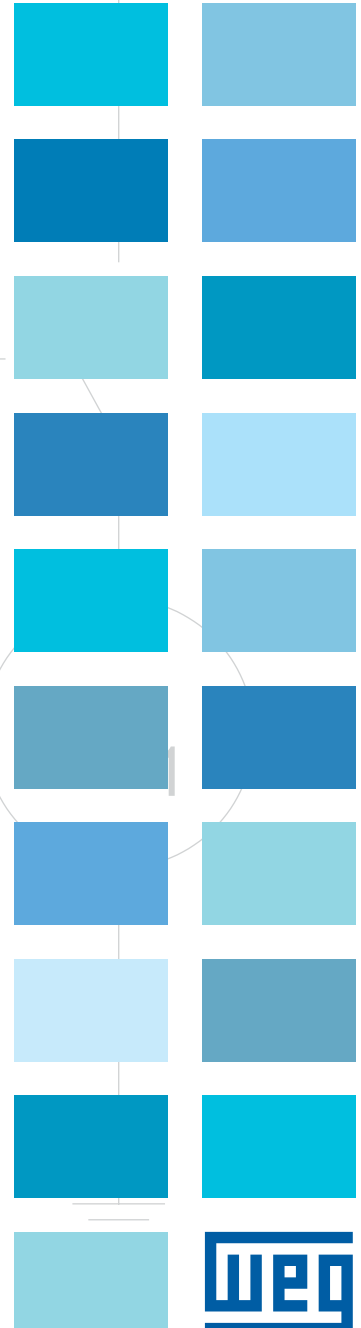


Transmission & Distribution

Line of Products and Solutions



Welcome to

WEG Transmission & Distribution

1

large group composed of five units which work in an integrated manner, searching for the best solutions for each customer

From a small electric motor plant in Santa Catarina, WEG has become an industry focused on synergetic electro-electronic solutions present worldwide.

The companies of the group are organized into five major businesses - Transmission & Distribution, Energy, Automation, Motors and Coatings - and reflect a true integration in the supply of full solutions to any industry.

100

countries in all continents can count on WEG's presence, with technical-commercial teams and manufacturing plants strategically located

WEG has 14 industrial parks in Brazil. Blumenau, Guaramirim, Gravataí, Itajaí, Linhares, São José, Joaçaba, Manaus, São Bernardo, São Paulo, Indaiatuba, Mauá and Jaraguá do Sul - the company's headquarters with two industrial parks. It also has plants abroad (Argentina, Austria, South Africa, USA, Mexico, China, India and Portugal), and commercial offices in the five continents, with presence in over 100 countries and over 26 thousand employees.

33,000

MVAs/year represent the manufacturing capacity of WEG Transmission & Distribution. This capacity is the reflection of a production process highly verticalized, providing flexibility and short delivery time

Focused on the industry, as well as on the generation, transmission and distribution, WEG Transmission & Distribution has five manufacturing plants (three in Brazil and two in Mexico). The portfolio is composed of Products (a wide range of transformers, besides high voltage equipment), Full Solutions (from turnkey conventional substations to mobile substations and transformers) and Services (which encompass retrofitting and repowering of transformers). This diversity represents an annual manufacturing capacity of approximately 15,000 units and 33 GVAs.

The WEG Group in the World



WEG Manufacturing Plants Transmission & Distribution



■ Blumenau/SC, Brazil.



■ Itajaí/SC, Brazil.



■ Gravataí/RS, Brazil.



■ Huehuetoca, Mexico.



■ Tizayuca, Mexico.

Other Manufacturing Plants of the Group



■ WEG Museum, Brazil.



■ Jaraguá do Sul/SC, Manufacturing Plant I, Brazil.



■ Jaraguá do Sul/SC, Manufacturing Plant II, Brazil.



■ Guaramirim/SC, Brazil.



■ Joaçaba/SC, Brazil.



■ São José/SC, Brazil.



■ São Bernardo do Campo/SP, Brazil.



■ São Paulo/SP, Brazil.



■ Mauá/SP, Brazil.



■ Linhares/ES, Brazil.



■ Manaus/AM, Brazil.



■ San Francisco, Argentina.



■ Córdoba, Argentina.



■ Buenos Aires, Argentina.



■ Minneapolis, USA.



■ Johannesburg, South Africa.



■ Nantong, China.



■ Hosur, India.



■ Maia, Portugal.



■ Viena, Austria.

