



## Siemens Transformers – Case Study

# Distribution Transformers for Data Center Applications

Ensuring reliability, security and environmental sustainability

### The challenge

In a world driven by the Internet and data being stored in clouds, data centers are the massive energy consumers of our time. As the request for ever more online services continues to increase, the role of data centers in the energy world of tomorrow will be even bigger than it is today – as will their need for transformers.



No matter in which cloud data is stored: it needs to be accessible at any time – just like electrical energy

But although the differences between a utility or transmission company and an Internet giant might appear immense at first sight, there are some basic requirements both groups have in common:

**Reliability:** As with transmission grids, provision of the services offered by data centers to consumers must be reliable.

**Security:** Not only does the data itself need to be protected from outside attacks by hackers –the equipment must also be safeguarded against any form of external harassment.

**Environmental sustainability:** In a world driven by sustainability and the target of humankind to preserve nature as best as possible, environmentally friendly solutions are in demand more than ever.

### The solution

This is why a globally active software-company requested GEAFOL transformers for their current project of building a hyperscale data center in the Netherlands.

GEAFOL transformers by Siemens Transformers are dry-type, cast-resin units with varying features, as are their liquid-filled alternatives. These transformers combine a variety of benefits, such as safety and reliability, environmental friendliness and high efficiency and, thus, were the perfect choice for the new data center.

Data centers must deal with a number of different components in the grid, such as converters, USP devices and other power electronics elements. This is why the customer requested GEAFOL transformers for static converter loads. These units will have to deal with harmonics and therefore need to be designed for extra harmonic strength as well as for partial discharge.

A total of 15 cast-resin transformers of two different types were ordered for the data center project:

	Type 1	Type 2
Rating	2,500 kVA	1,600 kVA
Voltage level	20 / 0.42 kV	20 / 0.42 kV
Size	2.2x1.3x2.13m	1.8x0.99x1.89m
Weight	5.45 to	3.45 to



### Technical features

Since 1965, more than 100,000 GEAFOLE cast-resin transformers have proven themselves in power distribution or converter operation around the globe. The GEAFOLE principle yields transformers with excellent electrical, mechanical and thermal characteristics that have proven to be particularly environmentally compatible.

#### 1. Compact

Since GEAFOLE transformers often need less space than liquid-filled and gas-insulated transformers, a higher output can be provided in the same area. The modular design of the transformer is another economical feature. Windings, for instance, can be mounted and replaced on the spot if necessary.

#### 2. Environmentally acceptable

State-of-the-art transformers improve the CO<sub>2</sub> balance thanks to their high efficiency and low losses. Moreover, GEAFOLE transformers are flame-resistant and self-extinguishing, reducing the hazard level to nearly zero. And as these are dry-type transformers, no insulation fluid is needed. GEAFOLE transformers are completely recyclable (approx. 90 % metals).

#### 3. Economically beneficial

Thanks to their high efficiency with low losses and as they require nearly no maintenance, the total cost of ownership is extremely favorable. Furthermore, GEAFOLE transformers need no special arrangements regarding installation or protection and are long-term assets with an economic lifetime of 30 years or more.

#### 4. Safe and reliable

GEAFOLE transformers are outstanding thanks to their high power-frequency voltage strength and impulse-withstand voltage strength. They are free from partial discharge up to twice the rated voltage and designed to safely handle harmonics – an important feature in an environment that includes converters, USP devices and other power electronics in the grid.

#### 5. Maintenance-free

GEAFOLE transformers are insulated with an epoxy resin /quartz powder mixture. This is an environmentally friendly material that makes the windings maintenance-free, moisture-resistant, tropicalized, flame-retardant and self-extinguishing.

### Continuity ensured

IT operations is a crucial aspect of most organizational operations around the world. One of the main concerns is business continuity. When building an entire data center from scratch a great deal of responsibility is needed to provide high reliability, availability, security and environmental sustainability. Industrial scale operations such as these use as much electricity as a small town.

So why should such a crucial industry depend on anything else but the best solution to uphold this responsibility?

#### How can we help you to ensure reliability of your datacenter?

Our transformer portfolio for data centers is limitless. We offer the whole range of GEAFOLE dry-type and liquid-immersed distribution transformers with tailor-made designs for every unique application. These include:

- High K-factor (weighting of the harmonic load currents according to their effects on transformer heating)
- Reinforced insulation to safely handle commutation voltages
- Special protective housings where necessary
- Customer-specific connections / busbars
- Increased insulation levels
- Specialized thermal monitoring, additionally with core temperatures monitoring

Talk to us! We care about the reliability of your data center as

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