

DRISTEEM[®]
The humidification experts



STS[®]
Steam-to-Steam
Humidification System
PRODUCT CATALOG



Chemical-free steam with STS®

**Figure 2-1:
STS side cleanout**



The side cleanout (shown with cleanout plate removed) provides access to the heat exchanger and evaporating chamber floor.

Humidify using an economical energy source

The STS steam-to-steam humidifier creates chemical-free humidification steam while using boiler steam as its energy source. The STS accomplishes this by circulating boiler steam within a heat exchanger, transferring heat to clean fill water and boiling it into chemical-free humidification steam.

No direct injection of boiler chemicals

Another way to use boiler steam for humidification is to disperse it directly into the air. However, humidifier owners are finding that chemically treated, boiler generated steam is unsuitable for direct injection humidification. Boiler water is usually treated with anticorrosion chemicals that can contaminate spaces humidified by direct steam injection.

Airborne boiler chemicals have been found to irritate eyes and skin, and to aggravate respiratory disorders. In addition, they accelerate the aging of certain materials like paper and wood, an issue especially relevant to museum owners.

To ensure chemical-free humidification while taking advantage of economical on-site boiler steam consider using an STS steam-to-steam humidifier.

Redesigned cover and cleanout plate ease maintenance

The redesigned STS provides improved access for maintenance. The removable cover allows tank access without disconnecting steam dispersion piping from the steam outlet. And the side cleanout plate provides direct access to the heat exchanger.

Microprocessor control

Precise control with Vapor-logic3!

STS features Vapor-logic3, DRI-STEEM's state-of-the-art controller. Vapor-logic3 offers precise and complete humidifier control, and is so easy to use, it practically runs itself!

Many new control capabilities. Key features of this modular controller include:

- **PID control** provides accurate, responsive and adjustable RH control.
- **The temperature sensor** enables the controller to hold water at a preset temperature allowing rapid response to a call for humidity
- **Data reports** help you monitor humidifier performance
- **Backlit display** is easy to read
- **Menus are intuitive** and easy to navigate
- **Real-time clock** allows time-stamped alarm tracking and the ability to program draining for preset times
- **LonTalk® interoperability** allows communication with a LonTalk building automation system
- **Multiple-humidifier control** allows control of up to 16 humidifiers with one controller

Figure 3-1:
Vapor-logic3 keypad



STS features and benefits

Figure 4-1:
STS humidifier



STS humidifier with H-legs and control cabinet

Reliable performance

- Control to $\pm 3\%$ RH
- Electronically monitored water level ensures safe and reliable operation
- Diagnostic test at unit start-up verifies system performance

Application flexibility

- Capacity range up to 1600 lbs/hr (726 kg/h) for each unit
- Link multiple units together for increased capacity
- Supports all types of water: tap, softened, reverse osmosis, or deionized; easy to field-convert if water type changes
- Disperses steam through ductwork or directly into a space
- Robust outdoor enclosure available for outdoor operation in any climate

Minimal maintenance

- Redesigned cleanout plate provides access to the heat exchanger
- Redesigned cover allows tank access without removing steam dispersion piping
- User-adjustable water skimmer skims off floating minerals
- Use of softened water significantly reduces maintenance requirements
- Constant thermal expansion and contraction of heat exchanger continuously sheds mineral buildup
- Controller-operated drain and flush removes precipitated minerals from evaporating chamber
- End-of-season autodrain minimizes microbial growth

Advanced control with Vapor-logic3

- Easy-to-use keypad displays current conditions, alarm log, graphed data and message reminder for tank cleaning based on water usage
- Temperature sensor enables freeze-protection and allows rapid warm-up
- Years of proven performance as a DRI-STEEM controller ensures trouble-free operation
- Cold-snap offset option prevents window condensation
- VAV control option
- Accepts all input signals
- LonTalk interoperability
- Multitank control (not available with LonTalk)

STS features and benefits

Optional LW417 control

- The LW417 controller monitors and adjusts water level, controls periodic draining and flushing, allows adjustable skim duration, and automates end-of-season draining
- Available as an option on standard-water models

Guaranteed absorption

- Cataloged and guaranteed steam absorption distances
- Unique tubelets in dispersion tubes eliminate condensate drips
- Published absorption tables for sizing and selecting the correct dispersion option
- Dri-calc® software available for computer calculation of absorption distances and system selection

Figure 5-1:
STS steam outlet



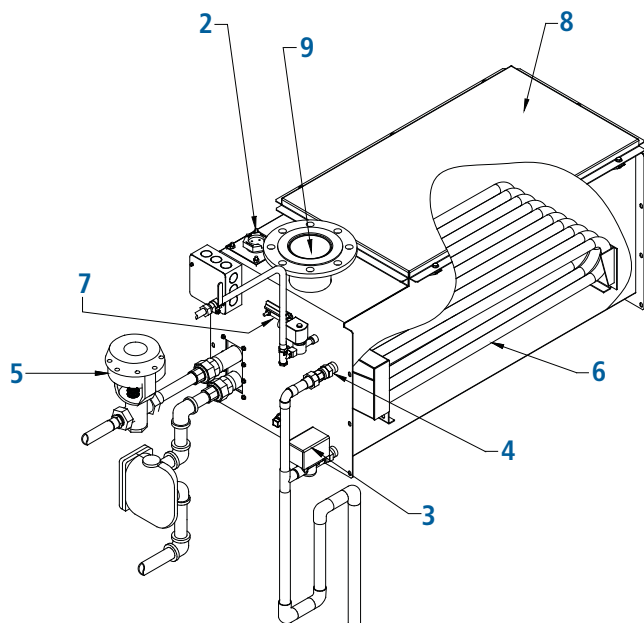
The redesigned, removable cover allows tank access without disconnecting steam dispersion piping from the steam outlet.

STS components

Figure 6-1:
Vapor-logic3 keypad



Figure 6-2:
STS components



OM-938B

1. Controller (not shown)

The Vapor-logic3 controller controls all functions of the humidifier (keypad shown in Figure 6-1). The optional LW417 controller controls water levels for tap or softened water systems. See Page 10 for more information.

2. Water level control

Tap or softened water systems control water levels electronically using a three-rod probe (see also Figure 7-1 on the next page). DI/RO water systems control water levels using a float valve (see Figure 7-2 on the next page).

3. Drain

Standard-water models are programmed to automatically drain if there is no call for humidity after a defined time period. DI/RO water models have a manual drain unless ordered with an electric drain to enable automated end of season draining (requires Vapor-logic3 or signal by other).

STS components

4. Water skimmer/overflow port

In standard water systems, the water skimmer reduces surface minerals in the evaporating chamber. Skimming occurs each time the humidifier fills. The skim time duration is user-adjustable. DI/RO water systems do not require skimming. In DI/RO systems, the skimmer port functions as an overflow port.

5. Valve

Upon a call for humidity, the valve allows boiler steam to enter the heat exchanger.

6. Heat exchanger

The heat exchanger transfers energy from boiler steam to the clean fill water in the evaporating chamber, generating steam. The STS is available with either copper or stainless steel heat exchangers.

7. Temperature sensor

This sensor, which is standard on all models with Vapor-logic3, enables:

- Freeze protection
- Preheating, allowing rapid response to a call for humidity

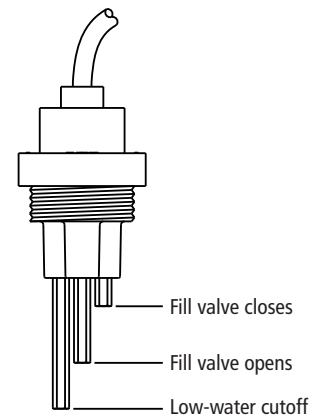
8. Service access

The redesigned access cover allows periodic inspection and servicing of the evaporating chamber without removing vapor hose or piping. The cleanout plate allows side access to the heat exchanger and tank floor.

9. Steam outlet

Steam generated in the unit rises and exits through the steam outlet and travels to the dispersion assembly through either vapor hose or piping.

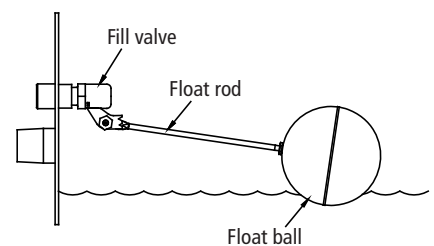
Figure 7-1:
Water level control for standard water systems



Systems using tap or softened water control water levels electronically using a three-rod probe. The controller responds with the above actions when the water level reaches each rod.

VLC-OM-030

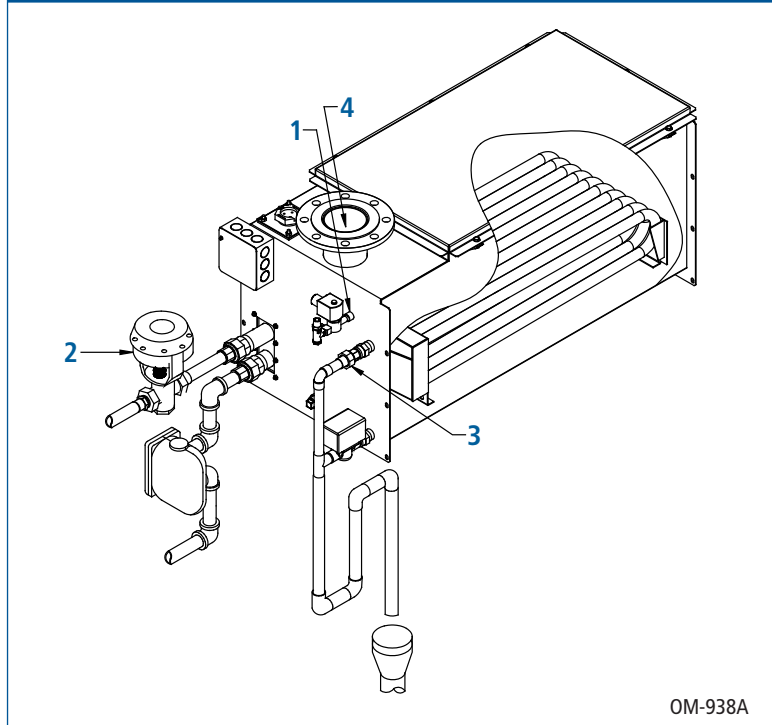
Figure 7-2:
Water level control for DI/RO water systems



VLC-OM-026

STS principle of operation

Figure 8-1:
STS principle of operation



1. When the system is first activated, the fill valve opens and the evaporating chamber fills with water to the operating level.
2. On a call for humidity, boiler steam passes through the valve to the heat exchanger, causing water in the evaporating chamber to boil. The fill valve opens and closes as needed to maintain the operating water level.
3. During refill in standard water systems, a portion of the surface water is skimmed off, carrying away precipitated minerals. (DI/RO systems do not require skimming.)
4. Steam created in the evaporating chamber flows through vapor hose or piping to the dispersion assembly, where it is discharged into the airstream.

STS control options

Accurate, responsive control with Vapor-logic3

Vapor-logic3 provides exceptional functionality, ease of use, and accurate RH control. Standard on all STS models, this controller features:

- **Real-time clock** allows time-stamped alarm tracking and three ways to program drain and flush cycles:
 1. Usage (unit drains after a set number of pounds of water have cycled through)
 2. Usage and time (unit drains at a preset time after a set number of pounds of water have cycled through)
 3. At a preset time
- **Keypad** has a backlit display and features:
 - Intuitive menu-driven access to all system functions
 - Default screen for quick viewing of system status and set points
 - Data reports to track performance and efficiency
 - System diagnostics and alarm tracking for troubleshooting
 - Password protection of setup parameters
 - Easy viewing in low-light environments
 - Three ways to mount the keypad:
 1. Hand-held; shipped with a 5' (1.5 m) cable
 2. Mounted on the control cabinet
 3. Mounted remotely using a standard telephone plate. The keypad can be located up to 500' (152 m; the maximum length of the keypad cable) from the STS.
- **Tank temperature sensor**, mounted on the evaporating chamber, allows Vapor-logic3 to provide:
 - Over-temperature protection
 - Freeze protection
 - Tank preheating, allowing rapid response to a call for humidity

(continued on next page)

Figure 9-1:
Vapor-logic3 keypad



The Vapor-logic3 keypad is easy to use and read, and it provides access to all humidifier functions.