Excellence in technologies of power supply

Industrial Processes

Technology and Verticalization page 05

Products

Transformers (oil and dry-type)
and Disconnectors page 08

Services

Retrofitting and Repowering page 10

Substations

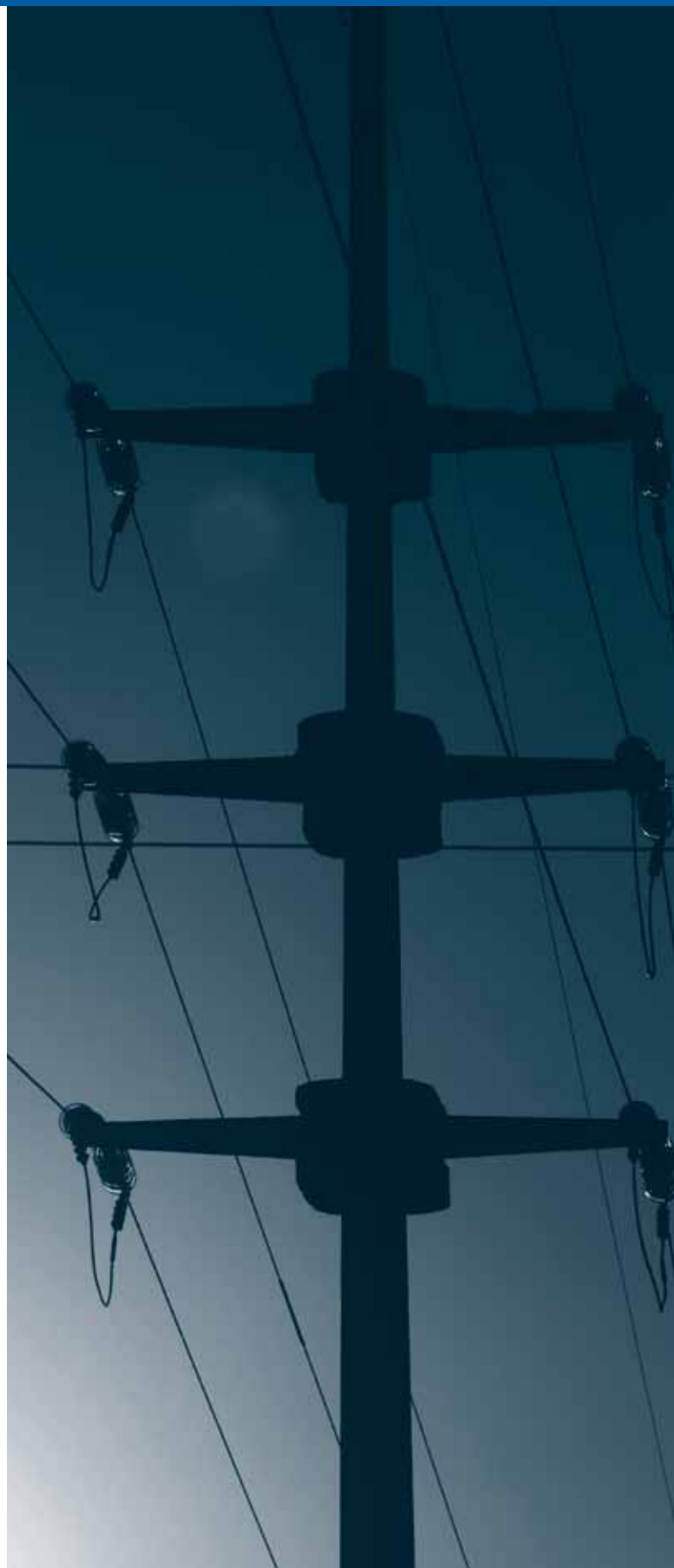
Conventional Substations
and Mobile Solutionspage 12

Reliability

Commitment and Qualitypage 14

Supplies

Experience and Know-how page 16



Industrial processes

A verticalized productive process, combined with the customization of projects, is an advantage WEG Transmission & Distribution offers.

Those advantages provide the customers with more flexibility and shorter delivery time, besides ensuring a high quality standard during the manufacturing stages.

Modern machinery and qualified technical teams ensure a wide range of products, adding value to every solution developed.

Engineering



WEG applies its own technology, fully developed by its technical staff. They are engineers and technicians constantly engaged in researching, developing and designing new projects, so as to offer the customers products with high levels of reliability, efficiency and durability. In this specific structure, the latest technical concepts and computer tools are available, combined with the capacity and experience of the WEG technical team.

