



# AIR HANDLING UNIT FOR CLEANROOM



Healthcare and Industry

# COMPANY

**Air Innovation Industrie (A2i) designs and manufactures air handling equipments for cleanroom and operating theater.**

Based in the south of France close from Montpellier, A2i opened its doors in April 2009 and offers you the tailor-made design of your aeraulic equipments specific to cleanroom. With a design office, a dynamic sales team, its own production workshop and worldwide after-sales service, A2i supports you from the design to the use of your equipment.

The technology of our air handling units (AHU) combined with our experience and expertise have enabled us to work with the most famous design offices and installers in the sector. We have references both in France and abroad, as well in industry or healthcare



## ISO 9001 CERTIFIED

In constant research of excellence, A2i is committed in the quality certification process of ISO 9001 standard in order to:

- Demonstrate our ability to provide a product that meets your requirements and applicable standards ;
- Increase your satisfaction through effective application of our products.



## OUR REFERENCES



# HIGHT TECHNOLOGY AND ENERGY SAVING

The A2i AHUs are designed and manufactured specifically to control temperature, humidity and overpressure conditions of environments in which the control of airborne contamination is mandatory.



## SPCS (HEALTH CONCEPT)

Operating Theater, Laboratory, Isolation room.

## SPCI (INDUSTRY CONCEPT)

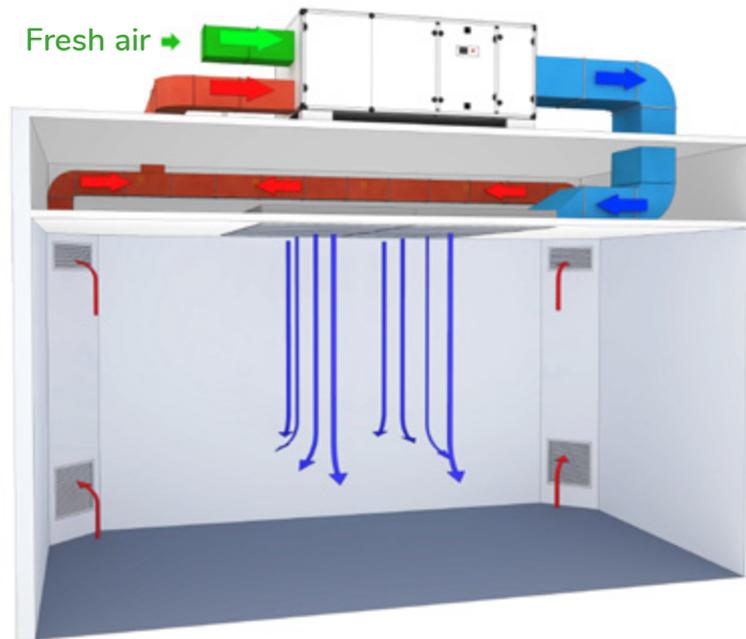
Research laboratory, pharmaceutical and microelectronic industry, mechanic and precision industrial process.



## NEW GENETION OF AHU PLUG AND PLAY

Rich in its knowledge in the fields of air treatment and automation, we have created a new generation of air handling units which integrates its own automaton

This PLUG & PLAY concept becomes the new alternative to your cleanroom projects.



*Several possibilities to connect fresh, recycled and exhausted air.*

## TECHNOLOGY

The selection of the structure and panels allows our AHUs to be installed outdoor.

The inlet filters are from G4 to F9 and outlet ones from F7 to H14, making it possible to meet all the cleanroom classifications.

Cold power can be supplied with chilled water or direct expansion exchanger. Hot power can be supplied with hot water exchangers or electrical heaters.

Our AHUs are equipped with high quality EC motors allowing a saving of 30% compared to the traditional asynchronous motors.



# FEATURES

AHUs can operate with recycled air, full fresh air or a mix. Different cycles are integrated: dehumidification, humidification, reduced mode, etc.

