READ AND SAVE THESE INSTRUCTIONS

VAPORSTREAM®
Models VLC and VLDI
ELECTRIC STEAM HUMIDIFIERS

Installation Instructions
and
Maintenance Operations
Manual

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Engineering Humidification For A Better Environment
30th ANNIVERSARY 1965 to 1995

DRI-STEEM® HUMIDIFIER COMPANY

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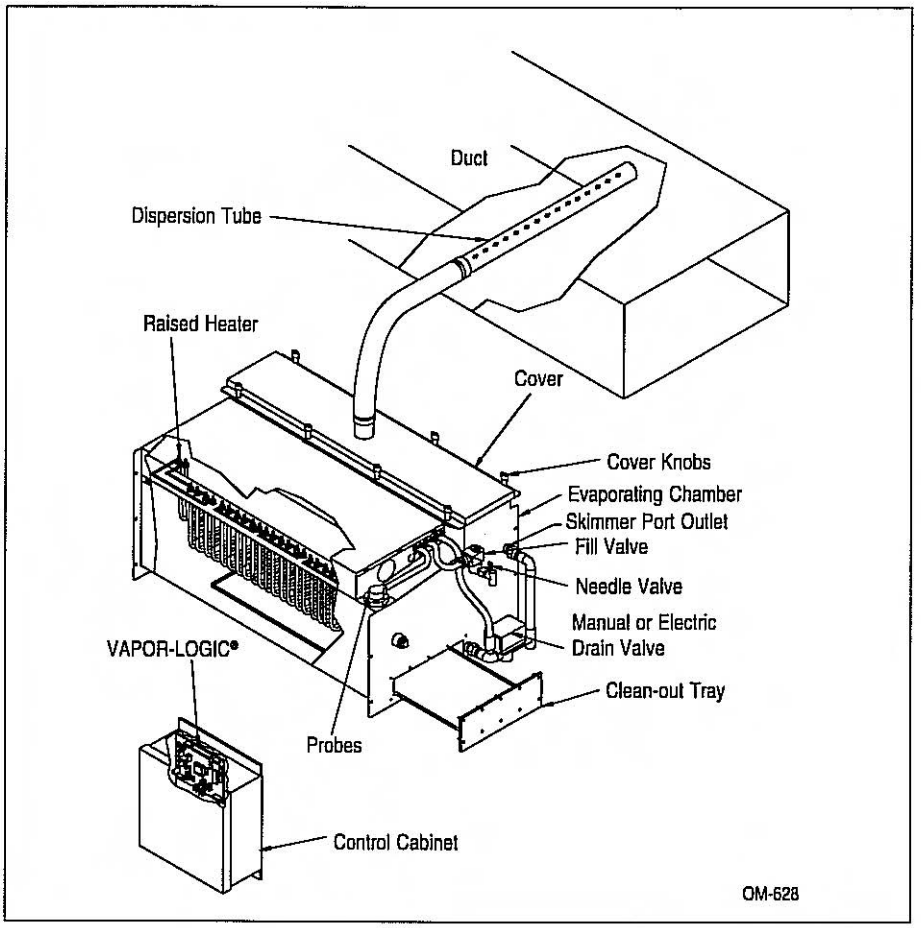
TO THE PURCHASER AND THE INSTALLER

Thank you for purchasing VAPORSTREAM® Model VLC equipment. We have designed and built this equipment to give you total satisfaction and many years of trouble-free service. Proper installation and operating practices will assure you of achieving that objective. We therefore urge you to become familiar with the contents of this manual.

This manual covers material for both VAPORSTREAM Model VLC and VAPORSTREAM Model VLDI humidifiers. Most of the application material will apply to both units. When information differs for the two units, it will be noted as such.

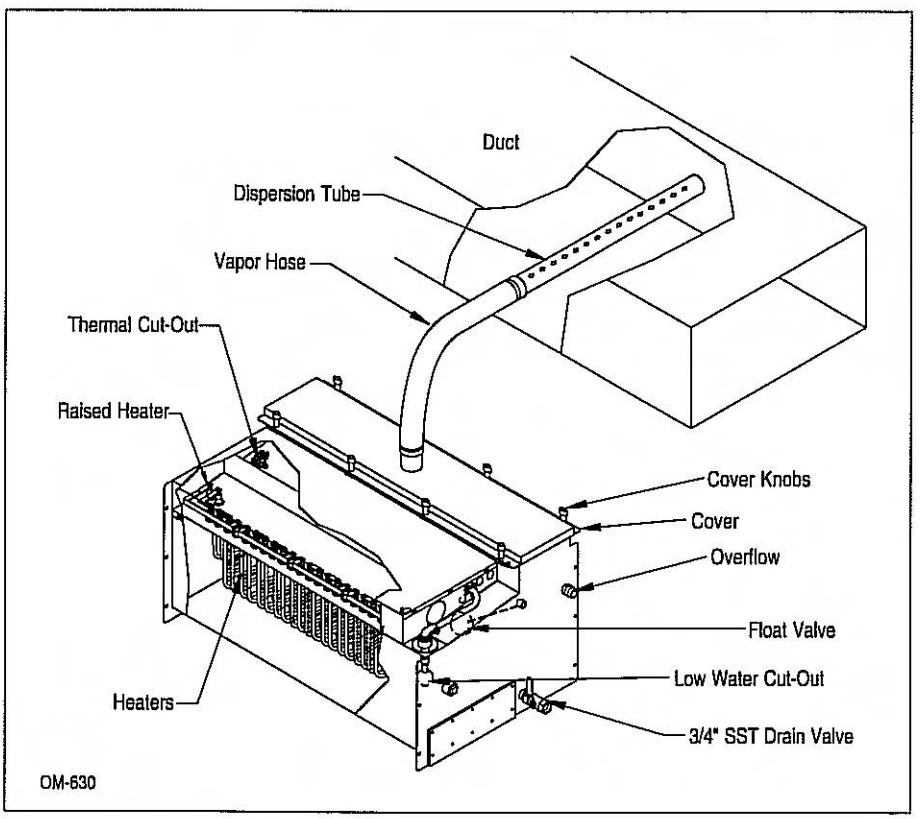
DRI-STEEM Humidifier Company



VAPORSTREAM VLC Electric Humidifier

Sophisticated, state-of-the-art technology in a simple, low-maintenance humidifier.

This humidifier is designed for use with either softened or unsoftened water (preferably softened). The probe type level control system requires water conductivity of 100 micromhos/cm (2 grains/gal) minimum to function, and therefore will not operate on water treated by reverse osmosis or deionization. However, VAPORSTREAM® Model VLC humidifiers are available for use with these water types. The standard humidifier can be converted in the field to a VLDI model. See below.



VAPORSTREAM VLDI Option

For use with deionized or reverse osmosis water. This unit produces chemical-free steam and reliable, accurate humidification control. It is virtually maintenance-free with no wasted water, heat, or downtime.

Selecting the Location

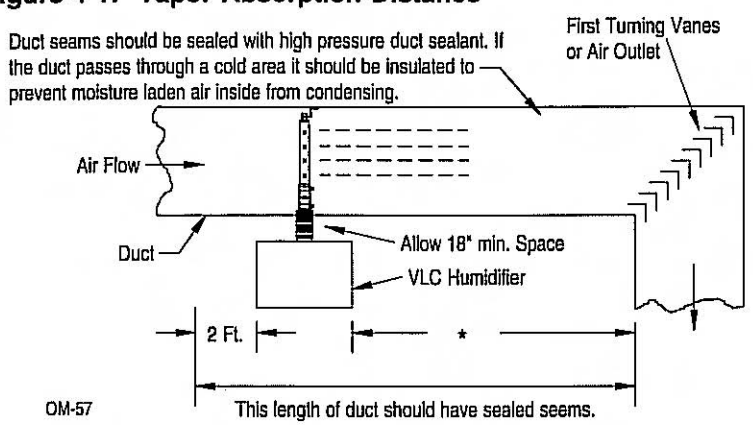
To install a VAPORSTREAM® Model VLC humidifier three items are required: tap water (preferably softened) or DI/RO water for the VAPORSTREAM VLDI, available electricity, and a drain system. VAPORSTREAM VLC humidifiers are made to adapt to any existing physical condition.

When selecting the location, the first consideration should be given to rapid, thorough absorption of the steam. *The warmest air will most readily absorb the steam. The most active part of the airstream will provide the best mixing of the steam and air.* Avoid dead spots, such as the inside curve of an elbow or an area immediately downstream of a baffle plate. Since the "fog" will travel some distance before absorbing and may saturate objects it touches, the wetting distance is predictable, and can be determined using the VAPORSTREAM VLC catalog. If this has already been done, the travel distance should be specified; if not, consult the VAPORSTREAM VLC catalog.

- Locate the humidifier where the water vapor being discharged will be carried off with the airstream and not condense or drip from the duct.
- In general, the electric evaporative humidifier is best placed after the heating coil or where the air temperature is highest.
- Do not place the unit in an outside air intake unless air is tempered with a preheat coil.
- Do not place the unit near the intake of a high efficiency filter. The filter will absorb the visible moisture and become waterlogged.
- Do not place the unit where discharged vapor will impinge on a metal surface.
- Do not place the unit close to a split in the duct. The unit may put more moisture in one branch than the other.

When adequate absorption distance is not available, a rapid absorption tube bank should be used. Refer to the VAPORSTREAM VLC product catalog or contact DRI-STEEM or your local DRI-STEEM representative.