Wire drawing



The copper, aluminum and transposed cables (CTCs) are made by WEG itself and the production capacity is 1,800 t/month. The manufacturing line of transposed cables uses copper wire insulated with varnish and/or thermostabilized material (Class E 120 ° C). Using this type of cable improves the mechanical and electrical quality of the windings, ensuring endurance to short circuit efforts, reduction of eddy current losses in the windings and shorter lead time. It evenly distributes the current between the wires of the turns and allows a more compact construction, reducing the mass of the transformer.

Cut and assembly of the core



In the manufacture of the core, WEG follows the core-type concept and the assembly is done with oriented-grain silicon steel laminations, and the step-lap standard may be used, which reduces noise, losses with no load and losses with exciting current. The fastening system of the core was developed to ensure that the laminations remain together, giving support to the windings. This project guarantees excellent resistance to short circuit forces and safety in the transportation of the transformers.

Industrial processes

Winding



The winding area complies with the strictest quality standards, combining cleanliness, state-of-the-art materials and high levels of control, which provides accuracy from the project to the execution. This is a closed environment with high control of temperature and air relative humidity. The winding process can be accomplished by horizontal or vertical winders (platform and pit).

Assembly room of the active part



The assembly of the active part is performed in an isolated room with controlled temperature. All those factors provide better cleanliness, improving the process quality.

Vapour phase



In order to dry the active part, WEG uses a controlled steam drying system. WEG manufacturing plants have vapor phase equipment manufactured by Micafil (Switzerland). This well-known method for drying active parts of large power transformers and reactors makes the treatment process fast and efficient, maintaining their durability.

Process verticalization.
Flexible and **short** delivery time.

Tank manufacture



Specific area of 7,800 m² for the manufacture of tanks and structural components painted with WEG coatings for different processes, depending on the necessity/painting plans, according to the conditions of the environment where the product will be used.

Heat exchanger manufacture



The heat exchangers are manufactured in an area of 3,150 m² with an automatic part manufacturing line, developed with Swiss technology (Schlatter) in a partnership with WEG tooling department. The heat exchanger plant has a production capacity of 400 t/month and has tanks for specific treatments, providing the product with special features and increased protection.

Test laboratory



Designed according to the latest concepts of high voltage technology, WEG laboratories are used to perform routine, type and special tests, following both national and international norms and standards.

Technical staff.
Experience and **competence** together.



One product for every need

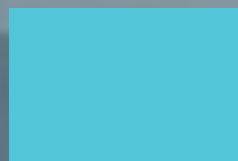
Oil Transformers

Reduction of weight and dimensions, types of insulating oils, longer lifespan and monitoring systems are just some of the items evaluated by WEG's technical team in order to develop oil transformers that provide the customer with the best solution.

The portfolio includes a complete line of distribution and power transformers up to 550 kV, with either mineral oil, reducing the equipment cost, or vegetal oil, significantly reducing environmental impacts.

Oil Transformers

- 1 Distribution transformers
- 2 Industrial transformers
- 3 Underground-type and submersible transformers
- 4 Power transformers and reactors
- 5 Transformers for furnaces and for rectification systems



Dry-Type Transformer

The transformers insulated with epoxy are the best option to meet the demand for transformers that provide more safety, use less space and reduce installation and maintenance costs.

This product line offers solutions for all kinds of environments. The vacuum encapsulation process and the quality of the resin prevent partial discharges and significantly increase the useful life of the transformer.

They are available with outputs from 300 to 20,000 kVA, in voltage classes up to 36.2 kV, with degree of protection up to IP55.

Dry-Type Transformer

Disconnectors

Offering more and more complete solutions, WEG also has a line of Disconnectors.

Their function is to ensure the insulation of equipment, sections of lines or substations, allowing the visual confirmation that the insulated segment is de-energized.

They are available in voltage levels from 15 to 550 kV, with current levels from 630 to 4,000 A and short circuit levels up to 50 kA/1s (other voltages, current and short circuit levels* upon consultation).

* The current and short circuit levels are not applied to all equipment and all voltage levels.

Disconnectors

Retrofitting and repowering services



Receiving



Disassembly and analysis



Retrofitting and repowering

With WEG quality standard, your service requests will be answered by our sales force with global presence.

