Mefta
GreenTransfo™

DISTRIBUTION
TRANSFORMERS

PRODUCT
catalogue

Powering the Sustainable Future

Electrical energy

Wind farms

PV applications

Data centers

EV charging stations

Customer benefits

- 80 years of experience in transformers production
- optimized design, reduced dimensions
- solid construction
- long life cycle with no maintenance
- proven quality and reliability
- economically optimized
- specially designed for SOLAR, WIND, EV CHARGERS, BESS applications
- on load tap changer transformers (OLTC)

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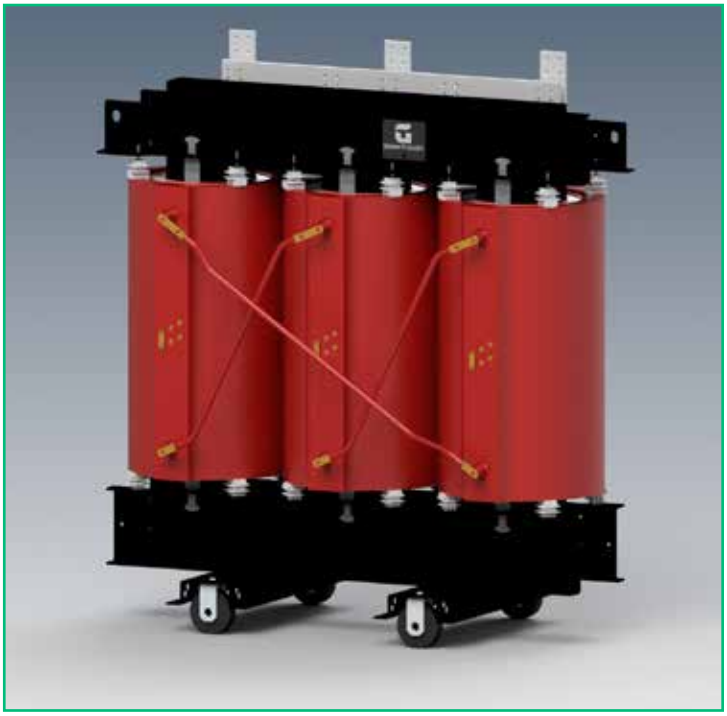


Our History >>>

Mefta Green Transfo Energy Poland sp. z o.o. is one of the leaders on the Polish market in the manufacture and supply of medium-voltage transformers for the energy sector.

We also supply the transformers produced in our factory to many export markets in Europe, Asia, Africa and Australia. Main markets include: France, Germany, Belgium, Austria, Finland, Slovakia and many others, where our customers include energy utilities, industry, large corporations and small businesses.

The history of the Transformer Plant in Mikolow dates back to 1945 when Elektrobau was nationalised (28.02.1945). The transformation of the company into a state-owned enterprise was followed by dynamic growth - increasing production, broadening the product range, increasing the number of employees, diversifying markets and gaining new experience. The factory produced oil and dry transformers during this period.

In 1992 the Mikołów Transformer Factory „MEFTA" was privatised and the plant was incorporated into the structures of international corporation AEG (17.12.1992).

Since 1993 the production of resin-insulated dry-type transformers has undergone rapid development, quickly gaining recognition as a reliable and environmentally safe product and consequently replacing the dry-type products manufactured to date.

In 1995, production began on the new hall.

The following years saw further transformations: the merger of AEG and GEC Alsthom - a change of name

to GEC Alsthom (1997) and later to Alstom (1998).

December 2001 saw the consolidation of the ALSTOM Group's companies in Poland.

In 2004 as a result of the acquisition of the Transmission and Distribution sector from Alstom by the AREVA concern, the company's name was changed to AREVA T&D sp. z o.o. In June 2010, Schneider Electric Group acquired the Distribution part from Areva T&D, which included the Transformer Factory in Mikolow.

In 2011, the company's name changed to Schneider Electric Energy Poland sp. z o.o., and then in 2017 it changed to Schneider Electric Transformers Poland sp. z o.o.

In 2023 (05.01.2023), the factory underwent another ownership change and became part of the Green Transfo Group, taking the name: Mefta Green Transfo Energy Poland Sp. z o.o.

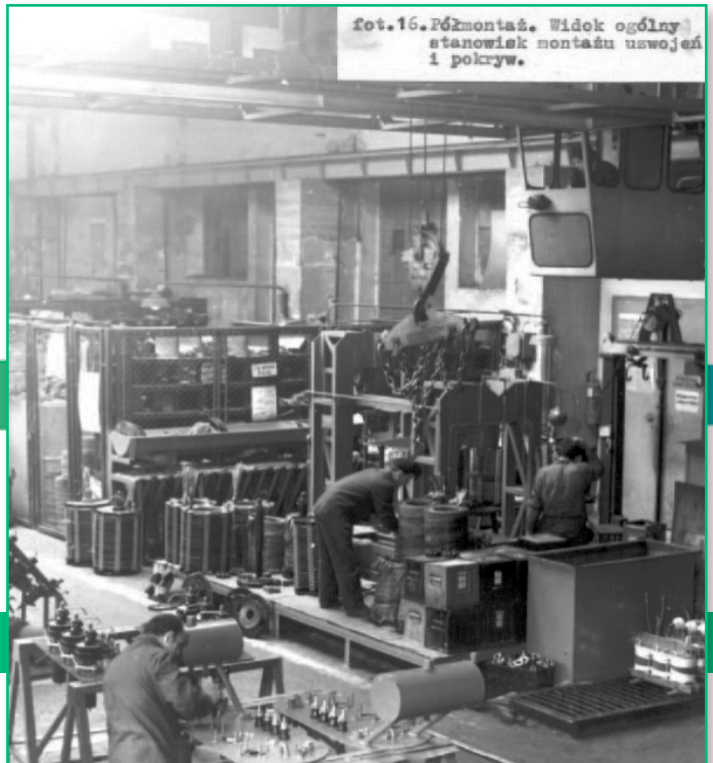
At present, the Mefta Transformer Factory manufactures the following types of transformers:

- SPHERA DT fluid-immersed transformers
- Resin dry-type transformers
- TRIHAL resin transformers licensed from Schneider Electric

We also manufacture a range of transformers in special designs according to customer requirement.

COMPANY DEVELOPMENT 1945-2023

1945
Establishment of Mefta



1992

Distribution fluid-immersed transformers in the power range up to 7000 kVA - 36 kV

Depending on the destination country's requirements and standards, the transformers are tailored to the parameters of the distribution network, while offering the most cost-effective solutions.

The Green Transfo Group also has a power transformer factory located in Turkey, producing power transformers in the range up to 125 MVA and a maximum of 170 kV, so we can offer you a variety of products in terms of power and voltage.

QUALITY AND EXPERIENCE

With 80 years of experience and more than three hundred thousand fluid-immersed transformers installed worldwide, you have the confidence to invest in proven technology that is constantly being upgraded at our R&D facilities.

SPHERA DT AS THE BEST SOLUTION

The standard range of SPHERA DT transformers includes the following units:

- 3-phase (1-phase available optionally)
- Up to 7000 kVA, 36 kV, 50/60 Hz
- With natural cooling (ONAN)
- With normal or reduced noise and/or losses

in designs:

- Hermetic or with a conservator
- Free-standing or pole-mounted (with their own sling or mounted on platforms)

On request, we can also offer transformers for special applications (earthing, conversion). The Green Transfo Group is also a manufacturer of transformers with on-load tap changers.

Whatever type of transformer you are looking for, SPHERA DT transformers are the best solution. SPHERA DT transformers meet the requirements of international standards such as IEC, as well as the new EU Commission Regulation no. 1783/2019.

