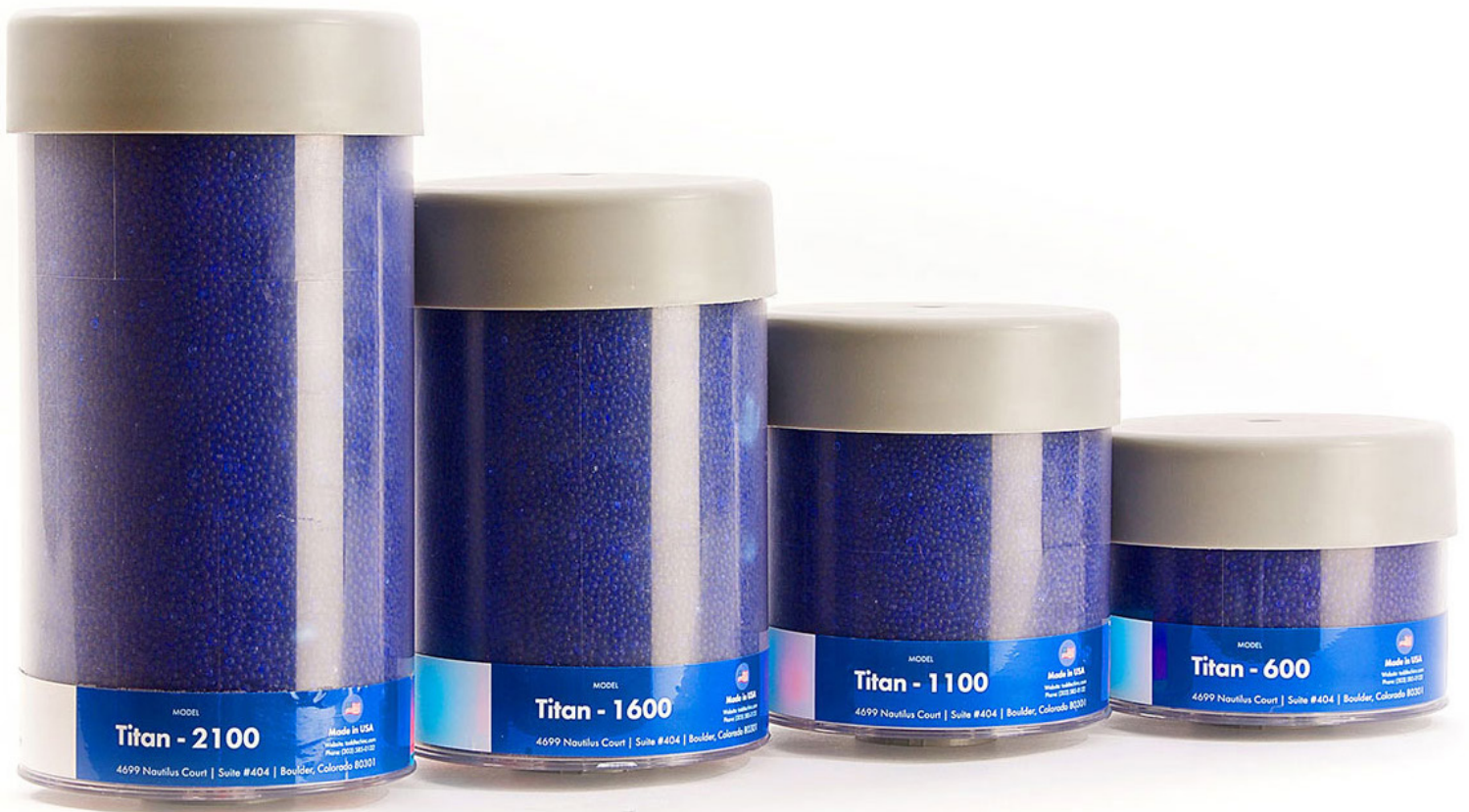




TODD TECHNOLOGIES INC



How to Get More Value from Your Desiccant Breathers

Extend Life, Improve Performance, and Select the Right Supplier

By Todd Technologies Inc

Getting More Value from Your Desiccant Breathers

Desiccant breathers are an important accessory for any lubrication or contamination control program. Over the past few years, they have become a more familiar sight in many industrial plants. How they work has been covered in other, informative [guides on the basics of desiccant breathers](#).

