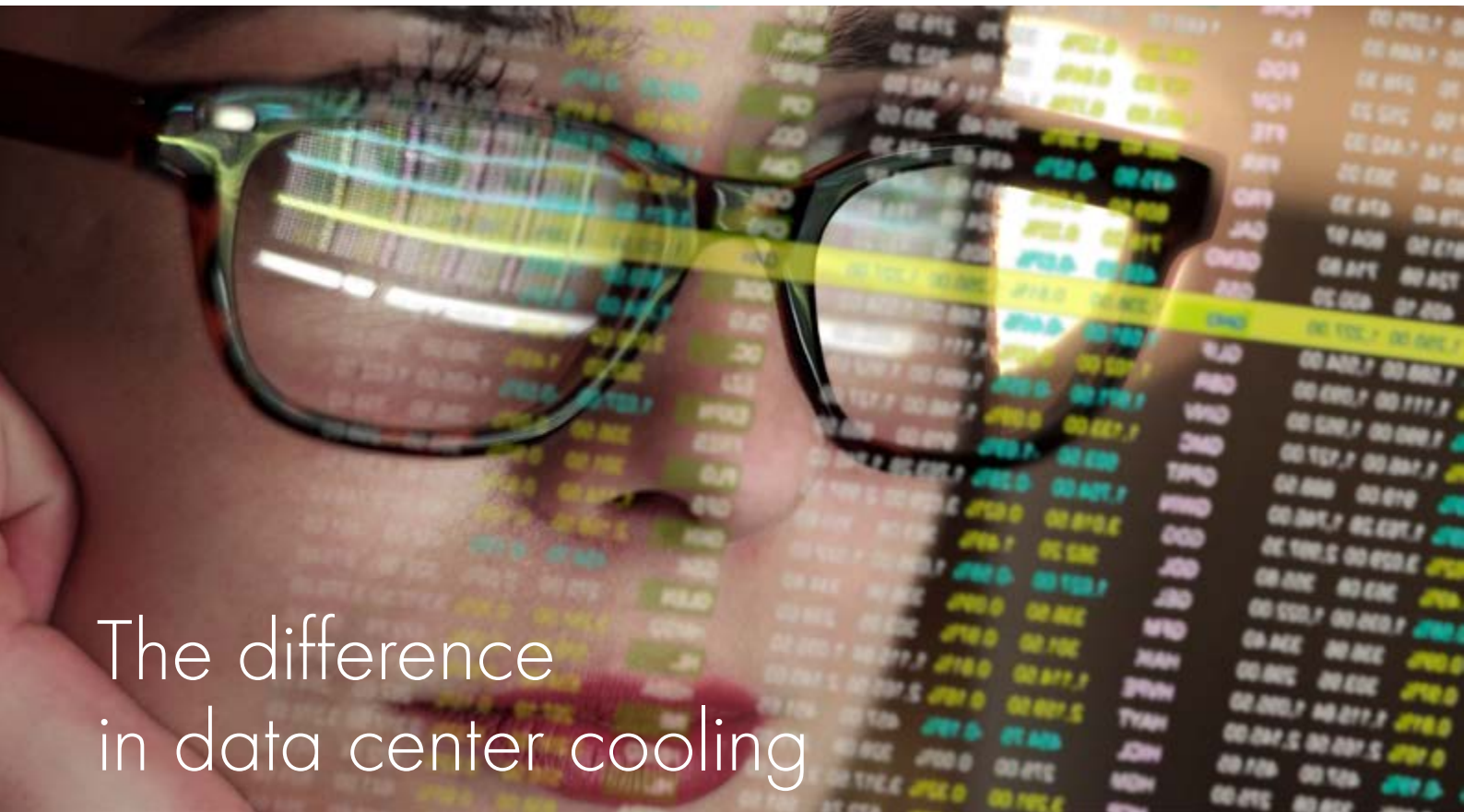


The Munters difference

Ultimate data center cooling and humidifying solutions





The difference in data center cooling

Unfathomable amounts of data are created every single day, and as global population grows, we are using more than ever. Streaming of video, more widespread artificial intelligence and the fact that more devices than ever also mean that these vast quantities will continue to increase even faster than before.

