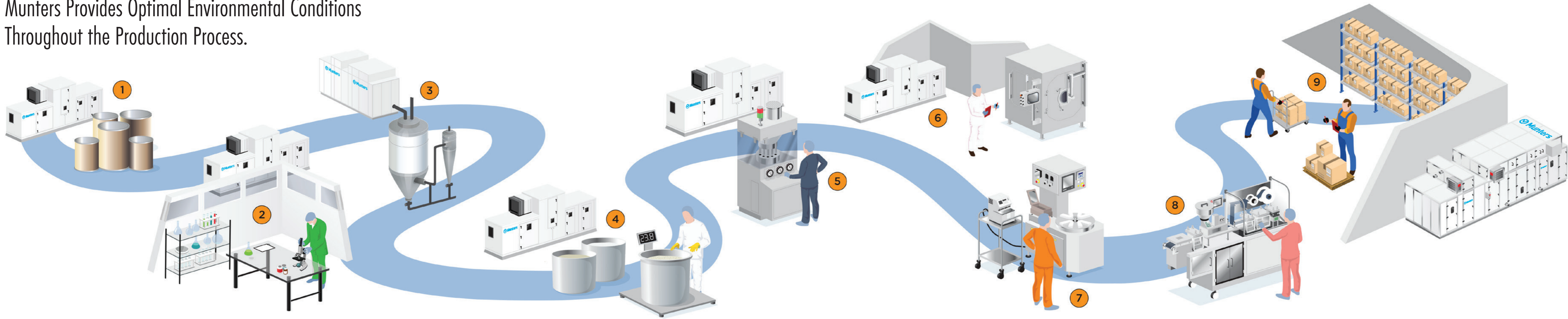


PHARMACEUTICAL PRODUCTION



Consistent and Effective Climate Control
Throughout the Production Process

Munters Provides Optimal Environmental Conditions Throughout the Production Process.



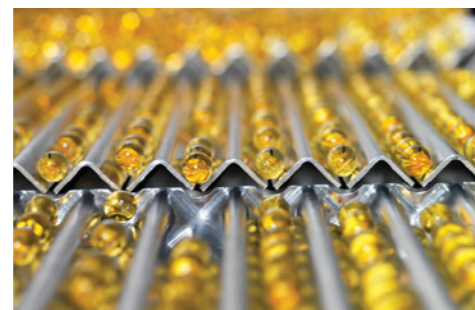
1. Dry Storage

Year-round stable humidity control in dry storage areas will prevent condensation, improve powder flow and reduce the need for frequent cleaning.



2. Cleanroom & R&D

Everything in a cleanroom needs to be accounted for and within specification, and that includes the air. Without proper humidity control, the exterior climate can affect the room conditions.



3. Drying

Optimal drying specifications for soft gel and hard capsule drying will be consistently delivered through desiccant dehumidification.

Ideal air quality is provided year round to assure soft gels dry quickly and meet quality standards.

Whether its gelatine, HPMC or other formulations, we can provide precise drying conditions. By carefully controlling the humidity, the moisture content of both filled and empty capsules is ensured.



4. Weighing/Mixing/Granulating

Optimal environmental conditions ensure that excipients and APIs can be continuously and reliably blended, while avoiding the influence of excess moisture that may affect mechanical and chemical properties.

The right balance of moisture ensures that the granulating mixture remains in equilibrium with the air around it, maintaining the required moisture content for granules to form.



5. Milling & Compressing/Tableting

Maintaining the specified humidity set point will result in higher production throughput (prevent product sticking, reduce stoppages, and decrease waste), reduced energy consumption, and improved dosing accuracy.



6. Coating

Smooth, consistent thickness of coatings yields maximum visual appeal and proper dispersion characteristics. Avoid coating problems like roughness/orange peel, blistering, hazing, sticking and picking, and erosion by selecting and supplying the right drying conditions.



7. Vaccines and Parenteral

Biologics, vaccines and parenteral product quality all rely on a clean, controlled manufacturing area. The presence of excessive humidity (>70% Relative Humidity (RH)) increases the potential for microbial growth. Humidity control also reduces drying time after cleaning operations.



8. Packaging

It's not just tablets or capsules that go into blister packing, the surrounding air also gets sealed in. With the right humidity level, you get packaged products that are longer lasting and durable.

During blow fill seal packaging, condensation on cold surfaces can lead to surface imperfections that affect appearance and structural integrity. Controlling the dew point of the air around the packaging during the blow forming process can prevent this from happening.



9. Storage

Until the product leaves the plant, every effort needs to be taken to maintain quality and efficacy. Providing low humidity air to cold storage areas prevents ice, frost and fog, and improves worker safety.

After production, dried capsule shells are vulnerable to the effects of humidity fluctuations, compromising mechanical strength and appearance. A stable climate during packing and storage avoids these risks.

Additional Areas that Benefit from Climate Control



Airlocks

Air within airlocks serves as a critical barrier between production zones. The optimal number of air changes coupled with humidity controlled air, reduces particle counts and reduces latent temperature loads on surrounding areas.



