Model MP

Steam Dispersion Panels

Installation, Operation, and Maintenance Manual

Read and save these instructions

driSteem

Table of contents

⚠ WARNING

Hot surface hazard

Steam humidification systems have extremely hot surfaces.

To avoid burns, allow humidifier, steam pipes, and dispersion assemblies to cool before touching any part of the system.

ATTENTION INSTALLER

Read this manual before installing.
Leave manual with product owner.

DriSteem Technical Support

- technical.support@dristeem.com
- 800-328-4447
- dristeem.com/technical-support

Unpacking High-Efficiency Tubes

NOTE: If you have an Ultra-sorb without High-efficiency dispersion tubes (non-insulated tubes), please skip to the next page.

UNPACKING

- Remove the dispersion assembly from the shipping container; be careful not to damage the PVDF insulating material on the dispersion tubes.
- Some dispersion panels are shipped unassembled. Do not lay High-Efficiency Tubes across or under anything that could compress or damage the insulating material. Compressed insulating material has a reduced R-value.
- Before start-up, remove the clear poly film covering the insulation by tearing it along the perforation. **Do not use a knife or sharp object to remove the poly film.**

High-efficiency tube option

Dispersion assemblies with the High-Efficiency Tube option are designed to produce significantly less dispersion-generated condensate and airstream heat gain, which reduces wasted energy by up to 85%.

CAUTION

Remove clear poly film; do not remove white PVDF insulation. High-efficiency tubes are sleeved in clear poly film for protection during, shipping, and installation. Leave the clear poly film on until installation is complete.

Remove and discard the clear poly film before start-up by tearing it along the perforations. **Do not remove the white PVDF insulation.**

- Keep flame away from the insulation to avoid damage.
- PVDF is resistant to UV light. UV-C light from germicidal lamps will not cause the insulating material to degrade.
- Do not tighten mounting clamps or fasteners to any part of the dispersion tube.

Field assembly

Note: These assembly instructions are for Ultra-sorb Model MP panels shipped unassembled by request or as required. Panels with unit height more than 93" (2360 mm) are shipped unassembled.

LAY OUT THE PANEL COMPONENTS

Place the panel components on a large, flat working surface.

ATTACH THE TOP FRAME ASSEMBLY

Span the flanges with the top frame assembly. Align the locating pins on the flanges and top frame, and insert screws.

TIGHTEN THE FLANGE LOCKNUTS

Torque the eight flange locknuts to 16 ft-lb (22 N-m) at 100 rpm maximum using a 7/16" deep-well socket.

INSTALL THE DISPERSION TUBES

Note: Do not remove the poly film from the dispersion tubes until after the panel is installed.

FIGURE 2-1: ULTRA-SORB MODEL MP COMPONENTS

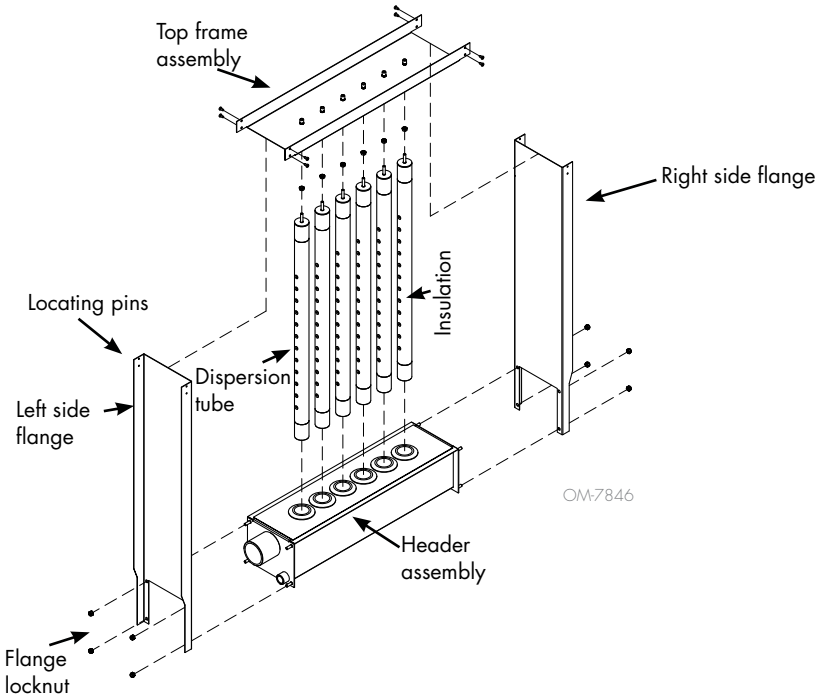


Table 2-1:
Ultra-sorb Model MP components

Component	Qty.
Header assembly	1
Dispersion tubes	Varies
Top frame assembly	1
Side flanges	2
Screws	Varies
Flange locknuts	8

Field assembly

INSERT DISPERSION TUBES INTO AN UNASSEMBLED ULTRA-SORB PANEL

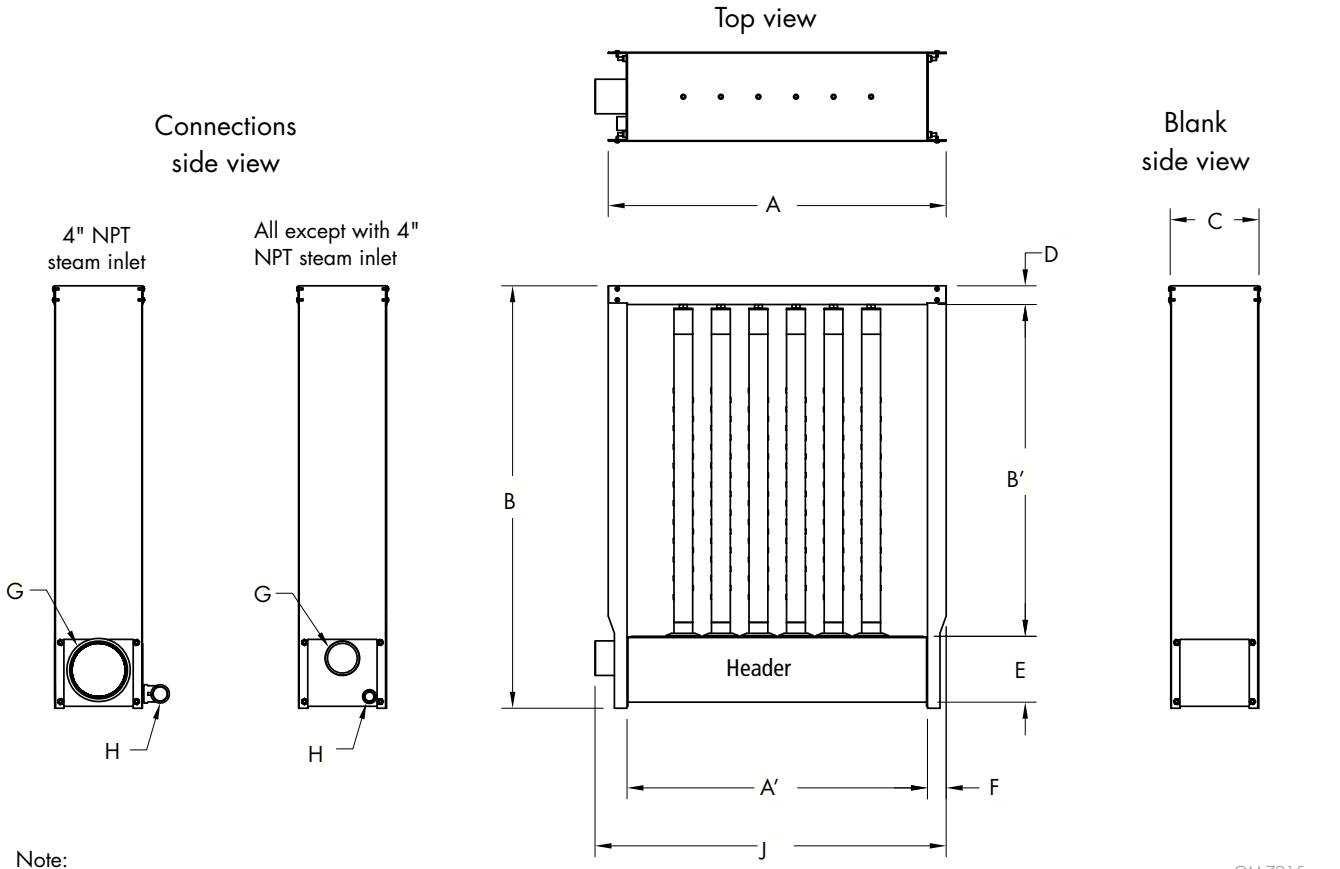
If the Ultra-sorb Model MP panel was shipped unassembled, the dispersion tubes need to be inserted into the panel.

Note: Use soapy water to lubricate end of tubes where inserted into rubber grommet.

1. Insert tube into rubber grommet at panel header, with open end at bottom. Insert at a slight angle to not interfere with top frame of Ultra-sorb panel.
2. Press downward on tube so to clear stud at top of tube. Align tube with rivet nut on top of the header.
3. Once aligned, turn the tube three full rotations into rivet nut for proper engagement.
4. Turn the tube backwards so that the steam tubelets face the next tube, perpendicular to air flow. Face the lowest tubelet of each tube in the same direction so the facing tubelets are at staggered heights.
5. Tighten the locknut down to the top header to 10 in-lbs (1.13 N-m). Note: If the rivet nut pulls through, add a ¼"-20 nut on each side of the top flange to secure the tube.

Mechanical specifications

FIGURE 4-1: ULTRA-SORB MODEL MP DIMENSIONS



Note:
See Table 5-1: Ultra-sorb MP dimensions

Table 4-1: Ultra-sorb Model MP unit capacity

Evaporative steam		Pressurized steam (2-50 psi)	
lbs/hr	**kg/hr**	**lbs/hr**	**kg/hr**
700	318	2720	1235

Table 4-2: Ultra-sorb Model MP tube capacity*

Tubes		lbs/hr	kg/hr
1.5"	Uninsulated	40	18.1
	Insulated	43	19.5
2.0"	Uninsulated	77	34.9
	Insulated	80	36.3

* If face height (B') is <17" (432 mm), consult DriSteem or see DriCalc for the correct calculation.

