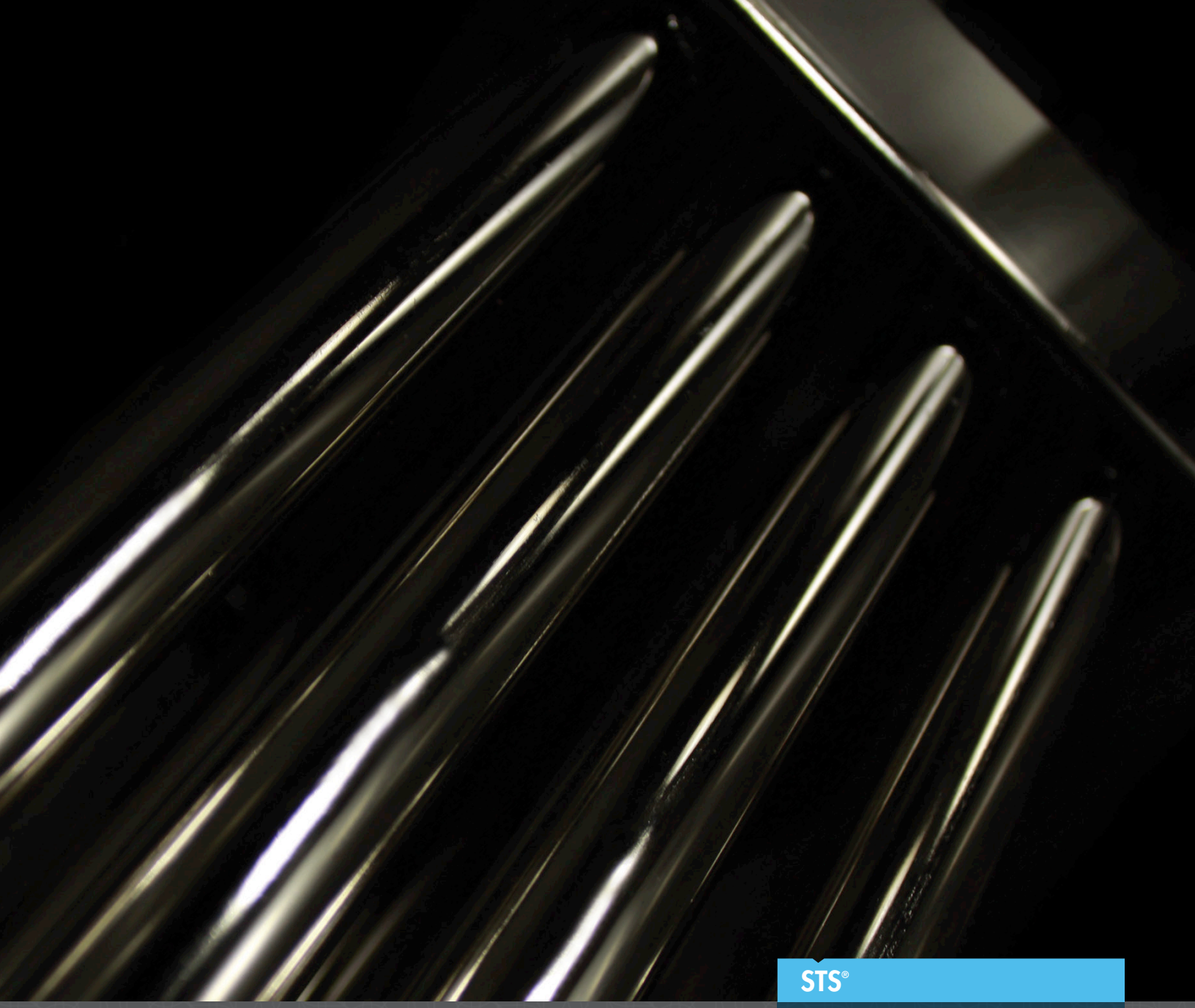


STS®

Steam-to-Steam Humidifier

Vapor-logic® controller with:

- *Web-enabled remote access*
- *Modbus®, BACnet®, and LonTalk® interoperability*
- *Ultra-sorb Model XV dispersion option*

driSteem™

Chemical-free humidification steam

HUMIDIFY USING AN ECONOMICAL ENERGY SOURCE

The STS steam-to-steam humidifier creates chemical-free humidification steam using boiler steam as its energy source. It accomplishes this by using boiler steam in its heat exchanger to vaporize clean fill water into humidification steam. It's a closed-loop system, so no boiler steam or chemicals enter the humidified space; they return to the boiler.

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 learning that chemically treated, boiler-generated steam is unsuitable for direct injection humidification for the following reasons:

- 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 humidifier.

INTEROPERABILITY, WEB-ENABLED ACCESS WITH VAPOR-LOGIC CONTROL

STS humidifiers are now fully interoperable via Modbus or optional BACnet or LonTalk. The Vapor-logic Web interface provides the capability to set up, view, and adjust humidifier functions via Ethernet, either directly or remotely through a network. See Page 3 for more information.

NO DISPERSION-GENERATED CONDENSATE WITH ULTRA-SORB MODEL XV

DriSteem's Ultra-sorb Model XV is an STS steam dispersion option, delivering chemical-free humidification steam with no condensate loss. That's because Ultra-sorb Model XV has a single header with an integral heat exchanger. Boiler steam in the heat exchanger instantly flashes dispersion-generated condensate back into humidification steam while returning pressurized condensate to the boiler without additional pumps, valves, or controls.

STS HUMIDIFIER

The STS humidifier generates chemical-free humidification steam. STS is designed for use with tap or softened water and is available with an option for RO/DI water (water that has been treated using reverse osmosis, or deionized water).

ACCURATE, RESPONSIVE CONTROL

The Vapor-logic controller provides accurate, responsive RH control. PID control tunes the system for maximum performance.

Web interface, a standard feature, enables remote, simultaneous, secure access from anywhere, at any time.

Modbus, BACnet, and LonTalk allow interoperability with multiple building automation systems (BAS).

Up-time optimizer keeps humidifiers operating through system faults, as long as safety conditions are met, minimizing production down-time.

USB port on Vapor-logic allows easy software updates, and data backup and restore capability.

PID control provides accurate, responsive, and adjustable relative humidity control.

Real-time clock allows time-stamped alarm and message tracking, and accurate drain and flush scheduling.

Tank temperature sensor, mounted on the evaporating chamber, allows over-temperature protection, freeze protection, and tank preheating, allowing rapid response to a call for humidity.

Auxiliary temperature sensor/transmitter allows temperature compensation control to prevent window condensation, or air temperature monitoring, such as in a duct.

Programmable outputs allow remote signaling or device activation, and are easily configured during the setup process.

Multiple-humidifier control allows staged control of up to 16 humidifiers with one controller.

Enhanced diagnostics include:

- Test outputs function, using the keypad or Web interface to verify component operation
- Test humidifier function, by simulating demand to validate performance
- Data collection of RH, air temperature, water use, energy use, alarms, and service messages for viewing from the keypad or Web interface

Factory commissioning of humidifier and control board guarantees a reliable, fast installation, minimizing field installation requirements. All units are operated and tested — heating water in each tank — before shipping.

Preconfigured but easily changed. Just go into the Setup menu to change a factory setting if, for example, a transmitter changes.

Insert a USB flash drive into the Vapor-logic board's USB port to perform software updates, download data logs, and back up and restore data.

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.

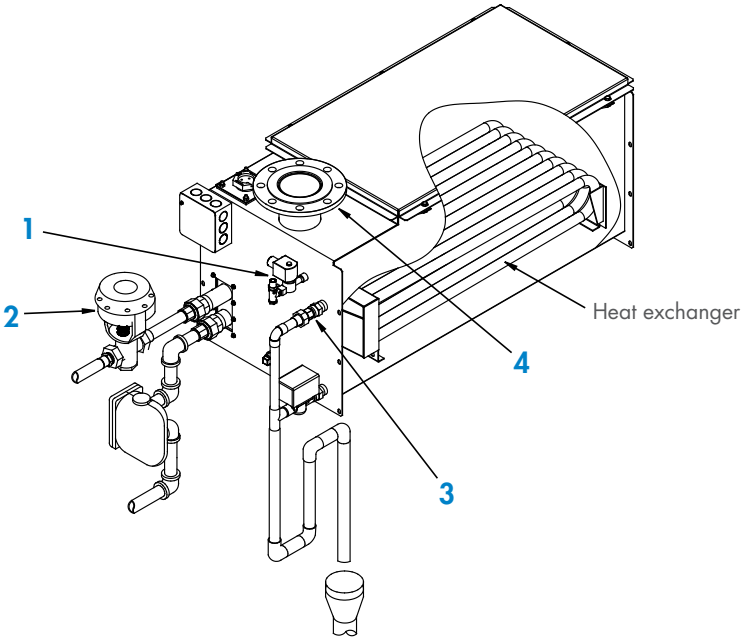
3 During refill in tap/softened water systems, a portion of the surface water is skimmed off, carrying away precipitated minerals.

Humidifiers with the DI/RO water option (using deionized water or water that has been treated using reverse osmosis) do not require skimming.

4 Steam created in the evaporating chamber flows through steam hose, tubing, or piping to the dispersion assembly, where it is discharged into the airstream.

STS PRINCIPLE OF OPERATION

Tap/softened water model shown



OM-938A

1 Vapor-logic controller
(keypad and web interface not shown)
Vapor-logic controls all humidifier functions as a stand-alone controller or integrated into a Modbus, BACnet, or LonTalk system.

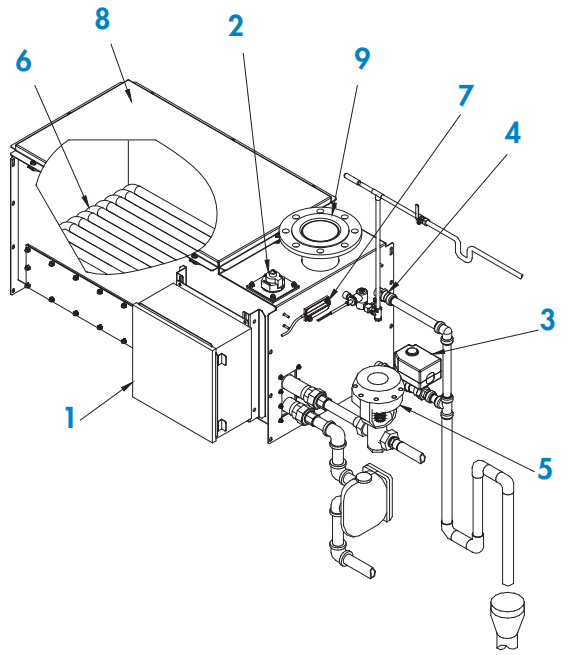
2 Water level control
Tap or softened water systems control water levels electronically using a three-rod probe. DI/RO water systems control water levels using a float valve and a low-water cutoff switch.

3 Drain
Tap/softened water humidifiers are programmed to automatically drain if there is no call for humidity after a user-defined time period (72-hour default).

Humidifiers with the DI/RO water option have a manual drain unless ordered with an electric drain to enable automated end of season draining.

