



# **INSTALLATION AND MAINTENANCE MANUAL ISOTHERMAL HUMIDIFICATION BY DRY STEAM DISPERSION DIPHUSAIR-MT1**

MMT1-EN-22-0

In compliance with the Rules and Standards of the European Union on Machine Safety, it is essential to read this manual carefully before installing any equipment.



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## 1. Introduction

Dear Customer,

The DIPHUSAIR humidifier is our answer to current technical needs, due to its safe operation, its operational convenience and economic efficiency.

**To ensure effective operation of your DIPHUSAIR humidifier, please read the Installation, Operation and Maintenance Instructions.**



Use the steam humidifier only in appropriate and safe conditions, while paying attention to all the notes in these instructions.

If you have any questions... Please contact us:

FISAIR, S.L.U.

Tel.: (34) 916.921.514

Fax: (34) 916.916.456

[www.fisair.com/contact](http://www.fisair.com/contact)

Or contact your local distributor.

### 1.1 Operation instructions

The correct use of the humidifier includes following our instructions for installation, set-up, operation and maintenance, as well as following the steps indicated in the instructions in the correct sequence as described.

This humidifier may only be used by persons who are fully qualified and authorized to do so.

Any person who transports and/or used the unit or who works with it must read and understand the relevant section of this manual, in particular the section entitled "Safety Instructions".

You are advised to keep a copy of the user manual in the place where the humidifier is going to operate (or nearby).

Ignoring these instructions may invalidate all applicable guarantees and warranties.

## 2. Safety Instructions

**FISAIR disclaims any liability if not all the installation and operating instructions it has provided are complied with; if the products have been modified or altered without the written consent of FISAIR; or if the products have been subjected to improper use, mishandling, alteration, improper maintenance or show signs of negligent use or being involved in an accident. These situations could include an incorrect power connection, impacts with other objects, removal or disarming of security fittings/measures, etc.**

Please read these safety notes carefully and examine the equipment to become familiar with it before installing, commissioning, or servicing.

The following symbols or messages may appear in this document or on the equipment. They warn of potential hazards or provide information that may help you clarify or simplify a procedure.



### See instructions

This manual should be read before installation by properly qualified personnel. Incorrect installation can cause personal and equipment damage. You must consult the manual before maintenance or start-up.



### Attention

This is a safety alert symbol. It warns of the potential of bodily injury.

Observe all safety information with this symbol to avoid any situation that could lead to injuries and/or damage to the unit.



### Attention, Live Current

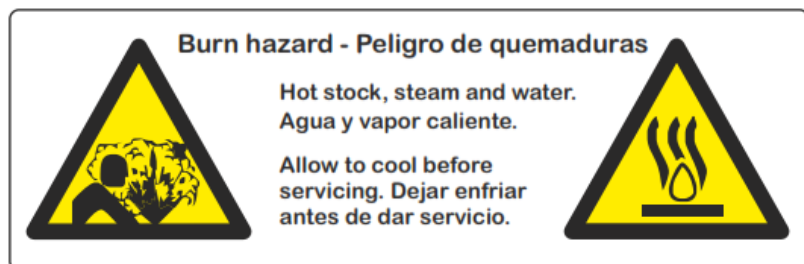
The presence of this symbol on a hazard or warning label indicates that there is a risk of electrocution, which can lead to personal injury or life-threatening conditions if the instructions are not followed.



### Turn off before opening

Turn off the power before opening the equipment to make new connections or perform maintenance in any part of it. Electric shock or fire may result if not turned off. Follow the equipment shutdown and control instructions to ensure the safety of the equipment and personnel.

### Hot surface and danger of burns



This steam humidifier has extremely hot surfaces. Water in the tank, pipes and distribution assemblies can reach 100°C.

Contact with the equipment surfaces and boiler water inlets and outlets is very dangerous and can cause severe burns. Let the equipment cool down before maintenance or inspection of any part of the system. The steam injected/discharged may not be visible and is therefore dangerous.

Make sure that all threaded connections in the system are properly tightened so they cannot leak steam or condensed water. These can cause burns and/or serious injuries.

Contact with hot surfaces, with condensate water or air containing discharged steam can cause burns and/or serious injuries.

## Insulation standards in equipment with hot surfaces:



According to the additional technical instructions standard, ITE 02.15.2 Hot Surfaces: *“Except for the surfaces of heat-emitting components, any equipment surface that can be touched accidentally must have a temperature lower than 60°C or be protected, where necessary ...”*

Appendix 03.1 of the same ITE, Minimum *thermal* insulation thickness: *“Equipment components (e.g. devices, appliances, pipes and accessories) must have a thermal insulation with the minimum thickness outlined below when they contain fluids at temperature: Lower than the environment, above 40°C and located in unheated rooms, including conduits, galleries, machine rooms and similar ...”* This type of equipment should be thermally insulated.

## General points

- If you notice that something is not working properly, switch off the unit immediately and take steps to ensure that it does not switch on again. All faults must be corrected immediately.
- Use duly qualified personnel to carry out repair work. This will ensure that the unit operates safely.
- Use only original FISAIR replacement parts.
- Refer to local regulations that restrict or regulate the use of this humidifier.

## How the unit works

- Do not jeopardise the safety of the unit.
- Periodically check the device's protection and alert devices.
- The unit's safety fittings must not be removed or disabled.

## Installing, Disassembling, Maintaining and Repairing the unit

- Switch off the unit's power supply when conducting maintenance work or making repairs to the unit.
- Never add components to the unit without prior written approval from FISAIR.

## About the electrical components

- Any work that affects the electrical components must be carried out by qualified electricians.
- Switch off the power supply and ensure that it does not re-connect while any electrical component is being handled.
- Switch off the unit immediately if any fault is detected in the electrical power supply.
- Use only original, correctly calibrated fuses.
- Carry out periodic checks of the electrical unit.
- All defects, such as loose connections or burnt cables, must be repaired immediately.

## 3. Transport and storage

When in transit, the unit must be protected from impacts of any kind, and all possible measures must be taken to prevent malfunctions due to improper loading or unloading of the unit.

When lifting the equipment, always use a pallet truck or forklift.

Upon receipt of the unit, make sure that the type and serial number of the plate correspond to the order and delivery information. Check that the unit is complete and in perfect conditions. If there are components missing or damaged during transport, immediately inform your supplier in writing.

Keep the unit dry and protected from the elements while in storage. If it has to be stored for a long period before installation, choose a place where the equipment will not be damaged mechanically or be contaminated by dust or construction materials. If stored outdoors, protect it against the weather and atmospheric elements.



### Attention

Avoid direct exposure to the sun and places that can exceed 50°C.

**Note:** Storage area temperature and humidity conditions:

- ❖ Temperature: [-20...+50°C]
- ❖ Relative humidity: [5...95% RH] no condensation.

Check the merchandise upon receipt. Check that the type and serial number of the label corresponds to the order and supply information, and that the equipment is complete and in good condition.



**Note:** Immediately inform your carrier in writing if there is any transportation damage or missing components.



#### 4. Rating plate

The rating plate provide essential information about the technical features of the machine.




The EC Machinery Safety Regulation requires all machinery operated within the European Economic Community to have a rating plate indicating its main features, the machine serial number and the manufacturer's name inscribed in a durable manner.

According to article 2, section g of the Machinery Directive 2006/42/CE - RD 1644/2008, 'partly completed machinery' means

*"Interchangeable equipment": a device which, after the commissioning of a machine or a tractor, is coupled by the operator himself to said machine or tractor to modify its function or provide a new function, provided that this equipment is not a tool"*

The DIPHUSAIR-MT1 series incorporates the following information on its plate:

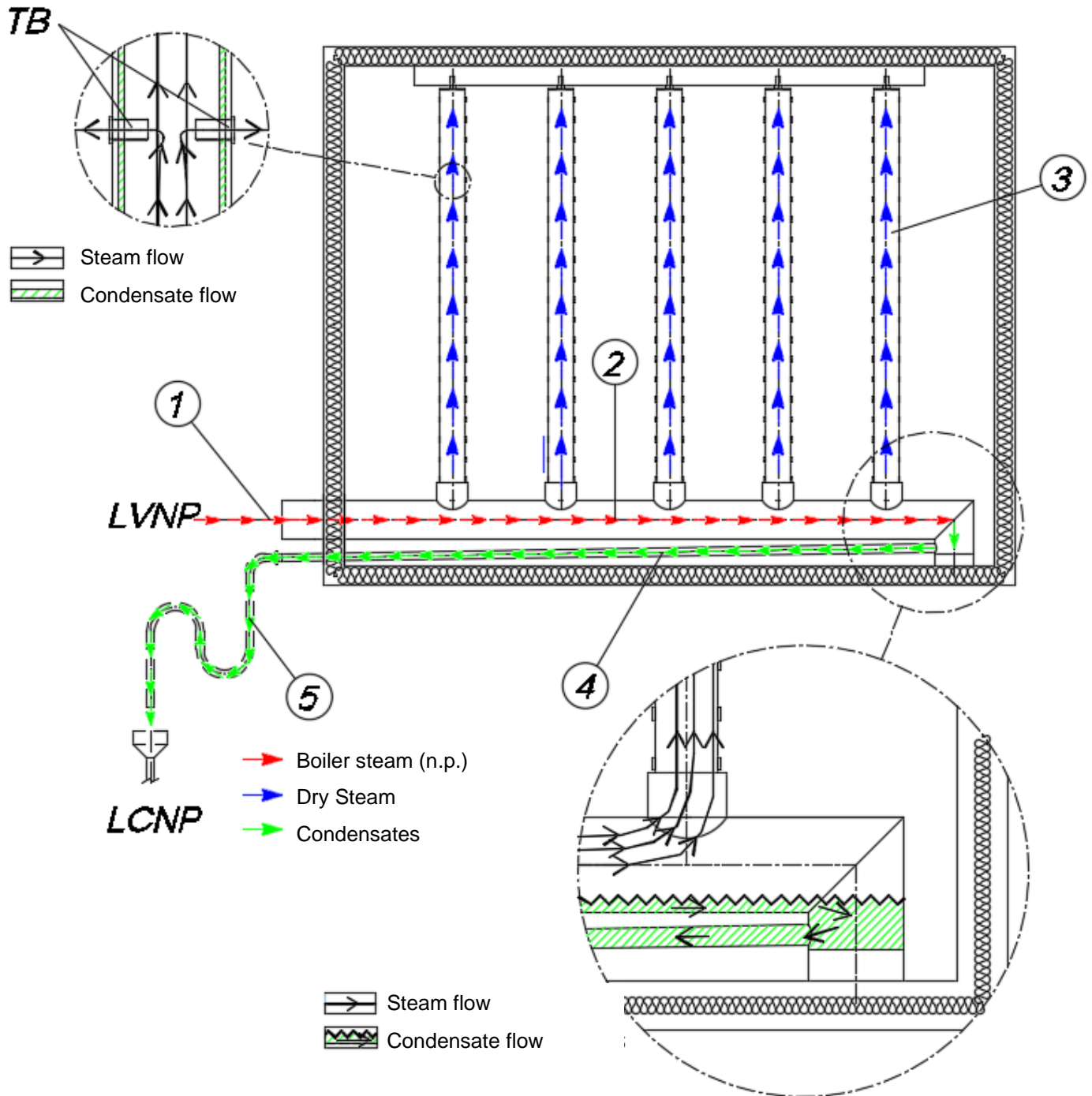
- Equipment model
- Equipment serial number
- Design capacity
- Design air flow
- Machine type
- Designed in accordance with directive
- FISAIR devices it can be joined with
- Made in Spain (EU): Place and date of manufacture
- QR code for technical assistance service and warranty activation

<b>fisair</b> air humidity control		FISAIR S.L.U. C/ Uranio, 20 - P.I. AIMAYR 28330 San Martín de la Vega MADRID (SPAIN) www.fisair.com	After Sales Service Servicio Postventa Mail: sat@fisair.com Tel: +34916921514
Modelo Model Typ	MT1-H-1/0/50-76/700-4x150x50/700		
Nº Serie Serial Number Seriennummer	2020---01		
Capacidad de diseño Steam Output Design DesignDampfmenge	--- Kg/h		
Caudal de Aire (Diseño) Air Design Airflow Luftstrom (Design)	---- m³/h		
Equipos de FISAIR a los que puede incorporarse FISAIR equipment you can join FISAIR-Ausrüstung, an der Sie teilnehmen können	VxV/ASC		
Tipo de máquina Machine type Maschinentyp	EQUIPO INTERCAMBIABLE INTERCHANGEABLE EQUIPMENT EQUIPEMENT INTERCHANGEABLE		
Diseñada de acuerdo a directiva Designed according to directive Entwickelt nach richtlinien	2006/42/CE		
Fabricado en España (UE) Made in Spain (EU) Hergestellt in Spanien (EU)	06/2020		
 			

Example of a DIPHUSAIR-MT1 device specification plate

## 5. Operating principle and components

The FISAIR DIPHUSAIR MT1 air humidifier series work by steam injection to isothermally increase the absolute air humidity in a controlled manner, such as in an AHU or duct:



LVNP = Non-pressurised steam line

LCNP = Non-pressurised condensate line

TB = Nozzles

1. The non-pressurised steam supply comes directly from a steam generator at atmospheric pressure. Such as our clean atmospheric pressure steam generator units, DIPHUSAIR VxV, DIPHUSAIR ASC, DIPHUSAIR RESISTANCE and DIPHUSAIR ELECTRODES.
2. The steam enters the collector located in the lower header and then into the dispersion tubes as it moves through the tube (see close-up). The condensate formed in the header is carried through the tube located for this purpose, which starts at the end of the header and moves the condensate to the exterior.
3. The steam is discharged uniformly throughout the length of the dispersion tubes through the nozzles. The condensate produced in the dispersion tubes descends down the tube walls without being able to reach the nozzles and settles in the lower collector, which transports it to the tube carrying the condensate.
4. This tube collects all the condensate from the collector and carries it to the exterior.
5. The condensate is discharged through the line with a trap to the drain pipe or non-pressurised condensate line.

