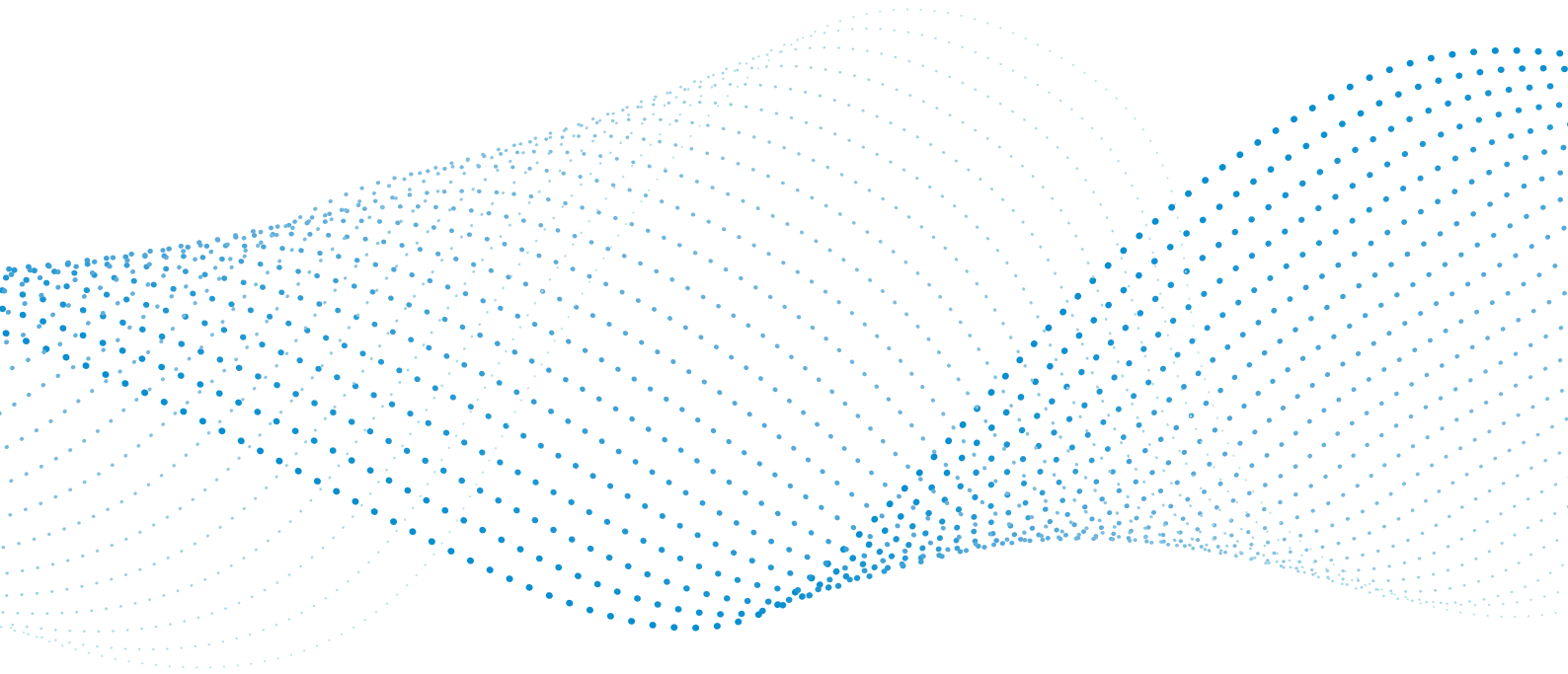
Munters

Control climate fluctuations

Munters' air treatment solutions for predictable spray drying



The critical need for climate control in spray drying

Spray drying is a vital process in food, pharmaceutical and chemical production to turn liquids into consistent powders. However, it faces several climate-related challenges. Uncontrolled humidity and temperature fluctuations can significantly disrupt the drying process.

Humid ambient air causes spray dryer walls to get sticky, making powder particles lump together and clog equipment. Excess moisture also invites mold, fungi, and bacterial growth, threatening product safety and quality. Water can condense on surfaces, leading to powder clumps, blockages, corrosion of equipment, and unplanned downtime.

