Power and Distribution Transformers
VRT Power Ltd.

We Enable Energy

VRT is a modern manufacturer for high-performance oil-immersed power transformers up to 800 MVA 500 kV. Customized design and the development of products to our client’s specific requirements are among our key competencies.

VRT power transformers are built according to the highest quality and industry standards using advanced technologies for greater reliability and durability. These technologies enable us to achieve low noise transformers with excellent electrical properties and ensure long operating life of our transformers and mobile substations.

The company has extensive experience and expertise in the energy sector, particularly in the area of power transmission and distribution.
VRT offers its customers a full range of services with their products.

Products & References
- Development, design and manufacturing of power transformers, distribution transformers, rectifier and furnace transformers as well as special transformers
- Worldwide references prove reliable quality products according to IEC, ANSI/IEEE, CENELEC or other international standards

Engineering & Design
- Advanced software for optimized costs and losses
- Design according to customer-specific requirements
- Proven designs to withstand mechanical and electrical forces, i.e. short-circuit forces, transient overvoltages and thermal stresses

Production & Testing
- Manufacturing of power transformers up to 800 MVA 500 kV and mobile substations up to 50 MVA 230 kV
- VRT’s production plant is equipped with state-of-the-art manufacturing equipment
- Quality assurance system for proven quality during production steps and final acceptance tests up to 1550 kV BIL

Quality, Service & Support all over the world
- Beside ISO 9001 and ISO 14001 VRT provides systematic continuous improvements of processes and all production steps
- Final acceptance tests in our high-voltage test lab validate the quality of our transformers
- VRT offers a full scope of services
- After delivery, installation and commissioning, customers enjoy full service from experienced service engineers in the factory or on a site
- VRT also provides training for your team for safe and reliable operation of your transformer fleet
- Responsibility for quality is our attitude and shared by all company employees

VRT offers oil-immersed, core-type transformers in accordance with international standards and customer-specific requirements. The latest manufacturing technology allows reliable production from distribution transformers up to large power transformers of 800 MVA 500 kV.

Power Transformers for Power Transmission and Distribution
VRT has long experience in design and production of substation- and high-voltage grid transformers. VRT is a key player in establishing and developing the electrical infrastructure of the local utility.

VRT went on to supply power transformers to utilities throughout the world and became a major player for customized network transformers.

Generator Step-up Transformers (GSU)
GSU transformers take the voltage level from the generator up to the transmission voltage level and are key components of any power plant. VRT has a long reference list as supplier of this sensitive link between generator and high-voltage grid which testifies to a reliable design.

Special Transformers
Tailor-made products and solutions for specific applications

Compact Wind Turbine Step-up Transformers
Our compact special transformers are designed to fulfill particular requirements such as
- High rating with compact dimensions
- Optimal overload performance and high temperature stability
- Ability to withstand harmonics
- High-end insulation systems with Aramid Nomex®
- Proven compatibility with system components
- Optimized no-load and load losses
- Usage of environmentally friendly materials like synthetic ester fluids
Industrial Transformers

Industrial application of transformers means industrial loads and conditions, i.e. operation close to short-circuit conditions and varied load cycles. Furthermore, industrial transformers are often exposed to hazardous conditions, for example in steel and aluminum production plants or in the chemical industry used as:
- Furnace Transformers
- Drive/Converter Transformers
- Rectifier Transformers
- Excitation Transformers

Mobile Substations

VRT mobile substations are turnkey solutions for flexibility in power distribution and emergency power restoration. Once mainly used for fast power restoration in emergencies, mobile substations have found new applications among power generation and transmission companies seeking versatile alternatives when planning new stations, e.g. added power distribution flexibility, and as an interim power supply when performing maintenance on existing stations.

Behind the high performance of a VRT power transformer is a highly motivated and experienced engineering team. The VRT® Engineering Department is responsible for the electrical and mechanical design of transformers and mobile substations.

Our engineers use advanced software to optimize costs and minimize losses. The software permits the verification of all calculations for mechanical and electrical stresses, such as short circuits, lightning and switching impulses, over-voltage, hot spots (magnetic field distribution in winding and metal parts), electrical field calculations and plots, noise levels, overload capacity and loss of insulation life.

Successful product development and a commitment to the highest standards have placed VRT at the forefront of transformer manufacturing. The sustained investment of time and resources in development over the past sixty years has been rewarded with cutting-edge innovation:
- Market-leading expertise in design and technical problem-solving
- A unique library of technical product innovations provides our customers with tested and proven state-of-the-art products
- Expertise of modern technology and the use of the best raw materials
- A wealth of manufacturing know-how
- The construction considers handling of seismic forces

VRT reputation for expertise in product development is demonstrated by our customers’ growing demand for unique product solutions for special projects – VRT is increasingly chosen to design and engineer transformers to meet those demanding requirements.

