GIEBEL Adsorber®

Product brochure

Adsorbers

Discoverd the first signs of **corrosion?**

Have you taken a look in the tank and discovered the **first signs of rust?** Does your last oil measurement show that the service **oil has clearly lost quality**? Annoying, because you fear that you are now facing hours of maintenance work, oil changes and high costs. Aren‘t you?

The villain: Water. We need it to live, but for machines it is deadly. A **few drops of condensate are the start of corrosion** on metal surfaces, loss of quality in hygroscopic fluids, poor lubrication on gearboxes, hydrolysis in transformers.

And moisture eeeeeeasily finds its way into systems, because **machines constantly draw in air during operation to equalize pressure**.

We offer you a **solution!**

This is what you need: a filter that keeps the water out of your machinery - exactly what GIEBEL Adsorbers® do.

GIEBEL Adsorbers® help you to prevent corrosion, protect operating oils, make your systems durable, cost-effective and most importantly: **less susceptible to maintenance**.

Learn how they work on the following page.

4 steps to **less maintenance!**

SOLUTIONS

01
Adsorbers

02
Accessories

03
GIEBEL
Xdry®

04
GIEBEL
Sense®

05
GIEBEL
Refresh®

APPLICATION AREAS

00
Applications

01
Hydraulics

02
Gears

03
Storage tanks

04
Barrels & IBC

05
Transformers

SUCCESS STORYS

Want to learn more about solving problems caused by moisture?
Then it‘s worth taking a look at our websites:

Europe
www.giebel-adsorber.de
www.giebel-desiccants.com

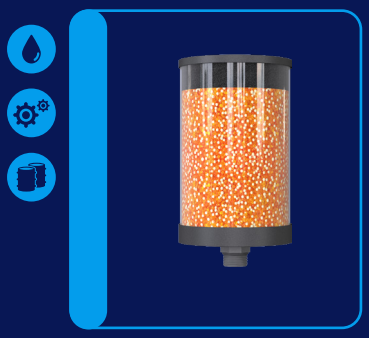
USA
www.giebel-adsorber.com

China
www.giebel-adsorber.cn

ADSORBERS

Breather dryers / Dehumidifiers
to prevent humidity entering your system

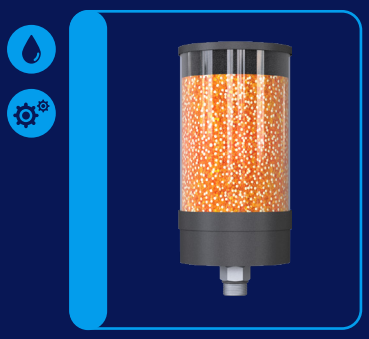
Water separators
to prevent liquid water entering your system



VV-D

*Disposable breather dryers, developed to **protect hydraulics, gears, drums and IBCs with constant air exchange and short maintenance intervals** in indoor, outdoor and offshore use against moisture damage.*

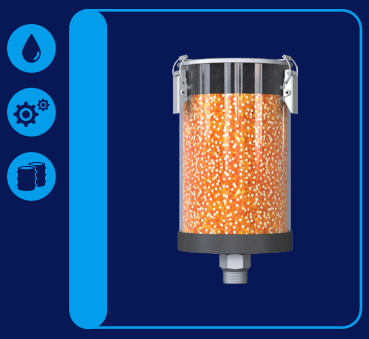
The plastic housing is filled with GIEBEL Xdry® and a 3µm filter to ensure effective drying and cleaning of supply air. A layer of activated carbon adsorbs escaping oil mist when the air is pressed out - to protect desiccant and environment from contamination. Once the adsorber is saturated, it is replaced.



VV-DV

*Disposable breather dryers, developed to **protect hydraulics and gears under dusty environments or when minimal pressure build-up is required even with high air flows** in indoor, outdoor and offshore use against moisture damage.*

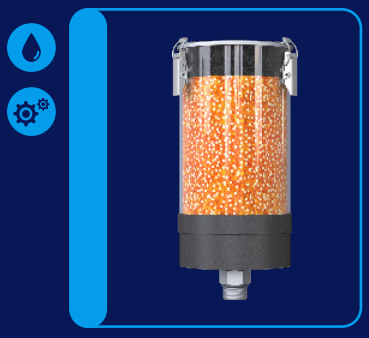
The plastic housing is filled with GIEBEL Xdry® and a 3µm filter to ensure effective drying and cleaning of supply air. A layer of activated carbon adsorbs escaping oil mist when the air is pressed out - to protect desiccant and environment from contamination. Once the adsorber is saturated, the cartridge is replaced.



VV-R

*Rechargeable breather dryers without valves, developed to **protect hydraulics, gears, barrels and IBC with constant air exchange and short downtimes** in indoor and outdoor use against moisture damage.*

The plastic housing is filled with GIEBEL Xdry® and a 3µm filter to ensure effective drying and cleaning of supply air. A layer of activated carbon adsorbs escaping oil mist when the air is pressed out - to protect desiccant and environment from contamination. Once the adsorber is saturated, all components of the inner workings can be replaced at low cost.



VV-RV

*Rechargeable breather dryers with valves, developed to **protect hydraulics and gears under dusty environments or when minimal pressure build-up is required even with high air flows** in indoor, outdoor and offshore use against moisture damage.*

The plastic housing is filled with GIEBEL Xdry® and a 3µm filter to ensure effective drying and cleaning of supply air. A layer of activated carbon adsorbs escaping oil mist when the air is pressed out - to protect desiccant and environment from contamination. Once the adsorber is saturated, all components of of the inner workings can be replaced at low cost.