Mechanical specifications

Table 5-1:
Ultra-sorb Model MP dimensions

Dimension	Inches (mm)
A Unit width	15" (380 mm) min, 147" (3735 mm) max, in ½" (13 mm) increments
A' Face width	12" (305 mm) min, 144" (3660 mm) max, in ½" (13 mm) increments
B Unit height*	19.375" (492 mm) min, 151.375" (3845 mm) max, in ½" (13 mm) increments
B' Face height	12" (305 mm) min, 144" (3660 mm) max, in ½" (13 mm) increments
C Frame depth	7.2" (183 mm) 2.3" (58 mm) for side drain port (H) when 4" coupling (DN100) steam inlet
D Frame enclosure	1.5" (38 mm)
E Header enclosure	5.85" (149 mm)
F Mounting flange	1.5" (38 mm)
G Humidification steam inlet	1" or 2" NPT coupling, for pressurized steam 1½" or 2" NPT coupling, for evaporative steam 3" or 4" flange, for evaporative steam DN25 or DN50 BSPT nipple, for pressurized steam DN50, DN80, or DN100 BSPT nipple, for evaporative steam 1½" or 2" (DN40 or DN50) hose, for evaporative steam
H Drain port (internal thread)	¾" NPT (DN20) coupling
J Overall width	1" NPT coupling, dimension A + 1/8"; 1½" NPT coupling, dimension A + ½"; 2" NPT coupling, dimension A + 1" 3" and 4" flange connection, dimension A + 6.5" DN25, DN50, DN80 BSP nipple, dimension A + 38 mm DN100 BSP nipple, dimension A + 64 mm 1½" or 2" (DN40 or DN50) hose connection, dimension A + ½" (dimension A + 13 mm)

* Panels with unit height more than 120" (3048 mm) have two-piece side flanges and are shipped with brackets for easy field assembly. Panels with unit height more than 93" (2360 mm) are shipped unassembled.

Supply and drain connections and dimensions

SUPPLY AND DRAIN CONNECTIONS AND DIMENSIONS

Table 6-1:
Condensate piping for Ultra-sorb MP steam dispersion panel

	Evaporative steam	Pressurized steam
P-trap water seal (Figure 6-1)	Drop: 2" (50 mm) Seal: 5" (130 mm)	Recommended method Drop: 2" (50 mm) Seal: 10" (255 mm)
Inverted bucket trap	No	No
F&T trap	No	No
Condensate to open drain	Yes	Yes
Condensate return by condensate pump (Figure 6-2)	Yes	Yes
Condensate return to humidifier by gravity	Yes	NA
Condensate return to boiler	NA	Yes

FIGURE 6-1:
P-TRAP WATER SEAL DIMENSIONS

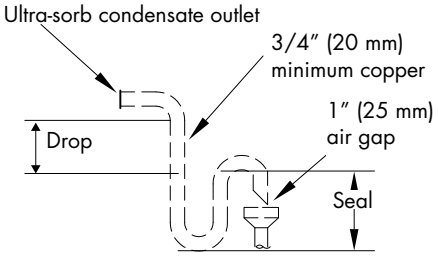
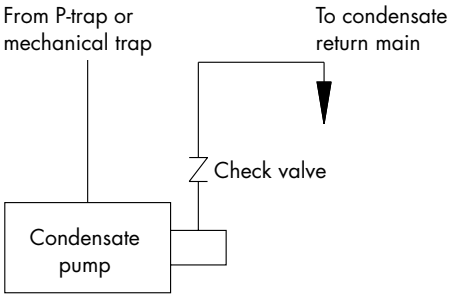
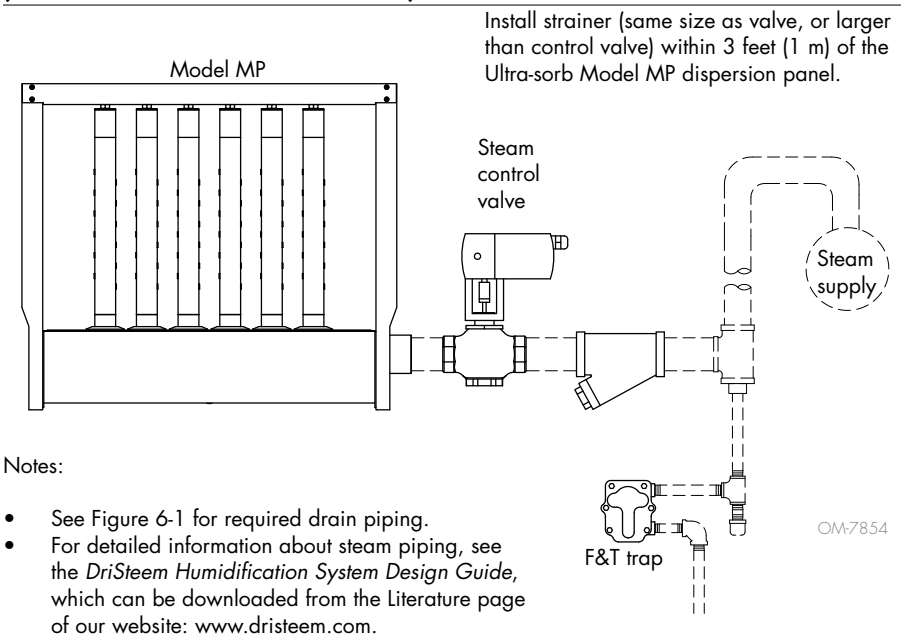


FIGURE 6-2: LIFTING CONDENSATE



Note:
The Ultra-sorb Model MP must be installed with the drain connection at an elevation that permits gravity drainage. For lifting condensate, use a condensate pump rated for your application. Contact your local DriSteem representative for pump selection.

FIGURE 6-3: STEAM SUPPLY CONNECTION TO A BOILER (PRESSURIZED STEAM APPLICATIONS)



Notes:

- See Figure 6-1 for required drain piping.
- For detailed information about steam piping, see the *DriSteem Humidification System Design Guide*, which can be downloaded from the Literature page of our website: www.dristeem.com.

Connections and dispersion tube detail

CONNECTIONS AND DISPERSION TUBE DETAIL

FIGURE 7-1: ULTRA-SORB MODEL MP STEAM INLET AND CONDENSATE OUTLET POSITIONS

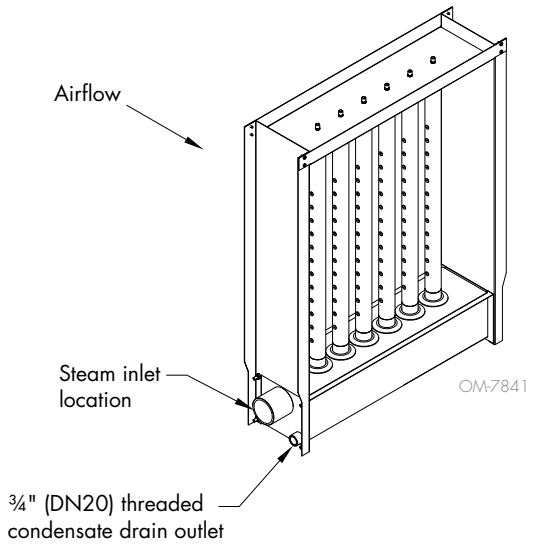


FIGURE 7-2: DISPERSION TUBE DETAIL

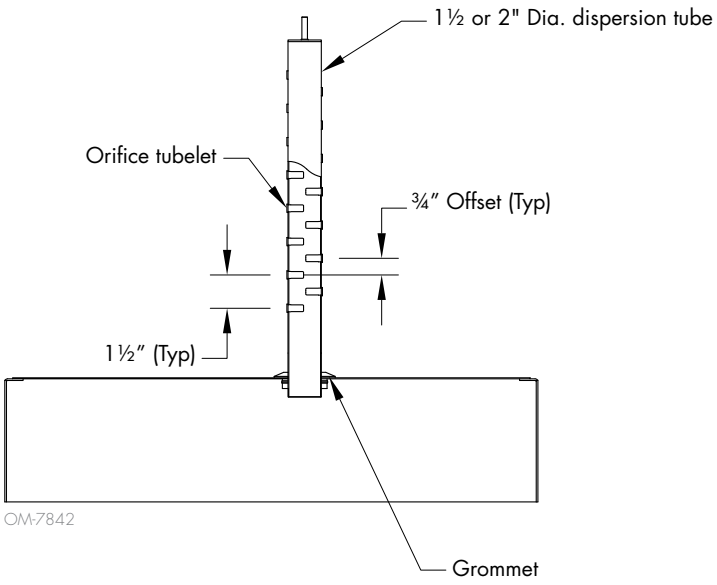


FIGURE 7-3: ULTRA-SORB MODEL MP STEAM INLET TYPES

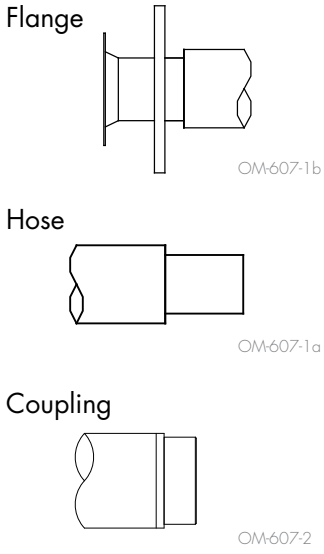
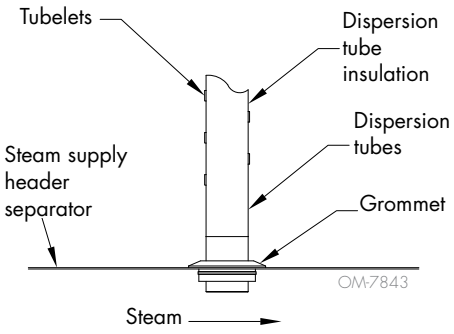


FIGURE 7-4: INSULATED TUBE DETAIL (HIGH-EFFICIENCY TUBE OPTION)



Selecting the location

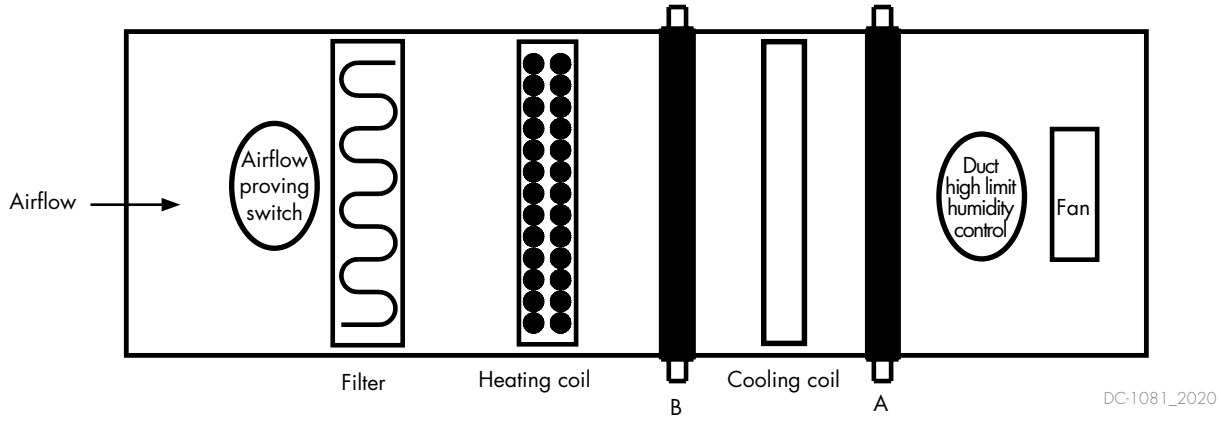
DETERMINE HUMIDIFIER PLACEMENT

Dispersed steam must be absorbed into the airflow before it comes in contact with duct elbows, fans, vanes, filters, or any object that can cause condensation and dripping.