Figure 4-1: Vapor Absorption Distance

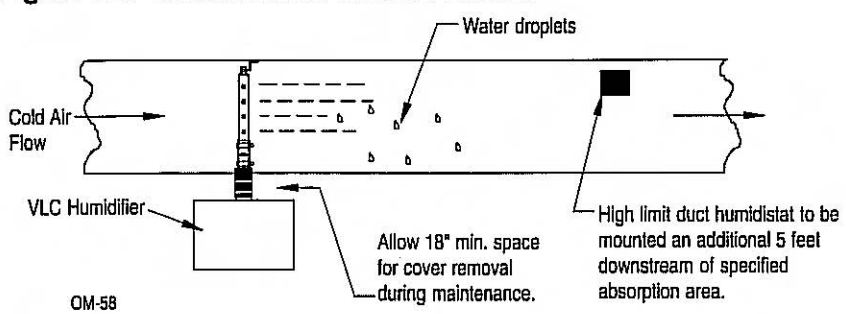


"Absorption distance" is measured downstream from the leaving side of the duct steam dispersion system to the point where condensed steam has been re-evaporated to the extent that wetting will not occur. Solid objects at duct temperature such as coils, dampers, fans etc. downstream of this dimension will remain dry.

Typically, the cooler the air being humidified, the further the mist will travel before becoming absorbed.

* The wetting distance of steam is predictable, and can be determined using the VAPORSTREAM VLC catalog. If this has been done, this distance should be specified; if not, consult the VAPORSTREAM VLC catalog, or contact your local DRI-STEEM representative or the DRI-STEEM factory.

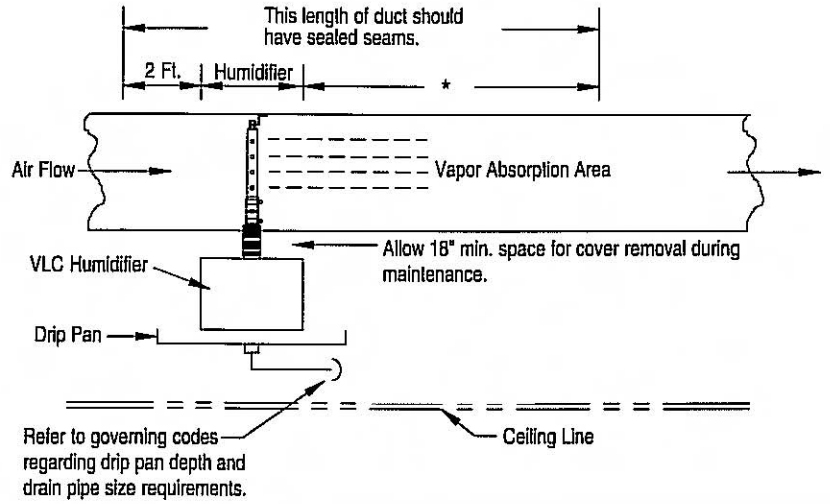
Figure 4-2: Installation in Cold Air Stream



When a humidifier is installed in a duct that will carry cold air periodically, the dew point temperature should be determined.

If the saturation of duct air is possible, protection should be provided. A high-limit humidistat set to cut off the humidifier at a safe temperature, can be used for this purpose.

Figure 5-1: Installation Above Equipment



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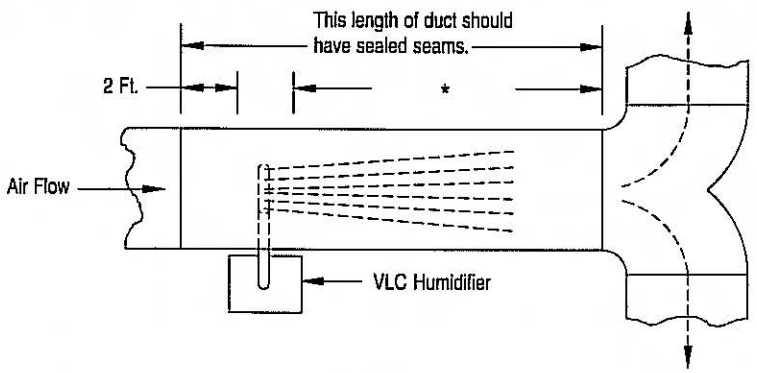
Water piping and humidifiers should not be installed above other equipment. A broken water pipe, leaking valve gland, condensation, or other water leaks may occur, causing serious damage and costly repairs to the equipment below.

Where this type of installation cannot be avoided, install a drip tray constructed of galvanized sheet steel under the humidifier, valve, etc. to catch any dripping water.

The drain should terminate above an open floor drain and the overflow from the VAPORSTREAM VLC should be piped to a floor drain rather than the drip pan.

Figure 5-2: Installation Ahead of Duct Split



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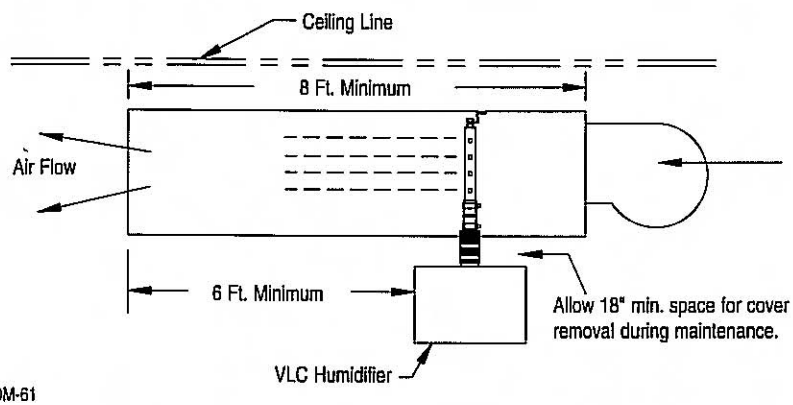
When a VAPORSTREAM VLC humidifier is installed upstream of a duct split, the humidifier should span most of the duct width or be centered upon it to equalize the humidifying effect between the two branches.

Figure 5-3: Recirculation Unit



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In an application where no duct system exists, or if the duct air is too cool for proper humidity absorption, a recirculation fan can be used. The fan circulates room temperature air across the VAPORSTREAM VLC humidifier and discharges humidified air into the space. The point of discharge should be carefully selected to avoid condensation on surfaces of the building or equipment.

* The wetting distance of steam is predictable, and can be determined using the VAPORSTREAM VLC catalog. If this has been done, this distance should be specified; if not, consult the VAPORSTREAM VLC catalog, or contact your DRI-STEEM representative or the DRI-STEEM factory.

ELECTRICAL SPECIFICATIONS AND CAPACITIES

Table 6-1: Control Cabinet Dimensions

Size	Inches	cm	Shipping Wt.	
Series S	12 W x 12 H x 6 D	30.5 W X 30.5 H x 15.2 D	24 lbs.	11 Kg
Series M	14 W x 16 H x 6 D	35.6 W x 40.6 H x 15.2 D	32 lbs.	14.5 Kg
Series L	20 W x 20 H x 7 D	50.8 W x 50.8 H x 17.8 D	55 lbs.	25 Kg
Series XL	24 W x 24 H x 7 D	61 W x 61 H x 17.8 D	73 lbs.	33.2 Kg

Table 6-2: Electrical Specifications

Model Number	Steam Capacities Per Hour		Heaters		Current Draw (Amps)									KW	Control Cabinet Sizes**
					Single Phase					Three Phase					
	Lbs.	Kg.	Qty.	Stages*	120V	208V	240V	480V	575V	208V	240V	480V	575V		
VLC/VLDI 2-1	5.7	2.6	1	1	16.7	9.6	8.3	4.2	3.5					2	S
3-1	8.6	4.0	1	1	25.0	14.4	12.5	6.3	5.2					3	S
4-1	11.4	5.2	1	1	33.3	19.2	16.7	8.3	7.0					4	S
5-1	15.2	6.9	1	1		25.6	22.2	11.1	9.3					5.33	S
VLC/VLDI 6-1	17.1	7.8	3	1		28.8	25.0	12.5	10.4	16.7	14.4	7.2	6.0	6	S
9-1	25.7	11.7	3	1		43.3	37.5	18.8	15.7	25.0	21.7	10.8	9.0	9	S
12-1	34.2	15.5	3	1				25.0	20.9	33.3	28.9	14.4	12.0	12	S
16-1	45.6	20.7	3	1				33.3	27.8		38.5	19.2	16.1	16	S
25-1	71.3	32.3	3	1					43.5			30.1	25.1	25	S
VLC/VLDI 12-2	34.2	15.5	6	2		57.7	50.0	25.0	20.9	33.3	28.9	14.4	12.0	12	M
18-2	51.3	23.3	6	2		86.5	75.0	37.5	31.3	50.0	43.3	21.7	18.1	18	M
24-2	68.4	31.0	6	2				50.0	41.7	66.6	57.7	28.9	24.1	24	M
32-2	91.2	41.4	6	2				66.7	55.7	88.8	77.0	38.5	32.1	32	M
50-2	142.5	64.6	6	2					87.0			60.1	50.2	50	M
VLC/VLDI 18-3	51.3	23.3	9	3		86.5	75.0	37.5	31.3	50.0	43.3	21.7	18.1	18	L
27-3	77.0	35.0	9	3		129.8	112.5	56.3	47.0	74.9	65.0	32.5	27.1	27	L
36-3	102.6	46.5	9	3				75.0	62.6	99.9	86.6	43.3	36.1	36	L
48-3	136.8	62.1	9	3				100.0	83.5	133.2	115.5	57.7	48.2	48	L
75-3	213.8	97.0	9	3					130.4			90.2	75.3	75	L
VLC/VLDI 24-4	68.4	31.0	12	4		115.4	100.0	50.0	41.7	66.6	57.7	28.9	24.1	24	XL
36-4	102.6	46.5	12	4		173.1	150.0	75.0	62.6	99.9	86.6	43.3	36.1	36	XL
48-4	136.8	62.1	12	4				100.0	83.5	133.2	115.5	57.7	48.2	48	XL
64-4	182.4	82.7	12	4				133.3	111.3	177.6	154.0	77.0	64.3	64	XL
100-4	285.0	129.3	12	4					173.9			120.3	100.4	100	XL

* Heater stage identifies the number of contactors.

