ULTRA-SORB®
STEAM DISPERSION PANEL

• Guaranteed short non-wetting distances
• Reduce wasted energy and condensate up to 85%
• Lowest installation cost
ALL ULTRA-SORB MODELS FEATURE

EFFICIENT BY DESIGN
Reduce wasted energy and condensate up to 85%.
High-Efficiency Insulated Tubes significantly reduce airstream heat gain and condensate production. (Standard on Model XV; optional on Models LV, LH, and MP.)

Higher capacities per tube increase efficiency, reduce cost.
Insulated dispersion tubes produce less condensate and, therefore, have more steam available for humidification, increasing the capacity of each tube. As a result, fewer tubes may be required to meet application requirements, further lowering condensate production and heat gain while reducing resource consumption and cost.

No steam jackets; no unnecessary heat gain.
When there is no call for humidity, Ultra-sorb panels are at duct temperature while conventional jacketed steam injection systems stay hot and continue to add heat to the airstream.

GUARANTEED, SHORT NON-WETTING DISTANCES
Install within inches of downstream devices.
Rapid, drip-free steam absorption means steam does not condense on downstream devices.

LOWEST INSTALLATION COST
Factory assembly eases installation.
Panels ship preassembled and install quickly with easy mounting, steam, and condensate connections.

ULTRA-SORB STEAM DISPERSION PANELS
Steam for humidification can be non-pressurized or pressurized. DriSteem steam dispersion units dispenses steam generated by pressurized steam boilers or by nonpressurized steam humidifiers. The steam is distributed through ducts, air handlers, and even directly into finished spaces, where it is released in the airstream with a steam dispersion system.
MODEL XV: HIGHEST PERFORMANCE
Integral condensate management.

An industry first for pressurized steam, Ultra-sorb Model XV vaporizes dispersion-generated condensate and returns pressurized condensate to the boiler without additional pumps, valves, vents, or controls.

Most efficient dispersion.

- Zero water waste. All condensate returns to the boiler while still hot, saving energy, water, and boiler chemicals.
- Lowest heat gain. High-Efficiency Insulated Tubes and an insulated steam delivery header reduce airstream heat gain by up to 85%.
- 304 and 316 stainless steel construction options

MODELS LV AND LH: MOST VERSATILE
Disperse pressurized or nonpressurized steam.

- Models LV and LH disperse steam generated by pressurized steam boilers or by nonpressurized steam generators such as DriSteem’s GTS®, STS®, RTS®, Vaporstream®, Vapormist®, and XT humidifiers.

Wide capacity range of options

- Steam capacity up to 4,000 lbs/hr (1815 kg/h)
- High-Efficiency Insulated Tubes option
- 316 stainless steel construction options

MODEL MP: LOWEST TOTAL INSTALLED COST

- Same side steam inlet and drain for reduced piping
- In-frame condensate drain piping maximizes available face dimensions and minimizes blank-off requirements for low duct air pressure losses.
- Integral steam header allows clear space on exterior walls of AHUs.
- High-Efficiency Insulated Tubes option
- 304 and 316 stainless steel construction options
<table>
<thead>
<tr>
<th>Model XV</th>
<th>Ultra-sorb Model LV</th>
<th>Ultra-sorb Model LH</th>
<th>Ultra-sorb Model MP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integral condensate management</td>
<td>Pressurized boiler steam or nonpressurized steam</td>
<td>Pressurized boiler steam</td>
<td>Pressurized boiler steam or nonpressurized steam</td>
</tr>
</tbody>
</table>