But for those who already know the basics, there is still much to learn about optimizing how desiccant breathers are used in the field.

By understanding your environment and key variables, you can get much more value from your breather spend and extend the service life of these products.



TTI Titan 2100

High flow, extended life Power Breathers are ideal for tank farms and large applications. Options include: standard check-valve technology, SmartFlow™ technology, and no check-valve option for extreme flow applications.



TTI Titan 2100 with SmartFlow™ Adapter, Frac Unit #1—Performing Well After 400 Service Hours.



TTI Titan 2100, Frac Unit—Performing Well After 400 Service Hours.

COMMON APPLICATIONS

If you are already using desiccant breathers on some machines or in some areas of your plant or worksite, you have already taken a key step in the fight against contamination. Since you have already built desiccant breathers into your program, it is easier to add them to other areas of the plant where they may be needed.

While oil reservoirs are common and high-priority applications for breathers, there are other places where adding breathers may bring significant benefits.

Often Overlooked Applications for Breathers

Lubricant Storage

Breathers can and often should be used on day tanks and containers used for dispensing lubricants. Standby equipment should also be fitted with breathers. Another rarely thought of application is attaching a desiccant breather to the bung of oil storage tanks.

Properly addressing these applications can help to stop moisture and other solid contaminants before they ever enter your machines. If you are spending money to keep oil clean and dry in your machines, desiccant breathers are a cost-effective way to maintain fluid integrity and improve the service life of tanks. Adding desiccant breathers to your storage area might improve the life of the breathers used in your machine applications by reducing overall moisture content in your oil. In fact, it just makes business sense—excluding contaminants costs roughly 10% of what it costs to remove them once they get in.

Missed Openings

Another overlooked application for desiccant breathers is missed openings. Many sumps and vessels have more than one egress point installed. It's common to find one breather properly installed immediately adjacent to another unsealed or potentially leaking opening. This is a perfect example of how small oversights often can lead to decreased breather life or effectiveness.

Other Areas of Focus

Other common areas that breathers can be useful are gearboxes, tanks, reservoirs and bearing sumps (process pumps, etc.). When these are intermittently used, they can accumulate water from headspace condensation. Hydraulic reservoirs on systems with linear actuators (cylinders, etc.) take in air with each stroke of the actuators. This air can take on considerable amounts of water and dirt over time.

Oil systems with a fair amount of surge volume, such as a hydraulic system, can especially benefit from properly installed breathers. Because the center of mass of the fluid is moved as part of normal operation, this routinely creates pockets of vacuum or over-pressurization, shifting the headspace to different high points.

Once you have determined the right applications for your breathers, it's time to evaluate the variables at your site.

“ The **Titan Power Breathers** are performing well. Versus leading competitors we used previously, they are offering **greater longevity**. ”

— a TTI Client in the Energy Sector

BREATHER SERVICE LIFE VARIABLES

When selecting applications where breathers may be needed, it's important to think about four key variables:

1. Frequency and volume of air intake
2. Operating pressure of the system
3. Amount of silica gel in the breather
4. Humidity in the application environment

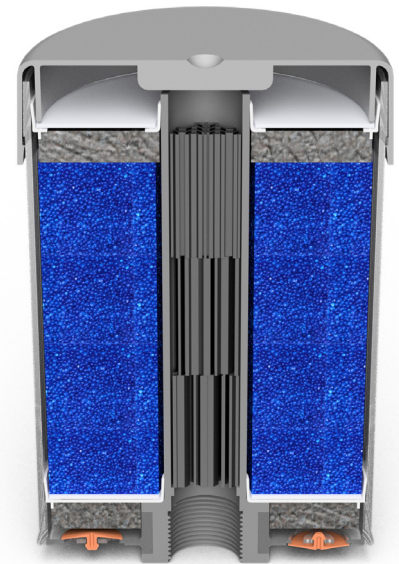
These four are the primary concerns relating to breather service life. While you may be aware of these variables already, you may not know all the ways that they can be controlled. This guide will help you think about ways to improve the life of your desiccant breathers by controlling these variables in ways you may not have explored before.