MT1 (Standard) REFERENCES:

MODEL RANGE	HYGIENIC	INLETS QTY.	MULTIPLE INLET	INPUT DIAMETER (Di)	HEADER DIAMETER (D)	AHU/ DUCT AVAILABLE WIDTH (mm)	TUBES QTY.(NT)	DISTANCE BETWEEN TUBES	DISPERSION TUBE DIAMETER	AHU/ DUCT AVAILABLE HEIGHT (mm)
MT1	H	1	0	25	40	XXXX	FROM 2 TO 18	x 150	x 25	YYYY
		2	Type L	40	50			300	40	
		3		50	76			450	50	
		4		76	104			600		
		5	Type T	104	129					
		6		129						
		8								
		10								
		12								

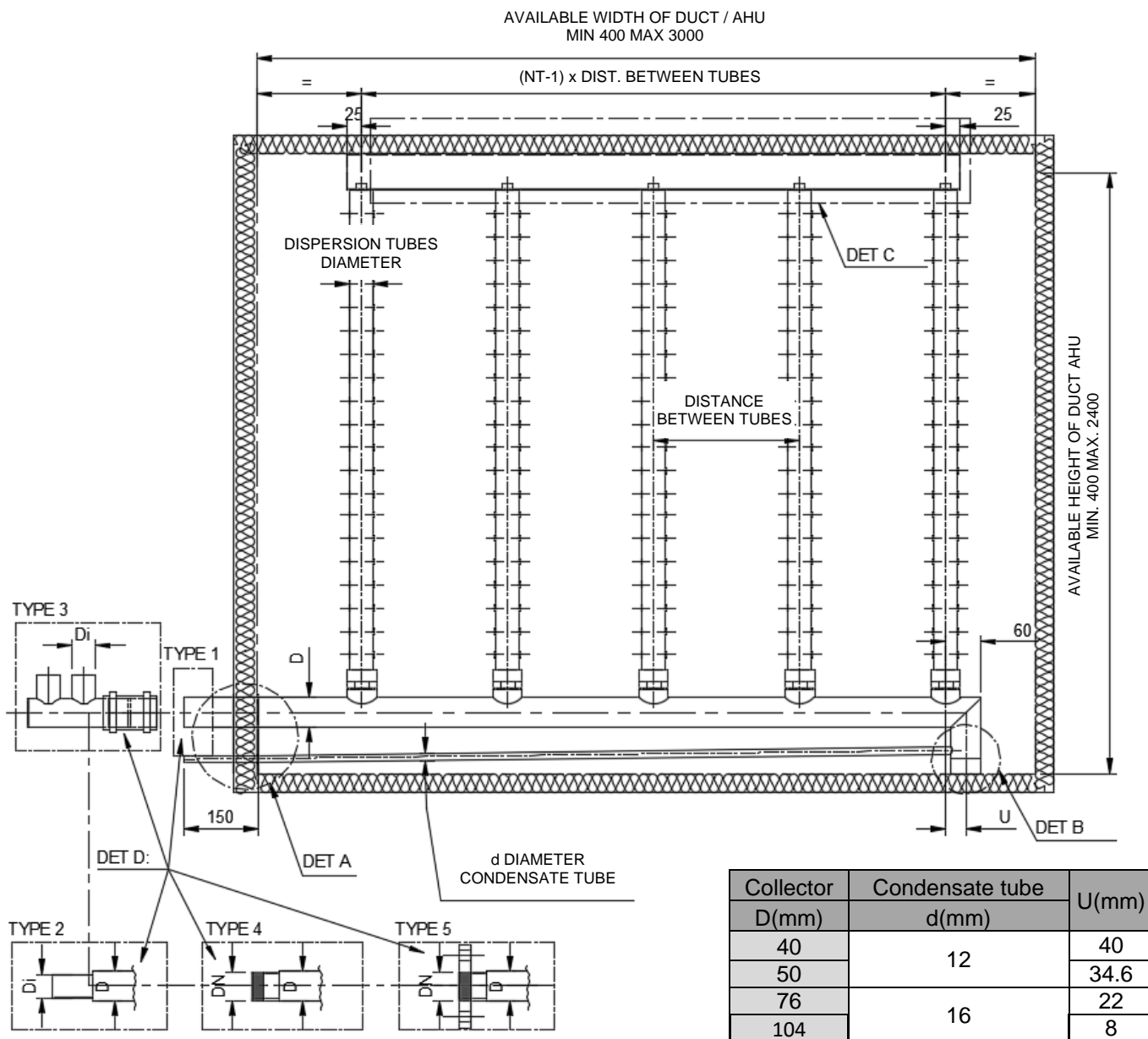
MT1 (Special) REFERENCES:

MODEL RANGE	HYGIENIC	INPUT DIAMETER (DN)	INPUT TYPE: THREADED (T) / FLANGED (F)	HEADER DIAMETER (D)	AHU/ DUCT AVAILABLE WIDTH (mm)	TUBES QTY.(NT)	DISTANCE BETWEEN TUBES	DISPERSION TUBE DIAMETER	AHU/ DUCT AVAILABLE HEIGHT (mm)
MT1	- H - 1 /	32	T - 40	/	XXXX	- FROM 2 TO 18	x 150	x 25	/ YYYY
		40	F	50			300	40	
		60		76			450	50	
		100		104			600		
				129					

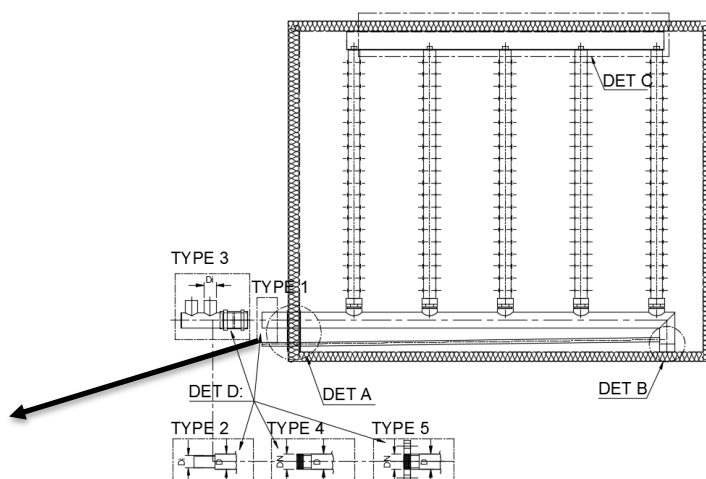
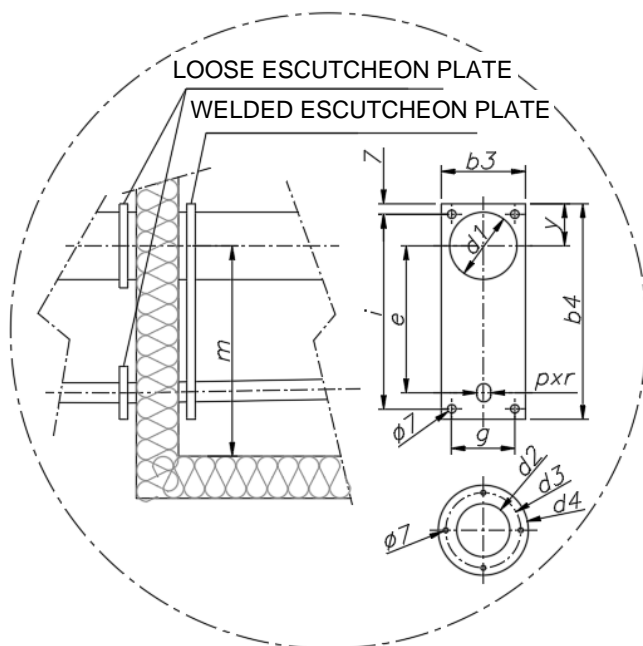
## 6. General dimensions

The following input connection options are available:

- **Type 1- Standard:** "N° of Inputs" = 1 →  $D_i$  "Input Diameter" =  $D$  "Header diameter"
- **Type 2- Standard:** "N° of Inputs" = 1 →  $D_i$  "Input Diameter" <  $D$  "Header diameter"
- **Type 3- Standard:** "N° of Inputs" > 1 (with the same "Input Diameter"  $D_i$ ) →  $D_i \neq D$
- **Type 4- Special:** "N° of Inputs" = 1 →  $D_i \neq D$ ;  $D_i$  = Threaded BSPT (DN) 32, 40, 60, 100.
- **Type 5- Special:** "N° of Inputs" = 1 →  $D_i \neq D$ ;  $D_i$  = Flanged DIN 2576 (DN) 32, 40, 60, 100



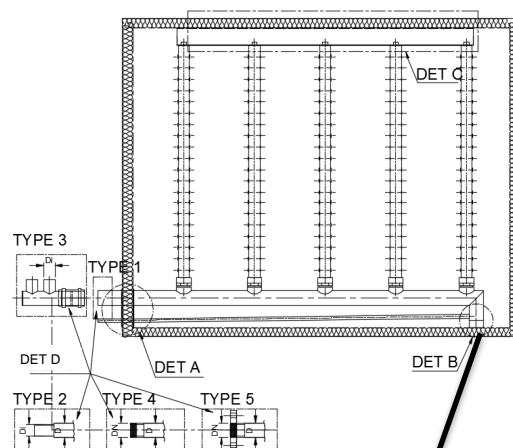
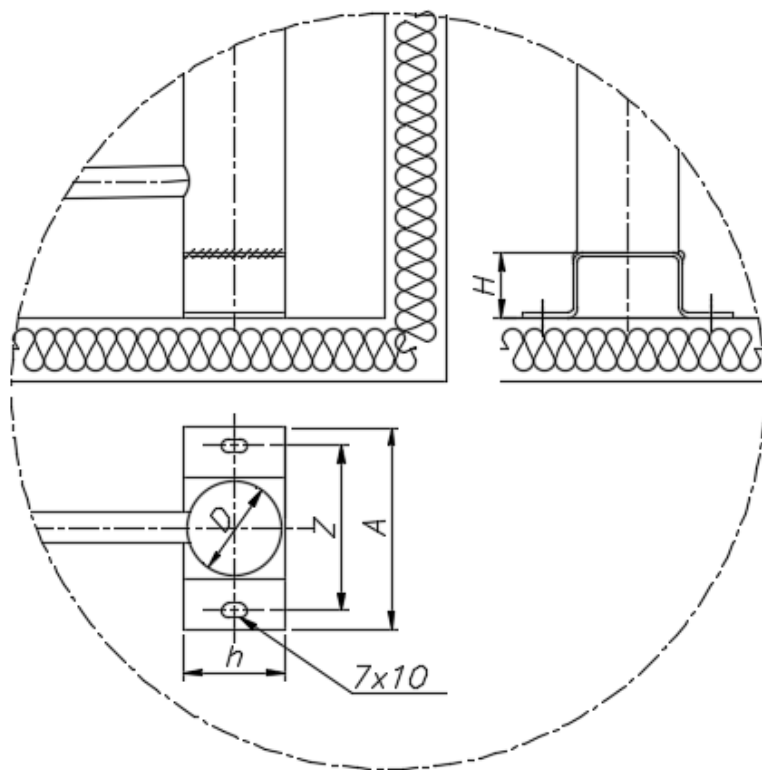
**DET A: Escutcheon plates.**



Welded escutcheon plate dimensions										
D(mm)	d(mm)	b3(mm)	b4(mm)	d1(mm)	p x r(mm)	g(mm)	e(mm)	i(mm)	y(mm)	m(mm)
40	12	70	135	42	12.5 x 16	55	80	121	36	130
50	12	70	135	52	12.5 x 16	55	80	121	36	125

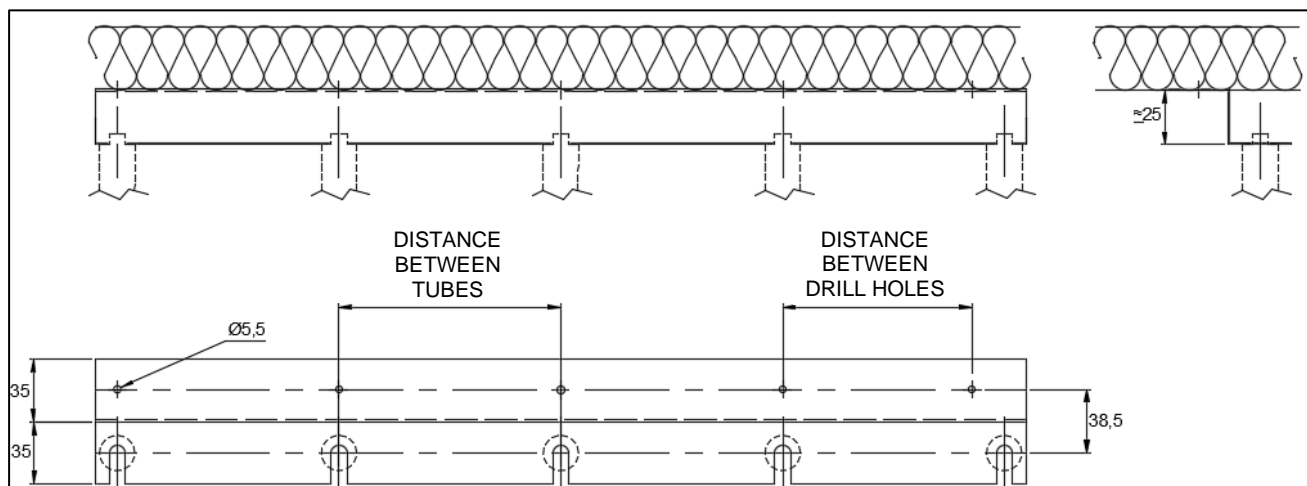
Loose escutcheon plate dimensions							
Condensate's tube escutcheon plate				Collector tube escutcheon plate			
D(mm)	d2(mm)	d3(mm)	d4(mm)	D(mm)	d2(mm)	d3(mm)	d4(mm)
12	13	44	60	40	43	59	75
16	17	44	60	50	53	69	85
				76	79	95	111
				104	107	123	139

**DET B: Omega clamp**

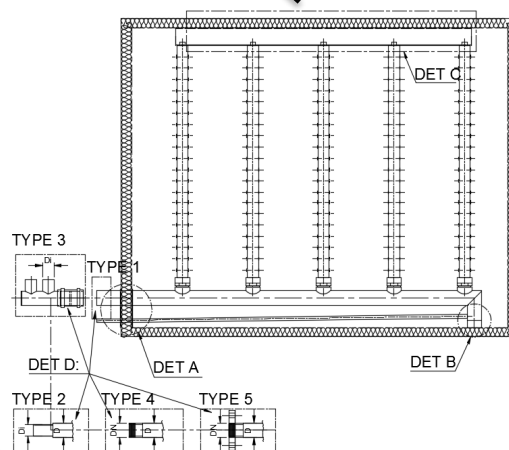


Omega clamp dimensions				
D(mm)	A(mm)	H(mm)	h(mm)	Z(mm)
40,50,76	105	54	50	90
104	145	60	100	130

