



ELECTRIC-TO-STEAM HUMIDIFIER

Vapor-Logic controller with:

- *Web-enabled remote access*
- *Modbus,® BACnet,® and LonTalk® interoperability*

Humidifiers for packaged systems

The compact CRUV® humidifier can be mounted inside an existing enclosure, such as a packaged air conditioning unit or added to an existing system, such as an environmental chamber. CRUV is self contained, compatible with all water types, and the clear choice for adding a humidification system while meeting minimum space requirements. And CRUV humidifiers provide reliable control to $\pm 3\%$ RH.

The standard LW series electronic control system controls water levels and drain and flush cycles. The Vapor-logic microprocessor controller is available for applications requiring advanced control.

ADVANCED CONTROL

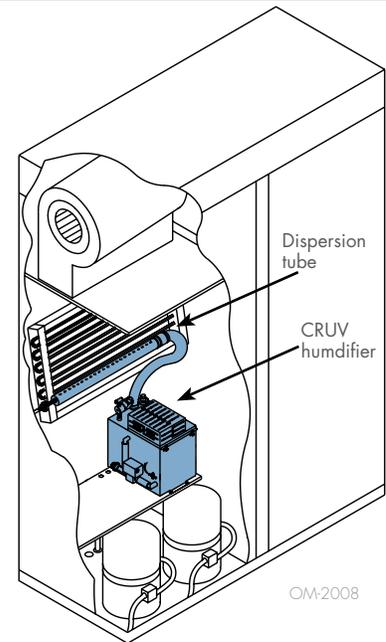
The optional Vapor-logic controller sets new standards for control in electric steam humidification:

Interoperability allows communication with building automation systems via Modbus® or with optional BACnet® or LonTalk® protocols.

Safety presets initiate fill and drain cycles and keep the humidifier cool and safe if sensed conditions, though unlikely, could be hazardous.

Web-enabled control allows you to set up, view, and adjust humidifier functions via Ethernet, either directly or remotely through a network.

CRUV IN A PACKAGED AIR CONDITIONING UNIT



CRUV with a single dispersion tube in a packaged air condition unit.



VERSATILE

- Supports all water types: tap, softened, reverse osmosis, and deionized
- Capacity from 6 to 102 lbs/hr (2.7 to 46 kg/h)
- Standard LW series controller and optional Vapor-logic controller for multiple levels of control capability

FLEXIBLE

- Dispersion with steam dispersion panels or tubes for broad application flexibility
- On-off or time-proportioned (TP) control for application control in most environments; solid-state relay (SSR) option for tight control
- Electronically monitored water level ensures consistent, reliable operation at any capacity

EASY TO MAINTAIN

- Heating elements and power conductors attach to tank cover for easy tank access without disconnecting wires or plumbing
- Softened water significantly reduces maintenance requirements
- End-of-season auto-drain minimizes microbial growth
- User-adjustable water skimmer removes surface residue
- Controller-operated drain and flush removes precipitated minerals from evaporating chamber
- Constant thermal expansion and contraction of heating elements continuously sheds mineral buildup

CLEAN ROOM APPLICATIONS



Two control options

LW SERIES CONTROL

An electronic module in the LW series control system, standard on CRUV, controls water levels and drain/flush cycles. Dip switches on the control board can be field-set to select timer-operated drain/flush cycles and water skimming durations. LEDs on the control board provide Power, Full, Drain, and Ready statuses.

ADVANCED VAPOR-LOGIC CONTROL

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

Modbus, BACnet, or LonTalk allow interoperability with multiple building automation systems. Modbus is standard, and BACnet or LonTalk are available options.

Web interface provides the capability to set up, view, and adjust humidifier functions via Ethernet, either directly or remotely through a network.

Cycle counter triggers a message when it's time to replace the contactor.

USB port allows easy firmware updates, and data backup and restore capability.

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

Programmable outputs allow remote signaling and device activation.

Controller data, such as RH, air temperature, water use, energy use, alarms, and messages, can be downloaded to a PC for viewing and analysis. RH, alarms, and messages can also be viewed on the keypad/display and Web interface.

