



Transformer Breathers

Ultimate protection against moisture and particulate contamination

DRYTECH Inc.

June 29, 2021- Rev B. H.F

LET MOISTURE BE OUR PROBLEM

Breathers & Dryers: Transformer Breathers

FIRST LINE OF DEFENCE AGAINST LUBRICANT CONTAMINATION & DIELECTRIC LOSS



The failure of many transformers or similar equipment can be directly attributed to the lack of proper control of the level of moisture entering the equipment. It is essential, therefore, that a very low level of humidity is maintained in the air space in the top of the conservator tank to avoid deterioration of the insulating properties of the cooling medium.

Transformer breathers provide an economic and efficient means of controlling the level of moisture entering the conservator tank during the change in volume of the cooling medium and/or airspace caused by temperature changes. However, with a new moisture content specification of oil being kept at less than 35 ppm moisture (ASTM D- 1522 test method), higher performance desiccant is needed. ZEOZORB Transformer Breathers exceed the ASTM D- 1533 testing specifications and outperform silica gel breathers by over 75% at average operating temperatures 77 °F.



In addition, testing shows that if the free air volume above the conservator tank oil is very dry, below 100 PPM, it will liberate and pull moisture from within the transforming insulating lubricant, maximizing performance and life. This dynamic is crucial to optimize operations and maintenance procedures.

QUICK FACT:

Drytech Transformer Breathers reduce the relative humidity levels in a conservator tank to less than 5%

Breathers & Dryers: Transformer Breathers

Transformer/ Dehydrating Breathers



Advantages

- Extend the life cycle of your lube oil
- Minimize component wear down time & repairs
- Protects against high humidity, water condensation & pressure variations
- Protects against dielectric loss & mold growth
- Extend MTBF and reduce O & M costs

FEATURES & PERFORMANCE

- 1.) Bi-directional Valve Air Flow-**
Air entering the breather is filtered and dried. Then, each unit is valved to ensure the most efficient flow possible prolonging the life of the breather.
- 2.) Rugged Construction-**
ZEOZORB transformer breathers are made of robust cast aluminum or robust ABS plastic and UV resistant polycarbonate tube.
- 3.) ZEOLITE Adsorbent-**
ZEOLITE adsorbent provides up to 28% by weight adsorption and provides clean dry air less than 100 PPM. ZEOLITE maintains performance in high temperature environments, unlike Silica Gel.
- 4.) Easy to use and Ergonomically Friendly-**
All ZEOZORB transformer breathers use a visual sight window to indicate when replacement is necessary. To replace- simply empty the spent breather contents and refill with new desiccant.
- 5.) Protective Housing-**
Optional protective stainless steel and expanded metal housings are available for additional protection
- 6.) Application Flexibility-**
Transformer breathers are offered in a variety of NPT/BSP and flanged connections. See our Adapters section for various fittings and DIN flange applications.
- 7.) Color Indication-**
When maximum adsorption is reached, the blue indicating beads will turn from blue to beige. This indicates replacement is required.



