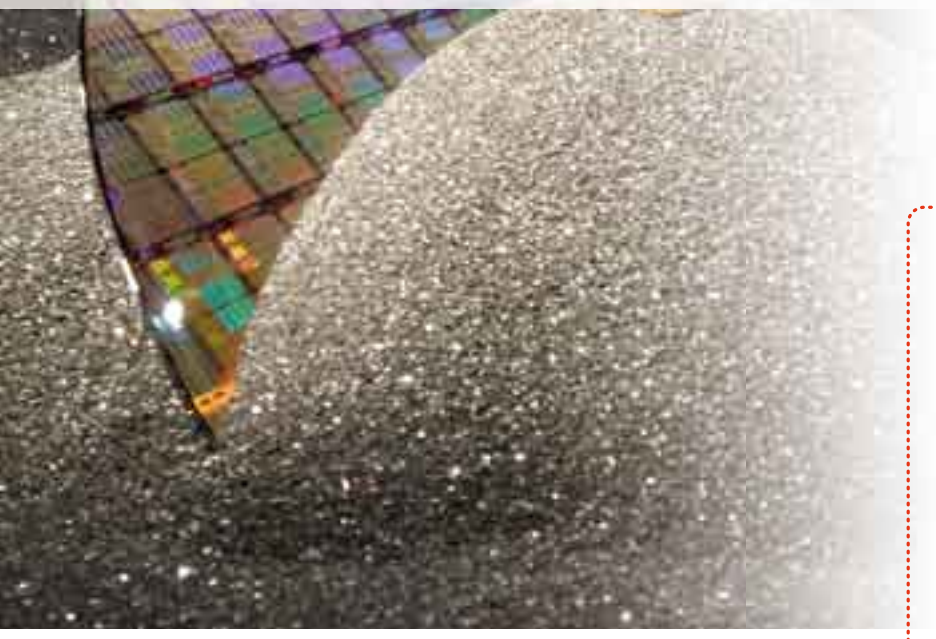
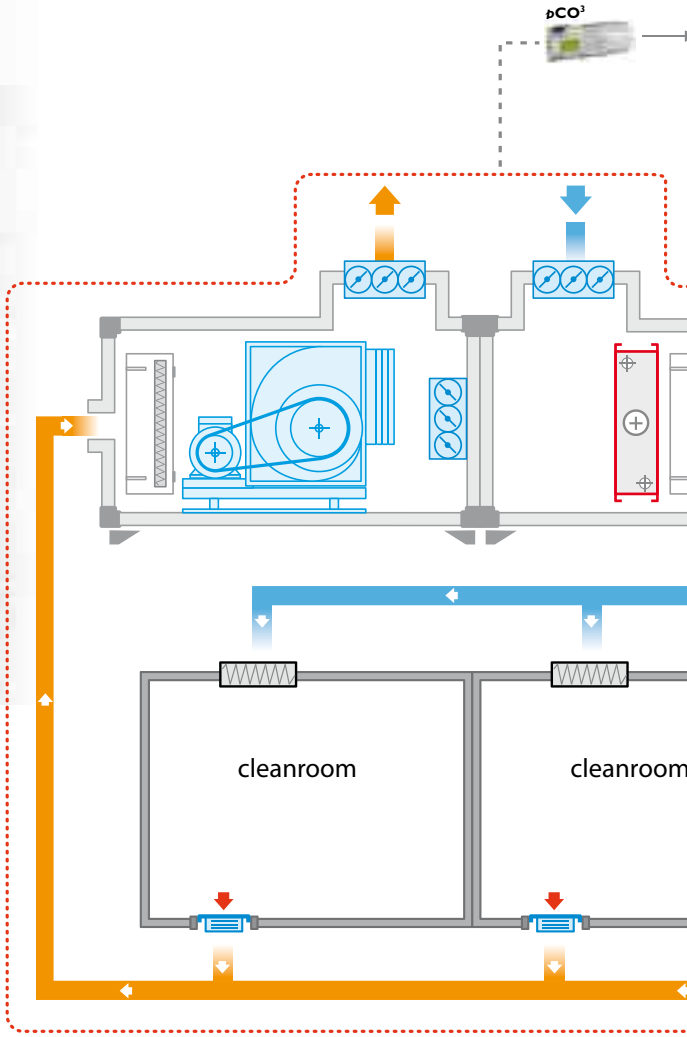
CAREL

Humidity control in clean rooms

Technology & Evolution

Greater productivity with the right humidity





Relative humidity is one of the fundamental ambient parameters used to define the normal operating conditions of a cleanroom, and often the limits in tolerance are very strict (in some applications, even just 1%).
Why is such precise humidity control required?

Very simply because relative humidity influences the main factors that affect the performance of the rooms:

- risk of electrostatic discharges;
- proliferation of biological contaminants;
- speed of chemical reactions;
- swings in the properties of photoresist;
- increase in capillary forces;
- personal comfort.

