Dry Air for Safe Process Design

Process air drying with the modular system ULT Dry-Tec®

ULT
UMWELT - LUFTTECHNIK

Surface drying protects sensitive foods

Humidity, brief and dry.

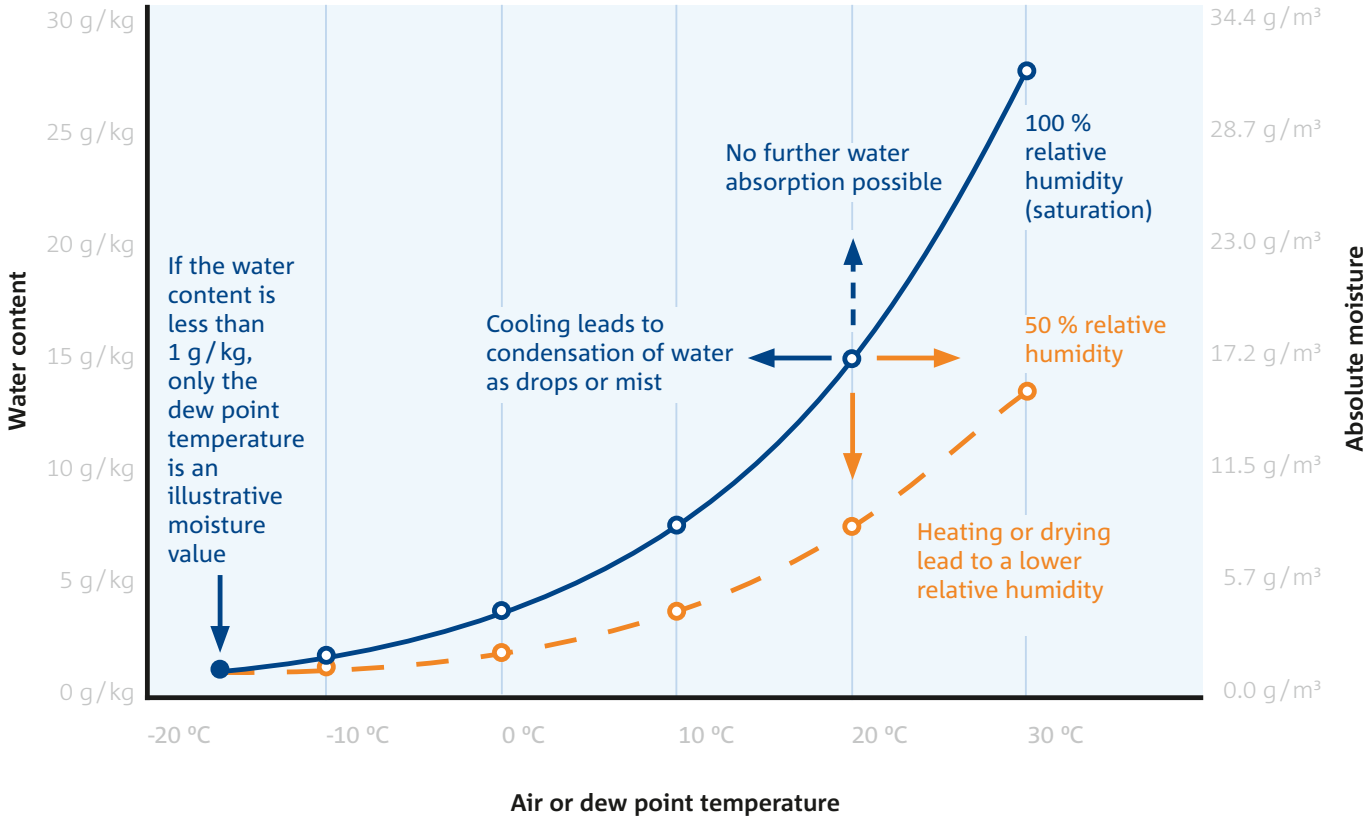
Moisture denotes the content of liquid, e.g. water, in a substance or gas. In industrial practice, it is mostly about the water content of the process air or a product.

Depending on the temperature of the air, only a limited amount of water can be absorbed. The rule is that warm air can absorb more water than cold air. The absolute humidity x is given in mass of water per amount of dry air.

The liquid content of the air, from which no more liquid can be absorbed at a certain air temperature, is called saturation, and corresponds to a relative humidity of 100 % (see temperature-humidity diagram below).

Since each temperature along the saturation line can be assigned an absolute moisture value, the saturation or dew point temperature can also be specified for an explicit description of the liquid content. This is particularly advantageous when the moisture content is low (e.g. <1 g / kg).

Temperature-humidity diagram



Different products – different process conditions

In the production and processing of sensitive materials and products, high demands are made, e.g. on the quality of the ambient or process air. Depending on the product category, different tasks are in the foreground prioritized.

To achieve effective and process-active drying, between 80 % and more than 99.99 % of the contained water amount must be extracted from the process air. This corresponds to a relative humidity of less than 0.05 % at 20 °C or a dew point temperature of -65 °C.