STS COMPONENTS

Tap/softened water model shown



OM-7643

STS features and benefits

Table 6-1: STS humidifier features and benefits	
Reliable	• Control RH to ±3% of set point; control to ±1% of set point with available options for specific applications. Consult DriSteem for recommendations. • Electronically monitored water level ensures continuous, safe operation. • Closed-loop system results in less wear on the boiler — no need to chemically treat make-up water for humidification.
Efficient	• Utilizes energy from existing plant steam. • Most energy-efficient means of producing chemical-free steam with pressurized steam as the energy source.
Flexible	• Easy retrofit for steam injection humidifiers • Broad capacity range from 10 to 1600 lbs/hr (4.5 to 726 kg/h), link up to 16 units for capacity up to 25,600 lbs/hr (11,612 kg/h). • Supports all fill water types: tap, softened, deionized, and reverse osmosis; easy field conversion if water type changes. • Suitable for all dispersion options. • Robust outdoor enclosure or weather cover options available for outdoor operation in any climate.
Easy to maintain	• Cleanout plate and removable cover provide access to heat exchanger and tank without removing steam dispersion piping. • User-adjustable water skimmer eliminates floating minerals, while automatic drain and flush removes precipitated minerals; softened fill water significantly reduces maintenance requirements. • Heat exchanger sheds mineral buildup automatically. • End-of-season autodrain.

Table 6-2: STS humidifier models and capacities with copper heat exchangers

STS models	Steam pressure at connection to STS steam valve (valve provided by DriSteem)							
	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

mc_010411_1645

Table 6-3: STS humidifier models and capacities with stainless steel heat exchangers

STS models	Steam pressure at connection to STS steam valve (valve provided by DriSteem)							
	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

mc_010411_1645

For use with tap/softened or RO/DI 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)

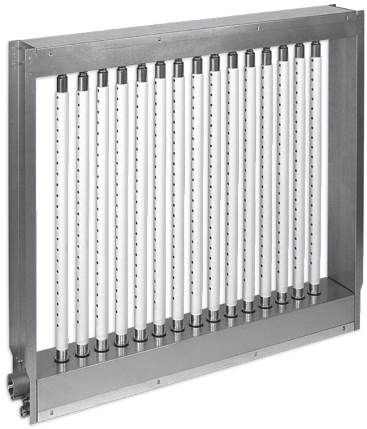
For use with RO/DI water option only:
STS models ending in SNC (stainless steel heat exchangers with no coating)

Table 7-1: STS weights				
STS model	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	413	186	1450	658
* Operating weight does not include weight of interconnecting piping provided by Installer.				

mc_010411_1647

Table 7-2: STS humidifier electrical specifications	
North America	120 V single phase max 3 amps
Europe	230 V single phase max 3 amps

ULTRA-SORB MODEL XV



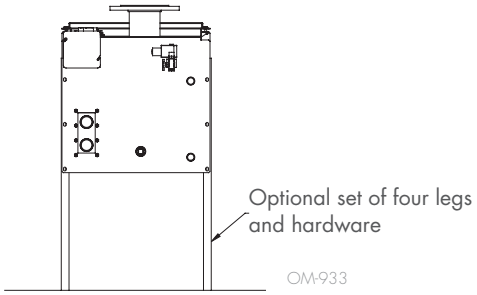
Ultra-sorb Model XV disperses STS-generated humidification steam with no condensate loss.

- *Zero water waste from condensate loss*
- *High-efficiency tubes and insulated header provide up to 85% reduction in wasted energy*
- *Steam capacity up to 450 lbs/hr (204 kg/h) per dispersion panel when used with STS*
- *Dispersion option for all STS models*

STS mounting options

SUPPORT LEGS, STS MODEL 25, 50 AND 100 ONLY

TAP/SOFTENED WATER MODEL SHOWN



WALL BRACKETS, STS MODEL 25, 50, AND 100 ONLY

TAP/SOFTENED WATER MODEL SHOWN

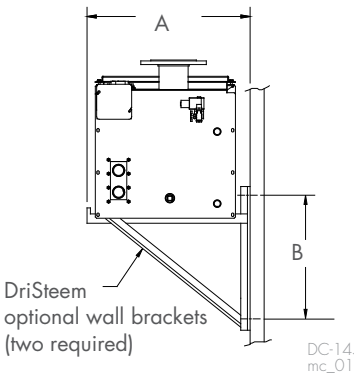
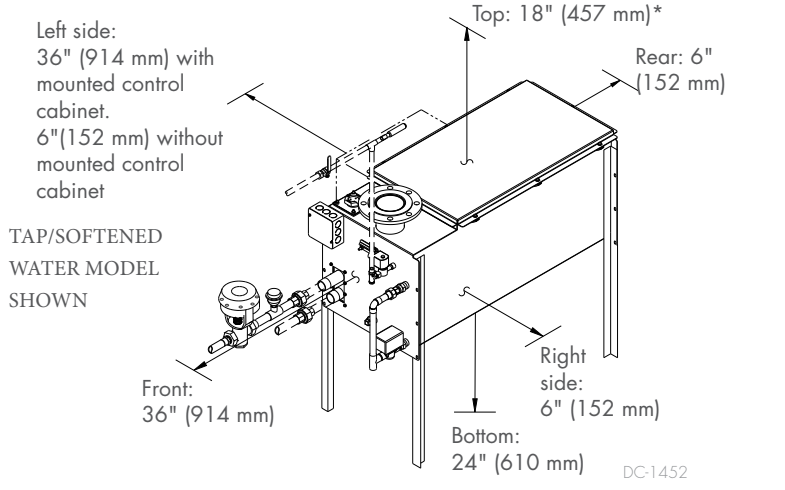


Table 8-2: Clearances

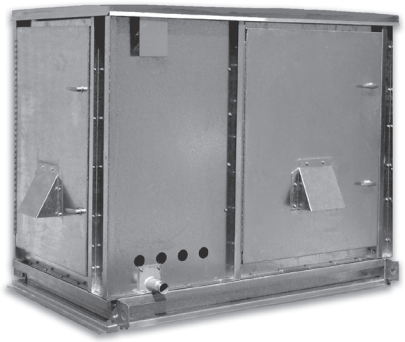
STS model	A		B	
	inches	mm	inches	mm
25 and 50	15.5	394	24	610
100	21	533	30	762

RECOMMENDED CLEARANCES

* Minimum access clearance of 18" (457 mm) recommended for periodic removal of top cover for access to tank.



OUTDOOR ENCLOSURE

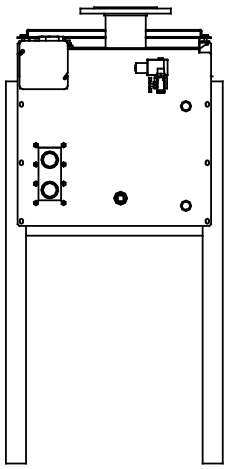


Install an STS humidifier virtually anywhere. This prepackaged, factory-installed unit ships complete to the job site, ready for easy-to-connect water and electrical connections. The STS outdoor enclosure option comes with the control cabinet mounted on the humidifier.

H-LEGS, STS MODELS 200, 400, AND 800 ONLY

TAP/SOFTENED WATER MODEL SHOWN

Due to size and weight, STS models 200, 400, and 800 must be mounted on H-legs.



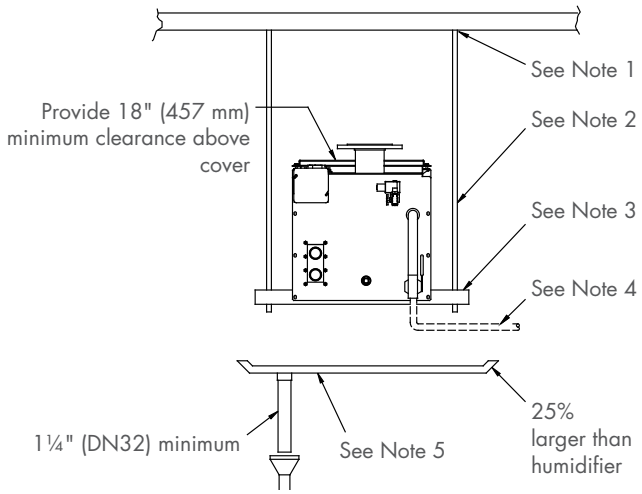
OM-947
mc_010511_1744-tap

Table 9-1:
STS mounting options

Mounting method	STS model	Uninsulated
	25, 50, 100	200, 400, 800
Trapeze hanger	standard	—
H-legs	—	standard
Support legs	optional	—
Wall brackets	optional	—

TRAPEZE HANGER, STS MODELS 25, 50, AND 100 ONLY

TAP/SOFTENED WATER MODEL SHOWN



Notes:
1. Secure rods to overhead construction.
2. 3/8" (M10) threaded rod of length required.
3. Angle or channel sized to properly support humidifier.
4. Humidifier drain to appropriate building waste. Do not drain humidifier directly into drip pan. Install water seal as shown on Pages 13 through 16.
5. Drip pan (by installer) recommended in overhead installations to prevent possible water damage to equipment below.

DC-1453
mc_010511_1743-tap

STS connection sizes

4 Water skimmer/overflow port

In tap/softened 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.

In systems with the DI/RO water option, skimming is not required; the skimmer port functions as an overflow port.

5 Steam valve

Upon a call for humidity, the steam 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 chemical-free humidification steam. The STS is available with either copper or stainless steel heat exchangers.

7 Temperature sensor

Mounted on the evaporating chamber, this sensor enables:

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

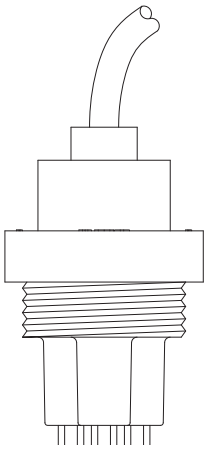
8 Service access

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

9 Steam outlet

Steam generated in the humidifier rises through the steam outlet and travels to the dispersion assembly through steam hose, tubing, or piping.

WATER LEVEL CONTROL FOR TAP/ SOFTENED WATER HUMIDIFIER



VLC-OM-030
mc_030910_1335-STS

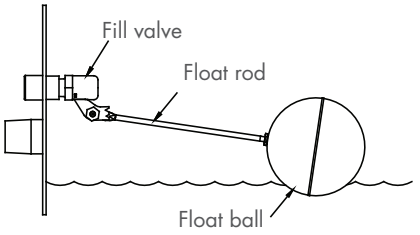
Fill valve closes when water level rises to this probe.

Fill valve opens when water level is below this probe.

Low-water cutoff. Power to heaters is cut if water level drops below this probe (if steam to STS heat exchanger is controlled by Vapor-logic).

Humidifiers 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.

WATER LEVEL CONTROL FOR DI/RO WATER OPTION HUMIDIFIER

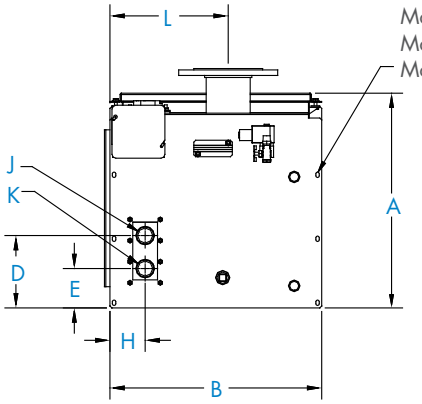


VLC_OM_026

Humidifiers using DI/RO water control water levels using a float valve. An optional low-water cutoff switch is available as a remote water indicator.

