MANUAL FOR RIGHT DESIGN OF HYGIENIC MODULAR UNITS MANDÍK

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TÜV SÜD EN 1886

RLT Raumlufttechnische Geräte Herstellerverband e.V.

MANDÍK®

MANUAL FOR RIGHT DESIGN OF HYGIENIC MODULAR UNITS MANDÍK

Before designing the unit it is necessary to know the difference between the unit in "hygienic"

design and unit with the certificate of the state health institute of "hygienic safety and airworthiness of the product for air distribution in all types of operations, including clean rooms in air health and food industry ". Unfortunately, this certificate does not guarantee that this certified unit will be to the hygienic application project designed so that perfect service and maintenance of the whole unit will be guaranteed.

Therefore, we issue this document for the correct design of units in hygienic design. You would then they should be designed to prevent dust accumulation, mold formation inside the chambers or components and chambers had service approaches to ensure trouble-free and rapid remediation inside the unit. All according to the standards of the relevant hygiene standards.

Main principles and modifications of units in hygienic design:

- chambers with an internal smooth surface, without unnecessary protrusions, creases, bends or protruding fasteners
- inner housing of the unit in stainless steel or painted housing (components inside are also in painted version)
- only tight types of heat recovery such as plate heat exchanger or high-efficiency glycol circuit
- units designed with air velocities below 2.5 m/s or even below 2.0 m/s
- use of multi-stage filtration (prefilter, 2nd and possibly 3rd degree filtration)
- free service chambers for proper cleaning and replacement of heaters, coolers, filters and more
- service doors with inspection windows or vents and lighting inside the chambers
- special drop eliminator in aluminum design
- use of special silencers
- possibility of placing HEPA filters directly into the chambers at the end of the air conditioner

The units are designed in standards standards:

- Austrian standards Ö-NORM H6020
- EN 13053 + A1
- German standards VDI 6022


HLK-Sachverständigen-Kooperation

GUTACHTEN


ČSN EN 13053+A1

ČESKÁ TECHNICKÁ NORMA

Větrání budov – Vzduchotechnické manipulační jednotky – Hodnocení a provedení jednotek, prvků a částí


VDI-RICHTLINIEN

VEREIN DEUTSCHER INGENIEURE

Hygiene-Anforderungen an Raumlufttechnische Anlagen und Geräte

Hygiene requirements for ventilation and air-conditioning systems and -units

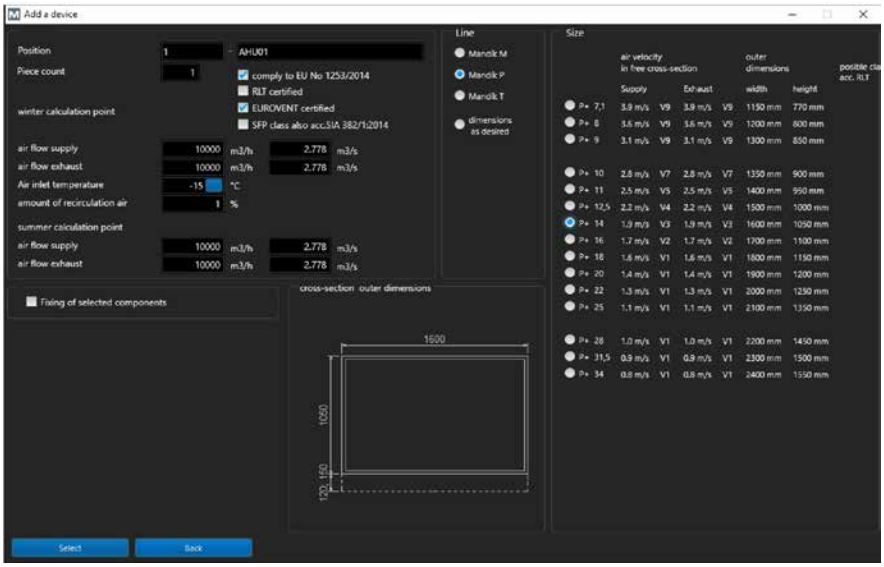
VDI 6022

CHOOSING UNITS IN PROGRAM AHUMAN

General setting

When choosing a new device, we recommend that you select the unit size to be the speed in cross-section below 2.0 m/s. According to the Austrian Ö-NORM H6020 standard, the speed through the coolers should be <2.0 m/s.

