



# AIR SENTRY

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## APPLICATION FIELDS

Air Sentry® Breathers are relied upon in many industries for their long lasting and quality performance.

Select an industry to learn about their applications.



BULK MATERIAL HANDLING

CEMENT AGGREGATE

FUEL STORAGE

GEAR BOXES

HYDRAULIC RESERVOIRS

POWER GENERATION

MOBILE EQUIPMENT

MINING INDUSTRY

RAILROAD MAINTENANCE-OF-WAY EQUIPMENT

SERVICE TRUCKS

STEEL PRODUCTION

TRANSFORMERS

WASTEWATER TREATMENT

WIND TURBINES





# Bulk Material Handling

**Air Sentry®**

Bulk material handling terminals load, unload and store material such as coal, aggregate and ore. The conveyor systems are used to move various materials. Each system is equipped with large drives, gearboxes and bearings that have oil and lubrication reservoirs. Air Sentry® breathers provide protection from airborne dust and moisture.



*Conveyor systems move large amounts of material around a facility on a daily basis. This material can create dust, which can get into the system's oils and wreak havoc over time on equipment. Install an Air Sentry® breather to protect against oil degradation.*

For extreme conditions, such as a bulk material facility where dust and dirt are a constant, we recommend the X-Series breathers for maintaining clean, dry oils and greases in your equipment. The X-Series breathers incorporate check valves in the top cap to extend the life of the filter media and desiccant.



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# Cement and Aggregate

**Air Sentry®**

Cement and aggregate facilities are dusty, dirty, humid environments. Sand, gravel, crushed stone and water are in use in many forms throughout the facility. Keeping solid particles and water vapor out of oils and machinery is important.



*Air Sentry® breathers prevent solid debris contamination, which is common in the cement and aggregate industry.*

Mobile equipment such as cranes and shovels are used to move materials around the facility or place them on conveyor systems. They are also used to dig or dredge the sand and gravel from lakes, rivers and streams. Hydraulic systems and gearboxes on the mobile equipment are subjected to dust and humidity continuously. Protecting the oils from water vapor and solid particulates keeps the systems running smoothly.

Bulk material handling terminals load, unload and store the fine and coarse aggregates. The conveyor systems are used to move various materials. Each system is equipped with large drives, gearboxes and bearings that have oil and lubrication reservoirs. Air Sentry® breathers provide protection from airborne dust and moisture.

For extreme conditions, like what can be found on equipment in a cement and aggregate facility, many breathers can be used. The M-Series breathers provide rugged steel housings for the most extreme conditions. The XR-Series combines the strength of the steel base plate with the controlled airflow of check valves in an economical disposable cartridge. For applications where vibration or rough ground isn't an issue, the X-Series breathers contain two check valves in the top cap to protect the breather and equipment from air ingress unless it's necessary.



**Air Sentry®**



# Fuel Storage

Fuel storage tanks located indoors, outdoors and underground are subject to accumulations of moisture and dust through vent caps. The cleaner the fuel, the more reliably it will perform when used.



*Air Sentry® breathers protect stored fluids from moisture and dirt for extended periods of time.*

Tanks store fuel for vehicles and equipment used at construction sites, shipyards, sawmills, petrochemical plants, rail yards, mines, quarries, manufacturing plants, etc. Outdoor storage locations are subject to the extremes of the environment.

Local environmental regulations often mandate use of biodegradable fuels in order to protect ground water, should a leak occur in the underground storage tanks.

Air flow requirements for all fuel storage tanks are complicated heavy vapors that are released by the fuels. These heavy vapors can overwhelm desiccant breathers in a short period of time.

A bypass or shut off valve should be installed between the tank vent and the breather to allow the heavy vapors to escape to atmosphere, instead of through the breather.

At left, two Air Sentry® X-122 breathers are mounted on a manifold, as an example of the type of bypass or shut off valve that should be used. A two way valve permits heavy vapors to vent to atmosphere during the filling of the fuel tank.