Moreover, spray drying is an energy-intensive operation by nature – any inefficiency in air handling treatment further drives up energy use and costs. These challenges mean manufacturers often struggle with inconsistent output, frequent cleaning stops, and high energy bills. In a wet summer or tropical climate, for example, a spray dryer's throughput can drop as operators slow feed rates to prevent products from sticking. Overall productivity suffers whenever the weather is not ideal.
The bottom line: without proper climate control, a spray drying line cannot run at peak performance year-round, impacting product quality and profitability.

We bring decades of experience in climate control and have developed proven solutions to solve these challenges in spray drying. By mastering air humidity and temperature, we enable stable, optimized drying conditions in any season. The result is a more productive, energy-efficient, and reliable spray drying process for your plant.

Our integrated approach – combining desiccant dehumidifiers with high-efficiency indirect air heaters (steam, gas, electric) and heat recovery – ensures your dryer receives clean, dry, and hot air consistently. This means fewer weather-related disruptions and a significant boost to your bottom line.

Key benefits of Munters' solutions for spray drying

Maximized throughput

Increase production capacity by up to 40% even in humid conditions, allowing you to produce more powder without investing in a new dryer. A stable low-humidity inlet air supply keeps the dryer running at full speed by eliminating the moisture bottleneck.

Energy savings

Reduce energy consumption up to 15% through our desiccant dehumidification and high-efficiency heaters. By conditioning air to optimal levels and recycling heat, the drying process uses significantly less fuel and power for the same output, cutting operating costs and improving sustainability.

Year-round reliability

Achieve consistent, round-the-clock operation regardless of season or climate. Munters' technology maintains the same drying conditions on a rainy day as on a dry day, so you no longer have to adjust your process or risk downtime due to ambient weather swings. This reliability means higher uptime, less emergency intervention and predictable product volume yields.

Reduced downtime and maintenance costs

A drier and cleaner process means fewer shutdowns and maintenance interventions. With our solutions, issues like clogging are greatly reduced. Less downtime for cleaning or fixing fouled equipment directly increases your production availability and lowers maintenance labor and chemical costs. Over years, this adds up to substantial savings and more consistent output.

Superior product quality and hygiene

Ensure a clean and safe drying environment. Our solutions prevent powder from lumping or spoiling, resulting in uniform higher-quality products with consistent bulk density and minimal rejects. Powders come out with the intended moisture content and particle characteristics, without scorch from overheating or spoilage from moisture. All equipment is designed to meet the highest hygienic standards, helping reduce the risk of contamination (no direct flames or combustion fumes) and even shortening CIP cleaning cycles due to less fouling. Consistently dry, controlled air leads to better product quality, longer shelf life and compliance with strict sanitary standards.

Fast return on investment

Thanks to the large gains in production and the energy savings, the payback period for Munters' products is typically very short. In real-world projects, ROI is often realized in 12 months or less. In other words, our solutions quickly fund themselves through improved profitability.

Sustainable footprint

Sustainability is another core aspect of our solutions. By reducing energy consumption by up to 40% when using the Thermo-Z or when combining the PureRecup with a heat pump, we directly help cut your facility's greenhouse gas emissions and carbon footprint. Lower fuel usage for the spray dryer means fewer CO_2 emissions for each ton of powder produced – a win for both the environment and your energy bills.

Munters delivers these advantages with a complete portfolio of climate control technologies, and spray dryer operators can expect a fast return on investment through higher yield and lower costs, along with the peace of mind that their process will run smoothly in any weather.

Air treatment solutions for optimal spray drying

Seasonal fluctuations, all year round.
Munters delivers precision-engineered solutions that ensure seamless, predictable and reliable spray drying process, regardless of weather conditions.

Munters' air treatment solutions installed at infant formula spray drying plant in the Netherlands.