** Refer to table 6-1 for Control Cabinet Dimensions.

Capacity Notes

Approximately 172 BTU's are required to raise the temperature of one pound of water from 40° to 212° F. An additional 970 BTU's are required to change one pound of water to water vapor.

The addition of ¾" rigid foil faced fiberglass insulation (optional) on all surfaces of evaporating chamber will increase unit efficiency by approximately 2%.

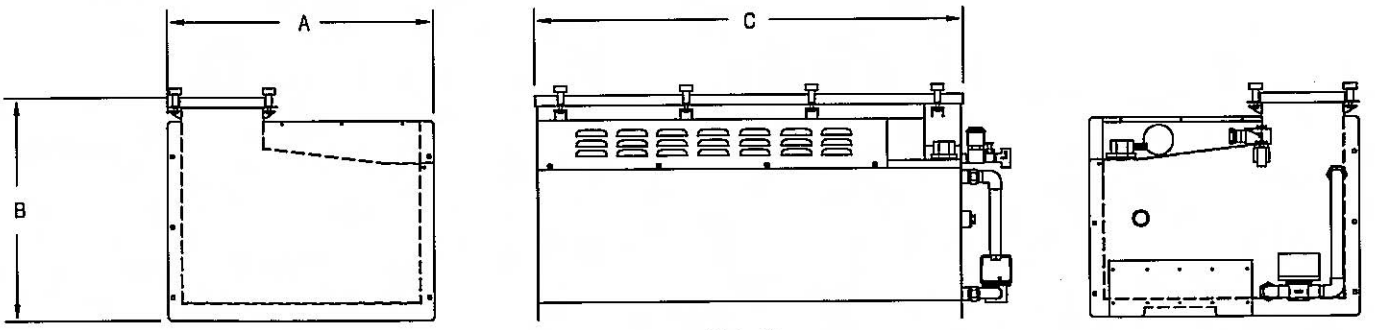
Another factor to consider is condensation steam loss from hoses and tubes. Use the following steam loss guidelines:

- vapor hose - .15 lbs/ft/hr
- insulated pipe - .05 lbs/ft/hr
- dispersion tubes - .5 lbs/ft/hr

Table 7-1: Dimensions

Model Number	A		B		C		Weight Empty	Weight Full
	Inches	mm	Inches	mm	Inches	mm		
VLC/VLDI 2-1	20.25	514.4	16.85	428.0	7.52	191.0	35	79
3-1	20.25	514.4	16.85	428.0	7.52	191.0	35	79
4-1	20.25	514.4	16.85	428.0	7.52	191.0	35	79
5-1	20.25	514.4	16.85	428.0	7.52	191.0	35	79
VLC/VLDI 6-1	22.00	558.8	18.38	466.9	12.85	326.4	57	157
9-1	22.00	558.8	18.38	466.9	12.85	326.4	57	157
12-1	22.00	558.8	18.38	466.9	12.85	326.4	57	157
16-1	22.00	558.8	18.38	466.9	12.85	326.4	57	157
25-1	22.00	558.8	18.38	466.9	12.85	326.4	57	157
VLC/VLDI 12-2	22.00	558.8	18.38	466.9	20.35	516.9	79	237
18-2	22.00	558.8	18.38	466.9	20.35	516.9	79	237
24-2	22.00	558.8	18.38	466.9	20.35	516.9	79	237
32-2	22.00	558.8	18.38	466.9	20.35	516.9	79	237
50-2	22.00	558.8	18.38	466.9	20.35	516.9	79	237
VLC/VLDI 18-3	22.00	558.8	18.38	466.9	27.85	707.4	110	326
27-3	22.00	558.8	18.38	466.9	27.85	707.4	110	326
36-3	22.00	558.8	18.38	466.9	27.85	707.4	110	326
48-3	22.00	558.8	18.38	466.9	27.85	707.4	110	326
75-3	22.00	558.8	18.38	466.9	27.85	707.4	110	326
VLC/VLDI 24-4	22.00	558.8	18.38	466.9	35.35	897.9	153	427
36-4	22.00	558.8	18.38	466.9	35.35	897.9	153	427
48-4	22.00	558.8	18.38	466.9	35.35	897.9	153	427
64-4	22.00	558.8	18.38	466.9	35.35	897.9	153	427
100-4	22.00	558.8	18.38	466.9	35.35	897.9	153	427

Figure 7-1: Dimensions



Back View

Side View

Front View

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Area-Type Humidifier Application Information

The operating characteristics of Area-Type steam humidifiers should be considered when selecting humidifier capacities and choosing mounting locations.

Steam discharge from the humidifier quickly cools and turns to visible, warm, microscopic drips of water (fog) which are lighter than air.

Should this fog contact any solid surface (columns, beams, ceiling, pipes, etc.) before it disappears, it may collect and drip, as water.

The greater the space relative humidity, the higher and farther the "fog" will carry and rise in the space before disappearing.

The table at right states the vertical (rise), horizontal (throw), and width (spread) dimensions that can be expected with the Area-Type humidifiers.

To avoid steam impingement on surrounding areas, these dimensions should be observed.

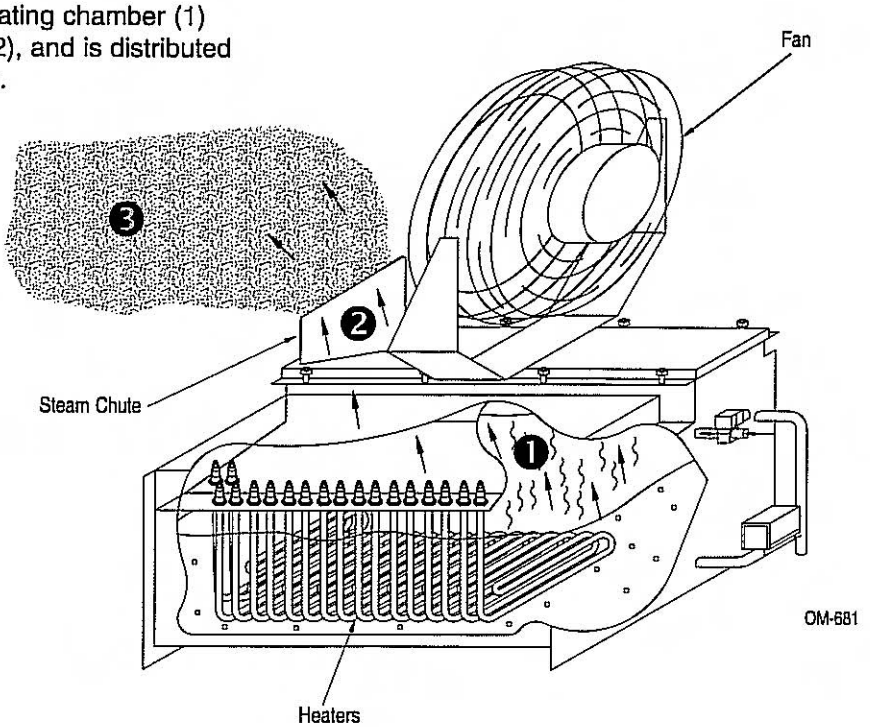
Note: Tank must be at least 12.85" and output should not exceed 285 lbs/hr. For more detailed information see table 7-1 on page 7.

Table: 8-1: Minimum Distance for Rise, Spread and Throw

Space Temp.	Space R.H.		50 PPH	100 PPH	150 PPH	200 PPH	250 PPH	285 PPH
60°F	30%	Rise	1 ft.	4 ft.	6 ft.	7 ft.	8 ft.	9 ft.
		Spread	2 ft.	4 ft.	5 ft.	7 ft.	8 ft.	9 ft.
		Throw	6 ft.	10 ft.	12 ft.	13 ft.	15 ft.	17 ft.
	40%	Rise	1 ft.	4 ft.	6 ft.	8 ft.	9 ft.	10 ft.
		Spread	2 ft.	4 ft.	5 ft.	7 ft.	9 ft.	10 ft.
		Throw	6 ft.	10 ft.	12 ft.	14 ft.	16 ft.	18 ft.
	50%	Rise	1 ft.	4 ft.	6 ft.	8 ft.	9 ft.	10 ft.
		Spread	2.5 ft.	5 ft.	5 ft.	7 ft.	9 ft.	10 ft.
		Throw	6 ft.	10 ft.	12 ft.	14 ft.	16 ft.	18 ft.
70°F	30%	Rise	1 ft.	3 ft.	4 ft.	5 ft.	5 ft.	7 ft.
		Spread	1.5 ft.	3 ft.	4 ft.	5 ft.	5 ft.	7 ft.
		Throw	4 ft.	8 ft.	10 ft.	11 ft.	12 ft.	14 ft.
	40%	Rise	1 ft.	3 ft.	4 ft.	5 ft.	6 ft.	7 ft.
		Spread	2 ft.	3 ft.	4 ft.	5 ft.	6 ft.	7 ft.
		Throw	4 ft.	8 ft.	11 ft.	12 ft.	13 ft.	15 ft.
	50%	Rise	1 ft.	3 ft.	4 ft.	5 ft.	5 ft.	7 ft.
		Spread	2 ft.	3 ft.	4 ft.	5 ft.	5 ft.	7 ft.
		Throw	4 ft.	8 ft.	11 ft.	12 ft.	14 ft.	16 ft.

