

# Resiglas

Dry Cast Resin Transformer

Up to 5.5 MVA - 36kV

Distribution Transformer



# Resiglas



Network users around the world seek solutions that are not only reliable and safe during operation, but are also environmentally friendly.

Nowadays much attention is paid to minimise the negative impact on environment and to maintain the Earth's natural resources.

Schneider Electric wants to meet such expectations by manufacturing products that are safe and environmentally friendly. High quality and reliability make Resiglas transformers ideal solutions for investment projects such as: transformer stations, production plants or public use buildings (shopping centres, subway, etc.)

Resiglas transformers are equipped with UV coils reeled using "wet" technology; the product itself is made of non-flammable and fire retardant materials. Therefore, it is perfect for application where the use of other types of transformers is impossible because of safety and difficult working conditions, e.g. in industrial installations susceptible to fire hazards. Additionally, it is suitable for internal use as a substitute for oil transformers.

## Resiglas - A safe and environmentally friendly solution

Resiglas cast resin transformers comply with all the necessary technical requirements. They are available as 3-phase units (or 1-phase at special Customer request).

Power: to 5.5 MVA, voltage: to 36 kV, frequency: 50/60 Hz. Transformers are equipped with natural air cooling for continuous indoor use or forced air cooling, with normal or lowered level of losses and noise.

## Customer Benefits

- Low noise level
- High resistance to insulation dampening - full airtight sealing of LV and UV windings
- High dielectrical resistance
- Non-flammable and fire retardant insulation
- Designed for professional power industry and individual consumers
- Space optimisation

Resiglas transformers are produced in accordance with the requirements of IEC standards, specific national standards and GOST requirements

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## Safety and Reliability, always essential

In order to ensure full compliance with all national and international standards, Resiglas cast resin transformers were subject to the most demanding tests. Thanks to successful test results, transformers may be characterised as follows:

- C2 - resistance to thermal shocks.
- Resiglas transformers withstand large changes in load and overload. Measurements show a very low level of partial discharges - <math><10\text{pC}</math> on average
- E2 - resistance to environment corrosivity. Transformers can work in polluted atmosphere and at high moisture content.
- F0 or F1 – fire retardant or non-flammable and self-extinguishing. During combustion at high temperatures transformers do not emit noxious gases and do not maintain combustion process after removal of fire source.

Resiglas products are the best solution for public safety, for uses both in factories susceptible to fire hazards and public use buildings (visited by thousands people per day).

## Environmentally friendly

In view of the fact that environmental protection is currently one of key aspects of our life, we design our products in such a way as to comply with the latest guidelines for environmental protection and meet the requirements introduced by the national and international provisions.

Resiglas cast resin transformers are made of non-flammable and fire retardant materials, and thus are devoid of risk of leakage of flammable or contaminated substances. With the use of high quality non-toxic materials the components are designed so as to optimise their re-processing. This is the best solution to replace transformers containing PCB.





Schneider Electric  
know-how guarantees  
the best transformers



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## Resiglas for a modern world

Minimisation of space costs and requirements is a key aspect in preparing construction designs. Regardless of whether the product is used in a new office building, city centre, to increase industrial area or wind farm, Resiglas project provides the desired solution.

Advanced technology used in the process of production of UV windings guarantees that Resiglas transformers are reliable and have operational characteristics necessary in technologically advanced applications, required parameters and the best quality of energy resources.

## Guaranteed best quality

We have introduced and keep the Quality Assurance System ISO 9001 and the Environmental Management System ISO 14001 to provide you with even better products.



ISO Schneider Electric Energy Poland 18001



ISO Schneider Electric Energy Poland 9001-14001

# Resiglas

## Core

Transformer cores are made of magnetic cold laminated sheets of low loss rate. A precise core design is possible thanks to the use of special mechanised and automated tables for assembling sheets and lifting the core to vertical position.

## LV Windings

Resiglas transformers are equipped with LV windings reeled using aluminium or brass band, according to the customer requirements.

## HV Windings

HV windings are produced using original modern technology. Subsequent winding layers are reeled using copper or aluminium conductors of circular or profile cross-section in double enamel insulation with class H heat resistance. The interlayer insulation consists of glass fibres (rowing) saturated with resin, reeled alternately diagonally and radially, which integrate the winding in a compact monolith after hardening. Winding constructed in such a way is characterised by a very high mechanical strength.

## Winding operation in the case of fire

The insulation system of Resiglas transformers is based on non-flammable and fire retardant materials. The tests have shown that flames are extinguished automatically shortly after the transformer is removed from the fire zone. At the same time, the applied materials do not emit any toxic gases at high temperatures.

