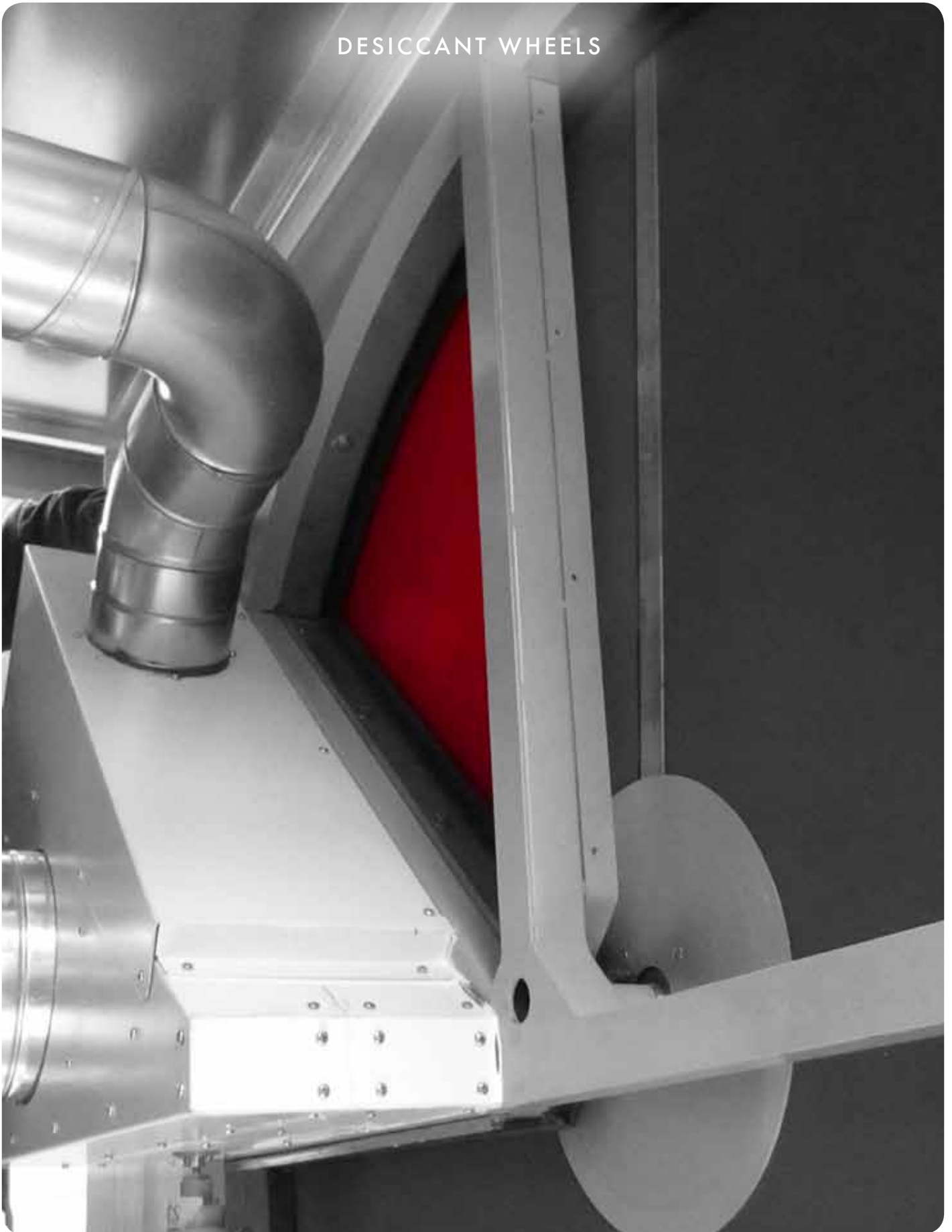


DESICCANT WHEELS



Advanced rotor technology
from the market leader within desiccant dehumidification



Munters energy efficient technique - your guarantee

Carl Munters designed a rotor for the future

Since the world famous Swedish scientist Carl Munters invented and patented the first desiccant wheel (rotor) dehumidifier over 60 years ago, it has been generally accepted that all high performance industrial dehumidifiers employ desiccant wheel technology. Munters is the only supplier holding know-how, R&D and production in house from the very first rotor fibre to the completed air treatment system.