As the data we create increases, the number of data centers around the world will continue to increase at a rapid rate. However, designing and building the best possible data center can be complex, as the operating conditions need to be ideal to meet extremely high demands on reliability and uptime, while the energy consumption needs to be as low as possible to limit environmental impacts and running costs.

Efficient cooling is essential

The various pieces of equipment in data centers consume a significant amount of power, and generate a lot of heat. This means the data centers need to be cooled or humidified, as if the temperature rises it can have a negative impact on the essential technology which is storing huge amounts of important information.

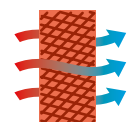
The most efficient cooling systems are needed, but this must be balanced with the amount of power consumed. Data center operators must assess how they impact not only the local environment, but the world

around us, so the cooling must therefore be efficient in both cooling/humidification capability and energy consumption.

The Munters Advantage

Munters has a long-established reputation as the experts in energy efficient climate technology, providing customers around the world with industry-leading solutions since 1955. We are always focussed on evolution and innovation, and this is especially apparent with our unique cooling media and modules designed for use in modern data centers.

We have developed a range of products with outstanding performance in every area, from durability to efficiency, and that is because we are always finding new ways to improve our existing technology. Our range of ceramic-coated media represents the future of evaporative cooling technology, while our FA6™ modular solution can help significantly reduce potential downtime.



Munters GLASdek™ ceramic coating



This is a Munters FA6™ humidifier.

Six reasons to choose Munters

There are many features which make Munters solutions really stand out, and every single one is designed to make data center cooling/humidification safer and more efficient – saving energy, water and space.



Fire-rated material

Our media is baked twice and ceramically coated, making it fire-rated according to ASTM E 84-97 a, as opposed to more common media types, which can be extremely flammable and does not comply to European norms and regulation.

Optimized energy efficiency

GLASdek™ GX40 ceramic pads have lower pressure drop than competition. This means you need less fan power for the required results, offering significant savings in the long run.

Hard water handling

Our modules are robust enough to handle almost any water quality, no matter the hardness or the pH. This could mean you do not need to invest in a full water purifying system on site.

Long lasting

Because of how our media modules are made, they can last up to twice as long as the nearest competitor. This means less downtime, and better profit margins.

Cleaning-in-place

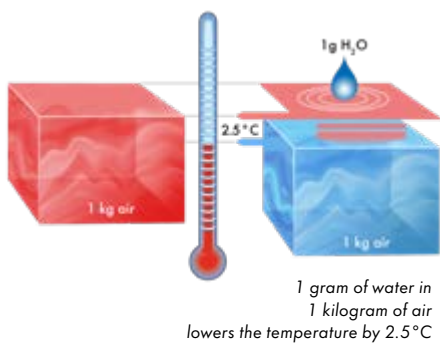
The pads are robust and resistant enough to clean them using acids and disinfectants, without ruining their integrity. This means, once again, less replacement pads, and better uptime.

Anti-legionella certification

Evaporative cooling relies on water troughs, and in the right conditions these can be home to legionella bacteria. GLASdek™ GX40 pads are proven against legionella, eliminating the risk of infection amongst people in the surroundings of a data center as a result of cooling or humidification.



Enhance your data center with evaporative cooling and humidification



The operating principle of evaporative cooling/humidification is relatively simple, as is so often the case with the best innovations. It works on the basis that water absorbs significant amounts of heat in order to evaporate, so if you change the phase of liquid water into water vapor, you can cool the dry air.

Evaporative cooling/humidification systems for data centers involve blowing the warmer air from outside through a cooling media, using industrial fans to increase air velocity. The cooling media is saturated with water, so as the air blows through the pad the water evaporates. This drops the temperature of the air being blown into the data center itself, which then cools down the interior of the building.

The solution of the future

Evaporative cooling/humidification is seen as the best solution for reducing the temperature in data centers for a variety of reasons, including:

- **Lower running costs.** This technology is less expensive to run than alternatives, thanks to the simpler methods applied along with more developed, efficient solutions for each individual part.
- **Improved sustainability.** As evaporative cooling/humidification uses less energy, it is kinder to the environment. Add to that the fact that some of the technology and material used is fully renewable, and you have a greener cooling solution with less CO₂ impact per kW of cooling.
- **Simpler maintenance.** The equipment, if chosen correctly, is easy to service, and can be replaced quickly if required. This means minimal downtime.