Oil mist separators / Aerosol filters to prevent oil mist & pollutants escaping your system

Gas separators to filter humidity and specific gases from process air

Fits **hydraulics**

Fits **gears**

Fits **storage tank**

Fits **barrels & IBC**

Fits **transformers**

MA-R

*Rechargeable breather dryers without valves, developed to **protect barrels and IBC filled with isocyanates, polyols, DOT4, SKYDROL, hygroscopic solvents or oils** in indoor and outdoor use against moisture damage. MA-R **comply with the ATEX** product directive 2014/34/EU and are available with FKM and EPDM seals.*

The aluminium housing is filled with GIEBEL Xdry® and a 3µm filter to ensure effective drying and cleaning of supply air. A layer of activated carbon adsorbs escaping oil mist when the air is pressed out - to protect desiccant and environment from contamination. Once the adsorber is saturated, all components of the inner workings can be replaced at low cost.

MA-RV

*Rechargeable breather dryers with valves, developed to **protect hydraulics and gears in harsh environments or with aggressive operating fluids** in indoor and outdoor use against moisture damage. MA-RV **comply with the ATEX** product directive 2014/34/EU and are available with FKM and EPDM seals.*

The aluminium housing is filled with GIEBEL Xdry® and a 3µm filter to ensure effective drying and cleaning of supply air. A layer of activated carbon adsorbs escaping oil mist when the air is pressed out - to protect desiccant and environment from contamination. Once the adsorber is saturated, all components of the inner workings can be replaced at low cost.

ME-RV

*Rechargeable breather dryers with valves, developed to **protect hydraulics, gears in the chemical industry or exposed to salt air** in indoor, outdoor and offshore use against moisture damage. ME-RV **comply with the ATEX** product directive 2014/34/EU and are available with FKM and EPDM seals.*

The stainless steel housing is filled with GIEBEL Xdry® and a 3µm filter to ensure effective drying and cleaning of supply air. A layer of activated carbon adsorbs escaping oil mist when the air is pressed out - to protect desiccant and environment from contamination. Once the adsorber is saturated, all components of the inner workings can be replaced at low cost.

MS-R

*Rechargeable breather dryers without valves, developed to **protect large storage tanks of more than 60cbm** in indoor, outdoor and offshore use against moisture damage. MS-R **comply with the ATEX** product directive 2014/34/EU, meet the criteria of **corrosivity category CX** and are available with FKM and EPDM seals.*

The stainless steel housing is filled with GIEBEL Xdry® to ensure effective drying and cleaning of supply air. Once the adsorber is saturated, all components of the inner workings can be replaced at low cost. In combination with a venting system and a supply air valve, the air flow into and out of a tank can be controlled.

VG-D

*Disposable oil mist separators without valves, developed to **protect hydraulics, gears, barrels & IBC - especially turbo gearboxes, test benches and recirculating oil lubrication systems** - in indoor and outdoor against the escape of oil mist.*

The plastic housing is filled with activated carbon. Combined with a slosh protection and oil demister, the activated carbon cleans the air coming out of the unit, protecting the environment from oil aerosol contamination. Once the adsorber is saturated, it is replaced.T4 according to the ATEX product directive 2014/34/EU.

VG-R

*Rechargeable oil mist separators without valves, developed to **protect hydraulics, gears, barrels & IBC - especially turbo gearboxes, test benches and recirculating oil lubrication systems** - in indoor and outdoor against the escape of oil mist.*

The plastic housing is filled with activated carbon. Combined with a slosh protection and oil demister, the activated carbon cleans the air coming out of the unit, protecting the environment from oil aerosol contamination. Once the adsorber is saturated, all components of the inner workings can be replaced at low cost.

TB-RV

*Rechargeable dehumidifiers, developed to **protect transformers** in indoor and outdoor use from moisture damage.*

The plastic housing is filled with GIEBEL Xdry® and a 2µm filter to ensure effective drying and cleaning of supply air. A layer of activated carbon adsorbs escaping oil mist when the air is pressed out - to protect desiccant and environment from contamination. Once the adsorber is saturated, all components of of the inner workings can be replaced at low cost.

TM-RV

*Rechargeable dehumidifiers, developed to **protect transformers in zone II 2 G / D IIC T4 according to the ATEX product directive 2014/34/EU** in indoor, outdoor and offshore use from moisture damage. TM-RV meet the criteria of **corrosivity category CX**.*

The stainless steel housing is filled with GIEBEL Xdry® and a 2µm filter to ensure effective drying and cleaning of supply air. A layer of activated carbon adsorbs escaping oil mist when the air is pressed out - to protect desiccant and environment from contamination. Once the adsorber is saturated, all components of of the inner workings can be replaced at low cost.

VL-D

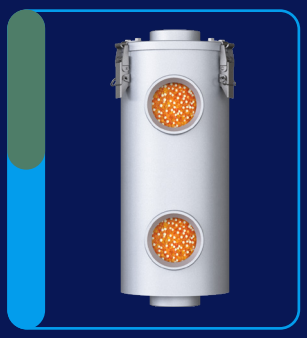
*Disposable inline filters, developed to **dry and filter pipeline air streams of storage tanks** from moisture and specific gases.*

Inside the plastic housing, a bed of GIEBEL Xdry® ensures effective drying of process air. In addition, a filter is integrated that separates abrasion and ambient dirt. When the adsorber is saturated, all components of the inner workings can be replaced at low cost. If required, the inline filters can be filled with molecular sieves (3A, 4A, 5A, 13X) to filter specific gases. With a DN50 thread, even large volume flows can be fed through the adsorber.T4 according to the ATEX product directive 2014/34/EU.

