CORPORATE OFFICE
1235 Hickory Street Pewaukee, WI 53072 USA
Tel: 262.691.9336 **Fax:** 262.691.2576 **Web:** www.tricocorp.com

9555 Rockside Road, Suite 350 Cleveland, OH 44125
Tel: 216.642.3223 **Fax:** 216.642.1484 **Web**: www.predictinc.com

How to choose the correct Breather!

Breather Designs

Watchdog Desiccant Breathers offers several designs for applications almost anywhere! We offer multiple Breathers; all Breathers include the dominant features which make the Watchdog breathers the best Breather available today.

Considerations when recommending Watchdog Desiccant Breathers

Choosing a breather for any application requires a proper evaluation. Never assume applications are similar just because they look the same. Know for sure you are recommending the right breather for the job by answering a few simple questions. We will discuss these questions below in “How to Size a Breather”.

Cross Referencing

Cross referencing using competitive model numbers is never the best way to determine the correct breather for your customer’s application. The primary concern when cross referencing is the lack of information to confidently confirm the CFM requirements. By placing a breather in the pathway of vented air, the breather now acts as the only way for air to flow into or out of the equipment. Assuming the competition “got it right the first time” may come back to hurt you. We highly recommend instead, taking the time to examine the application and ask the right questions to get the necessary information to make the correct recommendation.

What is CFM?

Air flow is created in a couple of ways: 1) temperature variations which cause very low air flow change and 2) maximum fluid level changes, typically caused by filling or emptying a tank or reservoir. This is typically considered the “maximum fluid level exchange” and is typically the measurement we use to determine the GPM measurement and equate the CFM requirements.

*Gearboxes typically have low CFM requirements because the air flow is low.

*Tanks typically have high CFM requirements because the fill rate is controlled by exterior pumps and the head space air is forced through pop open vents or goosenecks in the top of the tank. Tanks are exceptionally prone to damage because of their construction.

CORPORATE OFFICE
1235 Hickory Street Pewaukee, WI 53072 USA
Tel: 262.691.9336 **Fax:** 262.691.2576 **Web:** www.tricocorp.com

9555 Rockside Road, Suite 350 Cleveland, OH 44125
Tel: 216.642.3223 **Fax:** 216.642.1484 **Web**: www.predictinc.com

Warning for Fuel Tank Applications

Creating vacuum or pressure restriction beyond 1 PSID due to inadequate breather capacity or incorrect mounting recommendations for tanks, especially tanks that emit fuel fumes, can cause serious damage to tanks. Always contact Trico for full details on how to mount breathers on any tank.

Hydraulic reservoirs with stroking cylinders typically have high CFM ratings and in some extreme cases are not candidates for Watchdog Desiccant Breathers because the oil mist is not controllable. These scenarios must be determined prior to installation and recommendations for multiple breathers must be made if required. If multiple breathers are required to handle excessive air flow, a common manifold will be required to service the breather.

Realistically, most equipment capable of filling or draining fluid at critical levels will typically is limited to reservoirs and tanks; however, there are some larger gears that could possibly create enough fluid movement to cause high CFM requirements as well. These are few, and typical gearbox applications will normally fall under the 10 CFM range. Just because a CFM requirement is low, does not mean you have to use a low CFM rated breather to best serve the application. The opposite, however, is required when higher CFM requirements are present. Never mount a breather on an application under the required CFM rating. Airflow ratings (cubic feet per minute / cfm) are shown in the Watchdog Desiccant Breathers Catalog and on the website for all Watchdog Desiccant Breather models. Corresponding GPM (gallons per minute) ratings are shown there as well. The relationship and formula between these two measurements is figured below.

The Rule of 7.5 GPM = 1 CFM

1. Determine the maximum fluid movement at any given time and convert to Gallons per minute.

2. Divide the total gallons per minute by 7.5

3. The remainder equals your CFM requirement for that specific application.

4. Determine which model within the required Series meets or exceeds that CFM requirement.

*75 GPM ÷ 7.5 =10 CFM, therefore if your application requires less than 75 GPM any model number in any of our eight Series, that is rated at 10 CFM or less, will work for that CFM requirement. It is always OK to over rate the breather but never to under rate the breather.