### Maximum steam capacity

<table>
<thead>
<tr>
<th>Model</th>
<th>Per panel: Pressurized boiler steam</th>
<th>Per tube: Insulated: 86 lbs/hr (39 kg/h)</th>
<th>Per tube: Uninsulated: 80 lbs/hr (36 kg/h)</th>
<th>Per panel: Pressurized boiler steam</th>
<th>Per tube: Insulated: 86 lbs/hr (39 kg/h)</th>
<th>Per tube: Uninsulated: 80 lbs/hr (36 kg/h)</th>
<th>Per panel: Pressurized boiler steam</th>
<th>Per tube: Insulated: 86 lbs/hr (39 kg/h)</th>
<th>Per tube: Uninsulated: 77 lbs/hr (35 kg/h)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integral</td>
<td>Up to 2720 lbs/hr (1235 kg/h)</td>
<td>Uninsulated: 80 lbs/hr (36 kg/h)</td>
<td>Uninsulated: 80 lbs/hr (36 kg/h)</td>
<td>Up to 4000 lbs/hr (1815 kg/h)</td>
<td>Insulated: 86 lbs/hr (39 kg/h)</td>
<td>Uninsulated: 80 lbs/hr (36 kg/h)</td>
<td>Up to 3268 lbs/hr (1482 kg/h)</td>
<td>Insulated: 86 lbs/hr (39 kg/h)</td>
<td>Uninsulated: 80 lbs/hr (36 kg/h)</td>
</tr>
<tr>
<td>Vertical</td>
<td>Per tube: Insulated: 86 lbs/hr (39 kg/h)</td>
<td>Uninsulated: 80 lbs/hr (36 kg/h)</td>
<td>Insulated: 86 lbs/hr (39 kg/h)</td>
<td>Uninsulated: 80 lbs/hr (36 kg/h)</td>
<td>Insulated: 86 lbs/hr (39 kg/h)</td>
<td>Uninsulated: 80 lbs/hr (36 kg/h)</td>
<td>Insulated: 86 lbs/hr (39 kg/h)</td>
<td>Uninsulated: 80 lbs/hr (36 kg/h)</td>
<td>Uninsulated: 77 lbs/hr (35 kg/h)</td>
</tr>
<tr>
<td>Horizontal</td>
<td>Per tube: Insulated: 86 lbs/hr (39 kg/h)</td>
<td>Uninsulated: 80 lbs/hr (36 kg/h)</td>
<td>Insulated: 86 lbs/hr (39 kg/h)</td>
<td>Uninsulated: 80 lbs/hr (36 kg/h)</td>
<td>Insulated: 86 lbs/hr (39 kg/h)</td>
<td>Uninsulated: 80 lbs/hr (36 kg/h)</td>
<td>Insulated: 86 lbs/hr (39 kg/h)</td>
<td>Uninsulated: 80 lbs/hr (36 kg/h)</td>
<td>Uninsulated: 77 lbs/hr (35 kg/h)</td>
</tr>
</tbody>
</table>

### Steam source

- **Humidification steam inlet:** Steam from boiler or steam-to-steam (STS) humidifier
- **Internal heat exchanger:** Pressurized boiler steam

### Airflow

- **Horizontal**
- **Horizontal**
- **Horizontal or vertical:** pressurized steam
- **Vertical:** nonpressurized steam

### High-Efficiency Insulated Dispersion Tubes

- **Standard**
- **Available option**
- **Optional header enclosure provides air gap insulation (standard on units > 60” width)**

### Header insulation

- **Header inside of enclosure is insulated**
- **Header enclosure provides air gap insulation**
- **Optional header enclosure provides air gap insulation (standard on units > 60” width)**

### Condensate drain

- **Pressurized**
- **Atmospheric**
- **Vaporizes dispersion tube-generated condensate in header; returns pressurized condensate to condensate return main**
- **Available pump**

### Condensate lifting

- **Vaporizes dispersion tube-generated condensate in header; returns pressurized condensate to condensate return main**

### Airstream heat gain

- **Lowest**
- **Low with High-Efficiency Insulated Tubes option**

### Non-wetting distance

- **Shortest; performs to published Ultra-sorb non-wetting distance**

### Face dimensions

- **12” x 12” up to 144” x 144” (305 x 305 to 3660 x 3660 mm)**
- **12” x 12” up to 144” x 144” (305 x 305 to 3660 x 3660 mm)**
- **12” x 12” up to 120” x 120” (305 x 305 to 3050 x 3050 mm)**
- **12” x 12” up to 144” x 144” (305 x 305 to 3660 x 3660 mm)**

### Assembly

- **Pre-assembled (shipped unassembled by request or as larger dimensions require)**

### Dispersion tube mounting

- **Spring-loaded tubes and frame**
- **Slip couplings and frame**
- **Sealing grommets and frame**

### Steam / drain connections

- **Inlet: Steam for humidification**
- **Inlet: Pressurized steam for heat exchanger**
- **Outlet: Pressurized condensate to return main**
- **Outlet: Optional header overflow (if no float switch)**
- **Inlet: Steam for humidification**
- **Outlet: Condensate drain**

### Piping connections

- **Same-side connections**
- **Top or side steam inlet, top side steam connection**
- **Top or side steam inlet, 2 drain connections (one per header)**
- **Same-side steam supply and condensate drain connections**

### Optional stainless steel features

- **Header/dispersion tubes: 316 stainless steel (304 standard)**
- **Enclosure/frame: 304 or 316 stainless steel (galvanized standard)**
- **Header/dispersion tubes: 316 stainless steel (304 standard)**
- **Enclosure/frame: 304 or 316 stainless steel (galvanized standard)**
### Table 5-1: Condensate piping for Ultra-sorb steam dispersion