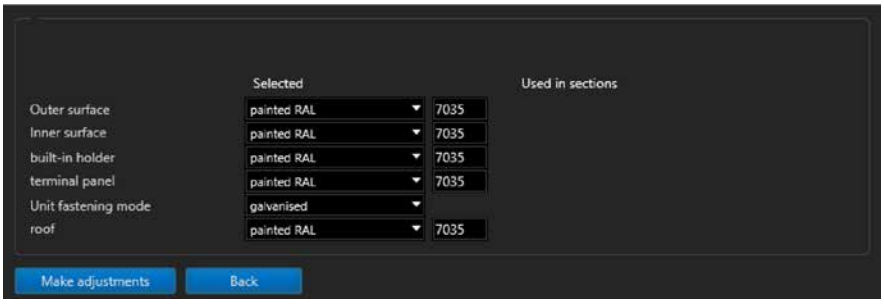
According to EN 13053, the maximum permissible speed in the free cross-section of the unit is 2.5 m/s.



Before selecting the first component in AHUman, click the "hygienic" button. This will disable it components not suitable for hygienic units (rotary heat exchanger, etc.). And whether the unit will be indoor or outdoor. If it is outdoor, so we recommend right away Start by clicking the "outdoor" button. Roofs will be added to the unit (as required by Ö-NORM H6020).

Furthermore, before selecting the first components, it is necessary to preselect the "surface treatment" of the unit.

Here are some surface variants. According to Ö-NORM H6020, all chambers in contact with humid air must have a surface made of stainless steel or a material of the same value. However, we recommend that the unit be completely painted. In the AHUman program it is also possible to choose a version with stainless steel inner wall surface, but this variant is more expensive.



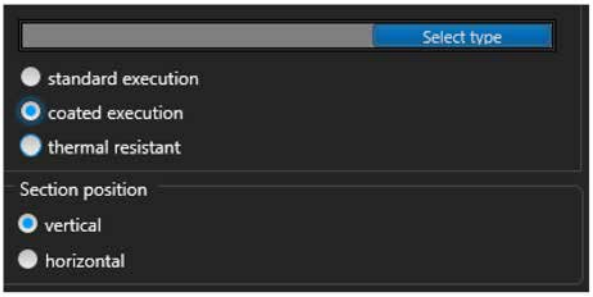
Choosing zinc-coated panels and components we are not recommended.

RECUPERATION

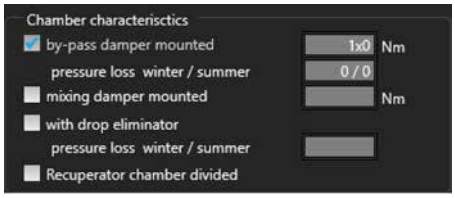
Plate heat exchanger

When selecting the heat recovery, we recommend choosing the "painted" design of the cube of recuperator. It is also recommended to choose the vertical version of the unit with plate heat recovery. It will be avoided thus possible condensation accumulation between the fins of the plate heat exchanger.

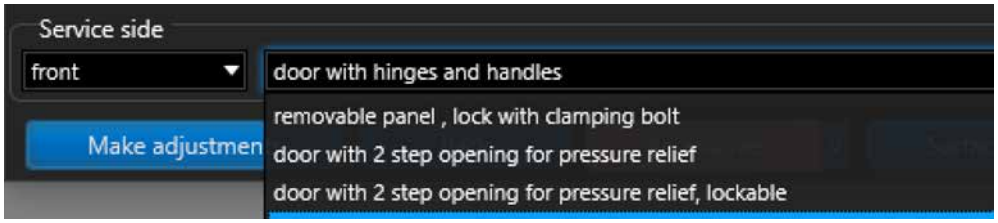
For vertical design this problem cannot arise.



In the plate heat exchanger section it is also possible to select the damper eliminator (if the speed is in exchanger up to 1.5 m/s, then according to EN 13053 the eliminator can be omitted).