Enhanced diagnostics include:

- **Test outputs** function using keypad/display or web interface to verify component operation
- **Test humidifier** function using simulated demand to validate performance

VAPOR-LOGIC KEYPAD/DISPLAY



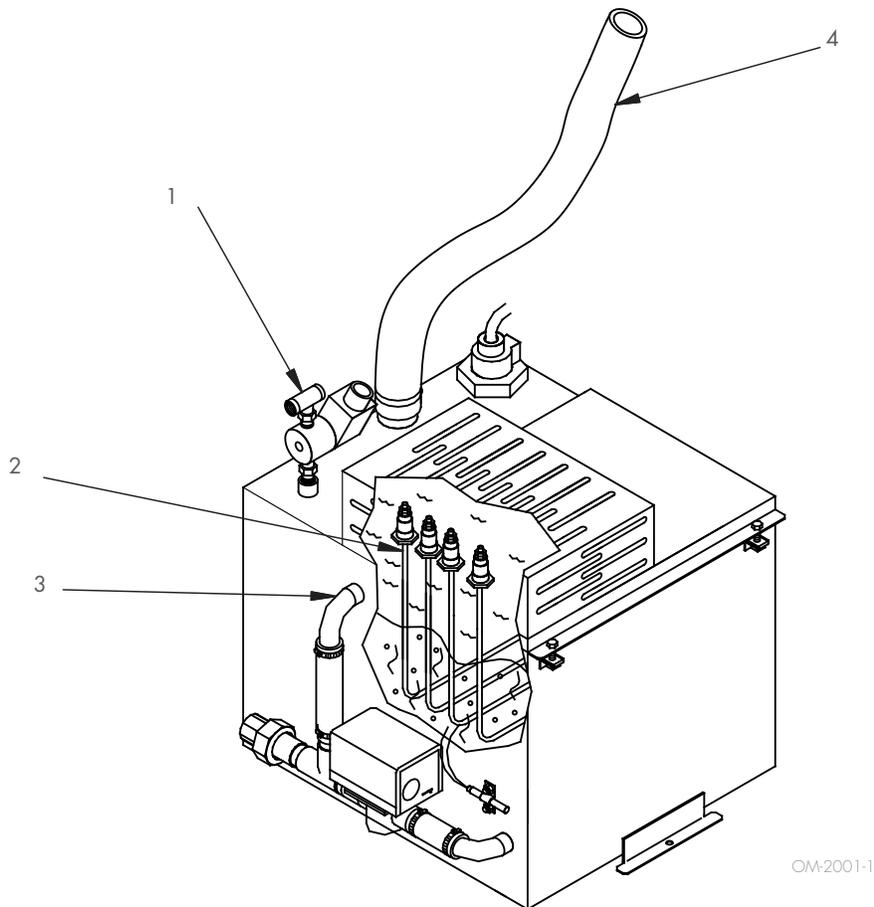
WEB INTERFACE



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.

- 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, the heating elements are energized, causing the water to boil. The fill valve opens and closes as needed to maintain the operating water level.
- 3 During refill, a portion of the surface water is skimmed off, carrying away precipitated minerals.
- 4 Steam created in the evaporating chamber flows through steam hose or piping to the dispersion assembly, where it is discharged into the airstream.

TAP/SOFTENED WATER CRUV SHOWN



CRUV components

1 Controller (not shown)

With the LW series controller, drain duration and frequency are user-adjustable via dip switches on the control board. With the Vapor-logic® controller, drain duration and frequency are user-adjustable via the keypad/display or web interface.

To avoid possible stagnant water and microbial growth, humidifiers with the end-of-season drain option automatically drain if there is no call for humidity after a defined time period.

2 Water level control

The water skimmer reduces surface residue in the evaporating chamber. Skimming occurs each time the humidifier fills. Skim duration is user adjustable.

3 Service access

Heating elements and power conductors attach to the removable tank cover for easy tank access without disconnecting wires or plumbing.

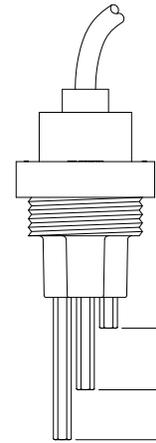
4 Heating elements

Low-watt-density Incoloy-sheathed heating elements ensure operation for many seasons. Constant expansion and contraction of heating elements sheds mineral scale. In the unlikely event of heater failure, heating elements remove easily for replacement.

5 Tank temperature sensor

The tank temperature sensor mounts on the tank to enable over-temperature protection, freeze protection, and tank preheating. Preheating allows a rapid response to a call for humidity.

WATER LEVEL CONTROL FOR TAP/ SOFTENED WATER HUMIDIFIER



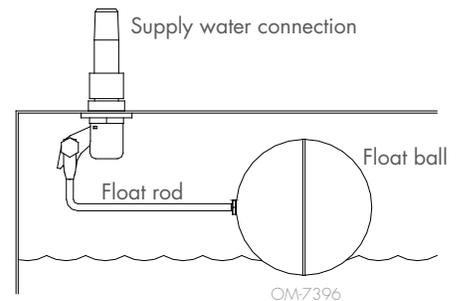
Fill valve closes when water level rises to this probe.

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.

VLC-OM-030

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



Humidifiers using DI/RO water control water levels using a float valve and low-water cutoff switch.