DIMENSIONS, STS MODELS 25, 50, 100, 200, AND 400 (WITH COPPER OR STAINLESS STEEL HEAT EXCHANGERS)

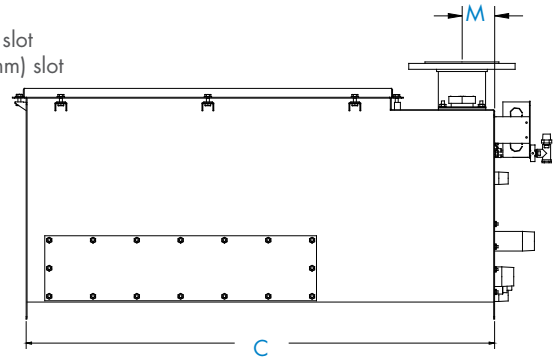
FRONT VIEW



Mounting holes:
Models 25–100: 5/16" (8 mm) slot
Models 200 & 400: 1/2" (12 mm) slot

OM-931

SIDE VIEW



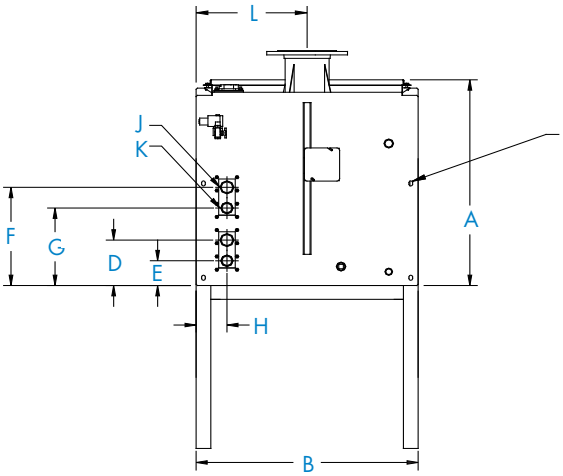
OM-932

mc_010511_1012-tap

Notes:
- Tap/softened water model shown
- See dimensions in Tables 12-1 and 12-2

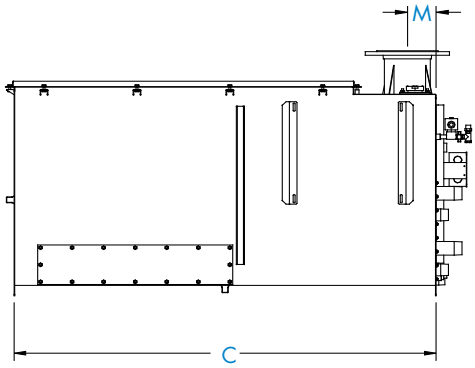
DIMENSIONS, STS MODEL 800 (WITH COPPER OR STAINLESS STEEL HEAT EXCHANGERS)

FRONT VIEW



Mounting hole:
1/2" dia.
(12 mm) slot

SIDE VIEW



OM-936

Notes:
- Tap/softened water model shown
- See dimensions in Tables 12-1 and 12-2

mc_010511_1013-tap

STS dimensions

Table 12-1: Dimensions, STS with copper heat exchangers

	Description See drawings on page 11	STS model*									
		25C		50C		100C		400C		800C	
		inches	mm	inches	mm	inches	mm	inches	mm	inches	mm
A	Height**	19.50	495	19.50	495	19.5	495	19.5	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	Bottom to supply inlet of first heat exchanger	6.63	168	6.63	168	6.63	168	6.63	168	6.63	168
E	Bottom to return outlet of first heat exchanger	3.63	92	3.63	92	3.63	92	3.63	92	3.63	92
F	Bottom to supply inlet of second heat exchanger	–	–	–	–	–	–	–	–	14.28	363
G	Bottom to return outlet of second heat exchanger	–	–	–	–	–	–	–	–	11.24	285
H	Side the 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 condensate return outlet	¾" pipe thread	DN20	¾" pipe thread	DN20	1¼" pipe thread	DN32	1¼" pipe thread	DN32	1¼" pipe thread	DN32
L	Side to steam outlet	6.25	159	8.63	219	9.63	245	13.00	330	13.00	330
M	Front to steam outlet	2.50	64	2.25	57	2.75	70	3.75	95	3.75	95

* C, S, and SNC in model numbers are explained in Table 6-2.
** 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.

mc_010511_1010

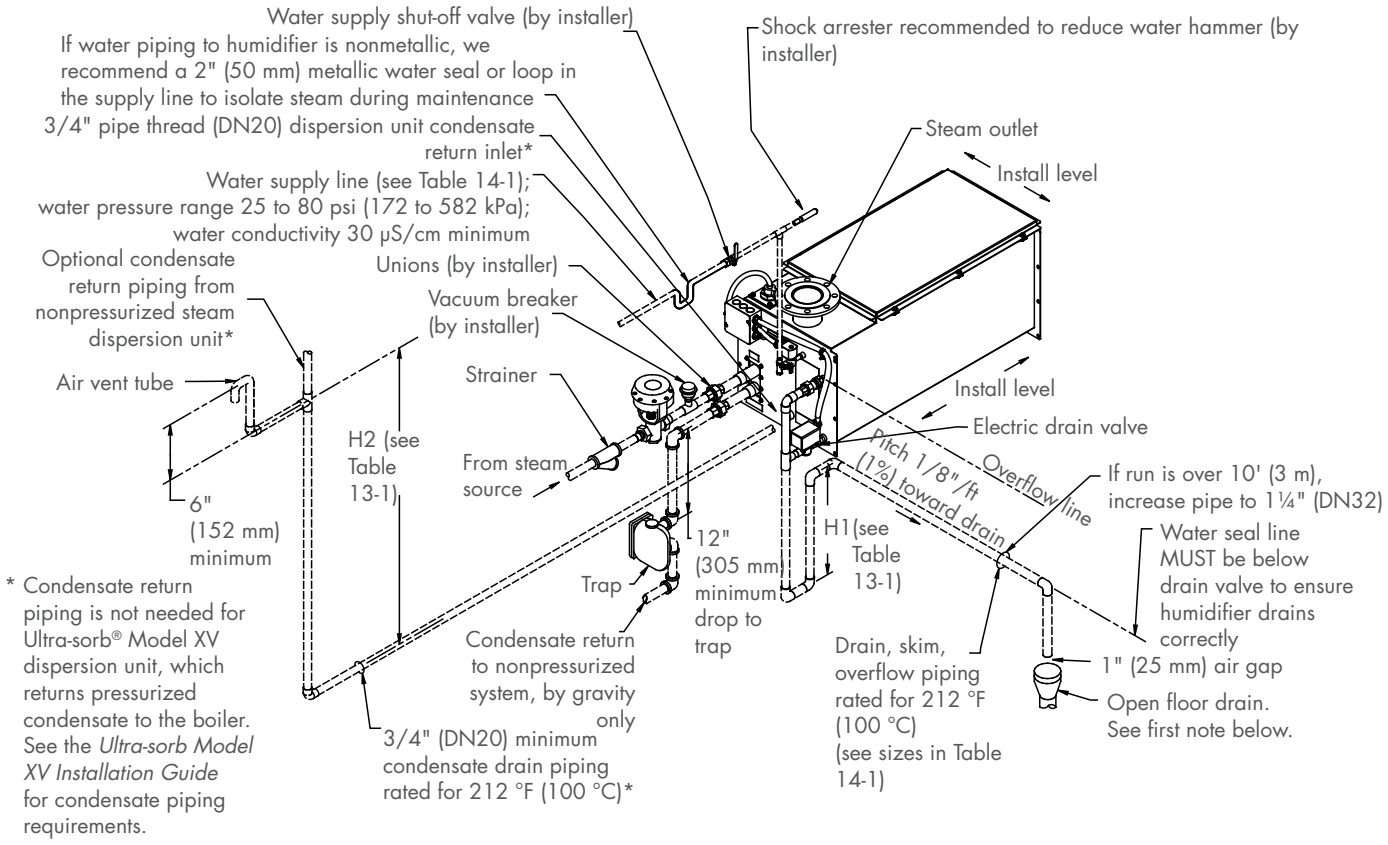
Table 12-2: Dimensions, STS with stainless steel heat exchangers

	Description See drawings on page 11	STS model*											
		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	19.5	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	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	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	Bottom to supply inlet of second heat exchanger	–	–	–	–	–	–	–	–	–	–	14.5	368
G	Bottom to return outlet of second heat exchanger	–	–	–	–	–	–	–	–	–	–	11.0	279
H	Side the 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 condensate 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	Side to steam outlet	6.25	159	8.63	219	9.63	245	13.00	330	13.00	330	13.00	330
M	Front to steam outlet	2.50	64	2.25	57	2.75	70	3.75	95	3.75	95	3.75	95

* C, S, and SNC in model numbers are explained in Table 6-2.
** 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.

mc_010511_1010

FIELD PIPING OVERVIEW FOR TAP/SOFTENED WATER STS MODELS 25, 50, 100, 200, AND 400



Notes:
- Offset humidifier from floor drain to prevent flash steam from rising into the humidifier.
- 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.
- Water supply inlet is more than 1" (25 mm) above skim/overflow port, eliminating the possibility of backflow or siphoning from tank. No additional backflow prevention is required; however, governing codes prevail.
- Damage caused by chloride corrosion is not covered by your DriSteem warranty.
- Dashed lines indicate provided by installer.

mc_010411_1556-tap
DC-1451

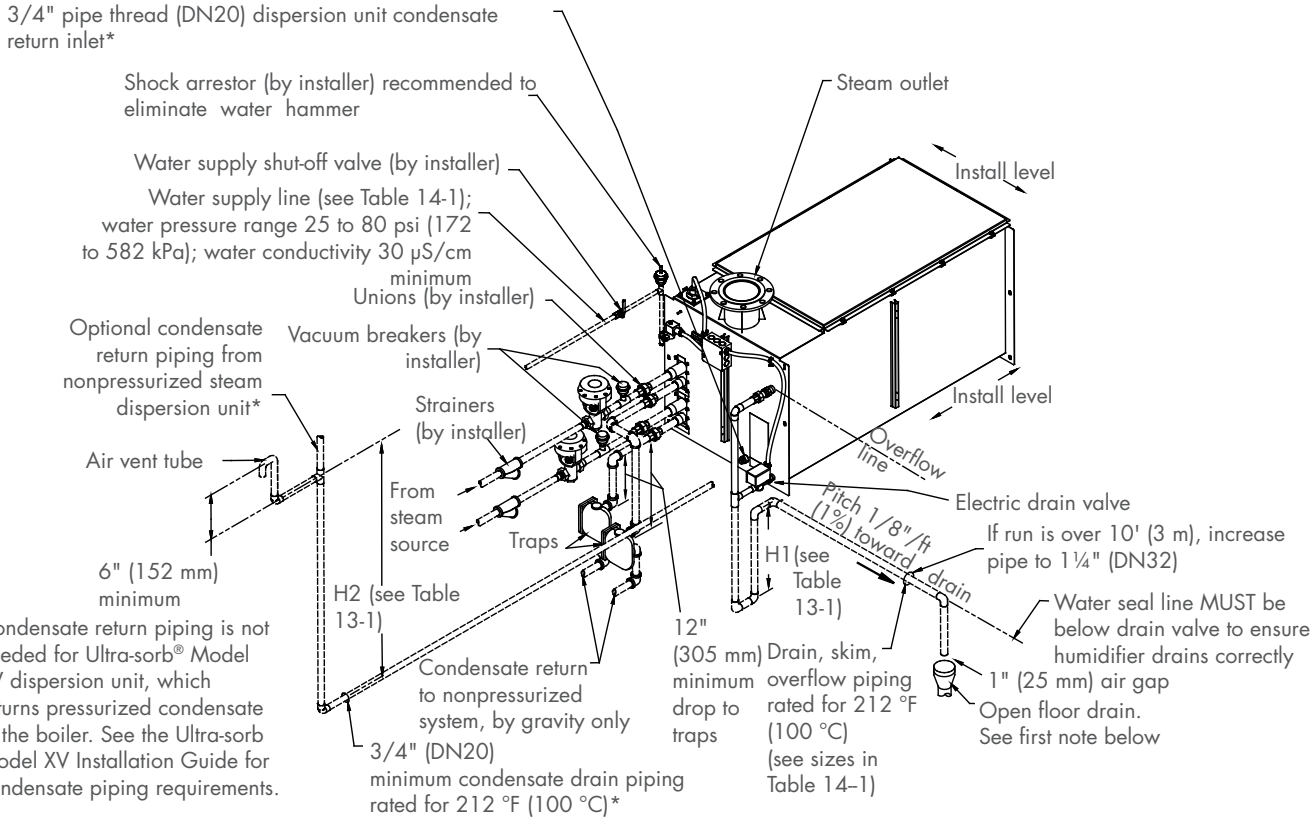
Table 13-1:
Height required to overcome humidifier internal pressure (H1, H2)

