



**"I won't sell the future for short-term profit."**

— Founder of Siemens: Ernst Werner von Siemens

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**SIEMENS**  
*Ingenuity for life*

**High-quality Transformers  
For All Requirements**

**Siemens Transformer (Wuhan) Co., Ltd.**

[www.siemens.com.cn](http://www.siemens.com.cn)



*we are the **1st** choice  
of medium power  
transformer & solution  
in global market with  
sustainable growth by  
living an **ownership** culture  
and **lean** philosophy*

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## Company Profile

Siemens has more than 100 years history in manufacturing transformers, relying on a worldwide network made of 19 transformer factories in the world. Siemens Transformer (Wuhan) Company (STWH) core business is the design and production of power transformers up to 230kV.

The design of the "Siformer" (Siemens Transformer) in STWH adopts the best technical solutions of Siemens Transformer factories, thus granting the production of high efficiency, high quality and affordable transformers featuring the most advanced equipment in the world, and fully compliant with Siemens manufacturing and quality control procedures. Furthermore, as result of STWH continuous improvements in design, manufacturing and process optimization, our transformers have lower losses, lower noise, lower partial discharge, stronger short circuit withstand ability, and longer life than competitors.





# Quality Assurance - Our Commitment

Every transformer is assembled by a large number of individual components, therefore, only by adhering to strict quality standards in every stage of the production, we can grant to our customer the highest level of quality.

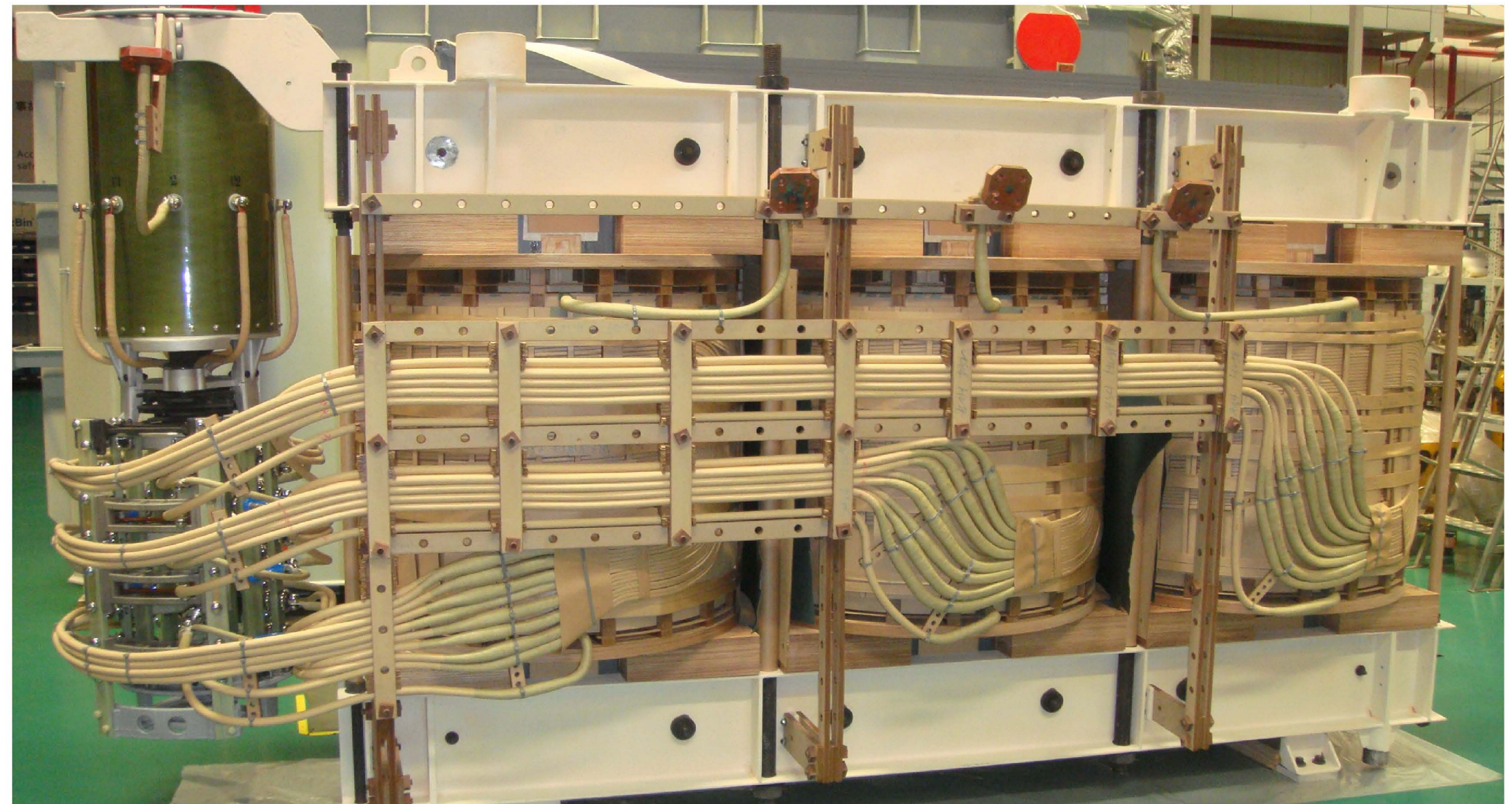
Each manufacturing step is followed by strict quality gates, being either worker self-checks with associated evidences or performed by our quality experts. The final testing or acceptance tests are exclusively performed in our own testing field. Are you willing to join the test of your transformer? Welcome!