The VRT research and development team has built the company’s reputation for engineering excellence through the development of innovative, top-of-the-range new products and technologies.

VRT is active in both CIGRE and the IEEE Transformers Committees.
VRT® power transformers and mobile substations are designed for high performance. They have value-added features that ensure compliance with the relevant specifications; they are reliable and have a long service life.

Core
To fulfill optimized noise requirements and no-load losses, grain-oriented steel sheets are cut by an automatic GEORG machine. Step-lap design assures the highest core yield.

Winding
The main winding operations for power transformers are performed on vertical winding machines in sealed, dust-free chambers. The coil is manufactured in its natural working position to achieve more uniform tension, which assures a superior quality winding process.

Tank
VRT introduced hot spray galvanizing to protect tanks and to defend against corrosion in one of the harshest climatic regions of the world – the Dead Sea, an area 1,300 feet below sea level that experiences high temperatures in excess of 46°C (115°F), high air pressure, many highly corrosive airborne salts and environmental effects of the chemical industry. Special shot blasting equipment assures a corrosion-free tank surface prior to zinc coating and painting.

Active Part
VRT achieves identical coil height in its transformers through a special drying and compression process. The coils are dried under vacuum in a circular oven and pressed to the exact specified size. In a second stage, each phase coil block assembly is dried and pressed again to assure absolute accuracy. Each core and coil undergoes a vapor phase process in the oven. During the final drying, the moisture content of the transformer is reduced to less than 0.3%. This takes place at 110°C (230°F) in a vacuum of less than 0.07 millibar. While still in the oven, and under vacuum, the tank is filled with oil; the unit is flushed and then new filtered oil is introduced. Finally, the transformer is removed from the oven and the oil is processed by the oil treatment plant.

Testing
The VRT high-voltage laboratory extends over 1,600 sq m (15,000 sq ft) and has a height of 21 m (69 ft). All routine, design and special tests (except short-circuit withstand tests) are conducted according to IEC, IEEE, ANSI, CSA and other applicable international standards for three-phase transformers up to 800 MVA 500 kV and single-phase transformers up to 500 MVA. A complete list of testing equipment is detailed in our prequalification documentation, which is available from your VRT representative.
VRT provides full consultation, installation and testing services for its transformers and mobile substations.

After delivery, installation and commissioning customers enjoy full service from experienced service engineers in the factory or on-site. If repairs are necessary, these are carried out on-site or, if necessary, at a VRT contracted repair facility under the supervision of a VRT representative.

VRT has opened a North American Service Centre to provide its customers with fast, professional and comprehensive service. This includes consultation, on-site installation of the transformers and full service until the end of the warranty period and beyond if required. We are interested in long-term business relationships, and our high-quality service has earned us the customer confidence necessary for long-term service agreements.
Worldwide Presence

VRT offers its customers a full range of solutions, including:

- Product Development
- Engineering & Design
- Testing Services
- Manufacturing & Assembly
- Transport & Full Installation Services
- Training

Historic Milestones

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
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<tbody>
<tr>
<td>1949</td>
<td>Elco was founded as a manufacturer of distribution transformers.</td>
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<tr>
<td>1960</td>
<td>Elco expands into the field of power transformers.</td>
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<tr>
<td>1960–1979</td>
<td>Acquisition of know-how and capabilities through Joint Ventures with ABB and CE.</td>
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<td>1999</td>
<td>Elco changes name to Enerco Enterprises.</td>
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<td>2002</td>
<td>Delivery of the first 100 units of power transformers to the North American market.</td>
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<tr>
<td>2003</td>
<td>Delivery of first transformers for the wind industry.</td>
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<tr>
<td>2008</td>
<td>Acquisition of Enerco Enterprises by Von Roll Switzerland.</td>
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<tr>
<td>2009</td>
<td>Enerco brand name changes to Von Roll Transformers.</td>
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<tr>
<td>2011</td>
<td>Order for 650 MVA 400 / 160 kV 3 phase auto-transformers.</td>
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<tr>
<td>2012</td>
<td>Acquisition of Von Roll by VRT Power Global SARL.</td>
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<tr>
<td>2016</td>
<td>The opening of North American Service Centre.</td>
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<td>2017</td>
<td>Von Roll Transformers brand name changes to VRT Power.</td>
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<tr>
<td>2019</td>
<td>100 units of mobile substations delivered to North American market.</td>
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<tr>
<td>2020</td>
<td>Delivery of first transformers for the wind industry.</td>
</tr>
<tr>
<td>2021</td>
<td>Order for 1000 MVA 400 / 160 kV 3 phase auto-transformers.</td>
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