ADVANTAGES

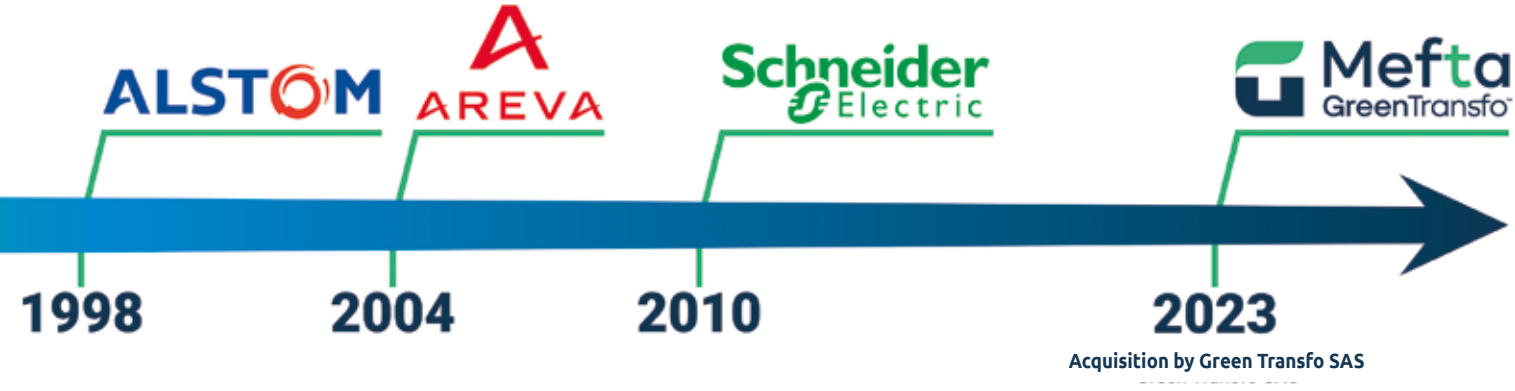
- Wide variety across the entire power range
- High quality and reliability
- Optimum parameters
- Capitalisation of losses
- Proven and optimised technology
- Reduced sizes
- Robust construction
- Long life and easy recycling

SPHERA DT

Depending on the application and the environmental impact and requirements, you may require different types of transformers.

The SPHERA DT series offers you expected diversity:

- Hermetic transformers or transformers with conservator
- For indoor applications in buildings or production halls and compact stations
- For outdoor use as free-standing or pole-mounted transformers (directly mounted on a pole or platform)
- Reduced noise levels (for residential and urban areas)
- With normal and reduced loss levels



SPHERA DT Fluid-immersed Transformers

High quality and reliability

Customer satisfaction is our main objective. Our efforts are therefore focused on improving the production process and shortening delivery times, while maintaining the highest quality. All SPHERA DT transformers are manufactured in accordance with ISO 14001, ISO 9001, ISO 45001 requirements. These transformers are subjected to product testing in accordance with current standards (IEC). On request, we can carry out special tests or present type tests.

We are constantly modernising our production processes.

The internal policy of our Company is one of continuous progress, taking into account the latest global developments. As a result, our transformers are state-of-the-art and fully meet the highest requirements of the global market in terms of: fast delivery, increased quality, improved recycling properties, reduced dimensions and meeting loss and noise levels.

Magnetic core

The transformer cores are made of cold-rolled magnetic sheet metal with low loss. The step-lap method of stacking was chosen to minimise both losses and no-load current in the transformer. To reduce noise and vibration, mainly caused by the magnetostrictive effect, the core has a properly designed mechanical structure and appropriate electromagnetic parameters.

Lower voltage winding

The lower voltage windings are made of paper-insulated profile wires (aluminium or copper) and, in higher power transformers, of aluminium or copper strip. The windings design provides very good dielectric strength, including high lightning resistance and very good short-circuit strength. Windings have a sufficient number of cooling channels to ensure adequate thermal performance. Electrical conductivity is ensured by an appropriate channel design between the LV and HV windings.

Upper voltage winding

The upper voltage windings are made of round or profile wires (aluminium or copper) depending on the power and voltage. The windings design provides very good dielectric strength, including high lightning- and very good short-circuit strength.

SPHERA DT Fluid-immersed Transformers

Windings have a sufficient number of cooling channels to ensure adequate thermal performance. Layered windings are usually used. Advances in winding technology make it possible to automate the process.

Tapping control in transformers with off-load tap changer

The tap adjustment allows the transformer to be adapted to the specific voltage parameters of the grid, as well as to the necessary voltage changes on the secondary side. Taps are arranged in the primary winding and connected to a tap changer. The changer head is located on the transformer cover. As standard, the transformers have an adjustment of ±2x2.5% or ±3x2.5%. Tap change can only be performed in the de-energised state.

Tap adjustment in transformers with on-load tap changers

The tap control allows the transformer to be adjusted to the instantaneous voltage parameters of the network to always maintain the desired secondary voltage. The taps are arranged in the primary winding and connected to an on-load tap changer.

The changer head is located on the cover of the transformer and contains the motor drive that switches the taps. The taps are switched by the controller. This controller can operate in manual, automatic or remote mode. As standard, the transformers have an adjustment of ±4x2.5%.

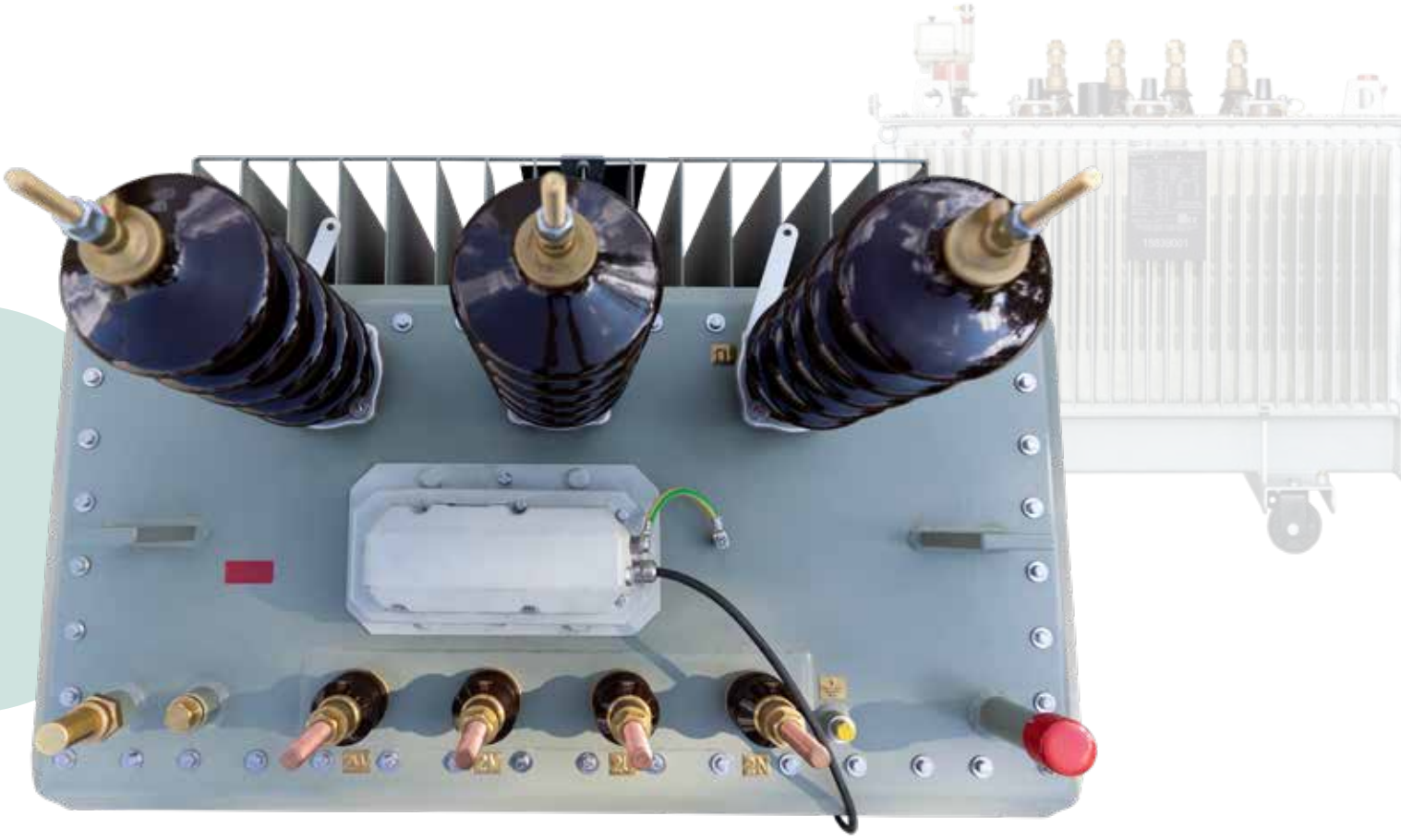
Tank design

In distribution transformers, the most common design is the corrugated walls design. The tightness of the tank is checked by means of a pressure test. For hermetic transformers, the corrugated wall design allows compensation for the oil volume increase associated with heating.