- Install the Ultra-sorb panel in a location where discharged water vapor will be absorbed by the airstream.
- Place the Ultra-sorb panel where the air temperature is capable of absorbing discharged steam without causing condensation at or after the unit. This will normally be downstream from the heating coil where the air is warmest.
- Do not place the Ultra-sorb panel in an outside air intake unless the air is tempered with a preheat coil.
- Do not place the Ultra-sorb panel near the entrance of a high-efficiency filter. The filter will remove visible moisture and become waterlogged. See the Caution "Installing the Ultra-sorb panel upstream from filter media" on page 21.
- Do not place the Ultra-sorb panel where discharged visible mist will impinge directly on a metal surface.

Air handling unit: Placement in an air handling unit

FIGURE 9-1: PLACING A DISPERSION ASSEMBLY IN AN AIR HANDLING UNIT



AIRFLOW PROVING SWITCH

Ensure placement is representative of air to dispersion device. Sail switch recommended for variable air volume applications. Pressure switch recommended for constant volume applications.

DUCT HIGH LIMIT

Place high limit as far downstream as possible but before a duct transition to prevent wetting again duct walls or other components within the airstream. General recommendation is 8'-12' (2.4 to 3.7 m) downstream.

PLACEMENT IN AN AIR HANDLING UNIT

- Location A is the best choice. Installing downstream from heating and cooling coils provides laminar flow through the dispersion unit; plus, the heated air provides an environment for best absorption.
- Location B is the second-best choice. However, conditions when both cooling and humidification is needed, the cooling coil will eliminate some moisture for humidification.
- Calculated absorption distances assume even airflow across entire dispersion device.

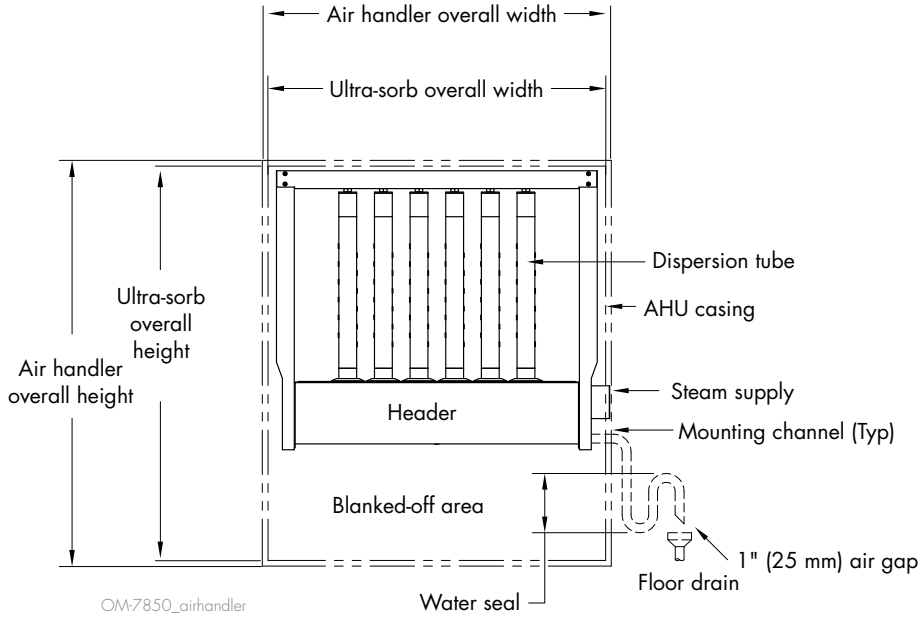
Air handling unit: Mounting and support

PLACEMENT IN AN AIR HANDLING UNIT

See placement recommendations in Figure 9-1.

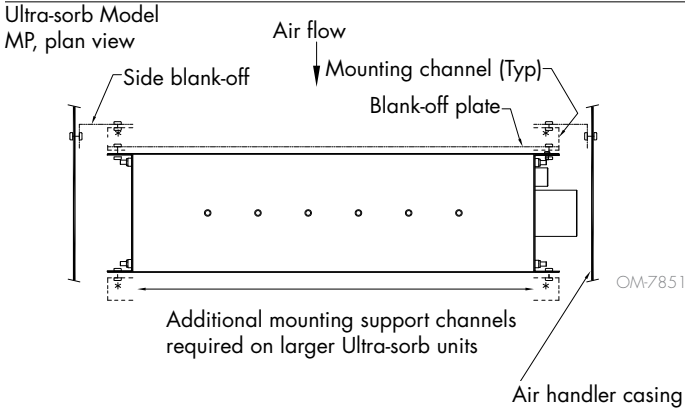
The metal support frame should be anchored to the air handler casing. Recommended fasteners for mounting the Ultra-sorb to a metal support frame are 1/4–20 nuts and bolts or #12 self drilling and tapping screws. Due to the possible forces exerted on this application, DriSteem recommends fastener spacing not to exceed 6" (150 mm). On larger Ultra-sorb installations, vertical channels may be required on both the inlet and outlet ends of the humidifier to provide proper support. See Figure 10-2.

FIGURE 10-1: ULTRA-SORB MODEL MP INSTALLED INSIDE AN AIR HANDLER



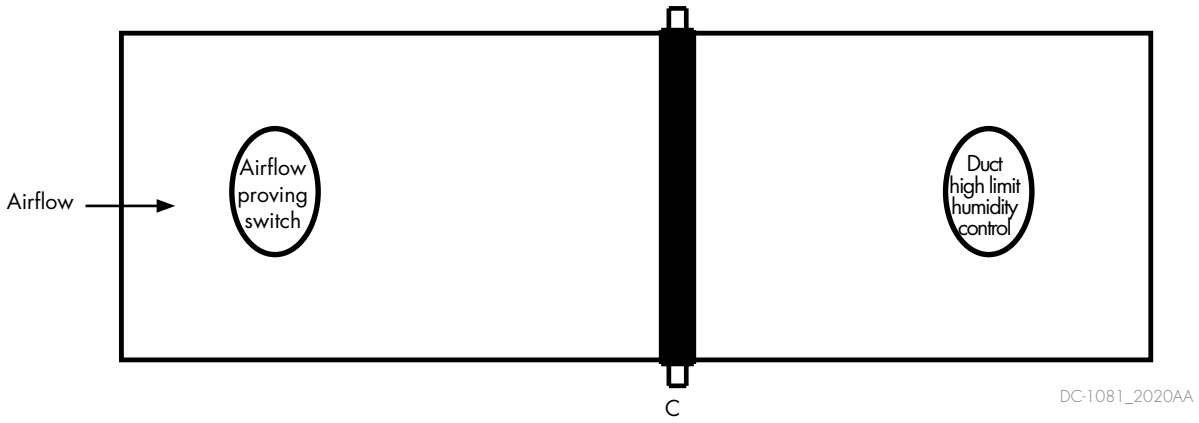
See Page 15 for trap dimensions.

FIGURE 10-2: VERTICAL CHANNELS INSIDE AN AIR HANDLER



Horizontal duct

FIGURE 11-1: PLACING A DISPERSION ASSEMBLY IN A DUCT



AIRFLOW PROVING SWITCH

Ensure placement is representative of air to dispersion device. Sail switch recommended for variable air volume applications. Pressure switch recommended for constant volume applications.

DUCT HIGH LIMIT

Place high limit as far downstream as possible but before a duct transition to prevent wetting again duct walls or other components within the airstream. General recommendation is 8'-12' (2.4 to 3.7 m) downstream.

PLACEMENT IN A DUCT

Location C is the best choice. Air leaving a fan is usually very turbulent and can cause vapor to not absorb at the expected non-wetting distance. Allow for more distance if installing downstream from a fan.

Calculated absorption distances assume even airflow across entire dispersion device.

Mounting and support

INSTALLATION IN A COLD AIR STREAM

When a humidifier is installed in a duct that will carry cold air, determine the dew point temperature. If the psychrometric chart reveals that saturation may occur, protection should be provided. A high-limit humidistat or humidity transmitter can be used for this purpose. See Figure 12-1.

PLACEMENT UPSTREAM FROM AN ELBOW OR DUCT SPLIT

Installation upstream from elbows or duct splits can be done. See Figure 12-2 if placed upstream a minimum of the non-wetting distance. Ensure adequate absorption prior to a duct transition to prevent potential wetting of duct surfaces. Place transition at least the non-wetting distance downstream but may be longer.

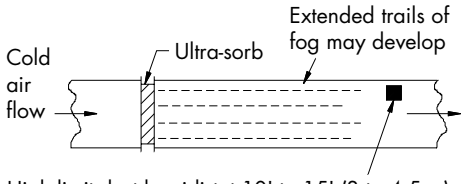
INSTALLATION ABOVE VALUABLE EQUIPMENT

Water piping and humidifiers should not be installed above expensive equipment. A condensing or leaking water pipe or other accidental water spillage could damage the equipment below. When such an installation cannot be avoided, install a drip pan under the humidifier piping, valve, etc. to catch and drain away unintended water. See Figure 12-3.

PANEL SUPPORT

The duct or air handler section and Ultra-sorb panel must be properly supported to carry the weight of the assembly. The weight of the piping must be supported by the building structure rather than by the Ultra-sorb unit. Excessive weight on the Ultra-sorb panel may stress the connections, causing them to fracture and leak.