Media matters

It is important to see the cooling system as a whole, and something where each part is built to work in harmony with the others. From the air inlets and the fans to the media and pipework, every part is of equal importance. However, the cooling media is often seen as the heart, and that is with good reason.

The media is responsible for cooling the air, holding the water, and ensuring that no contaminants are distributed into the data centers. It has two very important roles – to protect and to cool, and while it may not seem like the most advanced piece of equipment, good cooling media can have astonishing amounts of innovation included.

There is a world of difference between the most basic, simple media and the more premium, forward thinking materials, and what you choose will depend on your exact needs. However, here is one area where looking at the best solution will not result in performance that you do not use – the best will always help with efficiency, safety and uptime.

Technology that simply clicks

The cooling media is the heart, but it needs to be held firmly in place. With many solutions, the frame will be built to fit the dimensions required, which initially is fine but can cause issues when it comes to servicing and replacements.

Investing in a modular solution can be great for your business, as each part can be taken out and repaired or replaced as needed, and it is simply a case of clicking the frame into place and connecting pipes. This minimizes potential downtime, which is an essential consideration when it comes to data centers.



Unique double coating manufacturing process

Normally, cooling media material is coated and baked once, but Munters coats and bakes twice to improve the quality of our final product. The second time, we use a special ceramic coating which gives a wide range of advantages. Munters media is easy to recognize with stability you can feel and colour you can see.





Munters GLASdek™

GLASdek™ is our range of premium evaporative media, designed to offer the very best cooling and humidification efficiency combined with low pressure drop. This media is long-lasting, and made from inorganic, non-combustible material.

Water can be used straight from the tap with the GLASdek range, often completely cutting out the need for large, expensive water filtration systems, and because of the durability, the pads can be cleaned in place without compromising their integrity. This is due to the Munters manufacturing process, where we carefully coat pads with a ceramic layer, which makes them fireproof, durable and reliably efficient. Minerals and pollutants also stay behind the GLASdek GX40 media, ensuring the humidification process stays pure, and the air stays clean.

Benefits:

- Evaporative media made from inorganic, non-combustible, ceramical material
- High efficiency: 65%, 85% and 95%
- Low pressure drop
- Tested against the transfer of legionella (with contaminated water and air born bacteria's) by external body
- Approved according to VDI 6022
- Tested and approved according to Loosening of Air born Fibers, no risk of oversaturation
- No water treatment required
- GX media – high tolerance for pH levels in water – up to 10 pH is no problem
- Non-sensitive for chemical treatment
- ISO 9001
- GREENGUARD Gold certified
- Non-combustible according to ASTM E 84-97 a
- Complying with the UL900 standard

Tried and tested

The inorganic material GLASdek GX40 has been fire tested and classified as non-combustible material according to ISO 1182. RoHs compliant. Tested against the transfer of



legionella (with contaminated water and air born bacteria's) by external body. Certified for hygiene (no aerosols containing bacteria or legionella) at the University of Aachen, Germany by PD Dr. Med. Sebastian W. Lemmen.

Munters high performance media is GREENGUARD Gold certified and has been tested for emissions from over 360 individual chemicals of concern, guaranteeing them as having non-harmful emissions. Read more on www.munters.com/greenguard.

	GX40	GX60
Ceramic coating	✓	✓
Carbon coating		✓
Efficiency level	✓	✓



FA6™

FA6™ Evaporative humidifier/cooler has been specially designed for integration into air-handling systems within both residential and industrial buildings, and is the ideal solution for data centers. The design is compact, and sizes conform to all typical air-handling units (AHU).

The standard product line encompasses a wide range of sizes, options for multistage control, integrated droplet separators and three nominal humidification efficiencies; 65%, 85% and 95%. The choice of humidification efficiency depends on the control method and the cooling and/or humidity demand of the application. The individual units cover air volumes from 0.5-40 m³/s (1000-85000 cfm). For very large air volumes a combination of units is selected in order to achieve the desired size. Sizes can be modified upon request.