**Air Sentry®**



# Gearboxes

Gearboxes are used on various types of industrial machinery to provide increased torque while reducing speed from one type of rotating power source to another using gear ratios. A gearbox can be set up to do the opposite and provide an increase in speed with a reduction of torque. Some of the simplest gearboxes merely change the physical direction in which power is transmitted.



*Defend your gearbox against the ingress of water vapor and small particles with an Air Sentry® breather.*

Gearboxes are used in many applications, such as wind turbines, conveyors, draglines, bridges, wastewater treatment pumping systems, and many other large pieces of machinery that require a power source.

The Air Sentry® X-100 is the most commonly recommended breather for gearboxes. Airflow requirements for gearboxes are usually very low, as the fluid level rarely changes. Dual check valves in the top cap open at minimal pressure changes, allowing air to flow in and out as needed while maximizing the life of the silica gel. Replacement silica gel cartridges allow for easy, economical change out that create no down time for the equipment being protected from dirt and moisture.

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# Hydraulic Reservoirs

Air Sentry® breathers are used in many industries, on many types of equipment, to protect the hydraulic fluids within the reservoirs from dirt and moisture present in the air and surrounding environment.



*Hydraulic systems are present in every industry in almost every setting imaginable. Protecting the hydraulic system oil from contaminants and maintaining ISO cleanliness standards is the first step in a preventative maintenance program.*

Hydraulic systems consist of three parts: a hydraulic pump driven by a motor, valves to guide the system, and the motor. Hydraulic fluids and oils are stored in a reservoir attached to the hydraulic system. Hydraulic reservoirs vary in terms of capacity, but need to be large enough to accommodate the thermal expansion of fluids and changes in fluid level due to normal system operation.

Hydraulic cylinders and pumps move the hydraulic fluid through the system, powering the hydraulic drive system. If the hydraulic fluid is not kept free from dirt and moisture, it can degrade over time and create wear in the system or lead to a breakdown of equipment.

Fluid contamination is the primary cause of component wear and shortened fluid life in hydraulic systems. Hydraulic fluid will last 3 to 4 times as long if kept clean and dry.

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# Draglines & Shovels

**Air Sentry®**

Draglines and shovels are used in civil engineering and surface mining operations and are some of the largest pieces of heavy equipment built. The ropes and chains used to move the boom and bucket are powered by electric or diesel motors.



*Keeping machinery up and running is a necessity. Keeping the fluids that power the machinery clean is essential.*

Open pit draglines and shovels operate in some of the most challenging and harsh environments in the world. Dust and dirt, as well as humidity, are a constant threat to the fluids and oils used in the gearboxes, swing cases, fuels and hydraulic systems.

Dragline and shovel operators rely on oil analysis to alert operators to developing problems. Air Sentry® breathers are used as an integral part of the program to protect the equipment and keep the fluids clean and dry.

The best solution is the Air Sentry® XR-Series breathers for extreme applications, where dust, dirt, moisture and vibration are all part of the standard operating conditions.



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# Mobile Equipment

Mobile equipment faces some of the harsher operating conditions for hydraulic systems and lubricating moving parts. As equipment costs, wages for service technicians and the cost of operating the equipment continue to increase, a simple solution is available to help reduce maintenance and downtime costs.



*Heavy vehicles and mobile equipment are indispensable to many industrial activities.*

Installing an Air Sentry® breather to filter the air entering the hydraulic systems, keeping it clean and free of solid particles can save time and money.

Dust and dirt, as well as humidity, are a constant threat to the fluids and oils used in hydraulic systems. Air Sentry® breathers are used as an integral part of the program to protect the equipment and keep the fluids clean and dry. Many options are available to use on mobile equipment including the R-Series, the XR-Series and the M-Series. All are designed for extreme conditions, where dust, dirt, moisture and vibration are all part of the standard operating conditions.

All Air Sentry® breathers can be remotely mounted with extension tubes to help protect the silica gel from heavy oil vapors and mist.