Benefits:

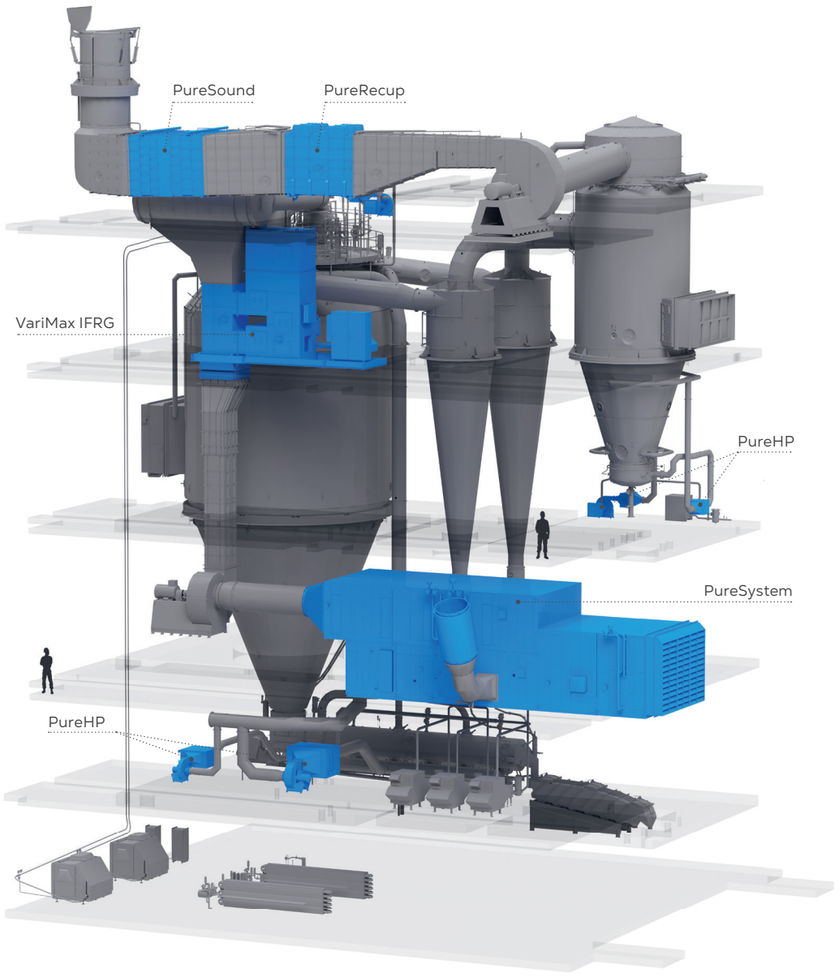
Maximized throughput with up to 40% increased production capacity

Energy savings with up to 40% lower consumption

Reduced CO_2 emissions through lower fuel usage for each ton of powder produced

Superior product quality with reduced lumping, clumping, fouling and blockage

Reduced Clean-In-Place (CIP) time and frequency



Solutions provided:
PureSystem, VariMax IFRG, PureHP, PureSound, PureRecup, Heat pump

PureSystem

Main air desiccant dehumidification

The PureSystem premium desiccant dehumidifier removes up to 105 gr/lb [15 g/kg] of moisture from the inlet air at airflows up to up to 81,000 SCFM [165,000 kg/h], enhancing dryer capacity and preventing powder sticking regardless of outdoor climate conditions. Constructed from welded stainless steel with food-safe components for optimal hygiene, it ensures ideal process conditions for powdered product production.

VariMax IFRG

High-efficiency indirect gas heater

The VariMax IFRG indirect-fired recirculating gas heater delivers contaminant-free process air for airflows up to 63,730 SCFM [130,000 kg/h] with over 34 MMBTH [10 MW] capacity. Designed for long-term reliability with ultra-low combustion temperatures and heat exchanger expansion joints, it achieves up to 98% efficiency and rapid thermal response of 29°F/min [16°C/min] with best-in-class low emissions.