6 Drain

With the LW series controller, drain duration and frequency are user-adjustable via dip switches on the control board. With the Vapor-logic controller, drain duration and frequency are user-adjustable via the keypad/display or web interface.

To avoid possible stagnant water and microbial growth, humidifiers with the end-of-season drain option automatically drain if there is no call for humidity after a defined time period.

7 Water skimmer

The water skimmer reduces surface residue in the evaporating chamber. Skimming occurs each time the humidifier fills. Skim duration is user adjustable.

8 Steam outlet

Generated steam rises and exits through the steam outlet and travels to the dispersion unit through steam hose or piping.

TAP/SOFTENED WATER CRUV SHOWN

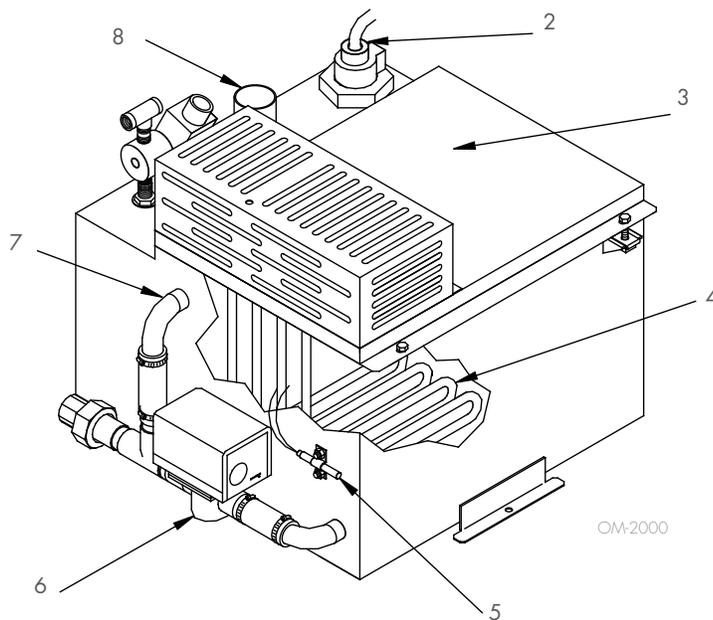


Table 8-1:
Vapormist capacities, electrical specifications, and weights

Model	Maximum steam capacity**		Current draw (amps)											Shipping weight***		Operating weight***	
			Single-phase						Three-phase								
kW	lbs/hr	kg/h	120V	208V	240V	277V	480V	600V	208V	240V	277V	480V	600V	lbs	kg	lbs	kg
2	6	2.7	16.7	9.6	8.3	7.2	4.2	3.3	–	–	–	–	–	25	11	45	20
4	12	5.4	33.3	19.2	16.7	14.4	8.3	6.7	16.7*	14.4*	12.5	7.2*	5.8*	27	12	47	21
6	18	8.2	–	28.8	25.0	21.7	12.5	10.0	25.0*	21.7*	18.8	10.8*	8.7*	37	17	75	34
8	24	10.9	–	38.5	33.3	28.9	16.7	13.3	33.3*	28.9*	25.0	14.4*	11.5*	37	17	75	34
10	30	13.6	–	–	41.7	36.1*	20.8	16.7	29.1*	25.3*	21.9	12.6*	10.1*	39	18	90	41
12	36	16.3	–	–	–	43.3	25.0	20.0	33.3	28.9	25.0	14.1	11.5	39	18	90	41
14	42	19.1	–	–	–	–	29.2	23.3	38.9	33.7	29.2	16.8	13.5	39	18	90	41
16	48	21.8	–	–	–	–	33.3	26.7	44.4	38.5	33.3	19.2	15.4	39	18	90	41
21	63	28.6	–	–	–	–	43.8	35.0	–	–	43.8	25.3	20.2	43	20	104	47
25	75	34.0	–	–	–	–	–	41.7	–	–	–	30.1	24.1	43	20	104	47
30	90	40.9	–	–	–	–	–	–	–	–	–	36.1	28.9	48	22	109	49
34	102	46.3	–	–	–	–	–	–	–	–	–	40.9	32.7	48	22	109	49

* For wiring sizing, the highest leg draw is shown due to current imbalance.

** Total humidifier load = load to meet design conditions + load to compensate for steam loss from the dispersion assembly and interconnecting piping. If total humidifier load is more than the humidifier's maximum capacity, design conditions will not be met. For steam loss data see the driSteam design guide available for downloading and printing at www.dristeem.com.

