



VIRGINIA TRANSFORMER CORP

Individual solutions | from a global perspective



Drive & Rectifier Transformers



Oil Drilling



Paper Mill

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

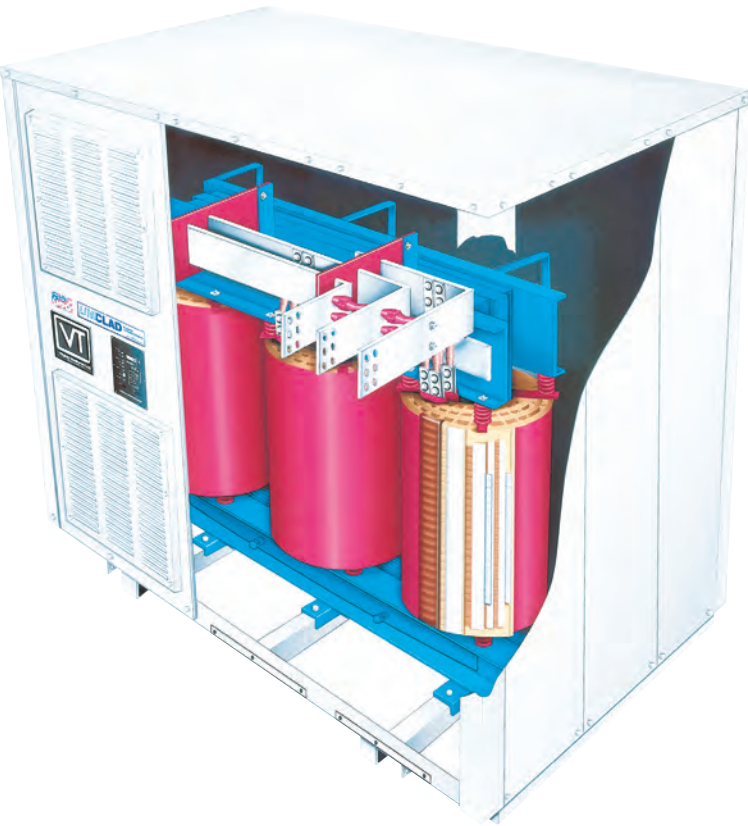


Steel Cutting Plant



Rapid Transit

Drive & Rectifier Transformers



Since 1975, Virginia Transformer Corp has lead the drives industry in supplying transformers for industrial and municipal applications.

We have supplied transformers from 300 kVA to 18,000 kVA for variable speed AC, DC, PWM and cycloconverter applications. Additionally, VTC supplies transformers for power quality applications. The unique Transit Traction industry, requiring 400% overloads and 40 year life performance, has been a strong market for VTC. Our Drive Transformers are installed in the U.S., Canada, Mexico, Asia, the Middle East, Northern Africa, and throughout South America. We have developed our reputation because of our thorough technical background in design for all applications covering all industries. We are committed to the idea that it is important to understand each application and offer solutions that fit that application. VTC offers a wide variety of dry type and liquid filled transformers to address the widest applications. More than any other company in North America. We design and build the very best system for each application.

In the rigorous field of drive duty applications, VTC understands the effect of harmonics on the core and conductor. Our engineers calculate the K factor from the harmonic data. The computation is considered in the design of the coils to balance the fields in order to reduce the effect of the fluxes. From the duty cycle of the hot strip rolling application to the gas line compressor it is taken care of in the design of the winding to withstand the axial and radial forces. The variable V/Hz experienced in the output transformer is considered for the core and the structure design within the transformer. The **UNIClad®** premium dry type transformer offers the best solution for safety and reliability. Other options for dry type transformers include VPI, UNIDIP, and TENV. TENV (totally enclosed non ventilated) dry type transformer offers complete protection from the elements. The liquid filled transformer is offered with mineral, Beta, or FR3 (biodegradable) oils. VTC offers 4 different paint systems to cover from a clean dry environment to a sulfur bearing environment in a refinery to the salt air exposure on the coast with high winds.