SPCS-H SPCI-H	Depth (mm)	Height (mm)	Length (mm)		Air flow (m³/h)	
			Regular	Extended	Max H14 supply Filter	Max F9 supply Filter
H2000	1350	1085	2350	2800	2000	2300
H4000					4300	4300
H8000		1980			7000	8400
H12000					9000	11200
H16000	1700	1980	2800	3250	13500	16800
H20000	2000				18000	22400
H26000	2450				22500	28000
H30000	2900				27000	33600





**Frame /** Aluminum frame and tee profiles, assembled by nylon angle to avoid thermal bridge.

**Panels /** Sandwich panel in electro galvanized painted sheet steel.

**Insulation /** thermal and phonic by rock wool panel 90 kg / m<sup>3</sup>.

**Flexibility /** Easily removable 42 mm thick front access panels mounted on an hinge.

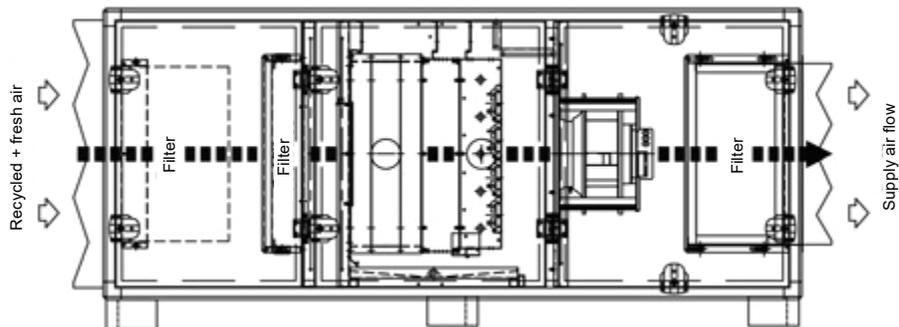
**Standard /** stainless steel condensate tray with droplet separator and siphon in accordance with the recommendations of french standard : NFS 90-351.

# CONFIGURATION AND REGULATION

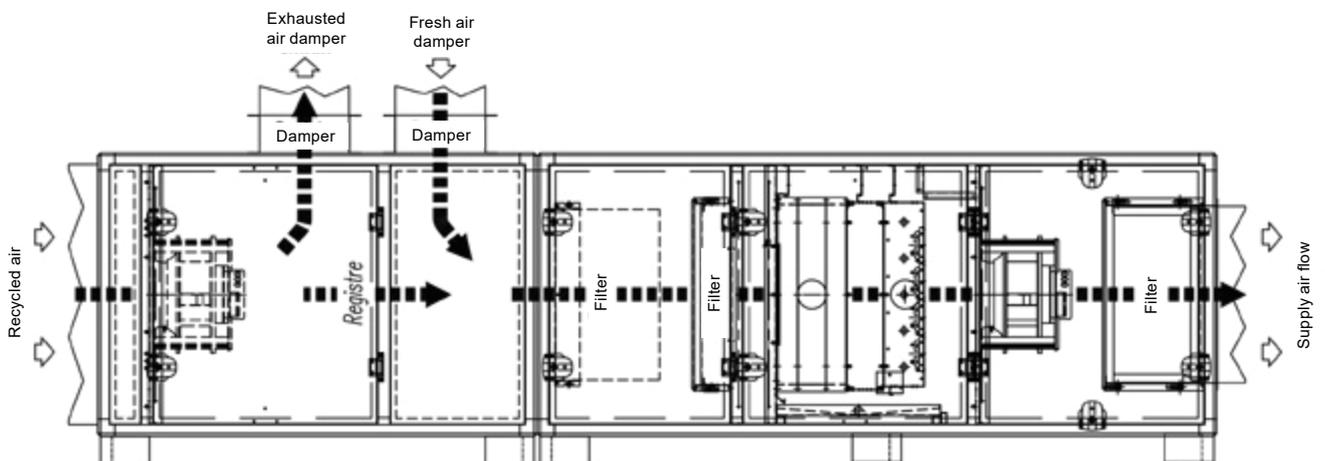
## MECHANICAL PERFORMANCE OF OUR AIR HANDLING UNIT

The quality of the design and manufacture of the frame, panels and sheet metal work allow our AHUs to reach the best classifications of the EN 1886 standard.