Breathers & Dryers: Transformer Breathers

W, Y Transformer Breathers

Operation

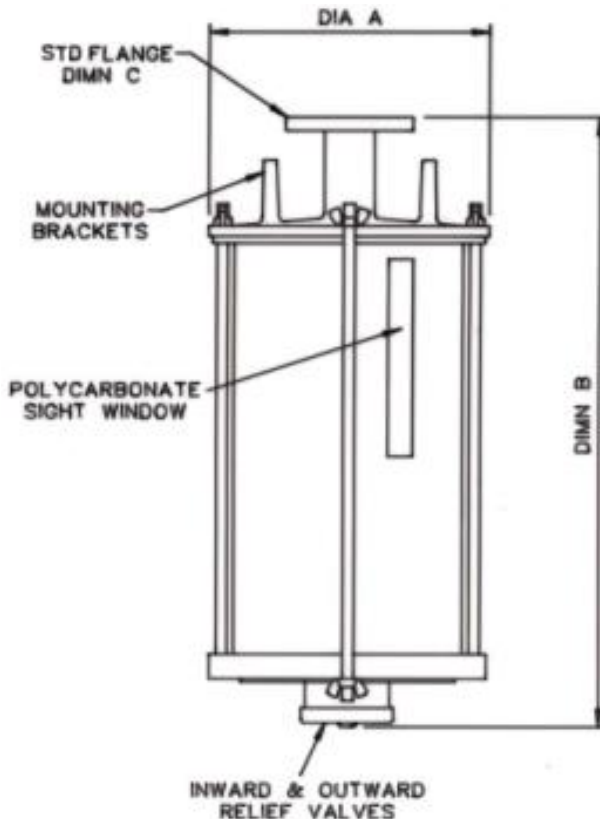
Drytech Transformer Breathers operate as your first means of protection against moisture contamination. Transformer breathers take the approach of filtering atmospheric air **before** it enters your equipment rather than trying to take moisture out **after** it has been introduced into a system.

Inhale Cycle

- 1.) Air will enter the base of breather
- 2.) As the air is drawn into the breather, the moisture is adsorbed
- 3.) This dry air will then flow upward and into the tank or reservoir being protected
- 4.) The very dry air will blanket the free air volume inside the tank and will liberate moisture

Exhale Cycle

- 5.) Air will be pushed down through the top of the breather
- 6.) The air will flow back down through the desiccant and out of the bottom of the breather