FIGURE 12-1: INSTALLATION IN A COLD AIR STREAM



High limit duct humidistat 10' to 15' (3 to 4.5 m) downstream from Ultra-sorb

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FIGURE 12-2: UPSTREAM PLACEMENT

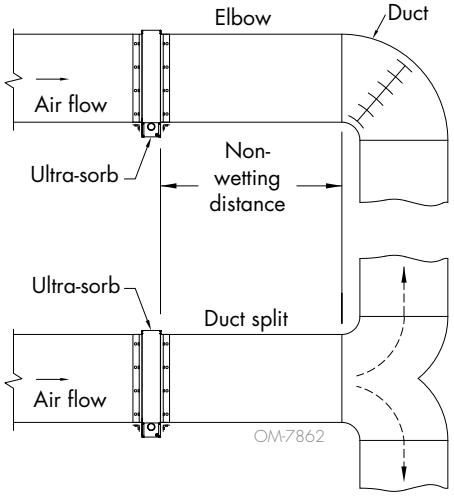
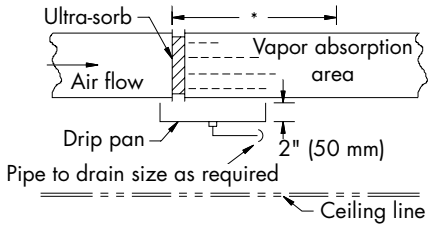


FIGURE 12-3: INSTALLATION ABOVE VALUABLE EQUIPMENT



* This length of duct should have sealed seams and should be at least three times the height of the Ultra-sorb panel.

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Mounting and support

MOUNTING IN A HORIZONTAL DUCT

The Ultra-sorb panel is contained within a mounting frame.
A mounting flange 1½" (38 mm) wide is provided on all four sides of the unit. The 1½" (38 mm) wide portion of the header enclosure is intended to be a mounting flange. See Figures 13-1 and 13-2. A matching flange or metal frame is required on the ductwork for connection to the Ultra-sorb flanges. The recommended fastener is a #12 x 3/4" self-drilling and tapping screw, spacing not to exceed 12" (305 mm). If an angle-iron frame is provided on the duct section, a longer screw may be required.

FIGURE 13-1: ULTRA-SORB MODEL MP IN DUCT

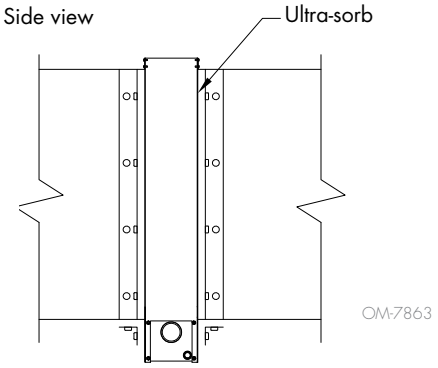
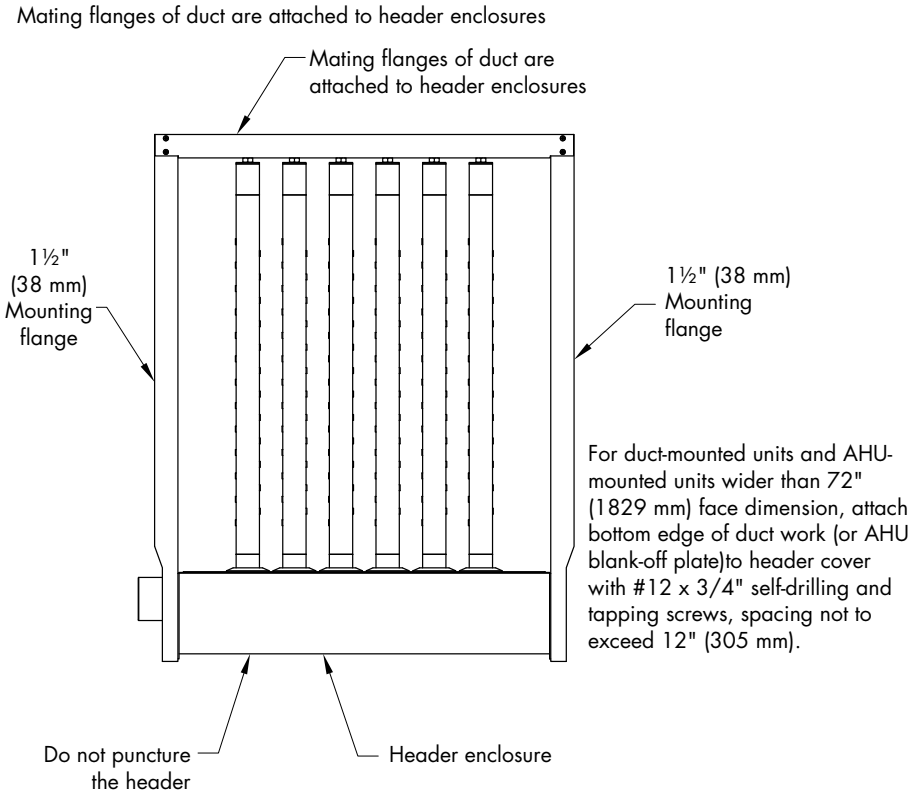


FIGURE 13-2: ULTRA-SORB MODEL MP



Note: To ensure proper drainage mount the panel level or slightly pitched towards the piping end of the panel.

Mounting and support

The Ultra-sorb panel can operate with air flow in either direction. The steam supply and condensate drain connections must be connected to the header assembly. To locate connections, the panel may be rotated 180° to the preferred side of the AHU or duct.

Once installed, verify that all steam discharge tubelets are pointed perpendicular to the airstream (see Figure 14-1). Loosen the jam nut at the top of the tube to allow rotation of the dispersion tubes for proper tubelet orientation.

When removing and installing the dispersion tubes, verify that the replacement grommets are seated in their grooves and lubricated. When sliding the dispersion tube into the grommet, be careful not to cut the grommet.

Note: To prevent leakage, use HVAC caulking, compressible strip, or a similar weather sealant to the dispersion panel joints and duct flanges. Seal all places where the Ultra-sorb installation hardware and fittings penetrate the wall of the duct. See Figure 14-1 below.

FIGURE 14-1: DISPERSION TUBE ORIENTATION

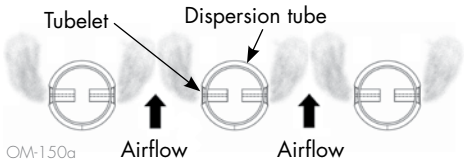
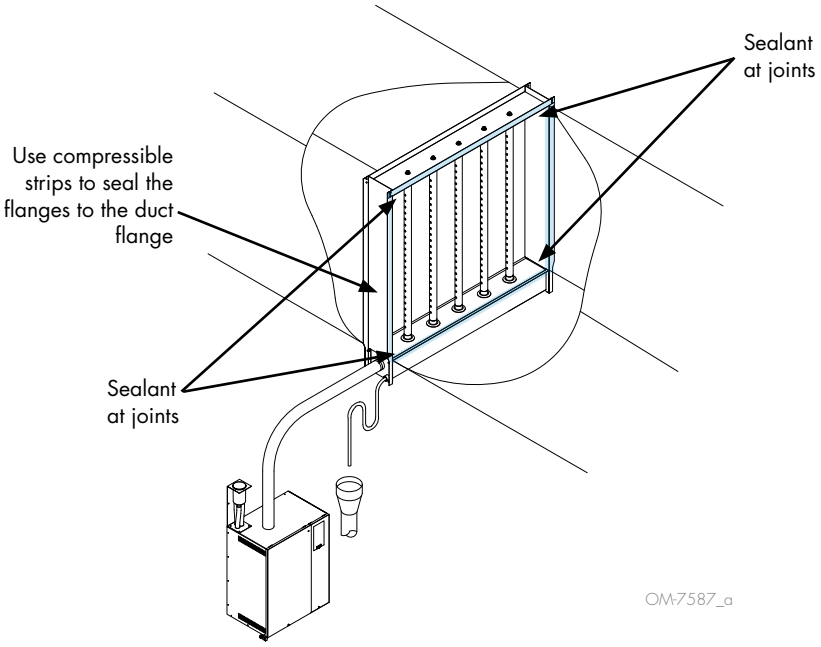
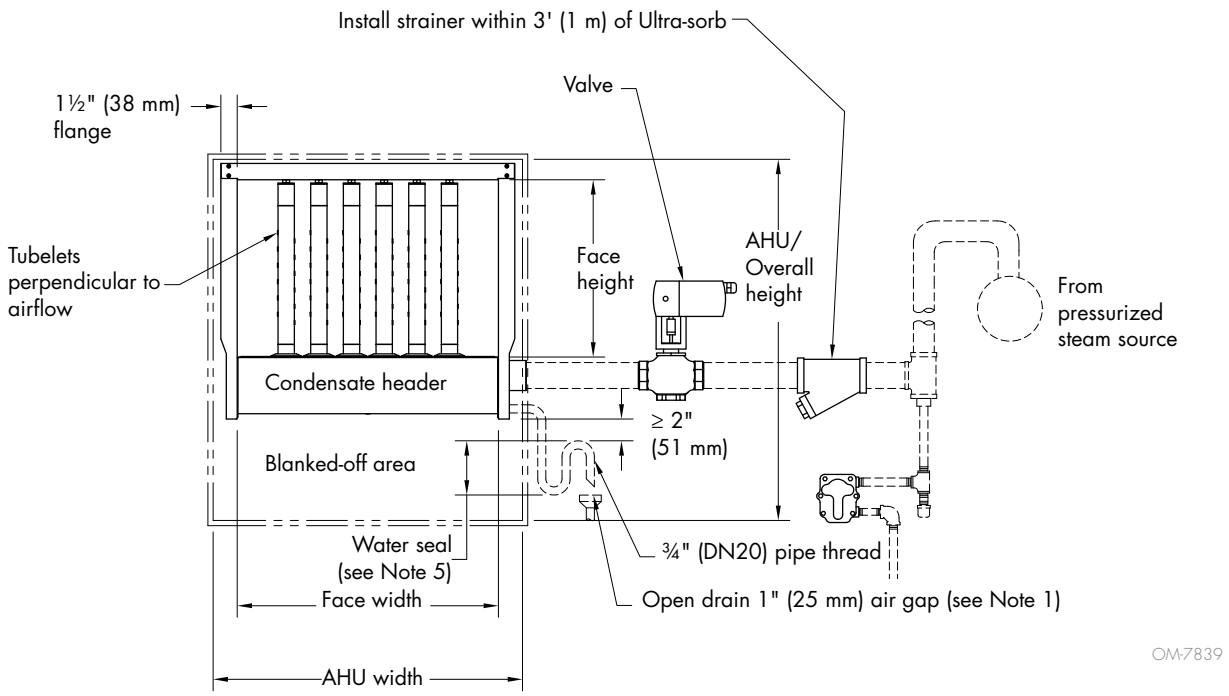


