

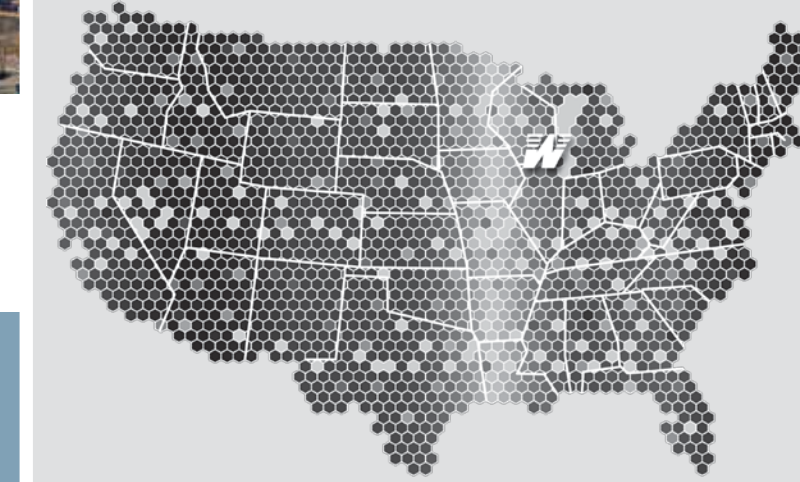


Large Power Transformers

www.waukeshatransformers.com
E: info@waukesha.spx.com



LARGE POWER TRANSFORMERS



Offering one of the broadest arrays of power transformers of any U.S.-based manufacturer in business today.

United States locations

WAUKESHA HEADQUARTERS

400 South Prairie Avenue
Waukesha, Wisconsin 53189
800 835 2732

GOLDSBORO PLANT

2701 US HWY 117 South
Goldsboro, NC 27530
800 758 4384

COMPONENTS

9011 Governors Row
Dallas, TX 75247
800 338 5526

SERVICE

Emergency Service Available
24/7/365:
888 365 24X7

SPX Transformer Solutions, Inc. (formerly Waukesha Electric Systems, Inc.) is one of the largest U.S. manufacturers of power transformers and a valued supplier of complete transformer service solutions, reverse-engineered components and replacement parts as well as a variety of substation-applicable training classes for all skill levels. Manufacturing locations include our headquarters in Waukesha, Wisconsin as well as satellite sites in Goldsboro, North Carolina and Dallas, Texas.

WAUKESHA® TRANSFORMERS

Our modern transformer manufacturing operations in Waukesha, Wisconsin and Goldsboro, North Carolina have amassed over 80 years of combined experience producing high quality power transformers that meet stringent customer demands. Utilizing sophisticated computer-controlled equipment and test systems, Waukesha® transformers also maintain one of the shortest production cycles in the industry, which allows the team to respond quickly to customer delivery and installation requirements.

WAUKESHA® SERVICE

Waukesha® Service can provide complete transformer service solutions for almost any manufacturer's units including installation, maintenance, relocation, testing and engineering assessments; oil processing, dryouts and retrofills; corrective and preventative maintenance; load tap changer field retrofits and repairs. Along with a vast number of skilled personnel located strategically across the country, we manage one of the largest fleets of specialized transformer service equipment in the United States. This allows us flexibility, optimized installation hours and costs while helping us provide efficient, safe and high quality service to our customers.

WAUKESHA® COMPONENTS AND TRAINING

Waukesha® Components division operates a manufacturing, testing and training facility in Dallas, Texas as a leading supplier of parts for most major current and obsolete load tap changer (LTC) and oil circuit breaker brands as well as being the original manufacturer of a line of Transformer Health Products®. Additionally, we offer a variety of LTC services, including maintenance training, failure analysis reporting and complete overhauls at this location while also continuing to build our reputation as an industry leader in reverse-engineering and design enhancement.

SPX CORPORATION

SPX Transformer Solutions, Inc. is part of SPX Corporation (NYSE: SPW). SPX is a global, Fortune 500 company providing products and services for multiple industries, including power and energy, food and beverage, transportation, oil and gas, HVAC, communication technologies and industrial infrastructure. For more information, visit www.spx.com.



experience

WAUKESHA® TRANSFORMERS — U.S. in ownership, production and service support!

EXPERTISE

Waukesha® has become a leading brand in the power transformer industry through the combined use of sophisticated design programs and world-class manufacturing facilities, complemented by a well-trained and experienced work force. With an installed base of over 10,000 units, our Wisconsin facility has produced reliable power transformers with proven field performance since 1971.