STS control options (continued)

DI/RO water systems control water level with a float/fill valve

DI/RO humidifiers control water level with a float ball and fill valve (see Page 7).

End-of-season draining is performed by manually opening the drain valve, unless the humidifier is ordered with Vapor-logic3, which automates end-of-season draining.

- **PID control** provides accurate, responsive, and adjustable relative humidity (RH) control.
- **LonTalk interoperability** allows communication with a LonTalk building automation system using Standard Network Variable Types (SNVTs). Note that LonTalk interoperability with a building automation system is not available when using multiple humidifier control.
- **Multiple-humidifier control** allows control of up to 16 humidifiers with one controller. The primary benefit of multiple-humidifier control is expanded capacity without giving up consistent humidity control. The Vapor-logic3 controller anticipates increased demand and preheats tanks as needed to provide a rapid response to demand changes.

Optional control for standard water: LW417

The LW417 controller monitors and adjusts water level, controls periodic draining and flushing, allows adjustable skim duration, and automates end-of-season draining. The LW417 has four lights indicating: power, full, ready water, and drain. Dip switches on the control board can be field-set for automatic draining and flushing frequency and skim duration. End-of-season draining is preset to activate after 72 hours without a call for humidity.

Drip-free dispersion basics

Guaranteed absorption distances

Using data collected in our on-site test lab, we have developed guaranteed steam absorption distances. Performance charts allow you to confidently choose equipment that will accommodate any application.

Dry steam

Adding humidification to an airstream without creating wetness in the duct system is critical for the maintenance of a healthy environment. Wet areas in ducts are a threat to the health of building occupants since they moisten dust on duct floors, creating ideal breeding grounds for disease-producing microbes. In addition, water accumulating in ducts can drip and cause building damage.

Steam escapes drip-free through tubelets

All DRI-STEEM evaporative dispersion tube units discharge steam through thermal-resin tubelets fitted into dispersion tubes. These tubelets extend from the center of the tube, where the steam is driest, through the tube wall, to the duct airstream. In essence, the tubelets provide a temperature-neutral escape tunnel for steam, allowing steam to cross over lower-temperature metal without condensing or dripping. Each tubelet contains a calibrated orifice sized for steam capacity. These tubelets are a DRI-STEEM exclusive, and are essential for drip-free steam dispersion.

Condensate drains away

Some condensation is inevitable in steam dispersion, but through careful design, condensate can be controlled and directed away from where it can cause problems.

For example, the Ultra-sorb® dispersion panel has a unique double-header design that uses gravity to remove condensate. Steam enters the supply header, escapes through the tubelets, and condensate drains out the return header. In the Rapid-sorb® dispersion unit, steam enters one end of a single bottom header with velocities carefully managed so that condensate is not pushed out into the air along with the steam, but rather drains out at the opposite end of the header.

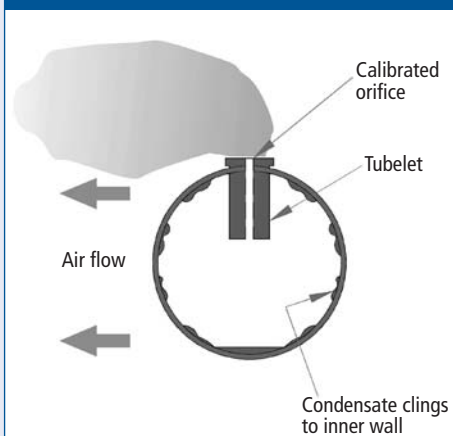
For more information about dispersion units, see Pages 12 and 25-31.

Figure 11-1:
DRI-STEEM dispersion tubes



DRI-STEEM's dispersion tubes are fitted with one or two rows of closely-spaced thermal-resin tubelets to evenly disperse steam across the airstream.

Figure 11-2:
DRI-STEEM tubelets

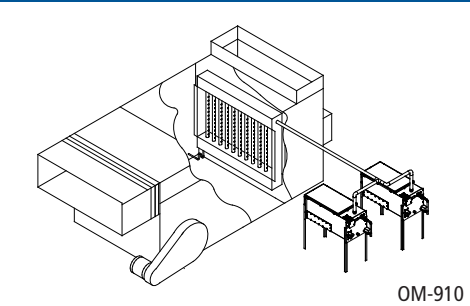


DRI-STEEM's unique tubelets extend into the center of the tube so only the driest steam is discharged into the air.

150-3bw

STS steam dispersion options

**Figure 12-1:
Ultra-sorb dispersion**



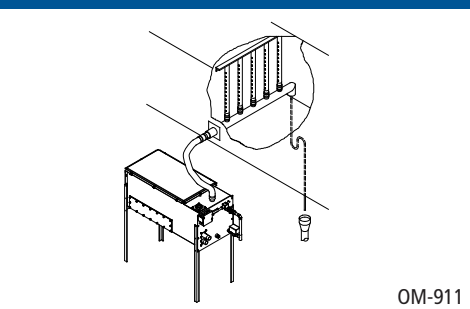
Ultra-sorb

The multiple-tube Ultra-sorb allows virtually instantaneous steam absorption. The factory-assembled panel can be installed within inches upstream of dampers, coils or elbows without dripping.

The Ultra-sorb's steam downflow design allows for high capacity dispersion. The unit is preassembled at the factory within a mounting frame, and installs easily. Simply mount the panel and complete the steam and condensate connections (see Pages 25-27).

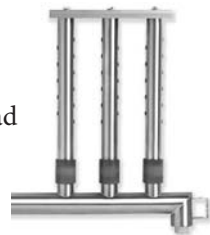


**Figure 12-2:
Rapid-sorb dispersion**

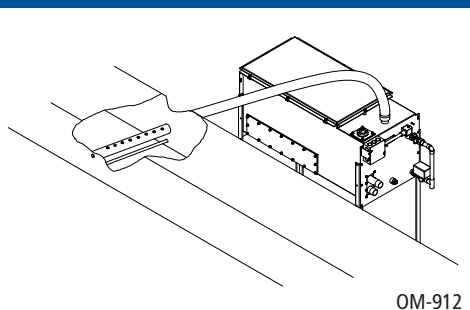


Rapid-sorb

Rapid-sorb has a single header design with steam flowing up from a bottom header. This design is an excellent choice for medium capacity systems where multiple tubes are needed to handle the load and/or when non-wetting absorption distance is limited. Rapid-sorbs are assembled on-site (see Pages 25 and 28-29).



**Figure 12-3:
Single or multiple tube dispersion**



Reduce wasted energy by up to 85% with High-efficiency tubes

DRI-STEEM's PVDF insulated dispersion tubes reduce wasted energy by up to 85% while significantly reducing airstream heat gain and dispersion-generated condensate production. Insulating the dispersion tubes makes more steam available for dispersion, and less is lost to condensate. High-efficiency dispersion tubes are an available option for Ultra-sorb and Rapid-sorb dispersion assemblies. For more information, see the High-efficiency Tube option brochure, available at www.dristeem.com

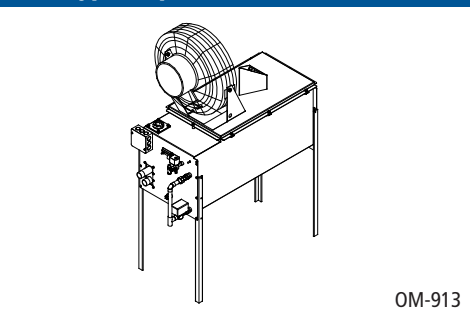


Single or multiple tubes

Single or multiple dispersion tubes are an excellent choice for lower capacity applications or where there is room for a longer absorption distance (see Pages 25 and 30).



**Figure 12-4:
Area-type dispersion**



Area-type

The Area-type™ dispersion unit disperses steam in large open spaces and is commonly used where there are no air-handling ducts. The fan distributes steam quietly and efficiently without introducing water droplets into the air. Area-type is available for all STS models operating at capacities up to 300 lbs/hr (136 kg/h). See Page 31 for more information.



STS capacities and weights

**Table 13-1:
Output capacities for STS models with copper heat exchangers**

STS model number	Steam pressure*							
	5 psi	34 kPa	10 psi	69 kPa	13 psi	90 kPa	15 psi	103 kPa
	lbs/hr	kg/h	lbs/hr	kg/h	lbs/hr	kg/h	lbs/hr	kg/h
25C	20	9	70	32	100	45	120	54
50C	50	23	150	68	200	91	240	109
100C	100	45	300	136	400	181	480	218
400C	300	136	580	263	720	327	790	358
800C	650	295	1275	578	1500	680	1600	726

Notes:

* Steam pressure at connection to the STS steam valve (valve provided by DRI-STEEM)

**Table 13-2:
Output capacities for STS models with stainless steel heat exchangers**

STS model number	Steam pressure*							
	5 psi	34 kPa	10 psi	69 kPa	13 psi	90 kPa	15 psi	103 kPa
	lbs/hr	kg/h	lbs/hr	kg/h	lbs/hr	kg/h	lbs/hr	kg/h
25S	10	5	25	11	30	14	35	16
50S	30	14	55	25	75	34	80	36
100S	60	27	110	50	140	64	150	68
200S	150	68	290	132	360	163	390	177
400SNC**	170	77	392	178	552	250	637	289
800SNC**	212	96	825	374	1095	497	1223	555

Notes:

* Steam pressure at connection to the STS steam valve (valve provided by DRI-STEEM)

** SNC = Stainless steel heat exchanger with no coating. For use with DI/RO water only.

**Table 13-3:
STS weights**

STS model number	Shipping weight		Operating weight*	
	lbs	kg	lbs	kg
25	95	43	175	79
50	125	57	336	152
100	139	63	350	159
200	245	111	850	386
400	320	145	950	431
800	410	186	1450	658

Note:

* Operating weight does not include weight of interconnecting piping provided by installer.