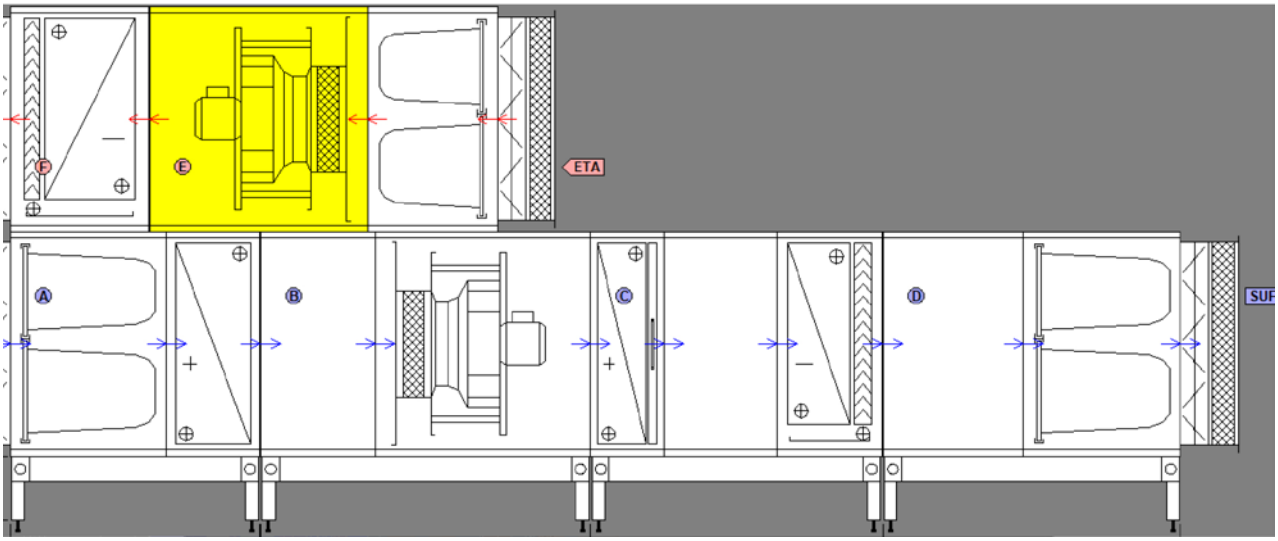
Door design to choose "door with hinges and handles", for easy access for chamber remediation. "Removable panel, fastened with clamps' is inadmissible.

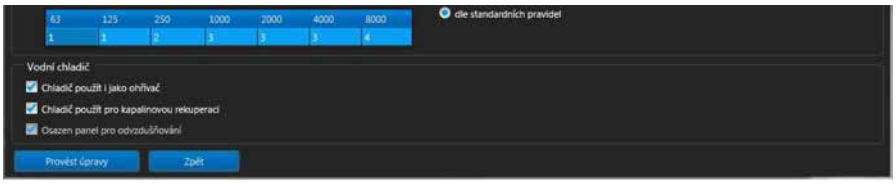


Glycol run-around recovery coils

According to Ö-NORM H6020, all heat exchanger ZZT must be equipped with a tray for condensate drain. The cooler in the drain must have a drop eliminator (if the speed is in the exchanger up to 1.5 m/s, then according to EN 13053 the eliminator can be omitted).

It is recommended to add min. 250 mm long free chamber or atypically exchanger chamber because of the size of special heat exchangers. This may be due to the wider range of special multi-row exchangers and the appropriate service approach to them.





FANS

The fans are selected in the standard way as with standard units, but suspended on the front panel – type GR. According to EN 13053, each ventilator chamber should be equipped with an inspection window and lighting inside the chamber. This above-standard function must be selected in the window of the section itself in the "Add-ons" window.

Choose item "Sight window" and "Lighting with switch, wired".

List of accessories

ID	Type	description
	COMMON ACCESSORIES	
KKPOBP4550	OBP 45-50	Sight window
KKUMFG140	MFG140	outside handle
KKUMFG140U	MFG140/035	outside lockable handle
KROK	MPS2012000	Handle for damper
KEO44	Lighting with switch, IP44	Lighting with switch, wired
KEO65	Lighting with switch, IP65 E27 60W	Lighting with switch, wired

Floor-to-floor installations with skids are optional, but we recommend using a fan installation (GR) mounted on the front panel of the chamber. The reason is better floor cleanability under fan installation.

FILTERS

For hygienic units it is recommended to have min. two stages of filtration. In the supply line before any recovery according to Ö-NORM H6020, place a filter of at least M5 + F7. On exhaust min. F6.

