



# 23MK-Hy

Air handling unit for hospital applications



**DIN 1946-4**



MEKAR S.r.l. participates in the ECP programme for AHU. Check ongoing validity of certificate: [www.eurovent-certification.com](http://www.eurovent-certification.com)

When the application of air handling units is in a critical field, such as a hospital environment, the cleanliness and hygiene requirements that must be guaranteed become stringent.

Mekar has developed and certified a specially dedicated range able to comply with the specifications of the DIN 1946-4 standard. This standard applies to planning, construction, testing and operation (including maintenance) of ventilation and air conditioning systems in buildings and in health care rooms: in which medical examinations, treatments and surgical operations are performed on people, as well as, in directly connected rooms.



# 23MK-Hy

Air handling unit for hospital applications



**CERTIFICATE**  
**Permission to use the test mark**  
**VOLUNTARY TEST OF**  
**HYGIENE REQUIREMENTS**  
**TESTED HYGIENE SUITABILITY OF**  
**AIR HANDLING UNITS**

TÜV NORD Systems GmbH & Co. KG, Hamburg, Germany,  
hereby confirms that the Air Handling Unit in Hygienic Version of the range  
**“23MK-H”**  
conforms to the requirements set by TÜV NORD Systems GmbH & Co. KG.

**Mekar S.r.l., Isola della Scala (VR), Italy,**  
is therefore granted the right to use the test mark shown below  
in connection with the above-mentioned product.

TÜV NORD Systems GmbH & Co. KG  
Expert of Testing Laboratory for  
Ventilation, Air-Conditioning and  
Refrigeration  
*Vera Gräff*  
Dipl.-Ing. Vera Gräff  
Essen, 23 February 2015



Tested compliance with the device-specific hygiene requirements according to:

- DIN 1946 Part 4 : 2008
- VDI 6022 Part 1 : 2011
- DINORM H5005 : 2007
- DINORM H5021 : 2003
- SWKI 99-3 : 2003
- SWKI VA104-1 : 2006

In further consideration of:

- DIN EN 1781 : 2014
- DIN EN 1898 : 2009
- DIN EN 12653 : 2012
- DIN EN 13779 : 2007
- VDI 3803 : 2010

The validity of the Certificate is laid down in the Agreement concerning the granting of entitlement to use a TÜV NORD test mark.

**DIN 1946-4**

The HY series guarantees construction standards certified according to this legislation, in particular:

- Internal surfaces and components in AISI 304 steel.
- Smooth internal surfaces to ensure complete product sanitation.
- Minimum space of respect at the various sections.
- Simplification and facilitation of access necessary for maintenance and cleaning.
- Extractable components (coils, fans, silencers, etc.).
- Dampers conforming to class 2 EN 1751.
- Double or triple filtration stage (F7, F9 and H13); UV-C lamps.
- VDI 6022 certified steam or atomised water humidifiers.
- Inclined tanks and draining bottoms.
- Extractable components to facilitate maintenance and cleaning operations.
- Use of intrinsically safe and hypoallergenic materials.
- Full guarantee of operation and high efficiency.
- Fans in stand-by and directly coupled.
- High degree of resistance to air leakage.





## Dust accumulation limits

### Smooth monobloc filter frames

The filter cells (of the rigid pocket type in the example, but the solution is validly applicable also to absolute filters) are fixed to a smooth frame made of sandwich panelling; this guarantees maximum rigidity, and therefore maximum sealing of the gaskets, without presenting gaps and sharp edges where dust can deposit. The frame is also more easily washable than standard frames.

### Frame and internal profile with double seal

The inside of the plant is completely smooth, with few joints and no visible screws. The gasket mounted on the aluminium profiles prevents the contact between the air and the angular profile, improving the cutting of the thermal bridges, further reducing air leaks and preventing the accumulation of dust by eliminating the cracks.

### “Plug” type fans (without auger)

The absence of the auger limits the interstices where dust can accumulate and in any case the fan is completely visible, controllable and clean. The “plug” type fan is also better suited to a configuration of the pressurized air handling unit as it ensures a more uniform distribution of the air on the downstream components.





