



David Claassen, MD of Trafo Power Solutions.

Dry-type transformers gain traction in Africa with Trafo

While oil-filled transformers have long dominated the African market, Trafo Power Solutions Managing Director David Claassen says there is growing appetite and scope for the application of dry-type transformers in the continent's mining sector.

Trafo Power Solutions was recently launched to offer a range of dry-type, or cast-resin, transformer products from the 100-year-old Toronto-based Hammond Power Solutions (HPS), acknowledged leaders in this increasingly popular technology.

"Dry-type transformers have been around since early last century but, due to the higher cost of their traditional process of manufacture, they were not as widely used," says Claassen. "Today, this price differential is no longer significant, opening the door for users to benefit from the numerous benefits of dry-type transformers."

An electrical engineer with broad-ranging experience, Claassen has worked at executive level in energy-related projects including turnkey installations, high voltage sub-stations, continuous and standby power generation, transformers, and control and instrumentation. He has operated in sectors such as open-cast and underground mining, infrastructure, renewable energy, and oil and gas.

Among the advantages of dry-type transformer technology, he says, is that it is safer, so the units can be installed indoors, in basements, or in other confined spaces for the sake of convenience and cost. The dangers associated with oil in a transformer require this equipment to be located outdoors and invariably within a structure built specifically for this purpose. Even risks that are

external to the unit itself, such as a fire in the building, preclude the possibility of locating an oil-cooled transformer indoors.

"This has traditionally made dry-type transformers popular in regions of extreme temperatures, where they can be installed inside buildings alongside other equipment or even in office facilities," he says. "In these environments, oil-filled units could not be used because the outside climate could negatively impact the operation."

While climate considerations in Africa's mining sector have not demanded a special solution, the dry-type transformers are now gaining traction as their design and manufacturing advances have brought about price parity.

Safety and environment issues both create extra cost when installing oil-cooled transformers, says Claassen. Oil leaks are a regular concern and a risk with oil-cooled units, so regulations require that these transformers are enclosed within a structure and a bunding wall, with a specific floor arrangement to help prevent the possibility of oil seepage into the ground. These structures – with their extra costs – are avoided when installing a dry-type unit, as these risks do not exist.

"Safety is always a concern where there is high voltage, heat and a pressurised tank filled with oil; when faults occur, there is a relatively high chance of an explosion and the consequences are often catastrophic," he says. "The safety risk with oil-filled transformers is therefore always quite high by any measure. In contrast, any failure in the operation of a dry-type transformer seldom poses any safety risks as the oil, heat and pressure elements are not present."

With the rise in awareness of safety at work – across the globe and in all sectors of the economy – there has been a trend towards safer technologies like these, he says. Dry-cooled transformers are categorised as F1 in terms of international fire resistance ratings, making

them low risk as they are self-extinguishing and flame-retardant by nature.

Oil-filled transformers also require regular maintenance including oil sample analysis to ensure operational consistency and safety. Dry-type transformers are low maintenance items that could last for 25 years without significant attention.

Reduced energy consumption is another factor that has attracted attention to these units in new markets, especially as electricity prices in South Africa have rocketed over the past decade.

"The higher efficiency of the cast-resin design means lower electricity bills," he says. "It also means that heat losses are lower, so these units require only a minimal movement of air across the windings to cool them down. Forced air options can also be employed where necessary, depending on ambient temperatures."

The technology behind these advantages has been a century in the making, and has recently been augmented by a European technical heritage. The roots of Canada-based HPS reach back to 1917, and it began building specialised transformers at the start of World War II in 1939. Boosted by the surge in demand for this equipment, the company grew steadily and continuously improved its products.

Using advanced techniques and materials in its core and coil construction, HPS also makes use of high quality insulation materials to ensure long lifespans for every temperature class. It offers specific solutions for ambient conditions that present particular challenges in terms of humidity, pollution, chemical agents or other factors.



Cast-resin transformers in the test bay.

In 2013, HPS expanded its presence in Europe and broadened its product offering and manufacturing capabilities in cast-resin technology, when it acquired the Italian companies Euroeletto and Marnate Trasformatore. Focused on the design, construction and marketing of low and medium voltage magnetic components, Euroeletto operates an 18 000 m² facility in Sarego in Italy's province of Vicenza. Marnate Trasformatore produces top quality cast-resin transformers from its manufacturing facility in Marnate in the province of Varese.

Claassen says he will be leveraging his extensive experience in South Africa and other parts of the continent to create a footprint for Trafo Power Solutions, bringing HPS's world-class technologies to new and existing markets. ■



A dry-type transformer with cast-resin technology.

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