<table>
<thead>
<tr>
<th>Model XV</th>
<th>Models LV, LH, and MP</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Nonpressurized steam</td>
</tr>
<tr>
<td>P-trap water seal for condensate drain</td>
<td>Not required</td>
</tr>
<tr>
<td>F&amp;T trap, for lifting condensate to elevated condensate return main</td>
<td>Yes, with no additional pumps, valves, vents or controls (&lt;15 PSI steam)</td>
</tr>
<tr>
<td>Inverted bucket trap, for lifting condensate to elevated condensate return main</td>
<td>Yes, with no additional pumps, valves, or controls (&gt;15 PSI steam)</td>
</tr>
<tr>
<td>Stainless steel thermostatic trap</td>
<td>No</td>
</tr>
<tr>
<td>Condensate to open drain</td>
<td>Not required</td>
</tr>
<tr>
<td>Condensate return by condensate pump</td>
<td>Not required</td>
</tr>
<tr>
<td>Condensate return to humidifier by gravity</td>
<td>n/a</td>
</tr>
<tr>
<td>Condensate return to boiler via return line</td>
<td>Yes, with no additional pumps, valves or controls</td>
</tr>
</tbody>
</table>

### FIGURE 5-1: LIFTING CONDENSATE WITH ULTRA-SORB MODEL XV

*Ultra-sorb Model XV vaporizes dispersion-generated condensate and returns pressurized condensate to the boiler without additional pumps, valves, vents, or controls.*
High-efficiency tubes are standard on Ultra-sorb Model XV and an available option for new or existing Ultra-sorb Models LV, LH, and MP.

The PVDF insulation on High-Efficiency Tubes provides the following benefits:

- **Reduce heat gain and condensate production by up to 85%** compared to uninsulated dispersion tubes, regardless of load or airstream temperature.

- **Save energy and water.** Every pound of condensate that does not drain from the dispersion assembly saves the heat energy (about 1,000 BTUs) required to boil it into steam.

- **Gain capacity.** Use fewer tubes and smaller steam generators. With a higher percentage of generated steam meeting the humidification load, fewer dispersion tubes are needed, and steam generators can be downsized in many cases.

**ADVANCED INSULATION MEETS STRINGENT REQUIREMENTS**

PVDF is an advanced material commonly used in chemical, semiconductor, medical, defense, and aerospace industries and has the following characteristics:

- **Approved for use in plenums.** Flame spread/smoke developed values are 0/0, exceeding UL 723 (ASTM E84) requirement of 25/50.

- **Rated for high-temperature operation.** Rated for 300°F (149°C) continuous operation.

- **Will not absorb water or support microbial growth** due to its closed-cell construction.

- **Virtually no airflow pressure drop.** PVDF insulation is only 1/8” (3.2mm) thick.

- **Will not shift or slip on tubes.** Advanced manufacturing process ensures insulation attaches securely to tubes.

- **Odor free.** Virtually no measurable outgassing.

- **Resistant to UV light.**

- **Rugged and durable.** No particle erosion per ASTM C1071 erosion resistance test; does not contain fiberglass.

Notes:

- This graph illustrates dispersion tube heat loss vs. airstream at 50 ºF (10 ºC) for a 3” (76 mm) spaced tube bank, 1 ½” (DN40) dia. stainless steel tubes with 212 ºF (100 ºC) internal wall temperature
  - PVDF insulation on tube is 1/8” (3.2 mm) thick and has a thermal conductivity of 0.0185 Btu/hr-ft-F 0.0107 W/m • K.

Read our white paper

For details on the industry-leading performance of DriSteem High-Efficiency Tubes, see our white paper on www.dristeem.com.
DETERMINE HUMIDIFIER PLACEMENT
Check available non-wetting distance, and review Figure 7-1. 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.

PLACEMENT IN AN AIR HANDLING UNIT
- **Location A is the best choice.** Installing downstream of heating and cooling coils provides the most even flow through the dispersion unit; plus, the heated air provides an environment for best absorption.
- **Location B is the second-best choice.** However, in change-over periods, the cooling coil will eliminate some moisture for humidification.
- **Location C is the third-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 of a fan.
- **Location D is the poorest choice.** The cooler air at this location requires an increased non-wetting distance.
PRINCIPLE OF OPERATION - PRESSURIZED STEAM

1 Pressurized steam enters heat exchanger
   Pressurized steam entry to the heat exchanger is controlled by a 2-position shutoff valve that admits steam to the heat exchanger when there is a call for humidity.

2 Humidification steam enters insulated header
   Humidification steam entry is controlled by a modulating valve located downstream of the 2-position shutoff valve to meet humidification demand.

3 Humidification steam flows through High-Efficiency Insulated Dispersion Tubes
   Humidification steam flows through the insulated header, up the High-Efficiency Insulated Tubes, and into the airstream. Dispersion tube insulation provides up to an 85% reduction in wasted energy by significantly reducing airstream heat gain and condensate production. See page 9 for more information.

4 Integral condensate management
   The heat exchanger vaporizes dispersion-generated condensate, which creates condensate within the heat exchanger. This condensate returns to the boiler via the condensate return main with no additional pumps, valves, vents, or controls.