On request, the transformer tank can be fitted with suitable hooks (slings) for pole mounting.

Corrosion protection

Corrosion protection is one of our main quality aspects. The anti-corrosion coating system is selected taking into account the environmental conditions (humidity, contaminants, etc.). Upon request, we supply transformers hot-dip galvanized or C5H class paint coating, including cataphoretical protection.



SPHERA DT Fluid-immersed Transformers

DISTRIBUTION FLUID-IMMERSED TRANSFORMERS	HERMETIC (without conservator) or with conservator
Rated power	Up to 7000 kVA*
Insulation levels	According to IEC for voltages U M=1.1 - 3.6 - 7.2 - 12 - 17.5 - 24 - 36 kV
Phases	3-phase (1-phase available optionally)
Range of adjustment	±2x2.5% or ±3x2.5% (other adjustment ranges available optionally)
Voltage regulation	In off-voltage state, and special version with on-load switch
Rated secondary impedance	From 220 to 800 V (standard 400, 420 V)
Short circuit voltage	Uk=4% or 4,5% for power ≤ 630 kVA Uk=6% for power ≥ 630 kVA or other upon request
Rated frequency	50 Hz (60 Hz on request)
Connection group	Dyn5 or Dyn11 On special request also other connection groups according to IEC or EN standards
Insulation heat resistance class	Class A according to IEC 60085
Temperature rise	Average winding temperature rise: 65 K Increase in oil temperature in the upper layer: 60 K At ambient temperatures in accordance with EN 60076-1, Air temperatures should not exceed: • 20°C average annual temperature • 30°C average daily temperature • 40°C maximum ambient temperature • -20°C minimum ambient temperature For other ambient temperatures we offer transformers with reduced temperature rise (on special order)
Cooling type	ONAN, KNAN
Insulating fluid	Non-inhibited mineral oil in accordance with IEC requirements. On special request: inhibited mineral oil, vegetable oil and cooling esters
Short circuit strength	Transformers withstand thermal and dynamic short-circuit effects on the secondary side in accordance with IEC 60076-5
Noise level	Measurement (sound pressure according to the A LpA correction curve) and calculation (sound power according to the A LwA correction curve) of the acoustic parameters are carried out in accordance with IEC 60076-10. Noise level requirements are in accordance with national recommendations or customer requirements
Place of installation	Indoor or outdoor
HV and LV connections	HV connections: porcelain tubes or connector plugs LV connections: porcelain tubes On request: quick-action cable clamps, bar clamps (terminal lugs), conduit covers, cable boxes
Accessories	• Standard: oil level indicator, pressure relief valve, oil filler, oil drain valve, grounding clamps, lifting eyes, rating plate, chassis with bidirectional wheels • Optional: thermometer with contacts, safety device (DGPT-2 or DMCR), vibration dampers • For version with conservator: Buchholz relay, oil level indicator, dehumidifier

*** 4000-7000 kVA available for photovoltaic applications**

SPHERA DT Fluid-immersed Transformers

Standards

Transformers meet the requirements of the following standards:

- EN 50464-1
- EN 60076-1 to 10
- EU Commission Regulation no. 1783/2019 Producer guarantees that transformers are manufactured from components that do not contain PCBs.

Description

Three-phase fluid-immersed transformers, 50Hz/60Hz, with the following technical parameters:

- Hermetic
- ONAN cooling
- Indoor and outdoor use
- Protective coating - corrosion protection category C3-C5H
- Painted tank (RAL 7033 or other selected by customer)
- Degree of protection IP00
- Copper or aluminium windings

Enhanced insulation

Enhanced insulation strength of LV winding - AC 8kV – as standard.

Standard equipment

- Seven-position or five-position off-load tap changer on the cover
- 3 porcelain insulators on the HV side
- 4 porcelain insulators on LV side with any chosen clamps
- 4 bidirectional wheels
- Transport lugs
- Pulling lugs
- Grounding terminals on cover
- Oil filler and overload valve
- Oil level indicator
- Drain valve
- Nameplate

Optional equipment

- Euromold plug-in on HV side
- Connector plugs on HV side
- TOGA type switching clamps
- Clamp covers on LV side
- DMCR or DGPT2 type protection
- Thermometer pocket
- Two-contact thermometer
- Version with conservator for 800 - 2000 kVA

SPHERA DT Fluid-immersed Transformers

Al/Al losses in accordance with Tier II (2021) of Commission Regulation No. 1783/ 18

Fluid-immersed transformers from 40 to 4000 kVA, insulation level ≤ 24 kV*

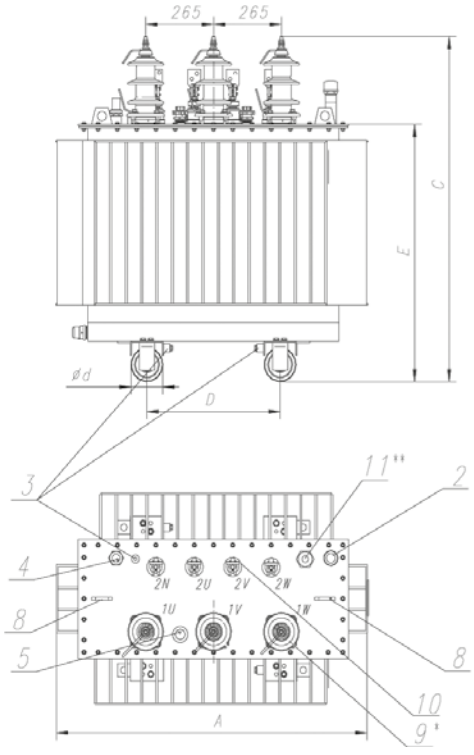
Electrical characteristics

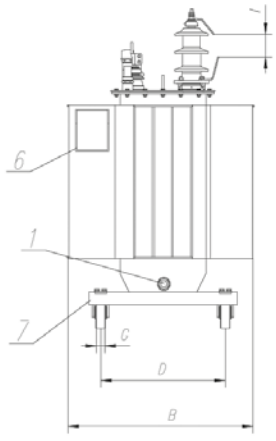
Power (kVA)	40	50	63	100	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500
HV (kV)	6 ÷ 22																
LV (V)	400 or 420																
HV insulation levels (kV)	in accordance with the power grid requirements																
HV tappings (%)	± 2x2,5%																
Connection group	Dyn1, Dyn5, Dyn11 (other to be agreed)																
Maximum losses	Ao-10%Ak																
No-load losses (W)	73	81	93	130	189	225	270	324	387	459	540	585	693	855	1080	1305	1575
Load losses at 75°C (W)	690	750	880	1250	1750	2016	2350	2800	3250	3900	4600	6000	7600	9500	12000	15000	18500
Impedance voltage (%)	4	4	4	4	4	4	4	4	4	4	4 or 6	6	6	6	6	6	6

Dimensions and weight

Power (kVA)	40	50	63	100	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500
Dimensions (mm)																	
A	880	880	990	1040	1100	1150	1220	1240	1250	1260	1490	1520	1570	1670	1680	2160	2300
B	680	680	700	740	760	820	840	870	890	890	950	1010	1030	1080	1310	1350	1370
C	1290	1290	1390	1430	1450	1540	1540	1620	1660	1680	1790	1890	1920	2100	2060	2270	2480
D	420	420	520	520	520	520	520	670	670	670	670	670	820	820	820	1070	1070
E	860	860	920	990	1010	1070	1070	1180	1180	1200	1280	1360	1410	1520	1590	1840	2110
G	40	40	40	40	40	40	40	40	40	40	40	40	40	40	50	70	70
d	125	125	125	125	125	125	125	125	125	125	125	125	125	125	160	200	200
Weight (kg)																	
Oil	110	110	110	140	180	220	240	300	310	390	440	580	710	810	880	1080	1250
Total	510	510	690	880	1050	1210	1400	1610	1840	2200	2610	3350	3690	4260	4940	5840	7260

*** 3150-4000 kVA require the development of an individual quotation**





1	Oil drain valve
2	Oil filler and preasure-relief valve
3	Grounding clamps
4	Oil level indicator
5	Tap changer
6	Nameplate
7	Chassis
8	Transport lugs
9	HV insulators (with spark gap) *
10	LV insulators with terminals
11	Thermometer **

* for voltages 15, 75 & 21 kV
** for power from 800 kVA

Weights and dimensions approximate.