This simple and extraordinary effective technology has since been advanced greatly thanks to decades of Munters research and development granting our customers optimized drying performance whilst operating expenses are being minimized.

The Munters desiccant wheel stands out as the most energy efficient technique for creating humidity controlled environments.

Our purge technology reduces regeneration energy by up to 30% and by means of cooler supply air the need of post cooling can be reduced by up to 70%.



The rotating heart of Munters dehumidifiers

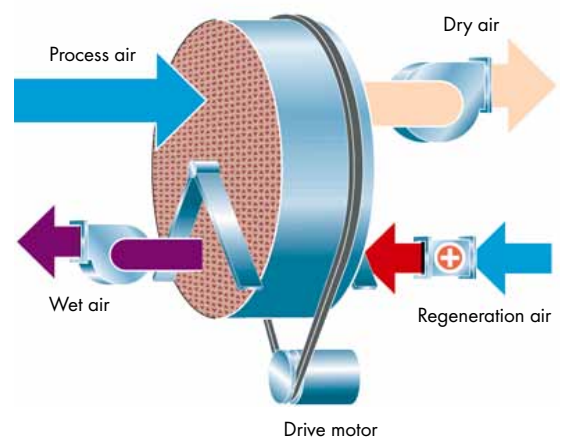
How the desiccant wheel works

The Munters desiccant wheel works on the principle of sorption, which is the adsorption or the absorption process by which a desiccant removes water vapor directly from the air.

The air to be dried passes through the desiccant wheel and the desiccant removes the water vapor directly from the air and holds it while rotating.

As the moisture-laden desiccant passes through the regeneration sector, the water vapor is transferred to a heated airstream, which is exhausted to the outside.

This process is continuous, allowing for highly effective and uninterrupted dehumidification.



Energy recovery sectors
for enhanced performance available
- saving up to 30% energy

Proven technique - outstanding quality

More than 300,000 rotors produced

Munters are a global leader in energy efficient air treatment solutions and have experience of over 300,000 installations worldwide and continues to set the world's standard for desiccant wheel production.

With our own multiple desiccant wheel production facilities worldwide, Munters provide a wide range of desiccant options and has obtained more than 250 patents in desiccant technology.

Certified bactericidal rotors for your safety

Customer health and safety is essential to Munters which is clearly reflected in the design of the rotors.

Our rotors are continuously being tested independently and have most recently been proven by The Swedish Institute for Food and Biotechnology to have both bactericidal and fungicidal properties. Not only the rotor surface but also air streams were tested. Furthermore the rotors are proven not to emit particles to the processed air and the rotor fibres used have a size not respirable and preclude associated health hazards.

Munters rotors and the hygienic design of our air handling systems form the optimal solution in situations where hygiene cannot be compromised eg. in baby milk powder production.

Proven outstanding quality

Made of a non-metallic, ceramic composite, Munters highly hygroscopic rotors are engineered to provide superior strength and durability. The unique and thorough manufacturing processes assure that the desiccant media and the casing is integrated perfectly.

Our quality control tolerates no imperfections that can inhibit the performance of the dehumidifier, and the desiccant wheel is characterized by a smooth and regular surface - designed to last.

Most Munters rotor factories are complying with the high environmental management standards of ISO14001.



Choose your desiccant option

HPS - High Performance Silicagel

The HPS rotor is our all-round work horse, where water resistant titanium silicagel is the adsorbent.

The manufacturing method, developed and patented by Munters, results in a strong and stable structure, offering ideal drying performance in a wide range of applications.