Figure 8-1: Principle of Operation

Steam created in the evaporating chamber (1) flows up through the chute (2), and is distributed into the space (3) via the fan.



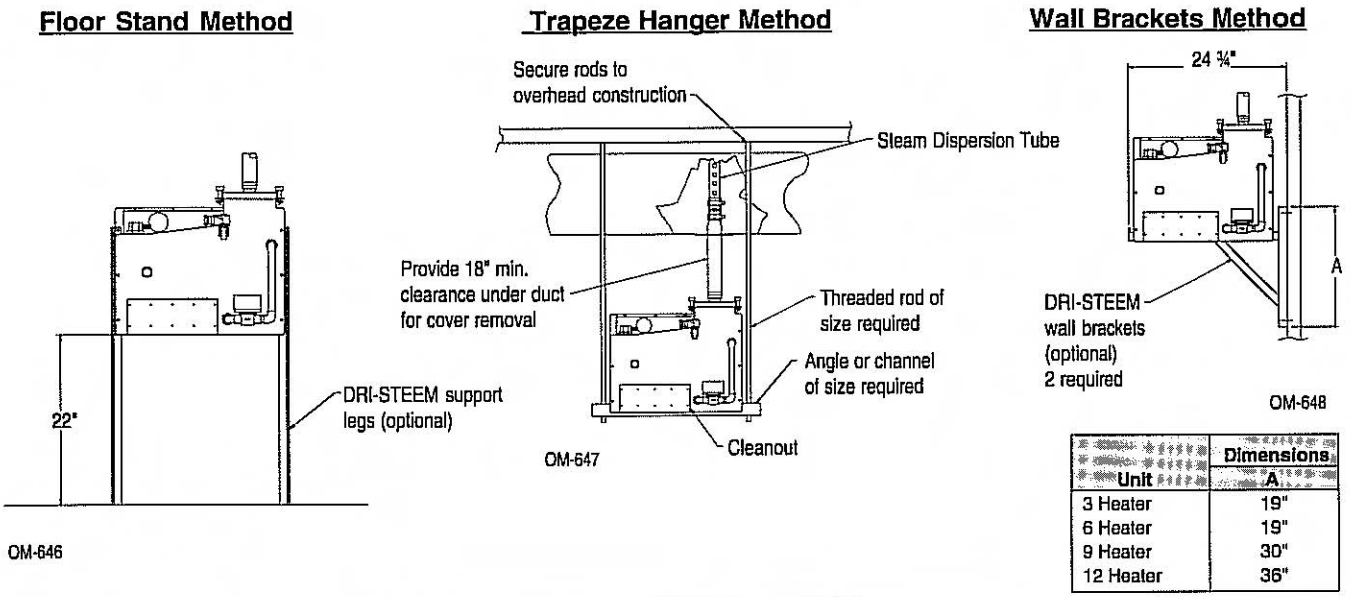
Mounting Procedures

For proper operation of the electrode probe water level control and the skimmer system, the humidifier should be mounted level in both directions.

Access (18" minimum) for periodic removal of the top cover is recommended. In most cases, scale that forms on the heating elements continuously flakes off as it forms and the loose scale settles to the bottom. A clean-out tray on the floor of the evaporator may be removed periodically through the front clean-out opening.

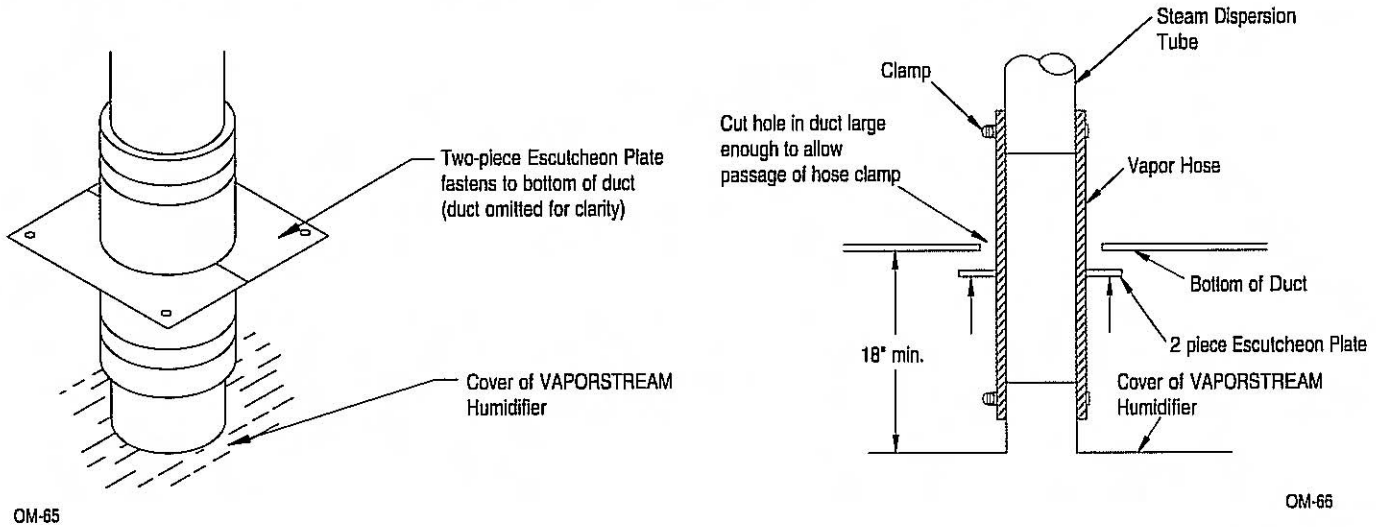
If the VAPORSTREAM® Model VLC is to be installed above expensive materials or devices, a drain pan of sufficient size and depth to retain rapid or sudden drainage of the contents of the humidifier should be provided. The drain pan should be drained to the sanitary waste water system.

Figure 9-1: Mounting Support Methods

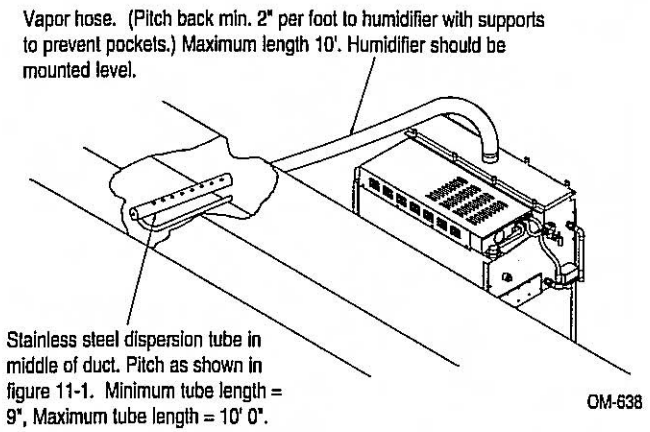


Unit	Dimensions A
3 Heater	19"
6 Heater	19"
9 Heater	30"
12 Heater	36"

Figure 9-2: Mounting Unit on Underside of Duct
Manufacturer recommends mounting humidifier 18" below duct to facilitate cover removal.