SUPPLIER SELECTION

Choosing a desiccant breather is about more than just the breather itself. Since these are consumable products that will have to be replaced regularly, your choice of [breather supplier](#) can play a major role in how you outfit, apply and maintain your breathers.

Make sure that your supplier understands your particular application(s) well and is able to provide clear [recommendations for sizing](#) and hardware options. Your supplier should be a partner in these contamination control efforts, offering diverse product options and bringing a “can-do” attitude to challenging or new applications.

In addition, if you rely on breathers to be delivered quickly and on-time, finding a [supplier with a fast delivery](#) and a short lead time (preferably measured in days rather than weeks) can be extremely valuable. If you know that a replacement breather is always fast and easy to get from your [supplier partner](#), that means less cash tied up in extra replacement breathers that may spend a lot of time just sitting on the shelves. Fast service makes replacing breathers a more efficient process.



Interior TTI Titan Power Breather rendering showing the desiccant and filter media.

MAKE SURE YOUR BREATHER IS THE CORRECT SIZE

When you set out to choose a breather, look for suppliers that will help you [size the breather appropriately](#) for your application.

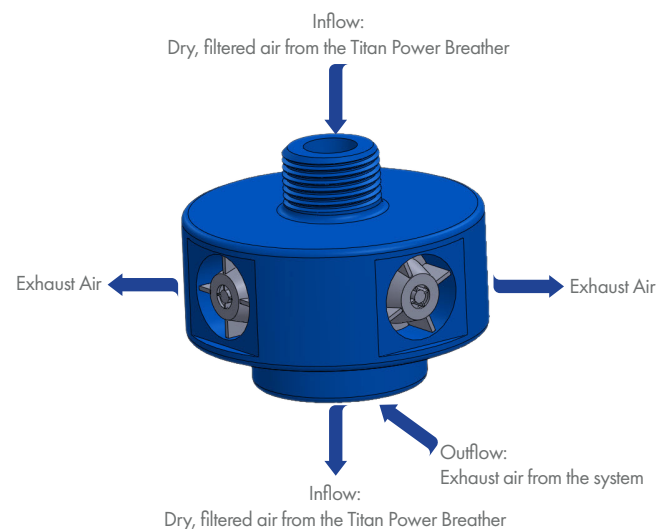
For instance, if you are considering a storage box, drum or tote application, you may assume that a basic, no-frills breather is all you need. But if that application has occasional washdowns or high humidity, choosing a [breather with check valves](#) may significantly improve breather service life.

This is especially true when it comes to managing a machine’s headspace. Stabilizing the cleanliness and dryness of the environment inside a machine’s housing is critical. Although this seems like a simple task on the surface, it can be difficult to accomplish on many systems without the right tools. To effectively manage a component’s headspace, a breather should address both excluding contaminants and removing them. This is accomplished in a single solution with the TTI Titan SmartFlow™ Power Breather. This adapter protects the breather from oil mist and system humidity, resulting in longer breather life while also doing the work of removing moisture from inside the component or machine.

If you are looking at a gearbox application, understanding the maximum airflow (in CFM) and the max reservoir size are both critical to choosing the right breather. If your supplier isn’t asking these questions early and often in your discussions with them, that may be a sign that they are not as strong a partner as they could be for you.