Heat exchangers and water type

Use with standard water:

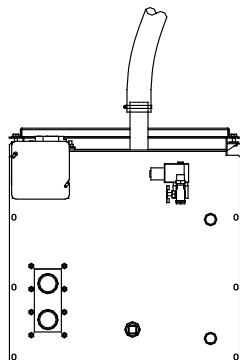
- STS models ending in "C" (copper heat exchangers with a nickel coating)
- STS models ending in "S" (stainless steel heat exchangers with a Teflon coating)

Use with DI/RO water:

- STS models ending in "C" (copper heat exchangers with a nickel coating)
- STS models ending in "S" (stainless steel heat exchangers with a Teflon coating)
- STS models ending in "SNC" (stainless steel heat exchangers with no coating)

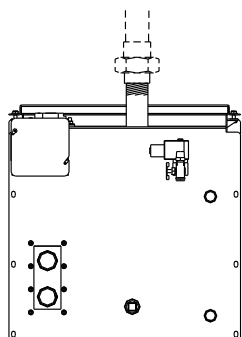
STS connections and clearances

Figure 14-1:
Hose connection



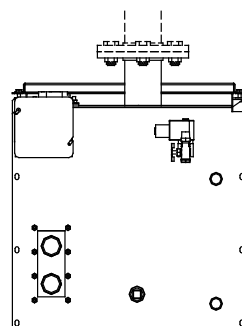
DC-1455

Figure 14-2:
Threaded pipe connection



DC-1456

Figure 14-3:
Flange connection



DC-1458

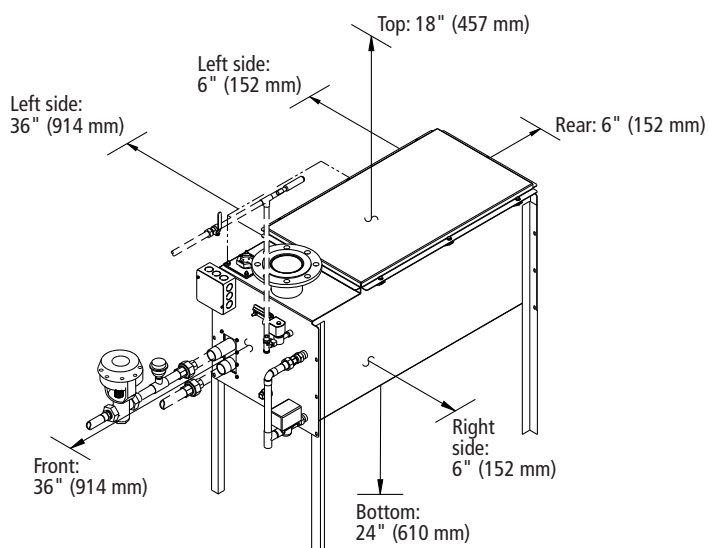
Table 14-1:
Available steam outlet size and type by model

STS model number	Pipe thread size		Hose size		Flange size				Area-type fan
	1½"	2"	1½"	2"	3"	4"	5"	6"	
25	X	X	X	X					X
50	X	X	X	X	X				X
100	X	X	X	X	X	X			X
200		X		X	X	X	X	X	
400		X		X	X	X	X	X	
800						X	X	X	

Table 14-2:
STS connection sizes

Description	Connection size
Water makeup (fill)	¼" pipe thread (DN8)
Drain	¾" (DN20) for standard water models 25 through 100 (and all DI water models) 1" (DN25) for standard water models 200 through 800
Steam dispersion outlet	Varies with capacity and dispersion type. To determine outlet size, see Dri-calc or the "Maximum steam carrying capacity and length of interconnecting hose, tubing, and pipe" table in the DRI-STEEM Design Guide.
Condensate return	¾" pipe thread (DN20)
Pressurized steam supply inlet and return outlet	See dimensions tables.

Figure 14-4:
Recommended clearances



DC-1452

STS dimensions

Figure 15-1:
Dimensions, STS models 25, 50, 100, 200 and 400 (with copper or stainless steel heat exchangers)

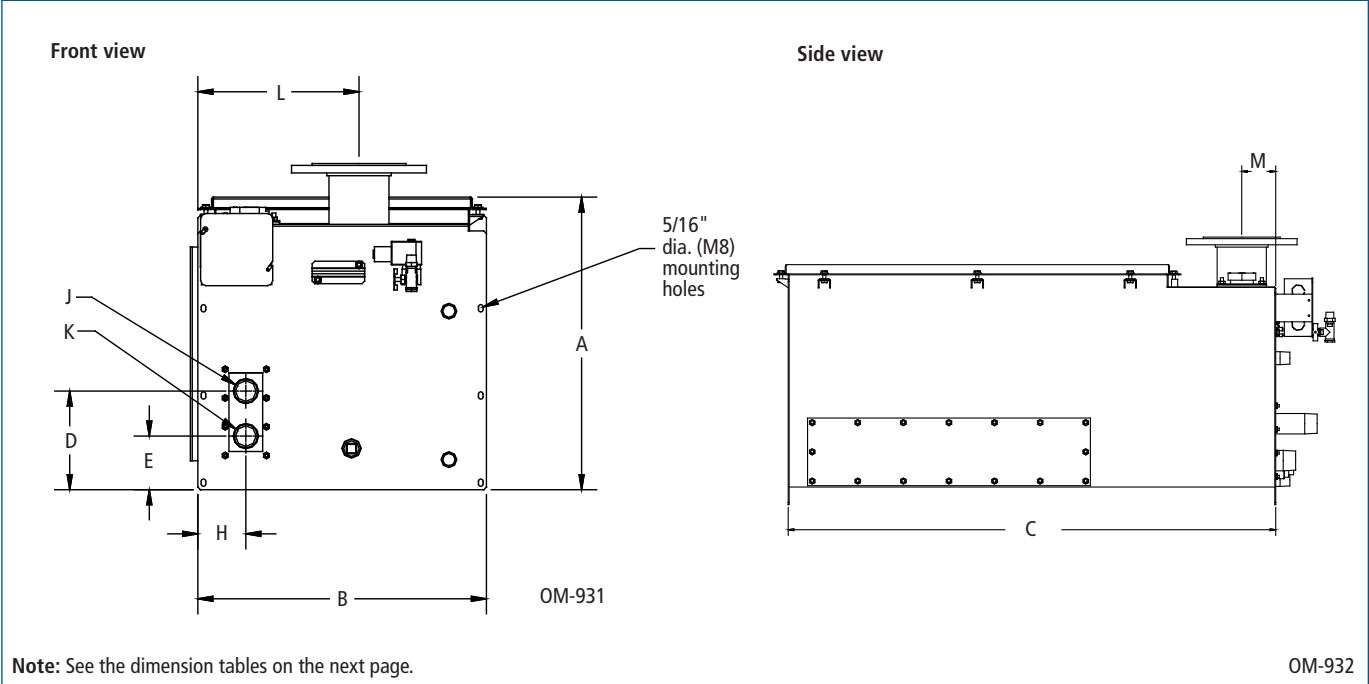
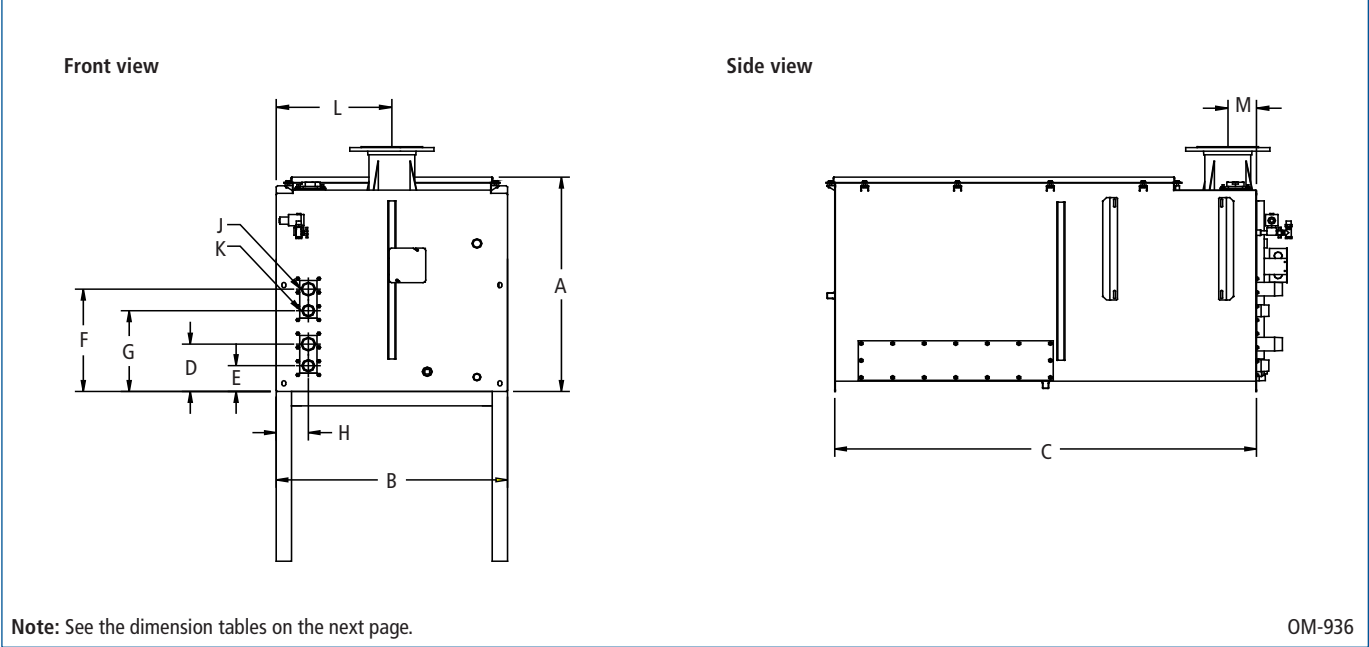


Figure 15-2:
Dimensions, STS model 800 (with copper or stainless steel heat exchangers)



STS dimensions (continued)

Table 16-1:
STS dimensions with copper heat exchangers

	Description	STS model numbers									
		25C		50C		100C		400C		800C	
		inches	mm	inches	mm	inches	mm	inches	mm	inches	mm
A	Height*	19.50	495	19.50	495	19.50	495	19.50	495	29.75	756
B	Width	14.75	375	14.75	375	19.25	489	30.25	768	30.25	768
C	Length	23.65	600	39.65	1007	39.65	1007	55.15	1401	55.15	1401
D	Distance from bottom to supply inlet of first heat exchanger	6.63	168	6.63	168	6.63	168	6.63	168	6.63	168
E	Distance from bottom to return outlet of first heat exchanger	3.63	92	3.63	92	3.63	92	3.63	92	3.63	92
F	Distance from bottom to supply inlet of second heat exchanger	—	—	—	—	—	—	—	—	14.28	363
G	Distance from bottom to return outlet of second heat exchanger	—	—	—	—	—	—	—	—	11.24	285
H	Distance from side to heat exchanger	3.25	83	3.25	83	3.25	83	3.25	83	3.25	83
J	Pressurized steam supply inlet	¾" pipe thread	DN20	1¼" pipe thread	DN32	1¼" pipe thread	DN32	1½" pipe thread	DN40	1½" pipe thread	DN40
K	Pressurized steam return outlet	¾" pipe thread	DN20	¾" pipe thread	DN20	1¼" pipe thread	DN32	1¼" pipe thread	DN32	1¼" pipe thread	DN32
L	Distance from side to steam vapor outlet	6.25	159	8.63	219	9.63	245	13.00	330	13.00	330
M	Distance from front to steam vapor outlet	2.50	64	2.25	57	2.75	70	3.75	95	3.75	95

Notes:
 * Add 23.5" (597 mm) to overall height when STS is mounted on four support legs.
 * Add 22.5" (572 mm) to overall height when STS is mounted on two H-legs.