Besides the routine tests for all transformers, we also perform type and special tests on request.

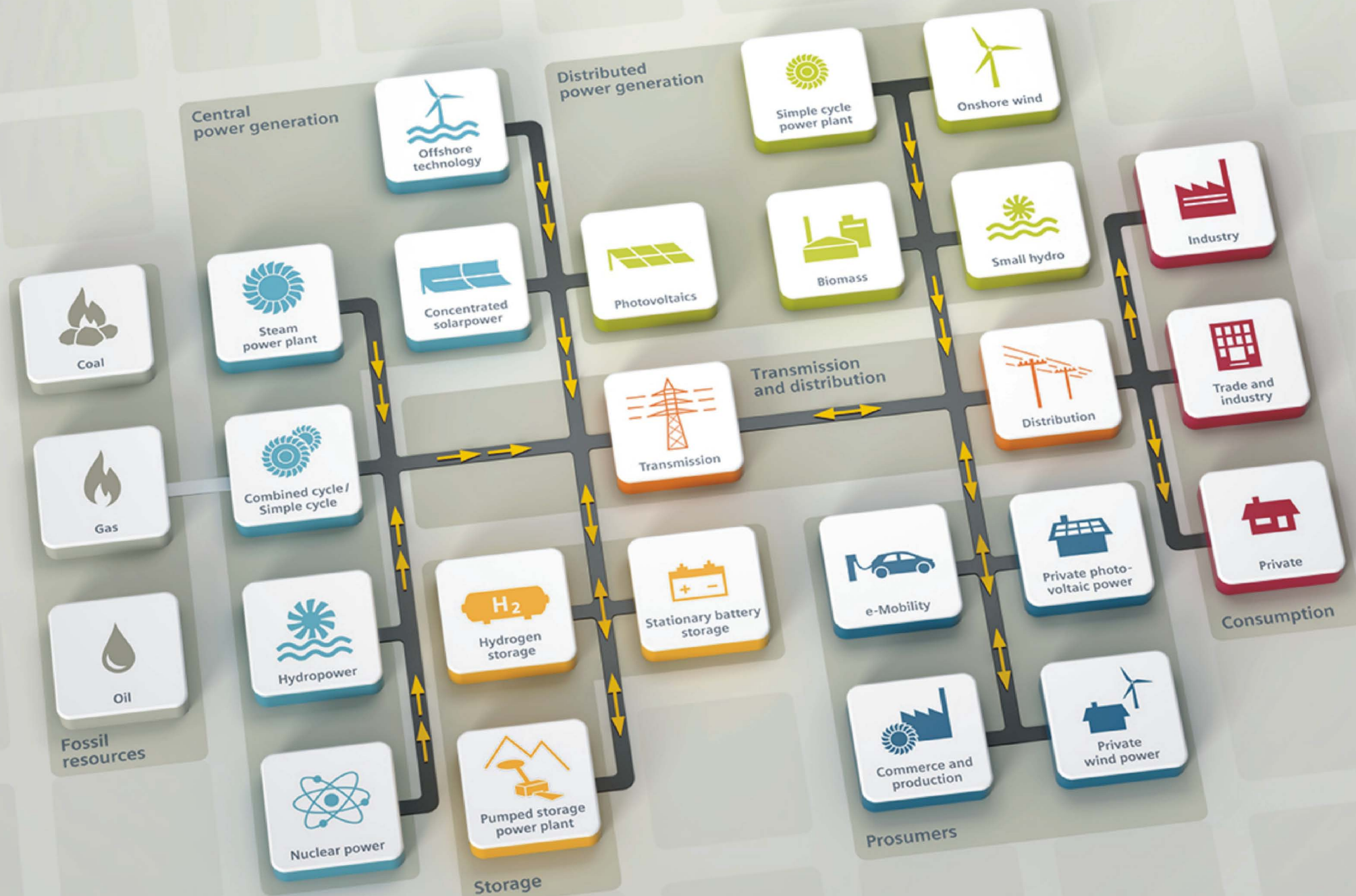
For Siformer, however, quality assurance is even more. We support you in every aspect, such as transformer monitoring and during operation. Transformer technology is developing day by day, thus we continuously update our offer to present you the solution most suitable for your needs.