Over the years, our voltage production capabilities have increased through equipment and knowledge base upgrades. With the most recent expansion to our established Wisconsin facility, we now have over 154,000 square feet solely dedicated to large power transformer production and testing and can offer one of the broadest arrays of power transformers of any U.S.-based manufacturer in business today: up to 1200 MVA, 500kV (with future potential up to 765kV). Our previously existing 292,000 square feet of manufacturing space continues to support our medium power business while also allowing for the increased large power offering.

Support and participate in many industry groups and organizations including:

IEEE	CIGRE	EPRI	Weidmann	NWPPA
IEC	AEIC	Doble	NRECA	RMEL

SERVICE

In addition to manufacturing power transformers, our Service division provides total transformer service solutions up to 765kV, including:

- Hauling and Rigging
- Installation
- Acceptance Testing
- Maintenance
- Oil Processing and Reclamation
- Engineering Services
- Renewal Parts and Components

COMMITMENT

Delivering on our commitments every day with the highest standards of quality to

- Our Customer
- Our Employees
- Our Suppliers and Channel Partners
- Our Shareholders
- Our Communities

We pledge our commitment to provide the products, services and support that meet or exceed our customers' expectations – every day, every order, every unit.

That is *The Waukesha Experience*®



EXPANSION

CAPABILITIES

Core Stacking and Cutting

- Automatic cutting machines and customized, state-of-the-art stacking table from GEORG include swing shear lines for cost-effective production of highest quality complex power transformer cores
- Advantages of this system include cutting of laminations with absolute minimum burr, high level of stacking accuracy and careful treatment of highly sensitive surfaces
- Three-leg or five-leg geometry for three phase transformers (two-leg or four-leg for single phase)
- Step lap construction utilized to reduce no load losses and noise level

Coil Winding

- Fully enclosed and environmentally-controlled coil winding room
- Larger windings produced on state-of-the-art Tuboly vertical and horizontal winding machines
- Coils up to 2.8m (9.2 ft) in diameter
- Interleaved, shielded disc, helical, disc or layer construction (depending on voltage and impulse rating)

Drying

- State-of-the-art Hedrich front entry vapor phase chambers utilized for coil stabilizing and core/coil assembly drying, including iso-static pressing for coil stabilization and precise measurements, ensuring compliance to design standards
- Optimizes heat transfer, process time and residual moisture
- Iso-static sizing leads to good elastic behavior and 'sizing pressure' is maintained during service to provide safety against short circuit forces

APPLICATIONS

GSU (Generator Step Up) Transformers

- Up to 900 MVA, Three Phase
- Up to 600 MVA, Single Phase

System Interconnection Auto Transformers

- Up to 1200 MVA, Three Phase
- Up to 1000 MVA, Single Phase

Assembly

- Humidity and dust controlled environment to minimize potential for contamination and moisture ingress, ensuring <0.5% moisture content in the finished transformer
- Low humidity "desert" room for final adjustments after vapor phase prior to transformer tanking
- 500 ton crane capacity

DESCRIPTION	STANDARD
Humidity Control	Below RH 50%
Temperature Control	20 ± 3°C
Floating Dust	Below 0.5 µm, 100,000 ea/ft³
Falling Dust	Below 10 mg/m² day

Testing

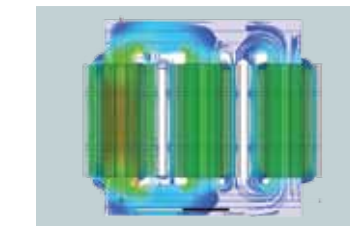
- Faraday Cage test lab electrically and mechanically isolated to minimize outside interference in test results and ambient partial discharge <5pc
- State-of-the-art Haefely test equipment utilized to ensure that each transformer meets or exceeds industry standards and customer specifications
- Capable of performing routine and special tests, including, dielectric, heat run and frequency response analysis (FRA) as per standards

Phase Shifting Transformers

- Up to 750 MVA

Voltage Level:

- Up to 500kV, Future to 765kV



TECHNOLOGIES

SPX Waukesha maintains a sophisticated suite of design methods and programs for designing power transformers:

- Cost and performance optimization
- Electromagnetic flux plotting
- Electrical transient calculation
- Short circuit analysis
- Stray and eddy loss
- Reactance calculation
- Thermal modeling
- Cable and lead temperature rise calculation
- Tank wall, clamp, flux shield, and temperature rise calculation
- Fully parametric, 3D mechanical design
- Finite element analysis