Contractual obligations only apply to the final drawings delivered in response to your order.

SPHERA DT Fluid-immersed Transformers

Cu/Cu losses in accordance with Stage II (2021) of Commission Regulation No. 1783/ 19

Fluid-immersed transformers from 40 to 4000 kVA, insulation level ≤ 24 kV*

Electrical characteristics

Power (kVA)	40	50	63	100	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500
HV (kV)	6 ÷ 22																
LV (V)	400 or 420																
HV insulation levels (kV)	in accordance with the power grid requirements																
HV Tappings (%)	± 2x2,5%																
Connection group	Dyn1, Dyn5, Dyn11 (other to be agreed)																
Maximum losses	Ao-10%Ak																
No-load losses (W)	73	81	93	130	189	225	270	324	387	459	540	585	693	855	1080	1305	1575
Load losses at 75°C (W)	690	750	880	1250	1750	2016	2350	2800	3250	3900	4600	6000	7600	9500	12000	15000	18500
Impedance voltage (%)	4	4	4	4	4	4	4	4	4	4	4 or 6	6	6	6	6	6	6

Dimensions and weight

Power (kVA)	40	50	63	100	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500
Dimensions (mm)																	
A	900	900	900	900	940	980	1030	1090	1140	1260	1340	1500	1460	1680	1810	2000	2070
B	660	680	680	700	700	740	780	820	870	890	930	990	1080	1160	1200	1350	1350
C	1040	1100	1160	1240	1310	1320	1330	1370	1410	1440	1470	1540	1640	1640	1750	2000	2210
D	420	420	520	520	520	520	520	670	670	670	670	670	820	820	820	1070	1070
E	740	750	760	800	920	950	980	980	1000	1000	1010	1120	1180	1240	1380	1510	1750
G	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	50	50
d	125	125	125	125	125	125	125	125	125	125	125	125	125	125	125	160	160
Weight (kg)																	
Oil	90	95	100	110	140	150	160	200	240	270	300	350	430	470	570	690	1070
Total	460	510	580	720	880	950	1150	1390	1630	1980	2330	2620	3160	3310	3880	5150	6210

*** 3150-4000 kVA requires the development of an individual quotation**

Approximate weights and dimensions

If the value of any electrical parameter (HV, LV , uk%, connection group, extra voltage, etc.) exceeds the values given in the tables, then the weight of the transformer and its dimensions will also change. In this case, it is recommended that you contact a Mefta Green Transfo representative

SPHERA DT Fluid-immersed Transformers

Al/Al losses in accordance with Stage II (2021) of Commission Regulation No. 1783/2019 for use in photovoltaic installations

Fluid-immersed transformers with capacities from 400 to 7000 kVA, insulation level ≤ 24 kV*

Electrical characteristics

Power (kVA)	400	500	630	800	1000	1250	1600	2000	2500
HV (kV)	15 ÷ 22								
LV (V)	800								
HV insulation levels (kV)	in accordance with the power grid requirements								
Tappings (%)	± 2x2,5%								
Connection group	Dyn1, Dyn5, Dyn11 (other to be agreed)								
Maximum losses	Ao-10%Ak								
No-load losses (W)	387	459	540	585	693	855	1080	1305	1575
Load losses at 75°C (W)	3250	3900	4600	6000	7600	9500	12000	15000	18500
Impedance voltage (%)	4	4	4 or 6	6	6	6	6	6	6

Dimensions and weight

Power (kVA)	400	500	630	800	1000	1250	1600	2000	2500
Dimensions (mm)									
A	1260	1290	1350	1340	1370	1460	1730	1860	1950
B	840	860	900	920	1000	1060	1060	1280	1280
C	1600	1600	1620	1760	1820	1900	1980	2160	2180
D	670	670	670	670	820	820	820	1070	1070
E	1210	1210	1230	1370	1430	1510	1580	1790	1780
G	40	40	40	40	40	40	40	50	50
d	125	125	125	125	125	125	125	160	160
Weight (kg)									
Oil	355	375	430	480	550	655	680	900	930
Total	1680	1820	2170	2580	2940	3500	3640	4810	5070

*** 3150-7000 kVA requires the development of an individual quotation**

Approximate weights and dimensions

Contractual obligations only apply to the final drawings delivered in response to your order.

If the value of any electrical parameter (HV, LV , uk%, connection group, extra voltage, etc.) exceeds the values given in the tables, then the weight of the transformer and its dimensions will also change. In this case, it is recommended that you contact Mefta Green Transfo representative.

Distribution resin transformers in the power range up to 6000 kVA - 36 kV

Transformer key features

Customers around the world are demanding green solutions for their transmission networks that are not only safe for their employees, but also for the environment. With the current emphasis on improving environmental impact and protecting the earth's natural resources, Mefta Green Transfo's contribution lies in the production of safe and environmentally friendly resin transformers of our design RESICAST.

Our product range also includes TRIHAL cast resin transformers that are manufactured under the licence agreement with former owner Schneider Electric.

High quality and reliability make resin transformers the right equipment for infrastructural projects such as transmission and distribution stations, public buildings and high-rise developments. Resin transformers are also ideal for special installations, photovoltaic farm rectifier units, utility power plants.

Resin transformers - safe and environmentally friendly solution

Our range of resin transformers meets all your requirements for distribution transformers. These transformers are available as three-phase units. They are made in a wide range of parameters. Rated output up to 6000 kVA and 36 kV, 50/60 Hz with natural AN cooling for continuous operation in enclosed spaces (with AF cooling options).

Quality assurance

Our transformer production facilities are certified to ISO 14001, ISO 9001, ISO 45001. After manufacture, each transformer undergoes product testing at a certified test station.

Transformer key features

Ecological

Since environmental protection is a very important issue for us, our products are designed to help you meet the latest environmental standards introduced by governments, national and international institutions. By using a resin transformer, the risk of leakage of flammable substances or pollutants is eliminated.

For the modern world

Minimizing the space requirements needed to install a transformer and the associated construction costs is now an important factor found in most construction projects. Whether dealing with a new downtown office building, an expansion of an industrial process or a wind farm project, compact transformer design is becoming a necessary but also cost-effective solution. The one-of-a-kind vacuum-cast HV coils and the advanced technology used for LV windings provide transformers with the reliability and operational characteristics needed for high-tech applications.

PRODUCT TESTING

Standard and dielectric tests

- Winding resistance
- Voltage ratio and connection group
- No-load losses and no-load current
- Impedance voltage
- Load losses
- Dielectric testing
- Partial discharge test

Type tests

In addition to basic tests, the following type tests can be carried out at Mefta Green Transfo laboratories on special request: lightning impulse test and heat-run test.

Special tests

Noise level testing can also be carried out at our laboratory upon request. Other tests to be arranged.

Specifications

Magnetic core

The core of the transformer is made of magnetic sheet steel insulated on both sides and with low loss. The step-lap method of stacking was chosen to minimize both core loss and transformer no-load current. The surface of the core is protected from corrosion by an insulating varnish resistant to high temperature. The use of insulating varnish and a suitable core mounting design ensures a low noise level of the running transformer.

LV winding

LV winding is made of aluminum or copper strip and high-quality thermohardening insulation. The winding design provides very good dielectric strength, including high lightning impulses resistance and very good short-circuit strength. To improve cooling in the LV winding, vertical ventilation ducts can be used.

HV winding

The HV winding is made from strips or aluminum/copper wires and epoxy resin. The wound winding is placed in a mold and casted with resin under vacuum. The resin is reinforced with glass fiber, which significantly improves mechanical stability during thermal overload and improves shock resistance.