Nowadays the protection of our environment and the efficient use of resources is more and more a sensitive topic worldwide. This applies in particular to growing cities, where the power stations and industrial factories are closer to buildings or households.

If you choose Siformers, it means that you are on the safe side regarding ambient protection and sustainability since we always work in accordance with the environmental management system ISO 14001.







## "Siformer" for All Demands

We provide the right transformer for every need. In addition to the normal power transformer, we also provide: **transformers with alternative insulation liquids, special transformers for industrial applications, line-feeder transformers, pre-assembled mobile substations, etc.**

	<b>Renewable Energy Transmission Solution</b>	<ul style="list-style-type: none"> <li>Wind power generation</li> <li>Solar power generation</li> <li>Hydro power generation</li> <li>Biomass power generation</li> </ul>
	<b>Power Grid Solution</b>	<ul style="list-style-type: none"> <li>Step-up transformer</li> <li>Step-down transformer</li> <li>Power plant transformer</li> <li>System-interconnection transformer</li> <li>Starting &amp; stand-by transformer</li> </ul>
	<b>Special Transformers for Industrial Applications</b>	<ul style="list-style-type: none"> <li>Furnace transformer</li> <li>Rectifier transformer</li> <li>Converter transformer</li> <li>SVC transformer</li> </ul>
	<b>Line Feeder Transformers</b>	<ul style="list-style-type: none"> <li>Railway</li> <li>Metro</li> </ul>
	<b>Pre-assembled Mobile Substations</b>	<ul style="list-style-type: none"> <li>35kV</li> <li>110 kV</li> <li>230 kV</li> <li>66 kV</li> <li>132 kV</li> </ul>



# 1、Medium Power Transformers



Our medium power transformers with a power range from 5 to 180MVA and a voltage up to 230kV are designed, manufactured and tested according to national and international standards, such as IEC, ANSI, GB, CSA and etc.

For our customers, the reliability of transformers is of primary importance, and the long-term reliability of a transformer starts with a design tailored on your requirements: from the rated voltage to the vector group, from the type of cooling to the tap changers, we can provide the best solution for your needs.

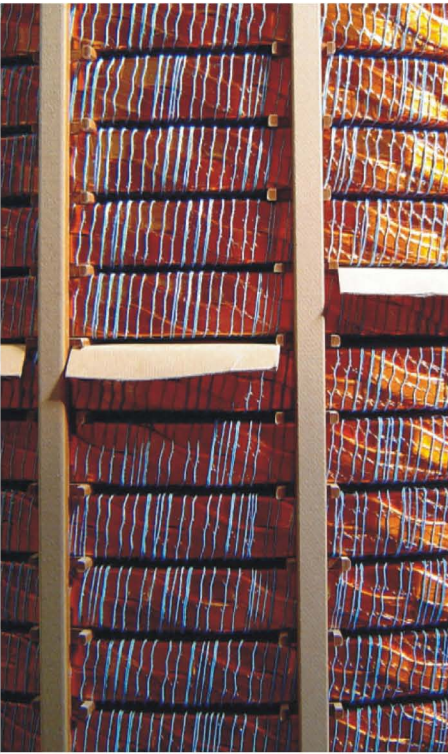
When we start the design, we will consider the worst possible conditions. The short circuit forces can be carefully considered by using the advanced finite elements programs from Germany, whereas the insulation structure is optimized by calculating the electric field on different kinds of insulation voltage test conditions. The load losses can be effectively reduced by the optimization of core and winding arrangement and by the careful selection of the shielding structure to control the stray field and reduce the additional losses in the structural parts. All these design details allow the Siformer to be used in the most challenging working conditions.