Unit output		Water seal height (H1)		Air vent height (H2)			
		All STS models		STS models			
				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	10.73

mc_010611_0730

STS piping: tap/softened water, two heat exchangers

FIELD PIPING OVERVIEW FOR TAP/SOFTENED WATER STS MODEL 800



* Condensate return piping is not needed for Ultra-sorb® Model XV dispersion unit, which returns pressurized condensate to the boiler. See the Ultra-sorb Model XV Installation Guide for condensate piping requirements.

Notes:

- Offset humidifier from floor drain to prevent flash steam from rising into the humidifier.
- 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.
- Water supply inlet is more than 1" (25 mm) above skim/overflow port, eliminating the possibility of backflow or siphoning from tank. No additional backflow prevention is required; however, governing codes prevail.
- Damage caused by chloride corrosion is not covered by your DriSteem warranty.
- Dashed lines indicate provided by installer.

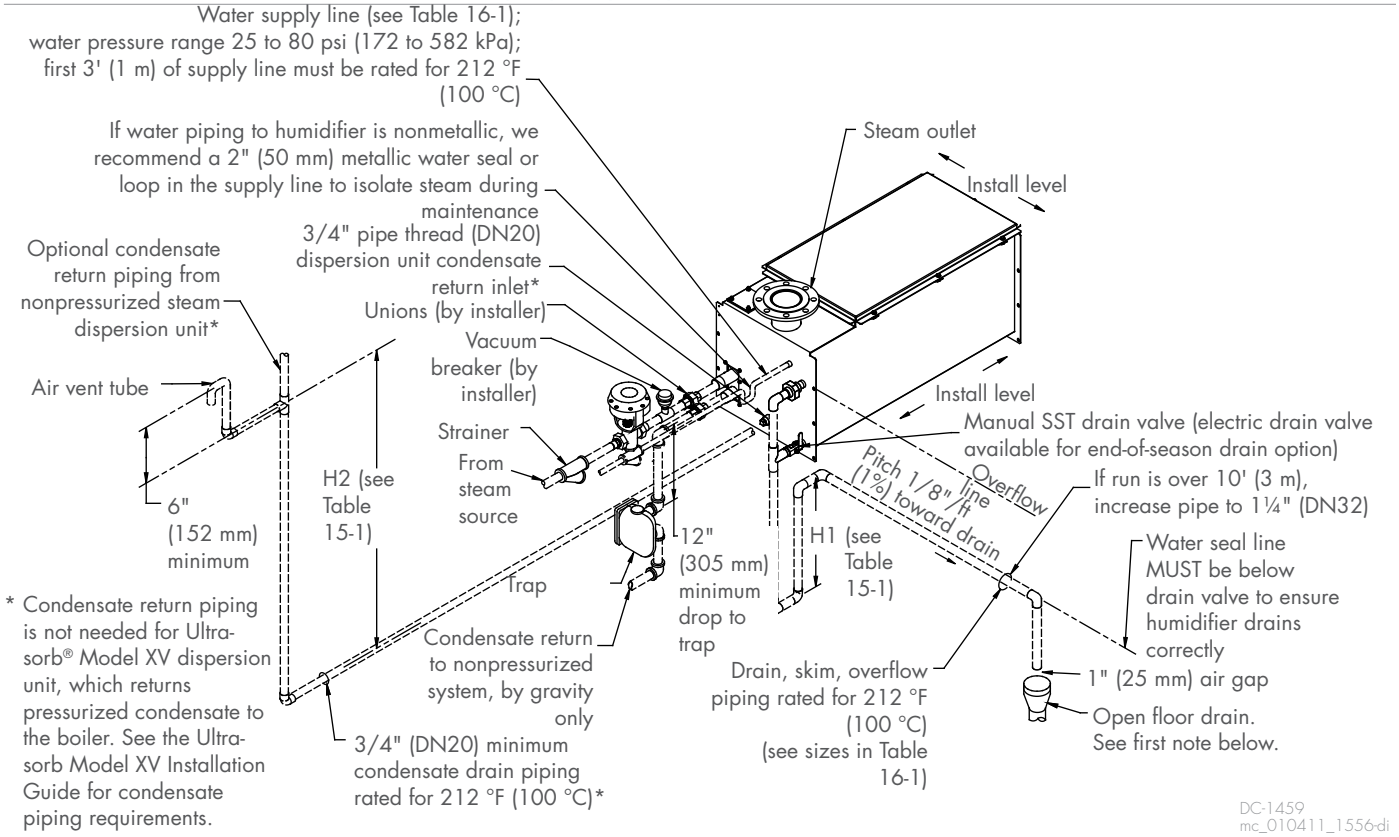
mc_010411_1550-tap
DC-1467

Table 14-1:
STS connection sizes

Description	Connection size
Water makeup (fill)	¼" pipe thread (DN8), all STS models
Drain	¾" (DN20) for STS models 25 through 100 1" (DN25) for STS models 200 through 800
Steam outlet	Varies with capacity and dispersion type; see Table 17-1
Condensate return	¾" pipe thread (DN20)
Pressurized steam supply inlet and return outlet	See sizes in Tables 12-1 and 12-2.

mc_01011_1555

FIELD PIPING OVERVIEW FOR STS MODELS 25, 50, 100, 200, AND 400 WITH DI/RO WATER OPTION



Notes:
- Offset humidifier from floor drain to prevent flash steam from rising into the humidifier.
- 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.
- Water supply inlet is more than 1" (25 mm) above skim/overflow port, eliminating the possibility of backflow or siphoning from tank. No additional backflow prevention is required; however, governing codes prevail.
- Damage caused by chloride corrosion is not covered by your DriSteem warranty.
- Dashed lines indicate provided by installer.

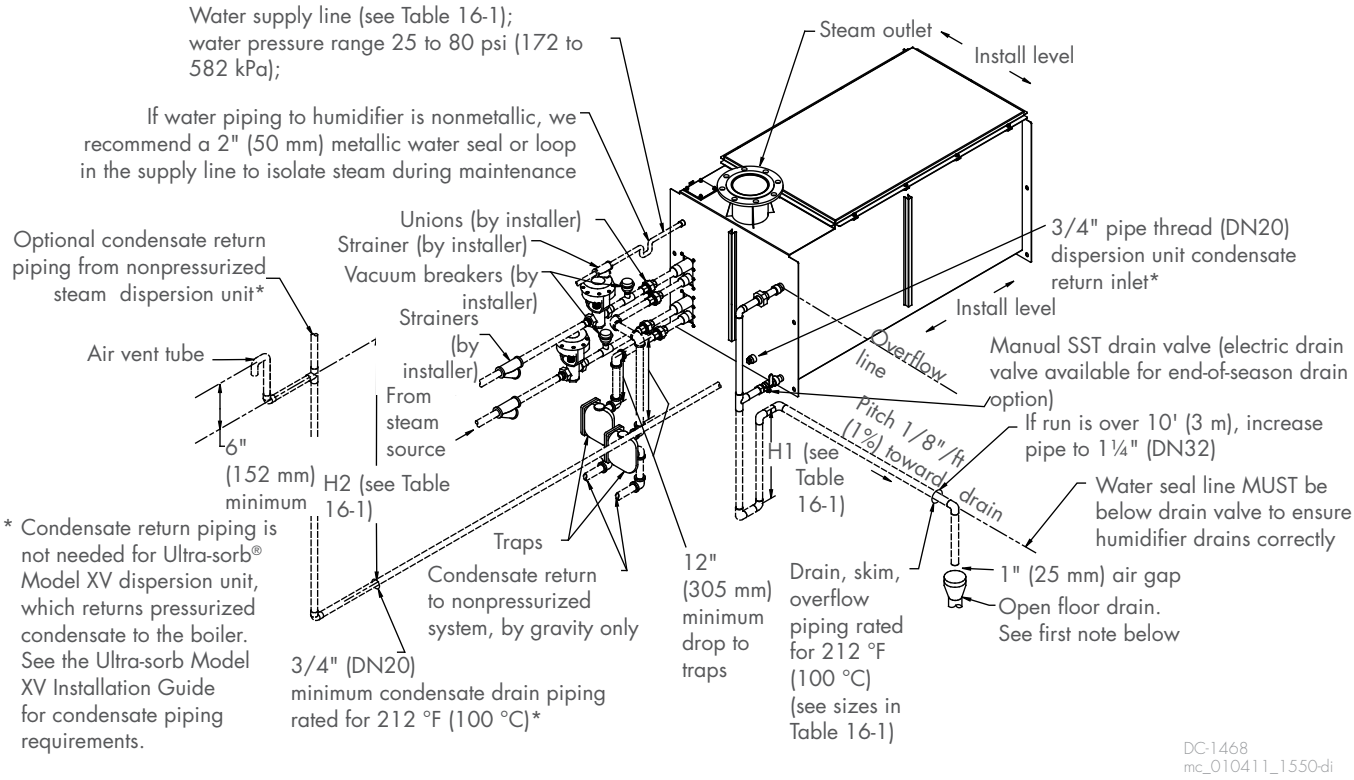
Table 15-1:
Height required to overcome humidifier internal pressure (H1, H2)

Unit output		Water seal height (H1)		Air vent height (H2)			
		All STS models		STS models			
				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	10.73

mc_010611_0730

STS piping: DI/RO water option, two heat exchangers

FIELD PIPING OVERVIEW FOR STS MODEL 800 WITH DI/RO WATER OPTION



Notes:
- Offset humidifier from floor drain to prevent flash steam from rising into the humidifier.
- 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.
- Water supply inlet is more than 1" (25 mm) above skim/overflow port, eliminating the possibility of backflow or siphoning from tank. No additional backflow prevention is required; however, governing codes prevail.
- Damage caused by chloride corrosion is not covered by your DriSteem warranty.
- Dashed lines indicate provided by installer.