*Stroking cylinders normally take less time to cycle than one minute and this must also be considered when figured into a formula for the correct GPM. In these instances, measure the time of each cycle and divide that time into one minute to determine your multiple factor. Example: A cylinder strokes every 6 seconds. Divide the 6 seconds of the cylinder cycle into 60 seconds in one minute and you will get 10. Multiple the numbers of gallons moved during the 6 second cycle and multiply by 10 to get the GPM. Then divide by 7.5 to get your CFM. Remember over rating is good!

CORPORATE OFFICE
1235 Hickory Street Pewaukee, WI 53072 USA
Tel: 262.691.9336 **Fax:** 262.691.2576 **Web:** www.tricocorp.com

9555 Rockside Road, Suite 350 Cleveland, OH 44125
Tel: 216.642.3223 **Fax:** 216.642.1484 **Web**: www.predictinc.com

When choosing a breather model, always select a model with a CFM rating greater than the CFM requirements of the tank or reservoir. Installing a breather with inadequate airflow will create excessive pressure or vacuum and will cause damage to the equipment.

Sizing a breather is not determined by the size of the tank or reservoir. It is determined by the maximum fluid movement in or out of the tank converted to GPM and divided by 7.5 to conclude the CFM requirement!

In some circumstances, more than one breather model is required to achieve CFM requirements above a single breather's capability. When using more than one breather you must enlarge the size of the manifold I.D.

When remote mounting, do not crimp or kink any tubing or extensions connected from the breather to the equipment.

Breathers Adsorb Water, not Oil…

Breather performance can be affected by factors other than breather design. Desiccant Breathers are designed to adsorb water only; they are not designed to adsorb oil, fuel, diesel, acids, fumes etc…

3 easy steps on how to choose the right breather model number

Step #1: Evaluate the application environment.
Determine the effect the environment will have on the breather. Consider using the Series that provides the optimum performance over time. Some environments to consider are high humidity, high vibration, limited space, caustic fumes, odor control issues and high dust environments. These environments will affect the life of breather and how the materials the breather is made from would hold up in those conditions.

Step #2: Choose a series designed for the conditions observed.
On the web site under each series heading, you will find the features incorporated into that design. Those features will help you choose the right series for the application. In the case of high humidity or dust, the EX-Series is generally the best solution. For limited space or low airflow requirements, use our mini breathers. Most stationary applications use our standard Watchdog Desiccant Breathers.

Step #3: The best choice will take into consideration the amount of silica gel in the breather, closest available connection threads that match up with the equipment, space available and most important, the CFM rating.

Consider the space available and the pre-determined life expectancy when choosing the breather. Remember, more silica gel equals longer life.

CORPORATE OFFICE
1235 Hickory Street Pewaukee, WI 53072 USA
Tel: 262.691.9336 **Fax:** 262.691.2576 **Web:** www.tricocorp.com

9555 Rockside Road, Suite 350 Cleveland, OH 44125
Tel: 216.642.3223 **Fax:** 216.642.1484 **Web**: www.predictinc.com

Special Notes on Mounting the Breather

1) Allow adequate space to service the breather when determining where or how to mount.
2) Place the breather where it can be seen clearly and maintained easily.
3) Never mount breather on equipment that is too hot to touch. The melt spec. on the breather materials are 200°F. Equipment temperatures over 150°F are not recommended for direct mounting. If the equipment reaches beyond 150°F we recommend remote mounting the breather up and away from the heat source.
4) Never mount the breather at an angle more than 45° vertical.
5) Never mount the breather at a level below the top of the vent hole on the equipment. This works against gravity and eliminates the chance of splashing or foaming oil getting into the breather.

