



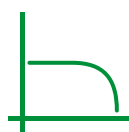
Clean air in  
datacenters  
Air filtration and  
corrosion control



# Clean air in datacenters

## Air filtration and corrosion control

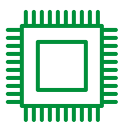
One of the biggest threats to datacenter reliability and performance is the invisible, corrosive gaseous pollutants that inlet air can bring in via the HVAC system. Failure to control these contaminants can have expensive consequences for datacenters:



Downtime from hardware failure



Ghost signals due to shorts by sulfide corrosion whiskers



Failure of circuit boards, gold/nickel connections, processors and drives



Electrical fire and/or explosion in the UPS area or wider data center



Severe health and safety issues for employees and service personnel



Financial loss due to non-compliance to warranty specifications

The International Society of Automation (ISA) standard ISA-71.04-2013 defines airborne contaminants and biological influences to help owners and service providers to datacenters to identify the root causes that affect industrial process control

equipment, electronic offices equipment and data center and network equipment. The standard established airborne contaminant classes for fixed installations during normal operation, or during transportation and storage (Table 1).

Table 1: Recommended gaseous corrosivity levels  
ISA-71.04-2013 Classification Scheme

Classification	Copper Angstroms / 30 days	Silver Angstroms / 30 days	Reliability Statement Summary
G1 Mild	< 300	< 200	Sufficiently well controlled
G2 Moderate	< 1000	< 1000	Effects of corrosion are measurable
G3 Harsh	< 2000	< 2000	High probability that corrosive attack will occur
GX Severe	≥ 2000	≥ 2000	Only specially designed and packaged equipment would be expected to survive



## PROTECT EQUIPMENT, MAXIMIZE UPTIME

MANN+HUMMEL Air Filtration solutions for datacenter HVAC systems help protect your equipment to ensure maximum uptime. Our chemistry and electronics experts can devise the most effective and efficient filtration system for each datacenter. This will include particle filter stages to capture dust contaminants and chemical filters to remove harmful gases that can cause corrosion and deterioration to servers, hard drives and other equipment.

Providing cool and safe air to datacenter hardware and workers is a mandatory but not easy task, and it is very likely that a considerable amount of energy of the total energy bill is part of that effort. Technologies such as free cooling can help

reduce datacenter energy spend, but a simple filter change can bring even bigger rewards in total cost of ownership.

MANN+HUMMEL offers an extensive product range for datacenter HVAC systems which offer many advantages:

- Site analysis and monitoring service
- Filters preventing corrosion related failures
- Energy savings by smart filter selection
- HVAC and related filter service partners

# ASHRAE TC 9.9

## Safety for your datacenter

### GUIDELINES FOR DATACENTER CONTAMINATION CONTROL

The hardware industry recognizes the danger that particulate and gaseous contaminants pose to their equipment. In response to the issue, over 400 members of the industry – including datacom manufacturers and users, facilities equipment manufacturers and other stakeholders – came together as ASHRAE Technical Council (TC) 9.9 to develop a set of best practices for data processing environments.

The resulting document – ‘Particulate and Gaseous Contamination Guidelines for Data Centers’ – details the measures that datacenter operators should take to protect their equipment and mitigate the risk of downtime.

Highlights from the report include:

- Sources of particulate and gaseous contamination should be monitored and controlled continuously.
- Datacenters should meet the cleanliness levels of Class 8 of the ISO Standard 14644-1 for cleanrooms.
- For data centers without economizers (heater-cooler unit): It may be possible to achieve ISO Class 8 with MERV 8\* filters for recirculated air and MERV 11 or MERV 13\* filters for air entering a datacenter from outside.
- For data centers utilizing free air cooling or air-side economizers: The filter selection is more complicated and achieving ISO cleanroom class 8 depends on the specific levels of contaminant that is present within the datacenter.
- Relative humidity should be closely monitored and not exceed the maximum allowable relative humidity of the data center.
- Direct measurement of gaseous contamination levels is difficult, and not necessarily a useful indicator that the environment is suitable for data processing systems. However, gaseous concentrations should remain within the ‘G1 – Mild’ corrosivity level (see table on page 2) in order to protect the installed equipment.

\* MERV 8 (ISO Coarse 85% according to ISO 16890) and MERV 11 – 13 (ISO PM1 50% according to 16890).

# Monitoring air quality

## Coulometric reduction

### **CORROSION MONITORING VIA COPPER/SILVER COUPONS**

Reactive monitoring is a simple, low-cost method to determine the corrosivity of air in a data center. The method – described in ISA-71.04 – is to expose copper and silver foil coupons to the internal environment for 30 days. Then, using coulometric reduction, analyse the accumulated corrosion product thickness and chemistry. With these results, the environment can be classified into one of the four corrosivity levels detailed in Table 1 on page 2.

For a full picture of the air quality in your datacenter, MANN+HUMMEL can conduct a survey of your facility. We will measure the external and internal contaminant levels, and provide you with a full report, including a recommended filter configuration for your specific environment. Please contact us for more information.



▲ Silver and copper foil coupons used for coulometric reduction analyses

# Product range

## Particle filtration



### AIRPOCKET

Pocket (or bag) filters with plastic or metal frames.

Pre or primary filtration for air conditioning, ventilation and cooling systems. Prefiltration for datacenter HVAC air intakes.

G	M	F	Coarse
ePM10	ePM2.5	ePM1	



### AIRPANEL

Pleated media in a variety of frame types.

Pre or primary filtration for HVAC systems. Also suitable for use in close-control air conditioning units, such as industrial and commercial control rooms, server rooms and datacenters.

G	M
Coarse	ePM10



### AIRCUBE

Compact filters, also known as a rigid bags.

Pre or primary filtration for HVAC cooling systems in urban, commercial or industrial environments. Ideal as fine dust filters in datacenter environments.

M	F
ePM10	ePM1

# Product range

## Gas phase filtration



### CARBOACTIV CUBE

Activated carbon filters with impregnated media in rigid, box-shaped frames.

Filtration of hazardous and corrosive gases in datacenter HVAC systems to improve cooling-air quality and avoid hardware corrosion.

ePM1



### CARBOACTIV TUBE

Cylindrical activated carbon filters with impregnated media.

For neutralizing corrosive gases in internal environments and industrial processes. Also suitable for the removal of radioactive and otherwise hazardous gases.



### CARBOACTIV FILL

Bagged or boxed impregnated activated carbon media for use in refillable gas adsorption equipment, such as deep-bed air purifier units.

For the adsorption of corrosive and otherwise hazardous gaseous molecular substances, contained in city air pollution, traffic and industrial exhausts, and aggressive agricultural gas emissions.



### PP-12 MODULE

Heavy duty deep-bed air purifier cassettes for high gas concentrations and air flows.

For removing high quantities of gaseous air pollutants in large and hyper-scale data centers, which require the highest equipment uptime and levels of safety.





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