VL-R

*Rechargeable inline filters, developed to **dry and filter pipeline air streams of storage tanks** from moisture and specific gases.*

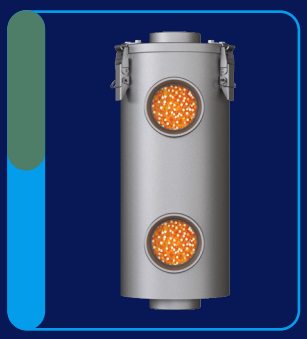
Inside the plastic housing, a bed of GIEBEL Xdry® ensures effective drying of process air. In addition, a filter is integrated that separates abrasion and ambient dirt. When the adsorber is saturated, all components of the inner workings can be replaced at low cost. If required, the inline filters can be filled with molecular sieves (3A, 4A, 5A, 13X) to filter specific gases. With a DN50 thread, even large volume flows can be fed through the adsorber.



VM-R

*Rechargeable inline filters, developed to **dry and filter pipeline air streams of storage tanks in extremely harsh environments or in explosion protection zones according to ATEX 2014** from moisture and specific gases.*

Inside the aluminium housing, a bed of GIEBEL Xdry® ensures effective drying of process air. In addition, a filter is integrated that separates abrasion and ambient dirt. Once the adsorber is saturated, all omponents of the inner workings can be replaced at low cost. If required, the inline filters can be filled with molecular sieves (3A, 4A, 5A, 13X) to filter specific gases.



VE-R

*Rechargeable inline filters, developed to **dry and filter pipeline air streams of storage tanks in extremely harsh environments or in explosion protection zones according to ATEX 2014** from moisture and specific gases.*

Inside the stainless steel housing, a bed of GIEBEL Xdry® ensures effective drying of process air. In addition, a filter is integrated that separates abrasion and ambient dirt. Once the adsorber is saturated, all omponents of the inner workings can be replaced at low cost. If required, the inline filters can be filled with molecular sieves (3A, 4A, 5A, 13X) to filter specific gases.

HS-D

*Waterseparators to **protect gears from water droplet ingress** while allowing them to breathe.*

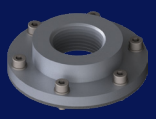
HS-D membrane filters are an excellent alternative to adsorbers when liquid water is a challenge but moisture is not a problem. With the help of an ePTFE filter in the core of the robust polyamide housing, the gear oil is protected from contamination by water, even if the transmission is used outdoors or cleaned with water.

ACCESSO-RIES

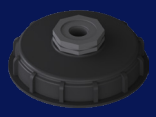
Fits **hydraulics**
Fits **gears**
Fits **storage tanks**
Fits **barrels & IBC**
Fits **transformers**

Assembly

Use these accessories for the installation of adsorbers in confined or difficult to access spaces or with very special connection requirements.



Flange adapters
for easy adsorber installation on hydraulics.

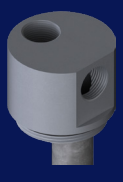


IBC covers
for easy adsorber installation on IBC.

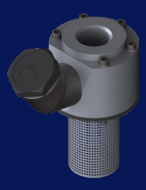
Wall mounts
for flexible adsorber installation in confined spaces.

Mounting adapters
for offset or horizontal adsorber installation in confined spaces.

Adapters
for easy adsorber installation on existing threads.



Suction lances
for connecting barrel pumps or bypass filter systems and extracting substances from the tank bottom during the adsorber operation.



Filling adapters
for refilling oil into hydraulic power units or gearboxes during the adsorber operation.

Monitoring

Use these accessories for monitoring the loading status of adsorbers.

Sensors

for monitoring the loading status of an adsorber and planning maintenance intervals.

Protection

Use these accessories for protecting adsorbers in harsh environments, against overpressure and underpressure, swelling and against escaping oil mist.

Oil demisters

for protecting adsorbers and the environment from contamination by larger oil particles.

Valve adapters

for holding existing tank preloads during the adsorber operation.

Protection adapters

for monitoring positive and negative pressure during the adsorber operation and protecting machines in the event of danger.

Protection hoods

for protecting adsorbers in harsh environments.

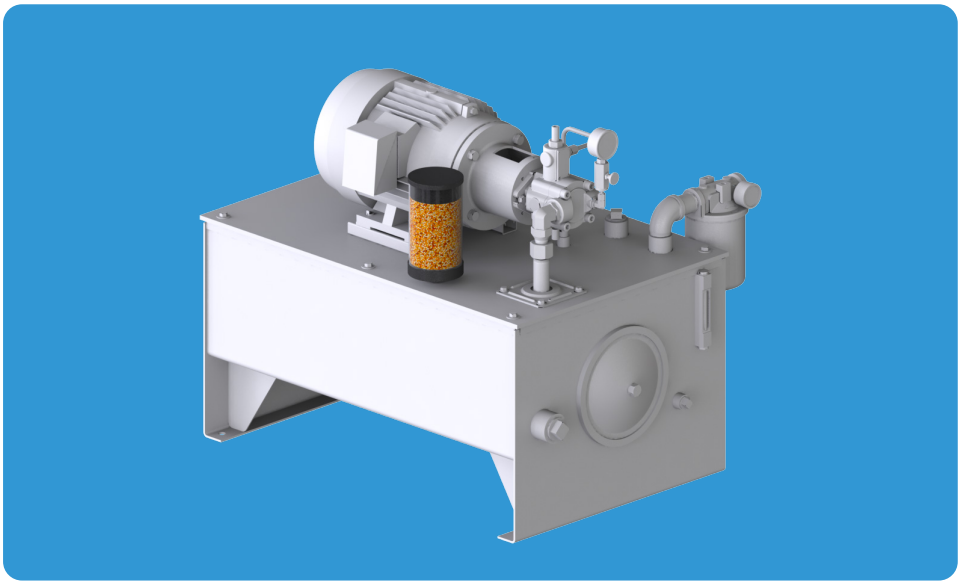
Ventilation

Use these assessories for filling or emptying tanks without vapor recovery.