FIGURE 14-1: ULTRA-SORB MODEL MP IN A HORIZONTAL AIRFLOW WITH ELECTRODE-TYPE HUMIDIFIER



Pressurized steam application

FIGURE 15-1: MOUNTING ULTRA-SORB MODEL MP (PRESSURIZED STEAM APPLICATION SHOWN)



PLACEMENT IN A STEAM APPLICATION

Notes:

1. Locate drain air gap only in spaces with adequate temperature and air movement to absorb flash steam; otherwise, condensation may form on nearby surfaces. Refer to governing codes for drain pipe size and maximum discharge water temperature.
2. Dashed lines indicate provided by installer.
3. Steam supply line to unit and piping are not included.
4. Mount the Ultra-sorb Model MP vertically (for horizontal airflow only).
5. For pressurized steam applications provide a 10" (255 mm) minimum water seal. See Table 6-1.
6. Locate drain air gap only in spaces with adequate temperature and air movement to absorb flash steam; otherwise, condensation may form on nearby surfaces. Refer to governing codes for drain pipe size and maximum discharge water temperature.
7. When mounting an Ultra-sorb in a duct, headers and flanges are mounted outside the duct.
8. 100% of the airflow must pass through the Ultra-sorb, which means that any openings surrounding it must be sealed. The blanked-off area below the Ultra-sorb provides clearance height for water seals, and condensate piping connections.
9. Due to the pressure drop across the valve, the steam pressure at the header traps is minimal. Condensate must be drained.
10. Dispersion tubes are available at : 3" (76 mm), 4" (102 mm; for 2" diameter only), 6" (152 mm), 9" (228 mm), 12" (305 mm) centers.
11. Ultra-sorb humidifiers will be assembled, crated, and shipped intact in all sizes up to 93" (2360 mm) unit height. Ultra-sorb can be shipped unassembled, by request, requiring field assembly.
12. Sizes are 12" to 144" (305 mm to 3658 mm) x 12" to 144" (305 mm to 3658 mm) in 1" (25 mm) increments.

Each Ultra-sorb humidifier is furnished with:

1. Type 304 stainless steel header/separator and dispersion tubes when shipped unassembled.
2. Hardware for connection of dispersion tubes to header when shipped unassembled.
3. Tube grommets for connection when shipped unassembled.

Each Ultra-sorb humidifier used with boiler steam is also furnished with:

1. One 3/4" NPT float and thermostatic trap (≤15 psi steam source) or an inverted bucket trap for steam main drip leg use (>15 psi).
2. Inlet "Y" strainer.
3. Normally closed steam valve with stainless steel parabolic plug and seat.

Piping from a pressurized steam application

STEAM FROM A PRESSURIZED STEAM

Ultra-sorb panels for pressurized steam have a threaded pipe nipple that extends outside the framework for a steam supply connection. The steam supply line should be dripped immediately ahead of the steam valve through a steam trap. See Figure 6-3.

RECOMMENDED TRAP FOR STEAM MAIN DRIP LEG

Use a float and thermostatic (F&T) trap on the steam supply if ≤15 psi and not lifting condensate. Use an inverted bucket trap if > 15 psi or lifting condensate.

DRIEST STEAM

To ensure driest steam, take humidifier steam off the top of the steam main (not the side or bottom).

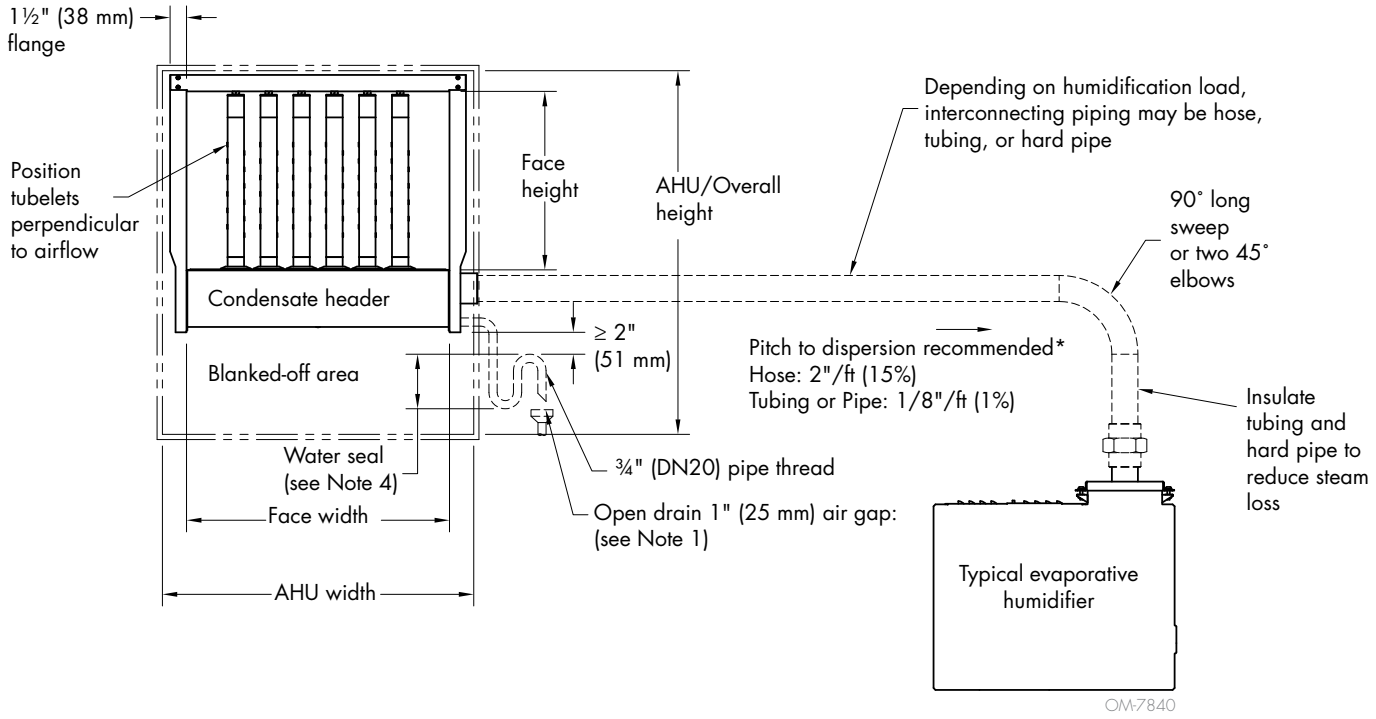
Table 16-1:
O.D. of pipe and tubing

Nom. Dia.	Standard pipe	Copper tubing	SST tubing	I.D. of hose
1¼" (30 mm)	1.660	1.375	-	-
1½" (38 mm)	1.900	1.625	1.500	1.50
2" (50 mm)	2.375	2.125	2.000	2.00
2½" (65 mm)	2.875	2.625	3.000	3.00

Note: Pipe thread and flange tubing adapters are available from DriSteem.

Nonpressurized steam application

FIGURE 17-1: MOUNTING ULTRA-SORB MODEL MP (NONPRESSURIZED STEAM APPLICATION SHOWN)



Notes:

1. Locate drain air gap only in spaces with adequate temperature and air movement to absorb flash steam; otherwise, condensation may form on nearby surfaces. Refer to governing codes for drain pipe size and maximum discharge water temperature.
2. When mounting an Ultra-sorb in a duct, headers and flanges are mounted outside the duct.
3. Mount the Ultra-sorb Model MP vertically (for horizontal airflow only).
4. For nonpressurized steam applications provide a 5" (130 mm) minimum water seal. See Table 6-1.
5. 100% of the airflow must pass through the Ultra-sorb, which means that any openings surrounding it must be sealed. The blanked-off area below the Ultra-sorb provides clearance height for water seals and condensate piping connections.
6. Condensate must be drained.
7. Dispersion tubes are available at: 3" (76 mm), 4" (102 mm; for 2" diameter only), 6" (152 mm), 9" (228 mm), 12" (305 mm) centers.
8. Ultra-sorb humidifiers will be assembled, crated, and shipped intact in all sizes up to 93" (2360 mm) unit height. Ultra-sorb can be shipped unassembled, by request, requiring field assembly.
9. Sizes are 12" to 144" (305 mm to 3658 mm) x 12" to 144" (305 mm to 3658 mm) in 1" (25 mm) increments.

Each Ultra-sorb humidifier is furnished with:

1. Type 304 stainless steel header/separator and dispersion tubes when shipped unassembled.
2. Hardware for connection of dispersion tubes to header when shipped unassembled.
3. Tube grommets for connection when shipped unassembled.

*For electrode type humidifiers pitch towards Ultra-sorb MP steam dispersion panel.
For other steam generators pitch towards generation possible

- Hose: 2"/ft (15%)
- Insulated tubing/pipe: 1/4"/ft (2%)
- Un-insulated tubing or pipe: 1/2"/ft (4%)

Piping

PIPING FROM A NON-ELECTRODE-TYPE EVAPORATIVE HUMIDIFIER

This section provides piping instructions for resistive-element electric, gas-to-steam, and steam-to-steam evaporative humidifiers. For electrode-type (DriSteem XT Series) humidifier piping, see Page 19.

TUBING

Standard connections on DriSteem evaporative humidifiers are 1½" (38 mm) stainless steel tubing. Two inch tubing connections are available as an option on higher capacity evaporative units. Hose cuffs are available for connecting to the tubing connection on the evaporative humidifier and to the Ultra-sorb (see Figure 18-2). DriSteem can also provide threaded connections on the evaporative humidifier and on the Ultra-sorb. For threading pipe connection options, see DriSteem's DriCalc sizing and selection software, available at www. dristeem.com.

When non-threaded pipe is used, steam hose and clamps can be used for connections at the humidifier steam outlet and at the Ultra-sorb. Due to the difference between the tubing O.D. and the steam hose I.D., multiple hose clamps may be required.

