



IAQ –FILTRATION / CO₂ CONTROL SOLUTIONS FOR FAN COILS

INTRODUCTION

Air pollution is characterized by different types of pollutants :

- **chemical pollutants** : VOC (Volatile organic compound) , ...
- **biological pollutants** : Virus, bacteria, mold, ...
- **particulate pollutants** : PM1, PM2.5 , PM10...
- **pollutants linked to human activity** : CO₂, humidity

In France the annual social cost linked to indoor pollution is estimated at 19 billion euros, at 20,000 premature deaths per year and the WHO estimates at 4.2 million the number of deaths in the world linked to the poor quality of outdoor air (mainly due to PM2.5).

CO₂ LEVELS

CO₂ is produced by human respiration. Carbon dioxide concentration is an indicator of the level of air containment, that is, the rate of air renewal. Outside the CO₂ level is around 400ppm and it is recommended to maintain a concentration below 1000ppm inside the buildings. It is not dangerous for humans, but high concentration affects cognitive performance and causes headaches and difficulty concentrating.

A minimum supply of fresh air (25 m³ / hour / occupant according to the French labor code) keeps the CO₂ concentration at an acceptable level.

→ OUR SOLUTIONS

A CO₂ sensor can be installed in the return air duct of the unit in order to control the level of fresh air to be brought into the rooms and optimize energy consumption in adapting the fresh air flow to the real room occupancy..

Our control solution NCT with IAQ card or WTC-307 are able to manage the opening of the fresh air damper according to the measure in ppm of the level of CO₂.

The CO₂ sensor is fixed in the return spigot of the unit and connected to the WTC or the NTC electrical box.

The CO₂ sensor threshold is configurable. The value 2000 ppm corresponds to 100% opening of the fresh air damper. The CO₂ threshold value by default is equal to 800 ppm.

The sensor sends a signal to the Carrier controller (NTC or WTC) which in turn passes an action signal to the fresh air valve :

- If CO₂ concentration is below a threshold value : the fresh air flow is minimal or zero
- If CO₂ concentration is above : the fresh air flow is increased up to the specified maximum



PARTICULATE POLLUANTS

Fine particulate matter (PM1, PM2.5 & PM10) accounts for more than two thirds of the deaths related to indoor pollution. According to the WHO (World Health Organization), the annual average guide value not to be exceeded is 10 µg/m³ in PM2.5. In most cities in France, the annual average outdoor PM2.5 is greater than 10 µg/m³.


Depending on their class, filters retain a more or less important % of the particles. The recycling operation of fan coil units reduces the concentration of fine particles inside the rooms. Even if the filter does not capture 100% of the particles in one pass, a high mixing rate in a room makes it possible to multiply the number of air passages in the unit, and therefore in the filters . As a consequence, the number of particles retained by the filters increase progressively.

➔ FILTER CATEGORIES DEFINITION ACCORDING TO ISO 16890

ePMx	ePMx min
Purification coefficient of fine dust	Minimum purification coefficient of fine dust
3 categories describe the particle size area on which the purification efficiency is based (PM10, PM2.5, PM1).	This value refers to the minimum dust efficiency in the PM1 or PM2.5 categories. To determine this value, the efficiency is measured on the filters charged and discharged with static electricity.

ISO 16890 classification				
Family	Mandatory requirements			Class value declared
	ePM1 min.	ePM2.5 min.	ePM10	
ISO Coarse	-----	-----	< 50%	Initial Gravimetric Efficiency
ISO ePM10	-----	-----	≥ 50%	ePM10
ISO ePM2.5	-----	≥ 50%	-----	ePM2.5
ISO ePM1	≥ 50%	-----	-----	ePM1

4 filter categories



ISO Coarse	Retains less than 50% of PM10
ISO ePM10	Retains more than 50% of PM10
ISO ePM2.5	Retains more than 50% of PM2.5
ISO ePM1	Retains more than 50% of PM1

➔ CARRIER FANCOIL FILTRATION SOLUTIONS

42GW cassette	<p><u>Standard filter</u> : G1 (EN 779) / Coarse 30 % (ISO 16890) <u>Option</u>: G3 (EN 779) / Coarse 50% (ISO 16890)</p>	
42KY Cassette	<p><u>Standard filter</u>: G3 : (EN 779) / Coarse 50% (ISO 16890)</p>	
42NC/ND/NI/NIU	<p><u>Standard filter</u>: G3 (EN 779) / Coarse 50% (ISO 16890)</p>	
42NH/ NL ducted	<p><u>Filtration solutions</u></p> <ul style="list-style-type: none"> • G1 filter (EN 779) / Coarse ...% (ISO 16890) • G3 filter (EN 779) / Coarse 50% (ISO 16890) <p>42 NH M5 (EN 779) / ePM10 ≥50 % (ISO 16890)</p>	
42EP slim ducted	<p><u>Standard filter</u>: G3 (EN 779) / Coarse 50% (ISO 16890)</p>	
42BJ ducted	<p><u>Filtration solutions</u></p> <ul style="list-style-type: none"> • M5 (EN 779) / ePM10 50 % (ISO 16890) • M6 (EN 779) / ePM2.5 50 % (ISO 16890) 	
42GR ducted	<p><u>Filtration solutions</u></p> <ul style="list-style-type: none"> • M5 (EN 779) / ePM10 50 % (ISO 16890) • M6 (EN 779) / ePM2.5 50 % (ISO 16890) • F7 (EN779) / ePM1 55 % (ISO 16890) 	