Ventilation systems

for filling or emptying tanks without vapor recovery during the adsorber operation.

HYDRAULICS



Protect **hydraulics** against corrosion, loss of oil quality, poor lubrication & the escape of pollutants.

Have you noticed condensation droplets inside your hydraulic tank or even worse: Rust, free water and dirt in hydraulic oil, poor lubrication, signs of abrasion and an oily smell when the unit is running? The cause: moisture and dirt particles entering your system unhindered every time it draws in air to equalize pressure, plus oil aerosols escaping when it breaths out.

Let's face it, if you don't do anything about it, you're heading for expensive maintenance work and damage to employees and environment.

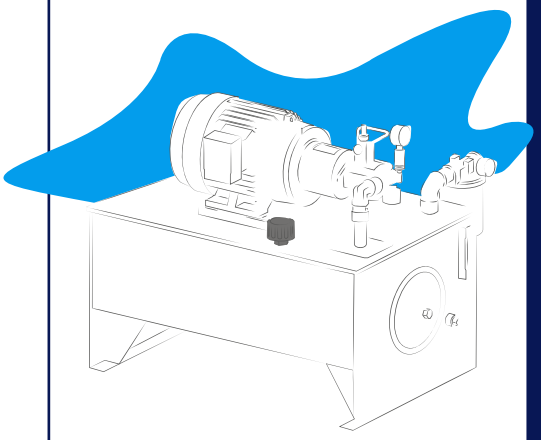
Why **water & dirt should be your biggest concern**?

When metals react with oxygen and water, this is known as corrosion. It leads to the formation of hard, highly abrasive particles. In hydraulic oil contaminated with water, these metallic impurities trigger an oxidative chain reaction. Free radicals are formed, which attack the hydrocarbon molecules and break down the oil. But that's not all: when oil additives react with water, acids are formed that further accelerate the decomposition. Over time, oil properties such as lubricity, viscosity and shear strength change.

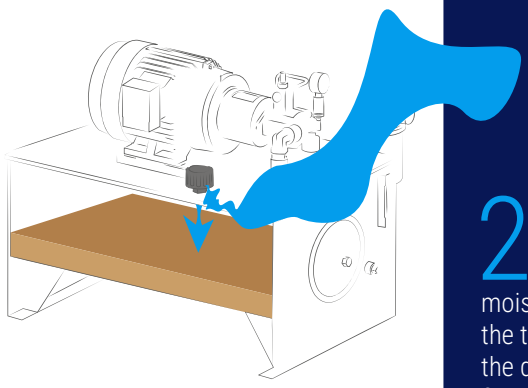
With higher flow characteristics, friction points are no longer supplied with the necessary volume of hydraulic oil. Extremely viscous oils, on the other hand, put a strain on the system's drive units and reduce efficiency. Oil ageing residues clog valves, sludge formation increases filter requirements and acidification hightens the risk of corrosion of all metallic components, plus impairs the seals.

Preventing the entry of moisture and dirt as well as the formation of corrosion is therefore the top priority in order to operate hydraulic systems for a long time, cost-effectively and with low maintenance! And that is exactly what our GIEBEL Adsorbers® do!

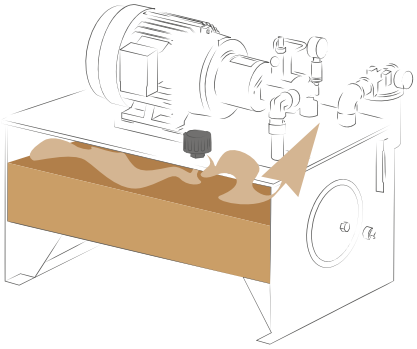
HYDRAULICS



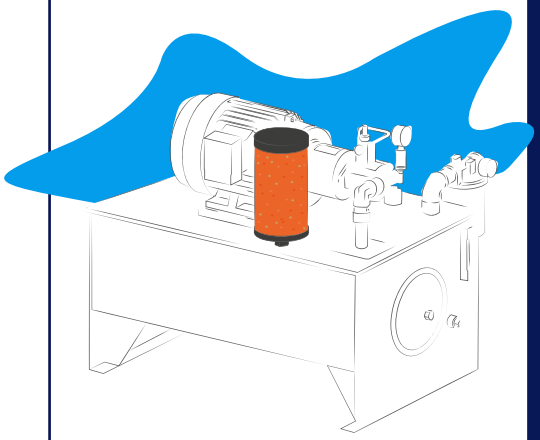
1 The hydraulic unit equipped with a standard filter cap is **exposed to humid ambient air**.



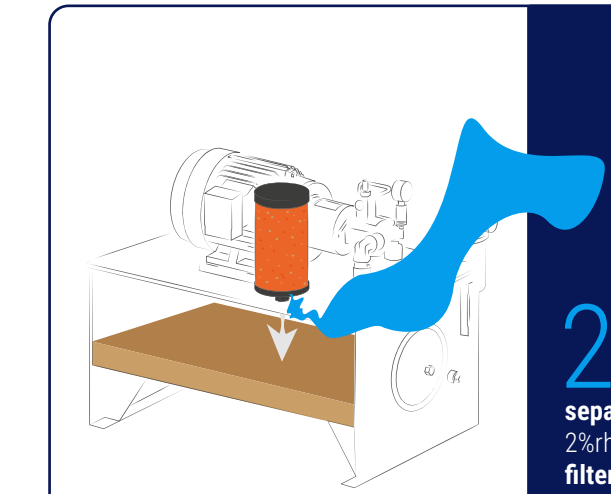
2 The oil level drops and air flows in to equalize pressure. The filter cap allows moisture and dust to enter. If the temperature falls below the dew point, **condensation forms**.