Table 16-1:
STS connection sizes

Description	Connection size
Water makeup (fill)	¼" pipe thread (DN8), all STS models
Drain	¾" (DN20) for STS models 25 through 100 1" (DN25) for STS models 200 through 800
Steam outlet	Varies with capacity and dispersion type; see Table ?-1
Condensate return	¾" pipe thread (DN20)
Pressurized steam supply inlet and return outlet	See sizes in Tables ?-1 and ?-2.

mc_01011_1555

Table 17-1:
Maximum steam carrying capacity and length of interconnecting steam hose, tubing, and pipe*

DriSteem steam hose†††						Copper or stainless steel tubing and Schedule 40 steel pipe					
Hose I.D.		Maximum capacity		Maximum length**		Tube or pipe size***		Maximum capacity		Maximum developed length†	
inches	DN	lbs/hr	kg/h	ft	m	inches	DN	lbs/hr	kg/h	ft	m
2	50	250	113	10	3	2	50	220	100	30	9
						3††	50††	450	204	80	24
						4††	80††	750	340	100	30
						5††	100††	1400	635	100	30
						6††	125††	2300	1043	100	30

* Based on total maximum pressure drop in hose, tubing, or pipe of 5" wc (1244 Pa).
** Maximum recommended length for steam hose is 10' (3 m). Longer distances can cause kinking or low spots.
*** To minimize loss of capacity and efficiency, insulate tubing and pipe.
† Developed length equals measured length plus 50% of measured length to account for pipe fittings.
†† Requires flange connection.
††† When using steam hose, use DriSteam steam hose for best results. Field-supplied 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.

mc_091410_1050-STS

STS steam outlet connections

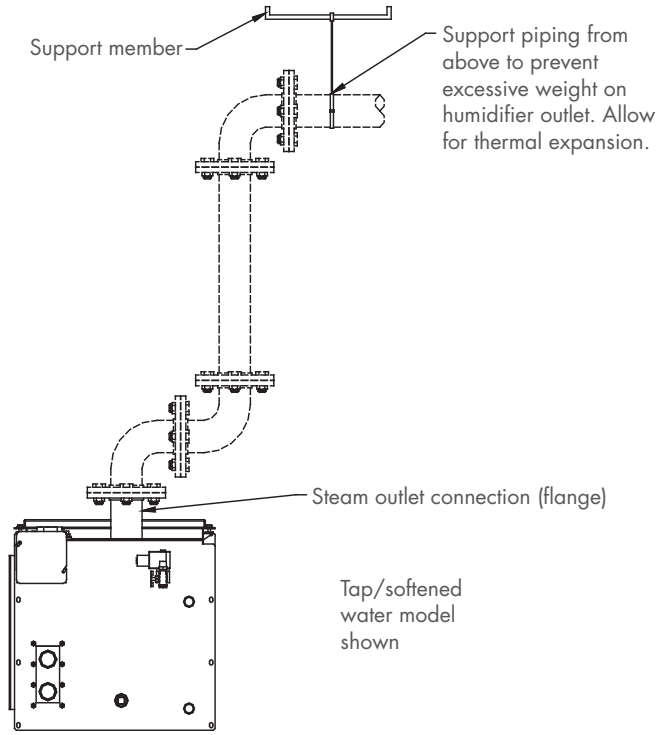
Table 18-1:
STS steam outlet sizes and types

STS model	Pipe thread size	Hose size	Flange size			
	2" (DN50)	2" (DN50)	3" (DN80)	4" (DN100)	5" (DN125)	6" (DN150)
25	X	X				
50	X	X	X			
100	X	X	X	X		
200			X	X	X	X
400			X	X	X	X
800				X	X	X

mc_010611_1100

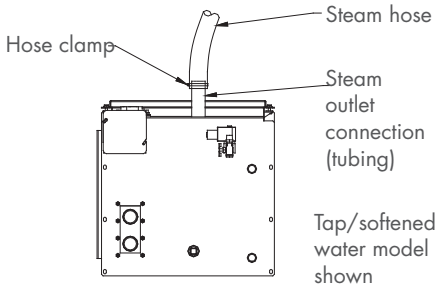
FLANGE CONNECTION

Dashed lines indicate provided by installer



DC-1458
mc_010511_1745-tap

2-INCH HOSE CONNECTION



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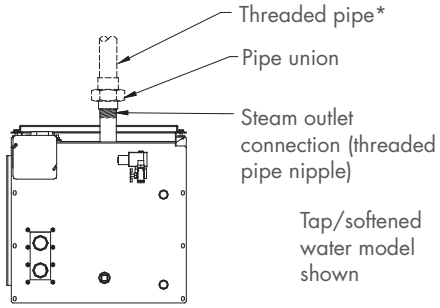
2-INCH THREADED PIPE CONNECTION

Dashed lines indicate provided by installer

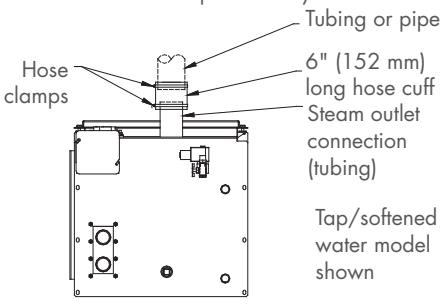
* Support pipe from above to prevent excessive weight on humidifier outlet. Allow for thermal expansion.



DC-1456
mc_010511_1747-tap

2-INCH TUBING OR HARD PIPE CONNECTION USING HOSE CUFF WITH CLAMPS

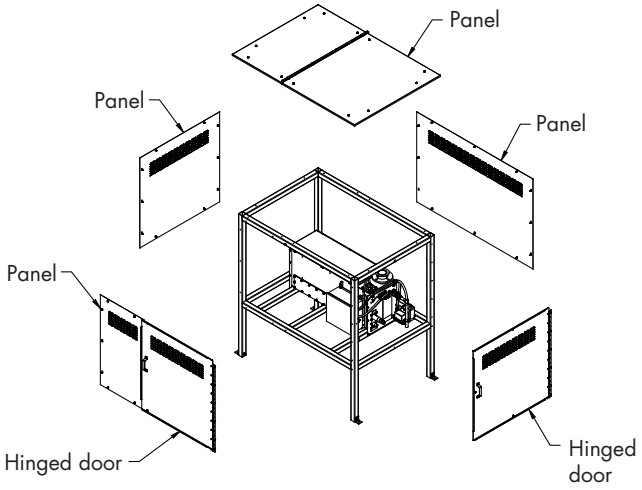
Dashed lines indicate provided by installer



DC-1456
mc_010511_1746-tap

The optional STS weather cover is water-resistant and designed to protect an STS humidifier from rain and sun. The STS weather cover option comes with the control cabinet mounted on the humidifier. This 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.

WEATHER COVER EXPLODED VIEW



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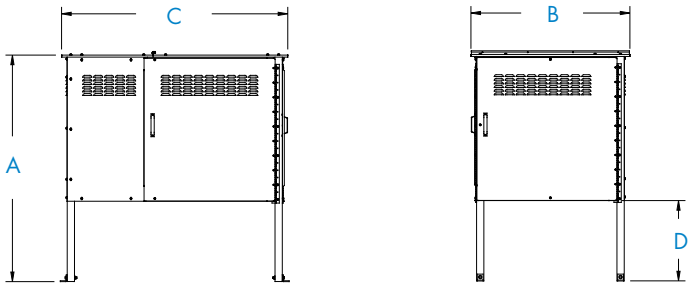
WEATHER COVER DIMENSIONS



OM-7465
mc_012511_1607

Table 19-2: Weather cover weights

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

mc_012511_1600

Table 19-1: STS dimensions

	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

mc_012511_1605

STS outdoor enclosure

Outdoor humidifier operation in any climate is possible with the DriSteem outdoor enclosure. The prepiped, factory-assembled unit ships complete to the job site. Installation is a snap with curb or flush mounting options.

Factory constructed and assembled. The outdoor enclosure is shipped complete with the humidifier preinstalled and tested. The humidifier is prepiped within the enclosure with an integral water seal, ready for quick connection to water, steam and electricity.

Install on the ground or on the roof. Outdoor enclosures are ideal for facilities that have limited interior space.

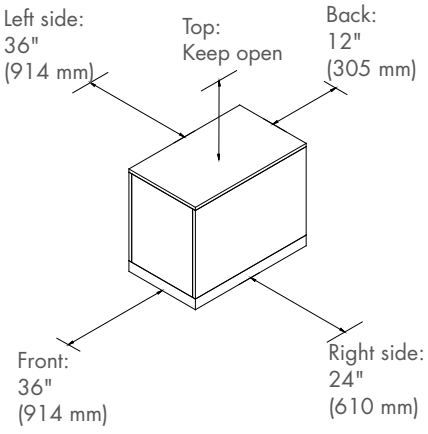
Certified, tested and proven. In-house testing and numerous successful installations have proven that the outdoor enclosure provides reliable operation under extreme conditions.

Easy access for service. Steel enclosure doors provide full access to internal components. The doors feature stainless steel hinges, and the latches operate from outside and inside 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).

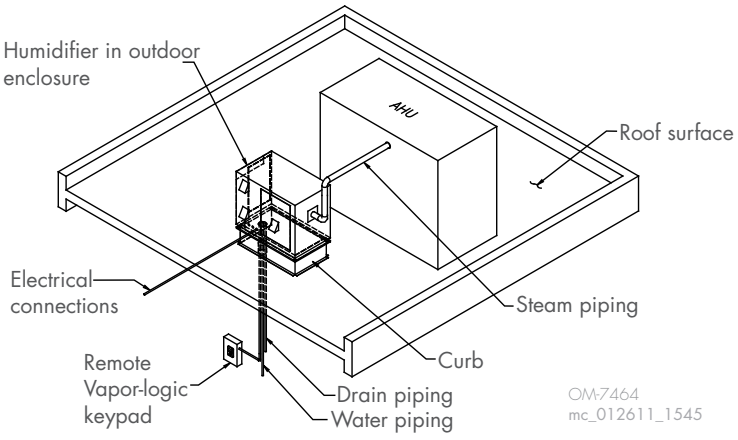
Robust design. The outdoor enclosure is ruggedly built to completely protect internal components. The enclosure is constructed of heavy-duty galvanized steel and is fully insulated. Gaskets on doors ensure a tight seal.