Figures 10-1 and 10-2: Mounting Units Away from Duct(s) Using Vapor Hose



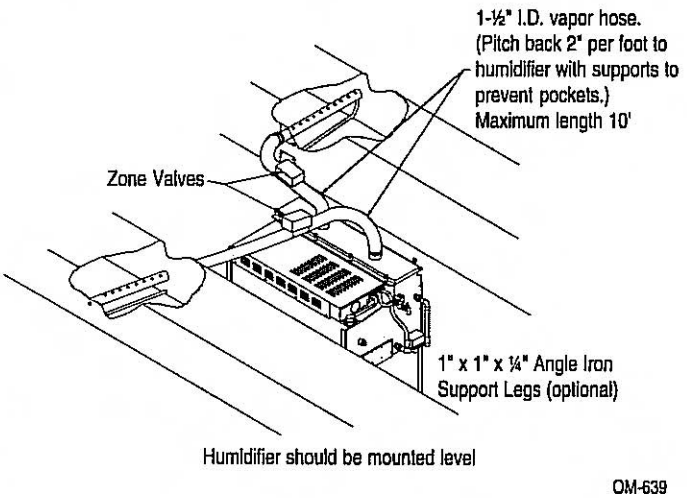
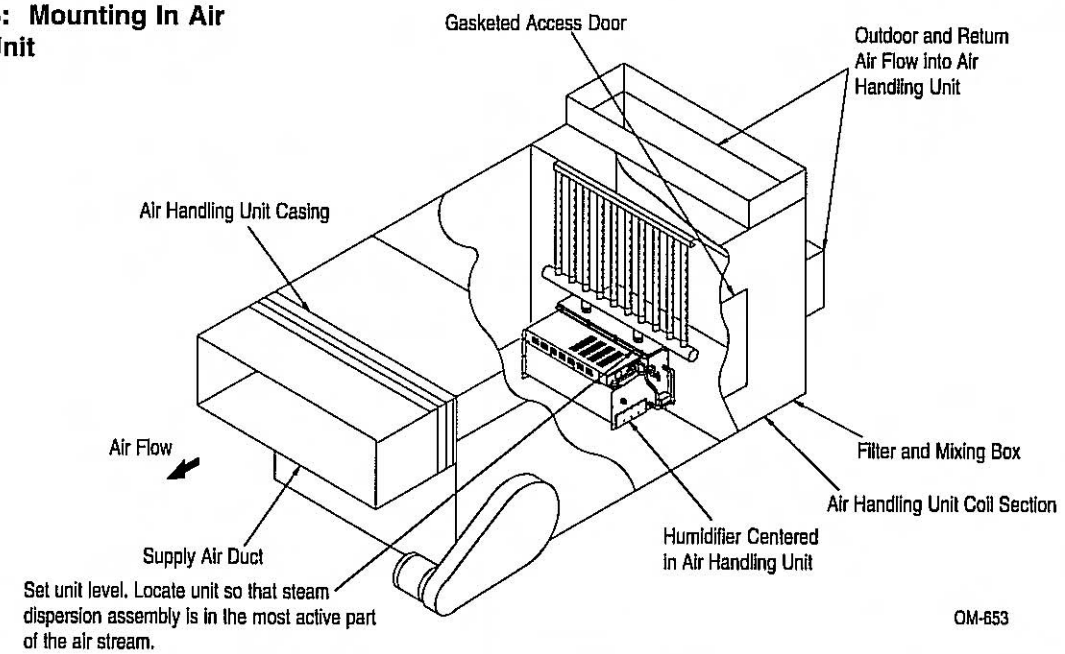


Figure 10-3: Mounting In Air Handling Unit



Electrical

The current characteristics, and capacity requirements should be checked against the nameplates. The control cabinet should be mounted in a location convenient for service. All wiring must be in accordance with all governing codes, and with VAPORSTREAM® Model VLC wiring diagram. The diagram is inside the control cabinet. The wiring between the control cabinet and humidifier must be rated at 105°C.

Caution: Only qualified electrical personnel should perform installation procedures.

Dispersion Tube Installation with Condensate Drain

(over 28 pph per dispersion tube)

Vapor Hose

- Vapor hose should be supported to prevent sags or low spots and to maintain a minimum pitch of 2" per foot back to the humidifier.
- For mounting the humidifier above the level of dispersion tube, see page 14.

Failure to follow the above recommendation may result in excessive back pressures being imposed on the humidifier. This in turn may lead to dispersion tube(s) spitting, lost water seals or leaking gaskets. When distance between humidifier and the dispersion tube(s) exceeds 10 feet, consult factory for special recommendations.

Rigid Piping (when used)

- Vapor piping should have a minimum I.D. of 1.5 inches.
- A minimum pitch of 2" per foot back to the humidifier should be maintained.
- 90° elbows are not recommended, use two 45° elbows one foot apart instead.
- Thin wall tubing will heat up faster and cause less start up loss than heavy wall pipe.
- Insulating the rigid piping will reduce the loss in output caused by condensation.

Tube Mounting

- Mount dispersion tubes pitched as stated above.
- Tubelets must discharge perpendicular to air flow;
- ** Return line piping material must be suitable for 212°F (100°C) water

Min. Condensate Drain Line Sizing

- One or two tubes: 3/4" I.D.
- Three or more tubes: 1" I.D.

Table 11-2: Water Seal Minimum Height*

Humidifier	Lbs/Hr	Height (Inches)
Up to 48 KW	5-138	12
49 KW to 64 KW	139-183	15
65 KW to 100 KW	184-227	18

* Height required to overcome humidifier internal pressure

Figure 11-1: Single Tube

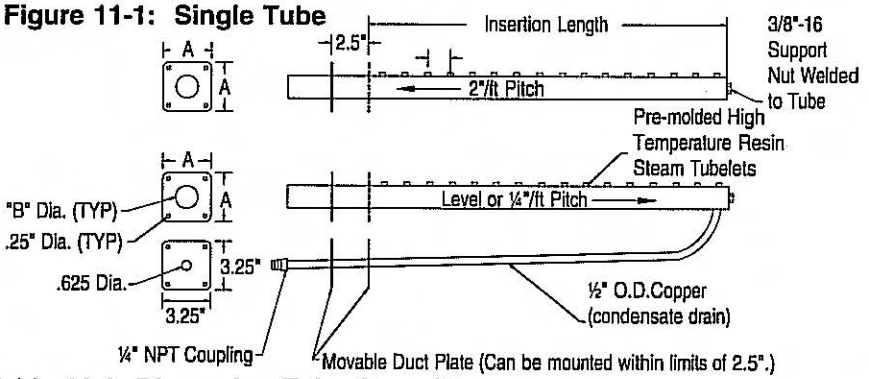


Table 11-1: Dispersion Tube Capacities

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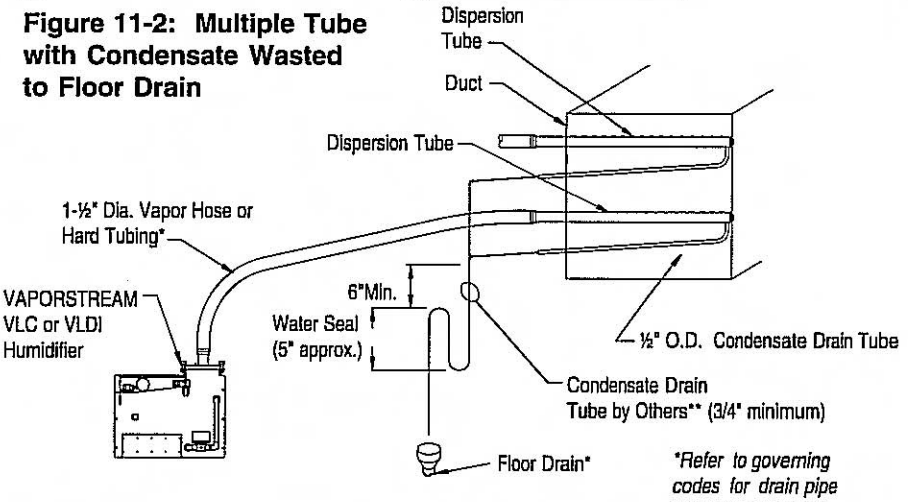
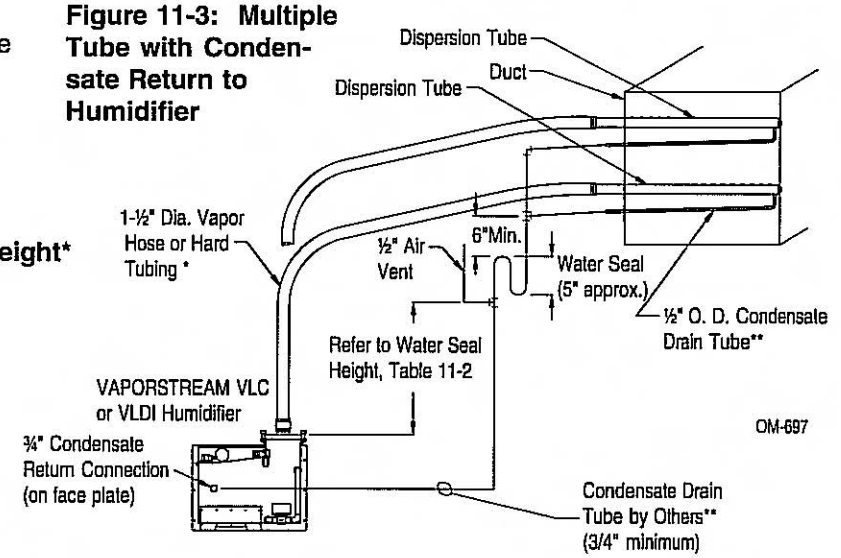
Tube Dia.	Capacity Without Drain	Capacity With Drain	A	B
1"	10 lbs/hr	N/A	3.25"	1.03"
1½"	28 lbs/hr	57 lbs/hr	3.25"	1.51"
2"	57 lbs/hr	85 lbs/hr	5.00"	2.03"

Figure 11-2: Multiple Tube with Condensate Wasted to Floor Drain



Refer to governing codes for drain pipe sizing requirements.

Figure 11-3: Multiple Tube with Condensate Return to Humidifier



Instructions for Horizontal Duct

1. Unpack shipment and verify receipt of all RAPID-SORB components with packing list. Report any shortages to the DRI-STEEM factory immediately.

2. Provide necessary access in and around duct work.

3. Locate 1" x 1½" stainless steel channel inside the duct. Hang the channel from the top of the duct, centered between duct side walls, with the two mounting holes provided.