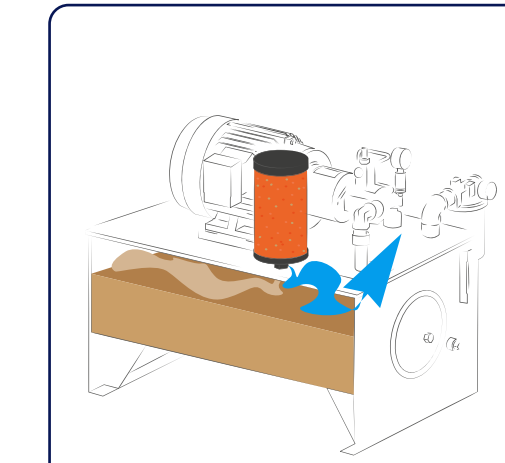
3 The oil level rises, air is pressed out to equalize pressure. The **filter cap allows oil aerosols to escape**.



1 The hydraulic unit equipped with an adsorber is **exposed to humid ambient air**.

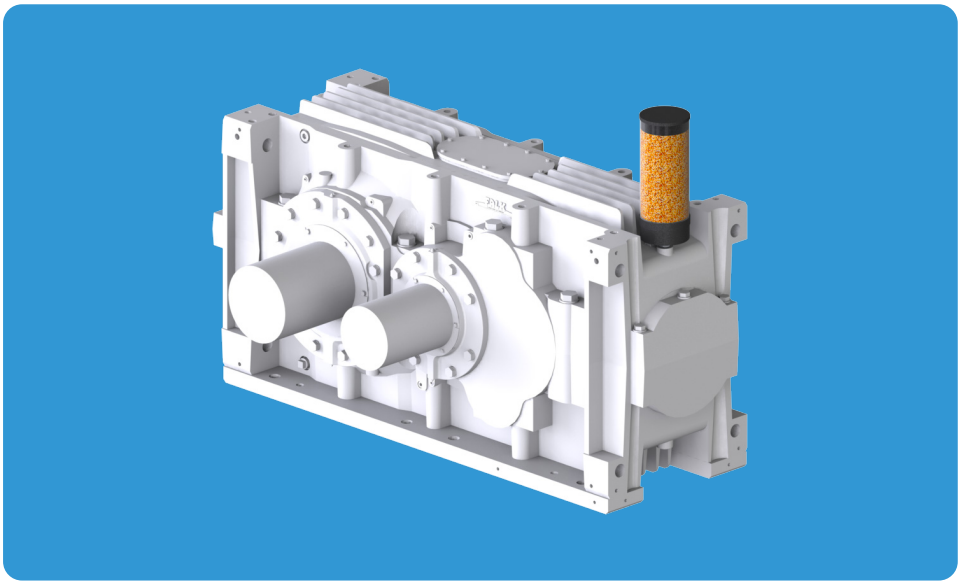


2 The oil level drops and air flows in to equalize pressure. The **adsorber separates moisture** down to 2%rh (10%rh on average) **and filters out dust particles**. The system remains dry.



3 The oil level rises, air is pressed out to equalize pressure. The **adsorber prevents oil particles from escaping**. In addition, the air flow removes some of the previously stored water from the adsorber, thus ensuring cyclical self-regeneration.

GEARS



Protect **gears** against corrosion, loss of oil quality, poor lubrication & the escape of pollutants.

Have you noticed condensation droplets inside your transmission tank or even worse: Rust, free water in gear oil, poor lubrication, signs of abrasion and an oily smell when the plant is running? The cause: moisture and dirt particles entering your system unhindered every time it draws in air to equalize pressure, plus oil aerosols escaping when it breaths out.

Let's face it, if you don't do anything about it, you're heading for expensive maintenance work and damage to employees and environment.

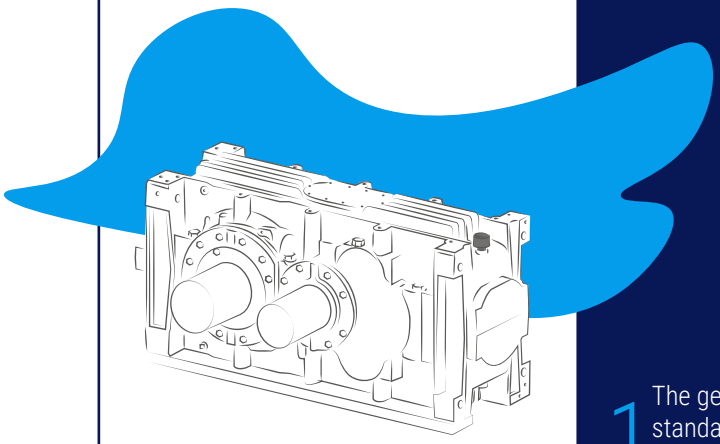
Why **water & dirt should be your biggest concern**?

When metals react with oxygen and water, this is known as corrosion. It leads to the formation of hard, highly abrasive particles. In gear oil contaminated with water, these metallic impurities trigger an oxidative chain reaction. Free radicals are formed, which attack the hydrocarbon molecules and break down the oil. But that‘s not all: when oil additives react with water, acids are formed that further accelerate the decomposition. Over time, oil properties such as lubricity, viscosity and shear strength change.