The insulation partitions along the electric field are precisely arranged to reduce the partial discharge. With the highly qualified materials and strict control of the production environment, lower partial discharge and consequently higher reliability can be achieved. The partial discharge of our first transformer is only 10pC.

Technical data of the standard products (110±8×1.25%/10.5kV,YNd11)

MVA	U <sub>k</sub> (%)	P <sub>0</sub> (kW)	P <sub>k</sub> (kW)	L <sub>PA</sub> (dB)	L (mm)	B (mm)	H (mm)	Oil Weight (ton)	Total Weight (ton)	Transport Weight (ton)
20	10.5	16	85	55	6200	4400	4680	9	48	40
31.5	10.5	19	120	55	6600	4560	4880	12	55	45
	14									
	17									
40	10.5	22	145	55	6780	4620	5220	13	61	52
	14									
	17									
50	10.5	24	175	60	6840	4600	5440	16	72	60
	14									
	17									
63	10.5	28	220	60	6900	4700	5680	17	77	65
	14									
	17									
80	17	34	264	60	7000	4800	6900	20	92	80
100	17	42	313	60	7640	4940	6120	25	116	86

## Winding



The windings are the key part of the transformer, thus they must be firmly protected against overvoltage surging or mechanical overload caused by short circuit. Siformers are designed to fully meet these requirements.

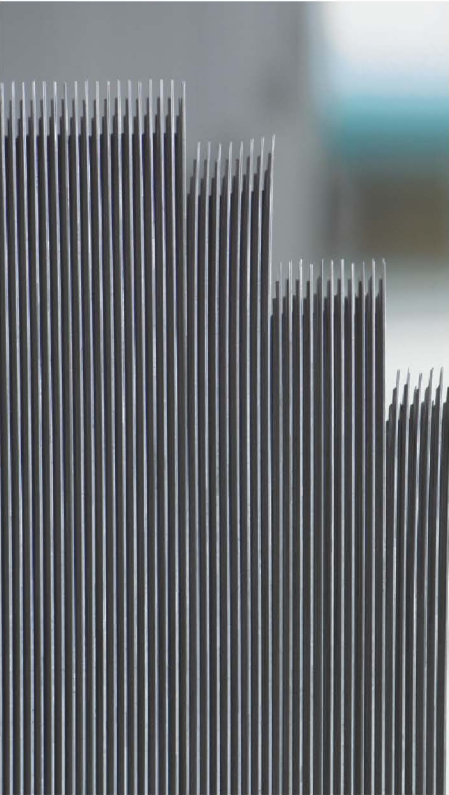
Our windings are made of copper. Generally, the low-voltage windings are made from net tape CTC, and the high-voltage windings are made from composite or transposed conductor, but evidently the right solution will be chosen based on your requirements.

In our design, the electrical field calculation is applied to optimize the insulation arrangement; the short circuit calculation is applied to control the short circuit forces; the magnetic field calculation is applied to guide the selection of the correct conductor type and dimension and the shielding structure calculation is applied to reduce eddy losses.

## Core

No matter the design or materials selection – the Siformer manufacturing technology of cores is always state of the art. We select the right silicon steel sheet to meet customer's needs. The cold-rolled and two-side insulated silicon steel sheets always ensure low losses and low noise possibly further enhanced by a laser treatment.

Silicon sheets are cut with high precision by GEORG Transformer Lamination Cut-to-Length Line, then stacked with Siemens standard step-lap arrangement. At the same time, rubbers are added between core sheets, between active parts and tank, between magnetic shielding and tank, effectively reducing noise and no-load losses of the transformer.



## Tank



The tank must be strong enough to secure the oil tightness both during the transportation and in service. The preconditions to achieve this goal are high-quality welding process, the advanced calculation methods and the mechanical assembling experience.