HERE ARE EIGHT REASONS WHY VTC IS THE MOST RELIABLE AND COST EFFECTIVE SOLUTION:

1. Increased thermal margins are offered to insure that heating from the overloads and the harmonics won't decrease the life of the transformer.
2. From magnetically, balanced winding designs to common faults, commutation and impact loads. The windings are precisely wound to achieve magnetic balance.
3. Surge shields are designed into the windings to evenly distribute the voltage due to conduction angle changes or pulse width modulation.
4. Core is constructed to handle the excessive heating and forces from the higher frequency voltage and wave forms.
5. Insulation is designed with low stresses to withstand the voltage surges from rapid voltage clipping.
6. Circular winding is used to handle the short circuit forces on our dry type transformers.
7. Vacuum/Pressure Impregnation (VPI) of the winding assures the bonding of the conductors to produce higher axial and radial strength in the winding on our liquid filled transformers.
8. Disc or helical windings are used to withstand the axial and radial forces due to duty cycle and common faults.



PRODUCTION TESTS

Routine in-house tests per ANSI include:

- Ratio
- Polarity
- Phase Relation
- No-Load Loss
- Excitation Current
- Impedance
- Load Loss
- Applied Voltage
- Induced Potential
- Resistance
- Design Tests are optional

Witness testing is offered in conjunction to our production schedule and arranged according to your schedule

CORE & COIL FEATURES AVAILABLE

- Increased thermal margin for longer life
- Magnetically balanced winding designs
- Surge shields evenly distribute voltage surges
- Superior core construction handles high heat
- Lower insulation stresses better withstand surges
- Multiple vacuum pressure impregnation provides corona-free operation and increased strength
- Higher BIL ratings handle switching surges in Pulse Width-Modulation
- Lower current density for high radial short circuit strength
- Water cooling for confined spaces

ADDITIONAL FEATURES

- Rigid galvanized conduit wiring
- Wheels underneath
- 4 Paint systems available

A TEAM READY FOR EVERY CHALLENGE

VTC's approach is especially important to our customers that need drive and rectifier isolation transformers. The industrial and commercial applications that require such systems are so varied that only a customized unit can truly do the job efficiently and reliably.

Design engineers begin by examining in detail the application and environment where the transformer will be used. Our staff works in a collaborative partnership with each customer, selecting the best materials, construction techniques, and accessories to ensure efficient and reliable operation and provide hassle-free field service.

During the manufacturing process, VTC's production experts adhere to rigorous process control and continuous improvement standards, including our zero-defect goal. All of our global operations are ISO 9001 certified. VTC transformers undergo testing to multiple engineering standards, including ANSI, IEC, IEEE, and NEMA. We offer other testing as well.

VTC constructs all transformer cores from the highest grade silicon steel, stacked for mechanical strength and low losses. We cut these laminations for step-lap mitered joints. Our coil winding areas are kept within strict temperature and humidity standards.

Customers can choose from a wide range of optional accessories. We offer conservators for oil preservation and fan-cooling packages. For temperature monitoring, VTC offers digital or analog gauges, with SCADA interface as an option. Surge arresters and demountable galvanized radiators are available. Different paint systems and oils for all environments are also available.

TOTAL SERVICE FROM START TO FINISH

VTC's delivery times are unparalleled in the industry. Dry type units from our Mexico plant, typically ship in 8 weeks, and liquid filled systems, from our Virginia and Idaho plants, in as few as 10. Larger transformers can be at your site in 16 to 24 weeks*. No one in the industry does it faster than VTC.

Our commitment to world-class service continues once your unit is ready for shipping and installation. VTC's staff takes great care in meeting each and every customer requirement. We offer total commissioning and testing services, from installation, to oil filling and processing. And once your unit is in operation, our maintenance and service staff is available 24 hours a day, 7 days a week and just a phone call away.