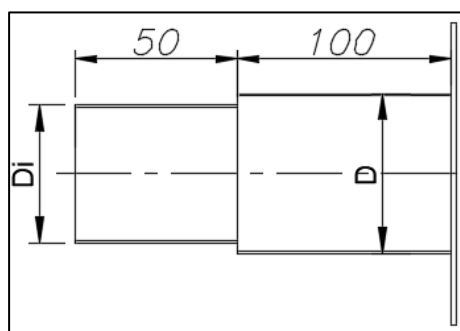
### DET C: Z profile attachment



“Distance between tubes” = Distance between drill holes



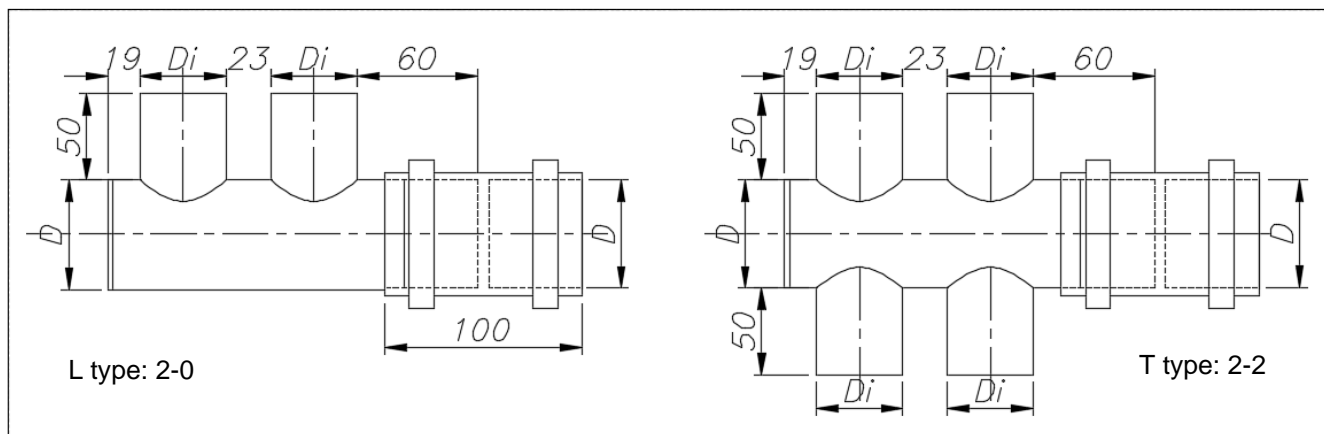
### DET D: Type 2



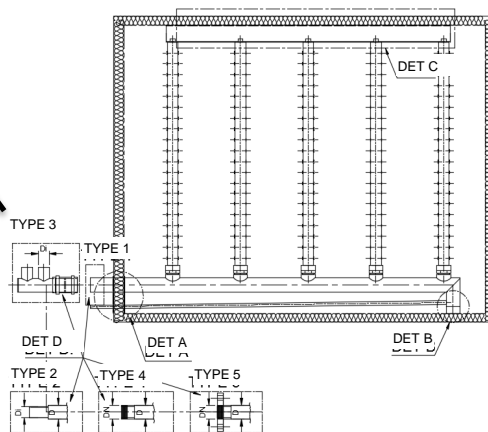
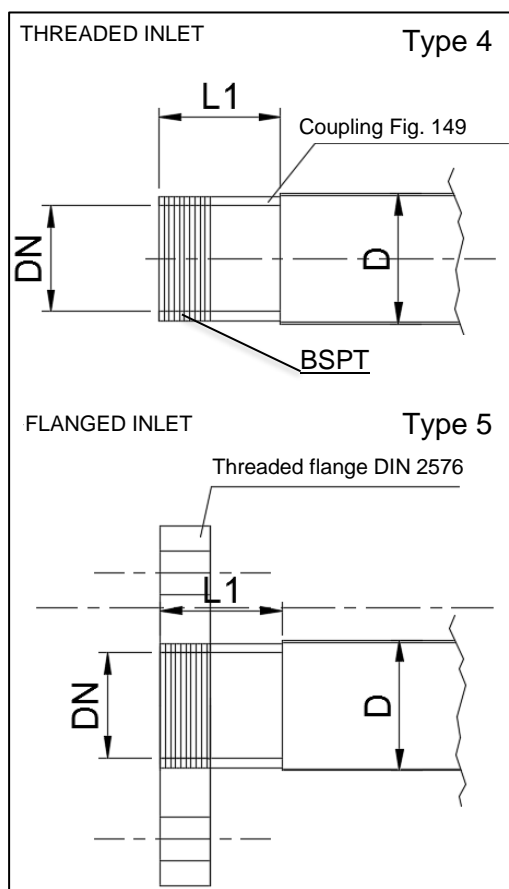


### DET D: Type 3:

Example of arrangement:

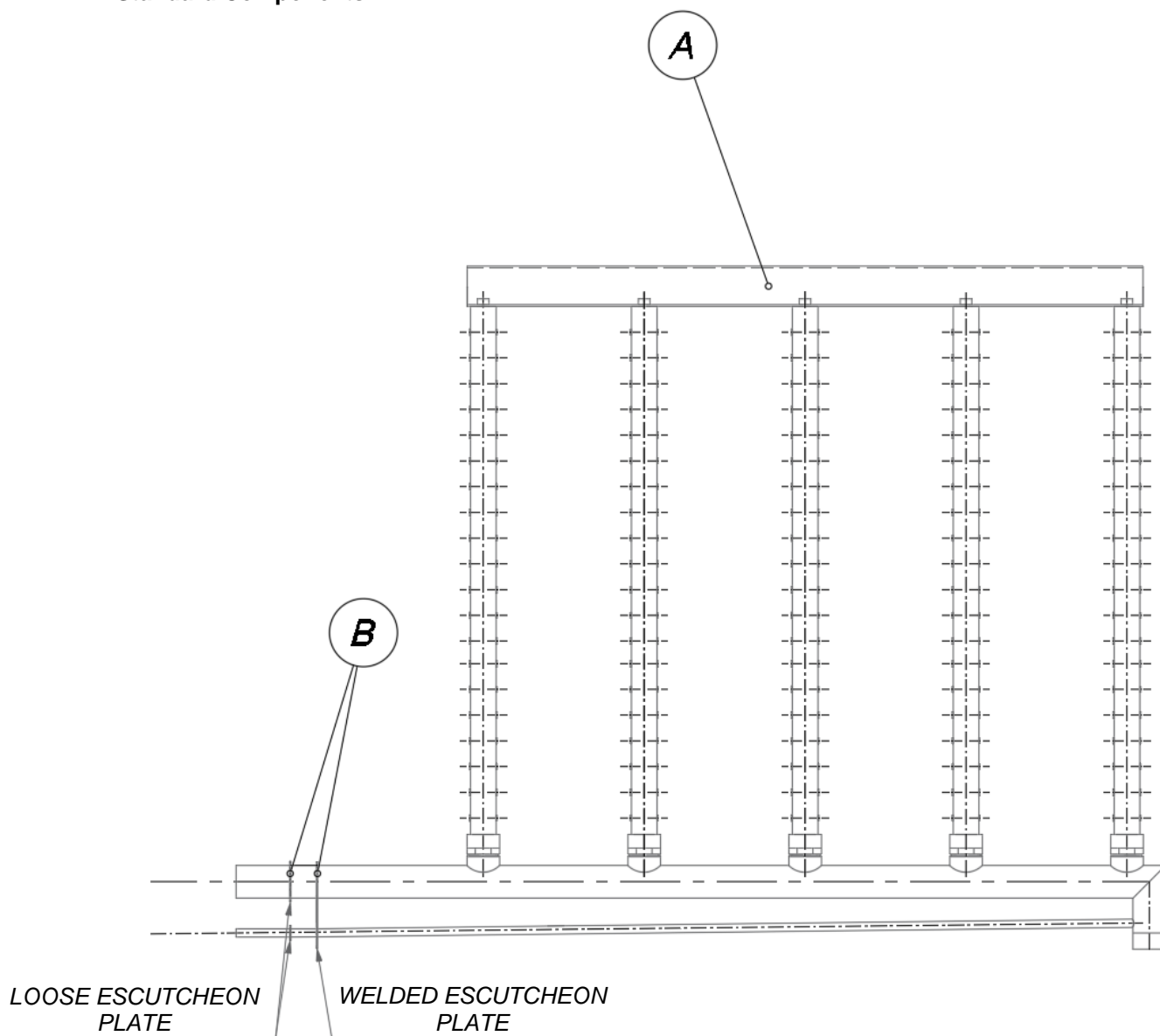


### DET D: Type 4 and Type 5



SMOOTH TRANSFORMATION → THREADED/FLANGED		
D (mm)	DN (mm)	L1(mm)
40	32	50
50	40	50
76	60	60
104	100	80

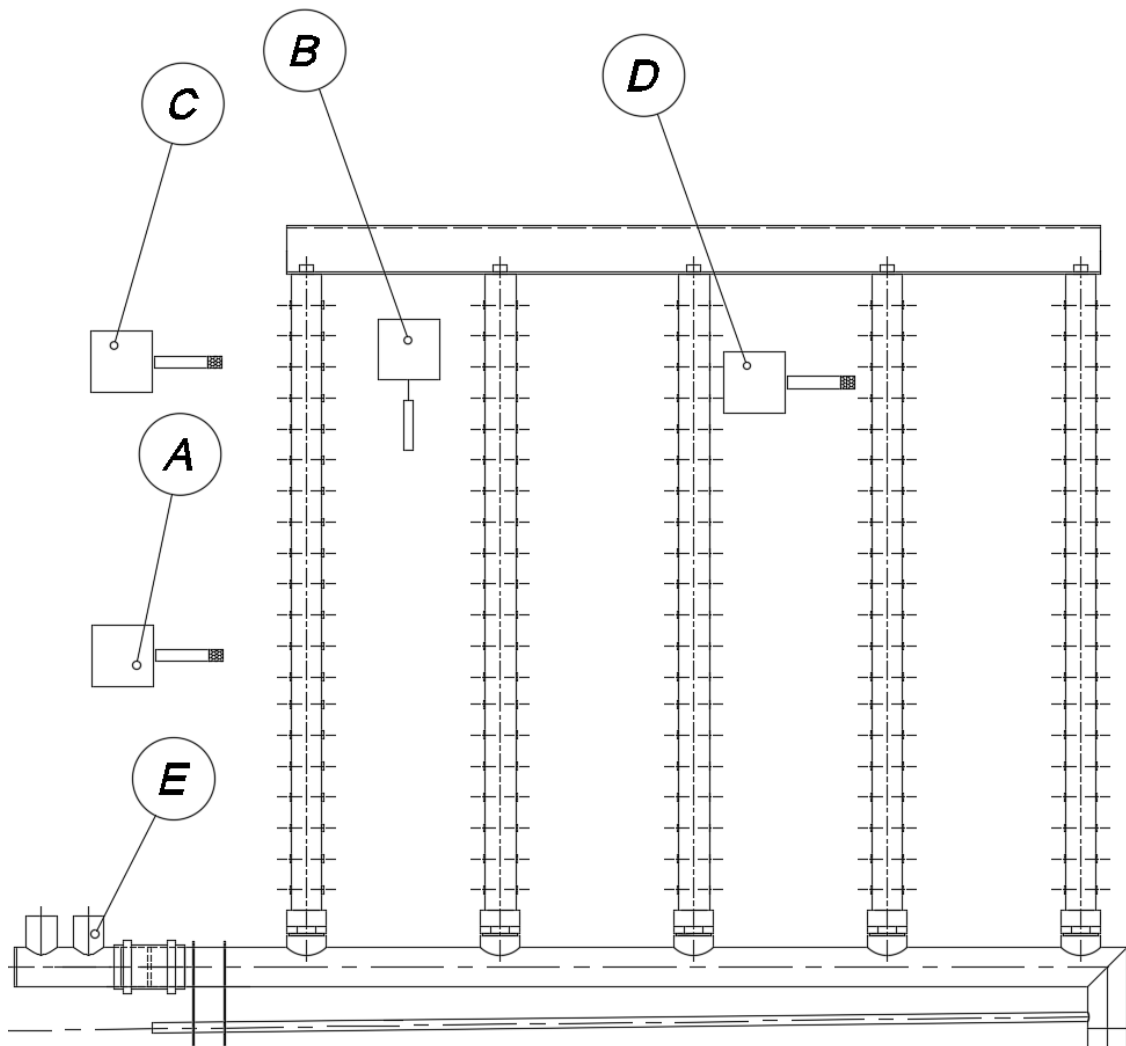
## 7. MT1 Standard Components



A. MT1

B- ESCUTCHEON PLATES (x2)

## 8. Optional MT1 Humidifier Components




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A. ACTIVE TEMPERATURE AND HUMIDITY (RH) DOUBLE SENSOR, DUCT/AHU OR ENVIRONMENTAL/ROOM

---

B. FLOW SWITCH

---

C. HUMIDISTAT (R.H.) WITH ACTIVE RH TRANSMITTER FOR DUCT/AHU OR ENVIRONMENTAL/ROOM

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D. MAXIMUM HUMIDITY CUT-OFF HYGROSTAT

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E. INPUT "TYPE 2", "TYPE 3", "TYPE 4" or "TYPE 5"

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F. SPECIAL FLEXIBLE STEAM TUBE + 2 CLAMPS

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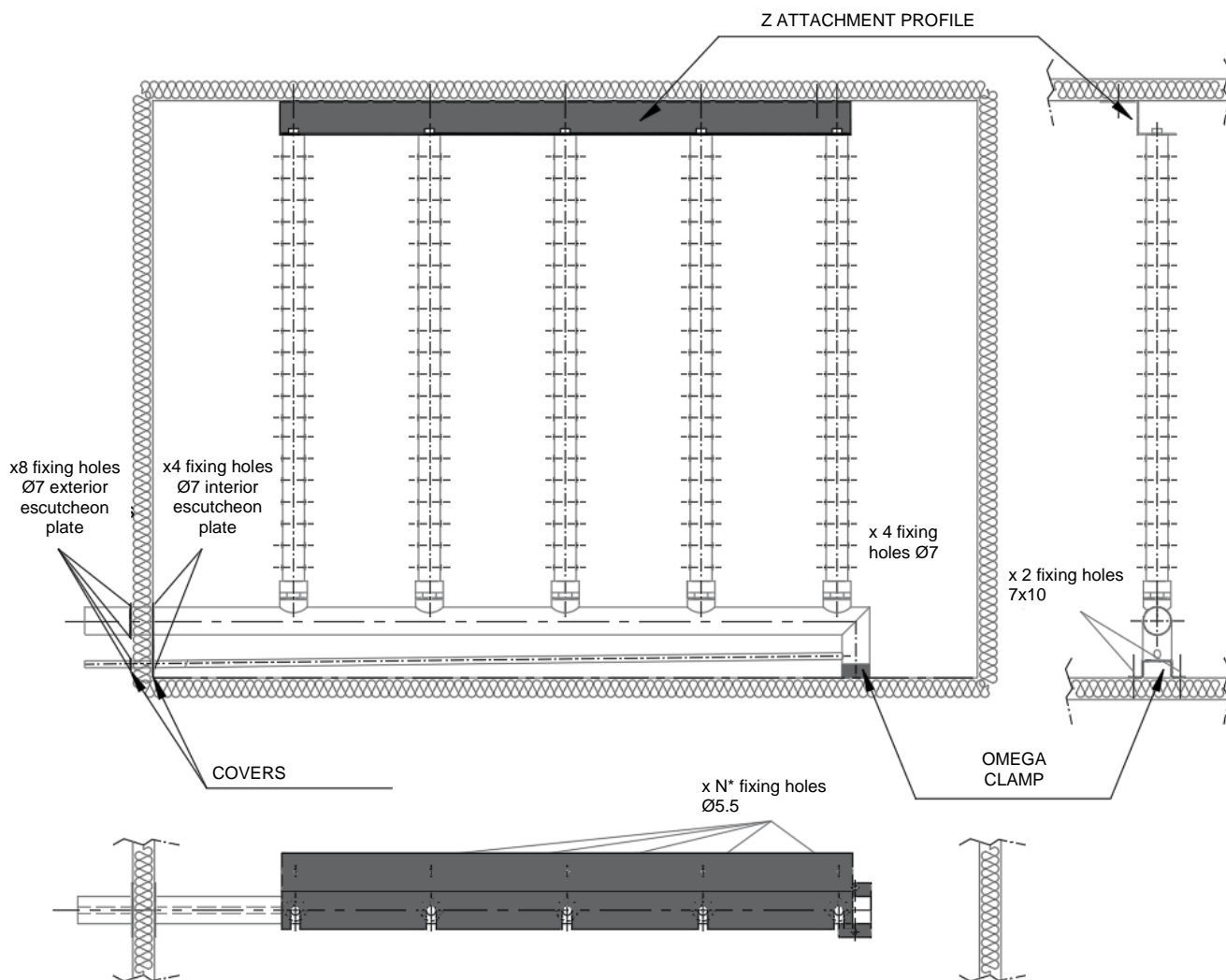
## 9. Assembly and installation

### Installation inside a duct or AHU.

1) Remove the side duct/AHU panel and make the steam inlet and condensate outlet holes in the bottom of the panel.