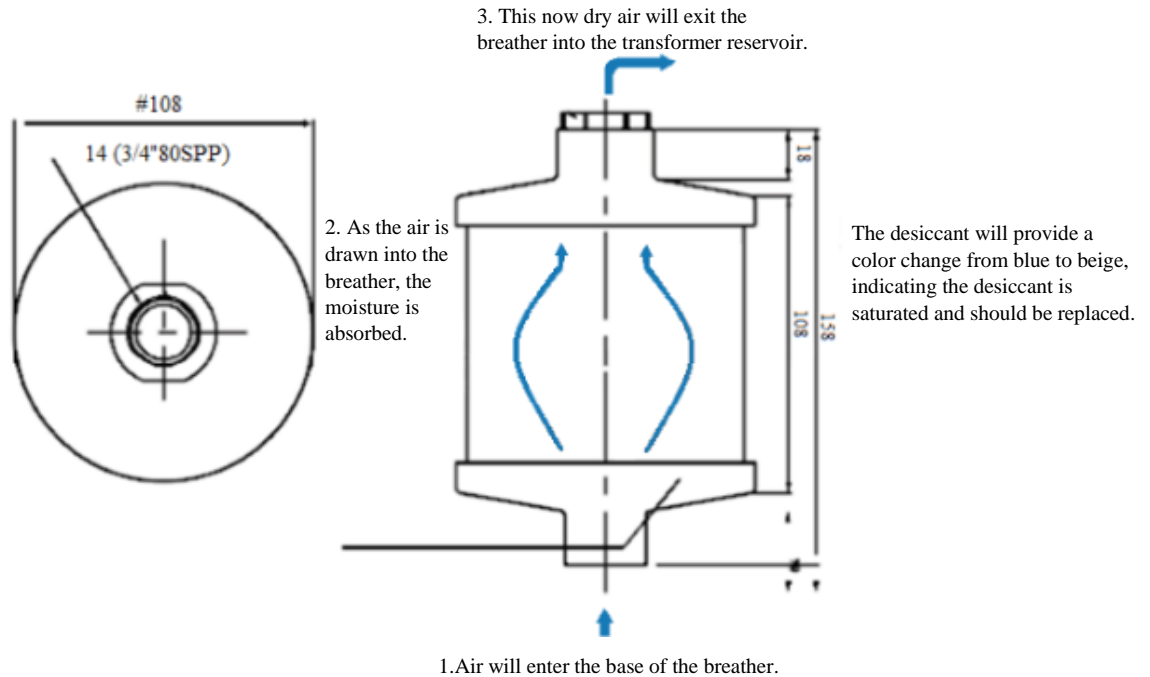


TECHNICAL & DEMENSIONAL

Series "W-2"		ZEOZORB Transformer Breathers			
Model	R	R1	R2	W	Y
DIM "B"	6.22" (158mm)	9.84" (250mm)	13.85" (352mm)	21.85" (555mm)	19.09" (485mm)
DIA "A"	4.25" (108mm) diameter			10.03" (255mm) diameter	
DIM "C"	3/4" FNPT, see adapters for other configurations			3 'V,W & X' uses 3/4" FNPT, 'Y&Z' uses 1" FNPT	
Transformer Rating	<1.25mVA	3 mVA	6 mVA	30 mVA	100 mVA
Max Transfer Oil Quantity	1,500 Liters	3,000 Liters	4,750 Liters	22,700 Liters	45,450 Liters
Desiccant Weight	2.2 (1kg)	3.3 (1.5kg)	4.4 (2kg)	10.5 (4.75kg)	17.6 (8kg)
Unfilled Weight	4.7 (2.1kg)	5.8 (2.6 kg)	6.9 (3.12kg)	17.6 (8kg)	30.8 (14kg)

Breathers & Dryers: Transformer Breathers

R, R1, R2 Transformer Breathers



Operation

Drytech Transformer Breathers operate as your first means of protection against moisture contamination. Transformer breathers take the approach of filtering atmospheric air **before** it enters your equipment rather than trying to take moisture out **after** it has been introduced into a system.

Inhale Cycle

- 7.) Air will enter the base of breather
- 8.) As the air is drawn into the breather, the moisture is adsorbed
- 9.) This dry air will then flow upward and into the tank or reservoir being protected
- 10.) The very dry air will blanket the free air volume inside the tank and will liberate moisture

Exhale Cycle

- 11.) Air will be pushed down through the top of the breather
- 12.) The air will flow back down through the desiccant and out of the bottom of the breather


TECHNICAL & DEMENSIONAL



Series "R"	ZEOZORB Transformer Breathers		
Model	R	R1	R2
DIM "B"	6.22" (158mm)	9.84" (250mm)	13.85" (352mm)
DIA "A"	4.25" (108mm) diameter		
DIM "C"	3/4" FNPT, see adapters for other configurations		
Transformer Rating	< 1.25mVA	3 mVA	6 mVA
Max Transfer Oil Quantity	1,500 Liters	3,000 Liters	4,750 Liters
Desiccant Weight	2.2 (1kg)	3.3 (1.5kg)	4.4 (2kg)
Unfilled Weight	4.7 (2.1kg)	5.8 (2.6 kg)	6.9 (3.12kg)



Breathers & Dryers: Transformer Breathers

Transformer Breather Adaptors

BLD 10090	BLD 10095
	
Reducing Adaptor 3/4" MBSP to 1/2" FBSP	Reducing Adaptor 3/4" MBSP to 2" FBSP

BLD 10090	BLD 10095
	
Reducing Adaptor 3/4" MBSP to 1/2" FBSP	Reducing Adaptor 3/4" MBSP to 1/2" FBSP

BLD 10915	BLD 10916
	
Reducing Adaptor 3/4" MBSP to 1" FBSP	Reducing Adaptor 3/4" MBSP to 1-1/4" FBSP


BLD 10915	BLD 10916
	
Reducing Adaptor 3/4" MBSP to 1/4" FBSP	Reducing Adaptor 3/4" MBSP to 3/8" FBSP


QUICK FACT:



Over 70% of lubrication failures are caused by surface degradation, of which 50% is from mechanical wear (particulates) and 20% is from corrosive wear (water)



Breathers & Dryers: Transformer Breathers

Transformer Breather Adaptors

BLD 10090	BLD 10095
	
Adaptor 3/4" MBSPP to 1- 1/2" MBSPT	Adaptor 3/4" MBSP to 3/4" FBSP

BLD 10090	BLD 10095
	
Reducing Adaptor 3/4" MBSP to 1/2" FBSP	Flanged Elbow Adaptor to DIN SPEC 42567

BLD 10915	BLD 10916
	
DIN 42567 Flanged Adaptor straight to MBSP	Plate Adaptor with elbow to 3/4" MBSP

BLD 10915	BLD 10916
	
1" PNG Flange Adaptor to 3/4" MBSP	3/4" MBSPP Adaptor to DN40 PN6 Flange

QUICK FACT:

ADTM D-1533 test method states that moisture content of conservator tank lube oils should be kept under 35 PPM (Parts Per Million) moisture.