We pay special attention to corrosion protection treatment. The process may vary according to the different locations and environment requirement, but it is always based on Siemens high standard. That means implementing pretreatment of the surface before painting (cleaning, dirt-removing and sandblasting or shot blasting), strictly controlling temperature and humidity during the paint spraying process, respecting the necessary time-lapse between laying of each paint layer. The coating thickness of the transformer we provided for 2014 World Cup and 2016 Olympic Games in Brazil reached almost 280 μm.



# Transformer Oil

An effective dimensioning of the cooling system and the choice of the right coolant are crucial to ensure a long transformer lifetime. The oil must be insensitive to high temperatures, resistant to oxidation to ageing and non corrosive. The transformer oils used by Siemens are adequate for every special requirement of all customers and applicable for any different Environment:

■ Mineral oil

The more common coolant for transformers. It complies with the requirements of all international standards for insulating oil.

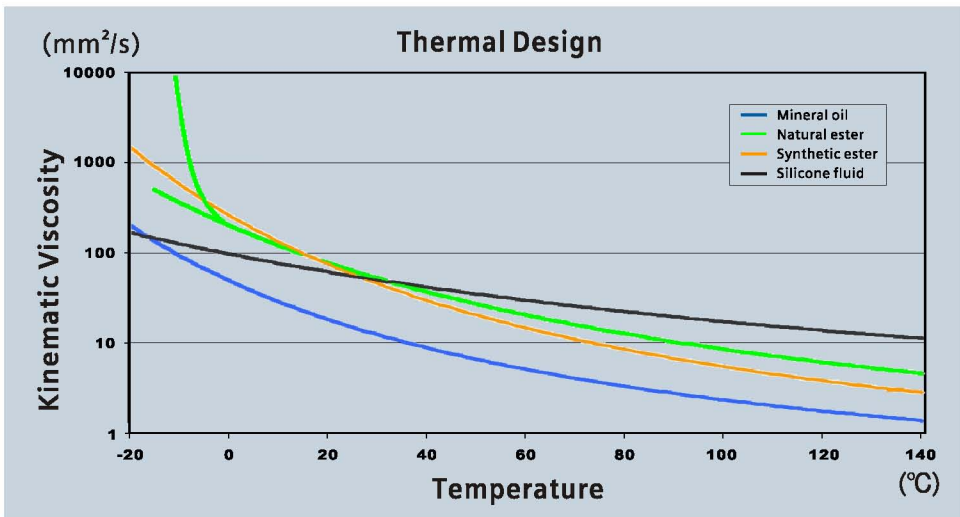
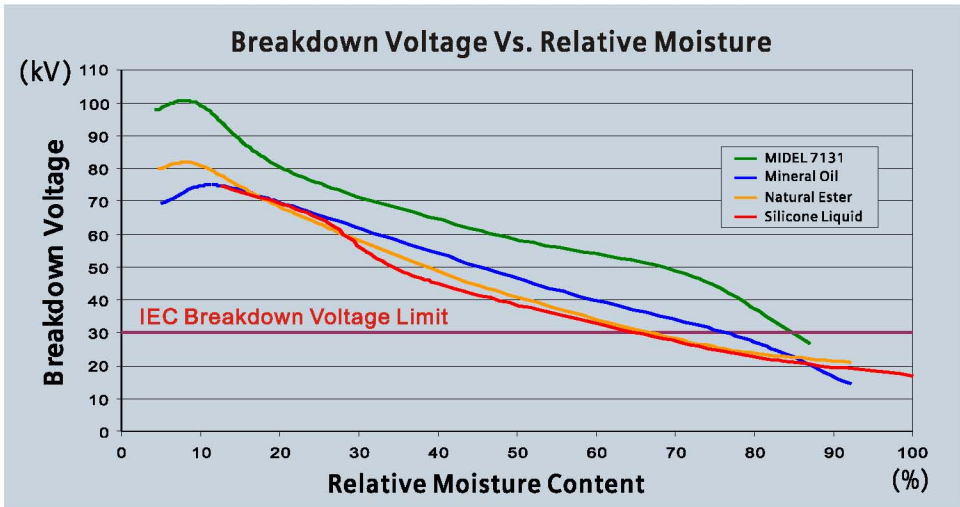
■ Silicon oil

It is self-extinguishing in case of fire, due to its high fire point above 300°C.

■ Ester

Natural ester is non hazardous to water and biodegradable. It is non-toxic and it has no effect on the degradation of the activate sludge in the waste water treatment plants. This is the most environmental friendly oil available and ensures the same high fire point above 300°C as the silicon oil.