4. If hose cuffs are used, slide cuffs over the open end of each tube. Install a pair of hose clamps on each tube.

5. Note direction of air flow within duct, then arrange each dispersion tube so steam will blow perpendicular to the air flow. Use the hex bolts provided to attach tubes to overhead 1" x 1½" channel. Do not secure. If the header is outside the duct (see figure 12-2), punch-out necessary clearance holes in the base of the duct to slide dispersion tubes up from bottom.

6. **For a Header Inside the Duct** (See figure 12-1.): Punch or cut out necessary clearance holes for RAPID-SORB header. Slide header into the duct, position header and slide the dispersion tube hose cuffs or slip couplings over the header dispersion tube nipples.

Position the header so vertical dispersion tubes are perpendicular to duct and pitch the header to condensate drain. Secure header to the mounting bracket. Use escutcheon plates to secure header where it enters the duct.

Check that the dispersion tubes release steam perpendicular to the air flow. Secure tubes to the overhead channel. Secure the channel to the duct, position hose cuffs or slip couplings over tube and header tube nipples, and secure.

For a Header Outside the Duct (See figure 12-2.): Position header under dispersion tubes, then slide hose cuffs or slip couplings over header dispersion tube nipples.

Position the header so dispersion tubes are perpendicular to duct and pitch the header to condensate drain. Secure dispersion tubes in place with the tube escutcheon plates provided.

Check the position of the tubes for steam release perpendicular to the air flow. Secure tubes to the overhead channel, and secure channel to the duct. With header pitched to condensate drain, slip hose cuffs or slip couplings over tube nipples and secure.

7. Connect a condensate drain to the header, provide the water trap as shown, and run to open drain, sized according to governing codes.

8. Attach the header steam supply connector to main header using the hose cuff and clamps provided, but do not secure.

9. Route the necessary number of vapor hoses or pipes from the humidifier tank, position connector to accept the hoses or pipes and secure.

Note: Refer to page 14 for vapor hose information on routing and for alternate vapor hose installation methods.

Figure12-1: RAPID-SORB Unit
Header Inside Duct

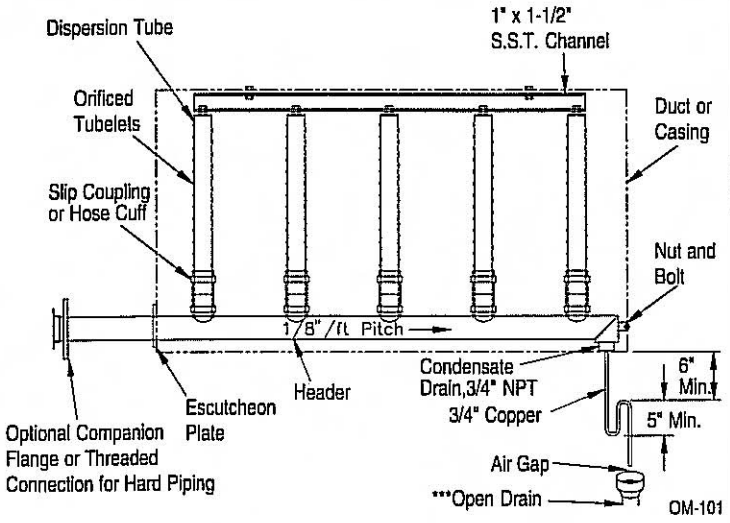
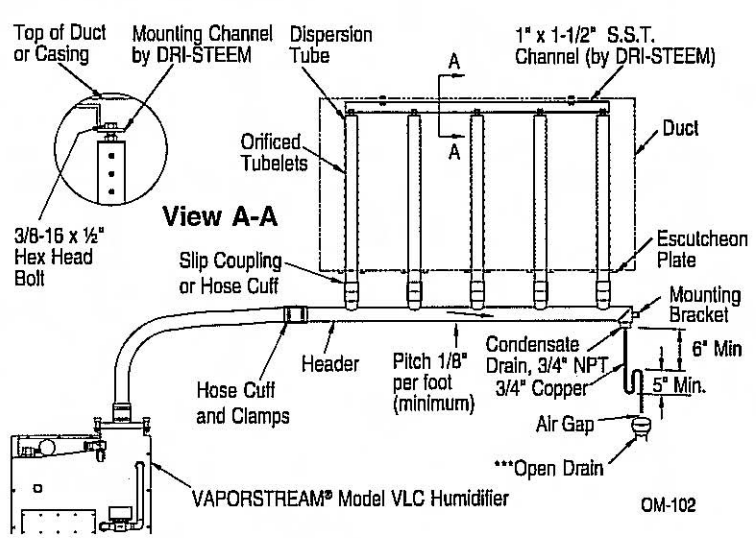


Figure 12-2: RAPID-SORB Unit
Header Under Duct



Instructions for Vertical Duct

Install the RAPID-SORB with dispersion tubes and header to condensate drain pitched as shown in figures 13-1,13-2, and 13-3. See "Instructions for Horizontal Duct" for additional information, as applicable.

Figure 13-1: Plan View

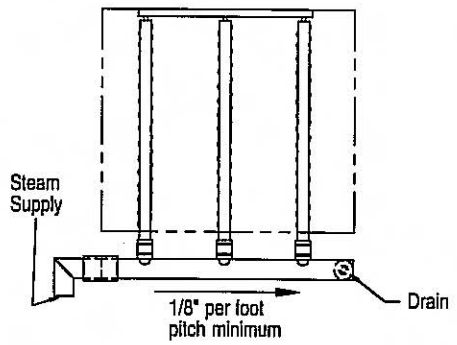


Figure 13-2: Elevation Tube without Drain

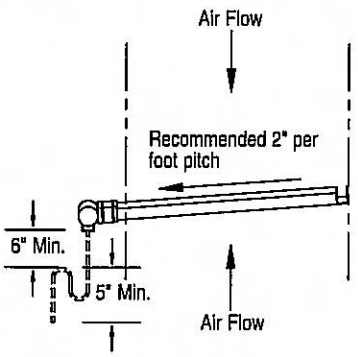
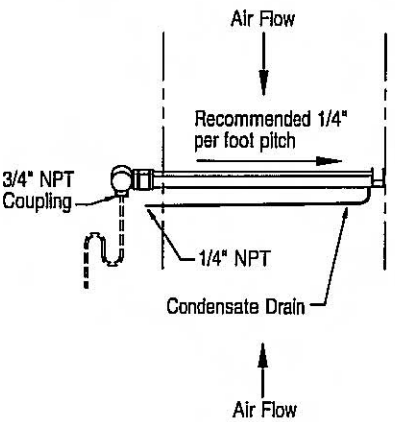


Figure 13-3: Elevation Tube with Drain



PIPING METHODS

Drain Piping

A drain line should be extended from the skimmer connection to a sanitary waste or suitable drain. If non-metallic pipe or hose is used, it must be capable of withstanding temperatures up to 212°F.

To prevent steam from escaping out the drain line, a water seal must be provided in the drain line of sufficient height to contain the pressure developed within the humidifier and steam dispersion system. To determine the proper height of the water seal, see table 15-1.

Make-up Water Piping

When non-metallic water piping is used, it must be rated to withstand 212°F or greater temperature. If not, the final 3 feet connected to the humidifier should be metallic and should not be insulated.

As part of the fill valve assembly, the needle valve restricts the rush of cold water entering the evaporating chamber during the fill cycle. Cold water could drop the chamber water temperature and collapse the steam.

The VAPORSTREAM® Model VLC has a one-inch internal "air gap". However, local codes may require a vacuum breaker.

Vapor Hose Piping

When a vapor hose and stainless steel dispersion tube are used, they should be pitched back to the humidifier. A minimum slope of 2" per foot (with no "low spots") is recommended. When this is not possible due to duct elevation or an obstruction, alternate arrangements may be used as shown below.

However, condensate that forms in the vapor hose must be removed. Preferably, it should be returned to an open drain with a water seal of sufficient height to contain the duct static pressure, as shown in figure 11-2.

The condensate can also be returned to the VAPORSTREAM VLC, as shown in figure 11-3, with an air vent. This method requires a water seal and an air gap to prevent back pressure from the VAPORSTREAM VLC tank effecting condensate returning below the VAPORSTREAM VLC water line.