Assembly of HV/LV

The windings are mounted on the core concentrically. The LV winding is attached directly to the core, while the HV winding is spaced by spacers, which also work as shock absorbers to compensate thermal expansion of the windings. This arrangement ensures structural stability and avoids the risk of the windings shifting during transport and installation.

Resin Transformers

DISTRIBUTION RESIN TRANSFORMERS	VACUUM TECHNOLOGY
Rated power	Up to 6000 kVA
Insulation levels	According to EN IEC 60076-11 for voltages U M=1.1 - 3.6 - 7.2 - 12 - 17.5 - 24 - 36 kV
Phases	3-phase (1-phase available optionally)
Range of adjustment	±2x2.5% (other adjustment available optionally)
Voltage regulation	In off-voltage state
Rated primary/secondary voltage	6.3 kV to 31.5 kV / 280 V to 800 V (standard 400, 420 V)
Impedance voltage	U_k=6% (another U_k level optionally available)
Rated frequency	50 Hz (60 Hz on request)
Connection group	Dyn1, Dyn5, Dyn11 On request also other connection groups according to IEC or EN standards
Thermal insulation class	Class F or Class H
Temperature rise	Permissible winding temperature rise is 100 K for Class F, and 125 K for Class H. Reduced levels of winding temperature rise are possible on special request. At ambient temperatures in accordance with EN 60076-1, air temperatures should not exceed: • 20°C average annual temperature • 30°C average monthly temperature • 40°C maximum ambient temperature • -25°C minimum ambient temperature Other levels of permissible ambient temperatures are possible on special request.
Cooling type	AN, AN/AF
Enclosures	Degree of protection: IP20, IP21, IP23, IP31, or other on request
Short circuit strength	Transformers withstand thermal and dynamic short-circuit effects in accordance with EN 60076-5.
Partial discharges	< 10pC, measurements carried out for each transformer in a test chamber in accordance with EN IEC 60076-11
Noise level	Measurement of the sound pressure Lp(A) and calculation of the sound power Lw(A) are carried out in a test chamber in accordance with EN 60076-10. Noise level values are in accordance with the requirements of the standard or customer guidance.
Place of installation	Internal, up to an altitude of 1,000 m as standard.
HV and LV connections	HV connections: made with cables. LV connections: made with cables or busbar bridge.
Accessories	• Standard: PTC temperature sensors + two-stage protection, chassis with bidirectional wheels, 2 earthing terminals. • Optional: PT 100 sensors + protection with programmable temperature thresholds for tripping the protection and visualisation of the measured temperature values, possible analogue 4-20mA output or digital RS485 Modbus, as well as temperature monitoring of MV coils, on request cooling system in the form of a fan unit with control system, surge arresters on the LV and MV side, anti-vibration pads under the wheels.

Resin Transformers

Design

Transformers are made in accordance with:
- EN 60076-11
- EN 50588-1

Level of loss according to:
- EN 50708-2-1 and EN 50708-3-1
- EU Commission Regulation 1783/2019

Partial discharges level:
- ≤ 10pC

Enhanced insulation resistance of LV windings - AC 10kV as standard

Description for standard version

Dry resin distribution transformer in standard version, 50Hz, 3-phase with the following parameters:
- Indoor design
- Thermal insulation Class F - permissible winding temperature rise 100K
- Maximum ambient temperature 40°C
- Installation altitude ≤1000m
- HV vacuum casted resin windings
- Natural cooling (AN)
- Core and frame protected against corrosion by painting

Standard equipment:

Transformer without enclosure (IP00):
- Off-voltage tap changer on the HV side
- 4 bidirectional wheels
- 4 holes for transport and lifting
- 2 earthing terminals
- 6 PTC sensors and temperature protection
- Nameplate
- Operating manual, dimension drawing, test report and warranty card

Transformer with enclosure (IP31):
- IP31 enclosure (enclosure base: IP21)
- 2 lifting lugs
- Access to tap changer and terminals after removing the panels
- Standard enclosure colour RAL7035
- Equipment as for IP00

Optional equipment:

- PT100 sensors and temperature protection relay (different kinds are available)
- Fans allowing periodic overloading of up to 40%
- Surge arresters, earthing terminals for service, wheel vibration pads
- Plug-in terminals
- Other type of enclosures (IP20,IP21 or IP23)

Al/Al losses in accordance with Tier II (2021) of Commission Regulation No. 1783/2019

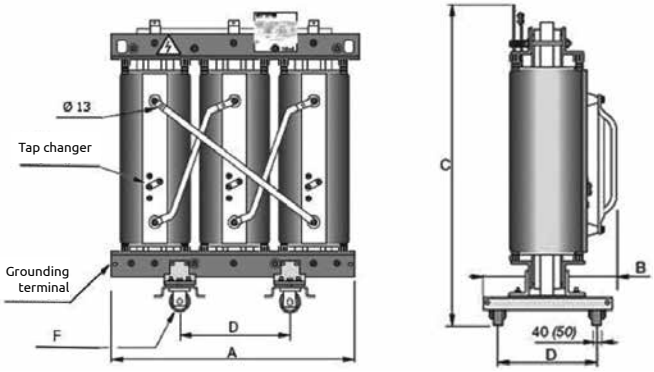
Resin transformers with capacities from 250 to 6000 kVA, insulation level ≤ 24 kV

Electrical characteristics

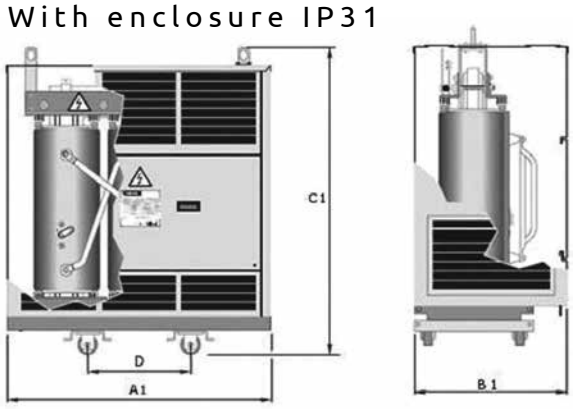
Power (kVA)	250	400	630	800	1000	1250	1600	2000	2500	3150-6000
HV (kV)	6 ÷ 22									
LV (V)	400 or 420									
HV insulation levels (kV)	7,2 ÷ 24									
Voltage resistance HV (kV) Voltage resistance LV (kV)	in accordance with the power grid requirements min. AC-10									
Tappings (%)	± 2 x 2,5 (in off-voltage state)									
Connection group	Dyn1, Dyn5 lub Dyn11 (other to be agreed)									
Maximum losses	Ao-10%Ak									Upon request
No-load losses (W)	468	675	990	1170	1395	1620	1980	2340	2790	
Load loss at 120°C (W)	3400	4500	7100	8000	9000	11000	13000	16000	19000	
Impedance voltage (%)	6	6	6	6	6	6	6	6	6	
THDi (%)	≤5	≤5	≤5	≤5	≤5	≤5	≤5	≤5	≤5	

Dimensions and weight

Without enclosure IP00



With enclosure IP31



Power (kVA)		250	400	630	800	1000	1250	1600	2000	2500	3150-6000
Without enclosure IP00											
Dimensions	- A (length)	1305	1420	1540	1605	1640	1760	1800	1900	2025	Upon request
(mm)	- B (width)	725	815	820	835	945	945	950	1195	1195	
	- C (height)	1345	1435	1625	1775	1940	1830	2010	2120	2190	
	- D (roller distance)	520	520	670	670	820	820	820	1070	1070	
Weight (kg)		1165	1550	1900	2270	2705	3190	3825	4600	5660	
With enclosure IP31											
Dimensions	- A1 (length)	1710	1800	1900	1930	1960	2150	2140	2270	2360	Upon request
(mm)	- B1 (width)	990	1020	1100	1060	1070	1170	1140	1230	1230	
	- C1 (height)	1740	2050	2300	2170	2320	2480	2400	2580	2670	
	- D (roller distance)	520	520	670	670	820	820	820	1070	1070	
Weight total (kg)		1460	1810	2180	2620	3020	3510	4250	5060	6120	

Weights and dimensions approximate.