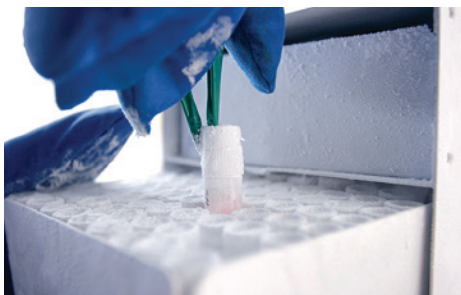
Pass Through Cabinets (PTCs)

Much like airlocks, PTCs need the right air treatment solution to maintain integrity of the adjoining zones. Using the same air handling specifications as neighboring airlocks reduces the moisture load within the cleanroom.



Corridors and Anterooms

Controlling the air conditions in adjoining corridors and anterooms contributes to reducing the moisture load within the freezer. These areas will also benefit from correct humidity control.



Biological Samples and Products in Freezers

When dealing with temperatures of -25°C / -13°F , -70°C / -94°F or even lower, there is an ever-present threat of unwanted ice development. This reduces the efficiency of cooling coils, increases safety risks from slipping and poor grip, and can compromise packaging integrity. Control the humidity level, and the icing problem is eliminated.

Humidity Control for Medical Products and Devices



Test Strips

The sensitive chemicals used for test strips need protection from moisture during production and storage. Providing the optimal humidity conditions through these production stages allows the end product to work as expected, which increases patient satisfaction.



Medical Devices

Implantable and external devices need a carefully controlled climate during assembly, as reliability is a major concern. A Relative Humidity level of 50% or lower eliminates corrosion caused by water as a vapor or liquid.

Your Partner in Production Process Improvements

Meeting Your Needs

From dry storage and cleanrooms, to tableting, coating, and storage, humidity control is critical to pharmaceutical processes and quality. Munters dehumidification solutions can deliver consistent and precise environmental control to meet the varying specifications required throughout all areas of your plant.

Each plant may demand different specifications due to location, climate, equipment and ingredients. In order to

fully understand your specific needs, a complimentary Site Review with the customer, contractor or engineer, and Munters Sales Engineer, is a good first step.

Site Review

During a walk-through of the areas requiring humidity control, our Sales Engineer and support team will review process air treatment issues, gathering information that will help define a

solution. Our proposed solution can include Munters equipment, drawings, utility data and energy analysis that, working closely with the customers' team, can become a plan to improve process productivity, quality and consistency. By exchanging information and working closely together, customers benefit from Munters extensive application experience - and this relationship continues through the life of Munters equipment, not just the sales process.

Service

Why Munters Service?

Munters Service is dedicated to helping our customers optimize the value of their equipment through planned maintenance programs. Drawing from over 60 years as the leading manufacturer of air treatment technology, Munters has developed service programs that extend the life of our equipment, optimize its performance and assure continuous operation.

ServiceCaire Maintenance Programs

Field experience has repeatedly shown that customers who employ planned maintenance can substantially extend their equipment life. By eliminating failures before they occur, customers maximize both the utilization of Munters equipment, and also lower the overall cost of ownership. The program includes a pre-determined number of visits and defined scope of work for specified equipment, or custom programs can be tailored to specific needs.

Parts

In most cases, parts will ship out together the same day you call. Convenient spare part kits provide exact parts and intervals for guided self-service or service contracts to provide all preventative maintenance.

Engineered Retrofits

Munters can retrofit your existing system to increase capacity, improve performance, extend unit life, and greatly reduce energy consumption.



Australia Phone +61 2 8843 1588, dh.info@munters.com.au **Austria** Phone +43 1 6164298-0, luftentfeuchtung@munters.at **Belgium** Phone +32 1528 5611, info@muntersbelgium.be **Brazil** Phone +55 41 3317 5050, munters@com.br **Canada** Phone +1 905 858 5894, dhinfo@munters.com **China** Phone +86 10 8041 8000, info@munters.com.cn **Czech Republic** Phone +420 544 211 434, info@munters-odvlhcovani.cz **Denmark** Phone +45 4495 3355, info@munters.dk **Finland** Phone +358 20 776 8230, laitemynti@munters.fi **France** Phone +33 1 3411 5757, dh@munters.fr **Germany** Phone +49 4087 96900, mgd@munters.de **India** Phone +91 20 668 18 900, info@munters.in **Italy** Phone +39 0183 52 11, marketing@munters.it **Japan** Phone +81 3 5970 0021, mkk@munters.co.jp **Korea** Phone +82 2761 8701, munters@munters.co.kr **Mexico** Phone +52 722 270 40 49, munters@munters.com.mx **Netherlands** Phone +31 172 433231, vochtbeheersing@munters.nl **Poland** Phone +48 58305 3517, dh@munters.pl **Singapore** Phone +65 6744 6828, info@munters.com.sg **South Africa** Phone +27 11 997 2000, info@munters.co.za **Spain** Phone +34 91 640 09 02, marketing@munters.es **Sweden** Phone +46 8 626 63 00, avfuktning@munters.se **Switzerland** Phone +41 52 343 8886, info.dh@munters.ch **Thailand** Phone +66 2642 2670, info@munters.com.th **Turkey** Phone +90 216 548 1444, info@muntersform.com **UAE** +971 4887 6462, middle.east@munters.com **United Kingdom** Phone +44 1480 432243, info@munters.co.uk **USA** Phone +1 978 241 1100, dhinfo@munters.com **Vietnam** Phone +84 8 8256 838, vietnam@muntersasia.com



Munters Corporation
Tel: (800) 843-5360 E-mail: dhinfo@munters.com
www.munters.com