OUTDOOR ENCLOSURE CLEARANCES



OM-955
mc_012611_1546

TYPICAL ROOFTOP INSTALLATION OVERVIEW



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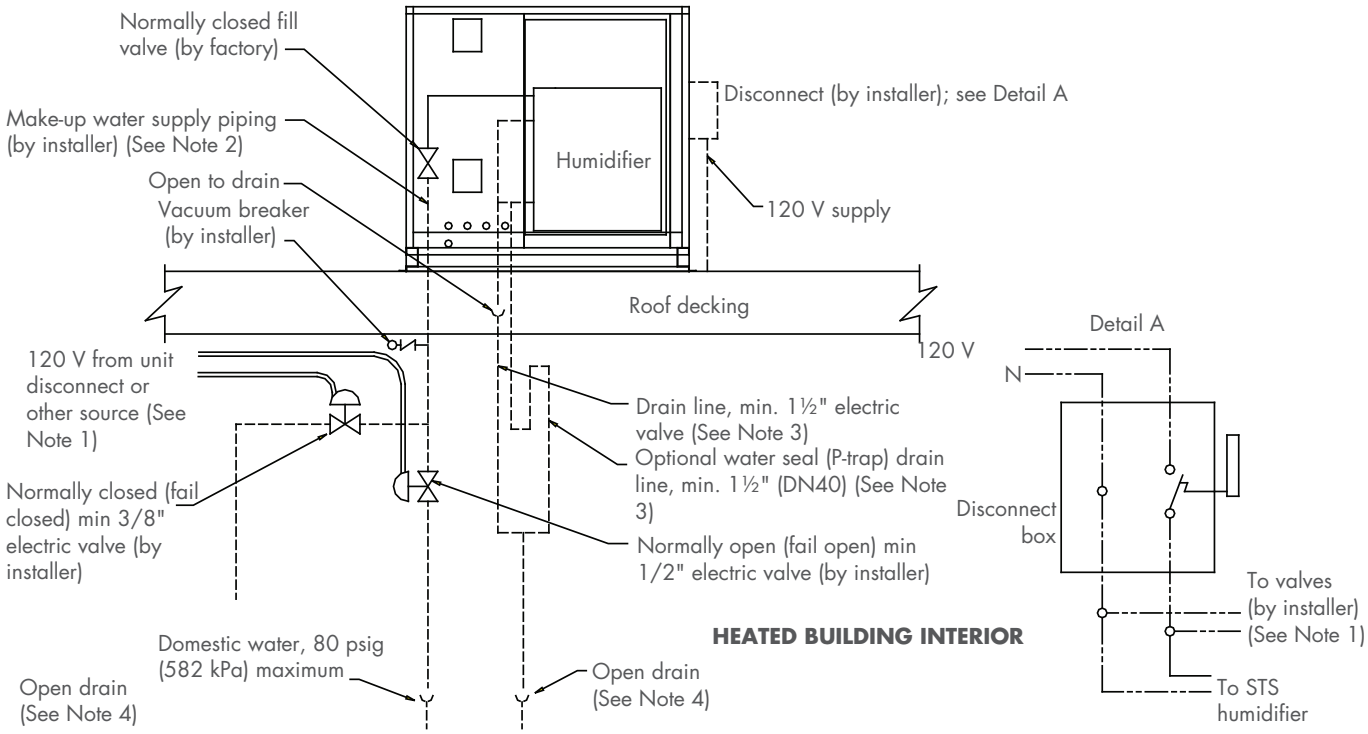
mc_012611_1545

OUTDOOR ENCLOSURE INSTALLATION DETAIL

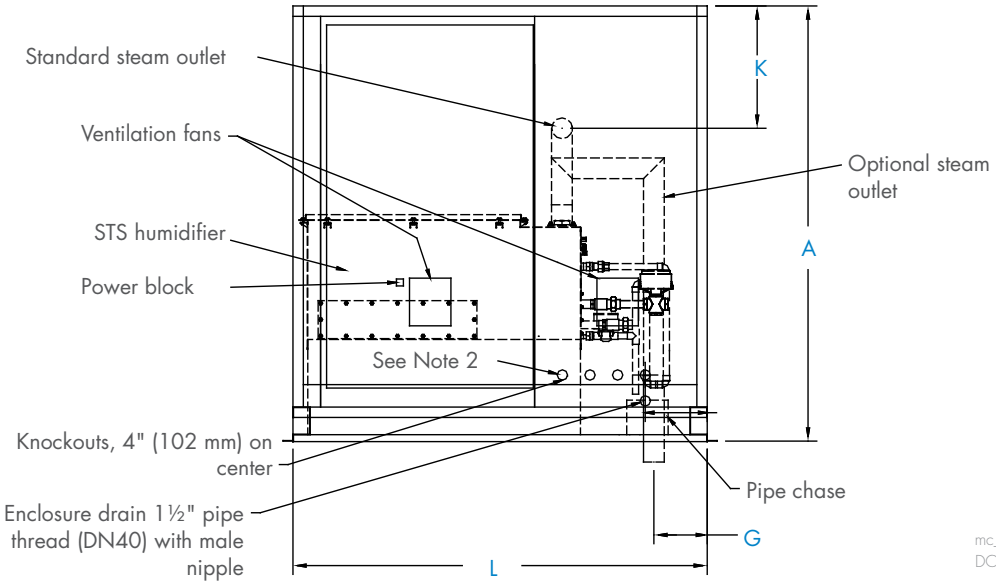


Notes:

1. Insulate supply water piping to avoid dripping from condensation. To ensure that water does not remain in the fill line and freeze if there is a loss of power, DriSteem recommends field installing additional valves upstream of the fill valve in a conditioned space. Power these valves on the same circuit that supplies the STS (as shown above); if the power goes off, water drains out of the fill line to prevent freezing.
2. Ensure that water lines are protected from freezing conditions.
   - Install heat tracing and insulation on fill piping inside the outdoor enclosure.
   - In extreme or critical applications in which the unlikely event of a water leak could cause severe damage, DriSteem recommends a thermostat with a remote sensor on the fill line to cut power to the STS and safety valves to stop fill water to the STS and drain the fill piping when the temperature is below freezing.
3. DriSteem recommends copper or iron drain piping for outdoor enclosures. On a loss of power the tank water will drain, but not be cooled by the Drane-kooler because of the field supplied safety shut-off valves. If it is critical to keep the Drane-kooler functional in the case of a power loss, disconnect the Drane-kooler and relocate it down inside the conditioned space of the building. Pipe the supply water for the Drane-kooler before the safety shut-off valves.
4. If copper or iron piping is used for both the fill and drain piping, these drains may be tied together. Locate 1" 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.

mc_011311_1705

OUTDOOR ENCLOSURE WITH STANDARD OR OPTIONAL STEAM OUTLET, ELEVATION VIEW



mc_012511_1635
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 1½" (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 steam hose, tubing, or piping.
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 in Table 22-1.

Table 22-1: Outdoor enclosure weights

STS Model	Shipping weight*		Operating weight*	
	lbs	kg	lbs	kg
25	600	272	680	308
50	625	284	840	381
100	640	290	860	390
200	1050	476	1650	748
400	1125	510	1750	794
800	1225	556	2250	1021

*Includes humidifier

mc_012611_1016

Table 22-2: Outdoor enclosure connection sizes

Description	STS Model	
	25-100	200-800
Water makeup (fill)	¼" pipe thread (DN20)	¼" pipe thread (DN20)
Drain	¾" (DN20)	1" (DN25)
Condensate return	¾" pipe thread (DN20)	¾" pipe thread (DN20)
Steam outlet	See Table 18-1.	

mc_012611_1017

OUTDOOR ENCLOSURE, TOP VIEW

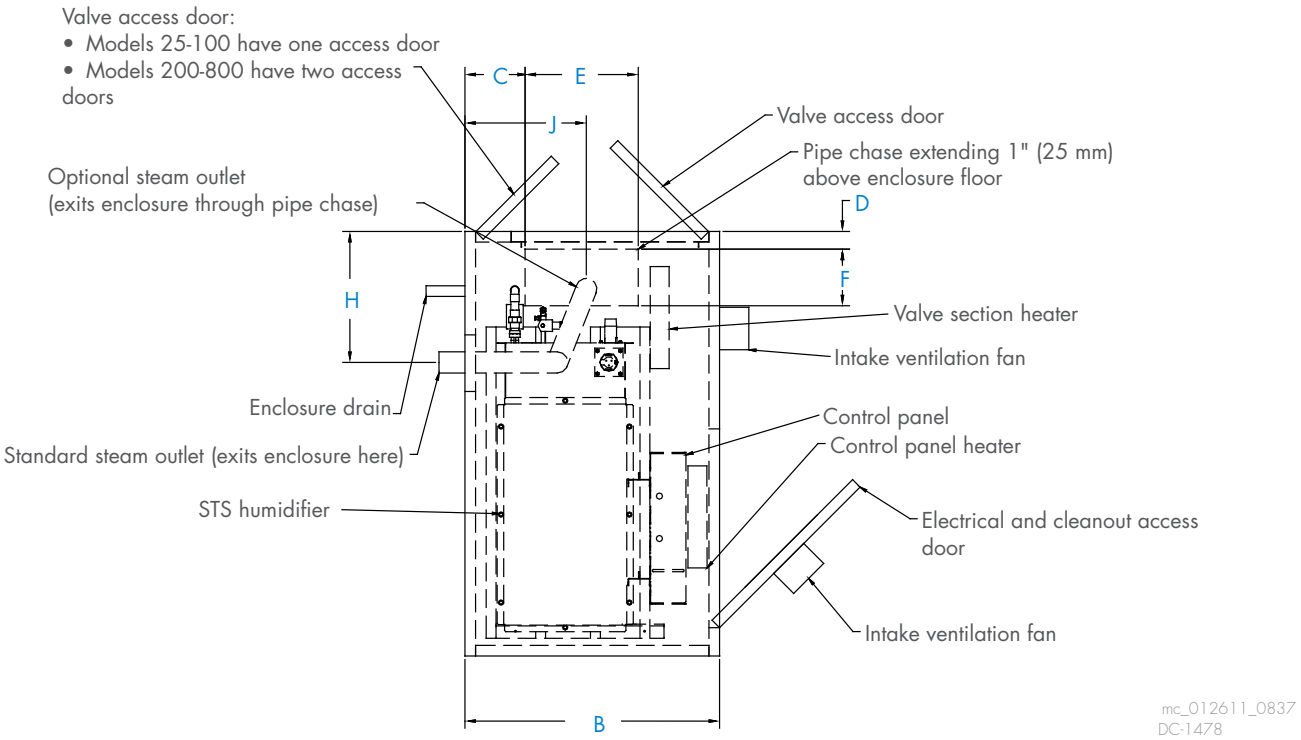


Table 23-1:
Outdoor enclosure dimensions*

Item	Description	STS Model			
		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

* See drawings on pages 22-1 and 23-1.

mc_012611_1015

Drip-free dispersion basics and options

GUARANTEED NON-WETTING DISTANCES

Using data collected in our on-site test laboratories, we have developed guaranteed steam absorption (non-wetting) distances, allowing 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 EXITS DRIP-FREE THROUGH TUBELETS

All DriSteem 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 exit 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 DriSteem exclusive, and are essential for drip-free steam dispersion.

CONDENSATE MANAGEMENT

Some condensation is inevitable in steam dispersion, but through careful design condensate can be managed.

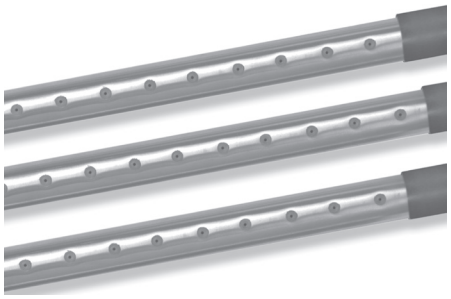
For example, Ultra-sorb® Models LV and LH use gravity to remove condensate. Steam enters the supply header, exits through the tubelets, and condensate drains out the return header. Ultra-sorb Model XV, available with STS® humidifiers, has a heat exchanger that vaporizes dispersion-generated condensate.

Rapid-sorb® dispersion units manage velocities to ensure condensate is not pushed out into the air along with steam but drains out the opposite end of the header.

REDUCE CONDENSATE, WASTED ENERGY WITH HIGH-EFFICIENCY TUBES

To significantly reduce condensate and wasted energy, use DriSteem's high-efficiency tubes, which reduce dispersion-generated condensate and wasted energy by up to 85%. See our High-Efficiency Tube option described in more detail on Page 17.