Additionally, thanks to its high moisture saturation capacity, it can absorb water from the insulation parts without reducing its insulation capacity thus keeping the insulation parts dry and consequently extending the lifetime of the transformer. We already had a successful application with MIDEI 7131 ester as the transformer oil in the GU3 cement project in Ecuador.



# Delivery On Time

As soon as the order is placed, we will arrange design, procurement, manufacturing and testing plan according to the delivery time and ensure the on time delivery.

After transformer delivery, our engineers will be available on site to supervise transformer installation and commissioning. Our experts are duly trained to solve promptly any problem which could occur on site. Customer cooperation and service attitude along with

excellently professional skills and quick reaction represent our commitment.

During transformer operation, we continue to be at your side with our Siemens TLM™-Transformer Lifecycle Management. Based on Siemens experience and proprietary technology, we can assist you in any possible way during transformer operation from real time monitoring to repair on site, from spare parts delivery to lifetime extension.

## TLM™ – Transformer Lifecycle Management Portfolio

- Condition Assessment & Diagnostic
- Online Monitoring
- Consulting & Expertise
- Maintenance & Lifecycle Extension
- Spare Parts & Accessories
- Repair & Retrofit
- Transport, Installation & Commissioning





## 2、Special Transformers for Industrial Applications

A number of industrial applications require highly specific and customized transformers particularly suitable for high current operation. We can produce special-purpose industrial transformer, like furnace transformer, rectifier transformer, converter transformer meeting the most challenging loading requirements.



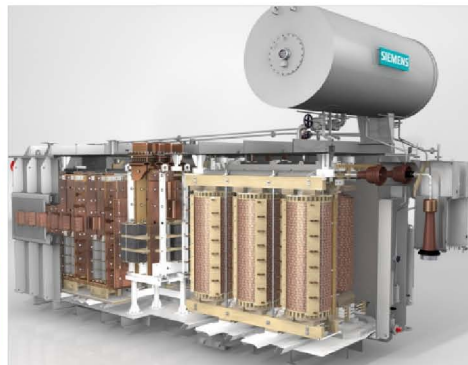
### Furnace Transformer

#### Special design:

- High current delta connection inside tank
- Optimized electromagnetic fields on LV side
- Siemens quality produced in China

#### Highlight:

- Types of cooling: OFWF
- OLTC: three TC with oil filter



### Rectifier Transformer

#### Special design:

- Multiple active parts in one single tank
- Safeguard very high currents
- Shielding of electromagnetic fields

#### Highlight:

- With built in transducers and interphase reactor



### Converter Transformer

#### Special design:

- Multi windings construction
- Independent filter winding
- Combine state of the art utility transformer design with special requirements due to large drive applications

#### Highlight:

- Converter transformers for large drive applications
- Filter winding

## 3、Line Feeder Transformer

Line feeder transformer is a type of transformer specially utilized in electrified railway and metro system. Siemens line feeder transformer distinguishes itself with low losses, low noise features, its strong capability of short circuit withstanding, and overloading accommodate itself in the frequent overloading operation application of electrified railways.



#### Line feeder transformer main features:

- Power supply mode : AT,BT Power supply
- Connection mode : VV, VX, Scott
- Voltage grade : 66~220kV
- Low no-load loss : No-load and load loss significantly excel than those specified by relevant standards
- Low noise : Usage of a variety of noise reduction measures and high-quality materials, make the noise level can reach a low value of 48.5db on normal design
- Outstanding short circuit withstanding capability : By accurate simulation of variety of short circuit conditions, and applying SIEMENS reliable transformer active part structure, Siemens line feeder transformer can withstand frequent short circuits working condition
- Strong overload capacity : The design can withstand severe overload cycle.

## 4、Pre-assembled Mobile Substation

As an emergency power supply equipment, the pre-assembled mobile substation is mounted on trailers, platforms or containers and is a cost-effective solution in extremely limit space. It is easy to transport and designed to respect any road limitation. It can be used to resume power supply in a very short time in case of interruptions or to provide emergency power transmission in case of rescue and relief occasions.

Both 66kV and 110kV mobile substations have already been designed and produced are currently successfully connected to the power grid. The pre-assembled mobile substation offers a creative solution to enhance the reliability of the power supply or to cope with an emergency. It opens a new age in the power transmission field.

