
<td>54 (1,370)</td>
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<td>3,000</td>
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<td>60 (1,520)</td>
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*Not for design purposes. Dimensions shown are for typical NEMA1 enclosure. Smaller enclosure sizes are possible. For exact dimension, weights, losses, features and warranty, call our National Sales office. Data is for estimating purposes only and should never be used for construction. Contact factory for actual dimensions, weights.

**UNICLAD® SPECIFICATION DATA**

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**UNICLAD® BENEFITS**

- Impressive 3-year warranty
- Circular design above 750 kVA
- 220 °C insulation class
- 15 percent overload capacity without fans at 115 °C rise
- Partial discharge free to 120%
- Water submersion 24 hours
- Thermal Shock - no cracks
- Humidity 100% for 48 hours
- Vibration 1.5 Gs
- Shock 30 Gs

*Witness testing is offered and arranged according to your schedule.
TRANSFORMER FEATURES

Range - Up to 15 MVA, 35 kV voltage class, 150 kV BIL
Loading - Designed to deliver rated current and MVA in all tap positions
Service - Indoor/Outdoor
Basic Impulse Level (BIL) - Per ANSI standard
Impedance - ANSI Standard
Coils - Aluminum or copper conductor, circular construction
Paint - ANSI 61 enamel on phosphatized cleansed surface
Nameplate - Metallized mylar
Other - Provisions on base for lifting, jacking and skidding, stainless steel ground pads

OPTIONAL FEATURES

- Reconnectable windings
- Non-standard impedance
- Fan cooling for increased MVA
- Available at 80 ºC or 150 ºC rise
- 4 Paint systems available
- Outdoor, NEMA 103R enclosure
- Temperature Monitoring - Choose from coil winding temperature sensors and indicators, gauges or temperature controllers
- Terminations - Copper or aluminum bus with NEMA hole patterns and optional plating, flexible bus connection provisions also available
- Special flanged throats or custom air terminal chambers
**Corporate/National Sales Office***
220 Glade View Drive, Roanoke, VA 24012
540.345.9892 • Fax 540.342.7694
sales@vatransformer.com

**Manufacturing Plants**
Roanoke, VA – 220 Glade View Drive, Roanoke, VA 24012
540.345.9892 • Fax 540.342.7694
Pocatello, ID – 3770 Poleline Rd. Bldg #37, Pocatello, ID 83201
208.238.0720 • Fax 208.238.1678
Chihuahua, Mexico – Complejo Industrial Chihuahua, Ave. Homero #3307, Chihuahua, Mexico
52.614.483.0000 • Fax 52.614.481.4900

**Field Service – Installation/Maintenance/Spare Parts**
1.800.882.3944 – 24 Hours a day/7 Days a week

*Visit our website at www.vatransformer.com to locate a sales representative in your area or contact our National Sales Office at 540.345.9892*