Ultra-sorb Model XV accepts humidification steam directly from a boiler or DriSteem STS steam-to-steam humidifier. The STS transfers boiler steam energy (through a heat exchanger) to clean fill water to boil it into humidification steam.
**PRINCIPLE OF OPERATION AND COMPONENTS**

**Control safety options**

The Ultra-sorb XV steam dispersion panel utilizes a built-in heat exchanger to evaporate condensate generated in the humidification process.

- For maximum energy efficiency, a DriSteem control cabinet is used to sequence a 2-position shutoff valve for the heat exchanger, with a modulating valve for humidification control.

- A float switch in the steam dispersion panel header, along with control sequence timings assure effective condensate management along with humidification output based on demand.

- When humidity demand ends, the digital controller in the DriSteem control cabinet keeps the heat exchanger valve open for 15 minutes, maintaining steam flow through the heat exchanger to evaporate any remaining condensate in the steam header.

- Optionally a temperature switch monitors the steam trap temperature and if below setpoint, closes the modulating steam valve or STS humidifier control system to stop humidification steam from entering the header and prevents further condensate production.

**Heat exchanger control options**

Heat exchanger options are packaged and available for ordering as shown below.

- **Boiler steam only:**
  a. Heat exchanger 2-position shutoff valve, modulating humidifier valve, control panel, float switch, and optional temperature switch
  b. Temperature switch, electric
  c. Temperature switch, pneumatic

- **Boiler steam paired with an STS Humidifier:**
  d. Control via STS Humidifier
  e. Temperature switch, electric
  f. Temperature switch, pneumatic

**FIGURE 9-1: CONTROL COMPONENTS**
FIGURE 10-1: ULTRA-SORB MODEL XV OPERATING WITH PRESSURIZED HUMIDIFICATION STEAM

Standard trap piping

Ultra-sorb Model XV installed in duct or AHU shown without piping

Note: Dashed lines indicate provided by installer.

FIGURE 10-2: ULTRA-SORB MODEL XV PIPING COMPONENTS WITH TEMPERATURE SWITCH, PRESSURIZED STEAM SOURCE

Applications with full-time operation of internal heat exchanger.

Install inlet strainer within 3' (1 m) of Ultra-sorb Model XV. Strainer should be same pipe size or larger than modulating steam valve.

Note: Dashed lines indicate provided by installer.
FIGURE 11-1: ULTRA-SORB MODEL XV DIMENSIONS

FIGURE 11-2: ULTRA-SORB MODEL XV CONTROL CABINET

Notes:
- Electrical power requirements: 120 VAC, 1 Amp, or 240 VAC, 0.5 Amps
- Components are 24 VAC, powered by a transformer in the control cabinet.
- Maximum distance from control cabinet to Ultra-sorb Model XV is 50’ (15 m).

Table 11-1:
Ultra-sorb Model XV tube capacity

<table>
<thead>
<tr>
<th>Diameter</th>
<th>lbs/hr</th>
<th>kg/h</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.5’</td>
<td>43</td>
<td>19.5</td>
</tr>
<tr>
<td>2.0’</td>
<td>80</td>
<td>36.3</td>
</tr>
</tbody>
</table>

Consult DriCalc® sizing and selection software to calculate capacities for your specific application.

Table 11-2:
Ultra-sorb Model XV dimensions

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Unit width</td>
</tr>
<tr>
<td>A'</td>
<td>Face width</td>
</tr>
<tr>
<td>B</td>
<td>Unit height*</td>
</tr>
<tr>
<td>B'</td>
<td>Face height</td>
</tr>
<tr>
<td>C</td>
<td>Frame depth</td>
</tr>
<tr>
<td>D</td>
<td>Frame enclosure</td>
</tr>
<tr>
<td>E</td>
<td>Header enclosure</td>
</tr>
<tr>
<td>F</td>
<td>Mounting flange</td>
</tr>
<tr>
<td>G</td>
<td>Humidification steam inlet (internal thread)</td>
</tr>
<tr>
<td>H</td>
<td>Pressurized steam inlet (internal thread)</td>
</tr>
<tr>
<td>J</td>
<td>Float switch, optional header overflow/access port (internal thread)</td>
</tr>
<tr>
<td>K</td>
<td>Pressurized condensate outlet (internal thread)</td>
</tr>
<tr>
<td>L</td>
<td>Overall width</td>
</tr>
<tr>
<td>Control cabinet</td>
<td>See Figure 11-2</td>
</tr>
</tbody>
</table>

Note:
* Panels with unit height more than 120” (3048 mm) have two-piece side flanges and are shipped with brackets and panel fasteners for easy field assembly. Panels with unit height more than 98” (2490 mm) are shipped unassembled.
FIGURE 12-1: ULTRA-SORB MODEL XV IN AN AIR HANDLER