Retrofitting and Repowering at the Plant in Power Transformers up to 550 kV

Technical Scope of the Service

For repairs and repowering, a full assessment of the transformer operating conditions is carried out, including operational risks, capacity to withstand overloads and estimated remaining useful life.

Transformers of any brand can be redesigned and rebuilt using the same technology applied in the manufacture of WEG transformers.

Older transformers almost always allow the redesign with increased power, with the main benefit of lower cost compared to the price of new equipment.

All this work is carried out by experienced teams specialized in assemblies in the field.

Main Services

- Disassembly in the field for transportation
- Receiving tests
- Opening of the equipment in the plant
- Disassembly of the active part
- Analysis/inspection of coils and complete rewinding
- Sheet metal shop, sandblasting and painting services
- Disassembly and/or manufacture of new core
- Replacement or inspection, cleaning and testing of the accessories
- Complete assembly of the equipment
- Testing according to ABNT 5356/5380
- Disassembly for transportation
- Assembly, installation and commissioning of the equipment





Tests



Transportation



Installation, commissioning and assisted start-up



Repair in Field

The repair of transformers in the field is one way to ensure cost-effectiveness when the equipment is installed in remote places or places with difficult access. The road conditions, and even the installations, often make the removal troublesome. The work in the field reduces lead time and eliminates complex and expensive transportation and logistics costs.

Structure for Repairs in Field

WEG has several tools and equipment necessary to prepare the site for the services, involving personnel and manufacturing resources, so as to ensure the same quality standards as of the projects executed at the factory. The field service team performs technical inspections, disassemblies and assemblies (transformers, laminations, coils) and carries out routine high-voltage testing, ensuring the reliability of the equipment before connecting it to the power line.

Low investment and warranty of new product.

Solutions

customized for your company

Conventional Substations

Full *turnkey* solutions

The substation department has an experienced and skilled team responsible for providing turnkey substations - from prospection, definition of a specific solution for the customer and project management and administration, to manufacture and assembly. It has proven experience, having already delivered and powered up over 250 substations in all voltage levels up to 550 kV.

WEG analyzes and executes HV and MV projects, such as:

- Electric, electromechanic and civil
- Studies of DC / Selectivity / Ground-grid / Protection / Systemic
- Supervisory System / Demand Control

WEG offers the customers contracts on a turnkey basis for high voltage substations, mobile substations and mobile transformers in all market sectors (industries, utility companies, generation - hydro, thermal and wind).

Another advantage is the interface with the other products it manufactures:

- HV devices (disconnectors, circuit breakers, surge diverters, CTs, PTs)
- HV and MV/LV transformers (oil and dry types)
- Panels - control/protection and auxiliary services
- Cubicles - control/feeder bay protection
- Supervisory system
- Generators

Experienced staff and engineering specialized in developing efficient and optimized projects.



Mobile Transformers and Substations

Practical solutions to restore *power*

Developed with the latest components of the market, the Mobile Solutions (Transformers and Substations) ensure dynamic operation and agility, being easy to install wherever necessary. They are used for emergencies and scheduled maintenances in power transformers and substations, allowing the jobs to be carried out without interrupting the power supply.

Main Benefits

- Mobility and flexibility in emergency situations
- Reduction of energy supply interruptions
- System reliability
- Easy preventive and corrective maintenance
- Different transforming and switching ratios
- Reduction of investments in spare equipment
- Optimization of size and weight of equipment
- Temporary supply for seasonal loads, new consumptions and events

Count on the leader in this kind of solution to develop the right product for your needs.



Reliability

Keeping the credibility and thrust of the customers is essential. Quality, Technical Assistance and Logistics are basic factors for the success of any business.

It is the combination of those factors with the technological capacity which makes WEG a remembered and recognized brand on the market.





Quality System

WEG Transmission & Distribution has the ISO 9001/2000 certification granted by the Bureau Veritas Certification.

The department of Quality Engineering coordinates the execution of internal and external audits, as well as the WEG Quality and Productivity Program, aiming at identifying opportunities for improvements in processes and products, so as to ensure the continuous development of their quality.

Warranty and Technical Assistance

WEG offers warranty against manufacturing and part faults of its transformers, when operated under normal operating conditions, with expiration dates as follows:

- Series products: 18 months from the issue of the invoice or 24 months from manufacturing date
- Engineered products: 12 months from the issue of the invoice or 18 months from manufacturing date

It also provides its customers with full after-sales services, including supervision of assembly, commissioning and start-up.

In Brazil there are over 40 accredited technical assistants, forming the largest network of technical assistance in transformers of the country.