## Adequate filtration

### Air cleaning classes for particles according to ISO 14644-1

Class		Maximum concentration limit in number of particles / m <sup>3</sup> of air					
ISO (N)	F.S.209 D	0.1 µm	0.2 µm	0.3 µm	0.5 µm	1 µm	5 µm
ISO 1		10	2				
ISO 2		100	24	10	4		
ISO 3	1	1'000	237	102	35	8	
ISO 4	10	10'000	2'370	1'020	352	83	
ISO 5	100	100'000	23'700	10'200	3'520	832	29
ISO 6	1'000	1'000'000	237'000	102'000	35'200	8'320	293
ISO 7	10'000				352'000	83'200	2'930
ISO 8	100'000				3'520'000	832'000	29'300
ISO 9					35'200'000	8'320'000	293'000

### Sequence of filtration classes in the cleanroom

Air cleaning class (ISO 14644-1)	Degree of air cleaning (F.S.209 D)	Air spares (vol / h)	Sequence of filtration classes for the various stages				
			I	II	III	IV	V *
ISO 3	1	360-600	G4	F8		H12	U17
ISO 4	10	300-540	G4	F8		H10	U16
ISO 5	100	240-480	G4	F7	F9		U16
ISO 6	1'000	40-120	G3	F7	F9		H14
ISO 7	10'000	20-40	G3	F6	F8	H13	
ISO 8	100'000	10-20	G3	F6	F8	H12	

\* The last stage in the cleanroom, not in the plant



## High sanitation

### Condensate collection tanks

The tanks are inclined completely to avoid water stagnation. The tanks inclined bottom allows for complete drainage. They are always made of stainless steel.

### Central steam humidifiers and with local generator and immersed electrodes

Steam is intrinsically safe. Where there is a centralized steam production plant, the distributor tube is fed with superheated steam through a modulating control valve. For small systems it is possible to provide a saturated steam generator with immersed electrodes, with modulating operation.

### Water humidifiers

A high-pressure pump allows the cold water to be sprayed into very fine drops, which immediately evaporates, leaving the inside of the plant practically dry. The nozzles can be partialised and the water flow is regulated by an inverter to obtain a modulating operation of the humidifier. Demineralized water must be used.

### Dedicated sanitary sealants

The sealant, although to a modest extent, is used to ensure the air or water tightness of some components. The sealant used is anti-bacterial, anti-mould and does not contain any components which are dangerous or allergenic.

### UVC lamps

The germicidal ultraviolet radiation is characterized by a band of wavelengths such as to destroy bacteria, viruses and other microorganisms, modifying their DNA or RNA and then inactivating them and preventing their reproduction. This principle allows air disinfection.



### Internal construction

The maintenance of the hygienic level is guaranteed by a series of technical and design solutions, designed to ensure a high ease of cleaning operations. All surfaces and materials applied are characterized by a particular predisposition to maintain a perfect hygienic condition.

The inner part is made of AISI 304 or 316 steel and includes draining bottom panels and the dedicated drain for collecting the cleaning/disinfectant liquid. This guarantees a high standard of hygiene, through the complete drainage of liquids favored by the particular inclination of the panels

### Removable coils

The coils are mounted on guides and are free to be removed from both sides of the control unit once the corresponding panel has been removed.

### Silent septum

The silencer septa are mounted horizontally to be individually removed laterally after removing the relative panel. Mineral wool is wrapped in waterproof plastic material and contained by a micro-perforated sheet. In this way, there can be no release of fibre into the air flow and the silencer septa are washable.

### Fan motor units

The fan motor unit can be completely removed from the side for cleaning or maintenance operations.





### Anallergic Materials (Latex Free)

All materials and components installed on the machine are latex-free.

### Ventilating sections

Dual fan 100% compartmentalized.

Where a complete standby unit cannot be provided, it can be considered the solution to the only safety fan unit.



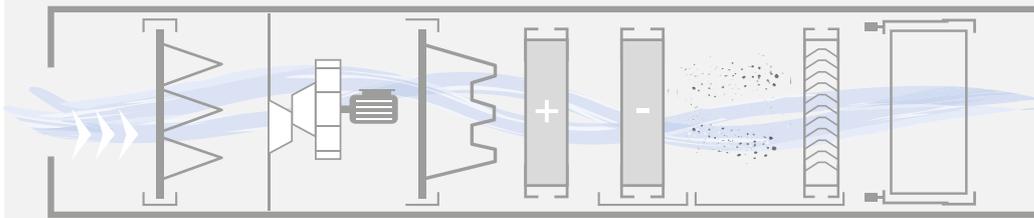
The fans never work simultaneously. The inlet and outlet dampers of the stopped fan are closed. If the fan flow switch in operation indicates a lack of airflow, its dampers will close, those of the other fan will open and will start running. The fan in alarm can also be inspected while the other fan is running, therefore without stopping the control unit.



### Leak-proofing

In this type of application the absolute degree of air leakage must always be guaranteed. To avoid contamination, the unit always works at positive pressure, therefore any air leaks are from the central system to outside, thus excluding the danger of infiltration of untreated air from the outside towards the central system.

In this type of application the suction and prefilter are positioned upstream of the fan, all the other components downstream.



Negative pressure

Positive pressure \*

\* Positive pressure: any air leaks are from the central to the outside and therefore the risk of infiltration of unfiltered air from the outside into the central unit itself which can then be sent to the environment to be conditioned is excluded. Suction and prefilter upstream of the fan, all the other components downstream.