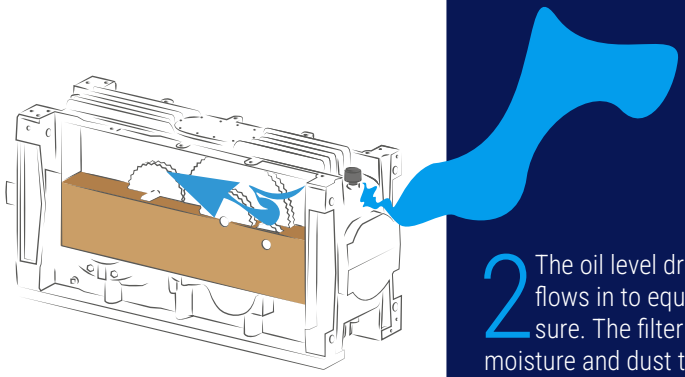
With higher flow characteristics, friction points are no longer supplied with the necessary volume of hydraulic oil. Extremely viscous oils, on the other hand, put a strain on the system‘s drive units and reduce efficiency. Oil ageing residues clog valves, sludge formation increases filter requirements and acidification hightens the risk of corrosion of all metallic components, plus impairs the seals.

Preventing the entry of moisture and dirt as well as the formation of corrosion is therefore the top priority in order to operate gears for a long time, cost-effectively and with low maintenance! And that is exactly what our GIEBEL Adsorbers® do!

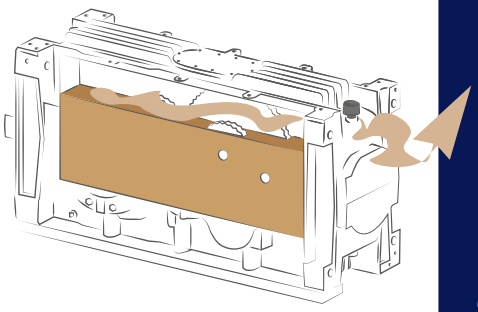
GEARS



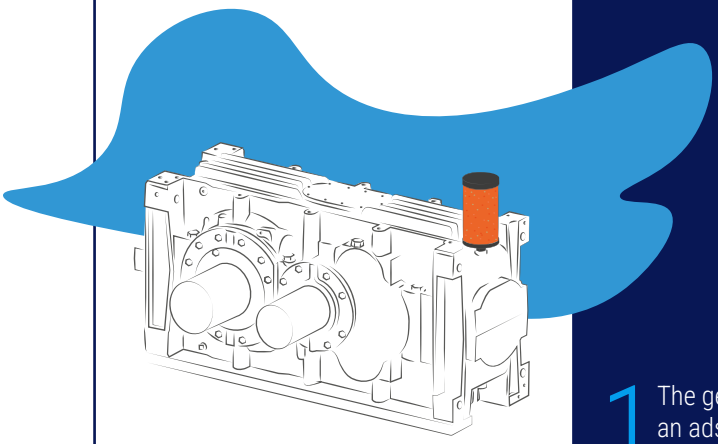
1 The gear equipped with a standard filter cap is **exposed to humid ambient air**.



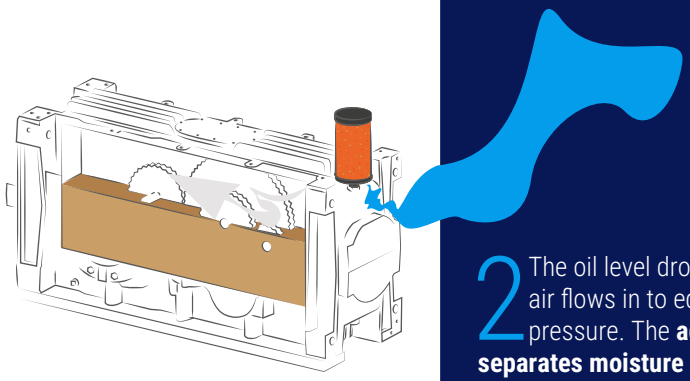
2 The oil level drops and air flows in to equalize pressure. The filter cap allows moisture and dust to enter. If the temperature falls below the dew point, **condensation forms**.



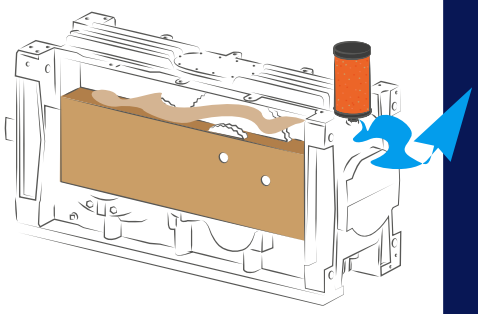
3 The oil level rises, air is pressed out to equalize pressure. The **filter cap allows oil aerosols to escape**.