Lead Time and Logistics

WEG offers shorter lead time due to its vertical structure and a specific logistics department for land, air and sea transportation.

Supplies

Power Transformers, Retrofitting and Repowering Services



1



2



3



4



5



6



7



8



9



10



11



12

1 Nokian Capacitors (Scotland)

Transformer 225 MVA - 275 kV

2 Itaipu Binacional

Single-Phase transformer 256 MVA - 525 kV - 60 Hz (Brazil)

Single-Phase transformer 275 MVA - 525 kV - 50 Hz (Paraguay)

3 VA Tech (Ecuador)

Transformer 127.5 MVA - 242 kV (2 units)

4 Anvil Mining (Democratic Republic of the Congo)

Autotransformer 150 MVA - 220 kV (2 units)

5 COPEL (Brazil)

Transformer 155 MVA - 550 kV (2 units)

6 Solar Turbines (USA)

Transformer 75 MVA - 169 kV

7 Energía Latina (Chile)

Transformer 100 MVA - 220 kV (2 units)

Transformer 100 MVA - 110 kV

8 ISA/CTEEP (Brazil)

Single-phase transformer 133.3 MVA - 362 kV (4 units)

9 CHESF (Brazil)

Single-phase transformer 185 MVA - 550 kV (4 units)

10 Compañía Minera Zaldívar (Chile)

Transformer 60 MVA - 242 kV

11 Duke Energy (Brazil)

Transformer 200 MVA - 550 kV

12 GE Hydro (Brazil)

Transformer 311 MVA - 242 kV (4 units)

Supplies

Power Transformers, Retrofitting and Repowering Services, Furnaces and Rectification Systems



13 CESP (Brazil)

Transformer 178 MVA - 440 kV

14 Eskom (South Africa)

Transformer 80 MVA - 145 kV (5 units)

15 Tractebel Energia - Suez Group (Brazil)

Single-phase transformer 248 MVA - 550 kV

16 Eletronorte (Brazil)

Transformer 150 MVA - 242 kV

17 Colbún (Chile)

Transformer 150 MVA - 230 kV

18 Furnas (Brazil)

Reactor 66.33 MVA - 72.5 kV

19 Aços Villares (Brazil)

Furnace transformer 75 MVA + 20% - 23 kV, 50 kA

20 Danieli Automation (Italy), installed in Syria

Furnace transformer 72 MVA + 20% - 33 kV, 50 kA

21 Danieli Automation (Italy), installed in Brazil

Furnace transformer 100 MVA + 20% - 33 kV, 60 kA

22 Danieli Automation (Italy), installed in Macedonia

Furnace transformer 100 MVA - 33 kV, 61 kA

23 Ferbasa (Brazil)

Furnace transformer 31.37 MVA + 30% - 15kV, 81.4 kA

24 Cia Mineira de Metais (Brazil)

Rectifier 44.5 MVA - 15 kV, 115

Supplies

Disconnectors, Conventional and Mobile Substations



25



26



27



28



29



30



31



32



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34



35



36

25 FURNAS (Brazil)

Vertical break disconnector - 800 kV

26 CTEEP (Brazil)

Horizontal semi-pantograph disconnector - 550 kV

27 CHESF (Brazil)

Vertical break disconnector - 550 kV

28 CEMIG (Brazil)

Vertical semi-pantograph disconnector - 245 kV

29 Eletronorte (Brazil)

Vertical break disconnector - 245 kV

30 Eletrosul (Brazil)

Vertical break disconnector - 245 kV

31 ISA/CTEEP (Brazil)

Embu substation - 13.8 kV, 400 MVA and integral digital system

32 Vale (Brazil)

Substation 242 kV, 180 MVA

33 Nestlé S.A. (Brazil)

Substation 138 kV, 20 MVA and transmission line

34 Usina Sta. Terezinha (Brazil)

Substation 138-13.8 kV, 62.5 MVA

35 CEMAT - Grupo Rede (Brazil)

Mobile substation 25 MVA - 145R72.5 kV - 72.5R36.2/15/15R7.2 kV

36 AES Sul Distribuidora Gaúcha de Energia S.A (Brazil)

Mobile transformer 30 MVA - 145R72.5 kV - 24.2R15 kV

Products, Services, Solutions and Reliability
Excellence in technologies of
power supply.



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For those countries where there is not a WEG own operation, find our local distributor at www.weg.net.



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