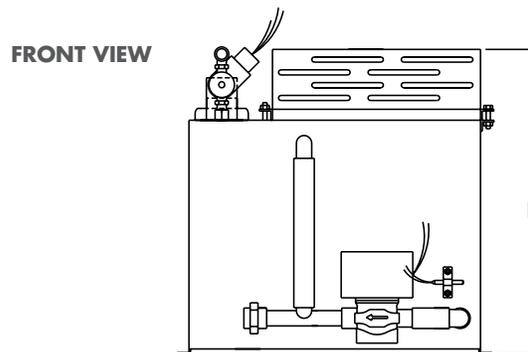
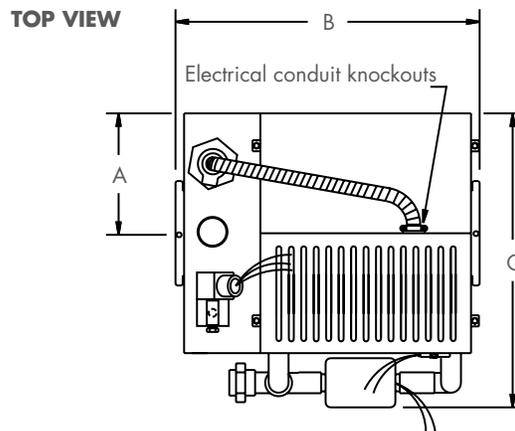
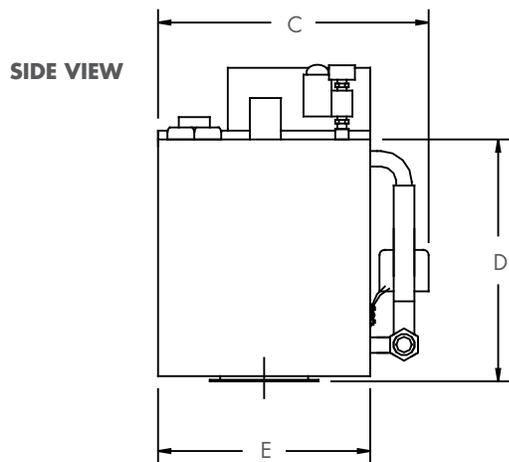
*** Depending on configuration, add up to 28 lbs (13 kg) for weight of control cabinet, subpanel, and other electrical components.

CRUV DIMENSIONS

CRUV FOR DI/RO WATER SHOWN

Electrical conduit knockouts:

- CRUV Models 2 and 4 have combination knockout for 1/2" and 3/4" conduit connectors; knockout diameters are 22.3 mm and 28.6 mm.
- CRUV Models 6 through 34 have combination knockout for 3/4" and 1" conduit connectors; knockout diameters 28.6 mm and 34.9 mm.



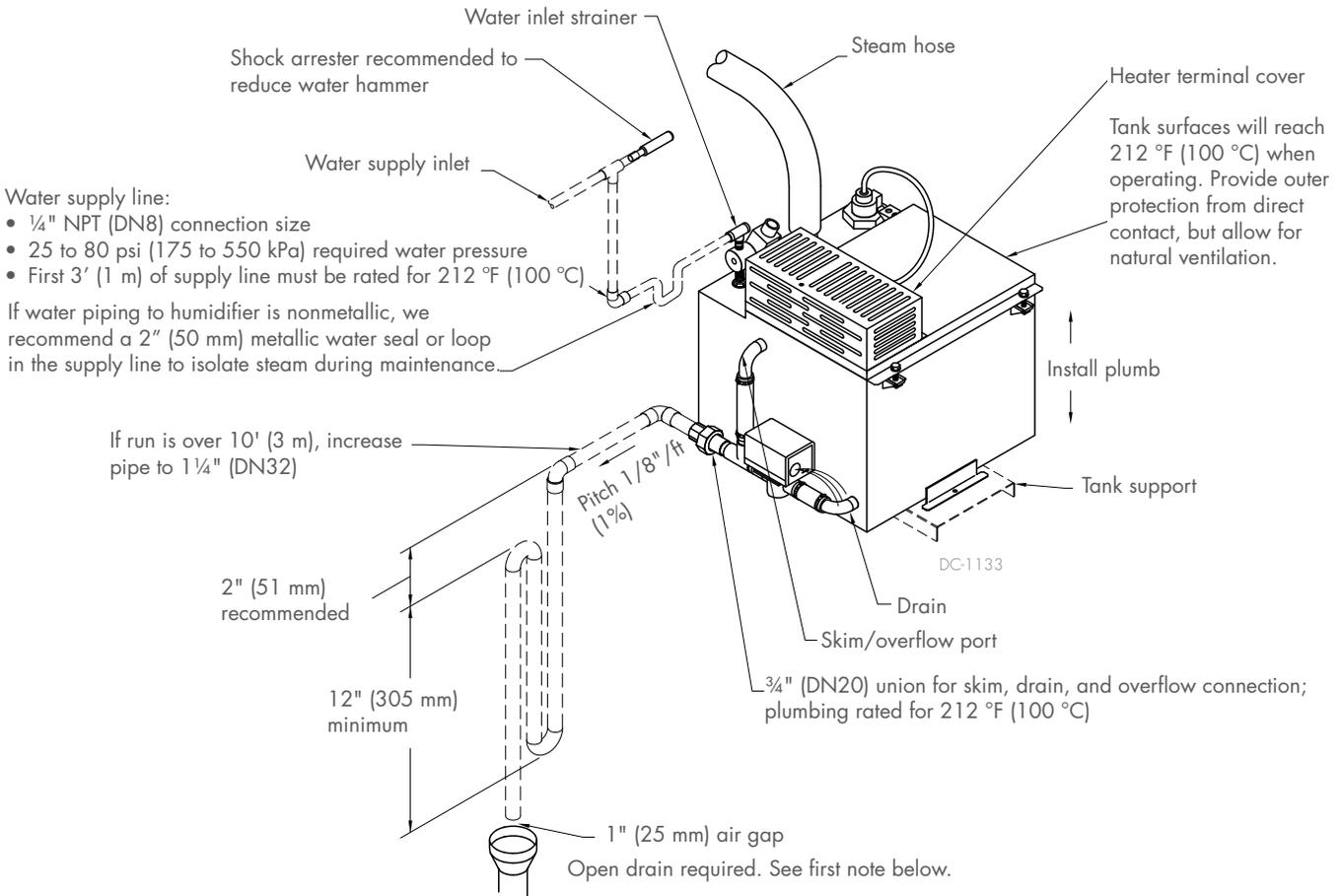
OM-2004, OM-2002, OM-2003
mc_071210_1445