2) Place the MT1 inside the duct/AHU so that it is crosswise:

- The manifold and condensate outlet pipes must go through the insulation holes made previously. Remember that the welded sealing plate must be located on the inside of the duct/AHU. Once the equipment is attached, place the other sealing plate on the exterior and attach it to the interior by the 4 holes provided for this purpose.
- The equipment must rest on the omega clamps, which must be screwed to the lower panel of the duct/AHU via the 2 holes provided for that purpose.



(\*) Number N of drill holes equal to the number of dispersion tubes (NT).

## 10. Connecting the steam generator to the MT1 steam dispersion system

It is important that the dispersion system is placed where there is no possibility of condensation in the duct; neither upstream nor downstream. In general, the best position is after the heating coil or in the area where the temperature is higher, since, with high temperatures, the absorption distance is shorter.

It should not be placed near a filter, or where the flow can hit a metal surface head-on, or where it can affect the firefighting or smoke detection system.

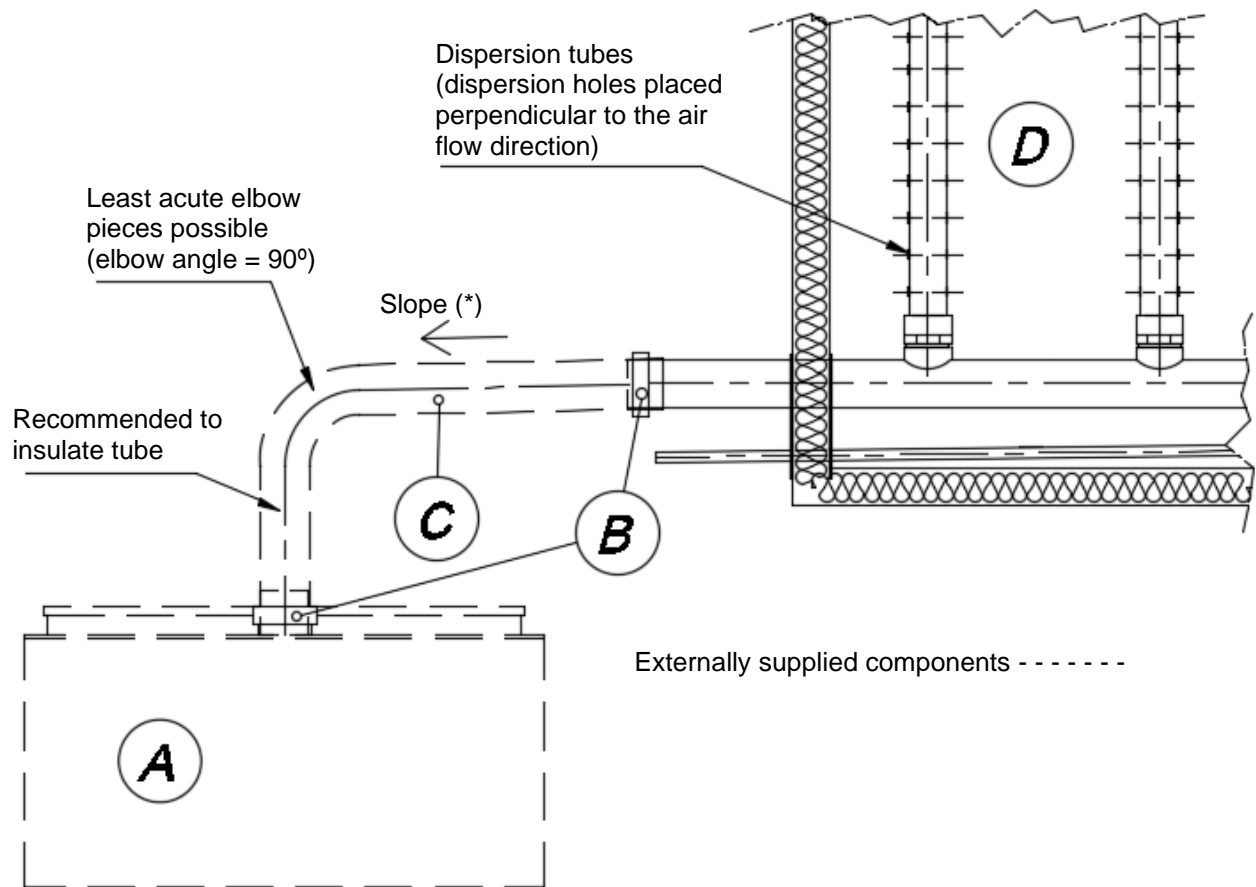
All recommendations for the application of DIPHUSAIR series are based on tests and field experience. However, these recommendations are based on duct air velocities, pressures and temperatures that are most encountered, and the recommendations may have to be modified when air flow velocities or pressures are high and/or air temperatures low. We also reserve the right to modify recommendations without notice if subsequent test or experience indicate that a change should be made. For the reason we urge you to check all applications with your FISAIR contact before installation.

**Nota 1:** A minimum distance of 2.5 m must be maintained between filters and dispersion systems. In any case, contact FISAIR for this type of installation since the useful life of the filters can be reduced by half, when working with high RH.

**Note 2:** It is not recommended to install the disperser in areas where the air flow has a pressure greater than or equal to +500Pa (positive pressure), -500Pa (negative pressure). Contact Fisair for other pressures.

**Note 3:** If the dispersion system is placed too close to the turbulent flow generated by a fan (<4m), the absorption capacity (kg / h) and distance can be seriously affected.

### 10.1 MT1 above the generator



A. STEAM GENERATOR

B. CLAMP (X2)

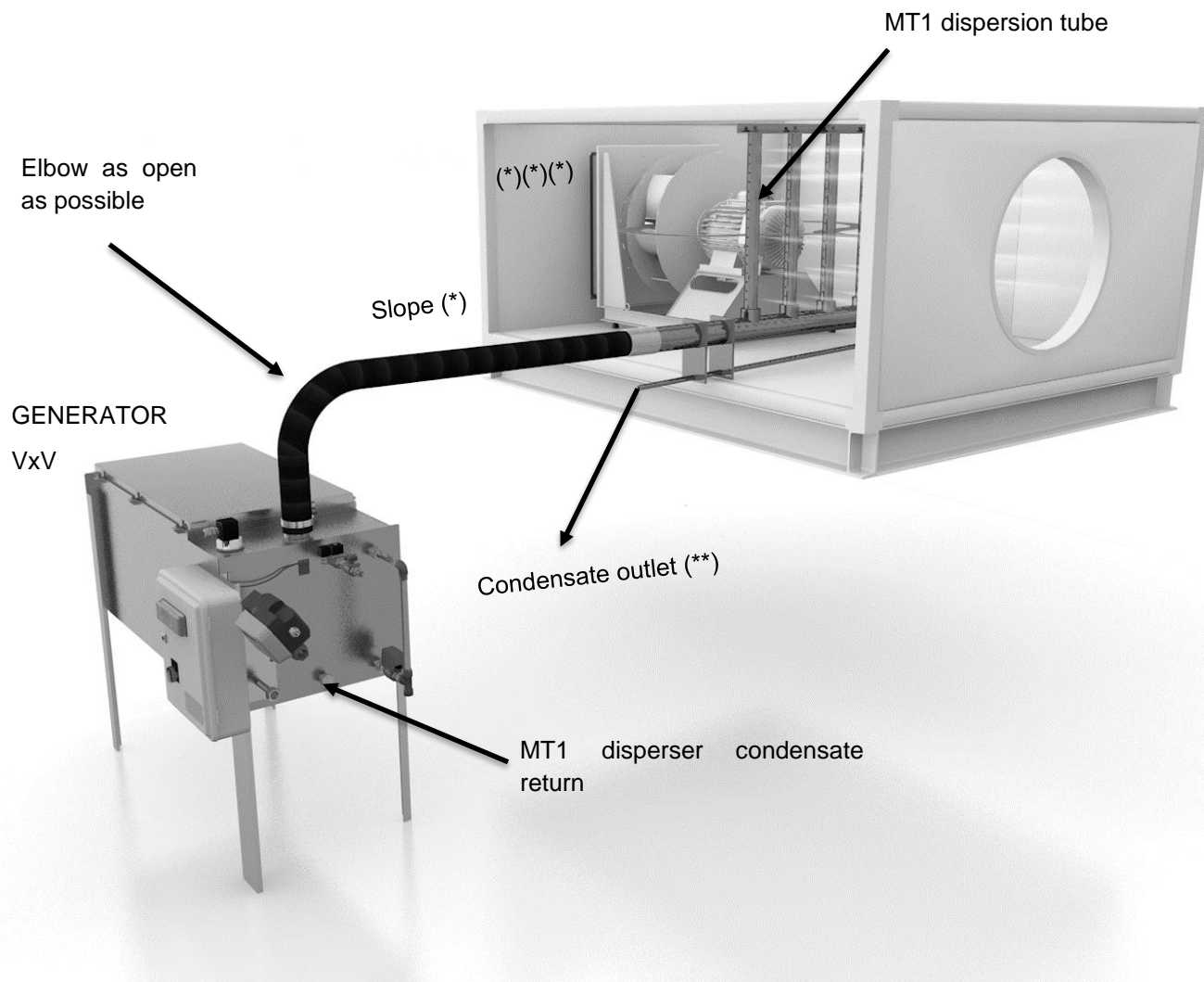
C. SPECIAL FLEXIBLE STEAM PIPE

D. MT1 SYSTEM

(\*) Minimum slope towards the steam generator:

- With flexible steam tubing; 15%
- With rigid tubing; 2%

Example of connection from the VxV generator to MT1 Steam disperser:



(\*) Minimum slope towards the steam generator:

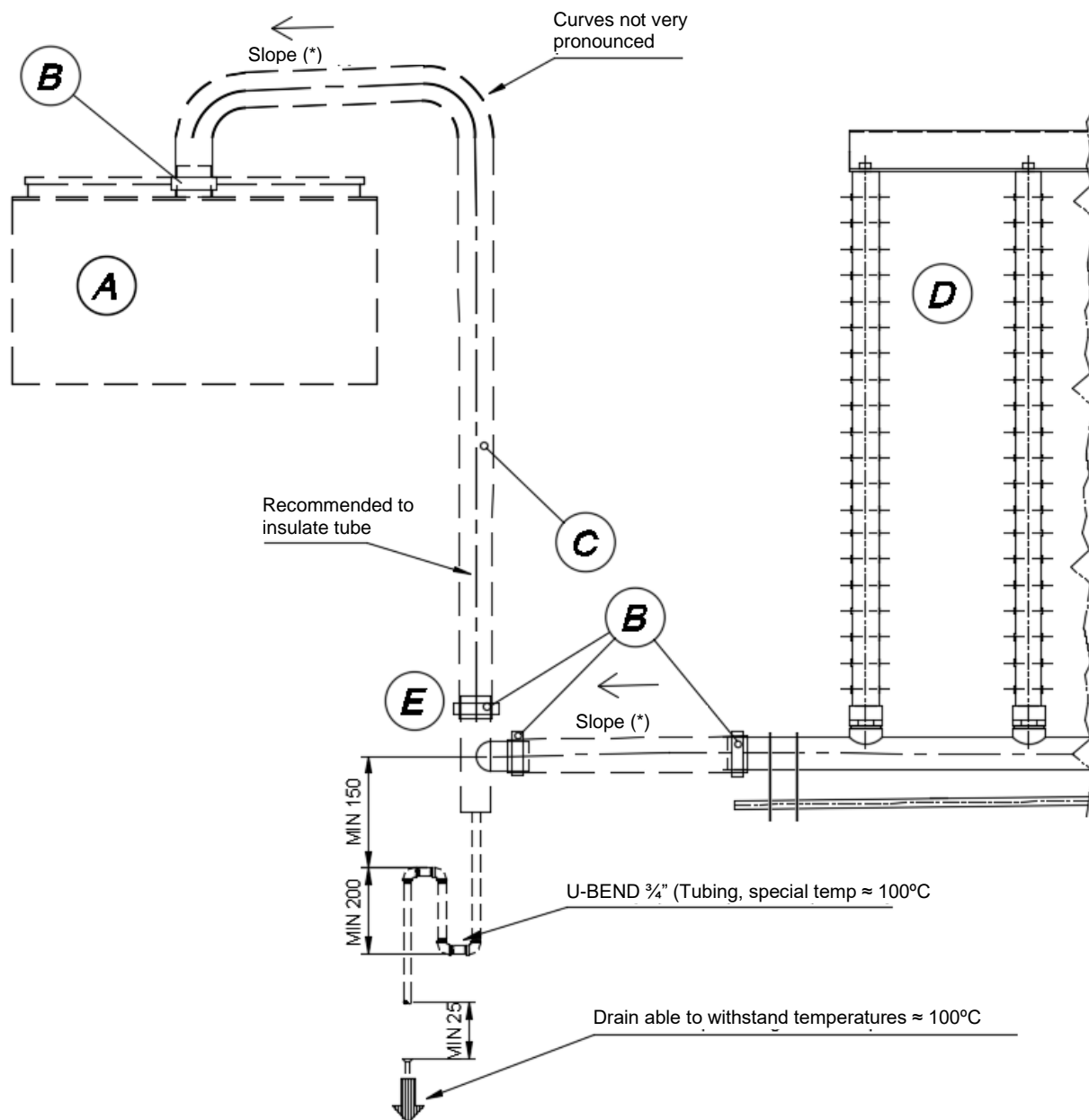
- With flexible steam tubing; 15%
- With rigid tubing; 2%