The last filtration stage in the inlet should be placed after the last component of all elements overpressure air treatment.

The last filtration stage should be replaceable from the "dirty" side of the filter. Therefore, it is appropriate before this filter place service free chamber min. in the length of the pockets of this filter. Place inspection window a in the section lighting according to EN 13053.

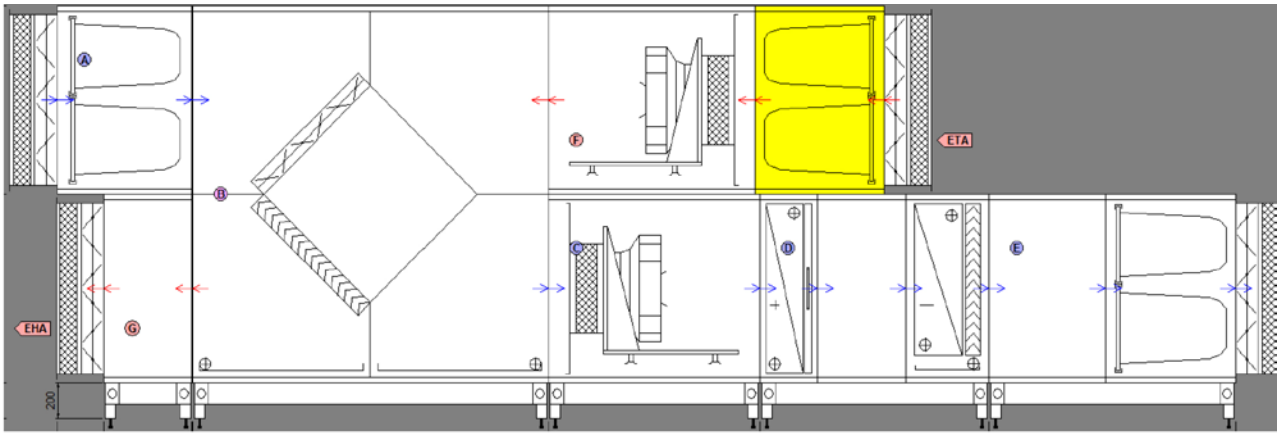
According to EN 13053, in two or more stage filtration, the first filter must be placed in front of the fan and the second one behind ventilator.

According to Ö-NORM H6020, it is necessary to have an analogue or digital pressure gauge for fine filtration filters.

If the unit contains a mixing chamber, according to Ö-NORM H6020, the inlet filter must be downstream air mixing chamber.

EN 13053 specifies that the second stage of filtration should be placed downstream of a moisture source or condensation, min. 500 mm (if it is a humidifier, then the distance counts after the calculated humidification path).

According to practice and according to Ö-NORM H6020, it is recommended to place it on the outlet part of the unit entrance fiber catcher (similar to grease filter, but all-stainless).



COILS

Heaters

According to Ö-NORM H6020, the minimum spacing of the fins for water heaters and condensers must be min. 2.0 mm.

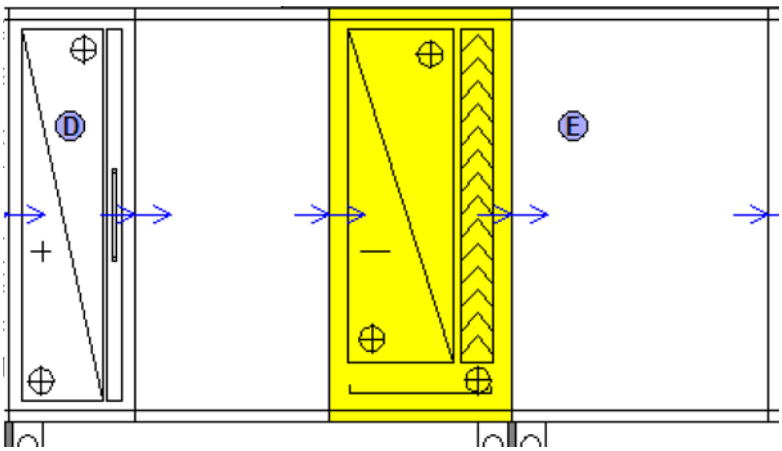
According to EN 13053, flue gas heat exchangers are not recommended for hygienic units.