#### Main Features:

- Compact and space-saving
- Small and flexible, easy to transport
- High technology and reliable equipment, operation safely
- Outdoor use for long term
- Pre-assembled and quick response for emergency

#### Applicable For:

- Primary power transmission
- Maintenance for existing substations
- Temporary power supply to large construction projects
- In emergency situations and natural disaster
- Approval delay for building a new substation



**Project Name:** 66kV/20MVA pre-assembled mobile substation

**Customer:** Dalian Power Supply Bureau of State Grid

#### Trailer #1:

Transformer  
Surge Arrester  
SF6 Dead Tank Compact  
Prime and Secondary Cable Hank  
Smart Terminal Box

#### Trailer #2:

10kV GIS  
Intelligent Protection and Monitoring System  
Solar Energy System  
Super Capacitor  
UAT and PT Cabinet



**Project Name:** 110kV/20MVA pre-assembled mobile substation

**Customer:** Sichuan Deyang Power Supply Company

#### Trailer #1:

Transformer  
Surge Arrester  
Dead Tank Compact  
SF6-gas Refilling Devices  
10kV Vacuum Switchgear  
Intelligent Protection and Monitoring System  
PT Cabinet

#### Trailer #2:

10kV Vacuum Switchgear  
Intelligent Protection and Monitoring System  
Lithium Battery  
UAT and PT Cabinet



# Our Footprint All Over the World



**Colombia ISA**  
50MVA, 230Kv+8/-12x1.25%/34.5kV/13.8kV, 60Hz  
Design Standard: IEC  
Seismic Active Environment Application



**Brazil Light**  
25MVA, 138kV/88kV±8x1.25%/10.5kV+6.3kV  
Design Standard: NBR  
For 2014 World Cup and 2016 Olympic Games



**Canada Altalink Mobile Substation Transformer**  
Type 1: 25MVA, ODAF, HV Serial - 138±8x1.25%, Parallel - 69±8x1.25%, LV 26.5kV, 60Hz  
Type 2: 215MVA, ONAN, HV - 26.5kV, LV 13.8 or 4.16kV, 60Hz  
Design Standard: CSA/IEEE  
Mobile Substation Application



**Canada Goulais Wind Farm**  
30MVA, 240±16x0.625/34.5kV, 60Hz  
Design Standard: CSA C88-M90/IEEE C57.12.00  
Wind Farm Application



**CEPCO, Japan**  
18MVA, 13.8±2x2.5/6.9kV  
Design Standard: IEC  
First Siemens Transformer to Japan



**Phillippines BAC-MAN Geothermal Power Plant-1**  
90MVA, 230±2x2.5/13.8kV, 60Hz  
Design Standard: IEC  
GSU Transformer Power Plant Application Highest voltage level and rating up to date



**Phillippines PSPC Synchronization to Nation Grid Shell MPDC (Frame Agreement) Project**  
Pilipinas Shell Petroleum Corporation  
25MVA, ONAF, 69±16x0.625/11.5kV, 60Hz  
Design Standard: IEC



**Singapore MRT Expo Intake Substation GREEN TRANSFORMER**  
75MVA, 66/22kV, KNAN/KNAF/KNAF  
Design Standard: IEC  
Railway Application  
Natural Ester Insulation Oil application



**Australia Smeaton Grange**  
60MVA, 132±16x0.625/11kV  
Impeadnce voltage 22.5%  
Design Standard: AS  
Data Centre Application



**Denmark Electrification Programm Line Feeder Transformer**  
Type 1: 30MVA/150kV-2x27.5kV, li0i0  
Type 2: 10MVA/150kV-1x27.5kV, li0  
Strong short circuit withstanding capability  
Strong overload withstand capability  
Installed in West Europe



**Egypt Power Plants - Beni Suef\_Al Burullus\_New Capital**  
Type 1: 36MVA, 22±2x2.5/11.5kV  
Type 1: 32MVA, 22±2x2.5/11.5kV  
Design Standard: IEC  
Turnkey Project for Siemens. Biggest Contract in Company History.



**South Africa Ethekiwini Umdloti Beach Substation Project**  
30MVA, 132kV+4/-12x1.25%/11kV  
Design Standard: IEC  
South African Utility Frame Contract project.



**Australia QGC LNG**  
18MVA, 33kV±10x1.25/11kV  
Design Standard: AS  
Low noise: 48.6 dB  
1 order with 27 units