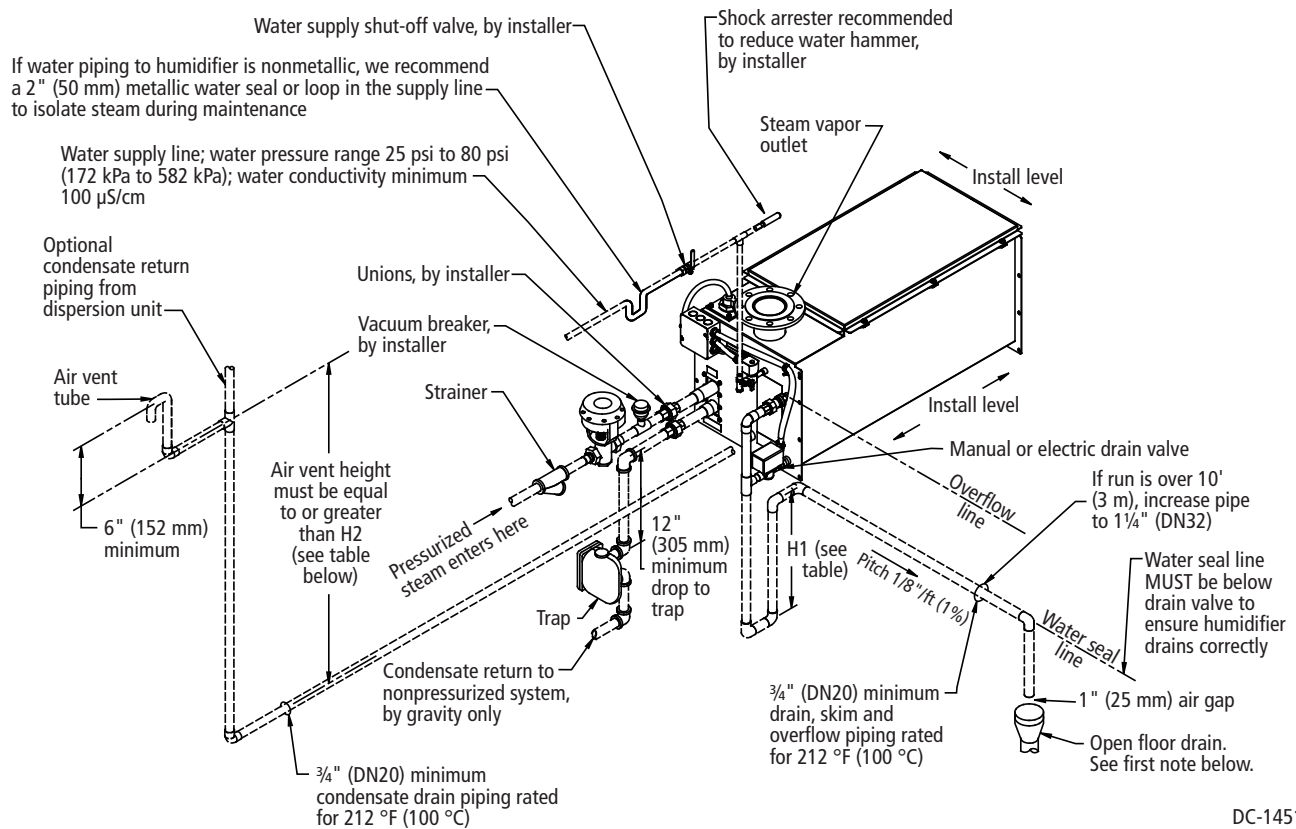
Table 16-2:
STS dimensions with stainless steel heat exchangers

	Description	STS model numbers											
		25S		50S		100S		200S		400SNC		800SNC	
		inches	mm	inches	mm	inches	mm	inches	mm	inches	mm	inches	mm
A	Height*	19.50	495	19.50	495	19.50	495	19.50	495	19.50	495	29.75	756
B	Width	14.75	375	14.75	375	19.25	489	30.25	768	30.25	768	30.25	768
C	Length	23.65	600	39.65	1007	39.65	1007	55.15	1401	55.15	1401	55.15	1401
D	Distance from bottom to supply inlet of first heat exchanger	6.85	174	6.85	174	6.85	174	6.85	174	6.85	174	6.85	174
E	Distance from bottom to return outlet of first heat exchanger	3.35	85	3.35	85	3.35	85	3.35	85	3.35	85	3.35	85
F	Distance from bottom to supply inlet of second heat exchanger	—	—	—	—	—	—	—	—	—	—	14.5	368
G	Distance from bottom to return outlet of second heat exchanger	—	—	—	—	—	—	—	—	—	—	11.0	279
H	Distance from side to heat exchanger	3.25	83	3.25	83	3.25	83	3.25	83	3.25	83	3.25	83
J	Pressurized steam supply inlet	¾" pipe thread	DN20	1" pipe thread	DN25	1" pipe thread	DN25	1½" pipe thread	DN40	1½" pipe thread	DN40	1½" pipe thread	DN40
K	Pressurized steam return outlet	¾" pipe thread	DN20	¾" pipe thread	DN20	¾" pipe thread	DN20	¾" pipe thread	DN20	¾" pipe thread	DN20	¾" pipe thread	DN20
L	Distance from side to steam vapor outlet	6.25	159	8.63	219	9.63	245	13.00	330	13.00	330	13.00	330
M	Distance from front to steam vapor outlet	2.50	64	2.25	57	2.75	70	3.75	95	3.75	95	3.75	95

Notes:
 * Add 23.5" (597 mm) to overall height when STS is mounted on four support legs.
 * Add 22.5" (572 mm) to overall height when STS is mounted on two H-legs.

STS piping (standard water, one heat exchanger)

Figure 17-1:
Field piping overview for STS models 25, 50, 100, 200, 400 (models with one heat exchanger)



DC-1451

Figure 17-1 notes:

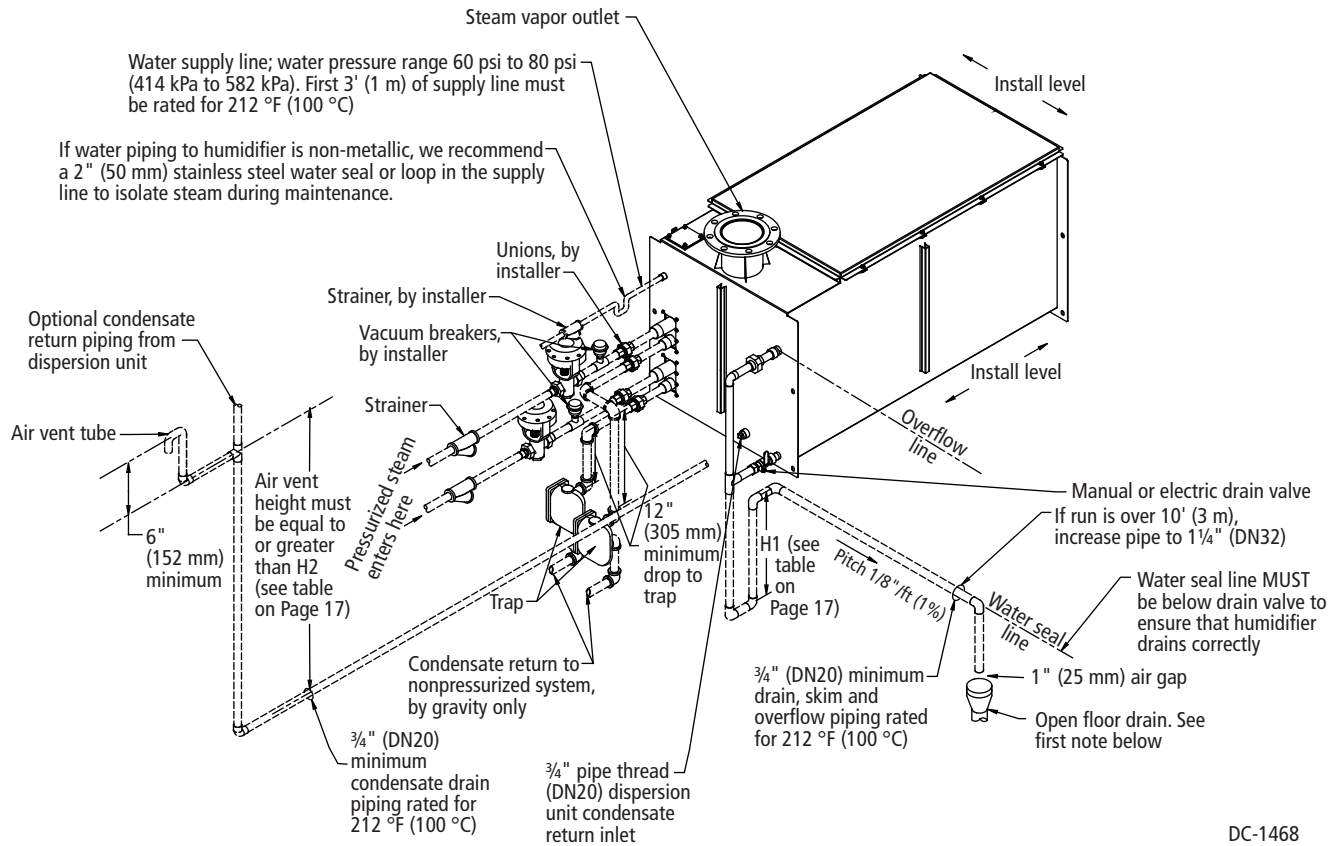
- Locate air gap only in spaces with adequate temperature and air movement to absorb flash steam; otherwise, condensation may form on nearby surfaces. Refer to governing codes for drain pipe size and maximum discharge water temperature.
- Offset humidifier from floor drain to prevent flash steam from rising into the humidifier.
- Dashed lines indicate provided by installer.
- The water supply inlet is more than 1" (25 mm) above the skim/overflow port, eliminating the possibility of backflow or siphoning from the tank. No additional backflow prevention is required; however, governing codes prevail.
- Damage caused by chloride corrosion is not covered by your DRI-STEEM warranty.
- See the next page for recommended water supply piping for a DI/RO system or for piping a system with two heat exchangers.

Table 17-1:
Heights required to overcome humidifier internal pressure (H1, H2)

Unit output		Water seal height (H1)		Air vent height (H2)			
		STS models		STS models			
		All		25, 50, 100, 200, 400		800	
lbs/hr	kg/h	inches	mm	inches	mm	inches	mm
≤ 138	≤ 62	12	305	27	686	—	—
139–183	63–83	15	381	30	762	—	—
> 183	> 83	18	457	33	838	42.25	1073

STS-DI piping (DI water, two heat exchangers)

Figure 18-1:
Field piping overview for STS-DI 800 (DI water model with two heat exchangers)



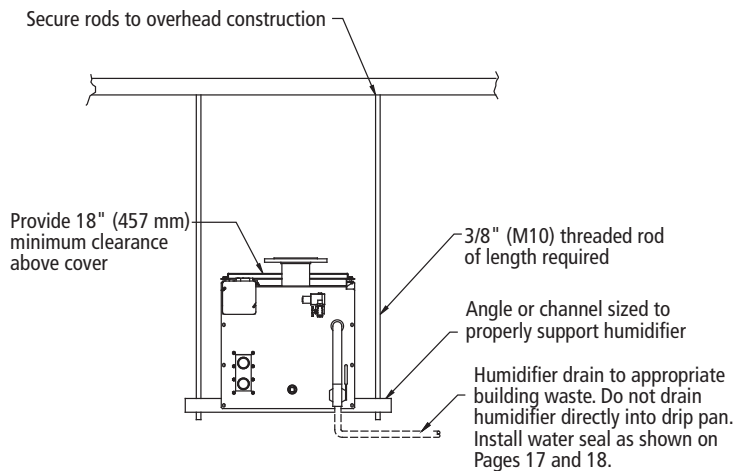
DC-1468

Notes:

- 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.
- Offset humidifier from floor drain to prevent flash steam from rising into the humidifier.
- Dashed lines indicate provided by installer.
- The water supply inlet is more than 1" (25 mm) above the skim/overflow port, eliminating the possibility of backflow or siphoning from the tank. No additional backflow prevention is required; however, governing codes prevail.
- STS-DI model 800 requires supply line water pressure to be between 60 psi and 80 psi (414 kPa and 552 kPa). An optional fill assembly for these models is available for water pressures between 25 psi and 80 psi (172 kPa and 552 kPa). All other STS models operate with water pressure between 25 psi and 80 psi (172 kPa and 552 kPa).
- Damage caused by chloride corrosion is not covered by your DRI-STEEM warranty.
- See the previous page for recommended water supply piping for a standard water system or for piping a system with one heat exchanger.