1 The gear equipped with an adsorber is **exposed to humid ambient air**.

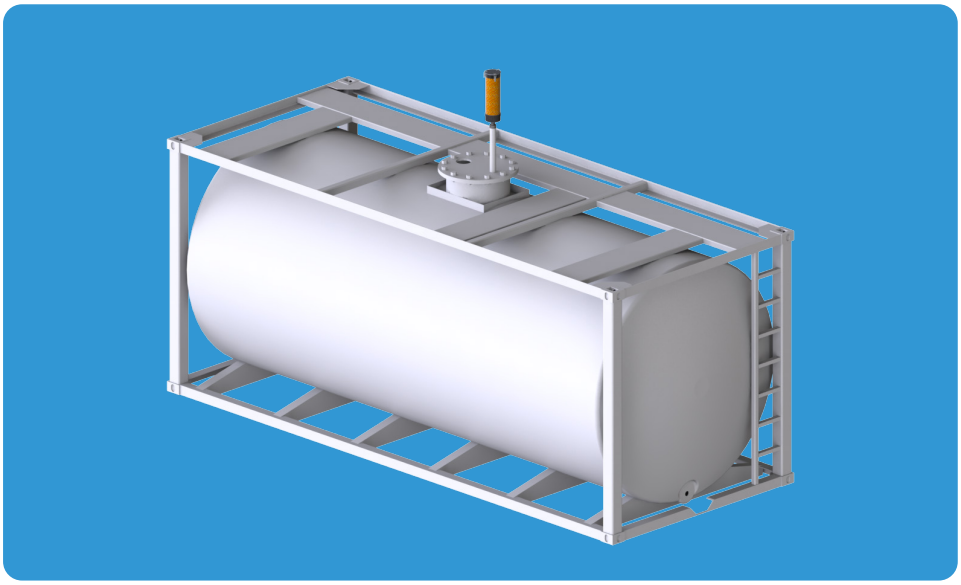


2 The oil level drops and air flows in to equalize pressure. The **adsorber separates moisture** down to 2%rh (10%rh on average) **and filters out dust particles**. The system remains dry.



3 The oil level rises, air is pressed out to equalize pressure. The **adsorber prevents oil particles from escaping**. In addition, the air flow removes some of the previously stored water from the adsorber, thus ensuring cyclical self-regeneration.

STORAGE TANKS



Protect **storage tanks** against corrosion & quality degradation of contained substances.

Have you noticed condensation droplets inside your storage tank or even worse: Rust, free water in the stored medium, sludge deposits and an oily smell when the tank is refilled?

The cause: Moisture and dirt particles entering the tank unhindered when stored medium is released and air is sucked in to equalize pressure, plus oil aerosols escaping when the tank is refilled.

Let's face it, if you don't do anything about it, you're heading for expensive maintenance work and damage to employees and environment.

Why **water & dirt should be your biggest concern**?

When metals react with oxygen and water, this is known as corrosion. It leads to the formation of hard, highly abrasive particles. In oil contaminated with water, these metallic impurities trigger an oxidative chain reaction. Free radicals are formed, which attack the hydrocarbon molecules and break down the oil. But that's not all: when oil additives react with water, acids are formed that further accelerate the decomposition. Over time, oil properties such as lubricity, viscosity and shear strength change.

Preventing the entry of moisture and dirt as well as the formation of corrosion is therefore the top priority in order to operate gears for a long time, cost-effectively and with low maintenance!

STORAGE TANKS

1 The storage tank equipped with a standard filter cap is **exposed to humid ambient air**.

2 The oil level drops and air flows in to equalize pressure. The filter cap allows moisture and dust to enter. If the temperature falls below the dew point, **condensation forms**.

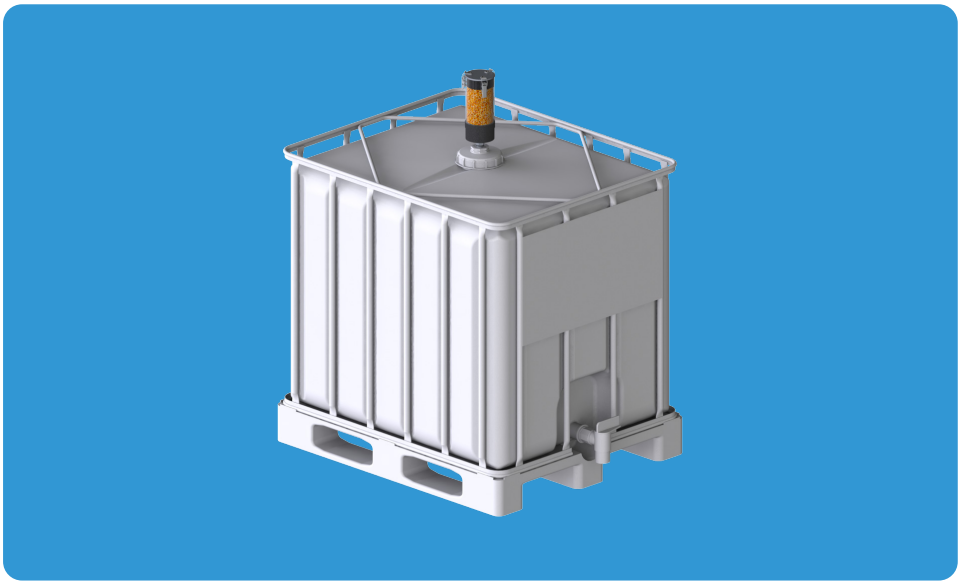
3 The oil level rises, air is pressed out to equalize pressure. The **filter cap allows oil aerosols to escape**.

1 The storage tank equipped with an adsorber is **exposed to humid ambient air**.

2 The oil level drops and air flows in to equalize pressure. The **adsorber separates moisture** down to 2%rh (10%rh on average) **and filters out dust particles**. The system remains dry.

3 The oil level rises, air is pressed out to equalize pressure. The **adsorber prevents oil particles from escaping**. In addition, the air flow removes some of the previously stored water from the adsorber, thus ensuring cyclical self-regeneration.

BARRELS & IBC



Protect **barrels & IBC** against quality degradation of substances contained and the escape of harmful aerosols.

Have you noticed condensation droplets inside your barrel or IBC or even worse: Rust, water in the stored medium, sludge deposits and an aggressive smell when the barrel or IBC is refilled?

The cause: Moisture and dirt particles entering the barrel or IBC unhindered when stored medium is released and air is sucked in to equalize pressure, plus aerosols escaping when the tank is refilled.