- Inert, stable and non-toxic desiccant that can hold up to 40% of its dry weight in water (when in equilibrium with air at saturation)
- Certified to have bactericidal effect to contaminants and does not emit particles to the processed air
- Even when exposed to air at 100% RH the silica gel desiccant is not "washed out"
- Resistant to acids, sulfur products and most chemicals
- Silicone free version available for eg. car and electronic industry
- Fully washable if air passage ways have been blocked by dust etc

LiCl - Lithium Chloride

On an operating cost basis the LiCl rotor is our most economical system, the LiCl being an extremely powerful absorbent. Our innovative rotor design allows for very low dewpoints still being remarkably energy efficient. Our LiCl wheel is a reliable, robust and hard working rotor top performing in demanding process industries like coating.

- Can hold over 10 times its weight in water (when in equilibrium with air at saturation), being one of the most hygroscopic compounds existing
- Reduces the number of organisms which might be carried in the air stream, thanks to the bacteriostatic properties of lithium chloride
- Resistant to most pollutants and contaminants like solvents and phenols and can even transfer solvents from process airstreams

Zeol - highly effective VOC abatement

Based on the desiccant wheel principle our Zeol rotors are designed specifically to remove harmful VOC's (volatile organic compounds) from industrial airstreams. By using hydrophobic zeolite adsorbent with our proprietary rotor technology and a variety of oxidation techniques we provide the most energy efficient air pollution control solutions.

- Energy efficient as the low pressure drop across the system reduces electrical costs since it allows for smaller fans
- Only Munters manufacture both zeolite rotors as well as entire VOC abatement concentrator systems in one facility

Reference applications



HPS - all round rotor

For preserving irreplaceable documents, and artefacts, for storing raw materials and products our HPS rotor provides a high drying capacity year after year. The perfect desiccant wheel choice for 90% of all drying applications.



Demanding production processes

Some production processes require a controlled climate with a relative humidity as low as down to 0.5 % RH. Our low dewpoint rotors will work effectively down to dew points at -65 °C solving the delicate problem at the world's most demanding manufacturers.

For your individual requirements

Quantum™

Our energy efficient Quantum™ rotor provides exceptional moisture removal without requiring any pre-cooling (eg. ΔX up to 15g/kg) thus making it suitable for high regeneration temperature applications.

The insoluble desiccant cannot be "washed out" - making it effective in applications utilizing 100% outdoor air.

- Energy saving unique and special desiccant that can stand very high regeneration temperatures
- Designed for all drying and cooling processes where a high ΔX is required
- Effectively eliminates the need of pre-cooling, reducing energy consumption
- Utilizes waste heat for regeneration
- Dry and hygienic environment due to no condensate in the system and certified bactericidal and fungicidal rotor properties

Hygienic
Energy
efficient

HCR

The HCR rotor is designed specially for use in our systems with low regeneration temperature such as our DryCool™ and DesiCool™ systems. When used in systems consisting also of refrigeration, the waste heat from the refrigeration process is used for regeneration of the desiccant wheel, resulting in an extremely energy efficient system.

- Specially engineered silica gel desiccant that can not be "washed out" and has high capacity at high relative humidity
- Very energy efficient design specially when using refrigeration waste heat for regeneration like in our DryCool™ systems

HPX

For special applications requiring a very low dewpoint (-60°C and lower) the HPX rotor can be highly recommended due to its special design of the desiccant pore system and material. The rotor offers a amazingly long lifetime.

- Special design and formula for very low dewpoint applications
- Used to maintain manufacturing environments as low as 1-2% RH
- Blend of Molecular Sieve and Silicagel secures an extremely long rotor lifetime

Reference processes



Spray drying, saving up to 40% energy

The special composition of the Quantum™ rotor enables it to stand extremely high regeneration temperatures, beneficial in eg. drying processes.

As no additional cooling and heating equipment is needed next to the desiccant dehumidification system the overall footprint will become small. Most important is the increased production capacity and stable quality as the production will no longer be affected by the outdoor climate.

COP and CO₂ emission per kilo powder produced will be reduced dramatically, thanks to an up to 40% more energy efficient and environmentally friendly production.

The highly efficient and bactericidal Quantum™ rotor eliminates the need of wet coils, securing better hygienic conditions. Worldwide references confirm the hygienic advantages, reliability and energy efficiency of Munters Quantum™ rotors for demanding processes like dairy and baby milk powder production.

