

Drycol Breather

for Power Transformers

Transformers are a critical asset within a substation and are required to operate at optimal performance with high availability and longevity. The life of a transformer can be preserved by keeping the main components dry and free of moisture. Moisture within the insulation of a transformer can reduce dielectric strength, increases risk of failure and accelerates irrecoverable insulation aging, ultimately reducing the life of the transformer. Operators need solutions that limit water content in the oil within the transformer, over the lifetime of the asset.

GE's Solution

GE has developed an effective refrigeration solution that maintains the dryness of a transformer's insulation, extends the lifetime of the asset and reduces oil treatment costs. The Drycol Breather is designed to remove moisture from different sources such as the tank and cooler gaskets, normal insulation degradation process and the oil/air interface in the conservator during the load cycle.

The Drycol Breather acts directly on the air in the conservator tank, operating continuously and without any mechanical moving parts, increasing the drying efficiency.

The dryness of the air in the conservator tank causes moisture to migrate from the oil into the air for removal. An additional benefit is the elimination of internal corrosion in the conservator tank by removal of corrosive acids.

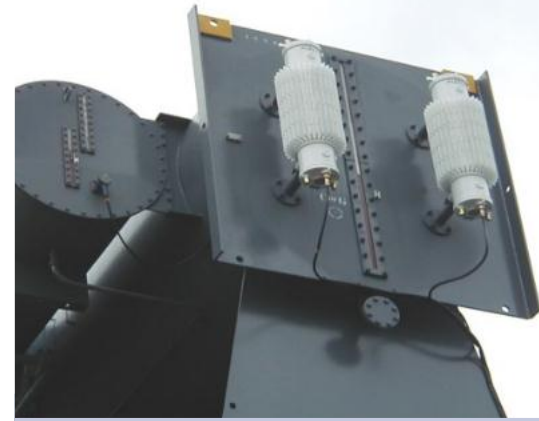
The solution can include:

- Drycol Breather - available in two models
- Spare parts supply
- Installation, commissioning and maintenance services

Applications

The Drycol Breather solution is designed for all power transformers, regardless of the manufacturer and can be installed on new transformers and retrofitted onto existing install base. The solution can also replace conventional desiccant breathers with minimal onsite modifications.

The Drycol Breather is available in two models to support all voltages, ratings and different oil volumes.



Increased Asset Life

- Maintain dielectric strength over lifetime
- Preserve insulation from water of all origin: atmosphere, condensation and auto-production

Versatile Solution

- Suitable for retrofit
- Supports broad range of transformers with oil levels up to 45,000 or 90,000 liters
- Suitable for all brands of transformers

Cost Effective Solution

- Reduced maintenance cost
- Drycol Breather can be installed during a planned outage
- Control cubicle fits with all Drycol Breathers models

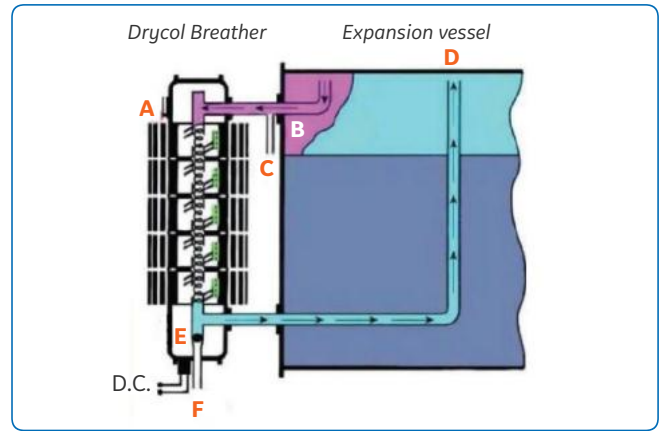
Extensive Experience

- 45+ years of expertise in transformer design and services
- Over 2,000 transformers are equipped with Drycol Breather solutions worldwide



How does it work?

- The Drycol Breather (A) operates by drawing moist and relatively warm air (B) from the interior of the oil expansion vessel via a thermosyphon action.
- The air is coming from the expansion vessel above the transformer oil level, or from outside via the air inlet tube (C) and goes through the drycol.
- A series of thermoelectric (Peltier effect) modules are used to cool and heat the unit's vertical central duct (E) in an automatic, continuously repeated cycle, thus extracting moisture as frost and ice and melting it to escape via the drain tube (F).
- The air returns it to the conservator (D) as cold dry air.



Operating Cycles

Drying Cycle (6 hours and 15 minutes)

As the cooling phase is initiated with DC current flowing in a forward direction through the modules, the air temperature in the central duct is cooled and a downward airflow is created by thermosyphon action.

At this stage, the duct is clear of frost, permitting maximum flow rate. Moisture present in the air is deposited on the surface of the duct where, under most ambient conditions, it freezes and cold dry air is returned via the bottom pipe to the conservator air space.

Defrost Phase (15 minutes)

After the drying phase, the cold duct is heated until all frost is melted by reversing the polarity of the DC supply to the thermoelectric modules. As the duct temperature rises, air flow ceases. Frost and ice melt and collect as water in the trap.

A diode-controlled heater automatically melts the ice in the drain tube and discharges the collected water. At the end of the defrosting period, the controls operate to restore the DC supply to normal polarity, thus commencing another drying phase.

Construction

At the heart of the drycol are the thermoelectric modules which are in thermal contact with the central cooling duct. To minimize heat transfer to and from the outer casing, the space between the central duct and the housing is factory-filled with high-performance polyurethane foam insulation.

The aluminum casing is deeply finned, dissipating the heat generated at the outer surface of the thermoelectric module during the cooling period.

Specifications

	Type A For transformers containing up to 90,000 liters of oil	Type B For transformers containing up to 45,000 liters of oil
Height	991 mm	484 mm
Diameter	317 mm	250 mm
Pipe flange centers	673 mm	279 mm
Weight	52 kg	16 kg
Power requirement	208 Watts	108 Watts
Power supply	110/120 or 230 V, 50/60 Hz	110/120 or 230 V, 50/60 Hz
Measured rate of air flow	0.3 liters per second	0.12 liters per second

Control System

- The Drycol Breather control system is housed in a weatherproof and high-grade stainless steel cabinet with a padlockable door. This can be fixed to any convenient vibration-free mounting separate from the transformer, an interconnecting cable ranging from 9-18 meters is also supplied.
- The design features state-of-the-art components to ensure reliable operation, even in the most extreme climatic regions, with an operating range of -50°C to +50°C (with fitted heater) and -40°C to +50°C (without fitted heater).
- Indicators and controls are visible through the cabinet door and include freeze and defrost contactor position, incoming power supply and alarms.
- A volt-free changeover contact arrangement of the alarm relay is such that either N/C or N/O contact positions can be selected.

For more information please contact
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Imagination at work