Electrostatic charges

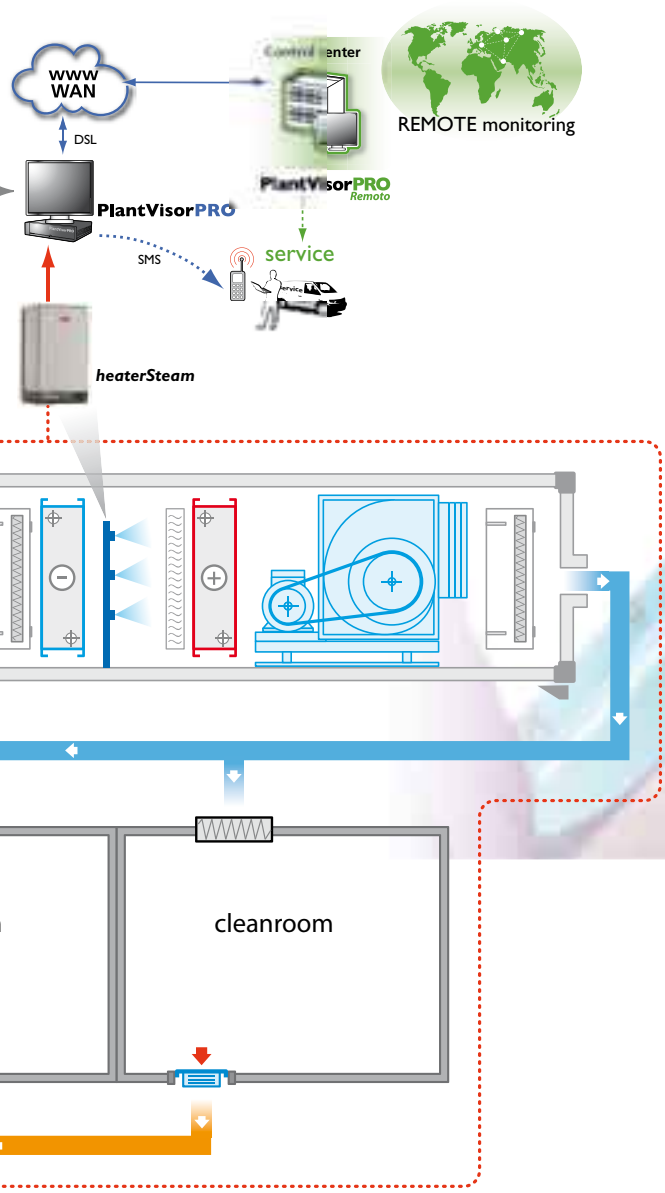
Relative humidity levels lower than 30% make it easier for electrostatic discharges to be generated and cause serious damage to electronic components.

Bacteria & biological contaminants

The increase in relative humidity above 50% causes a proliferation of bacteria and other biological contaminants (viruses, fungi, mould, mites). A range of relative humidity between 40% and 60% minimises the impact of bacteria and respiratory infection.

Chemical reactions

The speed of many chemical reactions, including the corrosion processes, depends on the relative humidity. Close humidity control means greater control over the processes.



Example system diagram

CAREL can supply the most suitable type of humidifier for the installation, together with a complete supervisory system that simplifies management and optimises maintenance.

CAREL specialist in humidification

From more than thirty years CAREL has been designing and manufacturing electronic control systems for air-conditioning and humidification solutions.

This specialisation, together with the extensive experience acquired, makes CAREL the ideal partner for high-tech industries and laboratories, where reliability and precise humidity control are indispensable.

Semiconductors

As the viscosity of the photoresist (and hence the possibility of laying a film of constant thickness) is extremely sensitive to relative humidity, extremely precise control limits are required when processing semiconductors.

Capillary forces

At high relative humidity levels, capillary forces increase the adhesion of water particles to surfaces. These capillary forces may have undesired effects on the precision and the speed of the processes.

Personal comfort

Relative humidity between 40% and 60% represents the personal comfort zone. Higher humidity causes a feeling of discomfort, while lower humidity involves dryness and inflammation of the mucous and chapped skin.

Sectors in which cleanrooms are used

The constant increase in the technological level of production processes has led to the increasing use of rooms with a controlled level of contamination.
CAREL humidification systems are successfully used in applications for:

- semiconductors and microelectronics;
- pharmaceuticals and pharmaceutical biotechnologies;
- cosmetics;
- medicine;
- hospitals and operating rooms;
- research laboratories;
- aerospace technology;
- micro and nano-technologies;
- agro-food industry;
- automobile industry.

Our solutions

heaterSteam

Immersed heater steam humidifier at atmospheric pressure (2 to 60 kg/h); precision ± 1% rH.

gaSteam

Gas-fired steam humidifier at atmospheric pressure (45 to 180 kg/h).

humiSteam

Immersed electrode steam humidifier at atmospheric pressure (1.5 to 130 kg/h).

ultimateSteam

Centralised steam distributors (3 to 900 kg/h of steam, 0.14 to 4 bar).

humiFog

High pressure water spray humidifier (60 to 500 kg/h standard; up to 5000 kg/h custom).

mc

Water spray humidifiers using compressed air (60 and 230 kg/h).

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