- Mechanical deformation class D1
- Sealing class L2
- Leakage rate of bypass filters class F9
- Transmittance / Thermal Transmission class T2 / TB2



**SINGLE FLOW**



**DUAL FLOW**

# ENERGY SAVING

## ERP (ESTABLISHMENT OPEN TO THE PUBLIC) REGULATIONS

We follow ERP regulations closely, however activities requiring the use of cleanroom are not directly affected. Indeed, the risk of contamination between the flow of fresh air and exhausted air prevents the use of crossflow exchanger or energy recuperator wheel. The new ERP requirements impose minimum yield of 73% of heat recovery, which cannot be reached with glycol water exchanger. Pending the evolution of ERP in our fields of activity, the A2i company set up all the means necessary to reach the highest yields in terms of energy recovery thanks to advanced automation solutions.

Our automation solutions integrate reducing energy consumption features:

- Reduced mode: air flow rates, temperature, humidity, initiated either manually, or by clock, or by the BMS
- Free cooling
- Humidification and dehumidification in absolute humidity
- Dehumidification only when humidification cycle is not mandatory / according to standards.



# PHARMACEUTICAL INDUSTRY

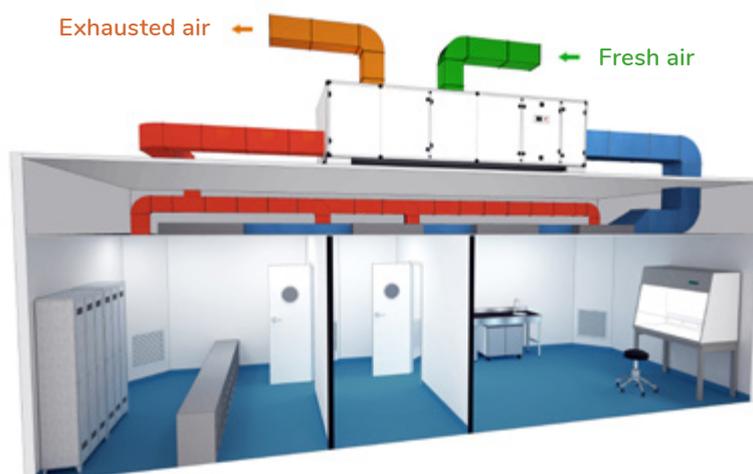
The ISO 14644-1 standard defines cleanrooms as room or a series of rooms where the particulate concentration is controlled in order to minimize the introduction, the generation, the retention of particles inside, generally in a specific industrial or scientific research goal. Parameters such as temperature, humidity and relative pressure are also maintained at a precise level.

## Particulate air cleanliness classes, according to NF EN ISO 146441-1. 2016

ISO classification	Pharmaceutical class	Maximum concentration (particles / m <sup>3</sup> of air) in particles of size equal to or greater than that given below					
		0,1µm	0,2µm	0,3µm	0,5µm	1µm	5µm
Class ISO 1		10	d	d	d	d	e
Class ISO 2		100	24 b	10 b	d	d	e
Class ISO 3		1 000	237	102	35 b	d	e
Class ISO 4		10 000	2 370	1 020	352	83 b	e
Class ISO 5	<b>A &amp; B</b>	100 000	23 700	10 200	3 520	832	d, e, f
Class ISO 6		1 000 000	237 000	102 000	35 200	8 320	293
Class ISO 7	<b>C</b>	c	c	c	352 000	83 200	2 930
Class ISO 8	<b>D</b>	c	c	c	3 520 000	832 000	29 300
Class ISO 9 g		c	c	c	35 200 000	8 320 000	293 000