FIGURE 18-1: STEAM HOSE

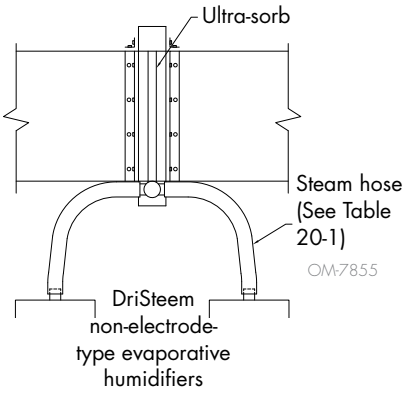
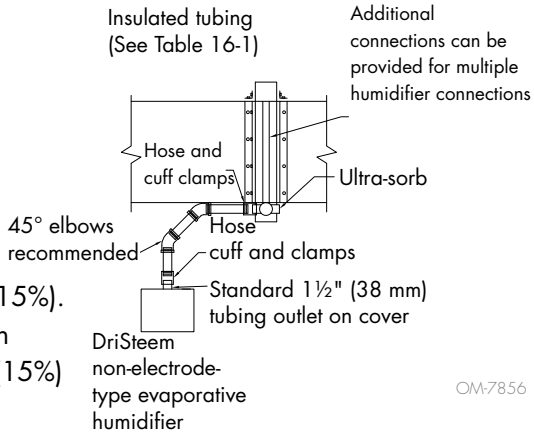


FIGURE 18-2: HOSE CUFF INSTALLATION



STEAM HOSE PITCH

Support steam hose to prevent sags or low spots, and pitch at least 2"/ft (15%). Recommended to pitch towards Ultra-sorb so condensate and steam flow in same direction. Alternatively can be return to humidifier using same 2"/ft (15%) pitch.

TUBING PITCH

- Pitch at least 1/8"/ft (1%) towards Ultra-sorb so condensate and steam flow in same direction. Alternatively can pitch back to humidifier using at least 1/4"/ft (2%) if using insulated tubing/pipe or 1/2"/ft (4%) if not insulated tubing/pipe.
- 90° elbows are not recommended. Use two 45° elbows one foot apart (see Figure 18-2).

Failure to follow the above recommendations may result in excessive back pressure on the evaporative humidifier. This may lead to loss of water seal or leaking gaskets. When the distance between the Ultra-sorb and the evaporative humidifier exceeds 20 feet (6 m), consult the factory for special recommendations.

- Thin wall tubing will heat up with less start up heat loss than heavy wall pipe.
- Insulate the tubing to reduce the loss in output caused by condensation in the tubing.

SUPPORT

Support interconnecting piping between the humidifier steam outlet and the dispersion system with pipe hangers. Failure to properly support the entire steam piping weight can cause damage to the humidifier tank and void the warranty.

Piping

STEAM FROM AN ELECTRODE-TYPE EVAPORATIVE HUMIDIFIER

TUBING

Standard steam hose connects to DriSteem electrode steam humidifier cylinders (XT series) and to the Ultra-sorb steam inlet directly or with a stainless steel adaptor. Hose cuffs are also available for connecting tubing. If specified when ordered, DriSteem can provide a threaded connection on the Ultra-sorb steam inlet. For threading pipe connection options, see DriSteem's DriCalc sizing and selection software, available at www.dristeem.com.

Hose and clamps can be used for connections at the steam cylinder and at the Ultra-sorb. Due to the difference between the tubing O.D. and the steam hose I.D., multiple hose clamps may be required.

STEAM HOSE PITCH

Support steam hose to prevent sags or low spots, and pitch at least 2"/ft (15%) toward the Ultra-sorb panel.

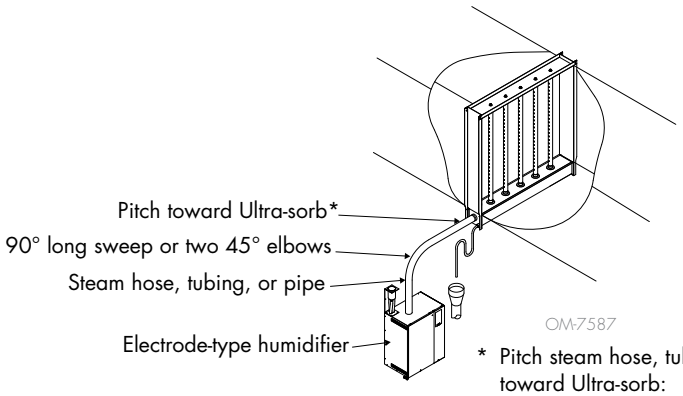
TUBING PITCH

- Pitch at least 1/8" /ft (1%) toward the Ultra-sorb so condensate and steam flow in same direction.
- 90° elbows are not recommended. Use two 45° elbows one foot apart as shown in Figure 19-2.

Failure to follow the above recommendations may result in faults at the electrode-type humidifier. This may lead to erratic or stopped operation. When the distance between the Ultra-sorb and the evaporative humidifier exceeds 20 feet (6 m), consult the factory for special recommendations.

- Thin wall tubing will heat up with less start up heat loss than heavy wall pipe.
- Insulate the tubing to reduce the loss in output caused by condensation in the tubing.

FIGURE 19-2: ULTRA-SORB MODEL MP IN A HORIZONTAL AIRFLOW WITH ELECTRODE-TYPE HUMIDIFIER



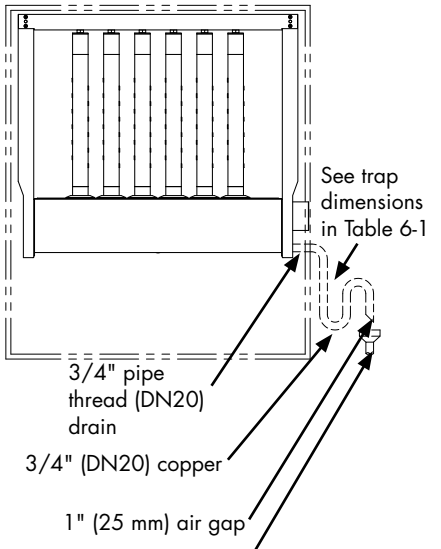
* Pitch steam hose, tubing, or pipe toward Ultra-sorb:
2"/ft (15%) when using steam hose.
1/8"/ft (1%) when using tubing or pipe.

Condensate drainage for all applications

Since Ultra-sorb panels operate with virtually zero internal pressure, condensate cannot be piped directly into a return main. It must be piped to a floor drain or into a condensate pump and returned to the steam source.

To prevent steam from escaping down the drain line, install a water seal or steam trap in the drain line. The water seal must be of sufficient height to contain the pressure in the humidifier.

FIGURE 19-1: CONDENSATE DRAINAGE



Open drain required.
Locate air gap only in spaces with adequate temperature and air movement to absorb flash steam; otherwise, condensation may form on nearby surfaces. Refer to governing codes for drain pipe size and maximum discharge water temperature.

Piping

Table 20-1:
Maximum steam carrying capacity and length of interconnecting steam hose or tubing

Steam hose [1]						Copper or stainless steel tubing					
Hose I.D.		Maximum capacity		Maximum length [2]		Tubing size		Maximum capacity [3]		Maximum developed length [4]	
inches	DN	lbs/hr	kg/h	ft	m	inches	DN	lbs/hr	kg/h	ft	m
1½	40	150	68	10	3	1½	40	150	68	20	6
2	50	250	113	10	3	2	50	220	100	30	9
						3 [5]	80 [5]	450	204	80	24
						4 [5]	100 [5]	750	340	100	30
						5 [5]	125 [5]	1400	635	100	30
						6 [5]	150 [5]	2300	1043	100	30

1. Use DriSteem steam hose for best results. Other hose may have shorter life and may cause foaming in the evaporating chamber resulting in condensate discharge at the dispersion assembly. Do not use steam hose for outdoor applications.
2. Maximum recommended length for steam hose is 10' (3 m). Longer distances can cause kinking or low spots.
3. Insulate tubing to minimize loss of capacity and efficiency.
4. Developed length of tubing equals measured length plus 50% of measured length, to account for fittings.
   Longer tubing lengths are possible at capacities lower than listed maximums. Consult factory.
5. Requires flange connection.

Note: Capacities and lengths in this table are for steam from a nonpressurized steam humidifier to a nonpressurized steam dispersion panel, and are based on total maximum pressure drop in hose or tubing of 5" wc (1250 Pa).

Table 20-2:
Steam loss of interconnecting steam hose or tubing

Description	Nominal hose or tubing size		Steam loss				Insulation thickness	
			Noninsulated		Insulated			
	inches	DN	lbs/hr/ft	kg/h/m	lbs/hr/ft	kg/h/m	inches	mm
Hose	1½	40	0.15	0.22	N/A	N/A	N/A	N/A
	2	50	0.20	0.30	N/A	N/A	N/A	N/A
Tubing	1½	40	0.11	0.16	0.020	0.030	2.0	50
	2	50	0.14	0.21	0.025	0.037	2.0	50
	3	80	0.20	0.30	0.030	0.045	2.5	64
	4	100	0.26	0.39	0.030	0.045	3.0	76
	5	125	0.31	0.46	0.035	0.052	3.0	76
	6	150	0.36	0.54	0.039	0.058	3.0	76

Note: Data based on an ambient air temperature of 80 °F (27 °C), fiberglass insulation, and copper tubing.

Performance data

NON-WETTING DISTANCE

Non-wetting distance is the distance downstream from the leaving side of the steam dispersion assembly to the point where wetting will not occur. This distance is dependent on several application parameters. To determine your dispersion assembly's non-wetting distance, consult your system's design engineer or project documentation. Non-wetting distance can also be calculated using DriSteem's DriCalc sizing and selection application, available at www. dristeem.com. Note that your current design conditions may vary from conditions used for system design.

- Note that the rise in relative humidity (ΔRH) between entering and leaving air has a direct bearing on the non-wetting distance. As the change in relative humidity (ΔRH) increases, the non-wetting distance increases.
- Uneven airflow over the Ultra-sorb panel cross-section may result in nonuniform mixing of steam with air, which may adversely affect absorption distance.
- A small amount of duct air pressure loss will be present downstream from the Ultra-sorb panel, depending on air density, velocity, and tube spacing. See Table 21-1.

CAUTION

Installing the Ultra-sorb panel upstream from filter media

Non-wetting distances described here do not apply when installing an Ultra-sorb panel upstream from filter media. If you must install upstream from filter media, consult DriSteem or your local DriSteem representative for recommendations.