One of the most important factors to consider when looking at desiccant breathers is your airflow rate. Desiccant breathers are sized according to the required cubic feet per minute (CFM). Always choose a breather with a higher CFM capacity than the CFM requirements of your tank or reservoir. Installing a desiccant breather without enough airflow creates excessive pressure causing a vacuum, which will damage the pumps and other system components. It is very important the breather doesn’t restrict air to the point it creates implosion within the system. If you need to convert gallons per minute (GPM) to CFM, the breather manufacturer should have the [corresponding GPM/CFM numbers for your reference](#).

The capacity of the reservoir often impacts how quickly the desiccant may be saturated with moisture. More oil equals more humidity in most cases. Reservoir capacity is also important to consider because the bigger the reservoir, the more headspace fluctuation there might be, which affects the amount of air moving through the breather. Each breather model



The TTI SmartFlow™ Adapter protects the breather from oil mist and system humidity, resulting in long breather life.

has different reservoir capacity requirements, so it's important to check the breather model number for specifics on the amount of CFM air flow capacity going to the reservoir before making your final purchase.

Lastly, desiccant breathers are rated for either continuous or intermittent flow. This is usually important when deciding between our standard Power Breather or Power Breather CV option. In intermittent flows, our Power Breather CV options will help extend the life of the breather.

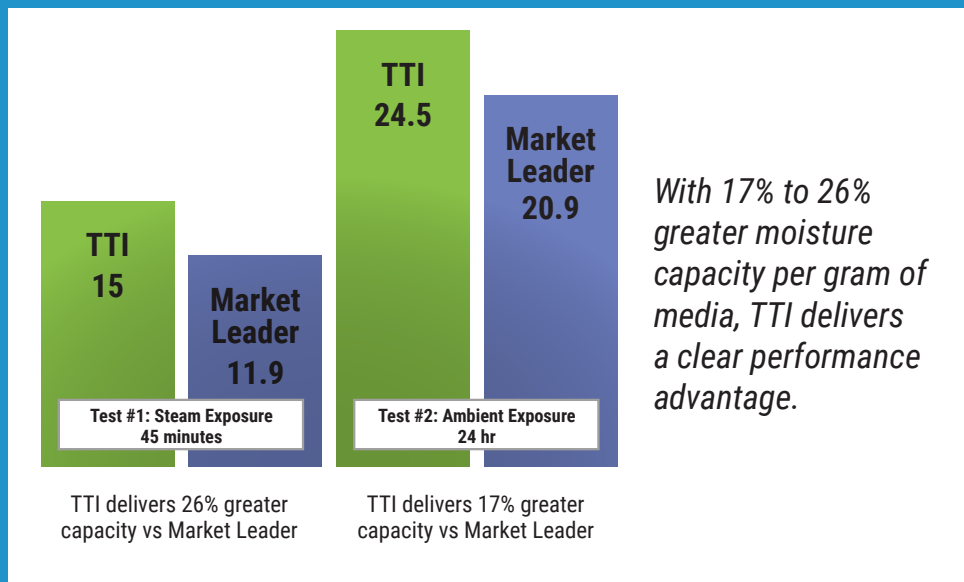
If you would like to benefit from check valve technology in order to mitigate the rate of ingressed contaminants but would also like to achieve the highest flow rates available in conjunction with the greatest gel volume in a disposable breather, our [Titan Power Breather](#) models combine these technologies to deliver a product intended for intermittent applications, high flow systems and long service life.



TTI BREATHER POWER BREATHER TECHNOLOGY

On average in head-to-head trials, TTI Power Breathers have offered 20% more life than leading competitors. This ultimately results in lower reduced maintenance and labor costs and lowers annual breather spend in both unit and freight cost.

TTI offers its industry leading Power Gel and revolutionary Dual Zone Microglass media in several consumable and rebuildable Power Breather options. Our expansive product offerings allow customers to choose the best fit for their application.



Comparison of TTI breather moisture capacity vs market leader.

Breather Sizing and Selection Field Example

A TTI client in the energy services sector was looking to increase the service life of their breathers in several applications, including a Serva model Twin Fluid Pump. The Serva pump was outfitted with two desiccant breathers—one on the passenger's side and one on the driver's side of the machine. The client had previously used other desiccant breathers but was looking at new supplier options to find a better fit for their application.