### Notes to the table of particulate classes above:

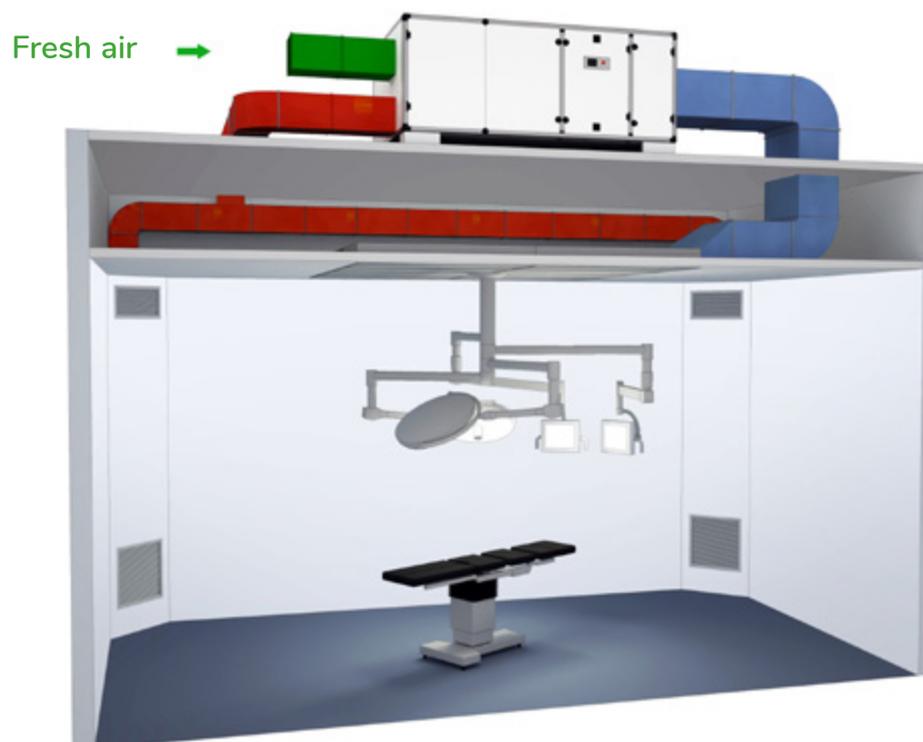
- a: concentrations expressed as cumulative (relative to a diameter).
- b: concentrations leading to the test of large volumes of air (use, if necessary, of sequential sampling).
- c: maximum admissible concentrations not applicable because they are too high.
- d: the sampling limits and the statistical limits on low concentrations make the classification inappropriate.
- e: the particles retained inside the sampling system make the classification inappropriate.
- f: possibility of using the descriptor M (concentration, measured or specified, of the macroparticles per cubic meter of air, according to definition ISO 14644-1,3.2.6) by associating it with at least one other particle size.
- g: class applicable only in activity.



# HEALTH CARE

Technical performances to reach in risk areas of healthcare establishments according to the french standard NF S90-351 April 2013.

Risk class	ISO class	Kinetic class of particulate decontamination	Microbiological class	Differential pressure	Temperature range	Diffusion mode	Other specifications
4	ISO 5	CP 5	M1	15Pa + OU – 5Pa	19°C à 26°C	Laminar air flow	Velocity under laminar flow from 0,25m/s to 0.35 m/s Fresh air rate > 6vol/h
3	ISO 7	CP10	M10	15Pa + OU – 5Pa	19°C à 26°C	Laminar or Turbulent air flow	Air change rate > 15 vol/h
2	ISO 8	CP 20	M100	15Pa + OU – 5Pa	19°C à 26°C	Turbulent air flow	Air change rate > 10 vol/h



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