Table 21-1:
Ultra-sorb air pressure loss

	Duct air velocity (55 ˚F at sea level)		Tube spacing			
			3"	75 mm	6"	150 mm
Uninsulated tubes	fpm	m/s	wc	Pa	wc	Pa
	500	2.54	0.020	5.1	0.004	1.1
	1000	5.08	0.082	20.5	0.017	4.2
	1500	7.62	0.175	43.8	0.038	9.5
High-efficiency tubes	fpm	m/s	wc	Pa	wc	Pa
	500	2.54	0.033	8.3	0.005	1.3
	1000	5.08	0.121	30.2	0.020	5.1
	1500	7.62	0.237	59.2	0.046	11.5

Notes:
- Ultra-sorb panels with 9" (225 mm) or 12" (300 mm) tube spacings have no measurable air pressure loss.
- Use DriSteem's DriCalc sizing and selection application to calculate your specific air pressure loss.

Controls

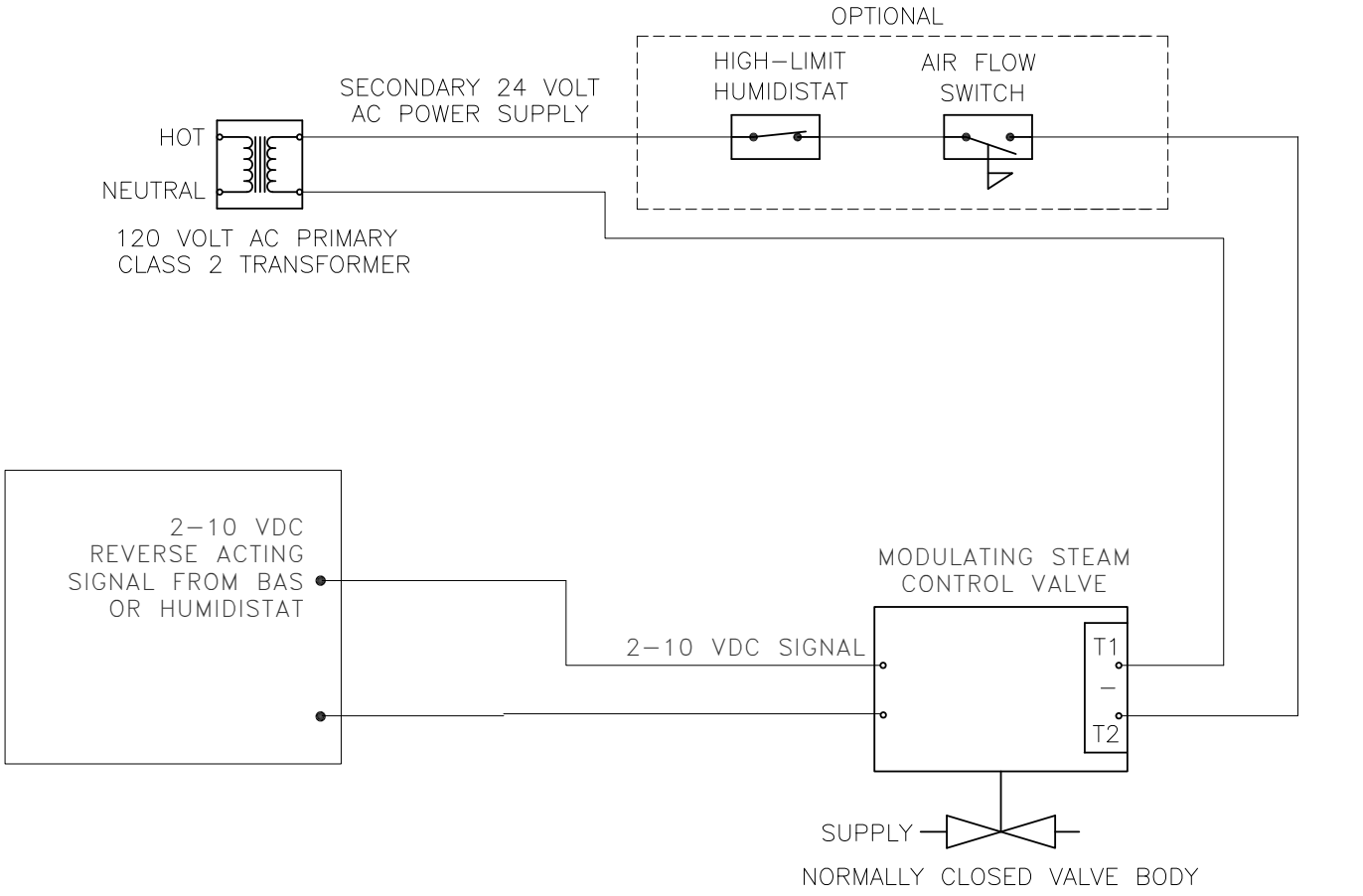
AIRFLOW PROVING SWITCH

An air flow proving switch should be used to prevent the steam valve from opening if air is not moving in the duct.

HIGH LIMIT HUMIDISTAT

To prevent over saturation when duct air is cooler than 70 °F (21 °C), use a high limit (duct mounted) humidistat (Figure 15-1). Mount it 10' to 15' (3 to 4.5 m) downstream from the Ultra-sorb panel, and set it at 80 to 90% RH.

FIGURE 22-1: ULTRA-SORB MODEL MP TYPICAL CONTROL WIRING



Startup

1. Turn on humidification steam to the Ultra-sorb supply header:
   - Pressurized steam: Open the modulating steam valve.
   - Evaporative humidifier: Follow the startup instructions in the humidifier's Installation, Operation, and Maintenance Manual.
2. Check for piping leaks.
3. See “Steam traps” on page 24.
4. Check the dispersion tubes for leaks.
5. Ensure that the dispersion tubes are oriented with the tubelets at a right angle to the airflow. See Figure 14-1.
6. Check for any other leaks from steam and drain connections.
7. Ensure that the P-traps are operating.
   - At the beginning of the season, ensure there is a stream of water from condensate drain when operating.
     1. If not, verify P-trap is not blocked.
     2. If steam is blowing out of the P-trap, it needs to be primed.
     3. Verify the P-trap is tall enough to contain panel operating pressure (see page 15 or 17).
     4. Duct static pressure > 2.5" (63.5 mm) wc may require a taller P-trap.

Inspecting and servicing components

STRAINER

Inspect the strainer screen at least twice during the first year. If fouled, inspect it more frequently.

STEAM TRAPS ON MAIN STEAM SUPPLY

At least twice a year verify that steam traps are functioning properly. A blocked steam trap is cold. A "blowing" steam trap is hot and noisy, and the discharge pipe from it is hot for 30 feet. A properly operating steam trap is hot and makes noise at intervals, and the discharge pipe is progressively cooler beginning at the trap.

VALVES

- Electric modulating:

  Inspect annually to be sure that the valve operates freely and closes off steam tightly and the stem packing is not leaking.

- Pneumatic:

  Inspect annually to be sure the valve closes off steam tightly, the stem packing is not leaking steam, and the diaphragm in the actuator is not leaking air.

HIGH-EFFICIENCY TUBES

- If the insulating material gets dirty or smudged, gently clean it with a damp cloth and a solution of soapy water or diluted non-toxic, biodegradable cleaner/degreaser.
- Do not clean the insulating material with a pressure washer. The direct spray could cause damage.
- If using a torch in the vicinity of the dispersion panel, keep the flame away from the insulating material to avoid damage.
- PVDF is inherently resistant to UV light. Indirect, low-intensity UV-C light from germicidal lamps will not cause the insulating material to degrade.
- Do not tighten mounting clamps or fasteners to any part of the dispersion tube.

Replacing Ultra-sorb Model MP dispersion tubes

REMOVING A DISPERSION TUBE FROM AN ULTRA-SORB PANEL

A dispersion tube may need to be removed for access to an adjacent coil, or because of tube damage or upgrade to an insulated tube. See page 3 for how to install a dispersion tube.

1. Apply soapy water around the tube grommet to ease turning and removal of the dispersion tube.
2. Loosen the jam nut from the tube nut at top of the tube. Rotate the tube off the top frame assembly bolt (about 4 rotations of the tube).
3. Press downward on the tube so to clear bolt at top of frame.
4. Move the tube to a slight angle so that it does not interfere with top frame of Ultra-sorb Model MP panel.
5. Pull the tube out from the rubber grommet.
6. If the grommet shows any sign of wear or damage, replace it before reinstalling the dispersion tube. See Table 29-1 for replacement parts.
   Note: Grommets are provided with replacement tubes.

Troubleshooting

Table 26-1:
Ultra-sorb Model MP troubleshooting

Problem	Possible cause	Action
Humidifier discharges water in duct	• Steam main overloaded with water due to boiler discharging water with steam (priming)	• Locate cause of priming and correct.
	• P- trap not draining properly	• Replace or clean trap as required. • If condensate return main is overloaded, find an alternative method for draining.
	• Humidifier improperly piped	• Correct the piping as shown on Page 6. Steam inlet should be at center off the header and condensate outlet at the bottom of the assembly.
	• Surges of condensate in steam supply due to condensate collecting at low, undripped point in steam main	• Install drips and steam traps as required. See Page 6.
	• Inadequate main steam trap capacity	• Replace with larger trap.
Humidity exceeds setting of humidistat	• Control valve not fully closing	• Foreign matter holding valve open; clean valve. • Check signal and power to valve. • Valve steam packing too tight; loosen and/or replace packing. • Steam pressure exceeds close-off rating of valve spring; replace actuator or valve spring with one that is compatible with the higher steam pressure. • Valve installed backwards; re-install. • Adjust valve linkage.
	• Faulty or inaccurately placed humidity controller	• Replace controller or relocate per catalog recommendations.
	• Poor location of control components	• Relocate per catalog recommendations.
	• Incompatible control components	• Replace per specified recommendations.
	• Automatic valve is hunting	• Humidifier capacity is oversized; change to smaller valve. • Pressure reducing valve is not accurately controlling steam pressure; repair or replace. • Boiler pressure is swinging too widely; adjust.
	• Excessive outside air volume	• Check fans, dampers, VAV, etc. See formula below. Mixed Air Inlet formula: (% outside air x moisture content) + (% return air x moisture content) = mixed air inlet in lbs/100 cfm (kg/100 m3/h)
Control system malfunctioning	• Incorrect control voltage	• Replace transformer.
	• Incorrect control signal	• Replace components.
	• Improper wiring connections	• Rewire.
	• Incorrect humidity sensor	• Replace.
	• Humidity controller out of calibration	• Recalibrate.
Air cannot absorb steam quantity being discharged	• Humidifier operates when blower is off	• Provide interlock.
	• Valve is hunting	• See above.
	• Air temperature in duct too low for steam quantity being emitted	• Raise duct air temperature.
Humidifier is noisy	• Steam pressure too high	• Reduce pressure.