Coolers

According to Ö-NORM H6020, a minimum spacing of 2.5 mm.

According to EN 13053, there should be sufficient space in front of and behind the air cooler for quality reasons cleaning and remediation of both exchanger, eliminator and condensate drain pan. Length of free chambers are not given, but it should be kept in mind that the wider the unit, the longer the service should be chamber for better cleaning. (We recommend at least 500 mm.)

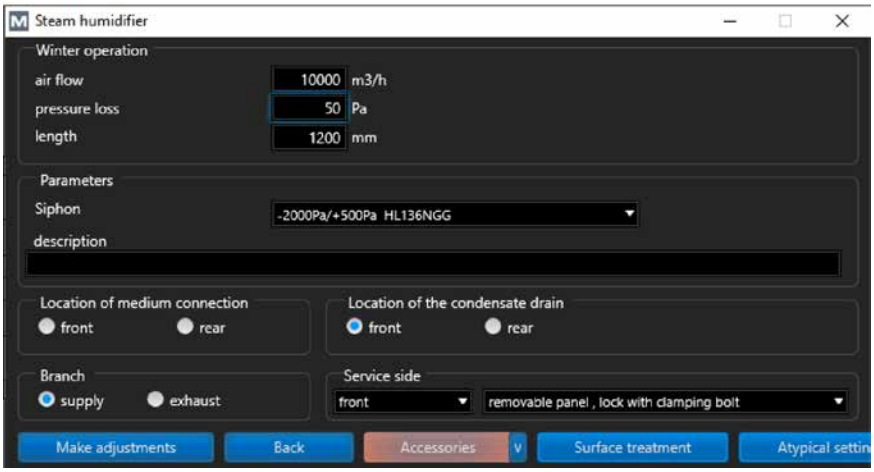
According to Ö-NORM H6020 it is recommended to place the radiator under positive pressure and place it in a sufficient position distance from filters (at least 250mm). If there is a cooler and a second filtration stage in the assembly, it is suitable unify service chambers into one.



According to Ö-NORM H6020, humidifiers on the principle of water circulation are not permitted. Therefore, there are 3 types of dampening that can be selected for sanitary areas:

- resistance steam humidification – isothermal humidification, control accuracy is ±5 % Rh,
- steam humidification – isothermal humidification, dry steam is injected into the air, accuracy ±5 % Rh
- electrode steam humidification – isothermal humidification due to high control inaccuracy (±10 % Rh) however, they are not very appropriate
- high-pressure spraying of water mist – adiabatic dampening, but it is necessary to have perfect water treatment (reverse osmosis = very expensive)
- Other humidifiers must be certified to be suitable for a hygienic environment Ö-NORM H6020 recommends placing the humidifier in a positive pressure.

Furthermore in AHUman select from the accessories in the humidifier chamber service window and lighting with higher protection.

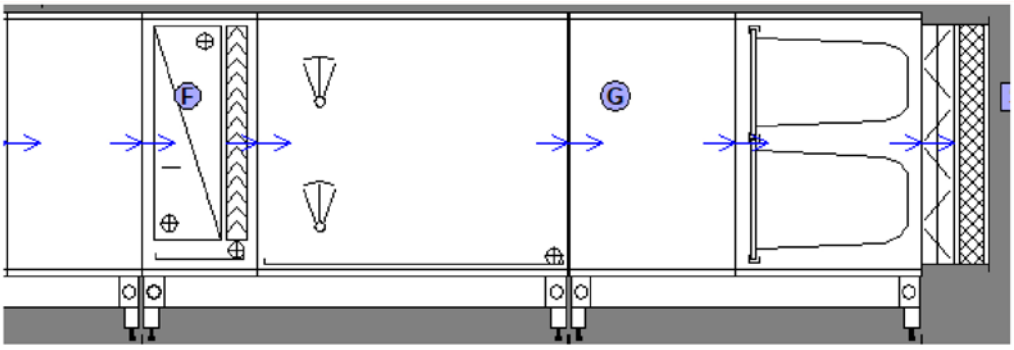


List of accessories

ID	Type	description
	COMMON ACCESSORIES	
KPHL136NGG	-2000Pa/+500Pa HL136NGG	Condensate syphon with Ball
KPHL136NT	-2000Pa/+500Pa HL136NT	Condensate syphon with Ball ,transparent
KPHL1362	-2000 Pa/+2000Pa HL136.2	Overpressure syphon
KKPOBP4550	OBP-45-50	Sight window

According to Ö-NORM H6020 it is recommended to start and stop the unit for a duration of 10 minutes to prevent condensation.

