OLSUN Electrics
Engineered Transformer Solutions

We can do that!

"Overlooked" Advantages of Dry Type Transformers vs. Liquid Filled Transformers

Within the electrical power distribution community there is a common misconception that a liquid filled transformer is a "less costly" alternative and practically more advantageous when compared to a dry type transformer. Prior to accepting this generalization, it should be noted that a properly designed and safe liquid filled transformer can have an initial cost equal to or greater than that of a dry type transformer.

Typical liquid filled safety devices not normally required for dry type transformers including dielectric level and pressure gages, rapid rise relays, pressure relief devices, winding temperature indicators, liquid thermometer devices and containment systems, along with remote monitoring capability (SCADA) associated with some of these liquid monitoring devices can drive the initial cost of the liquid filled unit up.

Other liquid filled related transformer indirect costs such as insurance premiums and monitoring of liquid related characteristics (temperature, level, dissolved gasses, etc.) are not applicable to a comparably rated dry type transformer and contribute to a higher total owning cost, liquid over dry. A dry type transformer could not only have an equal if not lower initial buy price, but a lower total owning cost over the life of the unit.

Cost ADVANTAGE: Dry Type Transformer

A frequent misconception is that a liquid filled transformer has a smaller "footprint" than that of its dry type counterpart. This is not true in all cases. In many instances, the tank containing the liquid dielectric medium is smaller than that of the enclosure about a dry type transformer… until you take into consideration the real estate required for panel radiators and cooling fins necessary for proper cooling of the dielectric as well as the area necessary for a liquid containment system.

Space requirements for personnel access to allow maintenance of the dielectric (sampling, draining) must also be factored in when considering the footprint of the transformer.

Footprint ADVANTAGE: Dry Type Transformer

Liquid filled transformers are designed to be stationary and to maintain a positive tank pressure. Forces the tanks are subjected to during shipment can result in failed welds on the pressurized tank or the cooling panels or fins. Damage to drain valves and samplers being struck during handling and resulting in leaks also occurs. It is not unusual for liquid filled transformers arriving at site to be leaking fluid while still on the truck. Costs associated in time and money to repair a leaking transformer can be significant. Dry type transformers have no medium to leak and therefore are not prone to required surprise repairs upon arrival at the application destination.

No Leaking ADVANTAGE: Dry Type Transformer

 · 10901 Commercial Street, Richmond, Illinois 60071
www.olsun.com · 815.678.2421 · 800.336.5786

A liquid filled transformer does need space to access and drain fluid, space to place a containment system, space to facilitate cooling devices such as panels and fins and in some cases must be placed at a significant distance from other equipment or a building because of insurance requirements. The ability of a dry type transformer to, in many cases, be placed closer to a load substantially reduces the cost associated with bussing and/or cabling connections that otherwise would need to be employed with a liquid filled transformer.

Interconnecting Savings ADVANTAGE: Dry Type Transformer

A difficult to appreciate fact is that dry type transformers handle moisture and water better than liquid filled units. An outdoor enclosure for a dry type transformer is not designed to keep water out, but it is made to redirect water to run down its panels instead of splashing the unit. Regarding condensation; contrary to beliefs or concerns about the formation of condensation, the inherent heat and ventilated design of the dry type transformer unit in application prohibits the formation of condensation. In those situations where the transformer may be de-energized, strip heaters may be utilized to stave off the formation of condensation on a de-energized unit.

The bottom line is that water reaching any core and coil assembly does pose a risk to the operation of the transformer. This includes moisture or water entering a compromised "sealed" tank of a liquid filled unit which is undetectable unless a medium dielectric analysis is conducted.

Moisture Adverse Effect ADVANTAGE: Dry Type Transformer

Using air for cooling provides some inherent advantages. Since air is far less efficient transmitting heat than oil, the design of a dry type transformer needs to consider lower thermal and dielectric stress levels on its components. Subsequently, the components on a dry type transformer need to handle higher temperatures than those on liquid filled units. This in turn results in the customer receiving a more robust unit design, consequentially a longer life expectancy and one that is less likely to fail due to overheating or premature aging of its insulation.

Higher Temperature Tolerance ADVANTAGE: Dry Type Transformer

The overall size of a liquid filled transformer depends greatly on the components used/required. The more components, the bigger the tank needs to be and subsequently more liquid dielectric increasing the weight. The design approach for a liquid filled transformer is to accommodate as many components as required into the smallest physical package… pushing dielectric distance minimums to the point of compromise.

The subsequent "cramped quarters" does not lend flexibility in terms of the core and coil size and connections themselves. With a dry type transformer, the space inside its enclosure allows for much greater customization possibilities. And should the customization requirements force the dry type enclosure to be larger, the customer will not be cost-penalized for the additional dielectric associated with a larger tank.

Dielectric & Customization ADVANTAGES: Dry Type Transformer

Every component on a liquid filled transformer that protrudes from the pressurized tank requires gaskets to maintain a seal. Over time, these gaskets need to be monitored and eventually replaced as they deteriorate. A dry type transformer maintenance process is much simpler overall, mainly consisting of visual inspection and proper cleaning. Gasket monitoring, dielectric sampling and dissolved gas analysis associated with a liquid insulated transformer is a more expensive and complex procedure.

Maintenance ADVANTAGE: Dry Type Transformer

Should a transformer fail, the repair associated with a dry type transformer is with little exception far less complicated as compared to a liquid filled transformer. A liquid filled unit may involve a person going into or working through a manhole in a confined space which is inherently dangerous. In addition, there is inconvenience, time and expense associated with draining the unit. In worse case scenarios, unwiring the entire core and coil assembly from tank components to remove the assembly from the tank is a painstaking process. Conversely, a dry type transformer core and coil assembly and associated accessories are relatively accessible by simply removing panels from the enclosure to access the item needing repair.

Repair ADVANTAGE: Dry Type Transformer

All things considered, an argument for the advantages of a dry type transformer versus a liquid filled transformer can certainly be made.

Overall ADVANTAGE: Dry Type Transformer

Transforming the Industry with:
Handcrafted Quality • Sophisticated Designs • Superior Materials • Olsun Flexibility

Olsun Electrics is a leading dry type transformer manufacturing company that has been providing solutions in the most challenging environments for over five decades.

OLSUN Electrics
Engineered Transformer Solutions

We can do that!

 · 10901 Commercial Street, Richmond, Illinois 60071
www.olsun.com · 815.678.2421 · 800.336.5786