Special Notes:

1. Our **by-pass adapter** blocks excessive oil and keeps it from backing up into the breather. Our by-pass adapter 39207 has check valves that allow air in through the breather but not back out through the breather. Instead, air out is rerouted through the side port of the adapter where it can be contained or recaptured via several methods.

   Unfortunately the adapter keeps air from back flushing the 2 micron filter pad in the top of the breather. When using this adapter, we recommend using our EX breather design with our 1” slip fit connection. The 1” slip fit connection fits into our by-adapter and the EX-Series top cap can be removed and the filter can be serviced and cleaned without having to remove the breather from the equipment. The filter can then be inspected regularly and cleaned off, if necessary, to eliminate solid particles or dust from clogging the particle filter and causing air flow restriction.

2. Our **Vapor Sentry** can be used with our full line of breathers. The Vapor Sentry is capable of capturing small vapors of oil and keeping them from entering into the breather. The Vapor Sentry is very durable and has a durable metal standpipe design. The product has numerous finned surface areas inside. These finned areas help small vapors to accumulate and become heavier drops, which by gravity flow back into the gearbox.

3. We offer a limited number of **activated carbon breathers**. Activated carbon is added into the breather either in the top or bottom in place of or in conjunction with silica gel. It is added to absorb fumes and odors or to protect the silica gel from becoming contaminated by fumes or odors. Activated carbon is only effective on certain chemicals. Carbon in the bottom of a breather limits the effects of heavy vapor. For example, breather 39302 (replacing 39102) has 1/3 activated carbon and 2/3 silica gel. It is important to note the CFM ratings on all breathers using any amount of activated carbon in place of silica gel effectively lower the air flow rating. The carbon is denser compared to the silica gel.

CORPORATE OFFICE
1235 Hickory Street Pewaukee, WI 53072 USA
Tel: 262.691.9336 **Fax:** 262.691.2576 **Web:** www.tricocorp.com

9555 Rockside Road, Suite 350 Cleveland, OH 44125
Tel: 216.642.3223 **Fax:** 216.642.1484 **Web**: www.predictinc.com

4. **Warning:** Three Way Shut-Off Valves are necessary when considering mounting Watchdog Desiccant Breathers on large tanks containing fuels or any fluid which creates fumes or vaporizes easily. Large tanks create heavy vapor issues when filled in such a manner as to churn, turn over (boil) the fluid mixing fumes with water and air that is exhausted out the normal vent hole in the top of the tank. Bottom filling or top filling using high pressure pumps is often the cause of churning the fluid. Desiccant breathers are designed to block airborne contaminants from the day to day breathing process of a reservoir and adsorb moisture from the air. They are not designed to soak up fuel fumes. If exposed to the fumes, these fuels produce during the tank filling process, the breather will become restricted and will not function to its CFM capacity. THIS WILL CAUSE DAMAGE TO THE TANK. When the fuel tank filling process forces a fluid into a reservoir under high pressure, large volumes of air (loaded with fluid vapors and possibly moisture) are forced through the breather in a short period of time. To protect from fume contamination and maximize the life of silica gel, it is recommended to mount a 3 way shut off valve in place of the vent hole and mount the breather on one side of the valve. During the filling of the tank the valve should be turned to vent to the atmosphere and not through the breather. The valve can then be turned to allow the breather to vent the tank and remove moisture and solid particles from the outside environment.
5. It is important to note, silica gel used in Watchdog breathers is dyed with a color indicating dye. The dye changes color (gold to dark blue green) during the process of adsorbing moisture from the air. If the silica gel turns a color other than gold or green, there is probably an issue with heavy vapors or the fluid is coming in contact with the silica gel. The color will vary with the fluid. For example, gasoline contacting silica gel will cause the desiccant to turn white or opaque. Oil will turn the silica gel brown; some hydraulic fluids will turn the silica gel to a reddish color. These color changes should be view as a positive sign and appropriate corrective actions taken to protect the breather's ability to block airborne moisture and solid particles.