PureMAH

Main air heater Steam or electric

The PureMAH main air heater delivers contaminant free process air for airflows up to 73,600 SCFM [150,000 kg/h] and operating temperatures up to 482°F [250 °C]. With a fully-welded insulated stainless steel casing, it provides ±5.4°F [±3 °C] temperature accuracy, rapid thermal response of 27°F/min [15 °C/min], and 15–40% efficiency gains when integrated with heat recovery.

PureHP

Hygienic secondary air treatment

The PureHP secondary air treatment unit delivers advanced filtration and temperature control for airflows between 980 SCFM and 22,000 SCFM [2,000 and 45,000 kg/h]. Its fully welded, airtight stainless-steel construction withstands pressures up to 32.10" W.C. [8,000 Pa], ensuring hygienic and reliable operations in the high-care area and fluid bed.

Thermo-Z

Highly efficient air-to-air heat recovery

The Thermo-Z fully welded plate heat exchanger handles airflows between 4,900 SCFM and 63,730 SCFM [10,000 and 130,000 kg/h], delivering up to 85% thermal effectiveness. Available in different configurations for perfect site integration, it recovers energy from the exhaust of the spray dryer, significantly reducing fuel consumption, operating costs, and carbon footprint.

PureRecup

Exhaust air-to-water heat recovery

The PureRecup hygienic heat recuperation module efficiently captures waste heat from spray dryer exhaust and transfers it to PureSystem and PureHP. This integration preserves dryer performance while significantly reducing fuel consumption and lowering the overall energy demand of the solution.

Heat pump

Highly energy-efficient utility supply

Integrated into PureRecup, PureSystem, and PureHP, the heat pump recovers heat from dryer exhaust to simultaneously produce hot and chilled water for the process. Powered by ammonia, a natural refrigerant with zero GWP and high thermal efficiency, it enhances the overall system energy performance with optimal thermal management and lower operating costs.

PureSound

Exhaust air noise reduction

The PureSound noise reduction system minimizes exhaust-air noise emissions from spray drying processes by up to 30 dbA using single- or double-stage baffle chambers. Its robust, welded stainless-steel design with fully sealed, hygienic, CIP-ready baffles enhances uptime, productivity, and long-term performance.

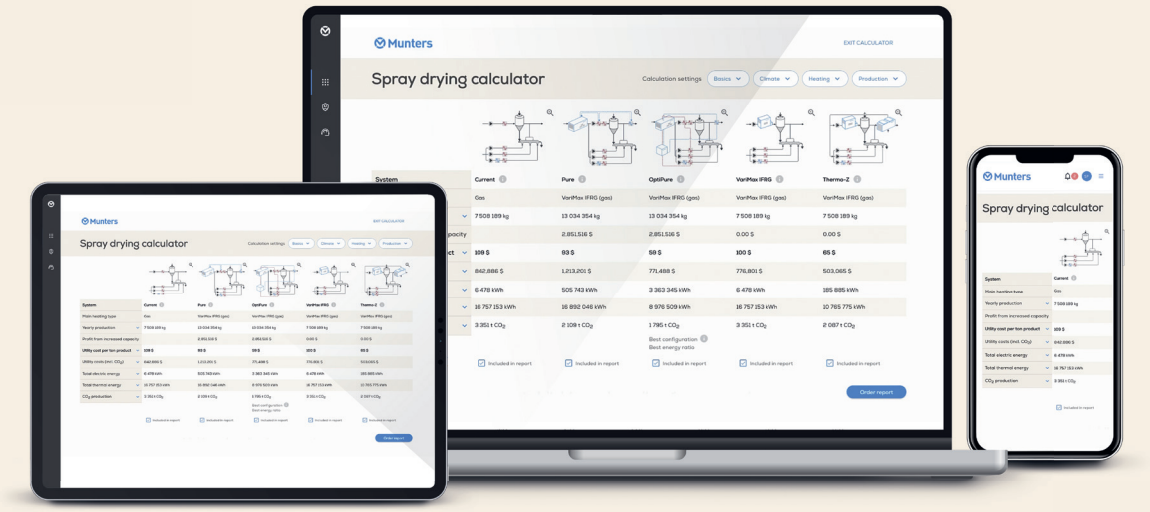
Munters' desiccant rotor improves Sensus Zwolle spray drying process

Based in Zwolle, the Netherlands, Sensus uses the chicory root to produce inulin, a sweetener used in the food industry, utilizing a spray drying process to convert the concentrated inulin solution to powder.