Let's face it, if you don't do anything about it, you're heading for expensive maintenance work and damage to employees and environment.

Why **water & dirt should be your biggest concern**?

IBCs and barrels are often used to store substances like esther oils so that they can be used for machines when required. These oils are highly hygroscopic, i.e. they literally attract moisture.

Up to the saturation limit of the oil, the water is present as dissolved water and is not visible to the naked eye. But if it is used in machines under pressure or temperature fluctuations, the water emulsifies or free water is formed.

Free and emulsified water are the two most harmful conditions in lubricating systems because the incompressibility of water overrides the hydrodynamic oil film that protects bearings, leading to excessive wear.

Water also reduces the durability of the oil by accelerating oxidation, breaking down the hydrocarbon chains.
Oil that contains additives are even more susceptible to water contamination. They form acids that increase corrosion in machines.

Preventing the ingress of moisture is therefore the top priority in order to store hygroscopic substances for a long time, at low cost and without causing consequential damage to the machines for which these oils are intended.

BARRELS & IBC

1 The IBC with a standard cover and vent opening is **exposed to humid ambient air**.

2 The oil level drops and air flows in to equalize pressure. The vent allows moisture and dust to enter. If the temperature falls below the dew point, **condensation forms**.

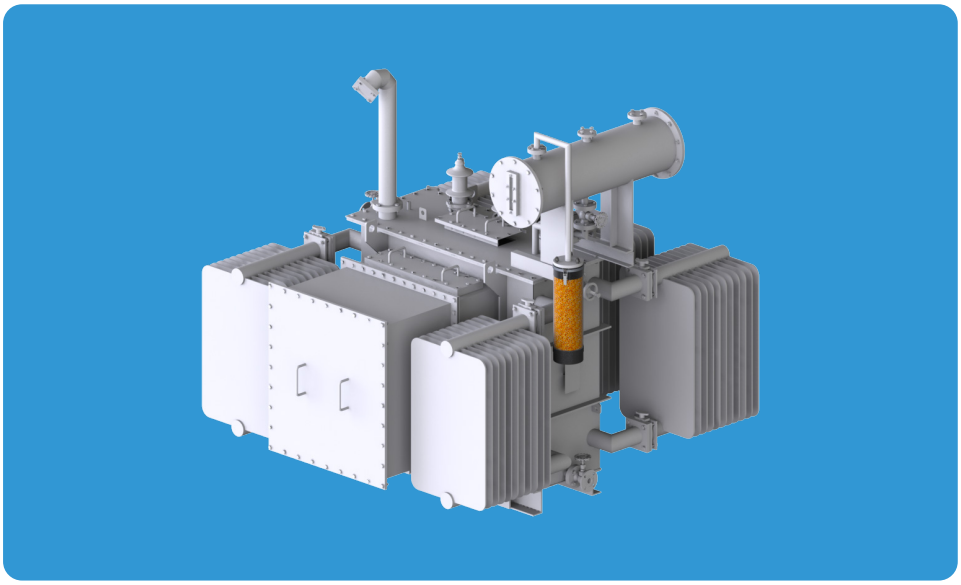
3 The oil level rises, air is pressed out to equalize pressure. The **vent allows oil aerosols to escape**.

1 The IBC equipped with an adsorber is **exposed to humid ambient air**.

2 The oil level drops and air flows in to equalize pressure. The **adsorber separates moisture** down to 2%rh (10%rh on average) **and filters out dust particles**. The system remains dry.

3 The oil level rises, air is pressed out to equalize pressure. The **adsorber prevents oil particles from escaping**. In addition, the air flow removes some of the previously stored water from the adsorber, thus ensuring cyclical self-regeneration.

TRANSFORMERS



Protect **transformers** against corrosion, sludge deposits & hydrolysis.

Have you noticed condensation droplets inside your storage tank or even worse: Rust in the expander, free water in the stored medium, sludge deposits in the tank and smeared sliding transformer diodes?

The cause: Moisture and dirt particles entering the tank unhindered when stored medium is released and air is sucked in to equalize pressure.

Let's face it, if you don't do anything about it, you're heading for expensive maintenance work.

Luckily, there's a solution: the installation of an GIEBEL Adsorber®. It dries and cleans the supply air and prevents pollutants from escaping - saving you maintenance work and money.

Why **water & dirt should be your biggest concern**?

TRANSFORMERS

1 The transformer equipped with a standard filter cap is **exposed to humid ambient air**.

2 The oil level drops and air flows in to equalize pressure. The filter cap allows moisture and dust to enter. If the temperature falls below the dew point, **condensation forms**.

3 The oil level rises, air is pressed out to equalize pressure. The **filter cap allows oil aerosols to escape**.

1 The transformer equipped with an adsorber is **exposed to humid ambient air**.

2 The oil level drops and air flows in to equalize pressure. The **adsorber separates moisture** down to 2%rh (10%rh on average) **and filters out dust particles**. The system remains dry.

3 The oil level rises, air is pressed out to equalize pressure. The **adsorber prevents oil particles from escaping**. In addition, the air flow removes some of the previously stored water from the adsorber, thus ensuring cyclical self-regeneration.

giebel-adsorber.de

GIEBEL FilTec GmbH
Carl-Zeiss-Str. 5
74626 Bretzfeld
Germany

GIEBEL Desiccants GmbH
Carl-Zeiss-Str. 5
74626 Bretzfeld
Germany

GIEBEL FilTec Inc.
470 Commerce Drive
Peachtree City, GA, 30269
USA

GIEBEL Technology (Shenzen) Co. Ltd.
No. 18, Lane 3, Xintian, Fuhai Street,
Bao'an District, Shenzen, 518100
China