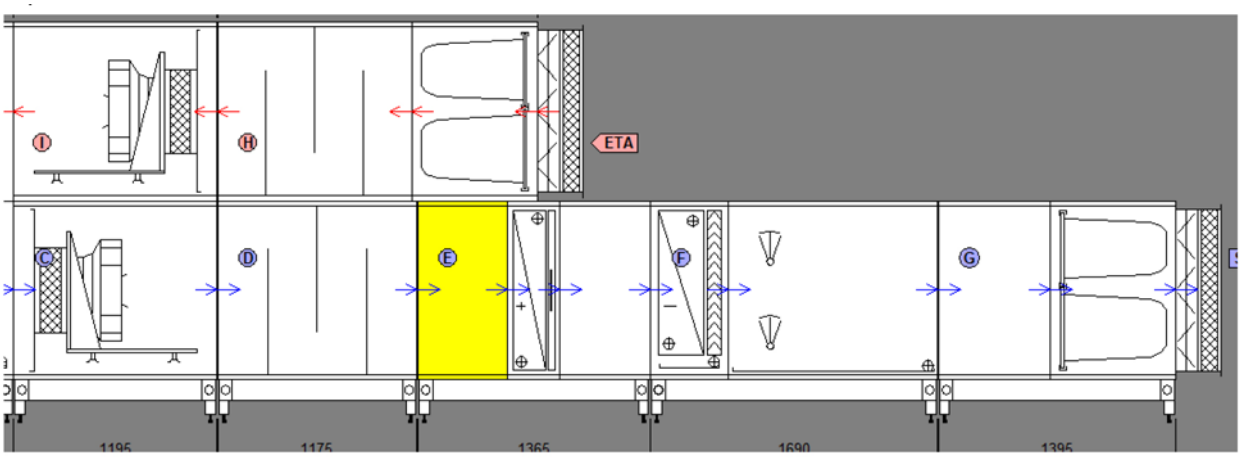
When designing a unit with both air cooler and dampening, it is recommended to place the chambers immediately behind and behind place these air filters at a distance. For pulling out filters at the end of the unit can be used the service door of the humidifier, but it is necessary to have the filter after the calculated humidification no dampening of the filter (according to Ö-NORM H6020).



SILENCERS

According to Ö-NORM H6020, perforated plate must not be used on the shock absorber slots, the sliding plate must be smooth.

According to EN 13053, silencers, especially in the inlet, must have backdrops in hygienic design. Mufflers should be installed as close to the noise source as possible. And for hygienic applications, all silencers should be located directly in the air conditioner, no in the pipeline route.

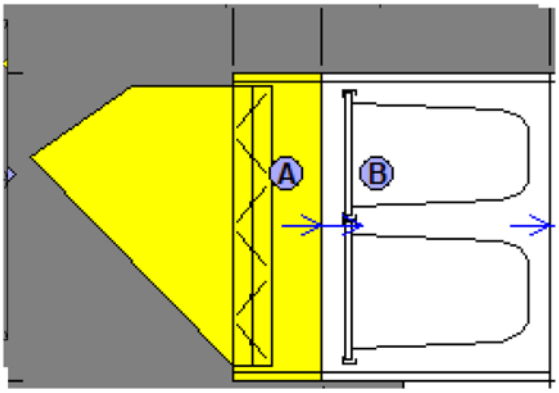


DAMPERS

According to EN 13053 the maximum speed on the dampers (except bypass and mixing) must not exceed 8 m/s.

This standard also states that in the outdoor unit, all dampers must have opening actuators located inside the chambers of the unit.