Breathers & Dryers: Transformer Breathers

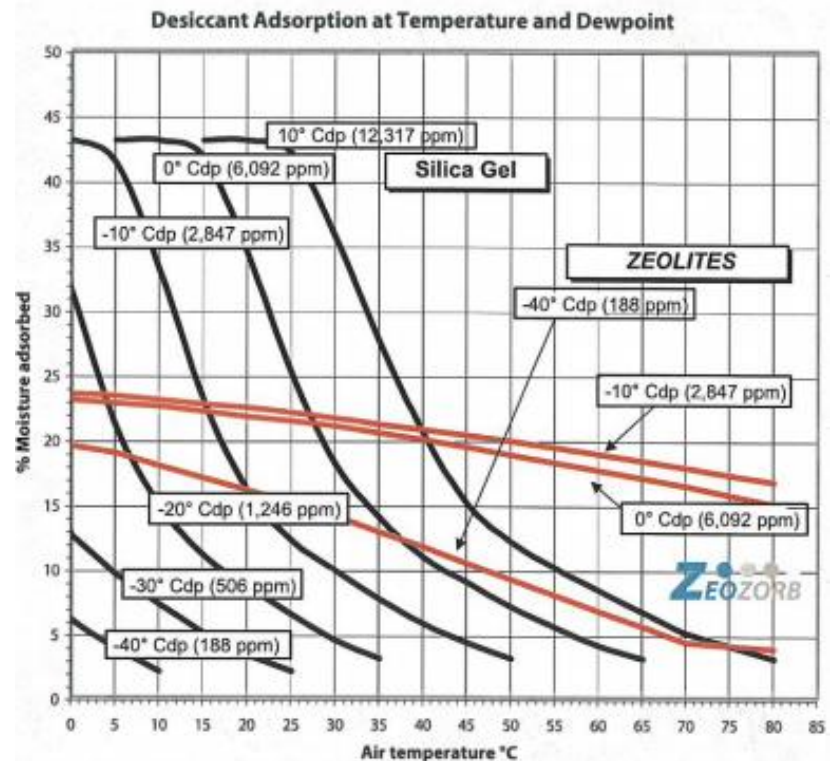
ZEOZORB Desiccant

Drytech Inc. Transformer breathers are filled with our high performing ZEOZORB desiccant which changes color from blue to beige as it becomes saturated with water vapor.



ASTM D-1533 specifications state that transformer conservator tank oil should be kept below 35 PPM (Part Per Million) water vapor. Current transformer Breathers used in the industry utilize Silica Gel as the absorbent media which **will not** meet this ASTM standard. ZEOZORB desiccant conversely is capable of conditioning air to below 10 PPM and thus meet the standard.

Drytech Inc. Transformer Breathers are designed to enable the easy and quick replacement of the desiccant charge. When the color change from blue to beige has reached the level shown on the label, the desiccant should be replaced.



The isotherm above illustrates the performance benefits of ZEOZORB desiccant, especially at higher temperatures. Silica Gel's adsorption capacity % drops off drastically as temperatures increase, whereas ZEOZORB maintains its efficiency. In addition, ZEOZORB can achieve a much lower dew point, less than 10 PPM.

Ordering & Delivery

To order one of our Transformer Breathers, please contact Matt Kinsey at Mkinsey@drytechinc.com or our sales department sales@drytechinc.com. Typical questions about the application will include:

- 1.) Size of conservator Tank
- 2.) Tank Pipe Connection
- 3.) Max Flow Rate
- 4.) Desired life of Desiccant