



Transformer Online DryOut System



Zero
DOWNTIME

Zero
MAINTENANCE

Our Customers



Transformer Online Dryout System

Online drying of transformers is an innovative process that maintains the electrical properties of insulating oil while simultaneously drying the core of the transformer. It removes moisture from the oil and winding paper in a live transformer by continuously circulating the oil through a system without disturbing the Dissolved Gas Analysis (DGA).

CbS systems incorporate all the necessary features to allow a transformer to remain in service while effectively removing moisture from its insulation. The system is safe, with several alarm features that shut it off and isolate it from the transformer in the event of any abnormal signal.

CbS provides a non-intrusive, cost-effective, and convenient method of maintaining transformers in a dry condition. Additionally, once the transformer is dried, the system can be retrofitted. This flexibility allows for increased oil processing applications compared to heat and vacuum systems.

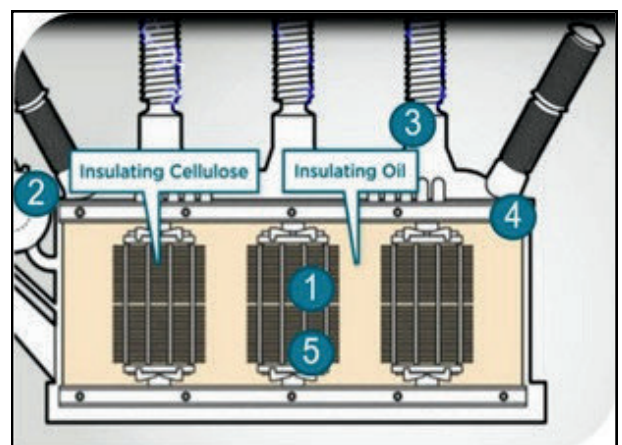


Benefits:

- Solid Removal filters to separate the solid particles up to 1.0 micron size
- Maintains Moisture up to or less than 5 PPM in the transformer
- Online minute to minute monitoring of moisture PPM in the Transformer oil
- Performance monitoring can be done from the control room through SCADA
- No need to shutdown the transformer, it remains in-service during process
- Operates continuously unattended
- Reduces transformer maintenance cost.
- Improves oil quality
- Improves oil parameters i.e. physical, electrical and chemical parameters
- Removes oil acidity level & carboxylic acid
- Improves dielectric strength of oil
- Extends oil service life
- Extends transformer service life
- Enables transformer to run at higher load cycles
- Offers continuous filtration/separation of Transformer Oil at constant efficiency

Sources of Moisture:

1. Residual moisture
2. From the atmosphere i.e. breathing during load cycles (eg. Saturated dehydrating breathers)
3. Through poor seals by the flow of moist air (created by total pressure gradient)
4. During installation and/or repair
5. Water formed as the paper insulation ages



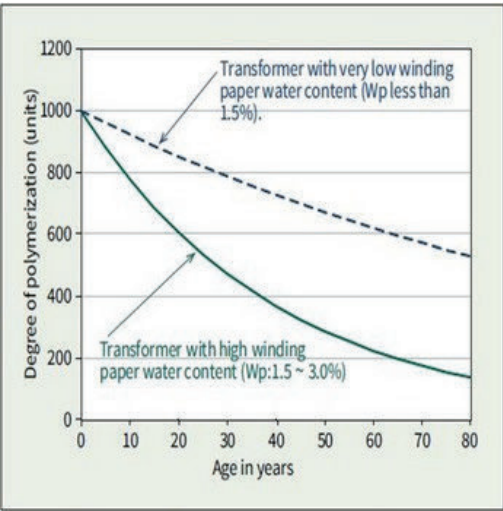
Effects of Moisture in Transformer Oil:

- Reduced Dielectric Strength thus increases risk of electrical breakdown
- Accelerated Insulation Degradation, shortening insulation life
- Formation of Sludge impairs oil performance and clogs filters
- Corrosion causes damage to metal parts
- Increased losses, reduces efficiency
- Reduced Heat Dissipation leads to overheating



Degraded insulation paper due to moisture

The amount of free & dissolved water present in oil is its moisture content - expressed in PPM (parts per million). For good transformer oil, the moisture content should be low. As recommended by IS-335 (2018), allowed water content in oil is up to 30 PPM.

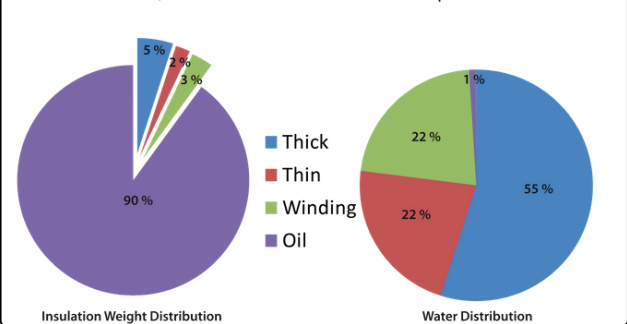


Relationship between elapsed years and degree of polymerization.