Notes:
1. Dashed lines indicate provided by installer.
2. See Page 7 for location guidelines.
3. Steam supply line to unit, and piping, are not included.
4. Dispersion tubes are available on 3", 4", 6", 9" and 1 ½" (75, 100, 150, 225, and 300 mm) centers.
5. Ultra-sorb humidifiers will be assembled, crated, and shipped intact in all sizes up to 98" (2490 mm) overall height. Any Ultra-sorb can be shipped unassembled by request, requiring field assembly.
6. Standard sizes are 12" x 12" up to 144" x 144" in 1" increments (305 x 305 mm up to 3660 x 3660 mm in 25 mm increments). Larger sizes are available.
7. Heat exchanger requires 5 psig (35 kPa) minimum steam pressure.
FIGURE 13-1: ULTRA-SORB MODEL XV PIPING WITH STS HUMIDIFIER
Steam to heat exchanger from pressurized steam source, humidification steam from STS humidifier.
MODELS LV AND LH: OPERATION AND COMPONENTS

PRINCIPLE OF OPERATION

1Steam enters steam supply header
Pressurized steam from a boiler or nonpressurized steam from a DriSteem steam generator enters the supply header/separator after passing through a modulating steam control valve.

2Steam enters dispersion tubes
Steam flows through the dispersion tubes and into the airstream. Dispersion tube diagonal end cuts capture only the driest steam from the center of the header. Calibrated thermal resin tubelets allow only the driest steam to exit into the airstream.

The dispersion tubes operate drip-free without steam jackets, so no unnecessary heat is added to the airstream when the humidifier is idle.

High-Efficiency Insulated Dispersion Tubes, available as a new or retrofit option, provide up to an 85% reduction in wasted energy by significantly reducing airstream heat gain and condensate production. See Pages 6 and 15 for more information.

3Condensate flows to condensate return header and drain
Any condensate generated in the dispersion tubes flows by gravity to the condensate return header to the condensate drain.

FIGURE 14-1: ULTRA-SORB MODELS LV AND LH COMPONENTS

ULTRA-SORB PANEL (MODEL LV ShOWN)
- Vertical tubes
- Suitable for AHUs or ductwork
- Use when duct height is greater than duct width
- May use with pressurized or nonpressurized steam (horizontal airflow only)

ULTRA-SORB MODEL LH
- Horizontal dispersion tubes
- Suitable for AHUs or ductwork
- Use when duct width is greater than duct height
- May use with pressurized steam in a vertical or horizontal airflow; may use with nonpressurized steam in a vertical airflow
HIGH-EFFICIENCY INSULATED TUBE RETROFIT OPTION

Engineered for existing dispersion systems, DriSteem's High-Efficiency Tubes are available as a retrofit option for existing Ultra-sorb Models LV and LH and Rapid-sorb® steam dispersion assemblies.

Energy efficiencies and water savings are provided by a simple upgrade to currently installed steam dispersion panels. See page 6 for a complete description of the benefits of High-Efficiency Tubes.

ORDERING AND RETROFITTING ARE EASY

Instructions are provided in the High-Efficiency Tubes Retrofit Brochure on the literature page of our website: www.dristeem.com.

SHORT PAYBACK

Retrofit High-Efficiency Tubes have a short payback period—usually less than two years based on the significant energy savings.

For an application-specific payback analysis, contact your local DriSteem Representative.

UPDATING FOR EFFICIENCY IS EASY!

Remove the existing tubes.

Install the High-Efficiency Tubes.

The energy saved by a DriSteem dispersion panel with High-Efficiency Tubes will more than make up for the cost of replacing any uninsulated steam dispersion assembly.
ULTRA-SORB MODEL LV: DIMENSIONS AND CAPACITY

Table 16-1: Ultra-sorb Model LH dimensions

<table>
<thead>
<tr>
<th>A</th>
<th>Unit width</th>
<th>15&quot; (380 mm) min, 147&quot; (3735 mm) max, in 1&quot; (25 mm) increments</th>
</tr>
</thead>
<tbody>
<tr>
<td>A'</td>
<td>Face width</td>
<td>12&quot; (305 mm) min, 144&quot; (3660 mm) max, in 1&quot; (25 mm) increments</td>
</tr>
<tr>
<td>B</td>
<td>Unit height</td>
<td>21&quot; (530 mm) min, 156&quot; (3960 mm) max, in 1&quot; (25 mm) increments</td>
</tr>
<tr>
<td>B'</td>
<td>Face height</td>
<td>12&quot; (305 mm) min, 144&quot; (3660 mm) max, in 1&quot; (25 mm) increments</td>
</tr>
<tr>
<td>C</td>
<td>Steam inlet diameter</td>
<td>Determined by maximum steam capacity</td>
</tr>
<tr>
<td>D</td>
<td>Condensate drain</td>
<td>3/4&quot; pipe thread (DN20)</td>
</tr>
<tr>
<td>E</td>
<td>Header enclosure (front to back)</td>
<td>For 3&quot; (DN80) header, E = 5&quot; (127 mm); for 5&quot; (DN125) header, E = 6&quot; (152 mm); for 6&quot; (DN150) header, E = 7&quot; (178 mm)</td>
</tr>
<tr>
<td>F</td>
<td>Header enclosure (top to bottom)</td>
<td>For 3&quot; (DN80) header, F = 4.5&quot; (114 mm); for 4&quot; (DN100) header, F = 5.5&quot; (140 mm); for 5&quot; (DN125) header, F = 6.5&quot; (165 mm); for 6&quot; (DN150) header, F = 7.5&quot; (191 mm)</td>
</tr>
<tr>
<td>G</td>
<td>Mounting flange</td>
<td>1.5&quot; (38 mm)</td>
</tr>
<tr>
<td>H</td>
<td>Condensate header enclosure</td>
<td>4.5&quot; (114 mm)</td>
</tr>
</tbody>
</table>

Note: Header enclosure dimensions are determined by supply header diameter. See Tables 17-2 and 17-3.

Table 16-2: Ultra-sorb Model LV and LH tube capacity

<table>
<thead>
<tr>
<th>Insulated</th>
<th>Uninsulated</th>
</tr>
</thead>
<tbody>
<tr>
<td>lbs/hr</td>
<td>kg/h</td>
</tr>
<tr>
<td>lbs/hr</td>
<td>kg/h</td>
</tr>
<tr>
<td>86</td>
<td>39</td>
</tr>
</tbody>
</table>

Consult DriCalc® sizing and selection software to calculate capacities for your specific application.
ULTRA-SORB MODEL LH: DIMENSIONS AND CAPACITY

Table 17-1:
Ultra-sorb Model LH dimensions

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Unit width</td>
<td>21&quot; (530 mm)</td>
<td>129&quot; (3280 mm)</td>
</tr>
<tr>
<td>A’ Face width</td>
<td>12&quot; (305 mm)</td>
<td>120&quot; (3050 mm)</td>
</tr>
<tr>
<td>B Unit height</td>
<td>15&quot; (380 mm)</td>
<td>123&quot; (3125 mm)</td>
</tr>
<tr>
<td>B’ Face height</td>
<td>12&quot; (305 mm)</td>
<td>120&quot; (3050 mm)</td>
</tr>
<tr>
<td>C Steam inlet diameter</td>
<td>Determined by maximum steam capacity</td>
<td></td>
</tr>
<tr>
<td>D Condensate drain</td>
<td>3/4&quot; pipe thread (DN20)</td>
<td></td>
</tr>
<tr>
<td>E Header enclosure (front to back)</td>
<td>For 3&quot; (DN80) and 4&quot; (DN100) headers, E = 5&quot; (127 mm); for 5&quot; (DN125) header, E = 6&quot; (152 mm); for 6&quot; (DN150) header, E = 7&quot; (178 mm)</td>
<td></td>
</tr>
<tr>
<td>F Header enclosure (top to bottom)</td>
<td>For 3&quot; (DN80) header, F = 4.5&quot; (114 mm); for 4&quot; (DN100) header, F = 5.5&quot; (140 mm); for 5&quot; (DN125) header, F = 6.5&quot; (165 mm); for 6&quot; (DN150) header, F = 7.5&quot; (191 mm)</td>
<td></td>
</tr>
<tr>
<td>G Mounting flange</td>
<td>1.5&quot; (38 mm)</td>
<td></td>
</tr>
<tr>
<td>H Condensate header enclosure</td>
<td>4.5&quot; (114 mm)</td>
<td></td>
</tr>
</tbody>
</table>

Note: Header enclosure dimensions are determined by supply header diameter. See Tables 17-2 and 17-3.

Table 17-2:
Nonpressurized steam header capacities

<table>
<thead>
<tr>
<th>Header capacity</th>
<th>Header diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>lbs/hr</td>
<td>kg/h</td>
</tr>
<tr>
<td>inches DN</td>
<td></td>
</tr>
<tr>
<td>300</td>
<td>135</td>
</tr>
<tr>
<td>600</td>
<td>270</td>
</tr>
<tr>
<td>1100</td>
<td>500</td>
</tr>
<tr>
<td>1850</td>
<td>820</td>
</tr>
</tbody>
</table>

Notes:
- When connected to a CRUV humidifier install Ultra-sorb Model LH in vertical airflows only.
- For more information about Ultra-sorb, see the Ultra-sorb catalog or DriSteem’s DriCalc software.