*Contact Sales Team at National Sales Office for current Lead time information 540.345.9892

TEMPERATURE RISE OF ISOLATION TRANSFORMERS

Transformer Duty Class	Long Time Rating	Maximum rms Duty Cycle (per unit)	Liquid Filled	Dry Type	UNIClad®
T1	==	1.00	65	150	115
T2	125%, 2 hours	1.00	65	140	115
T3	125%, 2 hours	1.08	60	130	105
T4	125%, 2 hours	1.18	55	120	95

DRIVE & RECTIFIER SPECIFICATION DATA

	Dry Type	Liquid Filled	UNIClad®
kVA*	500 - 10,000	500 - 20,000	500 - 10,000
Primary Voltage	2.4 to 35 kV	2.4 to 69 kV	2.4 to 35 kV
BIL	Up to 150 kV	Up to 350 kV	Up to 150 kV
Frequency	25 Hz to 60 Hz	25 Hz to 60 Hz	25 Hz to 60 Hz
Impedance	4% to 18%**	4% to 18%**	4% to 18%**
Winding Material	copper or aluminum	copper or aluminum	copper or aluminum
Insulation System	220 °C	120 °C	220 °C
Minimum Winding Temperature Rise	65 °C	45 °C	65 °C
Ambient Temperature [^]	-40 °C up to 55 °C	-40 °C up to 55 °C	-40 °C up to 55 °C
Elevation	Up to 14,000 ft.	Up to 14,000 ft.	Up to 14,000 ft.

*Secondary kVA may be higher than primary kVA

**Based on primary kVA

[^] Lower temperatures are also available

Data is for estimating purposes only and should never be used for construction.

Contact factory for actual dimensions, weights and oil volume.

DRIVE DUTY APPLICATIONS

- Pumps, Fans, Compressors
- Hoists & Cranes
- Steel Rolling Mills
- Water Treatment
- Pulp & Paper Mill
- Cement Plant
- Oil & Gas
- Cogeneration Plant
- Mining
- Induction Furnace
- Rapid Transit
- Wind Tunnel
- Marine Platform and Propulsion

DRIVE DUTY APPLICATIONS

- AC Drives & DC Drives
- 6, 12, 18, 24 & 36 Pulse Drive Isolation
- High Impedance Drive Input Transformers
- Low Impedance Drive Output Transformers
- Diode Active Front End
- LCI Converter Duty
- Generator Exciter Duty
- Power Quality (DVR, DSTATCOM, AVC)
- Cycloconverter
- PWM Drives

AVAILABLE CIRCUITS

- "Close" or "Loosely" coupled construction for voltage regulation - 0 -1.0
- Delta-double wye six pulse with IPT
- Delta-delta six pulse double way
- Wye-delta six pulse double way
- Delta-zigzag six pulse double way
- Delta-delta and wye 12 pulse double way
- Two Three-Phase bridges delta-wye secondaries in series
- Cycloconverter - delta-delta; delta-zigzag
- Delta-zigzag and wye-zigzag 18 pulse double way
- Wye-pulse shifted multiple delta; 24-36 pulse double way
- Many more...

PRODUCT RANGE

- Dry Type 10 MVA, 34.5 kV
- Uniclad® (encapsulated coils) - 15/20 MVA, 35 kV
- TENV - Up to 5 MVA, 35 kV
- Liquid Filled - 30 MVA, 230 kV
- Traction Duty - 30 MVA, 69 kV
- Air Core Reactor - 15 kV
- Iron Core Smoothing Reactors
- Inter Phase Transformers