Table 9-1:
CRUV dimensions

Model	A		B		C		D		E		F	
	inches	mm										
2, 4	4.50	114	15.50	394	12.50	318	9.00	229	9.00	229	12.13	308
6, 8	7.18	183	16.00	406	16.88	429	10.00	254	14.34	369	13.25	337
10, 12, 14, 16	7.1	183	16.00	406	16.88	429	11.75	199	14.34	364	14.88	378
21, 25, 30, 34	7.18	183	16.00	406	16.88	429	13.25	337	14.34	364	16.38	416

CRUV piping: tap/softened water

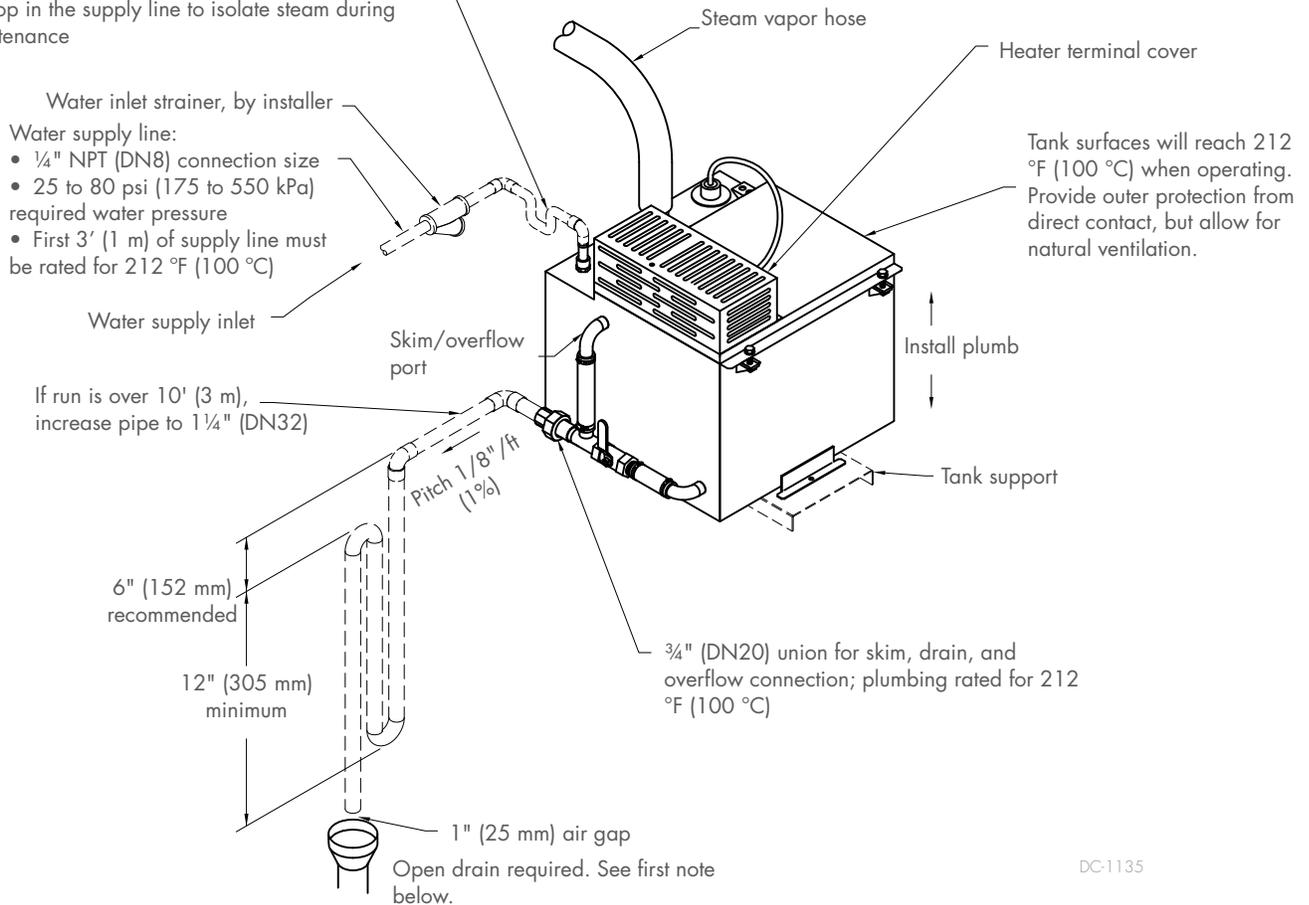
CRUV (TAP/SOFTENED WATER) FIELD PIPING OVERVIEW