Purge sectors - save up to 30% energy

Purge sector options

For an even higher energy efficiency our rotors can be provided with an energy recovering purge sector that comes both as a pre-installed feature or as a retrofit.

Recovering heat from the regeneration process through multiple methods the energy needed for regeneration is reduced by up to 30%.

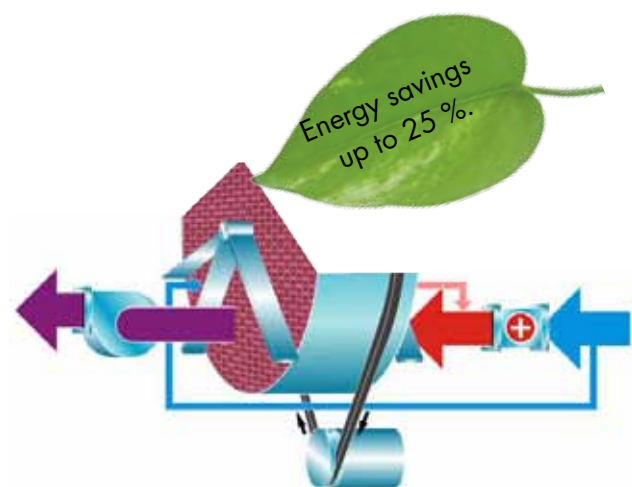
A special green power purge sector is available for systems supplying air for extremely low dewpoint applications like lithium battery production.

Energy efficiency purge

By adding an extra sector on the process inlet and outlet side, an external duct is used to recirculate air into the regeneration cycle after the heater.

(A partial air stream is led to the regeneration air stream after the heater).

Depending on air flows, unit type, application etc., the savings on energy needed for regeneration reaches up to 25 %



Power Purge™

By adding two sectors on each side of the rotor, positioned both before and after the regeneration sector, the energy needed for regeneration is reduced just like an eventual need of cooling of the dry air is decreased.

- A separate air stream recirculates and cools the rotor material on the process air inlet side and pre warms the rotor before it enters the regeneration sector.
- The performance of the desiccant wheel is increased by up to 30%



PURGE SECTOR BENEFITS:

- Reduction of regeneration energy of up to 30%
- Reduction of up to 70% post-cooling with cooler supply air
- Improved dehumidification capacity
- Return of investment only 1-2 years
- Reduced carbon footprint

Happy customers all around the globe

Coloplast A/S cuts CO₂ emissions by 230 tons per year

By retrofitting Munters Energy Recovery Purge sectors into two existing Munters dehumidifiers Coloplast A/S (manufacturers of products for ostomy care, urology and wound care) succeeded in reducing CO₂ emissions in their clean room facilities dramatically. Continuously striving to cut greenhouse gas emissions and energy consumption Coloplast appreciated the implementation of Munters' energy saving measures. The impressive Return of Investment in only 0.6 years speaks for itself.