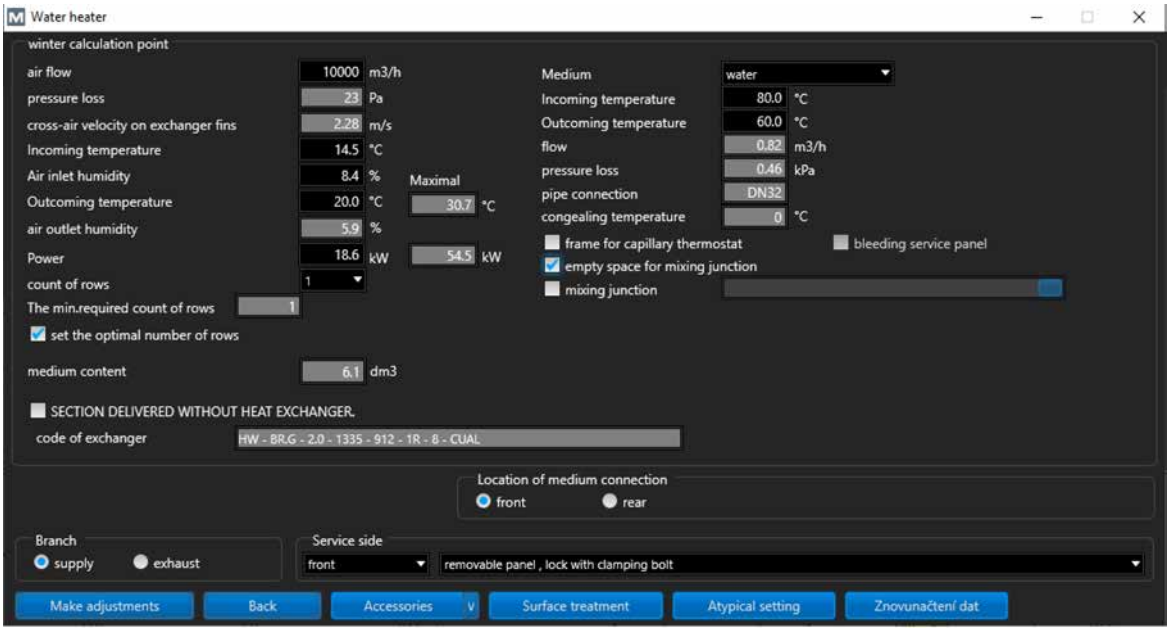
We recommend to place actuators with spring function on these dampers.



MIXING SETS

According to EN 13053 if it is a hygienic unit in outdoor version and if it contains water coil, then the mixing junction must be located in the unit.

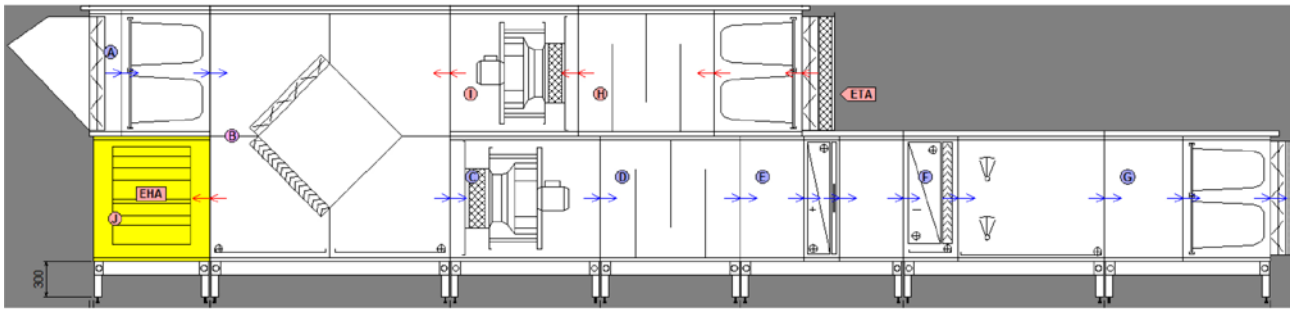
We recommend selecting "empty space for mixing junction" in the heat exchanger entry form.