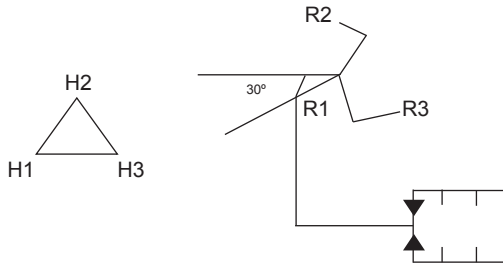
DRIVE OEMS

- TMGEAS
- CONVERTEAM
- SIEMENS E&A
- ABB
- ROCKWELL AUTOMATION
- S&C
- ABP INDUCTION
- INDUCTOTHERM

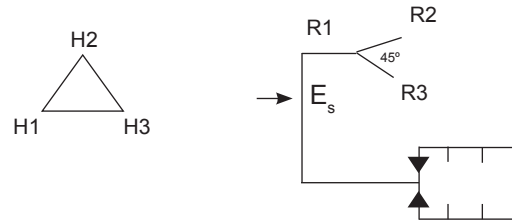
* Application Note: Vacuum circuit breakers switching is known to produce voltage resonance. Use appropriate caution in circuit design. (See IEEE Draft #C57.142)

TRANSFORMERS FOR A VARIETY OF RECTIFIER CIRCUITS*

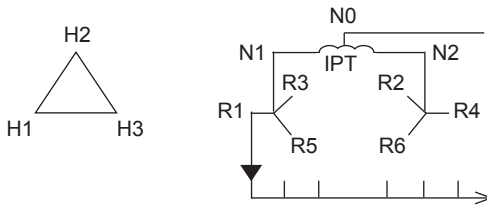
(27) Delta six pulse zigzag double way



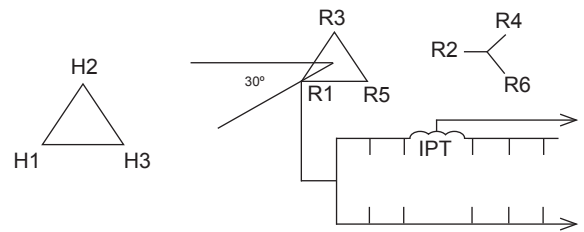
(23) Delta six pulse wye double way



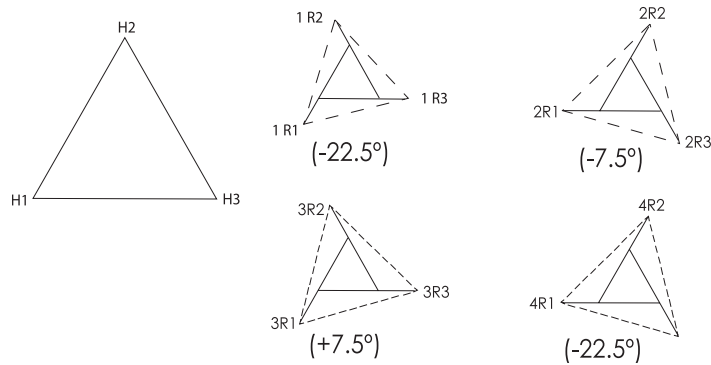
(45) Delta double wye six pulse with IPT



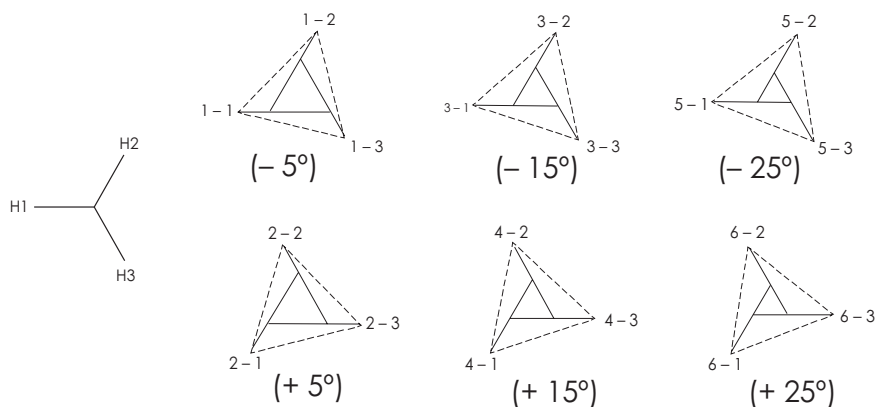
(31) Delta 12 Pulse multiple delta-wye double way