One of the most important parameters in the spray drying process is climate fluctuations and temperature and moisture content determine the product's glutinosity, which can cause production stops due to fouling.

The Munters PureSystem Premium Plus 3500 with the patented HPQ Quantum desiccant rotor optimizes Sensus spray drying process with perfect inulin moisture content.

With our proven technology, climate is no longer a variable but a constant factor, and production capacity has increased by 40%.



Optimize your system with Munters' online spray drying calculator

Our Spray drying calculator is a unique digital tool that puts the power of system design and ROI analysis at your fingertips. This user-friendly web application allows you to virtually configure a spray drying climate solution and immediately see the benefits and performance metrics.

Interactive system planning

Accessible through Munters' website, the configurator lets you select different equipment combinations (desiccant dehumidifiers, heaters, heat exchangers, heat recovery modules, heat pumps) tailored to your spray dryer. You can input details about your existing dryer or a new project. The tool adapts to your facility's parameters – you can adjust country or climate zone, seasonal conditions, dryer specifications, and more – to simulate how each Munters' solution would perform in your specific scenario.

Real-time performance insights

As you tweak parameters, the configurator instantly recalculates key outcomes like expected production increase, energy saved, and other performance improvements. You can immediately see how changes, for example adding a PureRecup module or using a larger PureSystem unit, will impact results. This real-time feedback helps you identify the optimal configuration for maximum ROI. The tool is designed for all levels of technical expertise, from experienced engineers to those new to drying systems, with clear visuals and guidance at each step.

Data-driven decision support

Once you have modeled a solution, the configurator generates a personalized report summarizing the projected benefits and including quantifications like "up to X% capacity increase" and "Y kWh energy savings". You can download the report for your use, and a copy can be and a copy can be shared with Munters' experts as basis for further discussions.

Try our Spray drying calculator!

The Spray drying calculator is available by request on munters.com. We invite you to try it out – in just a few minutes, you can discover your potential throughput gains and energy savings, and receive a tailored roadmap to a more efficient spray drying operation.

System integration

Every spray drying operation is unique. We have therefore made our solutions flexible and easy to integrate into any system architecture. Whether you are retrofitting an existing spray dryer or installing a brand-new production line, our equipment can seamlessly fit into your process. System integrators will find that our modules come in standardized, modular formats that can be dropped into new builds with minimal engineering effort, and end users will appreciate that even aftermarket upgrades can be done with limited downtime. In fact, all core Munters' solutions are applicable to both existing dryers and new dryer projects – you can enhance a dryer you already own or specify our options in a new turnkey system.

A key advantage of Munters' technology is its plug-and-play modularity. Each component functions as a self-contained unit with its own controls, which can be easily connected into the overall line. This modular design means you can implement the pieces you need, when you need them. We can deliver individual components or a complete integrated system, depending on your requirements.