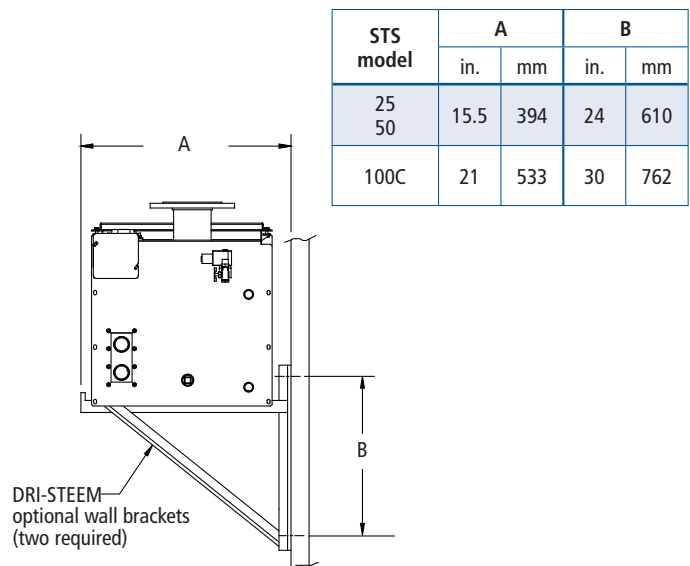
STS mounting

Figure 19-1:
Trapeze hanger



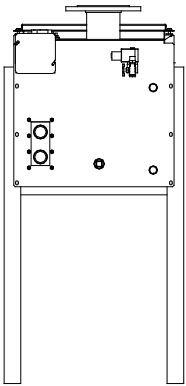
DC-1453

Figure 19-2:
Wall brackets



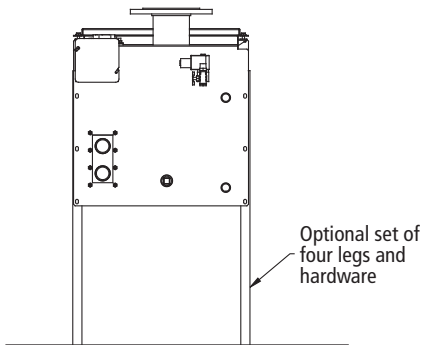
DC-1454

Figure 19-3:
H-legs



OM-947

Figure 19-4:
Support legs



OM-933

Table 19-1:
Mounting options by model

Mounting method	STS/STS-DI models			
	25, 50, 100		200, 400, 800	
	Standard	Optional	Standard	Optional
Trapeze	x			
H-legs			x	
Support legs		x		
Wall brackets		x		

STS weather cover

Optional STS weather cover

The optional weather cover is water-resistant and designed to protect an STS unit from rain and sun. The STS weather cover has been tested and approved by ETL Testing Laboratories, Inc., and is listed to UL Standard 1995 and certified to CAN/CSA Standard C22.2 No. 236.

Figure 20-1:
Weather cover exploded view

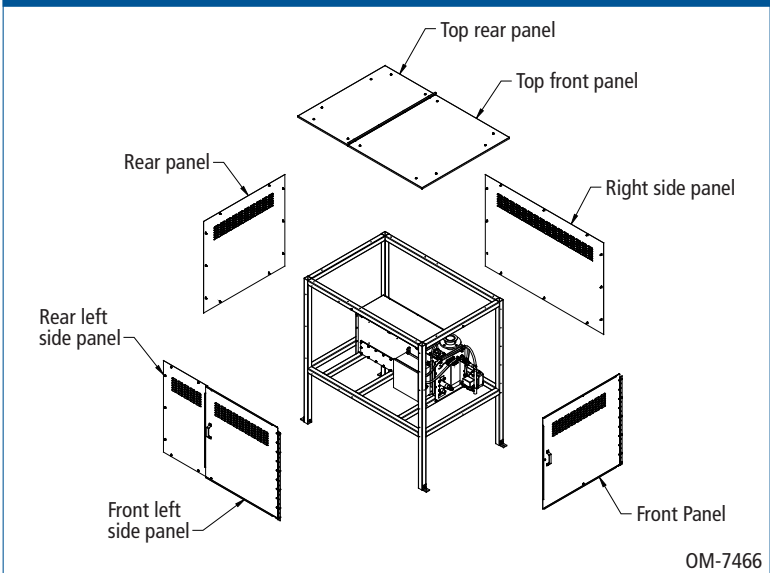


Figure 20-2:
Weather cover dimensions

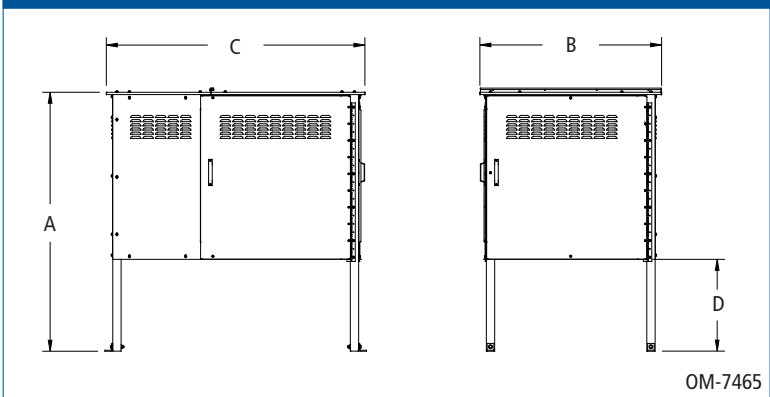


Table 20-1:
Weather cover weights

Weather cover size	lbs	kg
STS 25 to 100	425	193
STS 200 to 800	550	250

Table 20-2:
Weather cover dimensions

Letter	Description	STS 25 to 100		STS 200 to 800	
		inches	mm	inches	mm
A	Height	62	1575	66	1676
B	Length	43.5	1105	53	1346
C	Width	62	1575	78.25	1988
D	Distance from bottom	22	559	22	559

STS outdoor enclosure overview

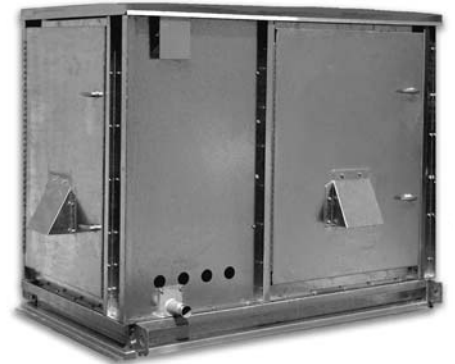
Outdoor enclosure expands application flexibility

Outdoor humidifier operation in any climate is now possible with the DRI-STEEM® outdoor enclosure. This prepackaged, factory-assembled unit ships complete to the job site, ready for easy-to-connect water, electrical or steam field connections to the preinstalled humidifier inside. With a variety of available mounting options — curb, legs, or flush — installation is a snap.

Outdoor enclosure features

- **Install on the ground or on the roof.** Outdoor enclosures are ideal for facilities that have limited interior space.
- **Factory constructed and assembled.** The outdoor enclosure is shipped complete with your humidifier preinstalled and tested. Humidifiers are prepped within the enclosure with an integral water seal and are ready for quick connection to water, steam and electricity.
- **Certified, tested and proven.** In-house testing and numerous successful installations have proven that the outdoor enclosure provides reliable operation under extreme conditions.
- **Easy access for service.** Steel enclosure doors provide full access to all internal components. The doors feature stainless steel hinges and latches operable from both the exterior and interior of the unit.
- **Protects in cold and hot climates.** To ensure complete safety and operation in all climates, the outdoor enclosure has supplemental heating and ventilating systems that automatically maintain required operation conditions. DRI-STEEM humidifiers housed in outdoor enclosures operate properly when outdoor temperatures range from -40 °F to 122 °F (-40 °C to 50 °C).
- **Robust design.** The outdoor enclosure is ruggedly built to completely protect internal components. The enclosure is constructed of heavy-duty galvanized steel and is fully insulated. Gaskets on doors ensure a tight seal.

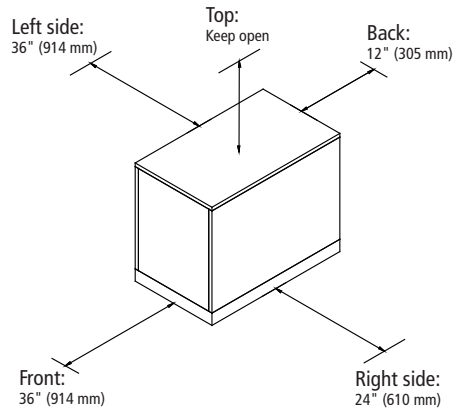
Figure 21-1:
Outdoor enclosure



Now you can install an STS humidifier virtually anywhere with our enclosure for outdoor humidifier mounting. This prepackaged, factory-installed unit ships complete to the job site, ready for easy-to-connect water and electrical connections.