Contractual obligations only apply to the final drawings delivered in response to your order.
If the value of any electrical parameter (HV, LV , uk%, connection group, extra voltage, etc.) exceeds the values given in the tables, then the weight of the transformer and its dimensions will also change. In this case, it is recommended that you contact Mefta Green Transfo representative.

Cu/Cu losses in accordance with Tier II (2021) of Commission Regulation No. 1783/2019

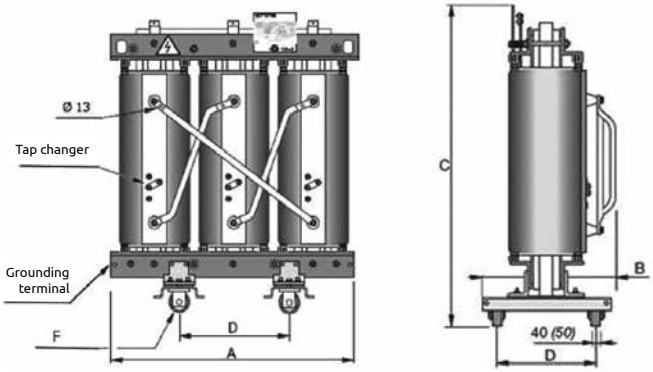
Resin transformers from 250 to 6000 kVA, insulation level ≤ 24 kV

Electrical characteristics

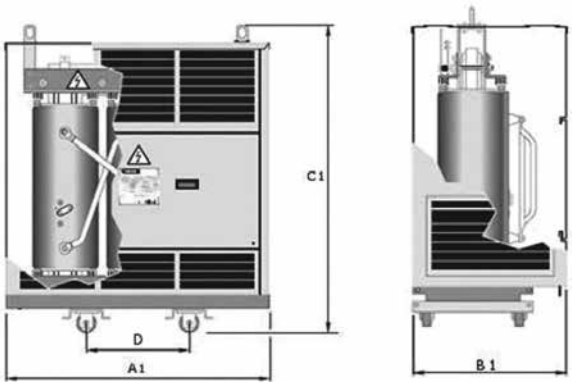
Power (kVA)	250	400	630	800	1000	1250	1600	2000	2500	3150-6000
HV (kV)	6 ÷ 22 kV									
LV (V)	400 or 420									
HV insulation levels (kV)	7,2 ÷ 24									
Voltage resistance HV (kV) Voltage resistance LV (kV)	in accordance with the power grid requirements min. AC-10									
Tappings (%)	± 2 x 2,5 (in off-voltage state)									
Connection group	Dyn1, Dyn5 lub Dyn11 (other to be agreed)									
Maximum losses	Ao-10%Ak									Upon request
No-load losses (W)	468	675	990	1170	1395	1620	1980	2340	2790	
Load loss at 120°C (W)	3400	4500	7100	8000	9000	11000	13000	16000	19000	
Impedance voltage (%)	6	6	6	6	6	6	6	6	6	
THDi (%)	≤5	≤5	≤5	≤5	≤5	≤5	≤5	≤5	≤5	

Dimensions and weight

Without enclosure IP00



With enclosure IP31



Power (kVA)		250	400	630	800	1000	1250	1600	2000	2500	3150-6000
Without enclosure IP00											
Dimensions	- A (length))	1210	1310	1390	1500	1530	1550	1740	1770	1810	Upon request
(mm)	- B (width))	670	800	800	800	950	950	950	1230	1230	
	- C (height))	1330	1380	1420	1590	1740	1900	1960	2150	2170	
	- D (roller distance)	520	520	670	670	820	820	820	1070	1070	
Weight (kg)		1210	1510	1830	2340	2730	3220	4090	4690	5330	
With enclosure IP31											
Dimensions	- A1 (length)	1710	1810	1890	1870	1930	1950	2040	2070	2090	Upon request
(mm)	- B1 (width)	890	1010	1000	1060	1170	1170	1170	1470	1510	
	- C1 (height)	1830	1700	1780	1950	2060	2270	2290	2470	2440	
	- D (roller distance)	520	520	670	670	820	820	820	1070	1070	
Weight total (kg)		1400	1750	2050	2590	2990	3540	4490	5120	6090	

Weights and dimensions approximate.

Contractual obligations only apply to the final drawings delivered in response to your order.
If the value of any electrical parameter (HV, LV , uk%, connection group, extra voltage, etc.) exceeds the values given in the tables, then the weight of the transformer and its dimensions will also change. In this case, it is recommended that you contact Mefta Green Transfo representative.

Al/Al losses in accordance with Tier II (2021) of Commission Regulation No. 1783/2019 for use in photovoltaic installations

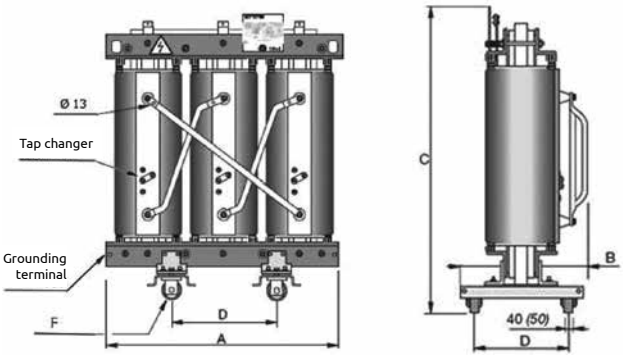
Resin transformers with capacities from 250 to 6000 kVA, insulation level ≤ 24 kV

Electrical characteristics

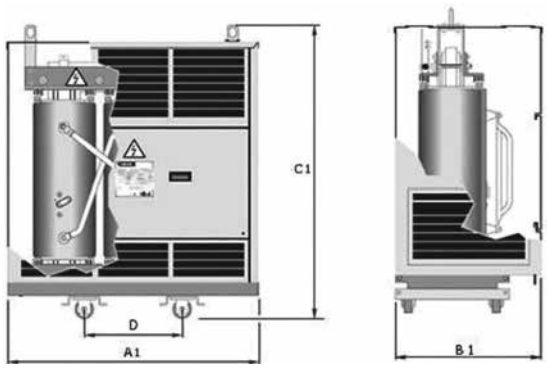
Power (kVA)	250	400	630	800	1000	1250	1600	2000	2500	3150-6000
HV (kV)	15 ÷ 22									
LV (V)	800									
HV insulation levels (kV)	17,5 ÷ 24									
Voltage resistance HV (kV)	in accordance with the power grid requirements									
Voltage resistance LV (kV)	min. AC-10									
Tappings (%)	± 2 x 2,5 (in off-voltage state)									
Connection group	Dyn1, Dyn5 lub Dyn11 (other to be agreed)									
Maximum losses	Ao-10%Ak									Upon request
No-load losses (W)	468	675	990	1170	1395	1620	1980	2340	2790	
Load loss at 120°C (W)	3400	4500	7100	8000	9000	11000	13000	16000	19000	
Impedance voltage (%)	6	6	6	6	6	6	6	6	6	
THDi (%)	5	5	5	5	5	5	5	5	5	
THDu (%)	8	8	8	8	8	8	8	8	8	
HV/LV screen	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	

Dimensions and weight

Without enclosure IP00



With enclosure IP31



Power (kVA)		250	400	630	800	1000	1250	1600	2000	2500	3150-6000
Without enclosure IP00											
Dimensions	- A (length)	1320	1450	1440	1530	1630	1680	1740	1820	1960	Upon request
(mm)	- B (width)	700	800	800	810	950	950	950	1230	1230	
	- C (height)	1390	1500	1710	1870	1910	1930	2080	2160	2220	
	- D (roller distance)	520	520	670	670	820	820	820	1070	1070	
Masa (kg)		1160	1650	1870	2340	2730	3070	3640	4240	5120	
Z obudową IP31											
Wymiary	- A1 (length)	1640	1840	1840	1840	2090	2090	2090	2340	2340	Upon request
(mm)	- B1 (width)	1030	1030	1030	1030	1180	1180	1180	1280	1280	
	- C1 (height)	1900	2150	2150	2150	2330	2330	2330	2700	2700	
	- D (roller distance)	520	520	670	670	820	820	820	1070	1070	
Weight total (kg)		1320	1820	2050	2510	2970	3300	3870	4530	5410	

Weights and dimensions approximate.