The Air Sentry® Splash Sentry™ is designed to protect fluids from splashing up into the breather during operation. The M-Series breathers have the Splash Sentry™ built into the standpipe. The R- and XR-Series breathers will allow the connection of the Splash Sentry™ directly into the base plate.

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# Power Generation

Coal fired power generation plants produce electricity making conveniences of modern life possible. The process and environment from which power flows is challenging for equipment. Water and coal dust are ever present. This combination of moisture and dust are the two most common avoidable contaminants found in lubricants.

For this environment, the Air Sentry® X Series or XR Series is the best choice for performance, serviceability and value. For stationary applications, Air Sentry® X Series, with double check valve design, delivers maximum life for the silica gel desiccant and the cost savings of a replaceable cartridge. The double check valve design allows air exchange as needed, while maximizing desiccant life in a wet, humid environment. For mobile or high vibration applications, such as conveyor lines, the XR Series with metal reinforced base is the best choice.

Pump manufacturers report a 50% increase in service life if pump lubricants are protected from airborne contaminants. Bearing manufacturers report a 3 fold increase in bearing life when lubricants maintain ISO cleanliness standards. With Air Sentry® on duty, equipment is more reliable, downtime is reduced and return on investment increases.



*Coal fired power plants are dirty, humid environments that operate continuously. Maintaining the life of the oils is a must, as performance is critical.*

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# Railroad Industry

Railroad Maintenance-of-Way equipment is used to clean, maintain and repair railroad tracks. Hydraulic systems are used to remove and insert new spikes, replace the ties, and move the rail. When this equipment is dispatched to perform maintenance, there is a limited window of opportunity to work before the next train comes along. Depending on the type of equipment and the job it does, the environment can be very dusty. Hydraulic systems that enable the machine to do the required work must be reliable and free of moisture and dirt.



*The railroad industry is one of the oldest means of transport in modern times. Maintaining our railways is vital to industry.*

Equipment vibration is a major concern, as the equipment travels down the track. A major US Railroad was concerned that the standard disposable breathers might not withstand the hours of vibration. Air Sentry, in conjunction with the railroad, developed the R-Series breathers. The R-Series offer a steel reinforced base plate designed to withstand the vibration.

In order to maintain a positive pressure of 5 psi required on certain hydraulic reservoirs, the A-306 Pressure Relief valve is used with the R-111 breather.

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# Service Trucks

Lubricant service trucks have tanks or reservoirs for different grades of motor oils, synthetic oils or hydraulic fluids used to support the lubrication needs of off road and construction equipment. These fluids must be kept clean during transit to maintain ISO cleanliness standards established by the OEM.



*Lubricant service trucks hold a wide variety of fluids to support the needs of off road and heavy equipment.*

When choosing a breather for a mobile application, the Air Sentry® R-Series or XR-Series is the best solution for the physical and environmental application requirements. The R-Series is designed with a reinforced metal plate capable of with standing the high vibrations typically caused by off road conditions. The XR-Series incorporates the metal base plate of the R-Series for high vibration requirements and the check valves of the X-Series for high humidity and dust environments, along with a replacement desiccant cartridge for affordability.

Remotely mounting the breather may be necessary to keep oil from splashing into the breather. The Splash Sentry™ adapter, available in either the 1" or 2" NPT, compliments the R-Series or XR-Series breather, to help protect the silica gel from being contaminated with splashing oil.

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# Steel Production

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The environment inside steel mills is hot, dusty and often humid. These conditions make desiccant breathers a necessity for companies who establish ISO standards for their lubricants and work to maximize plant efficiencies.



*With hot, humid conditions, steel production is a prime example of an extreme environment where oils must be protected from moisture ingress. Air Sentry® breathers installed on equipment will protect against water in the oil.*

The typical applications found in steel mills include hydraulic systems, gearboxes, and lubrication systems. Some hydraulic systems are large (5000 gallons) and require multiple breathers to accommodate the maximum air flow requirements.

This hydraulic system, at left, has five Air Sentry® D-109 breathers to handle the air flow created by the potential maximum fluid flow.