Direct evaporative cooling

With direct evaporative cooling water is evaporated into an airstream which will cool down as a consequence of the evaporation. The consequence of this method is that the Humidity Ratio of the airstream will always rise as all evaporated water will end up in the airstream. In an adiabatic cooling process

we know that the air temperature drop will be 2.5°C for every gram of moisture being evaporated into every kilogram of air.

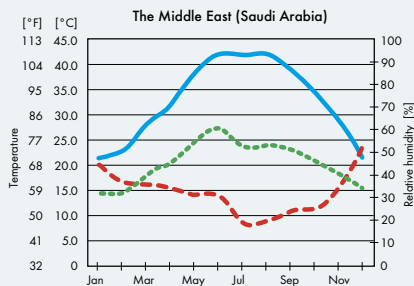
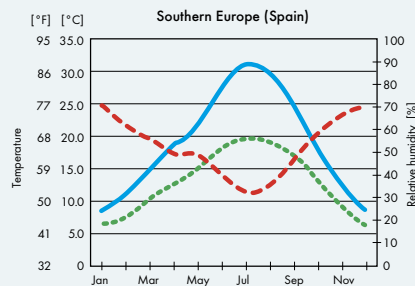
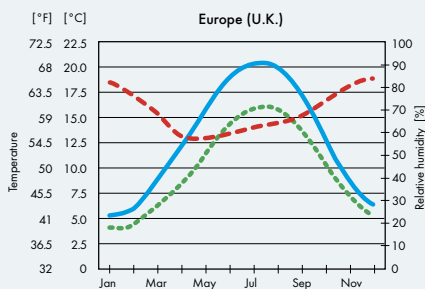
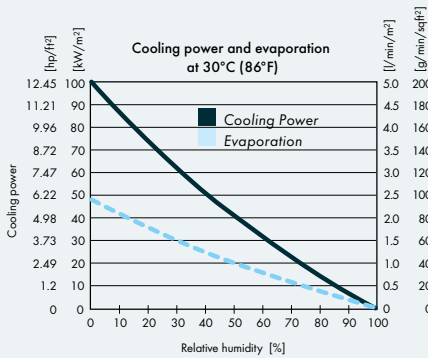
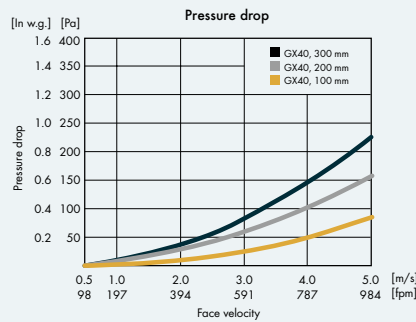
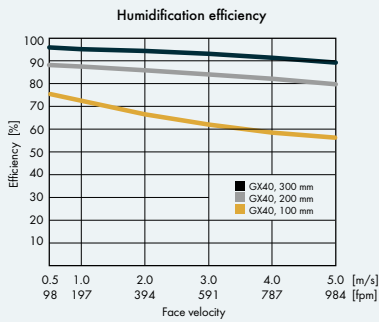
- Very low energy humidifier/cooler (50-250 W)
- Ideal for evaporative cooling
- Available in wide range of sizes from 0.5 to 40 m³/s (1000-85000 cfm), (single unit)
- High efficiency: 65%, 85% and 95%
- Low pressure drop
- Superb controllability - typically down to ± 2-5%
- No risk of over-saturation
- GLASdek™ GX40 evaporative ceramic media made from inorganic, non-combustible material
- No water treatment required
- Low running costs
- Compact design allows for space and cost saving
- Low maintenance
- Safe and hygienic
- Windows based selection program
- ISO 9001 certified manufacturing



GLASdek™, GX40 and GX60

TECHNICAL DATA

GX40 and GX60 – cooling power specified per m² surface area at 5.0 m/s (984 fpm) and 95% humidification efficiency.