(\*\*) Condensate outlet: Two possible systems:

- Syst. 1: No condensate return (see section 14.1)
- Syst. 2 : With condensate return (see section 14.2)

(\*\*\*) If the dispersion system is placed too close to the turbulent flow generated by a fan (<4m), the capacity (kg / h) and absorption distance can be seriously affected

## 10.2 MT1 under the generator



A. STEAM GENERATOR

B. CLAMP (X2)

C. SPECIAL FLEXIBLE STEAM PIPE

D. MT1 SYSTEM

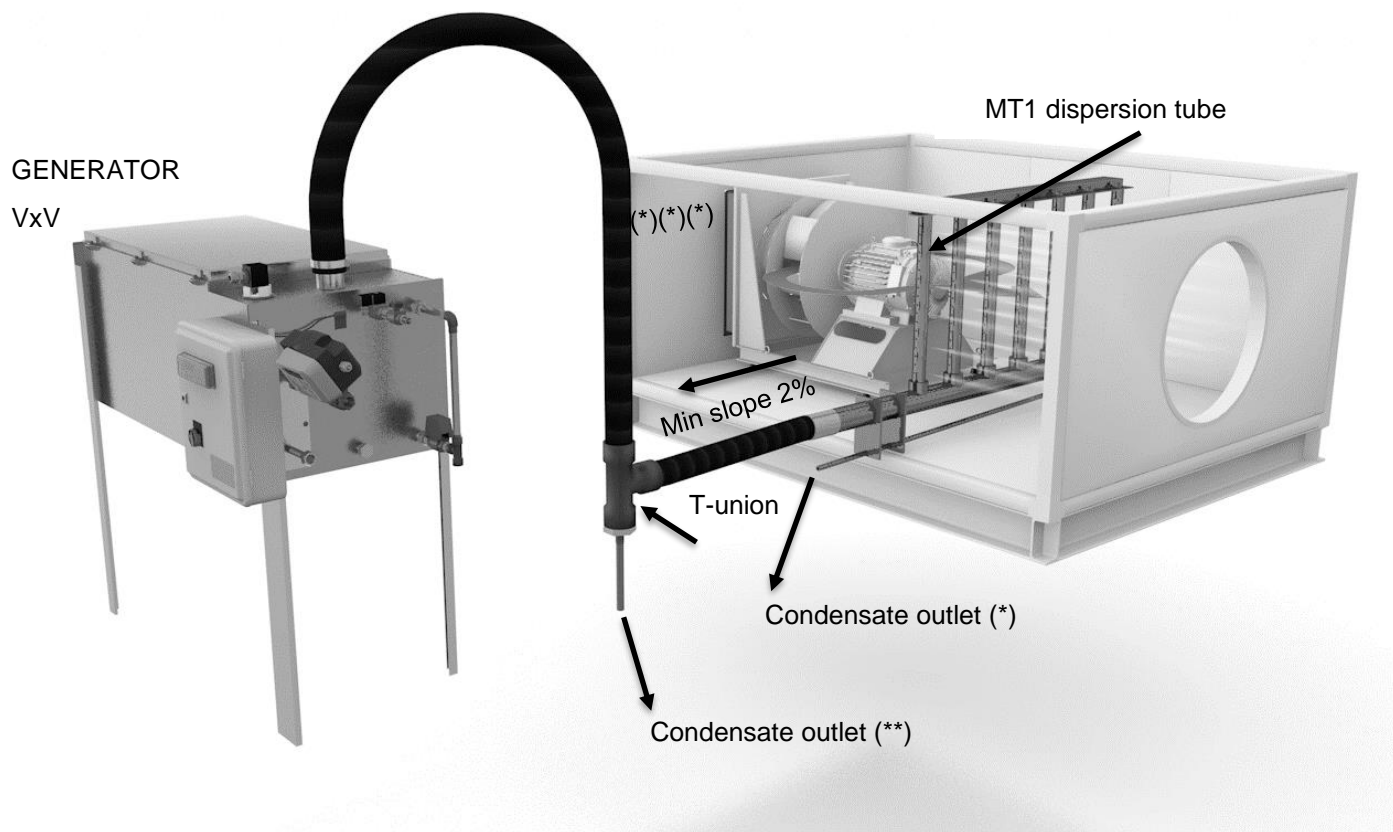
E. CONNECTION "T"

(\*) Minimum slope towards the steam generator:

- With flexible steam tubing; 15%
- With rigid tubing; 2%



Example of connection from the VxV humidifier to MT1 Steam disperser:



(\*) Condensate outlet to water trap. (See section 14.1)

(\*\*) As shown in section 10.2

(\*\*\*) If the dispersion system is placed too close to the turbulent flow generated by a fan (<4m), the capacity (kg / h) and absorption distance can be seriously affected

### 10.3 Connection tubing between the steam generator and MT1 system.

A special flexible hose for the steam should be used. No more than 3m of flexible hose should be used between the steam generator at atmospheric pressure and the DIPHUSAIR MT1 dispersion system.

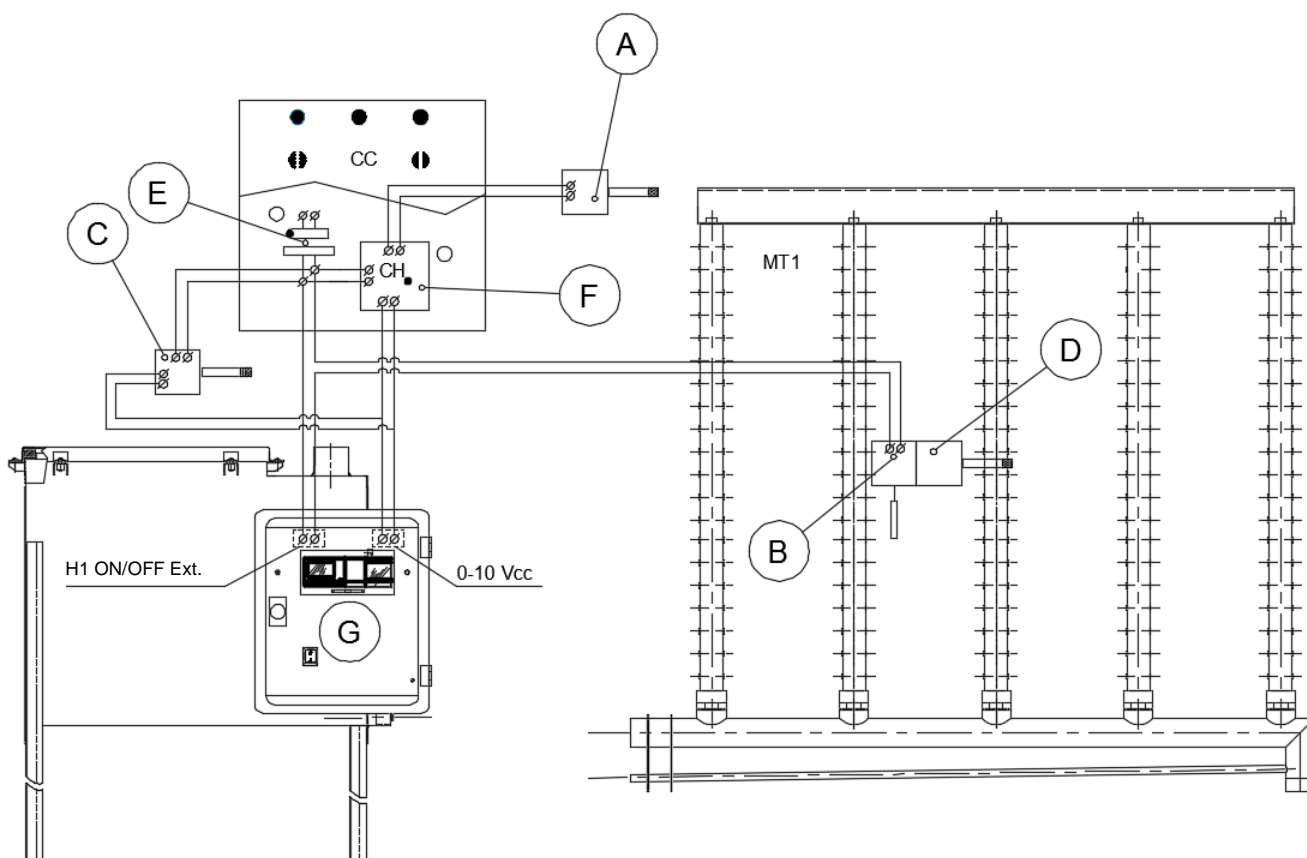
Flexible steam hose			Rigid copper or stainless steel tube		
Size Ø [mm]	Maximum capacity [Kg/h]	Maximum recommended length [m]	Size Ø [mm]	Maximum capacity [Kg/h]	Maximum recommended length [m]
25	25	Recom 3, max 5	25	23	5
40	65	Recom 3, max 5	40	60	7
50	123	Recom 3, max 5	50	120	8
76	200	Recom 3, max 5	76	204	22
104	340	Recom 3, max 5	104	320	28

1. Use FISAIR flexible tubing for the best results. Other tubing may last less time or may cause foaming in the evaporation chamber, resulting in condensate discharge into the dispersion system. Do not use flexible tubing for outdoor applications.
2. The maximum recommended length is 3 m, as longer lengths can cause the tube to twist or create lower points.

Description	SizeØ [mm]	Steam losses [kg/h/m]		Insulation thickness [mm]
		No insulation	Insulation	
Flexible tubing	25	0.20	-	-
	40	0.25	-	-
	50	0.32	-	-
	76	0.41	-	-
	104	0.53	-	-
Rigid tubing	25	0.18	0.028	50
	40	0.20	0.033	50
	50	0.27	0.040	65
	76	0.36	0.049	65
	104	0.49	0,061	75

Note: Data taken at room temperature of 25°C

## 11. Recommended electrical installation for MT1.



A. ACTIVE TEMPERATURE AND HUMIDITY (RH) DOUBLE SENSOR, DUCT/AHU OR ENVIRONMENTAL/ROOM

B. FLOW SWITCH

C. HUMIDISTAT WITH ACTIVE RH TRANSMITTER FOR DUCT/AHU OR ENVIRONMENTAL/ROOM

D. MAXIMUM RELATIVE HUMIDITY CUT-OFF HYGROSTAT

E. TRANSFORMER

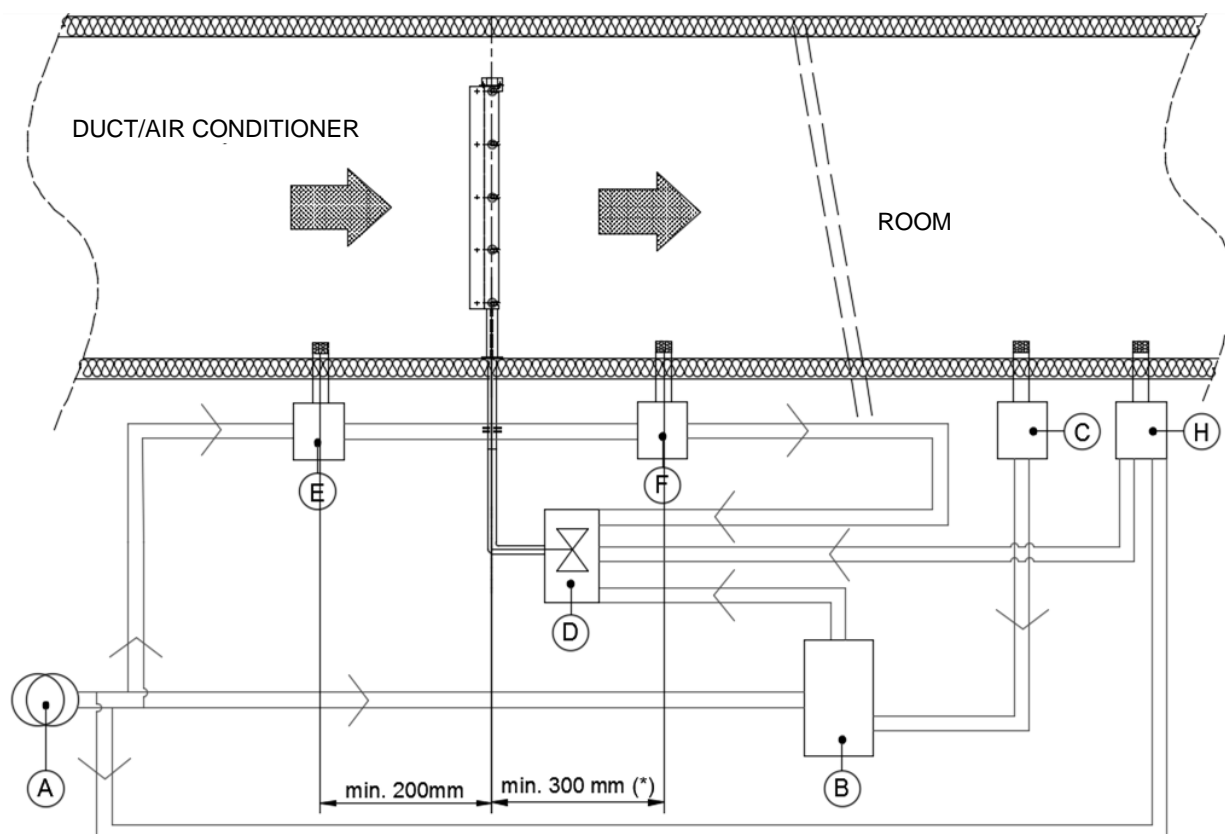
F. HUMIDITY REGULATOR (BMS/AHU)

G. CONTROL PANEL (Steam Generator)

## 12. Recommended sensor location

The location of the sensors has a significant impact on the operation of the humidifier. It is recommended not to exchange the duct sensors with the room sensors, since each is calibrated for a certain air velocity.