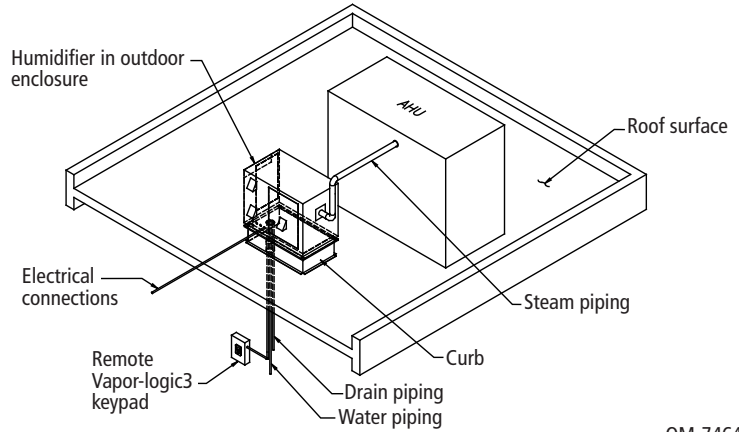
STS outdoor enclosure

Figure 22-1:
Outdoor enclosure clearances



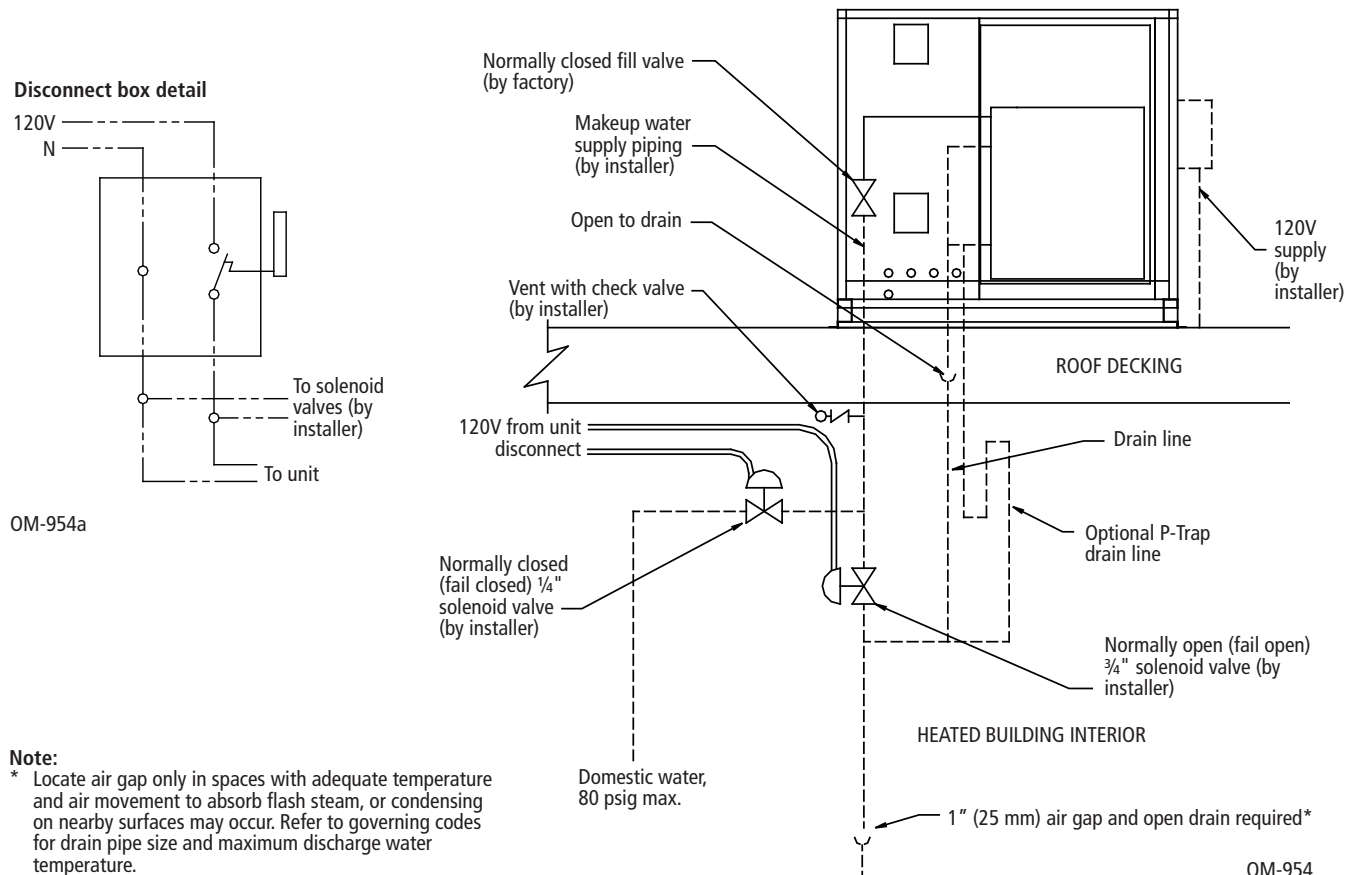
OM-955

Figure 22-2:
Typical rooftop installation overview



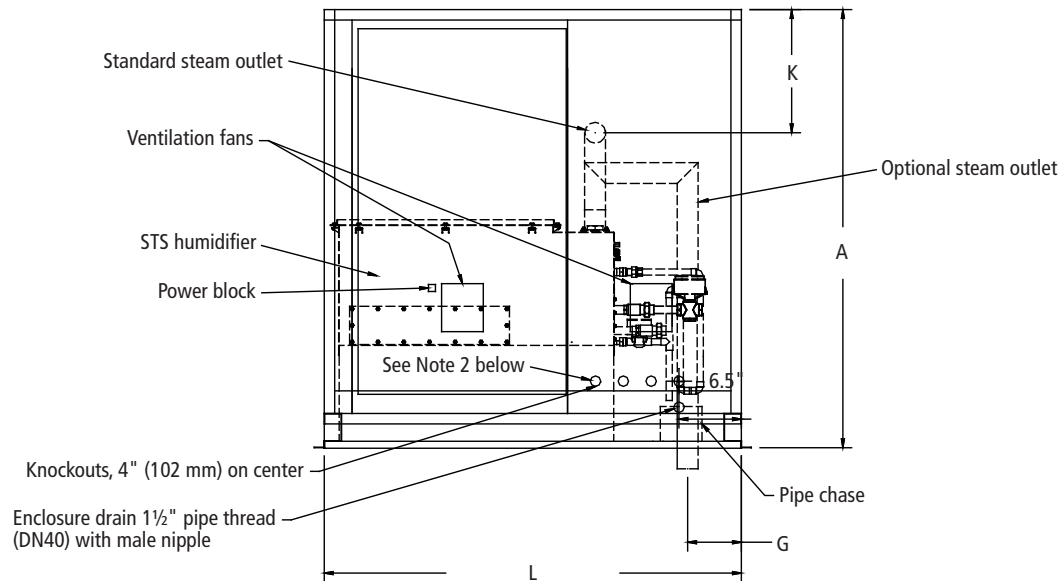
OM-7464

Figure 22-3:
Optional installation method for water supply piping



STS outdoor enclosure

Figure 23-1:
Outdoor enclosure with standard or optional steam outlet, elevation view



DC-1476

Notes:

1. The outdoor enclosure has two available steam distribution configurations. The standard configuration has a steam outlet on the right side of the outdoor enclosure for connecting to steam dispersion unit piping. The optional internal steam distribution configuration routes steam within the outdoor enclosure and down through the enclosure pipe chase into a building.
2. There are four knockouts located on the right and left side of the enclosure. Knockout sizes are 1 1/2" (hole dia. 50 mm) for STS models 25-100, and 2" (hole dia. 63.5 mm) for STS models 200-800. Run the electrical power into the enclosure at these knockouts.
3. All piping from the STS unit to the steam outlet is stainless steel pipe. Depending on the application, interconnecting piping from the steam outlet to the dispersion assembly can be tubing, pipe or DRI-STEEM vapor hose.
4. Install a riser trap in the branch line leading to the humidifier.
5. The preferred location for the STS steam control valve is inside the outdoor enclosure. If one of these valves must be located inside the building, it must be located within 6' (1.8 m) of the humidifier to reduce pressure drop.
6. See the dimensions table on the next page.

Table 23-1:
Outdoor enclosure weights

STS or STS-DI model number	Outdoor enclosure shipping weight*		Outdoor enclosure operating weight*	
	lbs	kg	lbs	kg
STS-25	600	272	680	308
STS-50	625	284	840	381
STS-100	640	290	860	390
STS-200	1050	476	1650	748
STS-400	1125	510	1450	794
STS-800	1225	556	2250	1021

Note:

* Includes humidifier

Table 23-2:
Outdoor enclosure connection sizes

Description	STS or STS-DI model number	
	25-100	200-800
Water makeup (fill)	1/4" pipe thread (DN8)	1/4" pipe thread (DN8)
Drain	3/4" (DN20)	1" (DN25)
Condensate return	3/4" pipe thread (DN20)	3/4" pipe thread (DN20)
Steam outlet	See Page 14	

STS outdoor enclosure (continued)

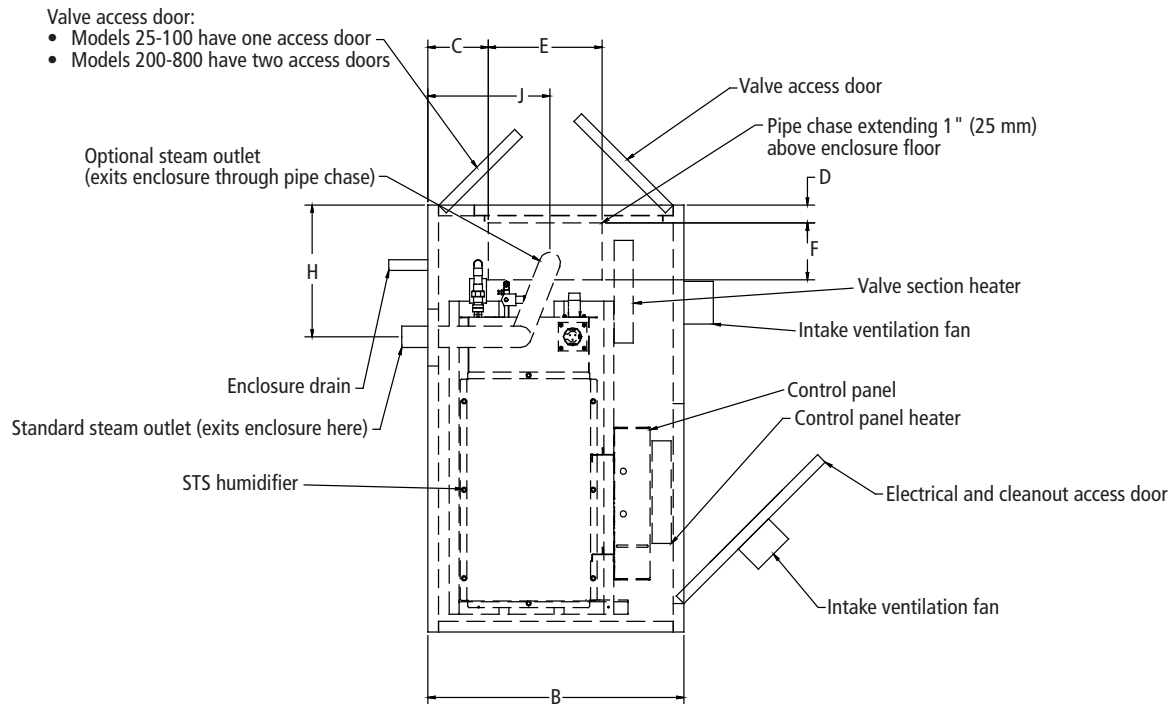
Table 24-1:
Outdoor enclosure dimensions*

Item	Description	STS or STS-DI model number			
		25-100		200-800	
		inches	mm	inches	mm
A	Enclosure height	56.00	1422	66.00	1676
B	Enclosure width	36.00	914	46.00	1168
C	Pipe chase position	4.50	114	4.50	114
D		2.00	57	3.50	89
E	Pipe chase size	20.00	508	32.00	312
F		8.00	203	10.00	254
G	Steam pipe position	6.00	152	8.50	216
H		18.63	473	22.00	559
J		14.50	368	20.50	521
K		12.25	311	11.00	279
L	Enclosure length	60.00	1524	78.00	1981

Note:

* See drawings on this and the previous page.

Figure 24-1:
Outdoor enclosure, top view



DC-1478

Calculating absorption distances

Sample exercise

To learn more about how to specify a dispersion unit based on absorption non-wetting distance, read the sample problem below. For purposes of this sample problem, assume you have chosen to use Ultra-sorb units because you want pre-assembled panels.

Assume the entering air is 20% RH, and the leaving air needs to be 70% RH. Design for a non-wetting distance of 24" (610 mm) maximum.

Solution

Refer to the graph on Page 26: Ultra-sorb non-wetting distances. Find 20% entering RH. Proceed vertically until you intersect the 70% leaving RH line. Draw a line horizontally from that point to the right to see that for 24" (610 mm) of non-wetting distance, 6" (152 mm) tube spacing would be the closest match.

Verify capacity

From Table 26-1: Ultra-sorb tube spacing and capacity on Page 26, note that for 6" (152 mm) spacing, maximum capacity is 18 lbs/hr/ft² (88 kg/h/m²). Multiply this value by the active face area of the Ultra-sorb to determine if the unit will produce adequate output capacity. If the capacity is inadequate, go to the next smaller tube spacing.

Steam absorption considerations

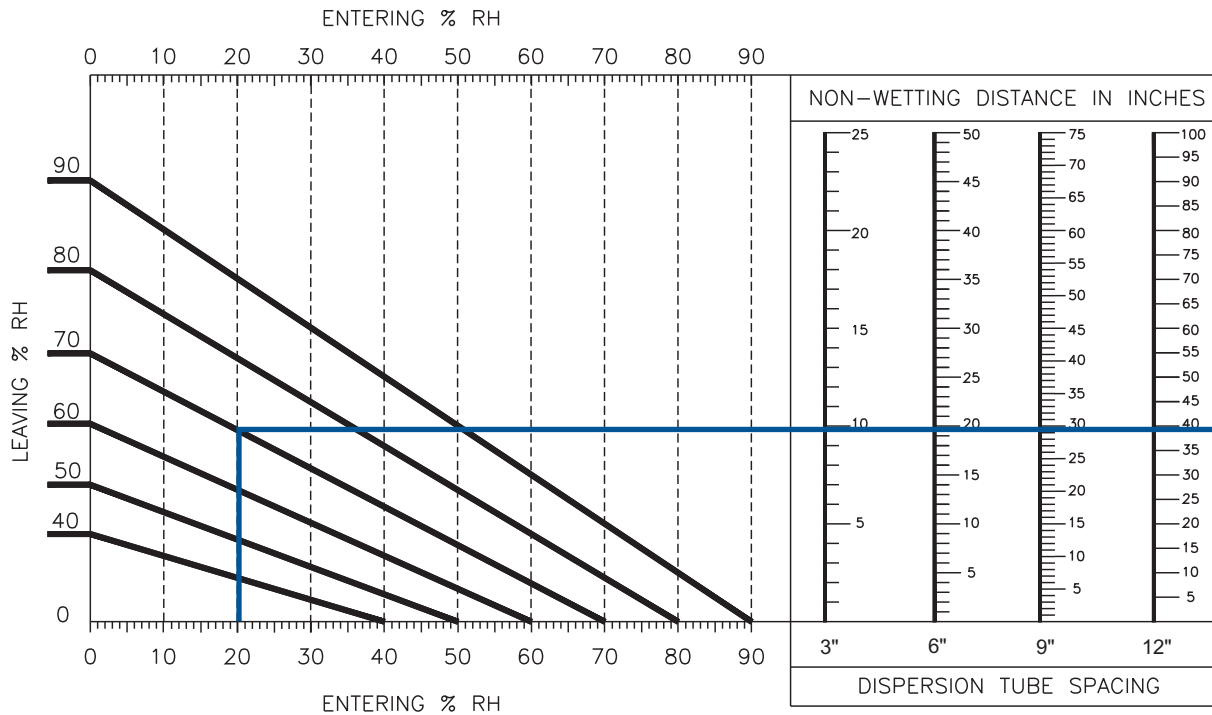
1. Non-wetting distance is the dimension downstream from the leaving side of the steam dispersion assembly to the point where wetting will not occur, although wisps of steam may be present. Solid objects at duct air temperature, such as coils, dampers, fans, etc., downstream of this dimension will remain dry.
2. **CAUTION!** Non-wetting distances described in this catalog do not apply when installing a steam dispersion assembly upstream of filter media. If you need to install a steam dispersion assembly upstream of filter media, consult your representative or DRI-STEEM directly for special recommendations.
3. Note that the rise (Δ) in RH (the difference between entering and leaving RH) has a direct bearing on the non-wetting distance. As the rise increases, more vapor needs to be dispersed into the air, and thus the non-wetting distance increases.
4. Uneven airflow over the cross-section of a dispersion assembly can result in nonuniform mixing of steam with air which, in turn, will adversely affect the non-wetting distance.