## Range of power and voltages

Resiglas transformers work in power range of 63 kVA to 5.500 KVA in the following types of voltage:

- maximum UV system voltage 7.2 kV; 12 kV; 17,5 kV; 24 kV; 36 kV
- maximum LV system voltage 1.1 kV; 3.3 kV; 7.2 kV.

On request, it is possible to manufacture transformers with others power and voltages than those presented in the specification sheet.

Losses, short circuit voltage 1st Connection Values of no-load and load losses, short circuit voltage and connection group concern typical Resiglas distribution transformers.

Parameter values may vary depending on the used winding material. Transformers of other parameter values can be designed on special customer request.

## Voltage control

Resiglas standard transformers are equipped with voltage taps with adjustment of  $\pm 2 \times 2.5\%$ . It is possible to manufacture transformers with others ranges and voltages control on request.

## Working conditions

Resiglas transformers are adapted to operation in ventilated closed areas that meet the following requirements:

- Maximum cooling air temperature 40°C,
- Average annual cooling air temperature 20°C,
- Relative air humidity at 20°C - to 95%,
- Location height to 1000 m above sea level.

Resiglas transformers may be located in public areas, provided that housing with an appropriate level of protection is used. Detailed guidelines can be found in the Operation and maintenance manual.



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## Resiglas Transformer Housings

Resiglas standard models are provided without housing (protection level IP00). On request, they may be provided in standard housings with protection levels IP20, IP21 or IP31.

On special request, it is possible to provide the transformer in housing that meets the arc resistance conditions (protection level IP 20 with a fibre optic arc resistant protection).

### IP21 (IP31) Housing

This housing is a self-supporting structure. Sectional removable head walls with ergonomic handles enable quick and easy access to the interior. Ventilation is ensured by bottom with openings, and ventilators located in the upper part of the housing. Cable connection is a standard method for connecting transformers in the housing to mains and receiving network. These cables are entered to the housing through bottom openings. Cables in the housing are attached to special stands, and particular conductors are lead to the transformer terminals. Various methods for connection, e.g. by bus ducts or bushing insulators, are possible at the customer request. Thanks to an appropriate design the housing is very easy to assemble.

### IP20 Housing

Housing with level IP20 has a structure similar to IP21 (IP31) housing. The only difference is the use of lid with openings instead of ventilators located in head walls.

Housing Meets the Arc Resistance Conditions Dry cast resin transformers in arc resistant housing are treated as a special design. Thanks to the use of IP20 housing and fibre optic arc resistant protection ZŁ-2 the solution ensures protection against arc short circuit which may be caused by failure inside the housing.

## Winding Protection Against Overheating

Resiglas cast resin transformers are made of insulating materials with at least class F heat resistance.

Transformer windings are selected in such a way that their maximum temperature does not exceed 155°C at ambient temperature of 40°C. In a cast resin transformer its windings are 50+60% of the entire device. Long-term operation of windings at temperatures above 155°C may lead to a premature ageing of or damage to their insulation. Therefore, it is appropriate to use equipment protecting against excessive increase in temperature, such as relays with PTC or PT100 sensors (normally PTC 140°C, 155°C + RTT14 sensors are used),

In addition, the transformer may be equipped with:

- Maximum digital thermometer and/or an additional indicator to be installed in the switchgear area
- Forced ventilation system together with control system

### Thermal relays with sensors

The use of protective relaying controlled by PTC sensors (posistors) is a modern way of protecting windings in cast resin transformers against overheating. These sensors are usually placed inside LV windings, which are at most risk of overheating. Sensor resistance is changed discretely after exceeding the response temperature. TZAM and TZM type windings are protected by posistors with a response temperature of 140°C (alarm) and 155°C (transformer switch-off). Each transformer is equipped with a set of sensors connected in series, lead to a common terminal strip. The set of relays controlled by PTC sensors with RTT14 system is a part of standard equipment. Other temperature protection system may be offered at the customer request. Depending on the needs the relays may be supplied by DC or AC voltage in a wide range of 42-230V. Detailed data can be found in Operation and Maintenance Manual for protective equipment.

Make the most of your energy<sup>SM</sup>

Schneider Electric Energy Poland Sp. z o.o.

Mikołowska Fabryka Transformatorów  
ul. Żwirki i Wigury 52  
43-190 Mikołów, Polska  
tel.: +48 32 77 28 222  
fax: +48 32 77 28 269  
[www.schneider-electric.com](http://www.schneider-electric.com)  
[se.mikolow@schneider-electric.com](mailto:se.mikolow@schneider-electric.com)

As standards, specifications and designs change from time to time, please ask for confirmation of the information given in this publication.

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Photos: Schneider Electric Energy Poland Sp. z o.o.