- 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 DriSteam warranty.

CRUV (TAP/SOFTENED WATER) FIELD PIPING OVERVIEW

If water piping to humidifier is nonmetallic, we recommend a 2" (50 mm) stainless steel water seal or loop in the supply line to isolate steam during maintenance



DC-1135

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 DriSteem warranty.

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 14.

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 WITH STANDARD HIGH-EFFICIENCY TUBES



ULTRA-SORB MODEL LV AND LH

Most versatile

- Guaranteed, short non-wetting distances – install within inches of downstream devices
- Reduce wasted energy by 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

HIGH-EFFICIENCY DISPERSION TUBES OPTIONS

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

- Highest efficiency
- Increased 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



ULTRA-SORB MODELS LV



ULTRA-SORB MODEL LH



ULTRA-SORB MODEL LV WITH HIGH-EFFICIENCY TUBES



RAPID-SORB WITH HIGH-EFFICIENCY TUBES



CRUV steam dispersion options

RAPID-SORB® DISPERSION TUBE SYSTEMS

Multiple tubes, short non-wetting distance

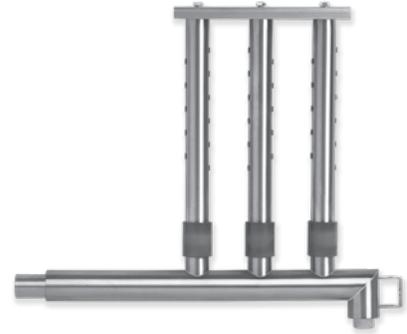
- Short non-wetting distance, compared to single dispersion tube
- Horizontal or vertical airflows
- Install Rapid-sorb header inside or outside duct
- Available with high-efficiency dispersion tubes
- Capacity: Up to 2100 lbs/hr (955 kg/h) per system

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)

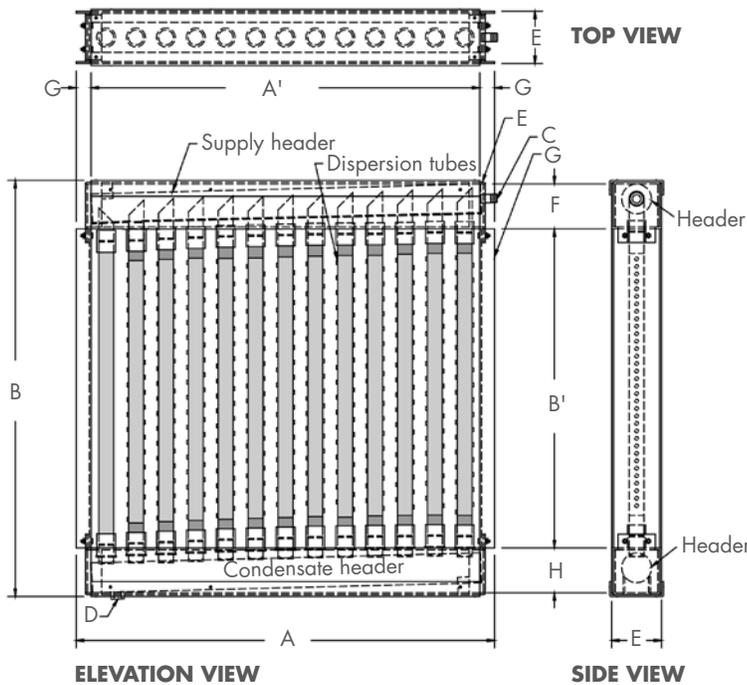
RAPID-SORB DISPERSION TUBE SYSTEM



SINGLE DISPERSION TUBE



ULTRA-SORB MODEL LV DIMENSIONS



OM-123

Table 15-1:
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.