In discussing the issue, the client reported that competing breathers had typically lasted 500 to 1000 service hours before needing replacement. They were looking for a solution to extend the service life of breathers and asked TTI to help [select a better option](#) for their application.

After discussing the applications, the client decided to use TTI's [Titan 1100](#) on the driver side and a Titan 2100 on the passenger side of the machine.

These two breathers were in place for over 6 months and accumulated 1602 hours of service over that period. The Titan 2100 on the passenger side could have been utilized longer, but the decision was made to switch both out as the unit was down for service at the time.

By the end of the test, the Titan 1100 on the driver side had completely changed color to pink and was due for change. The Titan 2100 was changing to pink at the top but the bottom was still mostly blue (breathers are shown upside down on a bench to the right).

When desiccant color changes from the top down in this way, it likely indicates a higher humidity condition on the inside of the machine. So in this case, the breather was primarily doing the job of drying out the inside of the machine itself rather than the incoming air.

This is a great example of how getting to know your breathers leads to a better understanding of your machine and its needs. Learning more about breathers and tracking their change intervals can even help alert you of machine failure, but more on that in a bit.

While it is difficult to quantify the lifespan of desiccant filters without strict control over ambient temperature and relative humidity, both the smaller 1100 model and larger 2100 model **significantly outlasted the competition** in this application, providing from 37.5% up to as high as 70% greater service life. As described above, choosing proper sizing for each application is one of the keys to success. The TTI Titan 2100 breather still had service life left at the end of the test period, a testament to its longevity.

By optimizing their breather and supplier selection the client was able to achieve their goal. They reported, "The Titan Power Breathers are performing well. Versus **leading competitors** we used previously, they are offering greater longevity."

In the end, the client was very pleased with the performance of their new breathers and the partnership they formed with TTI in the process. Both proper breather size selection and proper hardware options (such as check valves) helped drive this success. TTI's industry-leading Power Gel also plays a major role.



TTI Titan 1100, Serva Twin Pump, Driver's Side—Shown at 613 Service Hours



TTI Titan 2100, Serva Twin Pump, Passenger's Side—Shown at 613 Service Hours



TTI Titan 1100, Serva Twin Pump, Driver's Side—End of Test After 1602 Service Hours



TTI Titan 2100, Serva Twin Pump, Passenger's Side—End of Test After 1602 Service Hours

GET A BREATHER WITH THE CORRECT HARDWARE

This leads us to talking about hardware options. Breathers can be installed directly on many machines with a few simple modifications, but there are also [adapter kits](#) that allow you to seamlessly fill system fluid and sample fluid health, all while leaving the breather in place.

Such adapters, like [these from TTI](#) can simplify and reduce workload, allowing for better and easier procedure documentation.

Without the need to remove the breather, it is much simpler to inspect and make adjustments (as well as set standardized procedures for these elements).

Two examples of such adapters from TTI are shown below:



The TTHA hydraulic adapter kit (left) and TTGA gearbox adapter kit (right).

The [TTGA gearbox adapter kit](#) lets you install desiccant breathers on most gearboxes. The TTGA allows oil to be pumped in or out without exposing the gearbox to the atmosphere. You can tackle offline filtration, oil changes and oil sampling all through the adapter. The TTGA is equipped standard with a union connection at the bottom of the unit, which allows the operator to clock the product with a 45-90 degree orientation, eliminating any oil migration through the breather.

The [TTHA hydraulic adapter kit](#) lets you install desiccant breathers on any hydraulic fluid tank or reservoir. The TTHA has quick-connects for pumping oil in and out, so the system stays closed. Off-line filtration can also be achieved through this adapter without disrupting the breather or opening the tank.

There are many examples of more unusual or extreme environments where the choice of adapters or hardware such as check valves or quick exhaust manifolds (like our Titan SmartFlow™ adapter used on the frac unit in the success story above) can bring major improvements to breather service life.