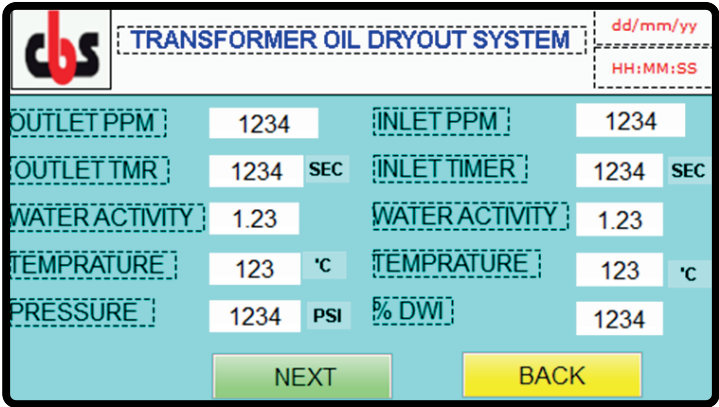
Impact of Moisture on the Aging of Insulating Paper:

1. Moisture accelerates the deterioration of the insulating paper
2. The aging rate of the paper is directly proportional to the moisture content
3. At low moisture levels, aging is slow, and the potential lifespan is long.
4. When the moisture level rises above 1.5%, the rate of decay begins to accelerate significantly.
5. Paper with 3.5% moisture degrades 20 times faster than paper with 0.5% moisture, making the insulation viable for only a short period of time.

Once water is inside, the molecules are stored in various parts of the insulation:



HMI Screen: Data Screen





Technical Data Sheet

Technical Specifications										
S. No.	Description	Unit	TODP-OLTC	TODP-Mini	TODP-005-SS	TODP-005-SP	TODP-005-MS	TODP-005-MP	TODP-005-2	TODP-012-VS
GENERAL										
1	Material of Construction		SS-304 / MS	SS-304 / MS	SS-304	SS-304	Mild Steel	Mild Steel	SS-304/MS	Mild Steel
2	Oil Flow Capacity	L/hr	300	300	600	600	600	600	600	1200
3	Variable Oil Flow Range	L/hr	60-300	60-300	200-600	200-600	200-600	200-600	200-600	120-1200
4	Rated Pressure	Bar	upto 5	upto 5	upto 5	upto 5	upto 5	upto 5	upto 5	upto 5
5	Mounting/Installation		Stationary/ Portable	Stationary/ Portable	Stationary	Portable	Stationary	Portable	Portable	Portable
6	Dimensions	LxBxH (mm)	450 x 500 x 950	550 x 600 x 700	550 x 650 x 1000	550 x 650 x 1000	550 x 650 x 1000	550 x 650 x 1000	1000 x 650 x 1000	900 x 900 x 1230
7	Operation		Auto/Manual	Auto/Manual	Auto/Manual	Auto/Manual	Auto/Manual	Auto/Manual	Auto/Manual	Auto/Manual
8	No. Of Cylinder for Moisture Adsorbent Media		1	1	1	1	1	1	2	1
9	Water Adsorbing Capacity	Ltr.	2 - 3	5 - 6	10 - 12	10 - 12	10 - 12	10 - 12	27 - 30	10 - 12
10	Moisture Removing	PPM	<5	<5	<5	<5	<5	<5	<5	<5
11	Pre filter/Strainer		Y-Type	Y-Type	Y-Type	Y-Type	Y-Type	Y-Type	Y-Type	Y-Type
12	Power Consumption	KW	0.37	0.37	0.37	0.37	0.37	0.37	0.37	2.5
13	Solid Contamination Removal	Microns	>0.3	>1	>1	>1	>1	>1	>1	>1
14	Operating Valves		Auto/Manual	Auto/Manual	Auto/Manual	Auto/Manual	Auto/Manual	Auto/Manual	Auto/Manual	Auto/Manual
15	Mode of Operation Basis		N/A	RS / Temperature / PPM / DWI	RS / Temperature / PPM / DWI	RS / Temperature / PPM / DWI	RS / Temperature / PPM / DWI	RS / Temperature / PPM / DWI	RS / Temperature / PPM / DWI	RS / Temperature / PPM / DWI
16	Weather Proof		IP 55	IP 55	IP 55	IP 55	IP 55	IP 55	IP 55	IP 55
17	Evacuation Vacuum Pump		N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes
ONLINE MONITORING										
1	Touch Panel HMI		N/A	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2	Moisture Content in Oil at Inlet & Outlet	PPM	N/A	Yes	Yes	Yes	Yes	Yes	Yes	Yes
3	Moisture in Insulating Paper	%	N/A	Yes	Yes	Yes	Yes	Yes	Yes	Yes
4	Oil Temperature at Inlet & Outlet	°C	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
5	Pressure	Bar	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
6	Online Oil Flow Diagram		N/A	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COMMUNICATION DEVICES (HMI Screen)										
1	PLC with Ethernet Port		N/A	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2	SCADA Compatible		N/A	Yes	Yes	Yes	Yes	Yes	Yes	Yes
3	External Interfaces - Ethernet (RJ45), GSM Modbus & IEC 61850, IOT		N/A	Optional	Optional	Optional	Optional	Optional	Optional	Optional

Product Types



Mini - Mountable



Stationary (SS 304)



Portable

Installation Pictures