■ Ambient temperature ■ Temperature after humidifier
■ Ambient humidity

Specific features

- Evaporative GX40 ceramic media made from inorganic, non-combustible, ceramical material
- ASTM E 84-97 a
- High efficiency: 65%, 85% and 95%
- Complying with the UL900 standard
- Low pressure drop
- Tested against the transfer of legionella (with contaminated water and air born bacteria) by external body
- Approved according to VDI 6022
- Tested and approved according to Loosening of Air born Fibers, no risk of over-saturation
- No water treatment required
- GX media - high tolerance for pH levels in water - up to 10 pH is no problem
- Non-sensitive for chemical treatment
- ISO 9001
- GREENGUARD Gold certified

Maintenance

Mineral deposits can be minimized by maintaining a continuous water bleedoff, or by periodically dumping the sump. The exact amount will depend on the pH and hardness of the water supply. Munters can assist by recommending individual bleed-off rates. Early implementation of simple maintenance techniques benefit pad life. The efficiency of the pad is maintained when the air can flow uninhibited through the pad. Munters maintenance bulletins provide information to help maximize the efficiency and life of the media.

Munters has made every attempt to ensure the accuracy and reliability of the information provided. However, the information is provided "as is" without warranty of any kind. Munters does not accept any responsibility or liability for the accuracy, content, completeness, legality, or reliability of the information contained.



Munters Services – With you all the way

We are dedicated to providing the most reliable, efficient and innovative products, but we know that service is just as important. That is why we offer Global Services, which ensures you benefit from our expertise wherever you are in the world.

Our range of services includes:

- A global network of Munters Service Engineers
- Comprehensive commissioning service
- Training and competence development
- Preventive maintenance and spare parts
- Performance checks and optimization
- Munters Remote Assist – online service solution when on-site visits are difficult
- And much more...

Protecting data centers against legionella

Legionella is a group of bacteria which thrives in aquatic environments, and can be a danger to humans if it is allowed to grow and spread through an atmosphere. There are 52 known species of legionella in existence today, and when inhaled the bacteria causes Legionnaires' disease.

It thrives in fresh water, and whilst it is not believed to be dangerous in its own habitat, it becomes a problem when it occurs in man-made environments. This means that any system which uses significant amounts of water could pose a threat.

Data center cooling systems rely on fresh water to maintain cooling efficiency, and the air which is pushed into the building travels through media soaked in this water first.

Who is most at risk?

When the bacterium is inhaled, the signs of Legionnaires' disease can appear soon after. This means potentially anyone is at risk, and it is more about the environment than the individual. Some groups are more likely than others to react to legionella, like those over 65 years old or those with weaker immune systems, but it can affect anyone and can, in some cases, be fatal.

How can the industry prevent Legionnaires' disease?

In hot water systems it is more straightforward to avoid the growth of legionella bacteria, as the water just needs to be kept at temperatures higher than 60°C. With

evaporative humidification and cooling, which are optimal systems for data centers, the water needs to be kept at lower temperatures. However, legionella is still prevented as the transfer of humidity occurs at molecular level, and these molecules are too small to carry legionella bacteria.

In other, non-evaporative humidification systems where spray nozzles or atomizers break water down into aerosols, the water if contaminated, can cause a health hazard.

Certified safety

Because of the potential dangers of legionella, and the fact that these concerns often come up in discussion, we decided to take action.

We took our FA6™ system to the Medical Faculty of RWTH in Aachen, Germany, to ensure that our products would not facilitate the spread of this harmful bacteria. As a result, we can present a certification which rules legionella out completely, proving that our FA6 system is completely safe from contributing to the transmission of legionella. As far as we know, we are the only company that can do this.

We invested in this testing process because we know how important data center safety is, especially for the people that work inside the data center, or in the surrounding area. We are proud to be able to say that our products are certified against legionella, as we want to contribute to ruling it out completely.



Dr. Sebastian W. Lemmen (MD). 'Hygiene report on the Munters FA6 evaporation humidifier.' 2001. Central Department for Hospital Hygiene at the Medical Faculty of RWTH Aachen, Germany.



Dr. Sebastian W. Lemmen (MD). 'Hygiene report on the Munters FA6 evaporation humidifier under operating conditions.' 2001. Central Department for Hospital Hygiene at the Medical Faculty of RWTH Aachen, Germany.





Find your nearest Munters office at www.munters.com

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