Munters After Sales organization

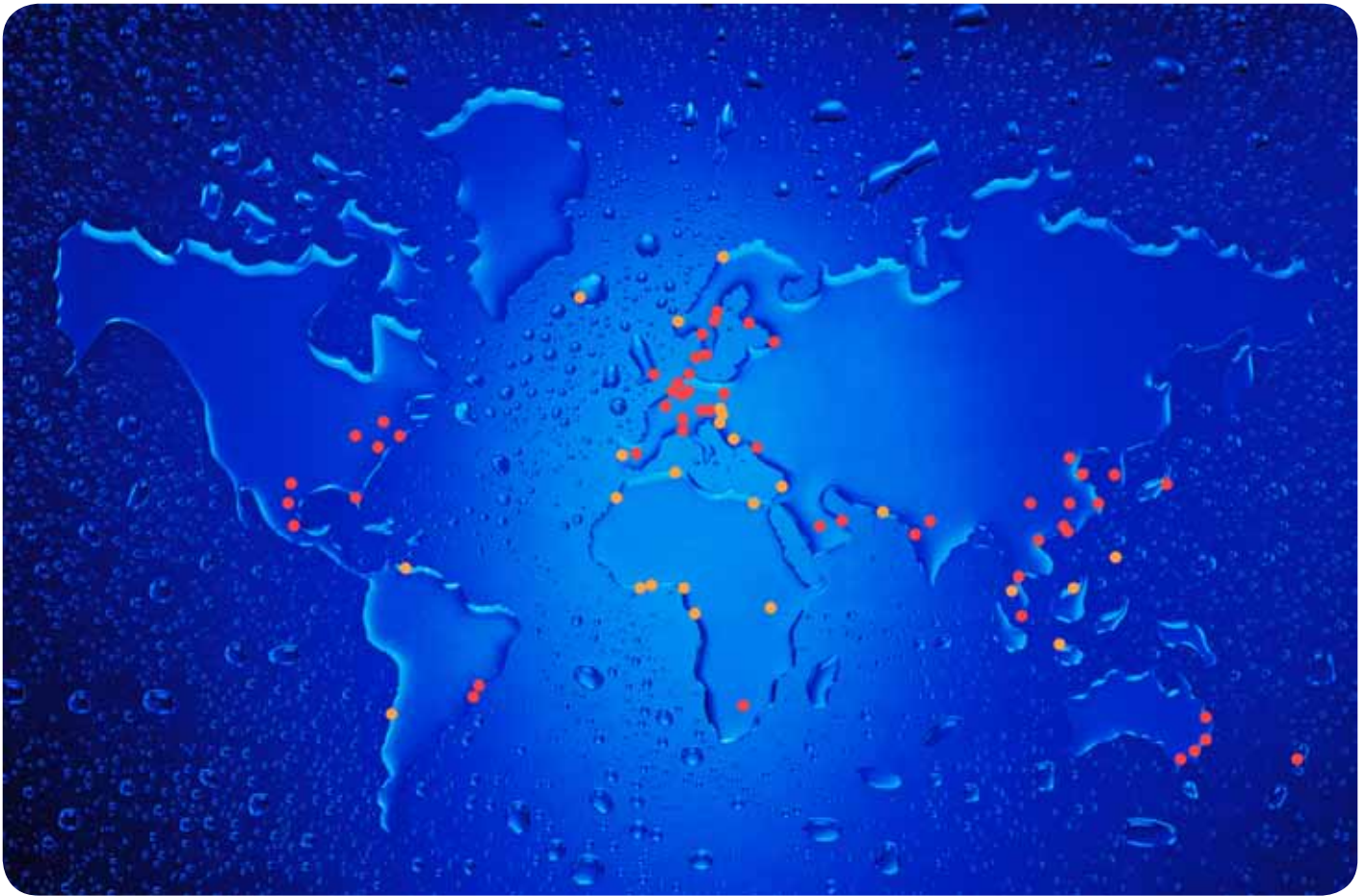
We provide an experienced international network of service personnel with engineers qualified and trained in servicing to our strict code of practice.

Our engineers are specifically trained to focus on improving the energy efficiency and performance of your systems. We will provide you with recommendations on optimizing energy efficiency by retrofitting rotor purge sectors as well as standard or tailor made solutions for energy conversion of the regeneration power source, converting from expensive to low cost energy sources.

To secure the most effective way of getting the most out of your system and an assurance that everything will work with maximum efficiency, at all times, our maintenance agreement is designed on an individual basis.

Original spare parts are delivered rapidly and we are supplying maintenance and critical spare parts kits for minimizing the down time in case of an unexpected break down.





An international name, where the customer comes first.

Munters, part of Nordic Capital, has offices in 30 countries and over 3,000 employees in many branches around the world. We are global leaders in energy efficient air treatment for comfort, process and environmental protection.

Munters shares ideas within its international network, giving the Group an outstanding reputation as a reliable, fast-acting and customer-orientated expert in air conditioning. Munters philosophy of customer satisfaction is central to our decision-making. When developing and manufacturing our systems, we see happy customers as our number one target. And this is what our employees strive to ensure every day.

For more information on Munters, please visit www.munters.com/rotor

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