Food

» Optimize product consistency
» Avoid mold growth
» Maintain freshness
» Extend shelf life
» Keep pests away
» Avoid incrustation, clogging and corrosion of the systems

Aspired dew point: 0 °C

Bulk materials

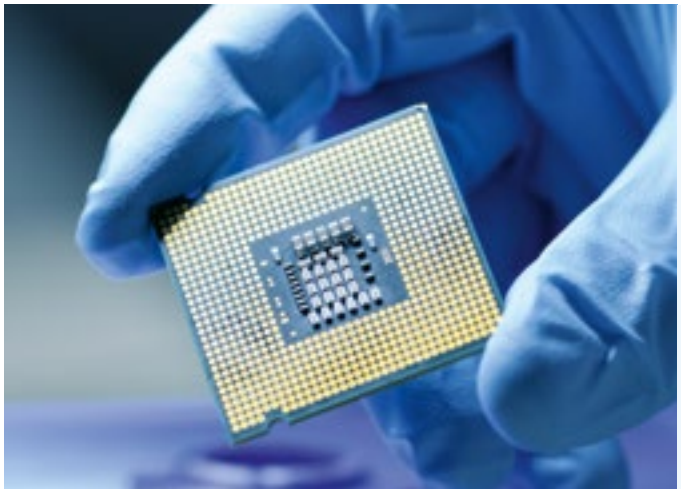
» Avoid clumping
» Optimize bulk handling capability
» Ensure processability
» Compensate for seasonal fluctuations in moisture
» Avoid incrustation, clogging and corrosion of the systems

Aspired dew point: -10 °C

Drugs

» Ensure processability
» Ensure product quality and stability
» Minimize germ and bacterial growth
» Comply with hygiene requirements
» Avoid incrustation, clogging and corrosion of the systems

Aspired dew point: -20 °C



Semiconductors

» Prevent corrosion on products and systems
» Avoid discharges and short circuits
» Ensure safe storage
» Compensate for seasonal fluctuations in moisture

Aspired dew point: -30 °C

Chemicals

» Provide sufficient capacity
» Improve product stability
» Avoid foreign inclusions
» Guarantee safe storage
» Avoid incrustation, clogging and corrosion of the systems

Aspired dew point: -65 °C

Sorption drying provides ideal conditions

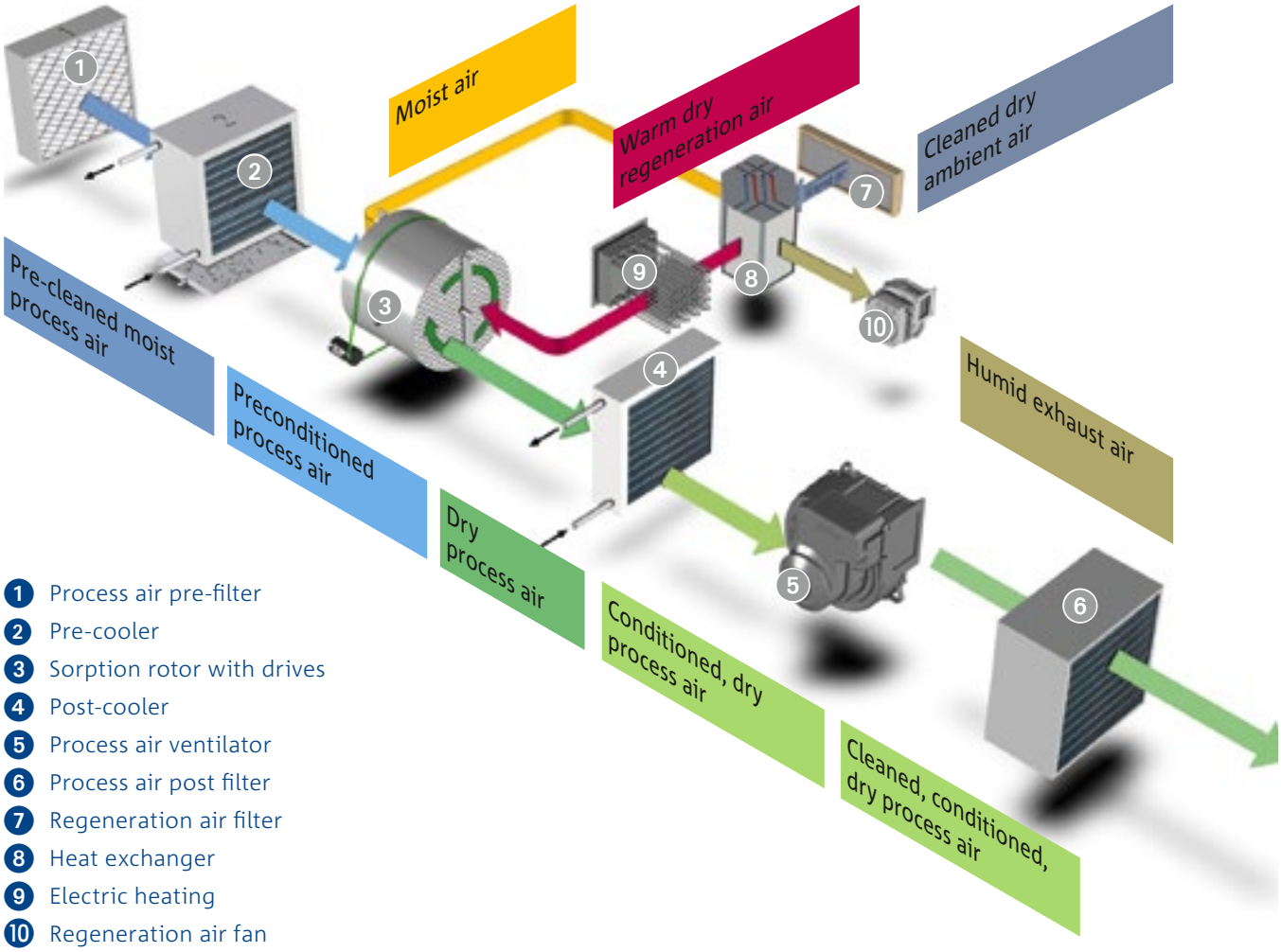
Dew points below 5 °C cannot be effectively achieved with simple drying methods, such as condensation drying – sorption drying is the only alternative.