Continued

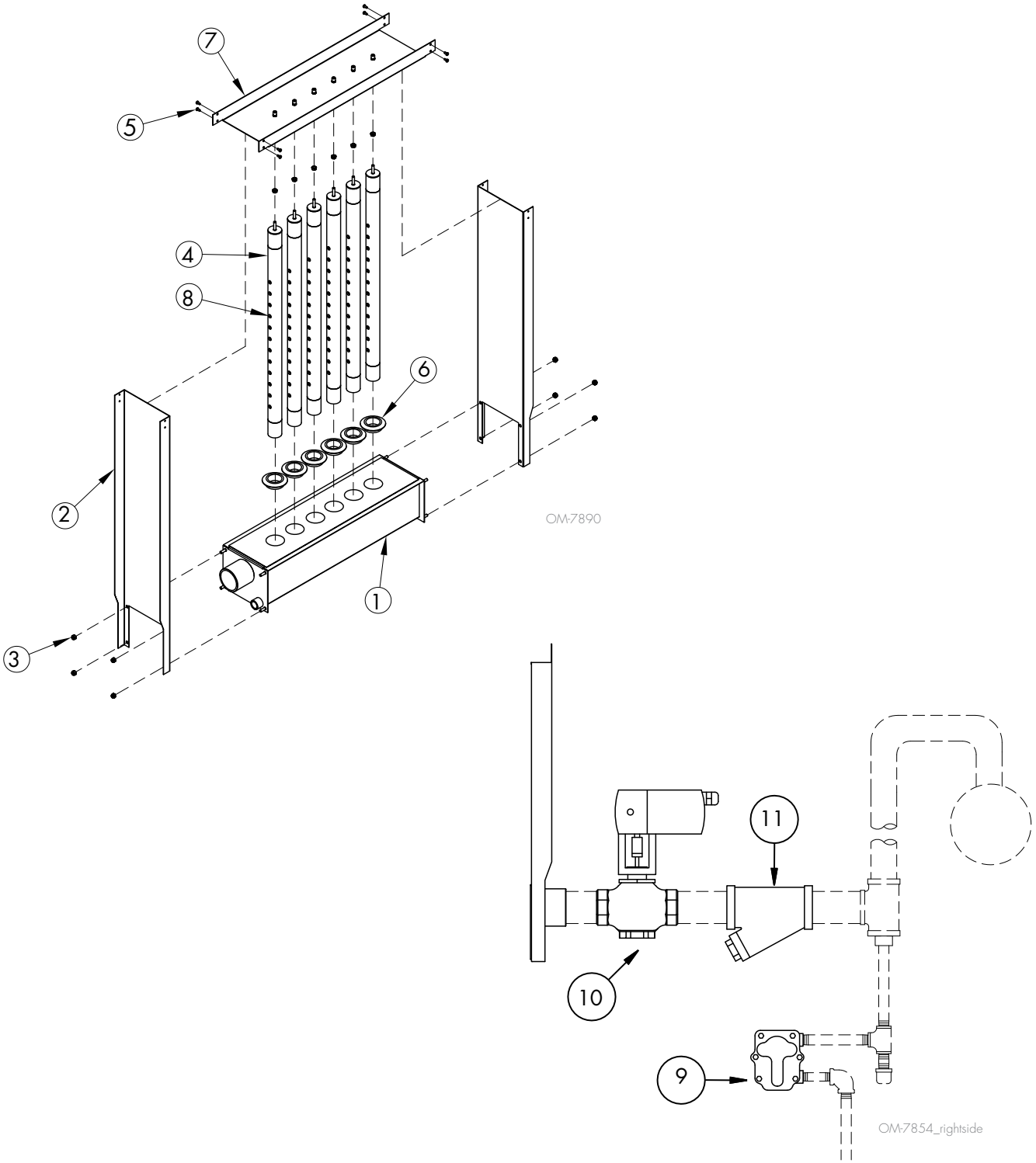
Troubleshooting

Table 25-1:
Ultra-sorb Model MP troubleshooting (continued)

Problem	Possible cause	Action
Space humidity will not rise to humidistat set point	• Steam pressure too low	• Increase.
	• Manual steam valve partially closed	• Open.
	• Strainer screen partially clogged	• Clean.
	• Boiler pressure too low	• Adjust control.
	• Pressure reducing valve not accurately controlling steam pressure	• Repair or replace.
	• Boiler pressure swinging too widely	• Adjust controls.
	• Incorrect piping	• Repipe. See Page 6.
	• Undersized steam piping	• Replace.
	• Undersized humidifier	• Replace valve with larger capacity valve. • Replace with larger humidifier. • Add additional humidifier.
	• Automatic steam valve not fully opening	• Valve packing is adjusted too tightly, loosen and/or replace packing. • Adjust valve linkage. • Recalibrate humidistat.
	• Electric control system malfunctioning	• Change transformer.
	• Incorrect control circuit voltage	• Replace component(s) to make all components compatible.
	• Incorrect control signal	• Replace components.
	• Improper wiring	• Rewire.
	• Incorrect humidity sensor	• Replace sensor.
	• Humidity controller out of calibration or malfunctioning	• Repair or replace.
	• Malfunctioning humidifier temperature switch not allowing humidifier valve to open	• Replace or readjust.
	• Pneumatic control system malfunctioning	• Repair or replace.
	• Obstructed air line	• Remove obstruction.
	• Malfunctioning pneumatic temperature switch	• Replace switch.
	• Air leak in actuator	• Repair or replace diaphragm.
	• Compressed air pressure is too low	• Adjust pressure.
Condensate in duct	• Foreign matter preventing valve from closing	• Clean or replace valve.
	• Humidifier is mounted too close to internal devices (dampers, turning vanes, etc.) in duct	• Move humidifier tubes to a point further upstream from internal devices. • Add more dispersion tubes for shorter non-wetting distance. Consult DriSteem to determine the total number of tubes required.
	• Non-insulated duct passing through unheated area (duct surface temperature too low)	• Insulate ductwork.

Replacement parts

FIGURE 28-1: ULTRA-SORB MODEL MP REPLACEMENT PARTS



Replacement parts

Note:
Consult factory for Ultra-sorb Model MP replacement parts.

Table 29-1:
Ultra-sorb Model MP replacement parts

No.	Description	Part number
1	Ultra-sorb Model MP header	Consult factory
2	Flange side Ultra-sorb Model MP	Consult factory
3	Nut lock ¼" 20 UNC Hex Nylock SST	191172-010
	Nut lock ¼" 20 UNC Hex Nylock plated	191170-035
4	1½" (38 mm) high-efficiency insulated dispersion tube	Consult factory
	1½" (38 mm) high-efficiency non-insulated dispersion tube	Consult factory
	2" (50 mm) high-efficiency insulated dispersion tube	Consult factory
	2" (50 mm) high-efficiency non-insulated dispersion tube	Consult factory
5	Screw #8 32 x 3/8" PHL PNHD DRV Type F stainless steel (SST)	191172-015
	Screw #8 32 x 3/8" PHL PNHD Type F	191172-020
6	Grommet for 1½" (38 mm) dispersion tube	405895-150
	Grommet for 2" (50 mm) dispersion tube	405895-200
7	Frame top, Ultra-sorb Model MP, split over, 144" (3658 mm) width	Consult factory
	Frame top, Ultra-sorb Model MP, to 144" (3658 mm) width	Consult factory
8	Tubelet	Consult factory
9	Steam trap	Consult factory
10	Steam valve	Consult factory
11	Strainer	Consult factory

Expect quality from the industry leader

Since 1965, DriSteem has led the industry with innovative methods for humidifying and cooling air with precise control. Our focus on ease of ownership is evident in the design of the Ultra–sorb steam dispersion panels, which feature cleanable, stainless steel construction. DriSteem also leads the industry with a Two-year Limited Warranty and optional extended warranty.

For more information
www.dristeem.com
sales@dristeem.com

For the most recent product information visit our website: www.dristeem.com

DRI-STEEM Corporation
a subsidiary of Research Products Corporation
DriSteem operations are ISO 9001:2015 certified

U.S. Headquarters:
14949 Technology Drive
Eden Prairie, MN 55344
800-328-4447 or 952-949-2415
952-229-3200 (fax)

Continuous product improvement is a policy of DriSteem; therefore, product features and specifications are subject to change without notice.

Form No. US-MP-IOM-EN-REVG-1221
Part No. 890000-611 Rev G

Two-year Limited Warranty

DRI-STEEM Corporation ("DriSteem") warrants to the original user that its products will be free from defects in materials and workmanship for a period of two (2) years after installation or twenty-seven (27) months from the date DriSteem ships such product, whichever date is the earlier.

If any DriSteem product is found to be defective in material or workmanship during the applicable warranty period, DriSteem's entire liability, and the purchaser's sole and exclusive remedy, shall be the repair or replacement of the defective product, or the refund of the purchase price, at DriSteem's election. DriSteem shall not be liable for any costs or expenses, whether direct or indirect, associated with the installation, removal or reinstallation of any defective product. The Limited Warranty does not include cylinder replacement for electrode steam humidifiers.

DriSteem's Limited Warranty shall not be effective or actionable unless there is compliance with all installation and operating instructions furnished by DriSteem, or if the products have been modified or altered without the written consent of DriSteem, or if such products have been subject to accident, misuse, mishandling, tampering, negligence or improper maintenance. Any warranty claim must be submitted to DriSteem in writing within the stated warranty period. Defective parts may be required to be returned to DriSteem. Excluded from the Limited Warranty are all consumable and wear and tear items such as cylinders, membranes, filters, or media replacements. These items are subject to usual wear and tear during usage.

DriSteem's Limited Warranty is made in lieu of, and DriSteem 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.

DriSteem 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 DriSteem has notice of the possibility of such damages.

By purchasing DriSteem'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 DriSteem 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. An extended warranty term of an additional twelve (12) months or twenty four (24) months of coverage may be purchased. The extended warranty term may be purchased until eighteen (18) months after the product is shipped, after which time no extended warranties are available. When a Dristeem humidifier is purchased with a DriSteem RO system, an extended twenty-four (24) month coverage is included.

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