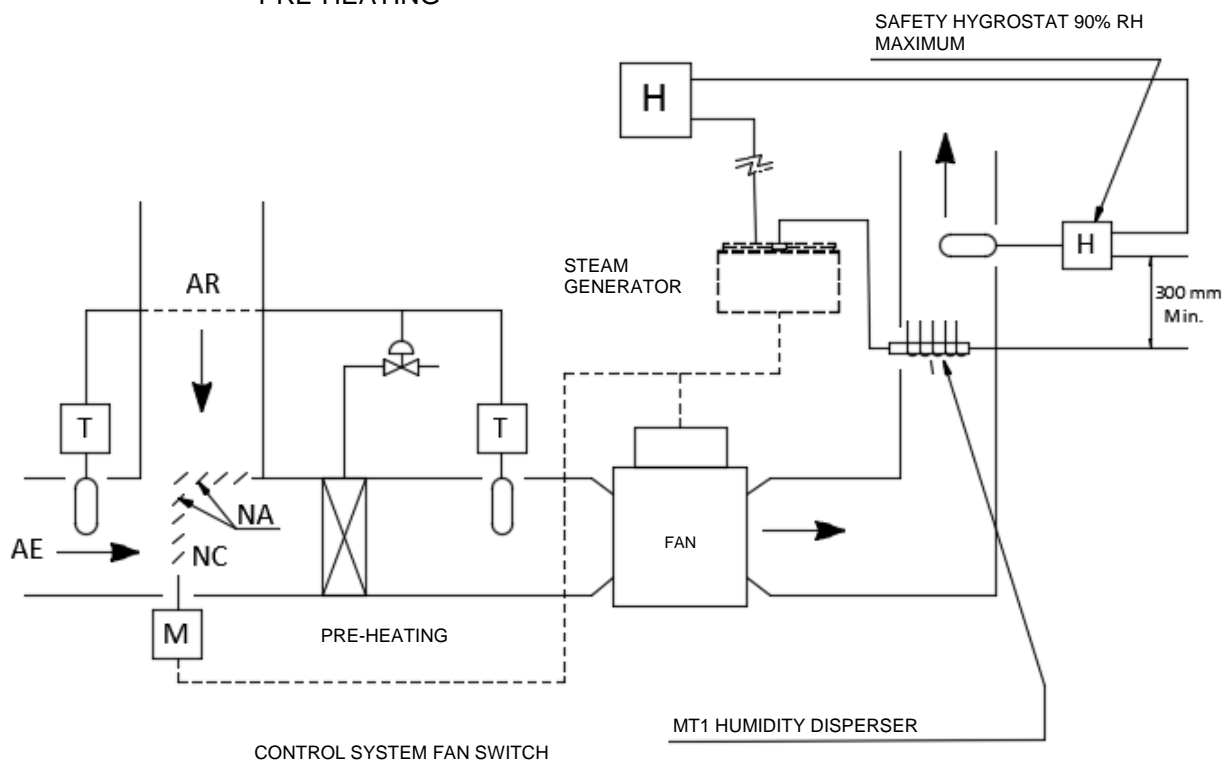
The proposed assemblies appear below. Some components must be supplied by the installer.



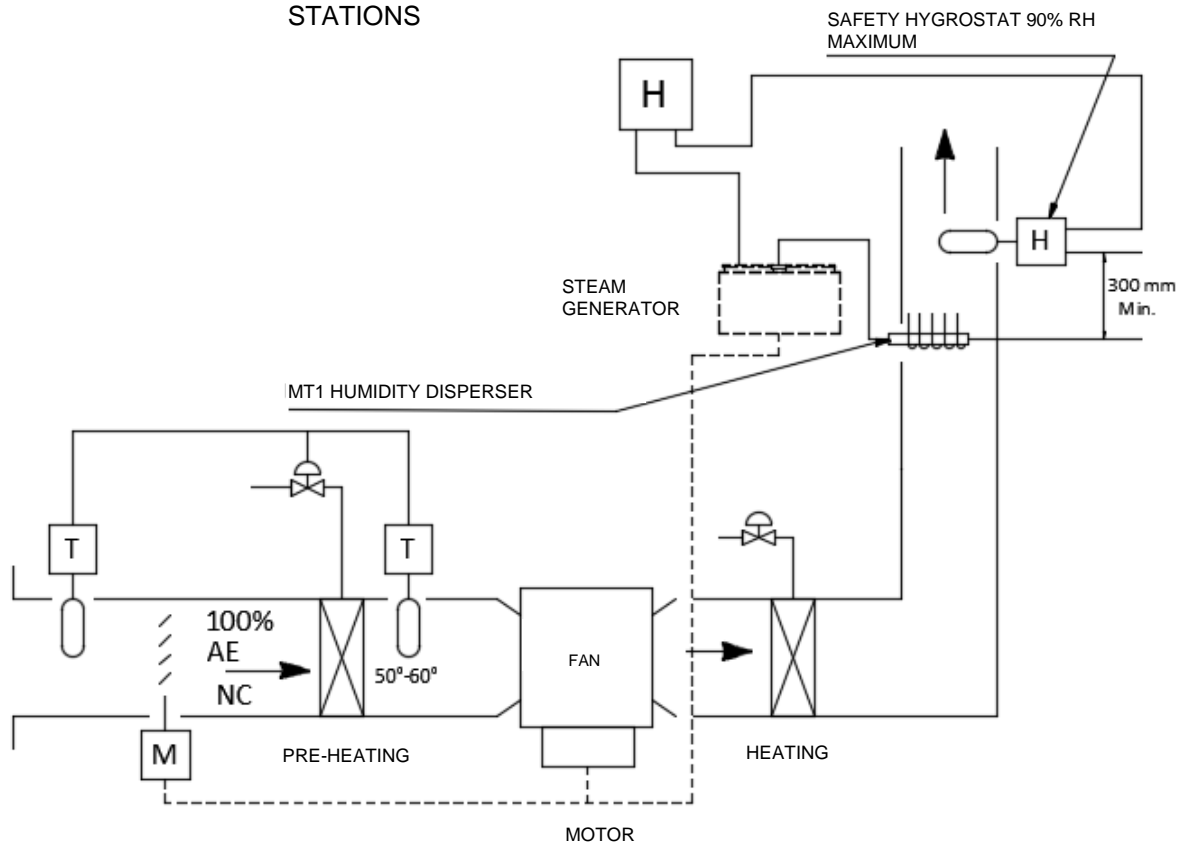
(\*) Add to absorption distance

A	Transformer	E	Flow switch
B	Humidity regulator	F	Maximum humidity cut-off hygostat (80-90% HR)
C	Active temperature and humidity (RH) double sensor, duct/AHU or environmental/room	H	Humidistat with active RH transmitter for duct/AHU or environmental/room
D	Steam generator control panel		

### DUCT INSTALLATION WITH RETURN AND EXTERIOR AIR WITH PRE-HEATING



### DUCT INSTALLATION WITH 100% EXTERIOR AIR AND 2 HEATING STATIONS

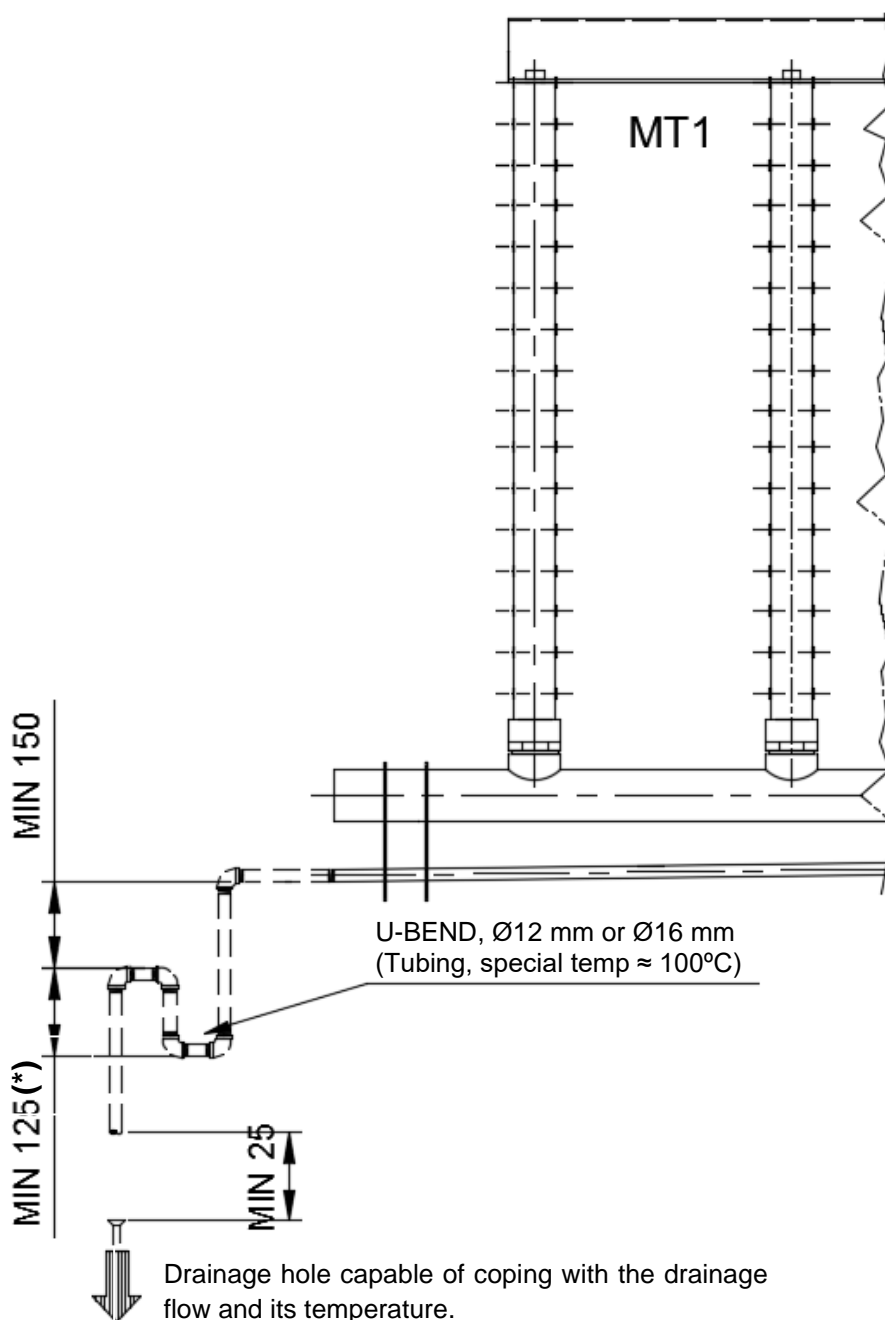


### 13. Operating environment temperature and humidity.

- ❖ Temperature: [-10...+80 °C]
- ❖ Relative humidity: [5...95% RH] no condensation.

### 14. Non-pressurised condensate line connection

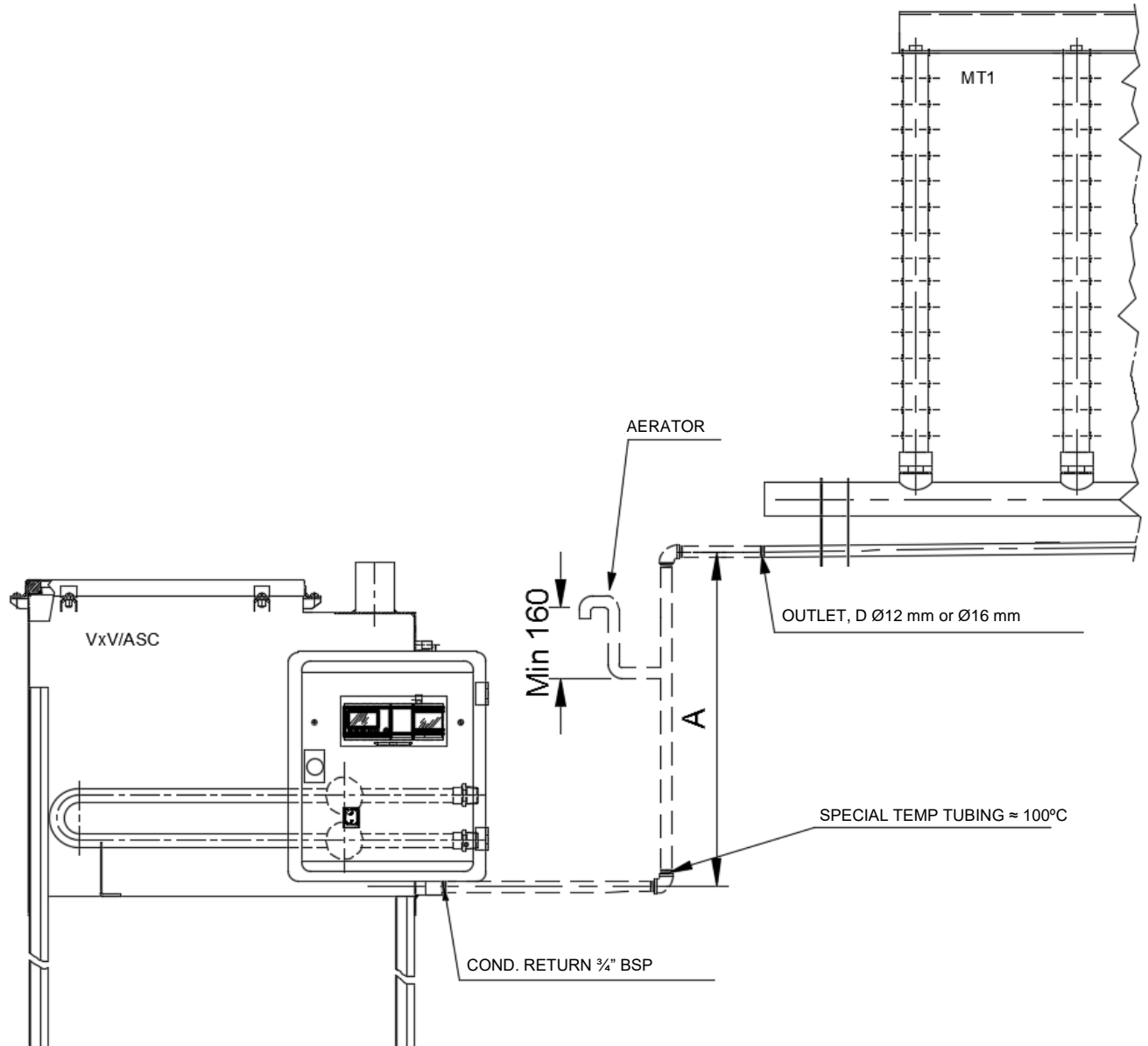
#### 14.1 System 1 (without condensate return)



(\*) A 250 mm siphon height is recommended (this height depends on the positive or negative pressure of the air flow)