DRISTEEM DISPERSION TUBES



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

Ultra-sorb Model XV

Highest performance

- Guaranteed, short non-wetting distances — install within inches of downstream devices
- Integral condensate management
  - Heat exchanger vaporizes dispersion generated condensate, creating condensate within the heat exchanger, which returns 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%

Capacity:
Up to 450 lbs/hr (204 kg/h) per panel
5 psi (35 kPa) minimum steam pressure

ULTRA-SORB MODELS LV AND LH

Most versatile

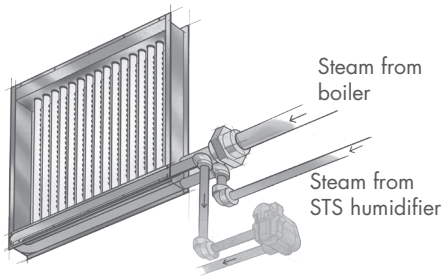
- Guaranteed, short non-wetting distances – install within inches of downstream devices
- Reduce wasted energy up to 85% and increase capacity with optional High-Efficiency Dispersion Tubes
- Lowest installation cost – factory assembly for easy installation

Capacity:
Up to 1850 lbs/hr (840 kg/h) per panel

Model MP: *Lowest total installed cost*

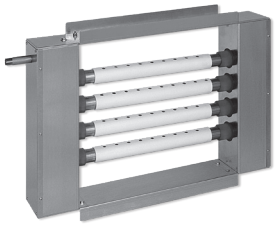
- **Disperse pressurized or nonpressurized steam**
  Model MP disperses steam generated by pressurized steam boilers or by nonpressurized steam generators such as DriSteem's GTS, STS, Vaporstream, Vapormist, and XT Series humidifiers.
- **Same side steam inlet and drain** for reduced piping
- **In-frame drain piping** maximizes available face dimensions and minimizes blank-off requirements.
- **Integral steam header** allows clear space on exterior wall of AHUs or ducts
- **Capacity**
  Pressurized steam: Up to 2720 lbs/hr (1235 kg/h)
  Nonpressurized steam: Up to 700 lbs/hr (318 kg/h)
- **Options**
  High-Efficiency Insulated Tubes
  304 or 316 stainless steel frame

ULTRA-SORB MODELS XV

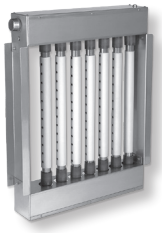


ULTRA-SORB MODELS LV

ULTRA-SORB MODEL LH



ULTRA-SORB MODEL LV WITH HIGH-EFFICIENCY TUBES



ULTRA-SORB MODEL MP

STS dispersion options

HIGH-EFFICIENCY DISPERSION TUBES OPTIONS

For new and existing Ultra-sorb, Rapid-sorb, single dispersion tube

- Highest efficiency
- Increases tube capacity up to 6 lbs/hr (2.7 kg/h)
- Up to 85% reduction in wasted energy, airstream heat gain, and condensate production
- Plenum approved for in-duct installation

RAPID-SORB® DISPERSION TUBE SYSTEMS

Multiple tubes, short non-wetting distance

- Short non-wetting distance, compared to single dispersion tube
- Horizontal or vertical airflows
- Install Rapid-sorb header inside or outside duct
- Available with high-efficiency dispersion tubes

Capacity: Up to 2100 lbs/hr (955 kg/h) per system

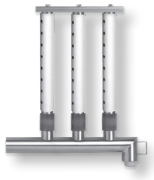
SINGLE DISPERSION TUBE

Installation flexibility

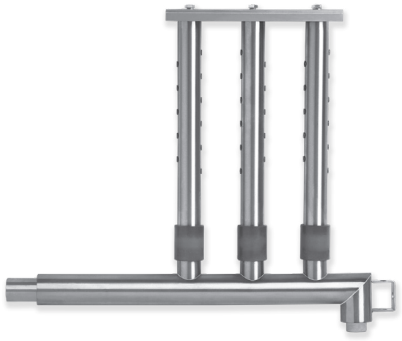
- Low-capacity dispersion for horizontal or vertical airflows.
- Available with high-efficiency dispersion tubes

Capacity: Up to 97 lbs/hr (38 kg/h)

RAPID-SORB WITH HIGH-EFFICIENCY TUBES



RAPID-SORB DISPERSION TUBE SYSTEM



SINGLE DISPERSION TUBE

Table 27-1: Ultra-sorb Model XV dimensions

Dimensions	Inches (mm)
A Unit width	15" (380 mm) min, 147" (3735 mm) max, in 1" (25 mm) increments
A' Face width	12" (305 mm) min, 144" (3660 mm) max, in 1" (25 mm) increments
B Unit height*	21.75" (550 mm) min, 153.75" (3905 mm) max, in 1" (25 mm) increments
B' Face height	12" (305 mm) min, 144" (3660 mm) max, in 1" (25 mm) increments
C Frame depth	7.2" (183 mm)
D Frame enclosure	3.9" (99 mm)
E Header enclosure	5.85" (149 mm)
F Mounting flange	1.5" (38 mm)
G Humidification steam inlet (internal thread)	• 1" or 2" NPT (DN25 or DN50), determined by maximum steam capacity • 3" (DN80) flange, for humidification steam from STS humidifier only
H Pressurized steam inlet (internal thread)	3/4" NPT (DN20)
J Float switch, optional header overflow/access port (internal thread)	1/2" NPT (DN15)
K Pressurized condensate outlet (internal thread)	3/4" NPT (DN20)
L Overall width	• 1" (DN25) connection, same as dimension A; • 2" (DN50) connection, dimension A + 1" (dimension A + 25 mm) • 3" (DN80) flange, dimension A + 6.5" (dimension A + 165 mm)
Control cabinet	See Figure 27-2.

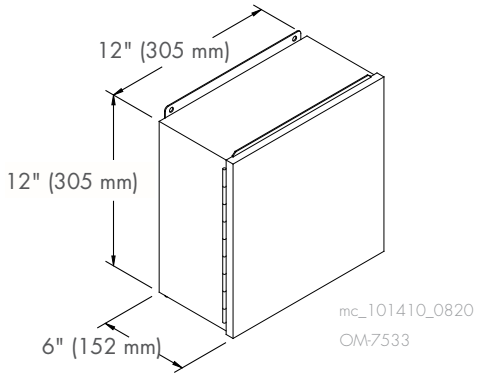
Note:
* Panels with unit height more than 120" (3048 mm) have two-piece side flanges and are shipped with brackets and panel fasteners for easy field assembly. Panels with unit height more than 98" (2490 mm) are shipped unassembled.

Table 27-2: Ultra-sorb Model XV tube capacity*

lbs/hr	kg/h
43	19.5

Note:
* If face height is <17" (432 mm), consult DRI-STEEM or see Dri-calc for the correct calculation.

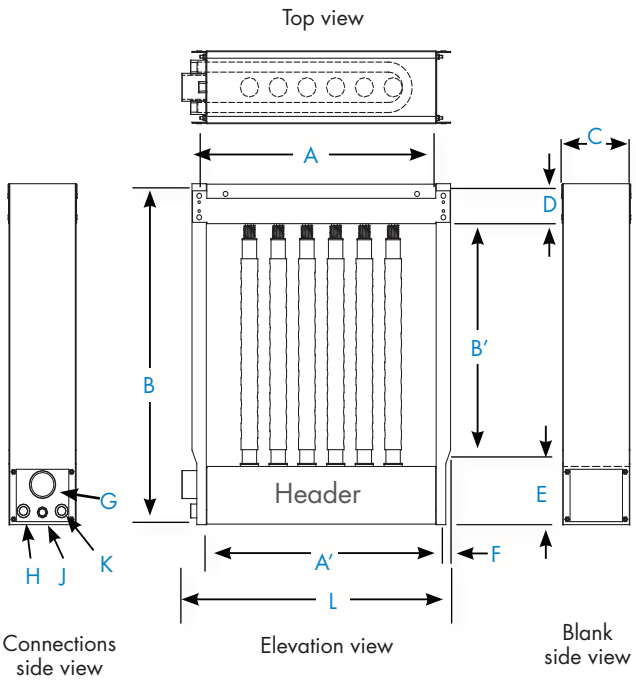
ULTRA-SORB MODELS XV CONTROL CABINET



Notes:
- Electrical power requirements: 120 VAC, 0.2 Amps, or 240 VAC, 0.1 Amps
- Components are 24 VAC, powered by a transformer in the control cabinet. A pneumatic interface is available for systems ordered with pneumatic control.
- Maximum distance from control cabinet to Ultra-sorb Model XV is 50' (15 m).

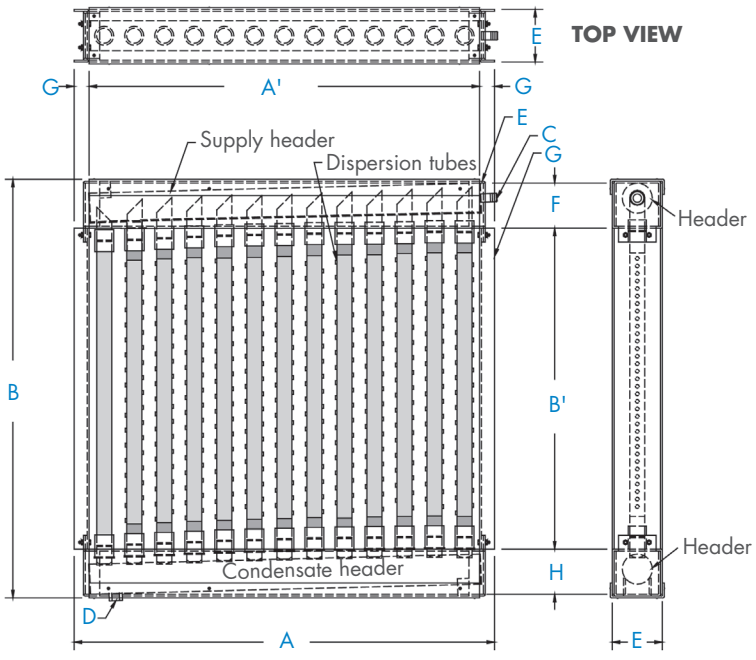
Note:
For more information about Ultra-sorb, see the Ultra-sorb catalog or DriSteem's Dri-calc software.

ULTRA-SORB MODELS XV DIMENSIONS



Ultra-sorb Model LV

ULTRA-SORB MODEL LV DIMENSIONS



OM-123
mc_062711_1425

Table 28-1:
Ultra-sorb Model LV and LH tube capacity*

Insulated		Uninsulated	
lbs/hr	kg/h	inches	DN
86	39	80	36

Notes:
* For Model LV, If face height is <26" (660 mm), tube quantity per panel may need to increase to compensate for reduced capacity of short tubes.
* For Model LH, if face width is <25" (635 mm), tube quantity per panel may need to increase to compensate for reduced capacity of short tubes.

Consult DriSteem or see Dri-calc for the correct calculation.

For more information about Ultra-sorb, see the Ultra-sorb catalog or DriSteem's dri-calc software.