Figure 14-1: Piping method recommended when obstruction prevents dispersion tube from being continuously pitched back to humidifier:

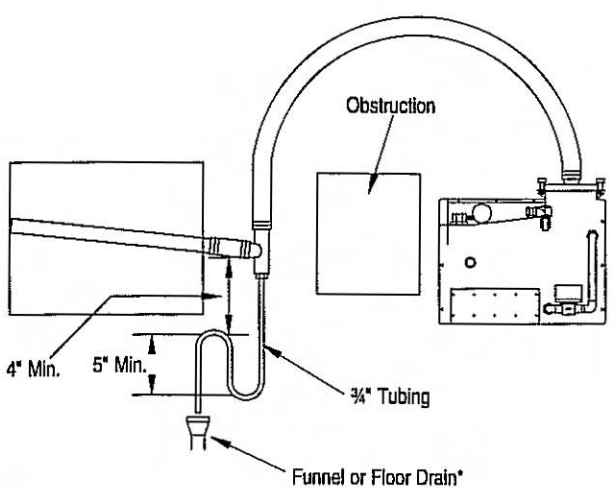


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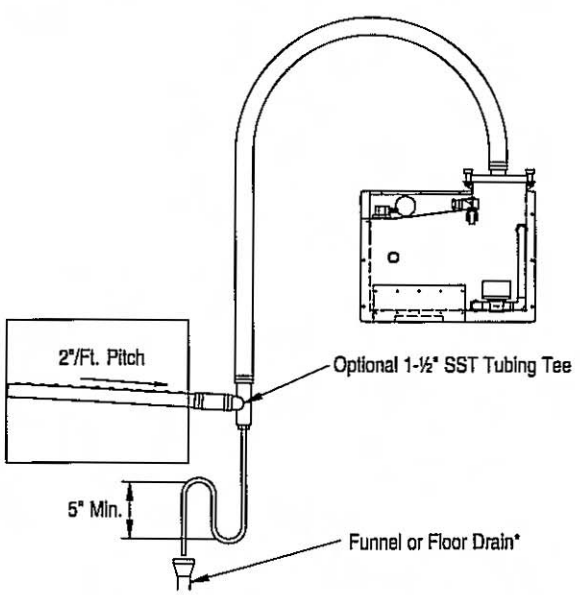
Figure 14-2: Piping method recommended when humidifier must be mounted higher than the duct:



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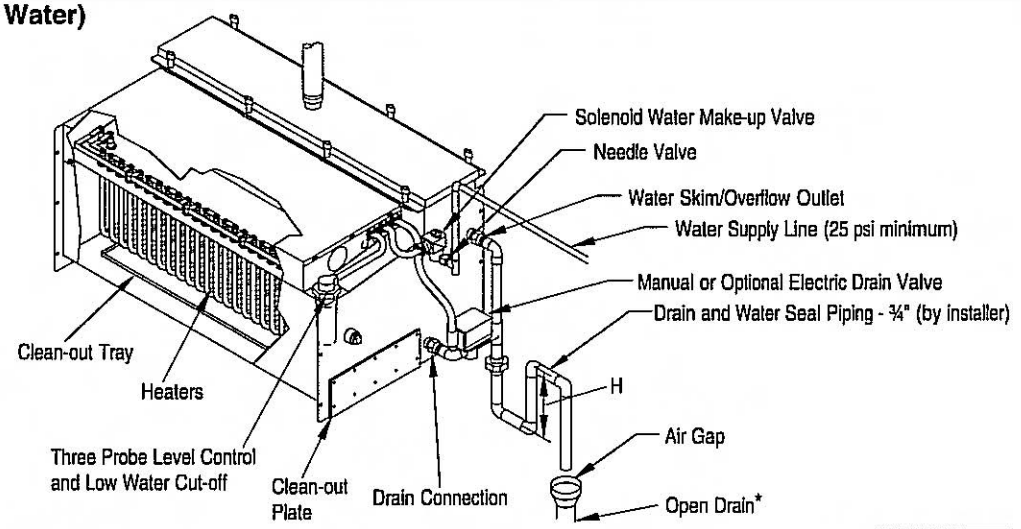
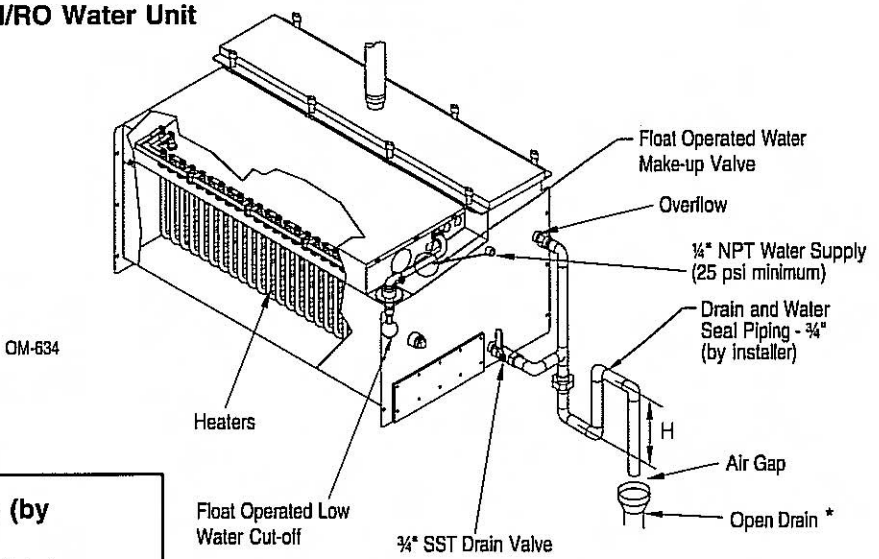
* Refer to governing codes for drain pipe size requirements.

PIPING DIAGRAMS: STEAM, WATER AND DRAIN

Standard Unit (Non-DI/RO Water)



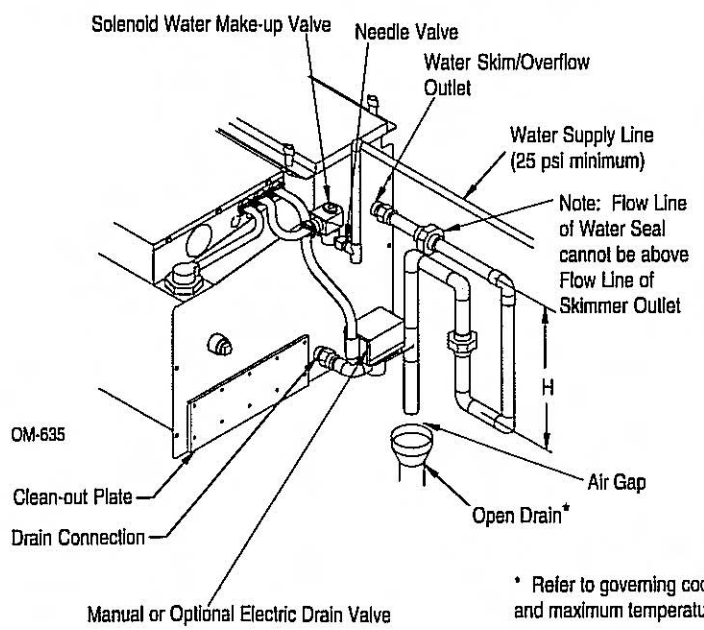
DI/RO Water Unit



Note: Drain piping material must be suitable for 212°F (100°C) water.

Alternate Water Seal and Drain Valve Piping (by installer)

Used when water seal must be elevated above flow line of drain connection (humidifier near floor)



* Refer to governing codes for drain pipe sizing and maximum temperature requirements.

Table 15-1: Water Seal Height (H) Recommendations

Humidifier	Lbs/Hr	Height (Inches)
Up to 48 KW	5-138	12
49 KW to 64 KW	139-183	15
65 KW to 100 KW	184-227	18

***Note:** If piping to dispersion tube is over 20 feet increase water seal height by 15%.*

START-UP PROCEDURE

Introduction

After the system has been properly installed and connected to both electrical and water supplies, it may then be started.

Startup and Checkout Procedures

Mounting

Check mounting to see that unit is level and securely supported before filling with water.

Piping

Verify that all piping connections have been completed as recommended and that water pressure is available.

Electrical

Verify that all wiring connections have been made in accordance with all governing codes and the enclosed VAPORSTREAM® VLC wiring diagram.

Caution: Only qualified electrical personnel should perform start-up procedure.

Control System

For your particular humidifier control system, refer to the Operations and Maintenance Manual, that was enclosed with the product shipment.

Caution: Overtightening cover will cause leaks. All cover knobs are turned down at the factory until the bottom of the knob makes contact with the flange, then one half turn further. If more compression is required, turn all knobs a half turn more. Do not turn knobs more than a half turn before identifying that a leak still exists.

OPERATION

For operating instructions, see the *VAPOR-LOGIC® Installation Instructions and Maintenance Operations Manual.*

MAINTENANCE

VAPORSTREAM® Model VLC Only

Using softened water will significantly reduce mineral build-up in the humidifier. When softened water is not available, the VAPORSTREAM VLC is designed to deal with water hardness in one of two ways depending on the degree of hardness. For light to moderate hardness (up to 10 grains per gallon), using the surface water skim time feature with annual cleaning is recommended. For high mineral content water (above 10 grains per gallon), a periodic drain and flush through the motorized drain valve, in addition to the surface water skim time feature, is recommended. The frequency of cleaning will depend on water condition and evaporation load.

The humidifier should be inspected for leaks at least annually. Also, the current draw of the heaters should be checked and all safety devices in the control circuit should be cycled on and off to verify that they are functioning.

Caution: *When performing maintenance on the VAPORSTREAM VLC, always set control module switch to "STBY" position, place main disconnect in "OFF" position, and close manual water shut-off valve.*

Seasonally or as Required

1. Cleaning Tank - Slide the clean-out tray out and dispose of any loose scale that has collected in the tray. This should be done before the build-up reaches the underside of the heating elements.

2. Cleaning Probes - Disconnect the plug and cable assembly and unscrew the probe holder from the VAPORSTREAM VLC unit. The scale will easily flake off from the sensing portion. The sensing portion (bottom 3/8") of the probe should be brushed clean with stainless steel wool.

3. Cleaning Skim Overflow Fitting - Loosen deposits with a long tool, such as a screwdriver. Proper skimmer drainage should be verified by a weekly visual inspection. Water should drain from skimmer drain pipe after each fill cycle. (For cleaning piping, disconnect and flush out. If mineral deposits have restricted the flow, replace piping.)