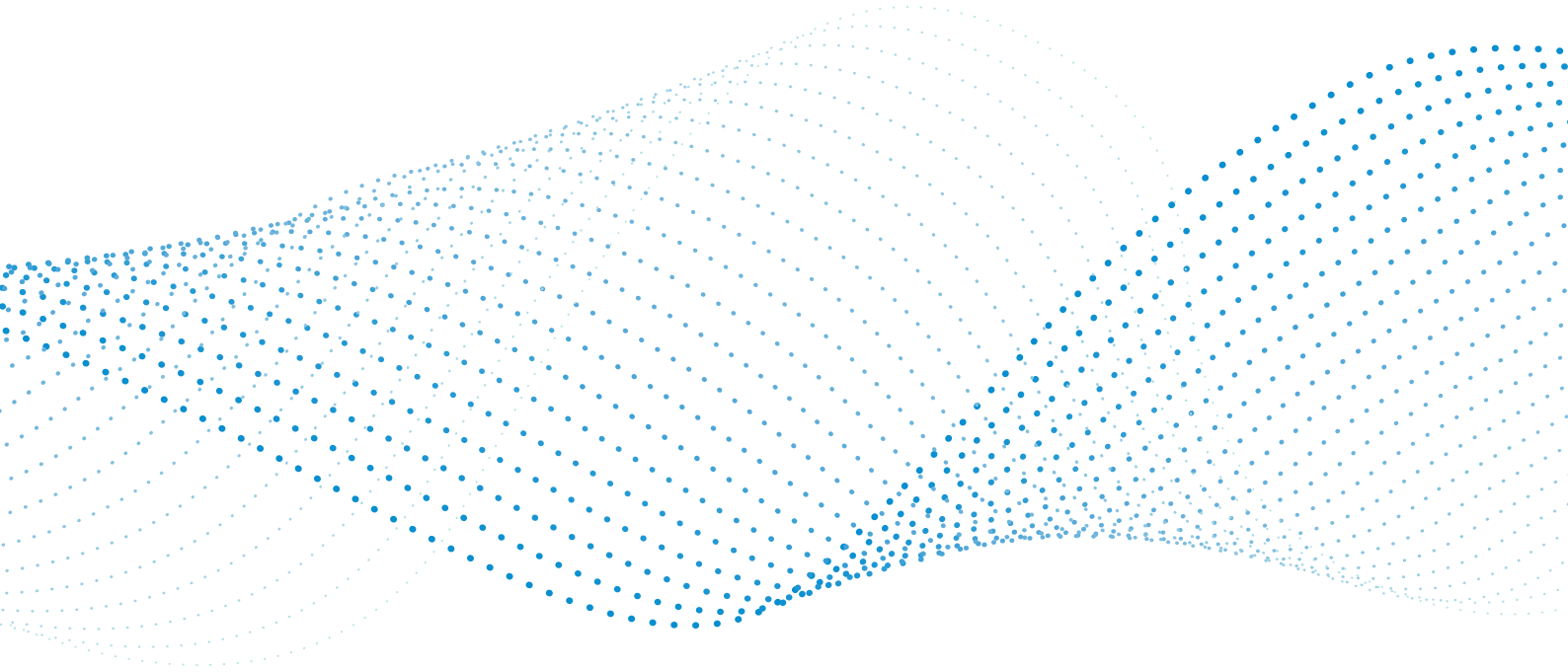
Service and support

Choosing Munters means gaining a long-term partner in productivity. We back the equipment with comprehensive global support and service throughout the entire lifecycle of your system.

From the moment you start evaluating a Munters' solution, our experts are available to assist with design recommendations and customization to fit your needs. During installation and commissioning, our field engineers can be on-site or on-call to ensure everything is integrated correctly and tuned for optimal performance. After startup, our service team remains available to keep your system running in peak condition.

We have a global service network, so no matter where your plant is located, you can count on timely support. In addition, we offer retrofit and upgrade services: as new technologies emerge or your capacity needs increase, we can upgrade your existing Munters' equipment to keep you at the cutting edge. By partnering with Munters, you ensure that your climate control system consistently delivers the promised benefits – maximum uptime, efficiency, and product protection – throughout its life. This comprehensive support is part of the value we provide as a global leader in climate solutions. We don't just sell you equipment; we commit to making it a lasting success in your production line.

- → Increased production capacity
- → Reduced energy consumption
- → Consistent process performance
- → Enhanced product quality
- → Reduced CIP time and frequency



Munters is a global leader in energy efficient and sustainable air treatment solutions. Using innovative technologies, Munters creates the perfect climate for demanding industrial applications and has been defining the future of air treatment since 1955.
Today, around 5,000 employees carry out manufacturing and sales in more than 25 countries. Munters has annual net sales of above SEK 14 billion and is listed on Nasdaq Stockholm.

For more information, please visit www.munters.com

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