Notes:

- Final equipment selection should account for condensate loss. See the DRI-STEEM Design Guide for steam loss tables.
- Dispersion assembly should accommodate maximum output capacity of humidifier.

Ultra-sorb dispersion

Figure 26-1:
Ultra-sorb non-wetting distances



Note:

The above data applies to all air velocities up to 1,500 fpm (7.6 m/s), and is based on air leaving the zone of humidification at conditions of 55 °F (13 °C) and the stated % RH. The blue lines in the graph refer to the sample exercise described on Page 25.

Table 26-1:
Ultra-sorb tube spacing and capacity

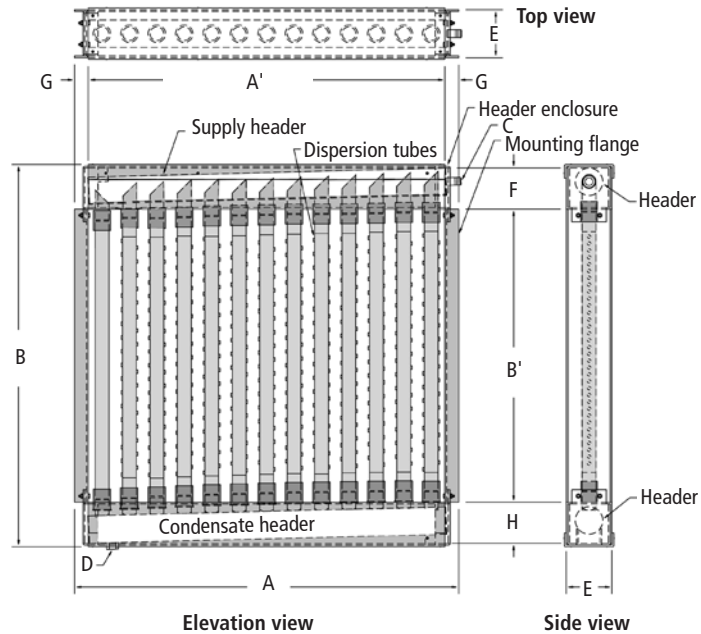
Tube spacing		Maximum capacity	
inches	mm	lbs/hr/ft ²	kg/h/m ²
3	76	36	175
6	152	18	88
9	229	12	59
12	305	9	44

Note:

The above steam flow capacity data is based on pounds (kg) of steam per hour per square foot (meter) of face area, exclusive of headers, at various tube spacings.

Ultra-sorb dimensions

Figure 27-1:
Ultra-sorb dimensions



OM-123us

Table 27-1:
Ultra-sorb dimensions

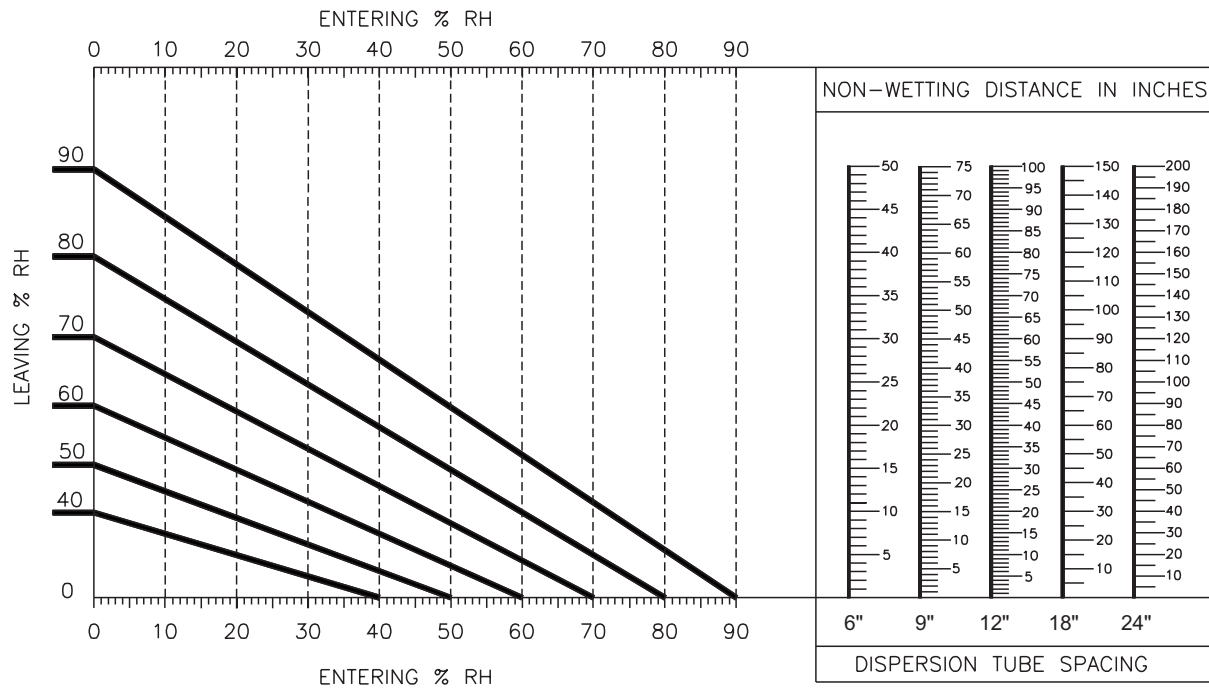
Dimension	Description	Inches (mm)
A	Overall width	15" (381) minimum to 147" (3734) maximum in 1" (25) increments
A'	Face width	12" (305) minimum to 144" (3658) maximum in 1" (25) increments
B	Overall height	21" (533) minimum to 156" (3962) maximum in 1" (25) increments
B'	Face height	12" (305) minimum to 144" (3658) maximum in 1" (25) increments
C	Steam inlet diameter	Determined by maximum capacity
D	Condensate drain	¾" pipe thread (DN20)
E	Header enclosure (front to back)	For 3" (76) and 4" (102) headers, E = 5" (127); for 5" (127) header, E = 6" (152); for 6" (152) header, E = 7" (178)
F	Header enclosure (top to bottom)	For 3" (76) header F = 4.5" (114); for 4" (102) header, F = 5.5" (140); for 5" (127) header, F = 6.5" (165); for 6" (152) header F = 7.5" (191)
G	Flange	1.5" (38)
H	Condensate header enclosure	4.5" (114)

Notes:

- Header diameter varies with capacity.
- Dimensions and specifications subject to change without notice.

Rapid-sorb dispersion

Figure 28-1:
Rapid-sorb non-wetting distances



Note:

The above data applies to all air velocities up to 1,500 fpm (7.6 m/s), and is based on air leaving the zone of humidification at conditions of 55 °F (13 °C) and the stated % RH.

Table 28-1:
Rapid-sorb header capacities

Header capacity		Header diameter	
lbs/hr	kg/h	inches	DN
≤250	≤113	2	50
251-500	114-227	3	80
501-800	228-363	4	100

Table 28-2:
Rapid-sorb dispersion tube capacities*

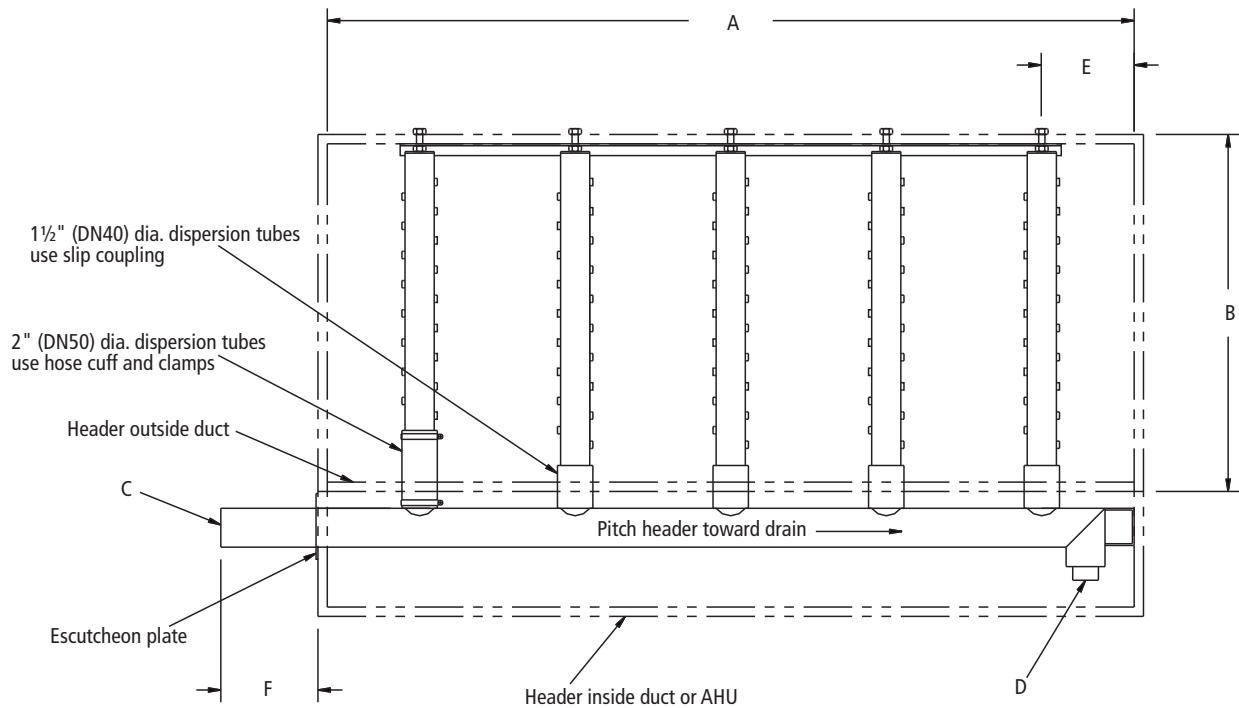
Tube capacity		Tube diameter	
lbs/hr	kg/h	inches	DN
≤35	≤16	1½	40
36-70	17-32	2	50

Note:

* If duct height is <15" (381 mm), tube quantities may need to increase to compensate for reduced capacity of short tubes. Consult DRI-STEEM or see Dri-calc for the correct calculation.

Rapid-sorb dimensions

**Figure 29-1:
Rapid-sorb dimensions**



Note:
Add water seal to condensate drain as shown in the Dri-calc Installation Guides or the STS Installation, Operation, and Maintenance manual.