Summer Maintenance

After the humidification season, a complete inspection and cleaning of the heaters, probe control, skimmer, and water chamber is recommended. After cleaning, the unit should remain empty until humidification is required.

Adjusting the Surface Skim Bleed-Off Quantity

The skim time determines the quantity of water skimmed with each fill cycle. The skim time is field adjustable using the VAPOR-LOGIC® keypad.

Each time the VAPORSTREAM VLC refills, it fills to an elevation near the lip of the skim overflow fitting. A portion of the refill water then flows to drain carrying the minerals floating on the water with it. This reduces the mineral concentration, thereby reducing the frequency of cleaning needed.

The heated water that flows to drain is a cost of operation. Cleaning the humidifier is also an operational cost. Therefore, it is recommended that the user observe and adjust the skimming quantity. By doing so, a balance between minimizing mineral build-up and conserving hot water can be achieved.

VAPORSTREAM® Model VLDI Only

The humidifier should be inspected for leaks at least annually. Also, the current draw of the heaters should be checked and all safety devices in the control cabinet should be cycled on and off to verify that they are functioning.

Make-up Water Piping

Use cold or hot makeup water. If the water pressure is above 60 psi and/or water hammer would be objectionable, a pressure reducing valve or shock arrester should be installed. Even though the VAPORSTREAM VLC has an internal 1" air gap, some local codes may require a vacuum breaker.

Caution: Minimum water supply pressure is 25 psi.

Cleaning Evaporating Chamber

As long as mineral-free water is used in the VAPORSTREAM VLDI, no cleaning or flushing of the evaporating chamber should be necessary.

TROUBLE-SHOOTING GUIDE

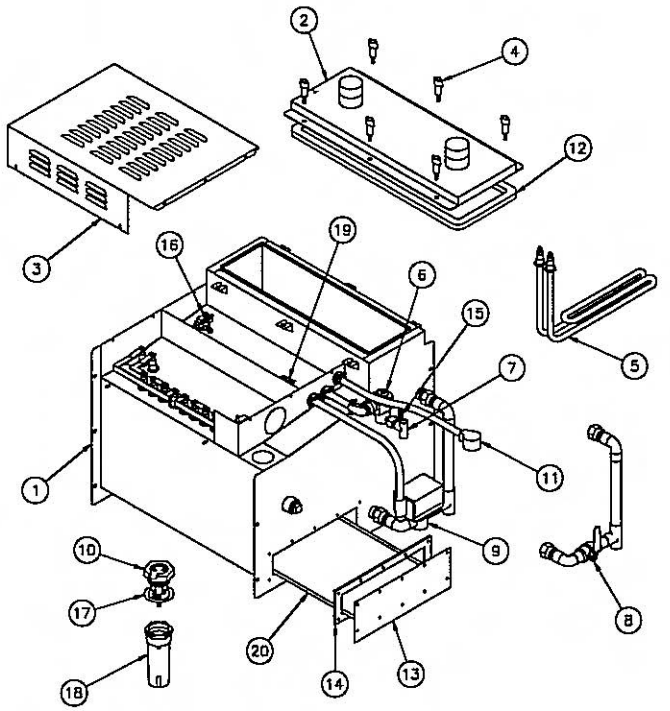
For trouble-shooting instructions, see the *VAPOR-LOGIC® Installation Instructions and Maintenance Operations Manual.*

VAPORSTREAM® Model VLC Humidifier

No.	Description	Part No.
1	Chamber	(1)
2	Cover, Chamber	(1)
3	Cover, Louvered	(1)
4	Knob, T-Handled Utility	700725
5	Heater	(1)
6	Valve, 1/4" Brass Fill	505080 (1)
7	Sediment Strainer, 1/4" NPT	300050
8	Valve, 3/4" Sweat Brass	505011 (2)
9	Valve, 3/4" HW Drain	505400 (1, 3)
10	Probe Assembly	406015
11	Probe Plug Wire Assembly	406050-002 (1)
12	Gasket, Cover	160691 (1)
13	Clean-Out Plate	165472
14	Gasket, 3½" x 11¾"	308225
15	Valve, Needle ¼" NPT	505070-001
16	Thermal Cut-out	409560-001
17	Gasket, Probe	160698
18	Probe Housing, Nylon	308500
19	Switch, Interlock	408475
20	Tray, Clean-out	167770 (1)

(1) Specify humidifier model and serial numbers when ordering.
(2) With manual drain only.
(3) With automatic timer drain down option only.

Notes:
1. For dispersion tube(s) specify type (L-tube, straight tube) and humidifier model and serial numbers.
2. Parts not itemized are typical hardware stock items.



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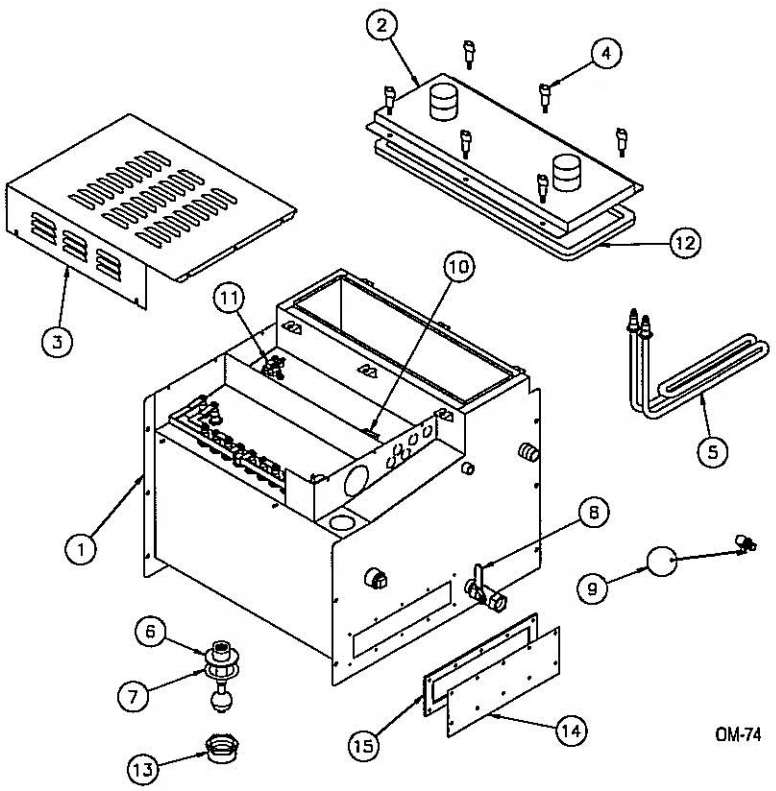
VAPORSTREAM VLDI Humidifier

No.	Description	Part No.
1	Chamber	(1)
2	Cover, Chamber	(1)
3	Cover, Electrical	(1)
4	Knob, T-Handled Utility	700725
5	Heater	(1)
6	Plate, VLDI Conversion	167785
7	Gasket	160698
8	Valve, 3/4" SST	505000-001
9	Float Valve Assembly, Straight	505210
10	Switch, Interlock	408475
11	Thermal Cut-out	409560-001
12	Gasket, Cover	160691 (1)
13	DI Housing, Nylon	167780
14	Clean-out Plate	165472
15	Gasket, 3½" x 11¾"	308225

(1) Specify humidifier model and serial numbers when ordering.

Notes:
1. For dispersion tube(s) specify type (L-tube, straight tube, RAPID-SORB, etc) humidifier model and serial numbers.
2. Parts not itemized are typical hardware stock items.



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MAINTENANCE SERVICE RECORD

DATE INSPECTED	PERSONNEL	OBSERVATION	ACTION PERFORMED

TWO-YEAR LIMITED WARRANTY

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

If any DRI-STEEM product is found to be defective in material or workmanship during the applicable warranty period, DRI-STEEM's entire liability, and the purchaser's sole and exclusive remedy, shall be the repair or replacement of the defective product, or the refund of the purchase price, at DRI-STEEM's election. DRI-STEEM shall not be liable for any costs or expenses, whether direct or indirect, associated with the installation, removal or re-installation of any defective product.

DRI-STEEM's limited warranty shall not be effective or actionable unless there is compliance with all installation and operating instructions furnished by DRI-STEEM, or if the products have been modified or altered without the written consent of DRI-STEEM, or if such products have been subject to accident, misuse, mishandling, tampering, negligence or improper maintenance. Any warranty claim must be submitted to DRI-STEEM in writing within the stated warranty period.

DRI-STEEM's limited warranty is made in lieu of, and DRI-STEEM disclaims all other warranties, whether express or implied, including but not limited to any IMPLIED WARRANTY OF MERCHANTABILITY, ANY IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE, any implied warranty arising out of a course of dealing or of performance, custom or usage of trade.

DRI-STEEM SHALL NOT, UNDER ANY CIRCUMSTANCES BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, LOSS OF PROFITS, REVENUE OR BUSINESS) OR DAMAGE OR INJURY TO PERSONS OR PROPERTY IN ANY WAY RELATED TO THE MANUFACTURE OR THE USE OF ITS PRODUCTS. The exclusion applies regardless of whether such damages are sought based on breach of warranty, breach of contract, negligence, strict liability in tort, or any other legal theory, even if DRI-STEEM has notice of the possibility of such damages.

By purchasing DRI-STEEM's products, the purchaser agrees to the terms and conditions of this limited warranty.

DRI-STEEM®
HUMIDIFIER COMPANY

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