Table 17-3:
Boiler steam header capacities

<table>
<thead>
<tr>
<th>Header capacity</th>
<th>Header diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>lbs/hr</td>
<td>kg/h</td>
</tr>
<tr>
<td>inches DN</td>
<td></td>
</tr>
<tr>
<td>980</td>
<td>445</td>
</tr>
<tr>
<td>1750</td>
<td>793</td>
</tr>
<tr>
<td>2750</td>
<td>1245</td>
</tr>
<tr>
<td>4000</td>
<td>1815</td>
</tr>
</tbody>
</table>
Notes:
1. For pressurized steam applications provide a 10" (255 mm) minimum water seal. For atmospheric steam applications, provide a 5" (127 mm) minimum water seal.
2. 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.
3. When mounting an Ultra-sorb in a duct, headers and flanges are mounted outside the duct.
4. 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 F&T traps, water seals, and condensate piping connections.
5. Dashed lines indicate provided by installer.
Notes:
1. A water seal or trap is required on each condensate line. For pressurized steam applications provide a 10" (255 mm) minimum water seal.
2. 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.
3. When mounting an Ultra-sorb in a duct, headers and flanges are mounted outside the duct.
4. 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 F&T traps, water seals, and condensate piping connections.
6. Dashed lines indicate provided by installer.
Table 20-1:
Standard length steam inlet extends beyond header

<table>
<thead>
<tr>
<th>Inlet type</th>
<th>Inlet nominal diameter, inches (DN)</th>
<th>Threaded</th>
<th>Flange</th>
<th>Hose</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1/2&quot; (15)</td>
<td>3/4&quot; (20)</td>
<td>1&quot; (25)</td>
<td>1 1/4&quot; (32)</td>
</tr>
<tr>
<td>Threaded</td>
<td>2.83&quot; (72 mm)</td>
<td>2.95&quot; (75 mm)</td>
<td>3.95&quot; (93 mm)</td>
<td>3.95&quot; (93 mm)</td>
</tr>
<tr>
<td>Hose</td>
<td>---</td>
<td>2.83&quot; (72 mm)</td>
<td>3.95&quot; (93 mm)</td>
<td>3.95&quot; (93 mm)</td>
</tr>
<tr>
<td>Flange</td>
<td>---</td>
<td>3.95&quot; (93 mm)</td>
<td>---</td>
<td>5.95&quot; (151 mm)</td>
</tr>
</tbody>
</table>
FIGURE 21-1: 200 SERIES
CONNECTION TO A BOILER
(PRESSURIZED STEAM APPLICATIONS)

Note: The Ultra-sorb 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. Pumps are rated by fluid temperature, head (pressure), and flow (gpm). Contact your local DriSteem representative for pump selection.

FIGURE 21-2: LIFTING CONDENSATE (MODELS LV AND LH)

Note:
Drop: 2" (51 mm)
Seal pressurized standard: 10" (255 mm)
Seal non-pressurized standard: 5" (127 mm)
PRINCIPLE OF OPERATION

1 Steam enters steam supply header
Pressurized steam from a boiler or nonpressurized steam from a DriSteem steam generator enters the supply header after passing through a modulating steam control valve.

2 Steam enters dispersion tubes
Steam flows through the dispersion tubes and into the airstream. Dispersion tube design with calibrated tubelets capture only the driest steam to exit into the airstream.

The dispersion tubes operate drip-free without steam jackets, so no unnecessary heat is added to the airstream when the humidifier is idle.

High-Efficiency Insulated Dispersion Tubes, available as an option, provide up to an 85% reduction in wasted energy by significantly reducing airstream heat gain and condensate production. See Page 15 for more information.

3 Condensate flows through header to condensate return drain
Any condensate generated in the dispersion tubes flows by gravity to the condensate return drain connection.

ULTRA-SORB MODEL MP COMPONENTS

Steam inlet and condensate outlet positions

Dispersion tube detail

1 ½ or 2” Dia. dispersion tube

⅝” Offset (Typ)

1½” (Typ)