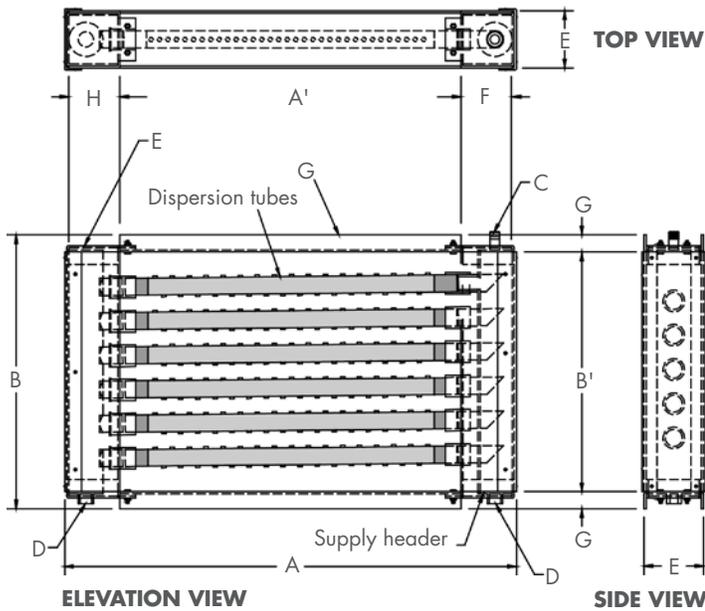
Table 15-2
Ultra-sorb Model LH dimensions

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 15-1.

Ultra-sorb model LH

ULTRA-SORB MODEL LH DIMENSIONS



OM-124b

Table 16-1:
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:

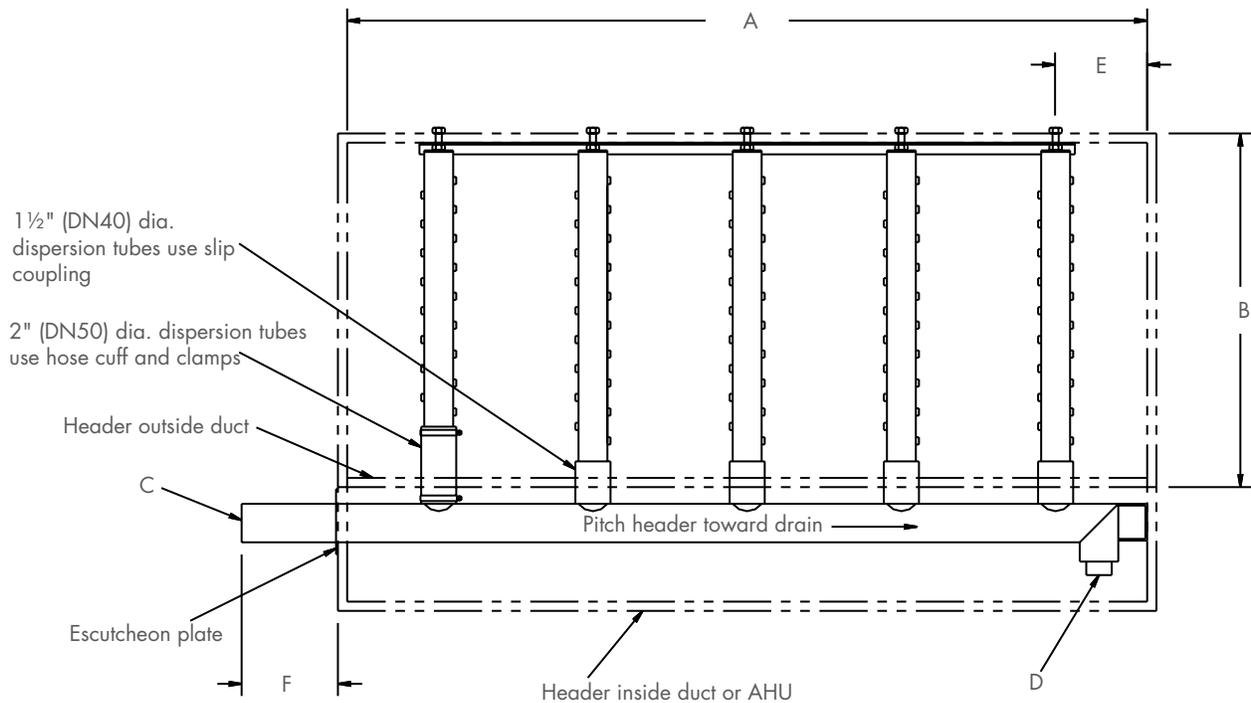
- When connected to a CRUV humidifier install Ultra-sorb Model LH in vertical airflows only.
- For more information about Ultra-sorb, see the [Ultra-sorb catalog](#) or DriSteem's [Dri-calc software](#).