Contractual obligations only apply to the final drawings delivered in response to your order.
If the value of any electrical parameter (HV, LV , uk%, connection group, extra voltage, etc.) exceeds the values given in the tables, then the weight of the transformer and its dimensions will also change. In this case, it is recommended that you contact Mefta Green Transfo representative.

Resin Transformers RESIGLAS

RESIGLAS Resin Transformers

Our offer also includes RESIGLAS cast resin transformers with HV coils manufactured using wet winding (roving) technology.

The high-voltage windings in these transformers are built in layers using a wet method. They are made from alternating layers of copper or aluminum wires and fiberglass (roving) soaked with epoxy resin. The fiberglass makes up about 60%–70% of the total material. The fiberglass strips are placed both along and across the coil. This creates a strong mesh structure that gives the coil very high mechanical strength. Thanks to this, the coils are resistant to cracks caused by temperature changes during varying transformer loads. That's why these transformers are ideal for applications where load changes and overloads are frequent, such as rectifier systems, tram or metro traction systems, or flameproof mining stations.

RESIGLAS Resin Transformers for Rectifier Systems

These transformers have two or three windings and are designed to supply 6-pulse or 12-pulse rectifiers. Each transformer is specially designed to handle the additional heat caused by current harmonics flowing through the windings.

RESIGLAS Resin Transformers for Mining Stations

These transformers are built to work inside flameproof enclosures in underground mines. They are made to be low in height and to have a low temperature rise, so that the windings stay within safe temperature limits even when enclosed. They are designed in temperature class H, which means the winding temperature can go up to 180°C.

Examples of our projects

No.	Company	Location
1.	AVON	WARSAW
2.	NEW UNIVERSITY HOSPITAL	KRAKOW
3.	"SOKOŁÓW" JOINT STOCK COMPANY	JAROSŁAW
4.	3M WROCŁAW	WROCŁAW
5.	AFLOFARM	PABIANICE
6.	AGATA MEBLE	GORZÓW WLKP.
7.	**ACADEMY OF MINING AND METALLURGY**	**KRAKOW**
8.	**ARCELORMITTAL POLAND S.A.**	**KRAKOW**
9.	ARKADIA	WARSAW
10.	ATLAS SP. Z O.O.	RASZKOW
11.	BRIDGESTONE POZNAŃ SP. Z O.O.	POZNAŃ
12.	BUMA "BŁONIA PARK"	KRAKOW
13.	BUSINESS GARDEN POZNAŃ 2	POZNAŃ
14.	**CATERPILLAR POLAND SP. Z O.O.**	**JANÓW LUBELSKI**
15.	CEMENTOWNIA WARTA S.A.	DZIAŁOSZYN
16.	ONCOLOGY CENTRE IN WARSAW	WARSAW
17.	CMC POLAND	ZAWIERCIE
18.	DAF	KRAKOW
19.	DELPHI	BŁONIE
20.	DĘBICA S.A.	DĘBICA
21.	DR. OETKER	GNIEWOMIERZ
22.	**EDF POLSKA BRANCH IN KRAKOW**	**KRAKOW**
23.	**EDF RYBNIK**	**RYBNIK**
24.	**CHP PLANT**	**GDYNIA**
25.	**CHP PLANT BĘDZIN S.A.**	**BEDZIN**
26.	**ELEKTROCIEPŁOWNIA ZPC ŻORY**	**ORNONTOWICE**
27.	**JAWORZNO POWER PLANT**	**JAWORZNO**
28.	**OPOLE POWER PLANT**	**BRZEZIE K/OPOLA**
29.	**OSTROŁĘKA POWER PLANT**	**OSTROŁĘKA**
30.	**TURÓW POWER PLANT**	**BOGATYNIA**
31.	**HYDROPOWER PLANT**	**GŁĘBINÓW**
32.	EUROGLAS POLSKA SP. Z O.O.	UJAZD
33.	BARRY CALLEBAUT FACTORY	ŁÓDŹ
34.	VELUX WINDOW FACTORY	NAMYSŁÓW
35.	PAPER MILL CZERWONAK SP. Z O.O.	CZERWONAK
36.	SOPEM ENGINE FACTORY	NIEPOŁOMICE
37.	FAN FACTORY "FAWENT" S.A	CHEŁM ŚLĄSKI
38.	FAURECIA	JELCZ LASKOWICE
39.	FENICE POLAND SP. Z O.O. FIAT	BIELSKO-BIAŁA
40.	FIAT AUTO POLAND S.A.	TYCHY
41.	FOSTER WHEELER/ FORTUM ZABRZE	ZABRZE
42.	FUCHS OIL CORPORATION	GLIWICE
43.	GALERIA PÓŁNOCNA	WARSAW
44.	GEBERIT	OZORKÓW
45.	GOODRICH AEROSPACE POLAND (GAP)	JASIONKA
46.	GÓRAŻDŻE CEMENT S.A.	GÓRAŻDŻE
47.	GRUPA AZOTY ZAKŁADY	POLICE
48.	PENDOLINO TEST HALL	CHORZÓW
49.	HOOP POLSKA SP. Z O.O.	KUTNO
50.	HOTEL EUROPEJSKI	WARSAW
51.	HOTEL PURO	KRAKOW
52.	HOTEL PURO	WARSAW
53.	**HOTEL SHERATON**	**WARSAW**
54.	ZINC MILL	MIASTECZKO ŚLĄSKIE
55.	GLASSWORKS CZECHY S.A	TRĄBKI
56.	ŻARY GLASSWORKS	ZARY
57.	HUTA ZABRZE S.A	ZABRZE
58.	**IKEA INDUSTRY POLAND SP. Z. O.O.**	**LUBAWA**
59.	ING BANK ŚLĄSKI	KATOWICE
60.	**JASTRZĘBSKA SPÓŁKA WĘGLOWA S.A.**	**SUSZEC**
61.	JOHNSON CONTROL ŻORY	ŻORY
62.	JOST CHEMICAL	KOŚCIAN
63.	**KGHM POLSKA MIEDŹ S.A.**	**LEGNICA**
64.	RADLIN COKING PLANT	RADLIN
65.	"BARBARA" EXPERIMENTAL MINE	MIKOŁÓW
66.	AGGREGATES MINE ZATOR	ZATOR-SMOLICE
67.	LIMESTONE MINE	KRZESZOWICE
68.	KRONOSPAN	STRZELCE OPOLSKIE
69.	KWK BOGDANKA	PUCHACZÓW
70.	KWK MARCEL	RADLIN
71.	KWK RUDA RUCH BIELSZOWICE	RUDA ŚLĄSKA
72.	LAFARGE CEMENT S.A	PIECHOCIN
73.	LEROY MERLIN	JABŁONNA
74.	LIBERO	KATOWICE
75.	LUMEN POLSKA SP. Z O.O.	WROCŁAW
76.	**MENNICA TOWER**	**WARSAW**
77.	MERCUS LOGISTYKA SP. Z O.O.	POLKOWICE
78.	**WARSAW METRO**	**WARSAW**
79.	METROPOLIA	GDAŃSK
80.	MLEKOVITA	LUBAWA
81.	MLEKPOL W MRĄGOWIE DLA	MRĄGOWO
82.	MUBEA AUTOMOTIVE POLAND SP. Z O.O.	UJAZD
83.	**MUSEUM OF JOZEF PIŁSUDSKI**	**SULEJÓWEK**
84.	NESTLE	NOWA WIEŚ WROCŁAWSKA
85.	NEWAG	NOWY SĄCZ
86.	NORDGLASS SP. Z O.O.	SŁUPSK
87.	NSK BEARINGS SPARK	KIELCE
88.	TREATMENT PLANT „WARTA" S.A.	CZĘSTOCHOWA
89.	TREATMENT PLANT ZABRZE	ZABRZE
90.	**ORLEN SA**	**PŁOCK**
91.	**PANATTONI EUROPE**	
92.	**PARK OF POLAND**	**WRĘCZA**
93.	**WATER PARK IN TYCHY**	**TYCHY**
94.	POLMLEK	LIDZBARK WARMIŃSKI
95.	POLMOTORS	BIELSKO-BIAŁA
96.	PROMENADA	WARSAW
97.	ROCKWELL	KATOWICE
98.	ROSSMANN	ŁÓDŹ
99.	SAINT-GOBAIN	DĄBROWA GÓRNICZA
100.	SANOK RUBBER COMPANY S.A.	SANOK
101.	**SEJM**	**WARSAW**
102.	SEMPERTRANS BEŁCHATÓW SP. Z O.O.	ROGOWIEC
103.	SILESIA CITY CENTER	KATOWICE
104.	STORA ENSO POLAND S.A.	TYCHY
105.	**HCP HOSPITAL IN POZNAŃ**	**POZNAŃ**
106.	**MSWIA CLINICAL HOSPITAL**	**WARSAW**
107.	**PROKOCIM HOSPITAL**	**KRAKOW**
108.	TYMBARK	OLSZTYNEK
109.	TYSKIE BROWARY KSIĄŻĘCE - KOMPANIA	TYCHY
110.	VALEO LIGHTING SYSTEM	CHRZANÓW
111.	WHIRPOOL POLSKA SP. Z O.O.	WROCŁAW
112.	VOIVODSHIP HOSPITAL IN TARNOBRZEG	TARNOBRZEG
113.	VOIVODSHIP SPECIALISED HOSPITAL	KRAKOW
114.	**HYDROPOWER STATION COMPLEX**	**MIĘDZYBRODZIE BIALSKIE**
115.	**SKI CENTRE ZŁOTY GROŃ**	**ISTEBNA**