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# Substation Transformers

Substations transform the electric voltage from a high voltage to a lower voltage, or from a low voltage to a higher one. The liquid filled transformers have insulating oil reservoirs that hold fire resistant insulating fluid. The insulating oil serves two purposes. It serves as electrical insulation to withstand the high voltages present in the transformer and it dissipates heat generated within the transformer. The oil must maintain maximum dielectric strength and resist degradation from heat and oxidation. When transformers fail, it leads to high repair costs, long downtime and possible safety risks. Moreover, transformers are too expensive to replace regularly and must be properly maintained to maximize their life expectancy.



*The transmission of electricity to our homes and workplaces is crucial to our daily lives. Control contamination of the transformer oils by posting an Air Sentry® breather to guard against dirt and moisture.*

As part of a complete preventative maintenance program, oil analysis should be used to monitor the condition of the transformer oil and predict problems before they occur. A study by Hartford Steam Boiler over a period of 20 years indicates that 13% of all transformer failures were caused by inadequate maintenance. This number is significant, considering the study found that the average age of a transformer at the time of failure was only slightly more than 11 years; transformers are expected to last 25 to 30 years.

Prior to the installation of the Air Sentry® breathers shown, these reservoirs were open to the environment, with little more than a screen cover over the vent hole. Air Sentry® D-102 breathers were mounted on 190 gallon fluid reservoirs of each substation transformer. The use of desiccant breathers with a 2-micron filter will protect the insulating fluid from dirt and moisture, extending the life of the insulating fluid by up to 50%.

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# Wastewater Treatment

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Wastewater treatment plants vary in design to meet federal, state and local regulations. Most facilities have similar equipment and applications for desiccant breathers.



*Keeping the pumps, gearboxes and hydraulic reservoirs that run the treatment facility free of contaminants is a full time job.*

Typical applications

include lubrication reservoirs on wastewater pumps, gearboxes and hydraulic systems. Pumps move wastewater step by step throughout the process. Gearboxes are found on equipment such as rotating biological contactors (RBC), clarifiers and conveyors.

Most of the processing equipment is located outdoors, subject to the high humidity in the area and exposed to extremes of weather. This gearbox is located at end of a rotating biological contactor (RBC). Inside are panels or media discs which support the process of breaking down solid waste.

An Air Sentry® X-100 desiccant breather was chosen for this application to help extend the useful life of the synthetic lubricant. Compared to other brands, the check valve design may double the life of the silica gel desiccant. Moisture blocked by the breather is adsorbed, causing gold to green color change, making it easy to see when it is time to change out the breather.



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# Wind Turbines

The wind energy industry has grown substantially over the last few years. Protecting the planet's natural resources is a growing desire for many.

On a wind farm, windmills generate the electric power necessary. These windmills are powered by large gearboxes and hydraulic systems. Preventative maintenance on these systems is scheduled over long periods of time. Protecting the oils in the reservoirs and gearboxes is critical, not only because of the extended maintenance schedule, but also because replacing these oils creates a demand for more of the natural resources we are preserving.



*Wind Turbines harness the wind's energy to protect the earth's natural resources. Using an Air Sentry® breather to protect the life of the oils in a wind turbine will conserve the oils in use.*

Large gearboxes are used to position the windmills. Hydraulic systems change the pitch of the blades. Both systems work together to maximize the efficiency of the windmill and to shut down the windmill during storms.

Air Sentry® GUARDIAN® breathers are the best solution for this application, allowing for extended time between maintenance intervals. The GUARDIAN Series combines multiple check valves at top, exhausted air sent to atmosphere and an internal isolation check valve to eliminate any gear oil mist or splashing. It also has a metal reinforced plate molded into the bottom cap, to withstand vibration. The XR-Series is the next best solution and combines the features of the X-Series, incorporating check valves to allow air movement only when necessary, and the R-Series, incorporating the metal reinforced base plate for high vibration. The GUARDIAN and XR-Series have the added benefit of replacement desiccant cartridges, reducing the waste going into our landfills.

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