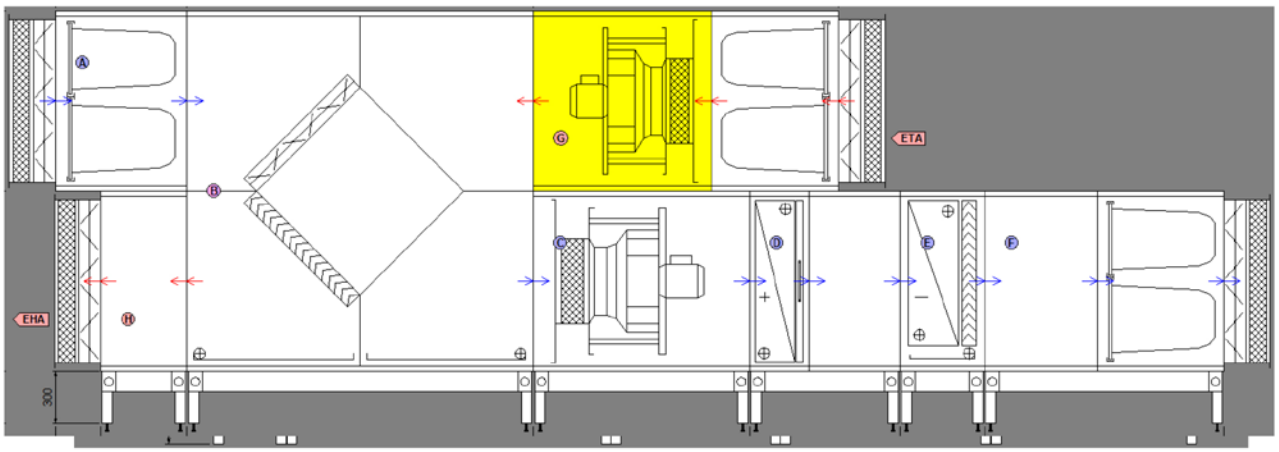
BASE FRAME

It is recommended to place a base frame with adjustable feet and height of 300 mm below the unit so that there is sufficient height for the condensate drain and the feet to adjust to the unit perfect horizontal position.

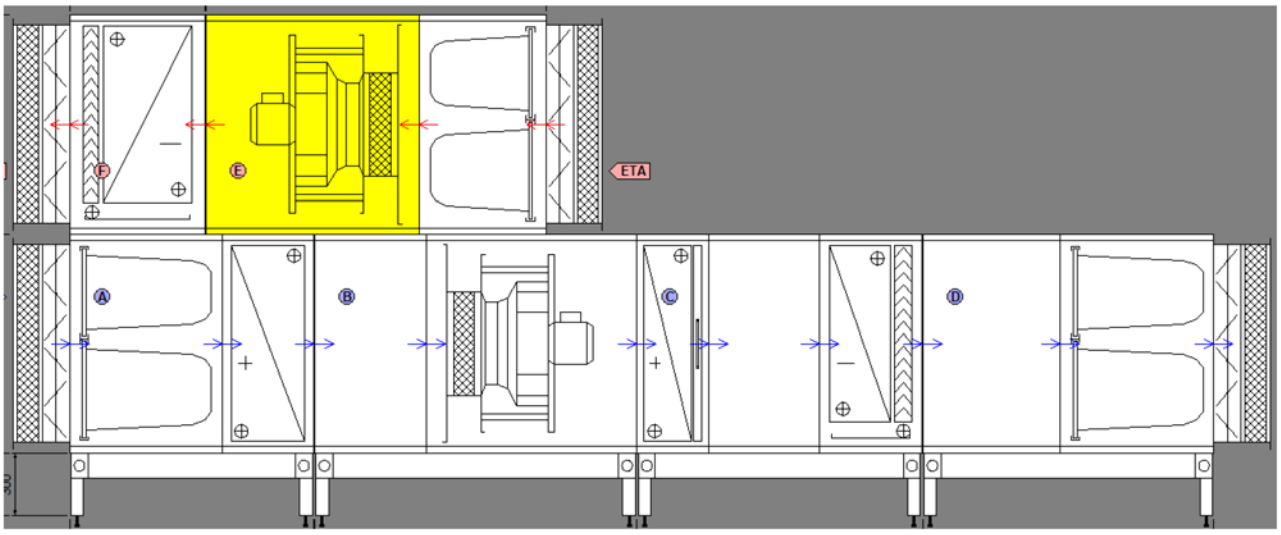
Examples how should be assembled hygienic units:



Outdoor unit with plate heat recovery, water heating and cooling, humidification, two-stage filtration and silencers on room side.



Indoor unit with plate heat recovery, water heating and cooling and two-stage filtration.



Indoor unit with glycol recovery, water heating and cooling and two-stage filtration.

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