Table 16-2:
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 16-1.

RAPID-SORB DIMENSIONS



OM-3005

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 17-1:
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 17-2:
Rapid-sorb dimensions

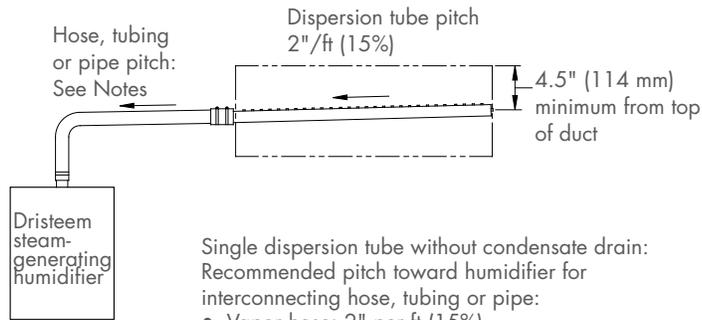
Dimension	Description	Inches (mm)
A	Face width	12" (305) minimum to 120" (3048) maximum in 1" (25) increments
B	Face height	12" (305) minimum to 120" (3048) maximum in 1" (25) increments
C	Steam inlet	Determined by humidifier maximum capacity
D	Condensate drain	¾" pipe thread (DN20)
E	Distance from tube 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

SINGLE DISPERSION TUBE WITHOUT AND WITH CONDENSATE DRAIN

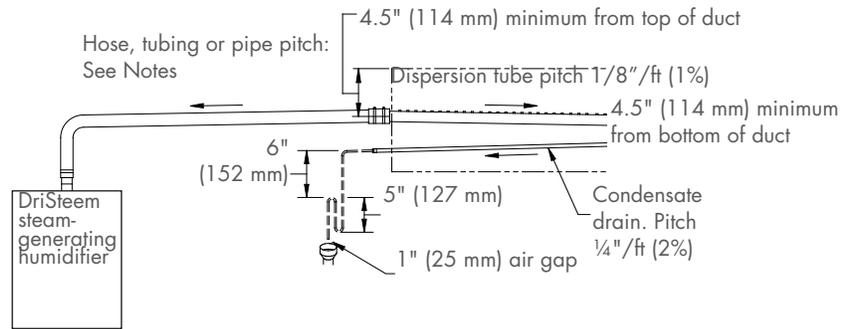
WITHOUT DRAIN



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%)
- 1/2" tubing or pipe: 1/2" per ft (5%)
- 2" tubing or pipe: 1/4" per ft (2%)

VLCOM-19-m
VLCOM-18-m

Table 18-1:
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.

Conserving resources through better performance

DriSteem conserves resources by designing humidification systems that optimize performance. Systems that perform well save energy and water and, ultimately, cost less to operate and maintain.

SAVE ENERGY

For applications requiring short absorption, High-Efficiency Dispersion Tubes reduce wasted energy up to 85% by significantly reducing airstream heat gain and condensate production. Available for new and retrofit Ultra-sorb® and Rapid-sorb® steam dispersion panels.

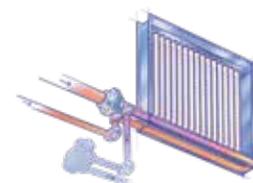
DriSteem's High-Pressure Atomizing Systems disperse unheated micro-fine water particles into airstreams or open spaces. As atomized water droplets evaporate, air temperature drops, reducing the cooling load. This provides significant energy savings when humidifying and cooling simultaneously.

SAVE WATER

Ultra-sorb Model XV eliminates water waste and reduces airstream heat gain, energy costs, and boiler chemical use. Available for STS® steam-to-steam humidifiers and all pressurized steam applications.

OPTIMIZE PERFORMANCE

DriSteem's most advanced controller, Vapor-logic® continuously monitors space conditions to align humidifier output with demand. The result is accurate, responsive control.



DRI-STEEM Corporation

A subsidiary of Research Products Corporation
DriSteem U.S. operations are ISO 9001:2015
certified company

U.S. Headquarters:
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