The most important component of such a system is the sorption rotor with a special coating. It rotates at a speed adapted to the process and absorbs the moisture from the process air flow. In countercurrent, warm air is led through the sorption rotor, which removes the moisture from it. The water-laden exhaust air is then released to the environment outside the process area.

Sorbent requirements (coating)

- High storage density
- High adsorption effect at low water content
- Desorption of the bound water with the lowest possible energy consumption

How sorption drying works – operating principle of ULT Dry-Tec®



1. Process air pre-filter
2. Pre-cooler
3. Sorption rotor with drives
4. Post-cooler
5. Process air ventilator
6. Process air post filter
7. Regeneration air filter
8. Heat exchanger
9. Electric heating
10. Regeneration air fan

Sorption rotor drive

Different performance classes – versatile equipment

ULT Dry-Tec 3.1 – small sorption module for flow rates up to 300 m³/h

The sorption modules of the ULT Dry-Tec series are available in different performance classes and can be adapted to different requirements depending on the customer and project. The structure, properties and equipment are based on the cleanliness requirements of the respective industry. Additionally, the robust and durable construction enables utilization under difficult environmental conditions - stability and tightness against dust, wetness, heat and cold.

The individual modules and system components are perfectly matched to one another. An integrated standard regeneration heat recovery system ensures very high efficiency with low energy consumption. The correct design and planning of the ULT Dry-Tec modules are only possible when taking the respective application in consideration.

Sorption modules in graded performance classes

Equipment: standards and options

Digital display and control panel with touchscreen
- Required drying capacity (stepless)
- Required regeneration performance
- Operating hours display incl. consumption statistics
- Performance statistics display
- Chronological graphic representation of the process parameters
- Data logger
- Password protection
- Trilingual plain text error message

Multiple LED signaling system with emergency stop switch

All-round mountings for forklifts

Protection class IP54

» Compact size
» Short maintenance intervals
» Freely configurable interfaces for process and regeneration air
» Speed-controlled fans for process and regeneration air
» Integrated heat recovery
» Safety equipment, among others:
  - Network monitoring
  - Temperature monitoring heating
  - Check, warning, and message regeneration filter
  - Check, warning, and message process filter
  - Monitoring rotor turning device

Options

» Pressure or volume flow control of the process fan
» Moisture-controlled regeneration performance
» Regulated pressure compensation for the regeneration filter
» Moisture control incl. monitoring of the moisture value threshold
» Remote control via analog signals
» Add-on screen for maintenance tasks

The modular system ULT Dry-Tec®

ULT Dry-Tec is designed as a modular system. In this way, individual processes can be supported with the help of freely configurable and freely set up sorption modules. The system can also be expanded and adapted – it grows with the performance requirements of the process. Various special modules can be added for special requirements.

Which ULT Dry-Tec module combination is best suited for your product and your individual manufacturing? In which performance class and equipment? Together with you, we would like to find out. You are welcome to contact us.

Special modules of the ULT Dry-Tec system

» **ULT Dry-Tec® superarid**
Sorption module for highest demands

» **ULT Cool-Tec®**
Additional module that can be connected upstream or downstream to heat or cool the process air or to compensate for fluctuating process and ambient conditions

» **ULT Vac-Tec®** and **ULT Fil-Tec®**
Additional modules that can be connected upstream or downstream to remove and clean particle-laden material flows

Combination of the standard sorption module ULT Dry-Tec with two additional ULT Cool-Tec modules

Module combination ULT Dry-Tec in use

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ULT is certified according to ISO 9001:2015. The plants are designed meeting international standards.

In addition, the plants always comply with current EC directives on energy efficiency (ErP directive: Total energy efficiency of ready-to-use ventilation systems or minimum energy efficiency of electric motors).

Detailed technical information can be found on device specific data sheets or on our website. All technical data is general and not binding and does not guarantee the suitability of a product for a specific application.

www.ult.de/en/products-and-services/process-solutions/air-dehumidification-drying.html

ULT_DryTec_06/20/EN

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