Tube sealing grommet

1. Steam inlet location

2. Dispersion tube

3. ¾” (DN20) threaded condensate drain outlet

Airflow

OM7842

OM7841
Table 23-1: Ultra-sorb Model MP dimensions

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Inches (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Unit width</td>
<td>15&quot; (380 mm) min, 147&quot; (3735 mm) max, in ½&quot; (13 mm) increments</td>
</tr>
<tr>
<td>A' Face width</td>
<td>12&quot; (305 mm) min, 144&quot; (3660 mm) max, in ½&quot; (13 mm) increments</td>
</tr>
<tr>
<td>B Unit height*</td>
<td>19.375&quot; (492 mm) min, 151.375&quot; (3845 mm) max, in ½&quot; (13 mm) increments</td>
</tr>
<tr>
<td>B' Face height</td>
<td>12&quot; (305 mm) min, 144&quot; (3660 mm) max, in ½&quot; (13 mm) increments</td>
</tr>
<tr>
<td>C Frame depth</td>
<td>7.2&quot; (183 mm)</td>
</tr>
<tr>
<td>D Frame enclosure</td>
<td>1.5&quot; (38 mm)</td>
</tr>
<tr>
<td>E Header enclosure</td>
<td>5.85&quot; (149 mm)</td>
</tr>
<tr>
<td>F Mounting flange</td>
<td>1.5&quot; (38 mm)</td>
</tr>
<tr>
<td>G Humidification steam inlet</td>
<td>1&quot; or 2&quot; NPT coupling, for pressurized steam</td>
</tr>
<tr>
<td></td>
<td>1½&quot; or 2&quot; NPT coupling, for evaporative steam</td>
</tr>
<tr>
<td></td>
<td>3&quot; or 4&quot; flange, for evaporative steam</td>
</tr>
<tr>
<td></td>
<td>DN25 or DN50 BSPT nipple, for pressurized steam</td>
</tr>
<tr>
<td></td>
<td>DN50, DN80, or DN100 BSPT nipple, for evaporative steam</td>
</tr>
<tr>
<td></td>
<td>1½&quot; or 2&quot; (DN40 or DN50) hose, for evaporative steam</td>
</tr>
<tr>
<td>H Drain port (internal thread)</td>
<td>¾&quot; NPT (DN20) coupling</td>
</tr>
<tr>
<td>J Overall width</td>
<td>1½&quot; NPT coupling, dimension A + 1/8&quot;;</td>
</tr>
<tr>
<td></td>
<td>1½&quot; NPT coupling, dimension A + ½&quot;;</td>
</tr>
<tr>
<td></td>
<td>2½&quot; NPT coupling, dimension A + 1&quot;</td>
</tr>
<tr>
<td></td>
<td>3&quot; and 4&quot; flange connection, dimension A + 6.5&quot;</td>
</tr>
<tr>
<td></td>
<td>DN25, DN50, DN80 BSP nipple, dimension A + 38 mm</td>
</tr>
<tr>
<td></td>
<td>DN100 BSP nipple, dimension A + 64 mm</td>
</tr>
<tr>
<td></td>
<td>1½&quot; or 2&quot; (DN40 or DN50) hose connection, dimension A + ½&quot; (dimension A + 13 mm)</td>
</tr>
</tbody>
</table>

* 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 98° (2490 mm) are shipped unassembled.

Table 23-2: Ultra-sorb Model MP unit capacity

<table>
<thead>
<tr>
<th></th>
<th>Evaporative steam</th>
<th>Pressurized steam (2-50 psi)</th>
</tr>
</thead>
<tbody>
<tr>
<td>lbs/hr kg/hr</td>
<td>lbs/hr kg/hr</td>
<td></td>
</tr>
<tr>
<td>700</td>
<td>318</td>
<td>2720</td>
</tr>
</tbody>
</table>

Table 23-3: Ultra-sorb Model MP tube capacity*

<table>
<thead>
<tr>
<th>Tubes</th>
<th>lbs/hr</th>
<th>kg/hr</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.5&quot;</td>
<td>Uninsulated 40</td>
<td>18.1</td>
</tr>
<tr>
<td></td>
<td>Insulated 43</td>
<td>19.5</td>
</tr>
<tr>
<td>2.0&quot;</td>
<td>Uninsulated 77</td>
<td>34.9</td>
</tr>
<tr>
<td></td>
<td>Insulated 80</td>
<td>36.3</td>
</tr>
</tbody>
</table>

* If face height (B’) is <17" (432 mm), consult DriSteem or see DriCalc for the correct calculation.
FIGURE 24-1: MOUNTING ULTRA-SORB MODEL MP (PRESSURIZED 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. 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.
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 98" (2490 mm) tall. 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.
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 non-pressurized steam, provide a 5" (127 mm) minimum water seal with a 2" (51 mm) minimum drop from the header connection.
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 98" (2490 mm) wide. 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.
MODEL MP: INSTALLATION

FIGURE 26-1: ULTRA-SORB MODEL MP INSTALLED INSIDE AN AIR HANDLER

Air handler overall width

Ultra-sorb overall width

Ultra-sorb overall height

Air handler overall height

Header

AHU coil

AHU casing

Steam supply

Mounting channel (Typ)

Blanked-off area

1" (25 mm) air gap

Floor drain

FIGURE 26-2: VERTICAL CHANNELS INSIDE AN AIR HANDLER

Ultra-sorb Model MP, plan view

Air flow

Mounting channel (Typ)

Blank-off plate

Side blank-off

Additional mounting support channels required on larger Ultra-sorb units

Air handler casing

FIGURE 26-3: ULTRA-SORB MODEL MP IN DUCT

Side view

Ultra-sorb

OM-7850_airhandler

OM-7851

OM-7863
Install strainer (same size as valve, or larger than control valve) within 3 feet (1 m) of the Ultra-sorb Model MP dispersion panel.

Note:
- See Figure 26-1 for required drain piping.
DRI-STEEM Corporation
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