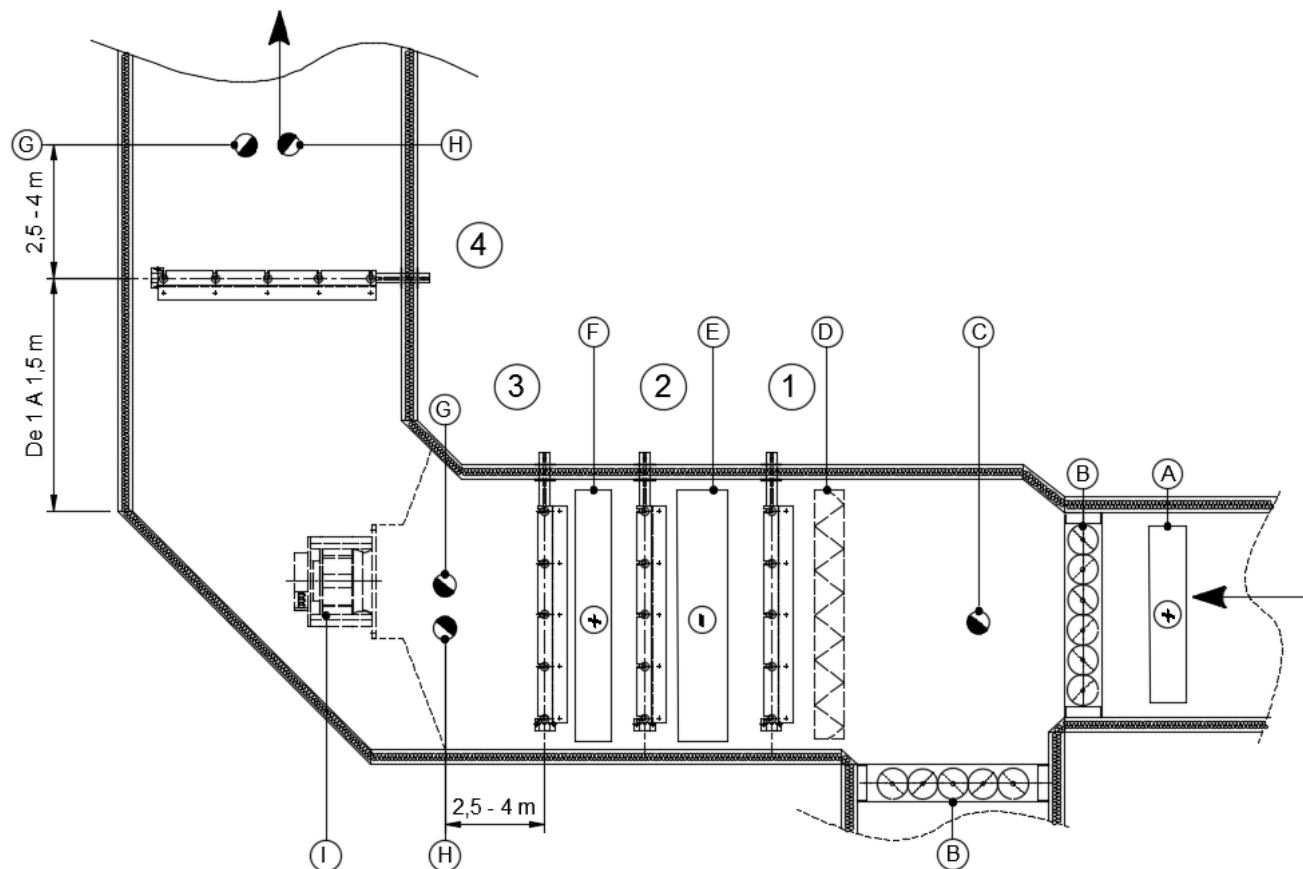
## 14.2 System 2 (condensate return)

The condensate is connected to the specific return for this in the humidifier. The return should have a u-bend and an aerator (consult for specific design).



Minimum HEIGHT	
Capacity (kg/h)	Height A (mm)
<50	700
50-80	800
>80	850

### 15 MT1 located inside an AHU



A Pre-heating coil

B Gate

C Economiser, control device

D Filter

E Cooling coil

F Heating coil

G Safety hygrometer

H Air flow switch

I Fan



**Location 3:**

This is the best option. Installing downstream from the heating and cooling coils, as it provides laminar flow through the dispersion unit, and the heated air absorbs the steam better.

**Location 2:**

This is the second best option, for overload periods, the cooling coil removes part of the moisture for humidification.

**Location 4:**

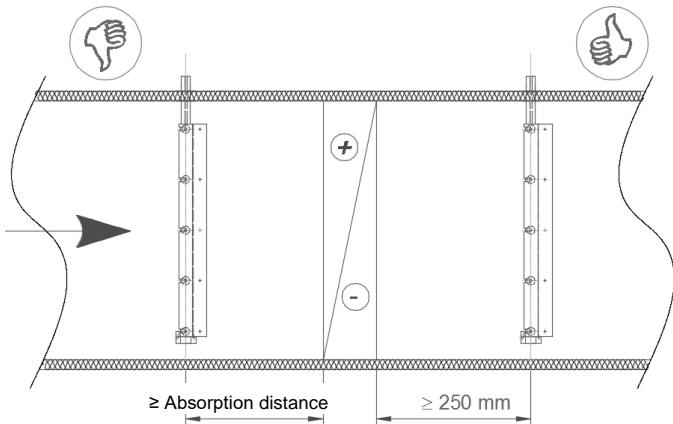
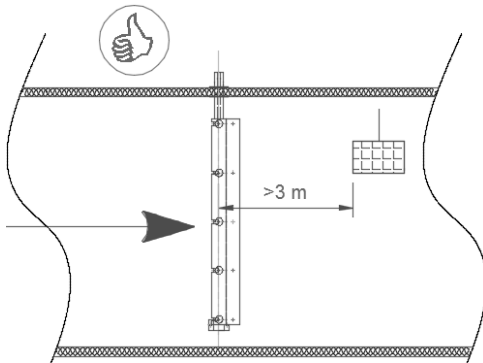
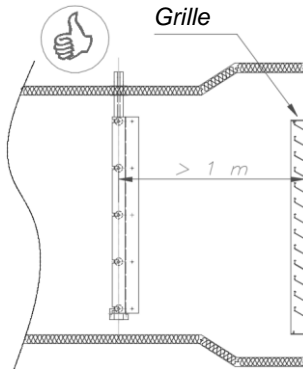
This is the third option. When the air leaves the fan, it is turbulent and the steam may not be absorbed within the established absorption distance. This gives more absorption distance if installing downstream from the fan. If the dispersion system is placed within 4 m of the turbulent flow, the absorption capacity (kg / h) and distance can be seriously affected.

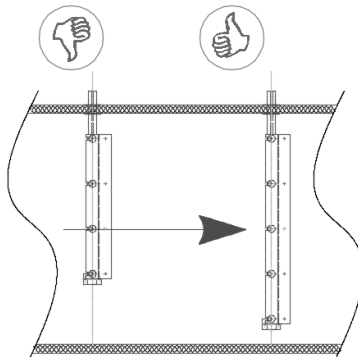
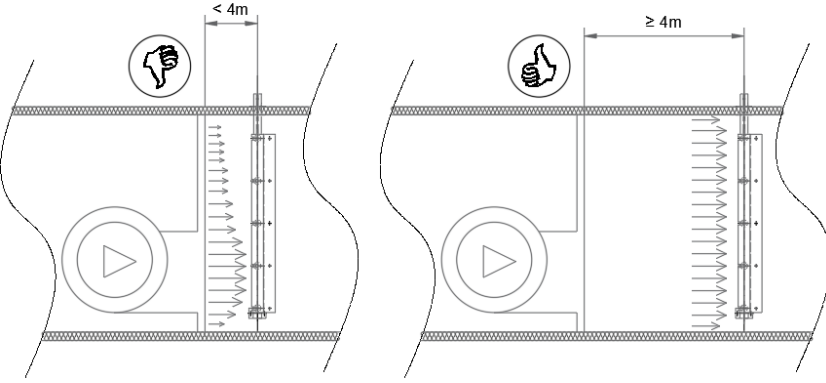
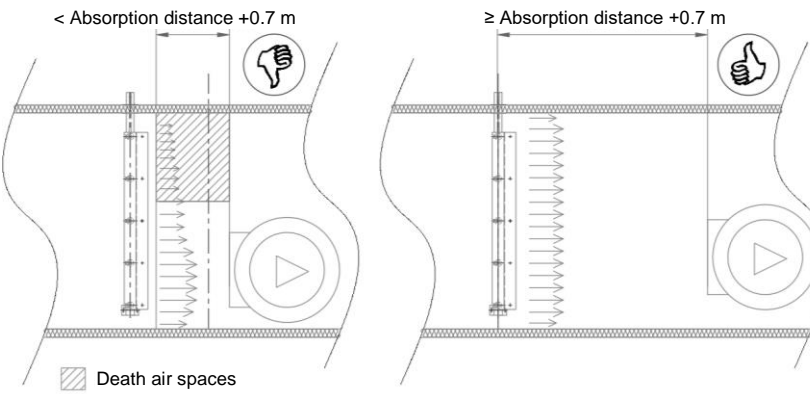
**Location 1:**

This is the least recommended position. The cooler air in this position requires a greater absorption distance.

**In conclusion, the best location options are locations 2 and 3, downstream of the batteries, the best option being location 3, downstream of the heating coil. Try, as far as possible, to avoid close locations, downstream of fans and in locations with too cold air.**

## 16. Notes to take into account when placing the MT1

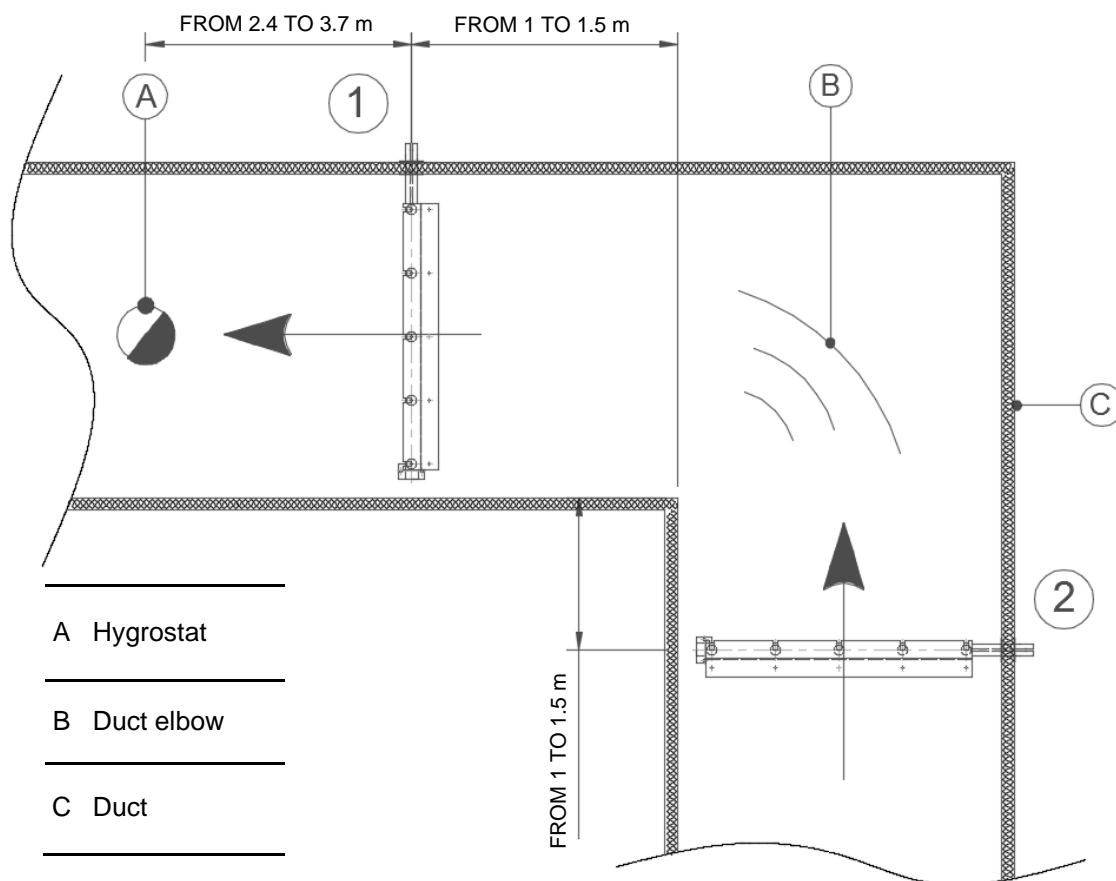
<p>When possible, install the humidifier by injection downstream of the coils. If the available distance between the MT1 and the coil on the upstream side is greater than the "absorption distance", the humidifier can be installed at that location.</p>	
<p>Do not install the MT1 less than 3m upstream of the temperature controller as it may give an erroneous signal.</p>	
<p>Always install the MT1 as far as possible upstream of the air discharge grilles, and never less than 1m upstream.</p>	

<p>Always select the MT1 with the side that most covers the width of the duct.</p>	
<p>The MT1 must have air flow across the entire cross section. Avoid fan discharges without gradually changing the section. If it is with pressures (+), place in the ducts after the AHU.</p>	
<p>The MT1 cannot have dead air space because it is too close the fan aspiration. Avoid fan aspiration without a good mixing zone.</p>	 <p>&lt; Absorption distance +0.7 m</p> <p>≥ Absorption distance +0.7 m</p> <p>Death air spaces</p>


- Installation of the humidifier near an elbow

Position 1: This is the best option. It leads to better absorption downstream from the elbow.

Position 2: This is the second-best option. Moisture may collect on the elbows of the duct. Try to place it 1-1.5m from the elbow.



## 17.Launching

1. Turn on the supply steam to the MT1:
  - Non-pressurized steam generator: Follow the start-up instructions in the corresponding Installation, Operation and Maintenance manual of the corresponding steam generator.
2. Check there are no leaks in the pipes.
3. Check installation and operation of the steam trap system (P-Trap/siphon).
4. Check if the dispersion tubes are leaking.  
 **Note:** Any condensate leakage at either end of the dispersion tube could be caused by missing/damaged O-rings.
5. Make sure the dispersion tubes and manifolds are oriented at 90° with respect to the air flow.
6. Check there are no other leaks in the steam and drain connections.
7. Make sure the P-trap is working.
  - At the beginning of the operation cycle, make sure there is a flow of condensate drain water when running:
    1. If not, check the P-trap is not blocked.
    2. Check the P-trap height is enough to overcome the air flow pressures.
    3. Static duct pressures > 650 Pa may require a higher P-trap.

**IMPORTANT** Request start-up of your units by contacting:

[sat@fisair.com](mailto:sat@fisair.com) o [service@fisair.com](mailto:service@fisair.com)

<https://fisair.com/es/servicio/puestas-en-marcha/> (application in Spanish)

<https://fisair.com/service/start-ups/> (application in English)

## 18. Maintenance

- The equipment requires regular inspection; if not, it could damage the components and invalidate the guarantee. Keep in mind that the equipment can be contaminated, and must be controlled to prevent this.
- The humidifier should be sterilised twice a year.
- The humidifier must be inspected monthly to ensure its proper operation, and that it has no difficulty requiring immediate correction.