24 pulse



36 pulse

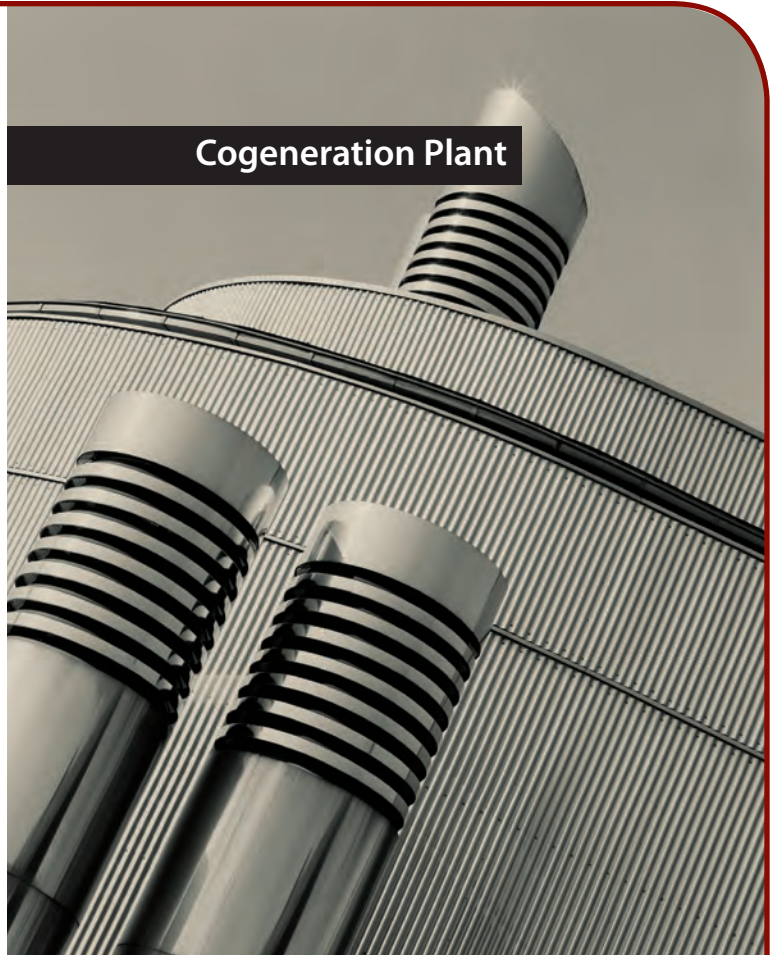


*Contact Sales Team at National Sales Office for additional circuit information 540.345.9892