Examples of our projects

No.	Company	Town	Country
1.	DISNEYLAND	PARIS	FRANCE
2.	SNCF	CRÉTEIL	FRANCE
3.	CASTROL	GHENT	BELGIUM
4.	HONDA AALST	AALST	BELGIUM
5.	ARCELORMITTAL MAGASIN GENERAL - DB1	FOS SUR MER	FRANCE
6.	USINE ROCKWOOL	COURMELLES	FRANCE
7.	JYSK ENERGI TEKNIK A/S	HOLSTEBRO	DENMARK
8.	DHOLLANDIA	PREDMIER	SLOVAKIA
9.	PORT DE MARSEILLE	MARSEILLE	FRANCE
10.	POSTE HTB DE BOIS PRINCE	YMONVILLE	FRANCE
11.	CONFORAMA	SOYAUX	FRANCE
12.	SNCF-TECHNICENTRE 221100115	SOTTEVILLE LES ROUEN	FRANCE
13.	POSTE HTB BOIS PAILLET	LES VILLAGES VOVEENS	FRANCE
14.	COPLAND SA	SAMADET	DENMARK
15.	POSTE SOURCE DE BEAUNE	BEAUNE LA ROLANDE	FRANCE
16.	RESIDENCE UNIVERSITAIRE LAENNEC	LYON	FRANCE
17.	AEROPORT CARCASSONNE/CH. SPIE	CARCASSONNE	FRANCE
18.	CLINIQUE MONTREAL	CARCASSONNE	FRANCE
19.	ADEKMA LEVAGE MANUTENTION	CARQUEFOU	FRANCE
20.	ALLIANZ	PARIS	FRANCE
21.	PORT GALLICE	JUAN LES PINS	FRANCE
22.	CAMPING HUTTOPIA	ARCACHON	FRANCE
23.	HOTEL HILTON NAOS	DIJON	FRANCE
24.	BNP PARIBAS	MERIGNAC	FRANCE
25.	UNIVERSITE CLAUDE BERNARD LYON	LYON	FRANCE
26.	CAMPUS AQUEDUC	GENTILLY	FRANCE
27.	COFRA TRAVAUX POSTE	AIGUILLON	FRANCE
28.	PORT DE MARINA	VILLENEUVE LOUBET	FRANCE
29.	UNIVERSITE DE BOURGOGNE	DIJON	FRANCE
30.	CAMPUS AQUEDUC	GENTILLY	FRANCE
31.	CENTRE HOSPITALIER SAINT OMER	HELFAUT	FRANCE
32.	PORT DE MARINA	VILLENEUVE LOUBET	FRANCE
33.	HOTEL SCHUMAN	AIX EN PROVENCE	FRANCE
34.	ACADEMY CMA CGM	MARSEILLE	FRANCE
35.	CLINIQUE BORDEAUX NORD	BORDEAUX	FRANCE
36.	HOTEL LES RIVAGES ZOO DE BEAUVAL	SAINT AIGNAN SUR CHER	FRANCE
37.	PORT DE MARINA	VILLENEUVE LOUBET	FRANCE
38.	CLINIQUE LA SALETTE	MARSEILLE-Z.I. LA CAPELETTE	FRANCE
39.	PORT DE MARINA	VILLENEUVE LOUBET	FRANCE
40.	AÉROPORT INTERNATIONAL DE GENÈVE	GENÈVE	SWIZER-LAND
41.	J&M LOGISTICS	BIERNE	FRANCE
42.	DHL GLOBAL FORWARDING FRANCE	BIERNE	FRANCE
43.	POSTE SOURCE DE FURIANI	FURIANI	FRANCE
44.	CLINIQUE STER	SAINT CLEMENT DE RIVIERE	FRANCE
45.	BAHNHOF HOERDE	DORTMUND	GERMANY
46.	GLOBAL SWITCH	FRANKFURT AM MAIN	GERMANY
47.	COLLEGE ANATOLE FRANCE	LIMOGES	FRANCE
48.	AIRBUS	MONTOIR DE BRETAGNE	FRANCE
49.	COLLEGE GUY MARESCHAL	AMIENS	FRANCE
50.	COLLEGE EDOUARD LUCAS	AMIENS	FRANCE
51.	HOPITAL DE HAUTEPIERRE CHU	STRASBOURG	FRANCE
52.	AVENEL	DARNETAL	FRANCE
53.	POSTE DE RINGO	BELLAC	FRANCE
54.	HOTEL MUTIGNY	MUTIGNY	FRANCE
55.	HOTEL LES ROCHES	LE LAVANDOU	FRANCE
56.	E.LECLERC	SEDAN	FRANCE
57.	AEROPORT CHATEAUROUX	DEOLS	FRANCE
58.	HOPITAL PAUL BROUSSE - POUR AMICA	VILLEJUIF	FRANCE
59.	CREDIT AGRICOLE	NIMES	FRANCE
60	LECLERC	SAINT PRIEST EN JAREZ	FRANCE
61.	HOPITAL SAINT PHILIBERT	LOMME	FRANCE
62.	DHL GLOBAL FORWARDING FRANCE	CRAYWICK BP99	FRANCE
63.	AEROPORT INTERNATIONAL	COTONOU	BENIN
64.	HOTEL RIVIERA SUITES/CH. MIE	NICE	FRANCE
65.	POSTE BARBUSSE CHANTIER S.F.I.E.E.	PARAY-VIEILLE--POSTE	FRANCE
66.	PARC EXPO CHANTIER INEO	PEROLS	FRANCE
67.	CLINIQUE THIERS	BORDEAUX	FRANCE
68.	HOTEL DES CARMES,ZD: COURS ST LOUIS	BORDEAUX	FRANCE
69.	AEROPORT DE DEAUVILLE NORMANDI	SAINT GATIEN DES BOIS	FRANCE
70.	KNAUF CHANTIER LA MAINTENANCE	DAINVILLE	FRANCE
71.	INTERMARCHE CHANTIER MASSELIN	EQUEMAUVILLE	FRANCE
72.	COLLEGE WILLIAM CLASSEN	AILLY SUR NOYE	FRANCE
73.	COLLEGE EUGENE LEFEBVRE	CORBIE	FRANCE
74.	CINEMA PATHE DIJON	DIJON	FRANCE
75.	INTERMARCHE (CHANTIER TSV)	SEYSSINS	FRANCE
76.	HOPITAL CHU NORD	SAINT PRIEST EN JAREZ	FRANCE
77.	CINEMA UGC ISSY COEUR DE VILLE	ISSY LES MOULI-NEAUX	FRANCE
78.	CAMPING HUTTOPIA / CH. PIERAUT	ROYAT	FRANCE

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