COMPONENT	FREQUENCY AND PROCEDURE
O-rings	Inspect them every three or four years of service, replace them if necessary.

**IMPORTANT** Request maintenance of your units by contacting:

[sat@fisair.com](mailto:sat@fisair.com) o [service@fisair.com](mailto:service@fisair.com)

<https://fisair.com/es/servicio/mantenimientos/> (application in Spanish)

<https://fisair.com/service/maintenance/> (application in English)

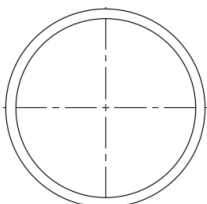
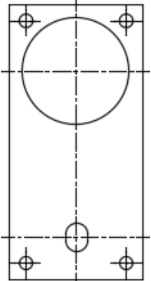
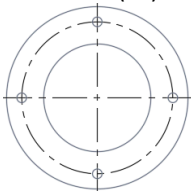
## 19. Troubleshooting

PROBLEM	POSSIBLE CAUSE	ACTION
The humidifier discharges water into the duct.	Improperly placed humidifier	- Correct the position of the humidifier
	Condensate return line overload.	- Install drip legs or traps as required.
Water leaks from the humidifier.	Defective links.	- Replace links.
Humidity exceeds the hygrosat value	The control system does not work properly.	<ul style="list-style-type: none"> <li>- Incorrect control voltage. Check and correct.</li> <li>- Incorrect control signal. Check and correct.</li> <li>- Incorrect connection. Check and correct.</li> <li>- Incorrect humidity sensor. Check and correct.</li> <li>- Humidity controller not calibrated. Calibrate.</li> </ul>
	Steam leak inside the duct.	- Repair leak.
	Incompatible control components	- Replace them with specific recommendations
	Poor location of control components	- Relocate them by recommendation of the manual
Humidity fluctuates around the desired humidity set point.	The control system does not work properly.	<ul style="list-style-type: none"> <li>- Humidity controller defective or inaccurate. Calibrate or replace.</li> <li>- Control components poorly located. Reposition.</li> <li>- Incompatible control components. Change components.</li> </ul>

The humidity of the space does not increase to the humidity point established.	Excessive external air volume.	<ul style="list-style-type: none"> <li>- Check fans, gates, etc.</li> <li>- Reduce air volume.</li> </ul>
	Steam pressure is very low.	<ul style="list-style-type: none"> <li>- The tubes are too small. Change.</li> </ul>
	The humidifier is too small.	<ul style="list-style-type: none"> <li>- Replace valve with one of greater capacity.</li> <li>- Replace with larger humidifier.</li> <li>- Add additional humidifier.</li> </ul>
	The control system of steam generator does not work properly.	<ul style="list-style-type: none"> <li>- Incorrect control voltage. Check and correct.</li> <li>- Incorrect control signal. Check and correct.</li> <li>- Incorrect connection. Check and correct.</li> <li>- Incorrect humidity sensor. Check and correct.</li> <li>- Humidity controller not calibrated. Calibrate.</li> <li>- The electrical system does not work correctly. Change transformer</li> <li>- Temperature switch malfunctions. Replace or readjust</li> </ul>
Condensate forms in the ducts.	The humidifier is mounted very close to internal devices (e.g. gates or elbows) in the duct.	<ul style="list-style-type: none"> <li>- Check fans, gates, etc.</li> <li>- Move the humidifier tubes to a point further from these devices upstream.</li> <li>- Add dispersion tubes to reduce absorption distance. Consult with FISAIR to determine the number of tubes required.</li> </ul>
	An uninsulated duct passes through an unheated area (cold surface temperature).	<ul style="list-style-type: none"> <li>- Insulate duct.</li> </ul>
	The air cannot absorb the amount of steam discharged.	<ul style="list-style-type: none"> <li>- The humidifier operates when the fan is off. Install flow switch + maximum humidity cut-off hygostat.</li> <li>- The air temperature in the duct is very low for the amount of steam supplied.</li> </ul>



## 20. List of spare parts

LIST OF SPARE PARTS	ITEM	COMPONENT	FISAIR CODE
1. 'O' RING 	1	Viton	
		Ø25,07 x 2,62 mm	62410010
		Ø40 x 3 mm	62410020
		Ø50,8 x 3,53 mm	62410030
2. MAXIMUM HUMIDITY CUT-OFF HYGROSTAT	2	Ambient humidistat, stage 1, 10A, 10-100 RH%, IP54	64220277
3. TRANSMISSION AND ENVIRONMENTAL HUMIDITY (RH) SENSOR	3	Trans. Active RH/Hygrostat ambient probe	64220107
4. TRANSMISSION AND DUCT HUMIDITY (RH) SENSOR	4	Trans. Active RH/Hygrostat duct probe	64220106
5-INTERNAL ESCUTCHEON PLATE(x2) 	5	Stainless Steel AISI-304L-2B (thickness 2 mm)	
		DN40 70x135xØ42 mm	40030161
		DN50 70x135xØ52 mm	40030160
		DN76 100x160xØ78 mm	40030162
		DN104 120x195xØ106 mm	40030166
6-EXTERNAL ESCUTCHEON PLATES(x2) 	6	Stainless Steel AISI-304L-2B (thickness 1.5 mm)	
		DN12 condensate tube escutcheon plate	40030137
		DN16 condensate tube escutcheon plate	40030138
		DN40 condensate tube escutcheon plate	40030169
		DN50 collector escutcheon plate	40030176
		DN76 collector escutcheon plate	40030177
		DN104 collector escutcheon plate	40030175

## 21. Declaration of conformity.

		<b>DECLARACIÓN CE DE CONFORMIDAD</b> EC CONFORMITY DECLARATION EG KONFORMITÄTSERKLÄRUNG DECLARATION CE DE CONFORMITÉ	
<b>Departamento de Dirección de Calidad</b> Quality Management Department		Qualitätsmanagement-Abteilung Département de gestion de la qualité	
		<b>FISAIR S.L.U.</b> C/ Ciudad de Frias,33-(P.L. Camino de Getafe) 28021 Madrid SPAIN Tel.: (+34) 916921514 info@fisair.com	
<p><b>La presente declaración de conformidad se expide bajo exclusiva responsabilidad del fabricante.</b>          This declaration of conformity is issued under the sole responsibility of the manufacturer.          Diese konformitätserklärung wird in der alleinigen verantwortung des herstellers ausgestellt.          Cette déclaration de conformité est délivrée sous la seule responsabilité du fabricant.</p>			
<p><b>Descripción/ Product description/ Produktbeschreibung/ Description du produit:</b> <span style="float: right;"><b>MT1</b></span></p>			
<p><b>Tipo de máquina/ Machine type/ Maschinentyp/ Type de machine:</b> <span style="float: right;"><b>EQUIPO INTERCAMBIABLE/ INTERCHANGEABLE EQUIPMENT/ AUSTAUSCHBARE AUSRÜSTUNG/ EQUIPEMENT INTERCHANGEABLE</b></span></p>			
<p><b>Marca/ Brand/ Marke/ Marque:</b> <span style="float: right;"><b>FISAIR</b></span></p>			
<p><b>Es conforme con la legislación de armonización pertinente a la unión europea:</b>          It complies with the harmonization legislation relevant to the European Union:          Es entspricht den für die Europäische Union relevanten Harmonisierungsgesetzen</p>			
			<b>2006/42/CE</b> <b>2014/30/UE</b> <b>2014/35/UE</b>
<p><b>Es conforme con las siguientes normas:</b>          It complies with the following standards:          Es entspricht den folgenden Normen:          Il est conforme aux normes suivantes:</p>			
			<b>UNE-EN ISO 12.100:2012</b> <b>UNE-EN 60204-2:2019</b> <b>UNE-EN 61000-6-6:2012</b> <b>UNE-EN 61000-6-3:2012</b>
<p><b>FISAIR se exime de cualquier responsabilidad a menos que se cumplan con todas las instrucciones de instalación y funcionamiento proporcionadas por FISAIR, o si los productos han sido modificados o alterados sin el consentimiento por escrito de FISAIR, o si tales productos han sido sometidos a un mal uso, mala manipulación, alteración, mantenimiento inadecuado o muestran consecuencias de accidente o utilización negligente.</b>          FISAIR disclaims any liability unless all installation and operating instructions provided by FISAIR are followed, or if products have been modified or altered without FISAIR's written consent, or if such products have been subjected to misuse, use, mishandling, alteration, improper maintenance or show consequences of accident or negligent use.</p>			
<p><b>Lea el Manual de Instalación, Funcionamiento y Mantenimiento antes de utilizar este equipo.</b>  <b>La puesta en servicio de cuasi máquina estará prohibida hasta que la cuasi máquina sea montada en una máquina y esta cumpla las disposiciones de la Directiva 2006/42/CE y se disponga de la declaración de conformidad de acuerdo con lo dispuesto en el Anexo II A. En el manual se determinan medidas de seguridad que deberá cumplir la máquina en la que se monte la cuasi máquina. FISAIR no se responsabiliza de la seguridad.</b>          Read the Installation, Use and Maintenance Manual before using this equipment.          The commissioning of the quasi-machine shall be prohibited until the quasi-machine is mounted on a machine and the machine complies with the provisions of Directive 2006/42/CE and the declaration of conformity is available in accordance with the provisions of Annex II A. The manual determines the safety measures that the machine on which the quasi-machine is mounted must comply. FISAIR is not responsible for security.</p>			
<p><b>Con exclusión de responsabilidades sobre las partes o componentes adicionados o montados por el cliente.</b>          With no liability for the parts or components added or assembled by the customer.          Unter Ausschuß der Verantwortung über die vom Kunden bereitgestellten und/oder angebaute Teile.          Avec exclusion des responsabilités concernant les parties ou les composants ajoutés ou assemblés par le.</p>			
<p><b>Juan Boeta Tejera</b>  <b>-Chairman and CEO- July 2020</b>          Property of FISAIR</p>			
			Rev01

## 22. Guarantee.

	<h3>FISAIR S.L.U. WARRANTY POLICY</h3>	
<b>Quality Department</b> Departamento de Calidad		
<div style="display: flex; justify-content: space-between; align-items: center;"> <div data-bbox="470 504 750 638">  </div> <div data-bbox="766 504 1276 638"> <p><b>FISAIR S.L.U.</b> C/ Uranio, 20 (Pol. Ind. Aimayr) 28330 San Martín de la Vega (Madrid) SPAIN ☎ Tº (34) 916921 514 ☎ Fax (34) 916916456</p> </div> </div> <p><b>Two-year Limited Warranty</b></p> <p>FISAIR warrants to the original purchaser that its products will be free from defects in materials and parts for a period of two (2) years after installation or twenty-seven (27) months from the date FISAIR ships such product, whichever date is the earlier.</p> <p>If any FISAIR product is found to be defective in material or assembly during the applicable warranty period, FISAIR's entire liability, and the purchaser's sole and exclusive remedy, shall be the repair or replacement of the defective product or part.</p> <p><b>Warranty disclaimer</b></p> <p>FISAIR shall not be liable for any costs or expenses, whether direct or indirect, associated with the installation, removal or reinstallation of any defective product.</p> <p>The Limited Warranty does not include any consumer part such as joints, pulleys, filters or media.</p> <p>FISAIR's Limited Warranty shall not be effective or actionable if:</p> <ul style="list-style-type: none"> <li>a) All related product invoices have been paid in time and terms.</li> <li>b) Unless there is compliance with all installation and operating instructions furnished by FISAIR, or if the products have been modified or altered without the written consent of FISAIR, or if such products have been subject to accident, misuse, mishandling, tampering, negligence or improper maintenance. Such situations could be an incorrect power supply connection, crashed with inappropriate objects, security protection devices unblocked and so.</li> <li>c) Components and/or manufactures are affected or damaged by the effects of corrosion (gradual wear of the metal bodies by the action of external actors not controlled by FISAIR).</li> </ul> <p>Any warranty claim must be submitted to FISAIR in writing within the stated warranty period.</p> <p><b>Parts Warranty</b></p> <p>Defective parts may be required to be returned to FISAIR. In case any part is claimed as a faulty one, FISAIR will ask the customer to send the part back to the factory in order to analyze if the part is failing due to any of above referred actions (see warranty disclaimer) or due to effective part failing.</p> <p>If the part must be replaced immediately, FISAIR will ship the part to the customer immediately and invoice the part with a 30 days delay payment for the faulty part to be returned. If the part is returned in this period, the part fail analysis would be made to emit a technical report for the warranty coverage based in this Warranty Statement document.</p> <p>In case that the part is failing due to a lack of quality, FISAIR will credit this invoice in order to stop the payment. In case FISAIR does not receive the part in this period, or if the failure is due to the reasons covered in the Warranty disclaimer paragraph, the invoice will be effective.</p> <p>In case any part from the product / shipment is missing, the customer should notify FISAIR before 3 days from the shipment date of arrival.</p>		
1/2		



## FISAIR S.L.U. WARRANTY POLICY



**Quality Department**  
Departamento de Calidad

### Service Covered by Warranty

In case that there is any FISAIR product that should be serviced in order to recover its proper used designed, FISAIR will select the person (s) in charge of this operation. These qualified technicians should have the enough knowledge to service FISAIR units.

No company should practice a warranty service without the writing FISAIR notice giving the authorization to do it and if any cost should be cover by FISAIR should be advised in advance to the service job. In case that FISAIR should send FISAIR staff to solve the solution, trip expenses are not covered by the warranty.

FISAIR's Limited Warranty is made in lieu of, and FISAIR disclaims all other warranties, whether express or implied, including but not limited to any implied warranty of merchantability, any implied warranty of fitness for a particular purpose, any implied warranty arising out of a course of dealing or of performance, custom or usage of trade.

FISAIR shall not, under any circumstances be liable for any direct, indirect, incidental, special or consequential damages (including, but not limited to, loss of profits, revenue or business) or damage or injury to persons or property in any way related to the manufacture or the use of its products. The exclusion applies regardless of whether such damages are sought based on breach of warranty, breach of contract, negligence, strict liability in tort, or any other legal theory, even if FISAIR has notice of the possibility of such damages.

By purchasing FISAIR's products, the purchaser agrees to the terms and conditions of this Limited Warranty.

### Extended Warranty

The original user may extend the term of the FISAIR Limited Warranty for a limited number of months past the initial applicable warranty period and term provided in the first paragraph of this Limited Warranty. All the terms and conditions of the Limited Warranty during the initial applicable warranty period and term shall apply during any extended term.

Each case should be valued in terms of type of product, equipment application, use and location of the product operation site.

Any extension of the Limited Warranty under this program must be in writing, signed by FISAIR, and paid for in full by the purchaser.

### Quality Manager:

**Hugo J. López Álvarez**  
San Martín de la Vega, February 2016