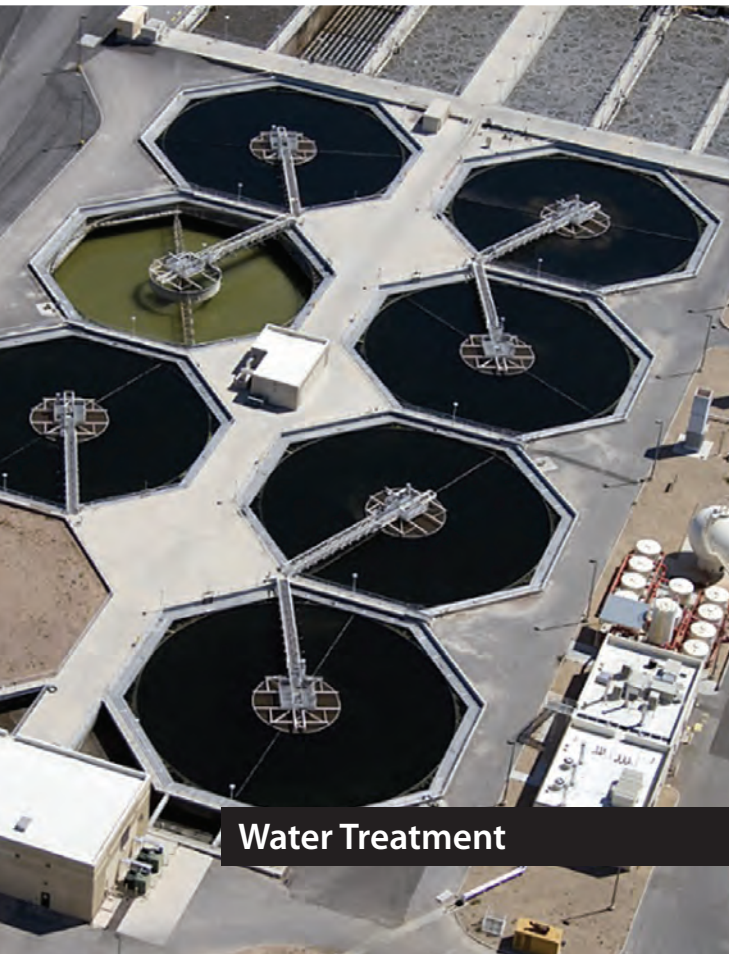
Oil Refinery



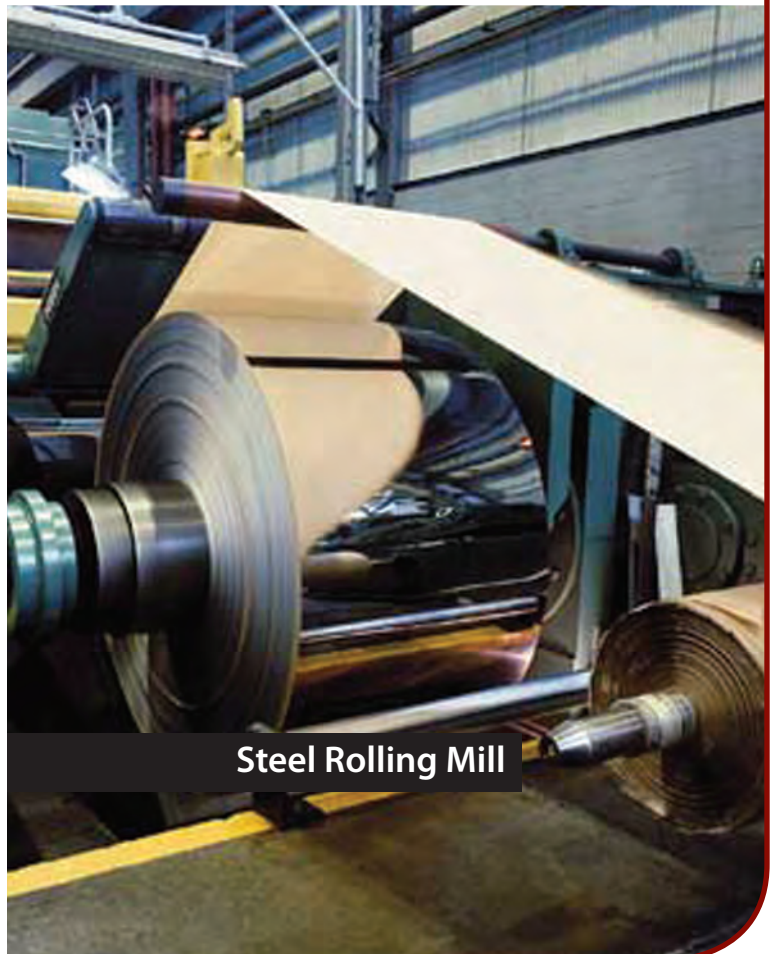
Cogeneration Plant

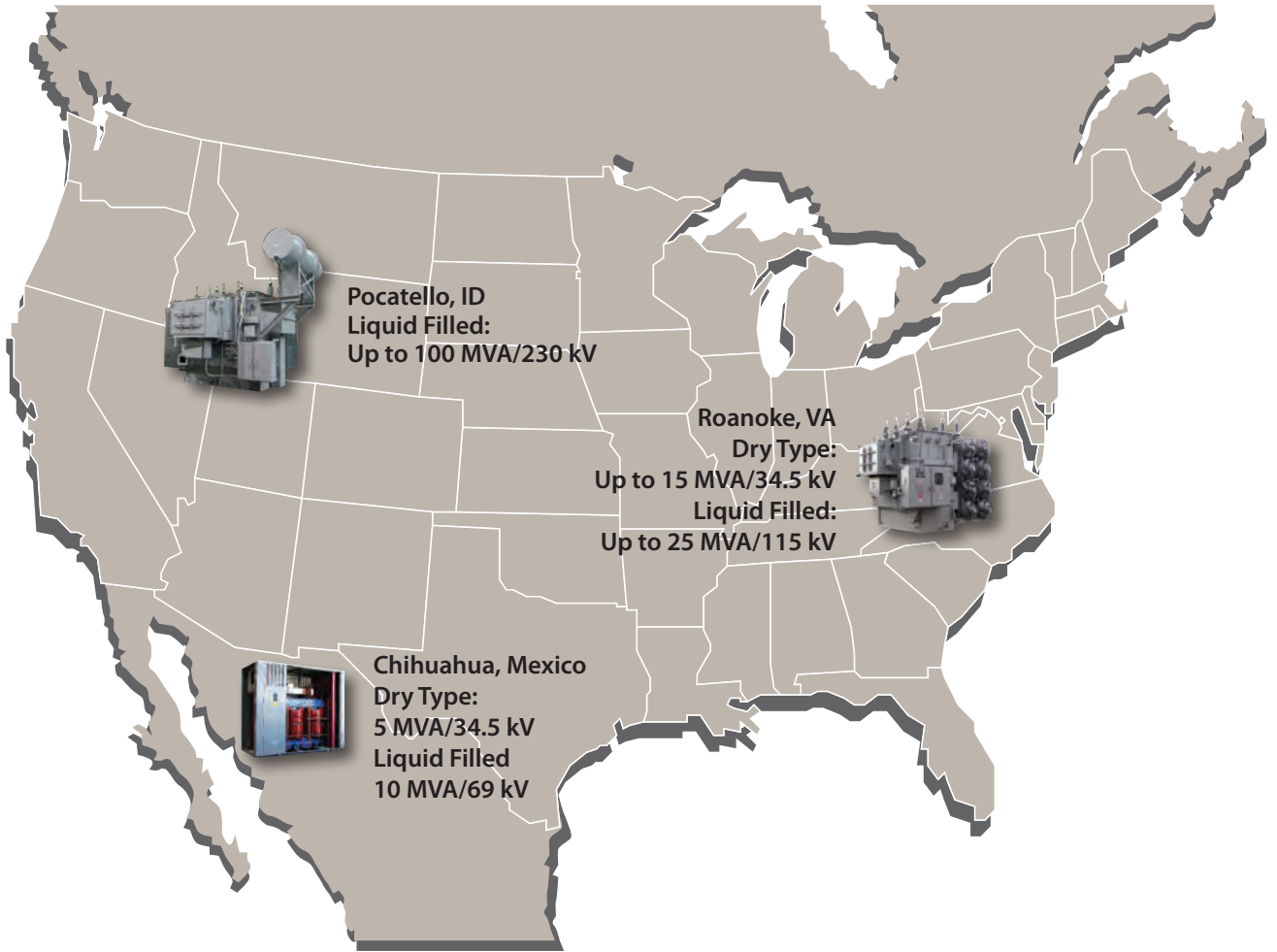


Water Treatment



Steel Rolling Mill





Corporate/National Sales Office*

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Manufacturing Plants

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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



VIRGINIA TRANSFORMER CORP

www.vatransformer.com

* 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

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