- Limited space applications: gearboxes, drums, totes and small oil containers.
- High humidity/dust applications: Paper mills, power plants, wash-down areas, steam cleaning rooms and mine quarries are good examples of high humidity applications. In these applications, use TTI's CV (check valve) options found in both the Power Breather and Titan Power Breather lines.
- High vibration applications: cranes, railroad maintenance vehicles, construction vehicles and off-road trucks benefit from the Titan Power Breather line designed for vibration and mechanized shock.
- Extreme environment applications: Exposed equipment like windmills and wind power turbines, mining equipment, farm equipment and off-road vehicles.
- Caustic fumes/gaseous applications: Airport boarding jetways, hydraulic fluid reservoirs, forklifts and baggage haulers.

OTHER TIPS FOR EXTENDING BREATHER SERVICE LIFE

Space the Breather Away from the Reservoir

One hardware change that is very simple to implement but often overlooked is spacing the breather away from the reservoir. By adding a length of pipe between the breather connection and the reservoir, the breather is protected against oil mist that can quickly reduce both the effectiveness of the desiccant and the overall service life of the breather.

The Titan SmartFlow™ Power Breather model can also help extend the breather's life by allowing for all headspace contamination (humidity, oil mist or splashing) to exhaust through the SmartFlow™ adapter prior to contacting the breather's silica gel.

Position the Breather for Optimal Life

Taking reservoir spacing considerations even further, it is possible to port out your breather as far as 30 feet from the reservoir connection point. This can accomplish two things: protecting the breather from the oil mist of the reservoir itself and also protecting the breather from any ambient conditions that may be shortening its life.

If steam exhaust, water spray, or jets of moist air are frequently coming in contact with the breather, porting it to a different spot may offer significant protection from these environmental issues and give the breather a much longer service life.

Reduce Ambient Moisture

If there is no way for the breather to escape the ambient moisture in your facility, it may be time to consider other ways to reduce the moisture level in the air overall. Focus on reducing steam leaks or leaky water lines resulting in a spray. This can help extend the life of breathers, but it also may help in other aspects of caring for your machines and keeping your lubricants clean, cool and especially dry.

Reduce Lubricant Moisture Level

As mentioned earlier, reducing the moisture level of your lubricants before they even enter the machine by adding desiccant breathers to lubricant storage equipment can help extend the life of the breathers on your machines. The desiccant not only reduces the humidity of incoming air, but also that of the headspace. The use of desiccants can even reduce the moisture level in a lubricant over time.

There are many other tools out there for reducing moisture in lubricants and some of these may come into play if you are looking for ways to combat moisture while extending the life of your breathers at the same time.

Headspace Management

The [headspace](#) you are dealing with is important to keep in mind, as it can help determine the amount of “breathing” that will occur inside the machine. Therefore, it is imperative to understand how much the headspace can fluctuate.

For instance, the headspace in a splash-lubricated gearbox will fluctuate less than that of a [hydraulic system](#) reservoir where there are large volumetric changes within the sump. This volumetric flow rate must be within the breather's capabilities, or it may cause a vacuum or pressurization condition inside the component.



A TTI Titan Power Breather in the field.

MACHINE “END OF LIFE” CONCERNS

When an aging machine enters its last phase of life, increasing clearances allow moisture to enter the machine more easily, contaminating the oil at a higher rate.

For machines nearing the end of their service life, tracking the time between breather replacements or filtration events

can be a great indicator to alert you of machine failure. This can be used in your predictive maintenance program to better plan for machine repairs.

CONCLUSION

For those who want to improve their contamination control practices, desiccant breathers are a must in many applications. Because these are consumable products, finding a supplier partner you trust to advise you on best practices and proper sizing, hardware and installation in your applications is critical.

A partner like TTI can offer all these benefits and more. That is the [TTI Difference](#), a promise to our customers that we are here to partner with them and, with the help of industry-leading technology and exceptional lead times, we deliver on that promise.