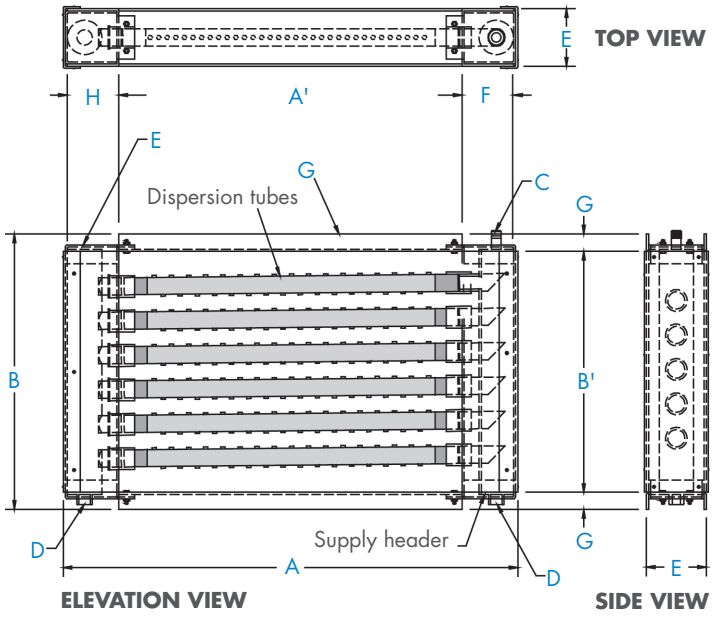
mc_010709_0710

Table 28-2
Ultra-sorb Model LH dimensions

A Unit width	15" (380 mm) min, 147" (3735 mm) max, in 1" (25 mm) increments
A' Face width	12" (305 mm) min, 144" (3660 mm) max, in 1" (25 mm) increments
B Unit height	21" (530 mm) min, 156" (3960 mm) max, in 1" (25 mm) increments Shipped unassembled by request or if unit height is more than 98" (2490 mm)
B' Face height	12" (305 mm) min, 144" (3660 mm) max, in 1" (25 mm) increments
C Steam inlet diameter	Determined by maximum steam capacity
D Condensate drain	3/4" pipe thread (DN20)
E Header enclosure (front to back)	For 3" (DN80) and 4" (DN100) headers, E = 5" (127 mm); for 5" (DN125) header, E = 6" (152 mm); for 6" (DN150) header, E = 7" (178 mm)
F Header enclosure (top to bottom)	For 3" (DN80) header, F = 4.5" (114 mm); for 4" (DN100) header, F = 5.5" (140 mm); for 5" (DN125) header, F = 6.5" (165 mm); for 6" (DN150) header, F = 7.5" (191 mm)
G Mounting flange	1.5" (38 mm)
H Condensate header enclosure	4.5" (114 mm)
Note: Header dimensions are determined by capacity. See Table 28-1.	

mc_050808_1215

ULTRA-SORB MODEL LH DIMENSIONS



OM-124b
mc_062711_1424

Table 29-1: Nonpressurized steam header capacities

Header capacity		Header diameter	
lbs/hr	kg/h	inches	DN
300	135	3	80
600	270	4	100
1100	500	5	125
1850	820	6	150

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 Dri-calc software.

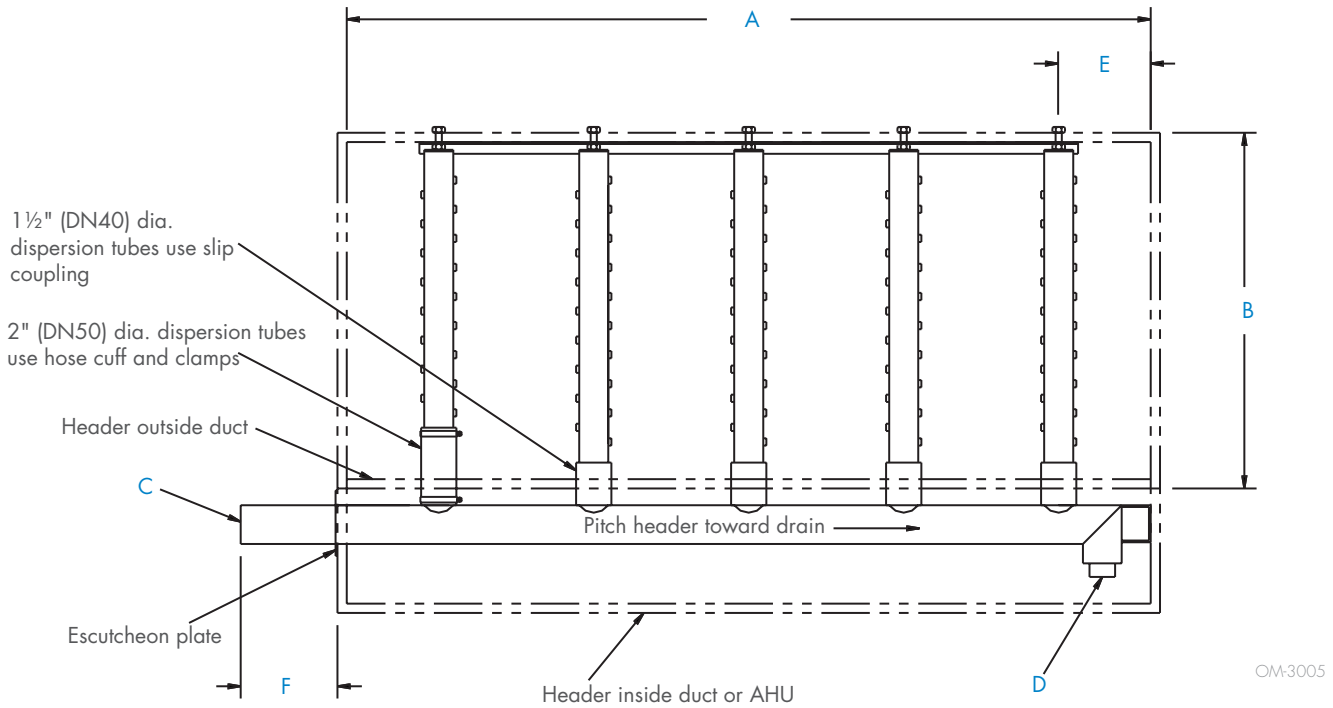
Table 29-2: Ultra-sorb Model LH dimensions

A Unit width	21" (530 mm) min, 129" (3280 mm) max, in 1" (25 mm) increments
A' Face width	12" (305 mm) min, 120" (3050 mm) max, in 1" (25 mm) increments
B Unit height	15" (380 mm) min, 123" (3125 mm) max, in 1" (25 mm) increments Shipped unassembled by request or if unit height is more than 98" (2490 mm)
B' Face height	12" (305 mm) min, 120" (3050 mm) max, in 1" (25 mm) increments
C Steam inlet diameter	Determined by maximum steam capacity
D Condensate drain	3/4" pipe thread (DN20)
E Header enclosure (front to back)	For 3" (DN80) and 4" (DN100) headers, E = 5" (127 mm); for 5" (DN125) header, E = 6" (152 mm); for 6" (DN150) header, E = 7" (178 mm)
F Header enclosure (top to bottom)	For 3" (DN80) header, F = 4.5" (114 mm); for 4" (DN100) header, F = 5.5" (140 mm); for 5" (DN125) header, F = 6.5" (165 mm); for 6" (DN150) header, F = 7.5" (191 mm)
G Mounting flange	1.5" (38 mm)
H Condensate header enclosure	4.5" (114 mm)
Note: Header dimensions are determined by capacity. See Table 29-1.	

mc_062711_1430

Rapid-sorb dimensions

RAPID-SORB DIMENSIONS



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

Table 30-1: Rapid-sorb capacities

Tube diameter		Insulated (high-efficiency tubes)		Uninsulated	
inches	DN	lbs/hr	kg/h	lbs/hr	kg/h
1½	40	43	19.5	40	18.2
2	50	80	36.4	77	35

Note:
* Capacities shown are for horizontal airflow. See Dri-calc for vertical airflow capacities.
If face height is <22" (559 mm), tube quantity per panel may need to increase to compensate for reduced capacity of short tubes. Consult DriSteem or see Dri-calc for the correct calculation.

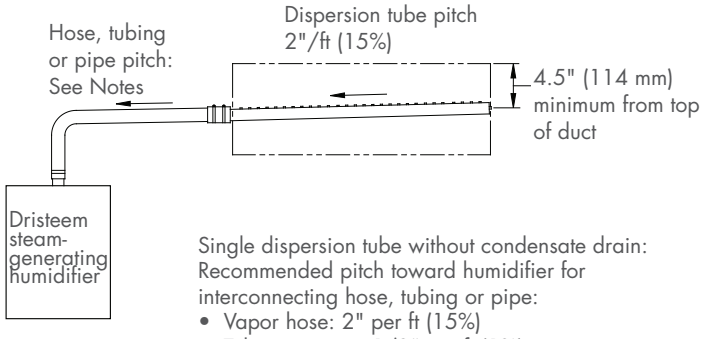
Table 30-2: Rapid-sorb dimensions

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 humidifier maximum capacity
D	Condensate drain	¾" 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 DriSteem for sizes larger or smaller than those listed above.

SINGLE DISPERSION TUBE WITHOUT AND WITH CONDENSATE DRAIN

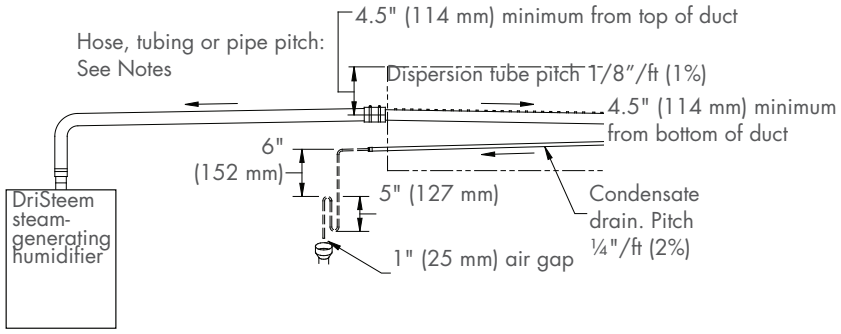
WITHOUT DRAIN



Single dispersion tube without condensate drain:
Recommended pitch toward humidifier for interconnecting hose, tubing or pipe:

- Vapor hose: 2" per ft (15%)
- Tubing or pipe: 1/8″ per ft (1%)

WITH DRAIN



Single dispersion tube with condensate drain:
Recommended pitch toward humidifier for interconnecting hose, tubing or pipe:

- Vapor hose: 2″ per ft (15%)
- 1½" tubing or pipe: ½" per ft (5%)
- 2" tubing or pipe: ¼″ per ft (2%)

VLC-OM-19-m
VLC-OM-18-m

Table 31-1:
Single dispersion tube capacities

Tube size		Insulated (High-Efficiency Tubes)				Uninsulated			
		Without drain		With drain		Without drain		With drain	
inches	DN	lbs/hr	kg/h	lbs/hr	kg/h	lbs/hr	kg/h	lbs/hr	kg/h
1½	40	29	13.2	65	29.5	28	12.7	62	28.2
2	50	65	29.5	97	44.1	62	28.2	93	42.3

Note:
Single dispersion tube available with face width between 6" (152 mm) up to 120" (3048 mm) in 1" (25 mm) increments.
* If face width is <19" (483 mm), tube capacity may be reduced. Consult DriSteem or see Dri-calc for the correct capacity.

mc_121311_1337

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

European office:
Marc Briers
Grote Hellekensstraat 54 b
B-3520 Zonhoven
Belgium
+3211823595 (voice)
+3211817948 (fax)
E-mail: marc.briers@dristeem.com

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www.dristeem.com
sales@dristeem.com

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