OM-3005

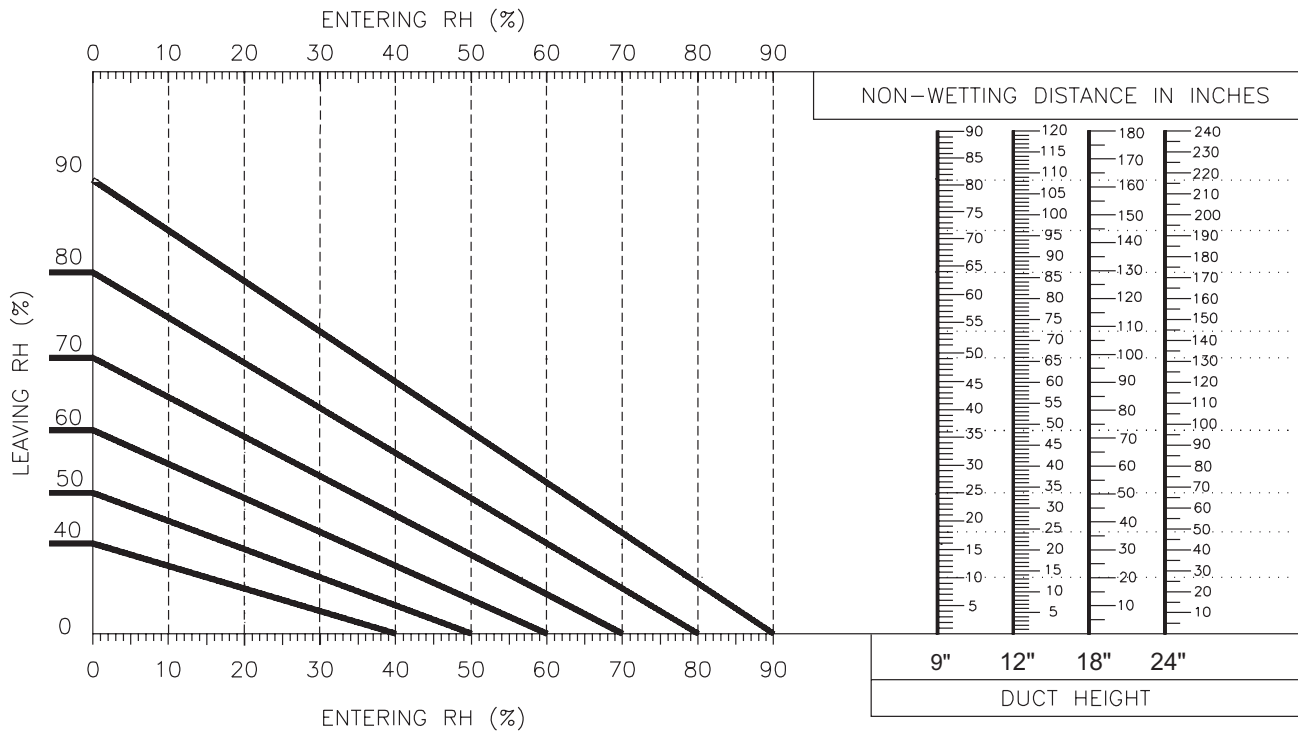
**Table 29-1:
Rapid-sorb dimensions**

Dimension	Description	Inches (mm)
A	Face width	12" (305) minimum to 120" (3048) maximum in 1" (25) increments
B	Face height	12" (305) minimum to 120" (3048) maximum in 1" (25) increments
C	Steam inlet	Determined by supply steam pressure
D	Condensate drain	3/4" pipe thread (DN20)
E	Distance from tube center to inside of duct or AHU wall	4.5" (114) minimum
F	Distance from outside of duct or AHU wall to end of Rapid-sorb leader	4.5" (114) minimum

Note:
All Rapid-sorb units are custom-sized and field-assembled to fit the duct or air handler. Consult DRI-STEEM for sizes larger or smaller than those listed above.

Single tube dispersion

Figure 30-1:
Single tube non-wetting distances



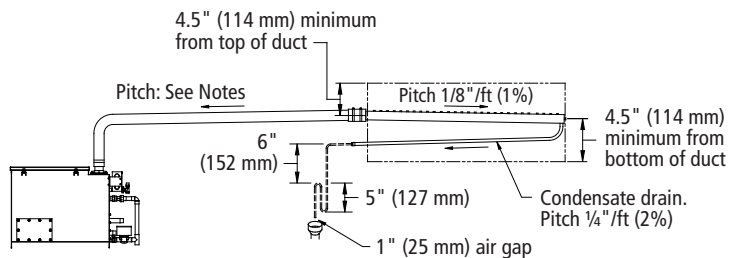
Note:

The above data applies to all air velocities up to 1,500 fpm (7.6 m/s), and is based on air leaving the zone of humidification at conditions of 55 °F (13 °C) and the stated % RH.

Table 30-1:
Capacities for single tube with condensate drain

Tube size		Capacity	
inches	DN	lbs/hr	kg/h
1½	40	56.8	25.8
2	50	85.2	38.6

Figure 30-2:
Single tube with condensate drain



Notes:

Recommended pitch toward humidifier for interconnecting hose, tubing or pipe:

- Vapor hose: 2" /ft (15%)
- 1½" tubing or pipe: 1/2" /ft (5%)
- 2" tubing or pipe: 1/4" /ft (2%)

OM-915

Area-type dispersion

Table 31-1:
Area-type (evaporative steam) minimum non-wetting distances*

Maximum steam capacity		60 °F (16 °C)																	
		30% RH						40% RH						50% RH					
		Rise		Spread		Throw		Rise		Spread		Throw		Rise		Spread		Throw	
lbs/hr	kg/h	ft	m	ft	m	ft	m	ft	m	ft	m	ft	m	ft	m	ft	m	ft	m
50	20	1.0	0.3	2.0	0.6	6.0	1.8	1.0	0.3	2.0	0.6	6.0	1.8	1.0	0.3	2.5	0.8	6.0	1.8
75	34	3.0	0.9	3.0	0.9	8.0	2.4	3.0	0.9	3.0	0.9	8.0	2.4	3.0	0.9	4.0	1.2	8.0	2.4
100	45	4.0	1.2	4.0	1.2	10.0	3.1	4.0	1.2	4.0	1.2	10.0	3.1	4.0	1.2	5.0	1.5	10.0	3.1
150	68	6.0	1.8	5.0	1.5	12.0	3.7	6.0	1.8	5.0	1.5	12.0	3.7	6.0	1.8	5.0	1.5	12.0	3.7
200	90	7.0	2.1	7.0	2.1	13.0	4.0	8.0	2.4	7.0	2.1	14.0	4.3	8.0	2.4	7.0	2.1	14.0	4.3
225	102	7.0	2.1	7.0	2.1	13.0	4.0	8.0	2.4	7.0	2.1	14.0	4.3	8.0	2.4	7.0	2.1	14.0	4.3
250	110	8.0	2.4	8.0	2.4	15.0	4.6	9.0	2.7	9.0	2.7	16.0	4.9	9.0	2.7	9.0	2.7	16.0	4.9
285	130	9.0	2.7	9.0	2.7	17.0	5.2	10.0	3.1	10.0	3.1	18.0	5.5	10.0	3.1	10.0	3.1	18.0	5.5
300	136	9.0	2.7	9.0	2.7	17.0	5.2	10.0	3.1	10.0	3.1	18.0	5.5	10.0	3.1	10.0	3.1	18.0	5.5

Maximum steam capacity		70 °F (21 °C)																	
		30% RH						40% RH						50% RH					
		Rise		Spread		Throw		Rise		Spread		Throw		Rise		Spread		Throw	
lbs/hr	kg/h	ft	m	ft	m	ft	m	ft	m	ft	m	ft	m	ft	m	ft	m	ft	m
50	20	1.0	0.3	1.5	0.5	4.0	1.2	1.0	0.3	2.0	0.6	4.0	1.2	1.0	0.3	2.0	0.6	4.0	1.2
75	34	2.0	0.6	2.0	0.6	6.0	1.8	2.0	0.6	2.5	0.8	6.0	1.8	2.0	0.6	2.5	0.8	6.0	1.8
100	45	3.0	0.9	3.0	0.9	8.0	2.4	3.0	0.9	3.0	0.9	8.0	2.4	3.0	0.9	3.0	0.9	8.0	2.4
150	68	4.0	1.2	4.0	1.2	10.0	3.1	4.0	1.2	4.0	1.2	11.0	3.4	4.0	1.2	4.0	1.2	11.0	3.4
200	90	5.0	1.5	5.0	1.5	11.0	3.4	5.0	1.5	5.0	1.5	12.0	3.7	5.0	1.5	5.0	1.5	12.0	3.7
225	102	5.0	1.5	5.0	1.5	11.0	3.4	5.0	1.5	5.0	1.5	12.0	3.7	5.0	1.5	5.0	1.5	12.0	3.7
250	110	6.0	1.8	6.0	1.8	12.0	3.7	6.0	1.8	6.0	1.8	13.0	4.0	6.0	1.8	6.0	1.8	14.0	4.3
285	130	7.0	2.1	7.0	2.1	14.0	4.3	7.0	2.1	7.0	2.1	15.0	4.6	7.0	2.1	7.0	2.1	16.0	4.9
300	136	7.0	2.1	7.0	2.1	14.0	4.3	7.0	2.1	7.0	2.1	15.0	4.6	7.0	2.1	7.0	2.1	16.0	4.9

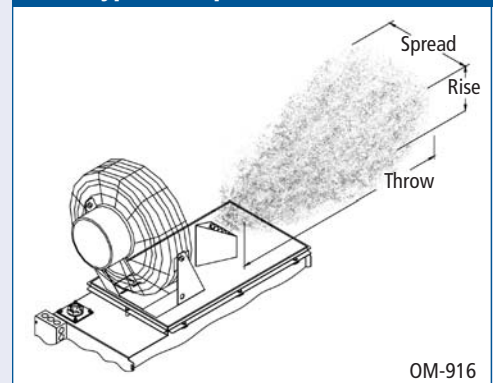
Notes:

* With fan on high speed
 Rise: Minimum non-wetting height above the steam chute
 Spread: Minimum non-wetting width from the steam chute
 Throw: Minimum non-wetting horizontal distance from the steam chute

Table 31-2:
Area-type electric fan specifications*

Motor	120 V, 50/60 Hz
Blade diameter	18" (457 mm)
Speeds	3
Control	Rotary switch
cfm (high speed)	3190
m³/s (high speed)	1.51
rpm (high speed)	1500
Amps (high speed)	1.52

Figure 31-1:
Area-type rise, spread, throw



STS accessories

Expect quality from the industry leader

For more than 40 years, DRI-STEEM has been leading the industry with creative and reliable humidification solutions. Our focus on quality is evident in the construction of the STS, which features cleanable, stainless steel construction, and an industry-leading Two-year Limited Warranty.

For more information

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For current product information, please see the [literature section](#) of our web site.

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Form No. STS-CAT-1009



STS outdoor enclosure

Now you can install an STS humidifier virtually anywhere with our enclosure for outdoor humidifier mounting. This prepackaged, factory-installed unit ships complete to the job site, ready for easy-to-connect water and electrical connections.



Drane-kooler water tempering device

Cool discharged hot water to 140 °F (60 °C), meet governing code requirements for discharge water temperature, and prevent damage to PVC drain piping by using Drane-kooler™. See our Drane-kooler catalog for more information.



Let Dri-calc do the heavy calculating!

DRI-STEEM's exclusive software, Dri-calc, is a user-friendly software program designed to save engineering time. The software sizes loads, selects equipment, writes specifications, generates as-configured installation guides, and creates equipment schedules for DRI-STEEM products. It also includes a library of technical documents. Request a free copy of Dri-calc at our web site, www.dristeem.com.



Your DRI-STEEM representative is: