

READ AND SAVE THESE INSTRUCTIONS

DRI-STEEM MODEL STS[®] AND STS-DI[®]

STEAM-TO-STEAM HUMIDIFIERS

Installation Instructions and
Maintenance Operations Manual

DRI STEEM[®]
HUMIDIFIER COMPANY

TABLE OF CONTENTS

TO THE PURCHASER AND THE INSTALLER

Thank you for deciding to purchase DRI-STEEM STS Series humidification equipment. We have endeavored to design and build this equipment to give you total satisfaction and many years of trouble free service. Avoiding certain pitfalls during installation and observing proper operating practices thereafter will assure you of achieving that objective. We respectfully urge you to familiarize yourself with the contents of this manual.

DRI-STEEM Humidifier Company

Installing the STS Humidifier	3-5
• Inverted U-Tube Details	4
• Inside Air Handling Unit	5
• Multiple Inverted U-Tubes	5
Mounting Methods	
• Mounting Procedures	6
• Rapid Absorption Assembly Installation	7
Piping	8
• Piping Diagrams	9
Components and Piping Methods	10-11
Wiring Diagrams	12
Operation	13
Start-up and Checkout Procedures	14
Recommended Maintenance	14-15
Trouble Shooting Guide	16
Replacement Parts	17-18
Maintenance Record	19
DRI-STEEM Warranty	20

INSTALLING THE STS HUMIDIFIER

Selecting the Location

When selecting the location, first consideration should be given to rapid, thorough absorption of the steam. The warmest air will most readily absorb steam. The most active part of the air stream 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 "disappearing" and will saturate objects it touches while visible, you should avoid discharging the steam nearer than your calculated absorption distance* upstream of fans, filters, dampers, etc. unless the air temperature is warmer than 90°F. If so, a shorter distance may be permissible. If in doubt, consult factory.

When the remote mounting method with the vapor hose kit is used, condensate will drain into the duct unless the dispersion tube is positioned correctly and the tube and vapor hose are pitched properly. Preferably, the condensate should drain back to the humidifier in the vapor hose. When job conditions prevent this, an alternate method is used. Water-logged low points in the hose will cause "gurgling" and in severe conditions periodically "slugs" of condensate may be discharged into the duct. (See page 7 for alternate methods.)

* When adequate distance is not available, you should use a rapid absorption tube bank. Refer to pages 14-15 in the VAPORSTREAM catalog or contact DRI-STEEM at 1-800-328-4447, or your local representative.

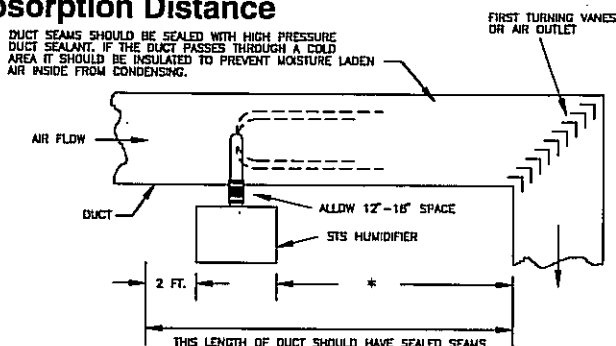
The location selected must also provide for electrical service, cold water for makeup and sanitary waste for drain.

Simply Stated:

- It is very important that the dispersion tube be located where the water vapor being discharged will be carried off with the air stream and will not cause condensation or dripping from the duct.
- In general, the STS humidifier is best placed where the air can most readily absorb the moisture being added without causing condensation at or after the unit. This will normally be after the heating coil or where the air temperature is highest.
- Do not place the unit too close to the intake of a high efficiency filter. The filter may remove the visible moisture and become waterlogged.*
- Do not place unit where water vapor will impinge on a metal surface.
- Do not place the unit too close to a split in the duct. The unit may put more moisture in one branch than the other.

Vapor Absorption Distance

Fig. 3-1



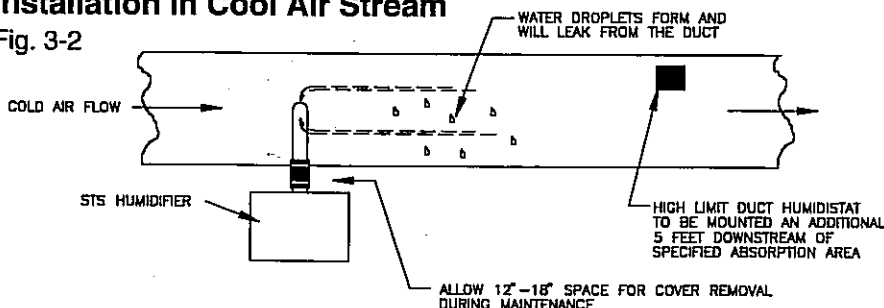
A distance of air travel is required for the steam to "disappear" or go into the gaseous state.

While visible, the steam may collect on internal devices, such as turning vanes, resulting in dripping.

*A distance of 5 to 8 feet is recommended, depending on temperature. (When duct air is cooler than 80°F, up to 12 feet should be allowed.)

Installation in Cool Air Stream

Fig. 3-2



When a humidifier discharges into a duct that will carry cool air (under 70°F) periodically, the dew point temperature should be determined.

If the psychrometric chart reveals that saturation may occur, protection should be provided. A high limit humidistat or a thermostat, set to cut off the humidifier at a safe temperature, can be used for this purpose.

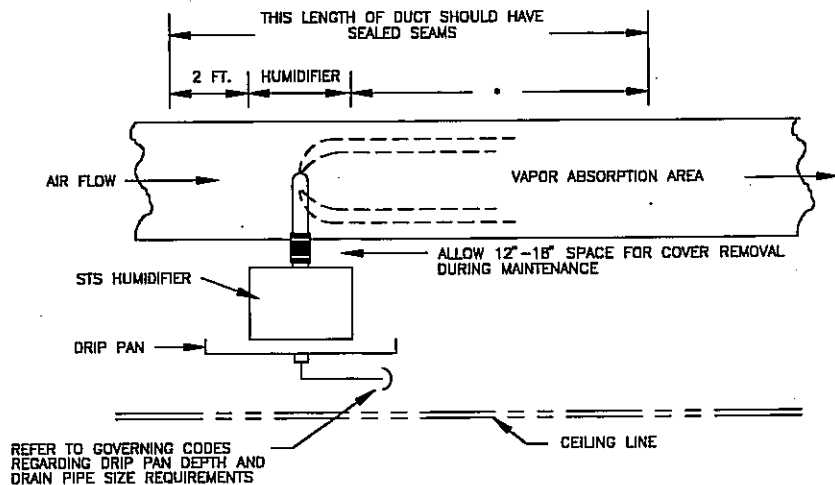
INSTALLATION

Water piping and humidifiers should not be installed above expensive apparatus or 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 under the humidifier, valve, etc. to catch any possible water drip.

It is advisable to terminate the drain above an open floor drain. The overflow from the STS should be piped separately to a floor drain rather than the drip pan.

Fig. 4-1
Installation Above Valuable Equipment



* The distance steam will travel within a given airstream is predictable and can be determined using the STS catalog. If this has already been done, the travel distance should be specified; if not, consult the STS catalog or contact your DRI-STEEM representative or the DRI-STEEM factory.

Note: Refer to governing codes for drain pipe size requirements.

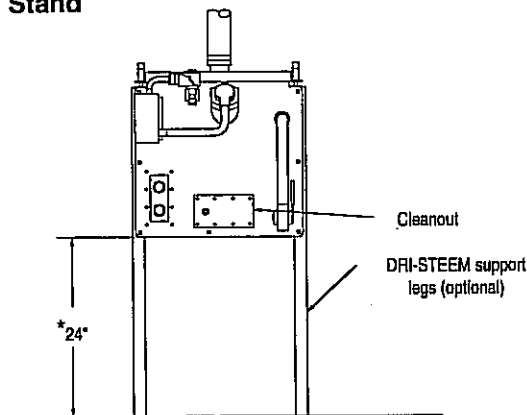
INVERTED U-TUBE DETAILS

Mounting

For level operation of the water level control and the skimmer system, the humidifier should be mounted dead level.

Access for periodic removal of the humidifier cover is required.

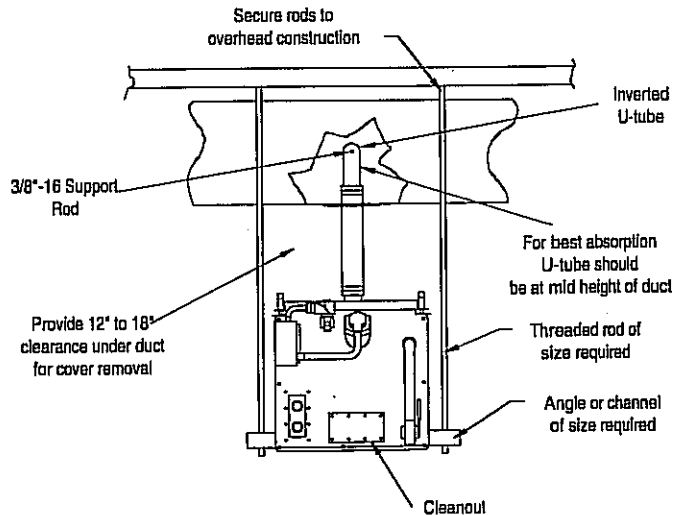
Under or Beside the Duct Using a Floor Stand



*24" standard-other lengths optional.

DRI-STEEM cradle style support stand recommended for STS-800.

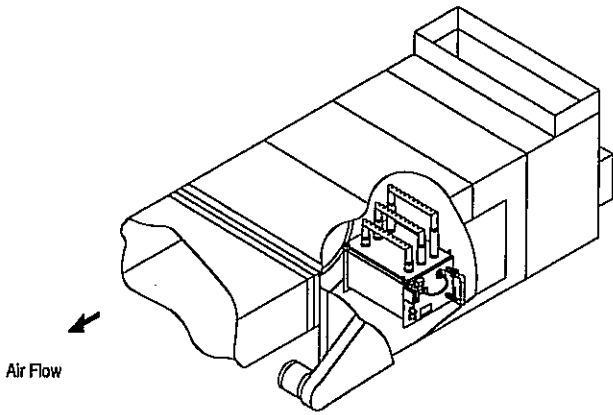
Under the Duct Using a *Trapeze Hanger



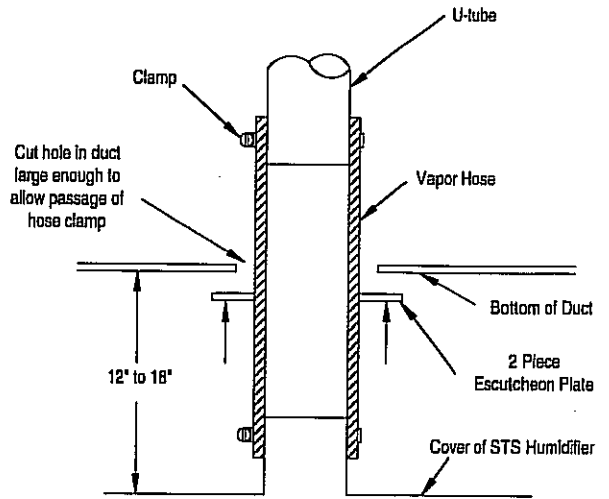
* Due to the size and weight of the STS 200, 400 and 800 units, the trapeze hanger method is not recommended.

INSTALLATION

Inside an air handling unit

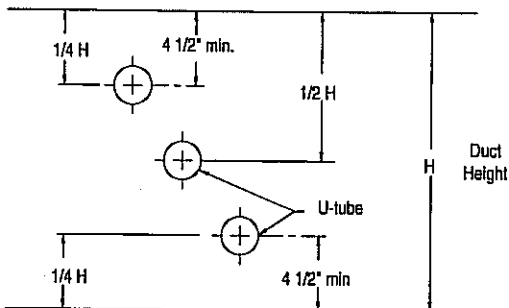


Detail of Connection to U-Tube



Note: Local regulations may not permit combustibles (steam hose) inside of duct. When necessary U-tubes can be specified to have extended legs of length necessary to reach below floor of duct.

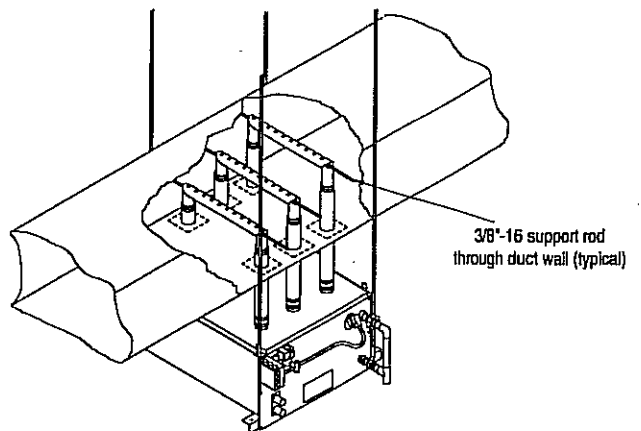
U-tube Spacing for Tall Ducts
Improves absorption in 'tall' air streams.



U-tube Spacing for Improved Absorption

Duct Height	No. U-tubes
up to 12"	1
13 to 24"	2
25 to 36"	3

Multiple Inverted U-tubes
Provides extra steam dispersion capacity needed for larger STS units.



MOUNTING METHODS

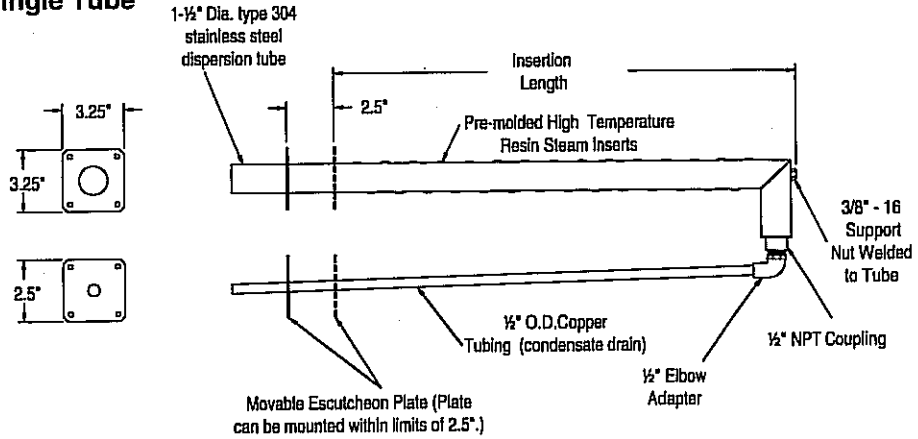
STS Dispersion Tube Installation with Condensate Drain (over 28 pph per dispersion tube)

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.
- When mounting the humidifier above the level of dispersion tube, see pg 8.

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.

Single Tube



Vapor Rigid Piping (when used)

- Vapor piping should have a minimum I.D. of 1.5 inches.
- A minimum pitch of 2" per foot 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

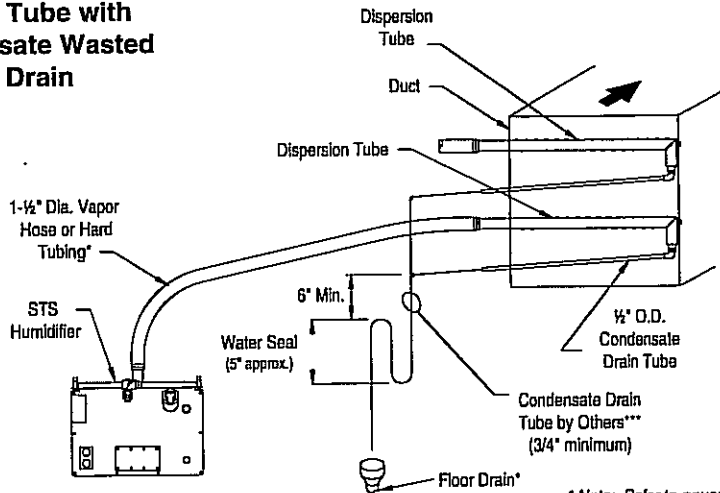
- Mount dispersion tube dead level.
- Best vapor absorption occurs when dispersion tube discharges against the air flow.

***Return line piping material must be suitable for 212° F (100°C) water.

Min. Condensate Drain Line Sizing

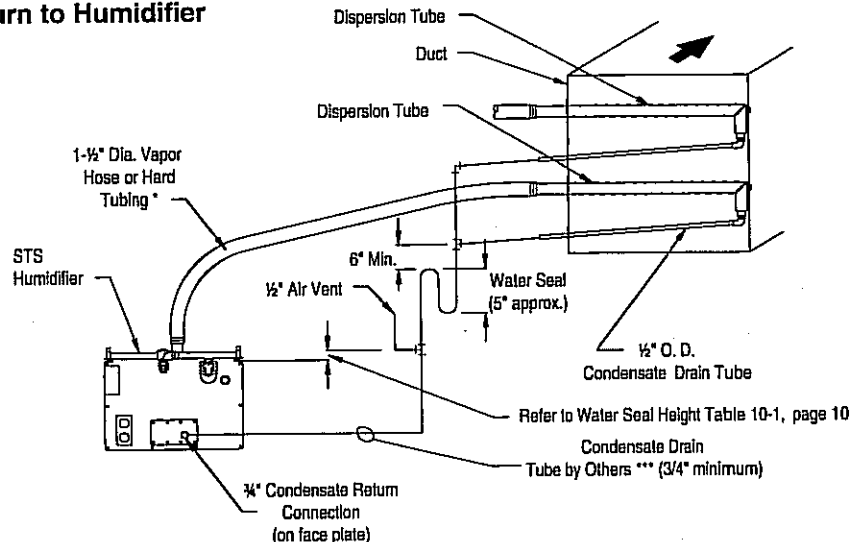
- One or two tubes: 3/4" I.D.
- Three or more tubes - 1" I.D.

Multiple Tube with Condensate Wasted to Floor Drain



* Note: Refer to governing codes for drain pipe size requirements.

Multiple Tube with Condensate Return to Humidifier



RAPID-SORB ASSEMBLY

RAPID-SORB Assembly Installation

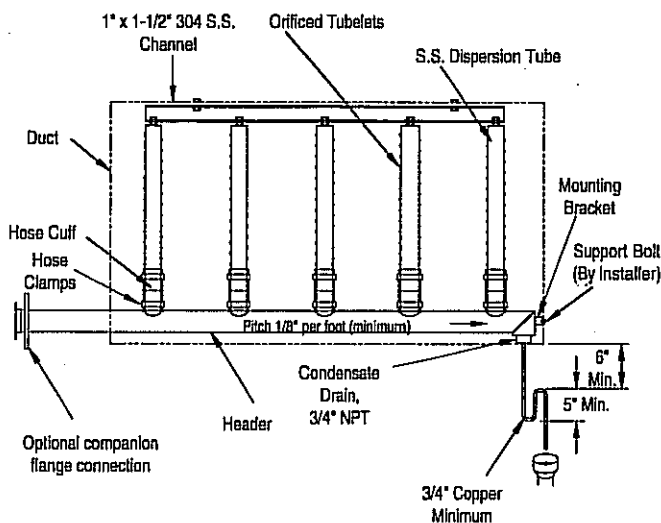
1. Unpack Shipment and verify receipt of all RAPID-SORB components with packing list. Report any shortages at once to the DRI-STEEM factory.
2. Provide necessary access around and into duct work.
3. Locate 1" x 1½" stainless steel channel inside duct centered between duct side walls. Hang channel from top of duct with the two mounting holes provided.
4. Locate dispersion tubes and slide hose cuffs over end of each tube, include a pair of hose clamps.
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. On style 2, punch-out necessary clearance holes in base of duct to slide dispersion tubes up from bottom.
6. Style 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 over the header dispersion tube nipples. Style 2: position header under dispersion tubes, then slide hose cuffs over header dispersion tube nipples. Secure some hose clamps.
7. Style 1: position the header so vertical dispersion tubes are perpendicular to duct and the header is pitched to condensate drain. Secure header with the header escutcheon plate provided and to mounting bracket. Style 2: position the header and dispersion tubes as stated above, then secure dispersion tubes in place with the tube escutcheon plates provided.
8. Style 1: check that the dispersion tube release steam perpendicular to the air flow. Secure tubes to overhead channel (1" x 1½"). Secure channel to duct, position hose cuffs over tube and header tube nipples, then secure hose clamps. Style 2: check position of tubes for steam release perpendicular to the air flow. Secure tubes to overhead channel, secure channel to duct. With header pitched to condensate position slip hose cuffs over tube and header tube nipples, secure hose clamps.
9. Connect a condensate drain to header, provide the water trap as shown and run to open drain, sized per governing codes.
10. Attach the header swivel hose connector to main

header using the hose cuff and clamps provided, do not secure.

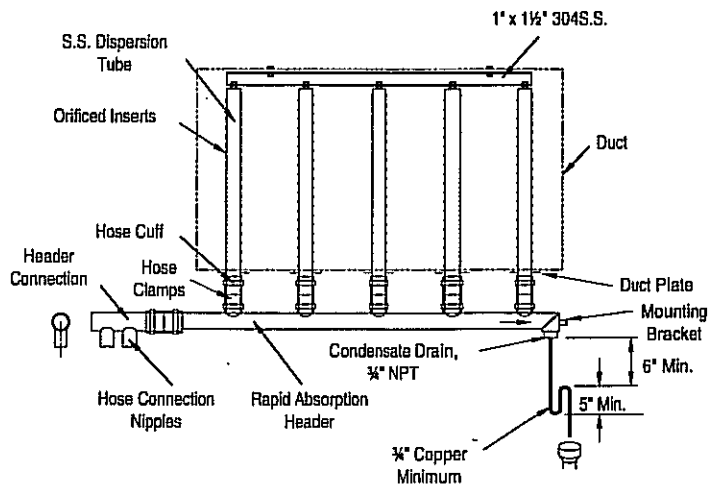
11. Route the necessary number of vapor hoses from humidifier tank, position swivel to except these hoses, then secure all necessary hose clamps.

Note: Refer to page 6 for vapor hose information on routing and alternate vapor hose piping methods.

RAPID-SORB Unit (Style 1) Header Inside Duct



RAPID-SORB Unit (Style 2) Header Under Duct



PIPING

Steam Supply

The heat exchanger in the STS standard humidifier is designed for a maximum steam pressure of 15 PSI. The steam valve, trap and strainer are shipped loose for field installation.

Makeup Water Piping

Either cold or hot water can be used for makeup. 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 STS has an inner 1" air gap, some local codes may require a vacuum breaker in the water supply pipe.

Make-up Water Considerations

The STS Humidifier works with all water types. The STS can be arranged for the use of unsoftened, softened, and demineralized make-up water. The decision of which one should be used is usually based on:

- 1) budget
- 2) the mineral content of the water supply untreated
- 3) the expected diligence of the maintenance program
- 4) level of accuracy of humidity control that is required

Preferably this humidifier should be supplied with softened water. However, the probe type level control system requires water conductivity of 100 micromhs/cm

(2 gr/gal) minimum to function and may not operate in water treated by reverse osmosis or deionizing process. Specially designed STS D.I. humidifiers are available for use with these water types.

Softened Water

There are two major advantages derived from using softened water instead of unsoftened water (assuming the native hardness is over 10 grains per gallon): maintenance and accuracy of control.

Maintenance. The skimmer, in conjunction with softened water, is an unbeatable combination for eliminating scale formation in the evaporating chamber. Several seasons of operation with no need for cleaning is normal, even with water having up to 30 grains of dissolved minerals per gallon prior to being softened.

Accuracy of control. Reducing the higher skimmer quantity and eliminating the drain/flush cycle (both of which are accomplished by the use of softened water) improves controllability. This is true because the result is a more stable operating temperature because of the fewer cool downs.

Softened water reduces water usage.

The fewer number of make-ups per unit of time and the lesser the amount of water per make-up, the more "on time" or actual humidifying time will occur thus improving control accuracy. This is especially true

when modulating control of the steam input to the humidifier is used.

Unsoftened Water

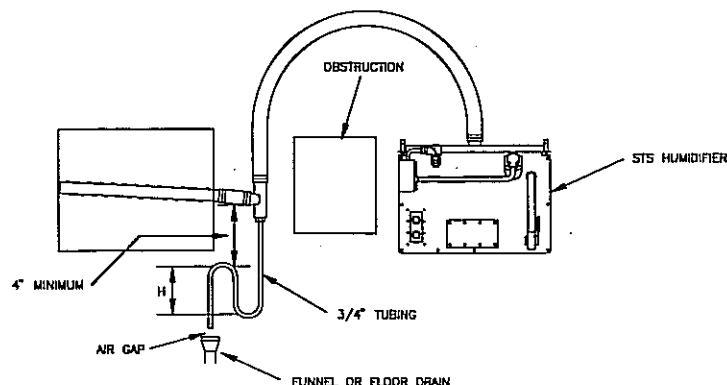
For water less than 10 grains per gallon hardness the skimmer system alone, without softening, usually provides a full season or more of humidification without a need for cleaning the evaporator.

For water hardness above 10 grains per gallon and where softened water is not available the optional timer operated drain/flush feature is available. When this option is furnished the humidifier control module contains an integral adjustable timer which accumulates the "on" or actual humidifying time of the unit. When this accumulated time reaches the amount previously pre-set in the control module, the drain/flush cycle is activated.

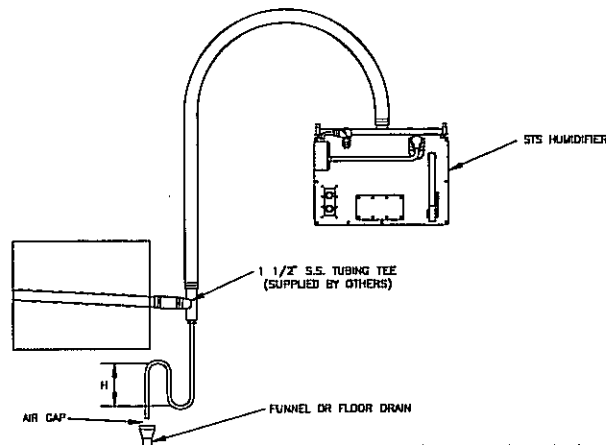
Drain Piping

A Drain line should be extended from the skimmer/drain connection to a sanitary waste. A water seal should be provided in the drain line of sufficient height to contain the pressure developed within the humidifier. Without this, steam will be forced through the drain line which could be objectionable. The depth of the water seal must be sufficient to overcome the static pressure of the air handling system plus the pressure developed by the humidifier itself.

This piping method is recommended when obstruction prevents dispersion tube from being continuously pitched back to the humidifier.

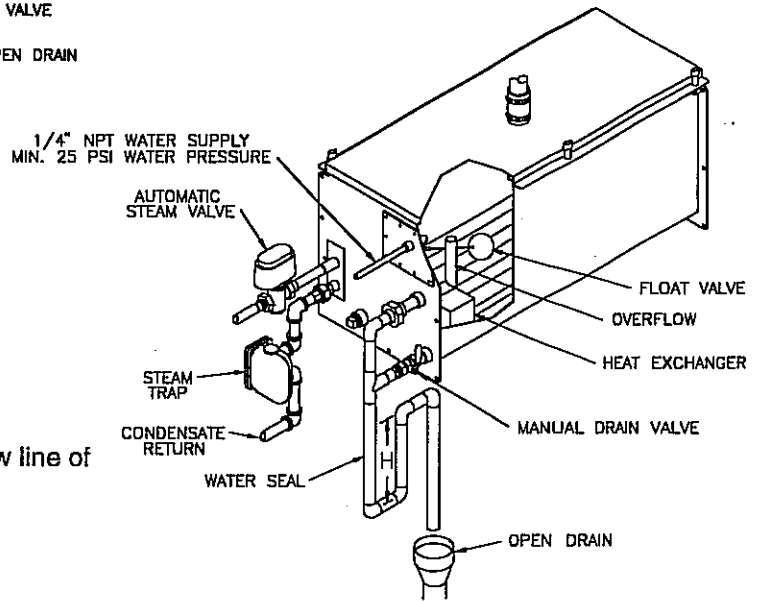
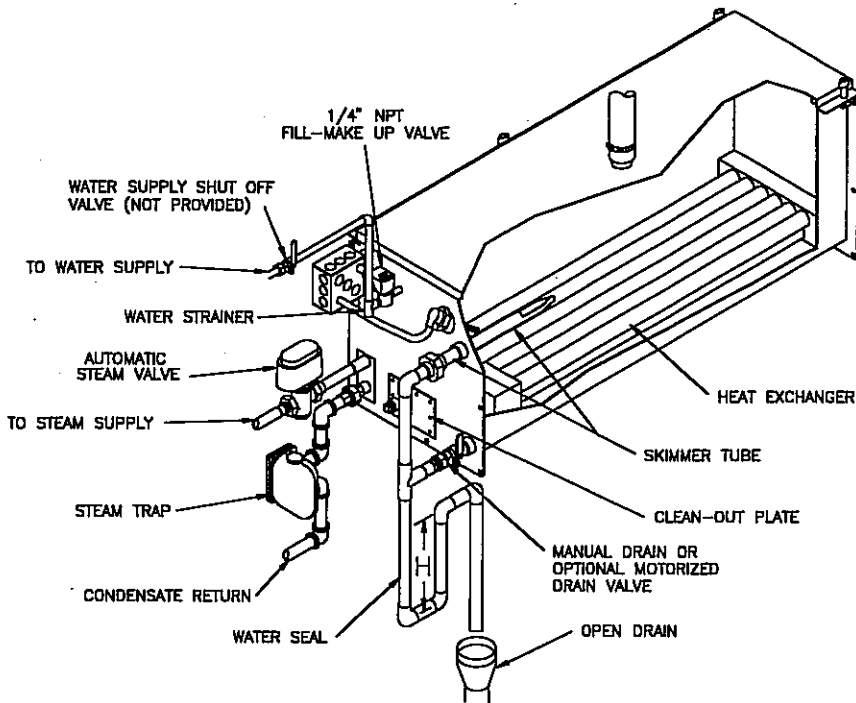


This piping method is recommended when humidifier must be mounted higher than the duct.



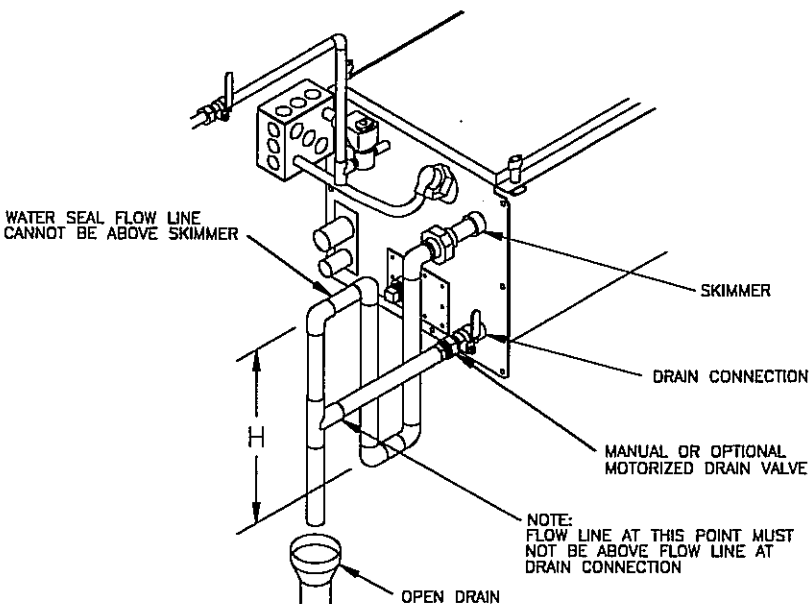
* Note: Refer to governing codes for drain pipe size requirements.

Piping Diagrams: Steam, Water and Drain



Alternate Water Seal and Valve Piping

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



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

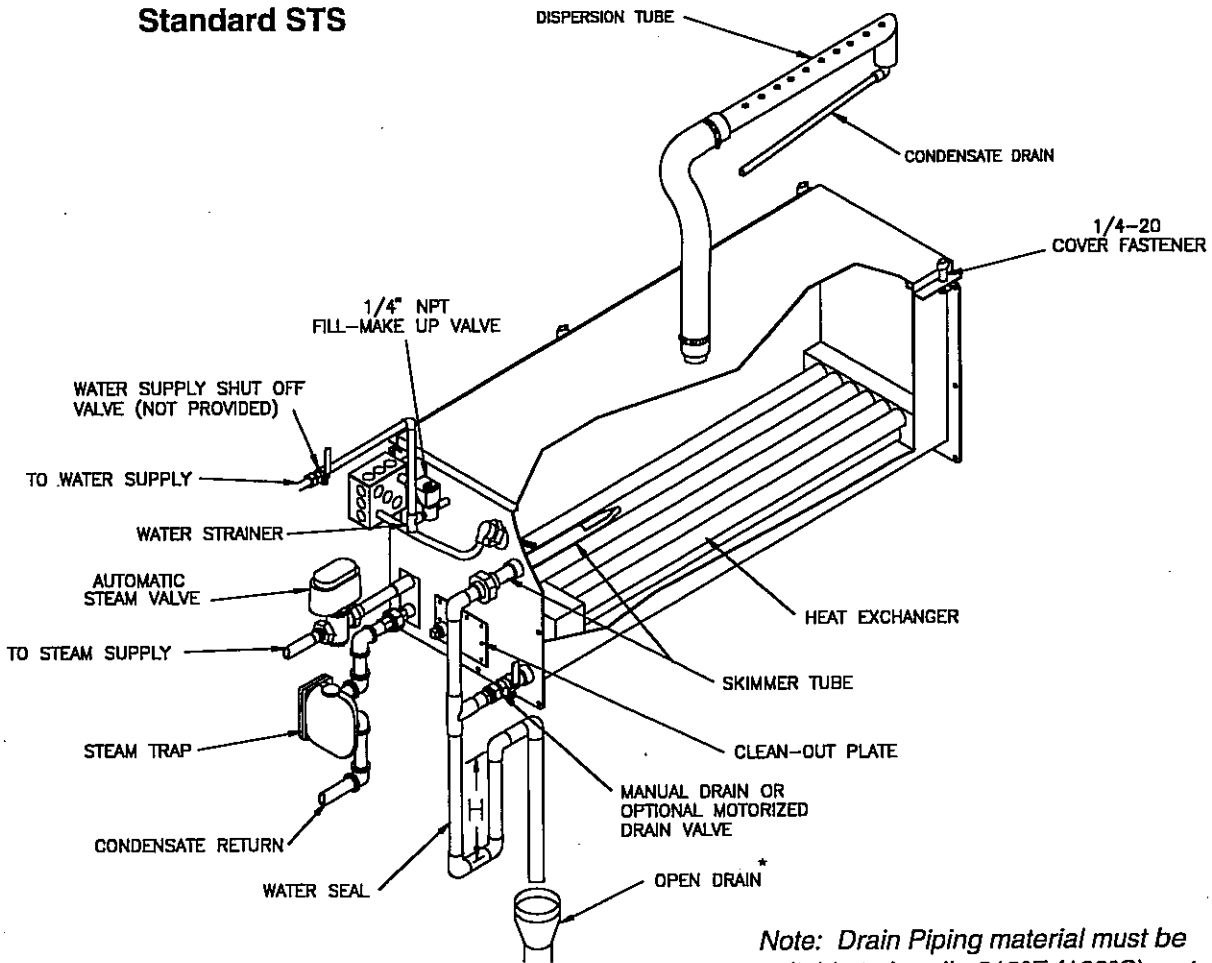
Water Seal Height Recommendations Refer to Table 10-1.

Note: Refer to governing codes on drain pipe sizing requirements.

INSTALLING THE STS HUMIDIFIER

Components and Piping Methods

Standard STS



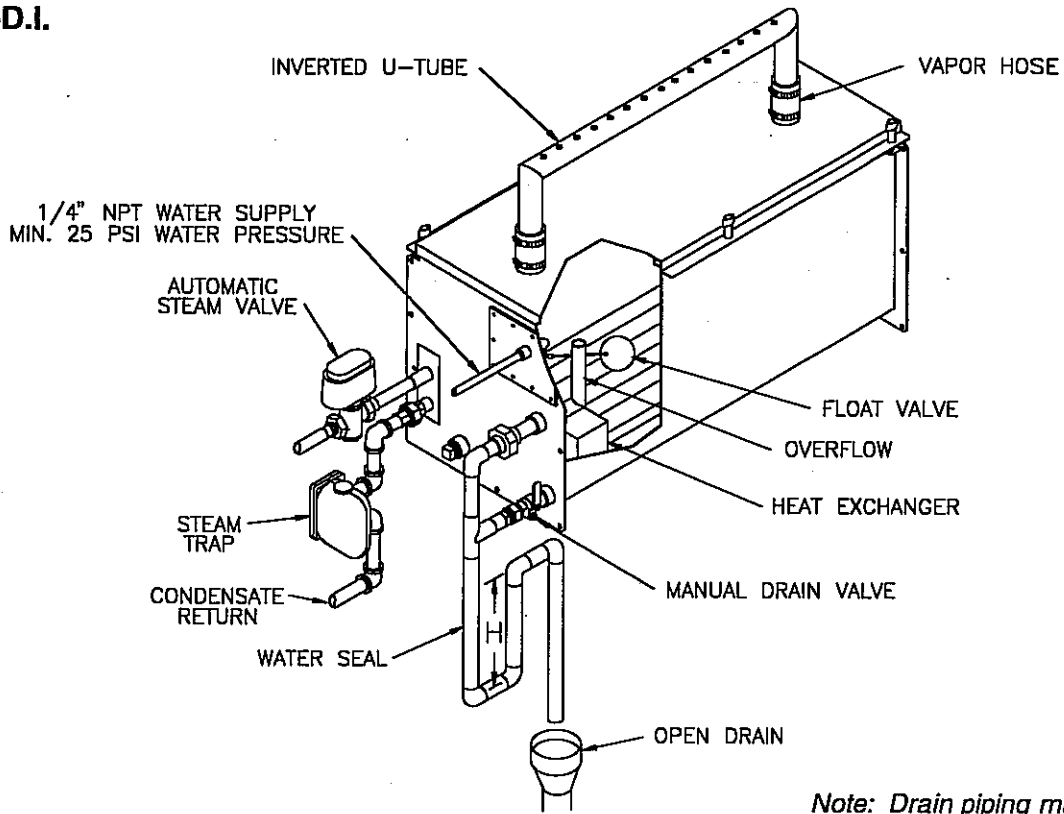
Note: Drain Piping material must be suitable to handle 212°F (100°C) water.

** Refer governing codes for drain pipe size requirements.*

Table 10-1

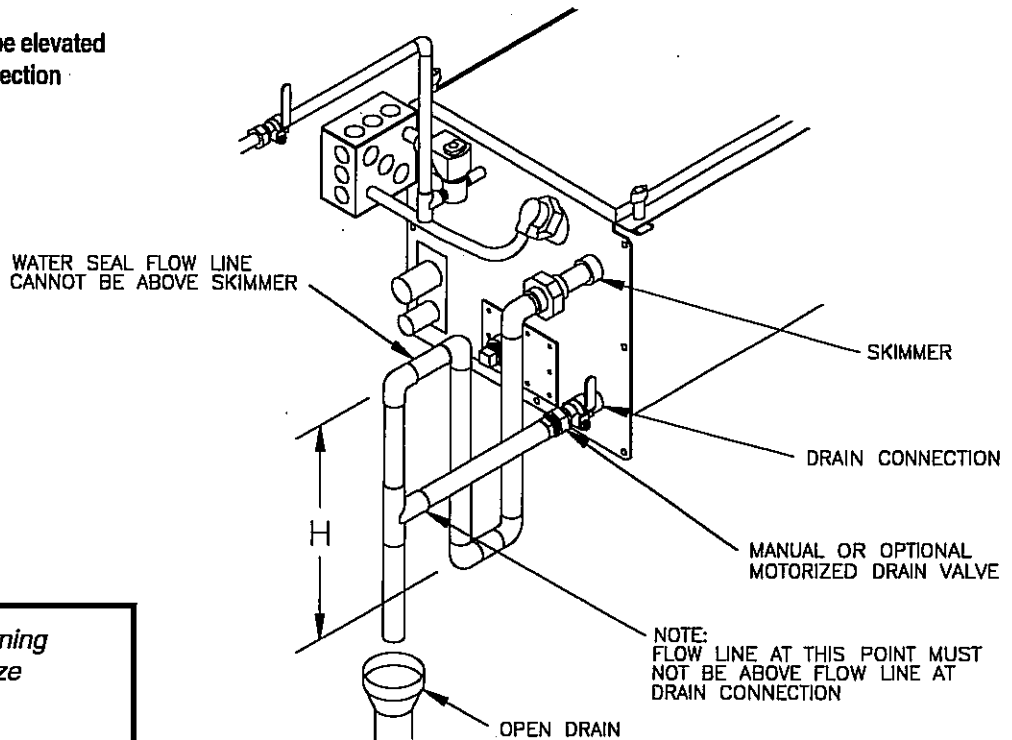
Water Seal Height (H)	
Flow rate of Vapor Hose or U-Tube (Lbs. Steam/Hr.)	H (Inches)
5-138	12
139-183	15
184 and higher	18

**Alternate Water Seal and Valve Piping
STS-D.I.**



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

Used when water seal must be elevated above flow line of drain connection (Humidifier close to floor).



** Note: Refer to governing codes for drain pipe size requirements.*

ELECTRICAL

The electrical supply is 120 volt, single phase. The control cabinet should be mounted in a location for service. All wiring must be in accordance with all governing codes and the STS wiring diagram. A wiring diagram is inside the control cabinet. The wiring between the control cabinet and the humidifier must be 105°C rated wire.

or unsoftened water. The probe type level control system requires water conductivity of 100 micromhos/cm (2 grains per gallon) minimum to function and therefore will not operate with water treated by the reverse osmosis or deionizing process. However, special design STS-DI humidifiers are available for use with these water types.

The basic water level control circuit displayed is common to all STS standard series humidifiers.

Caution: Only qualified electrical personnel should perform installation and start-up procedures.

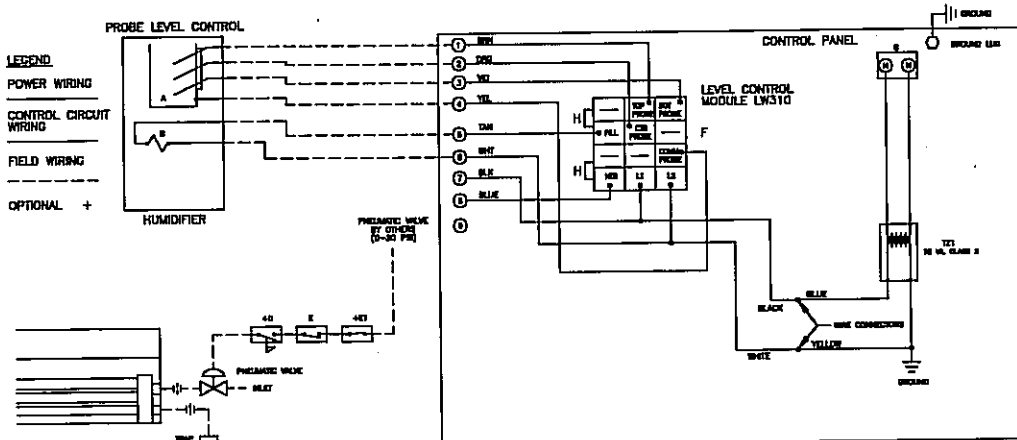
The STS standard humidifier is designed for use with either softened

Note: No electric power required on D.I. models.

STS Humidifiers Pneumatic Steam Valve Wiring Diagram

NOTE: ALL WIRING TO BE PER LOCAL AND NATIONAL ELECTRICAL CODES

SUPPLY
120 VOLT, 1 PHASE, 60/50 HZ
SEE WIRE SIZE



- LEGEND**
- POWER WIRING
 - - - CONTROL CIRCUIT WIRING
 - · · FIELD WIRING
 - OPTIONAL +
- A= HUMIDIFIER TANK & PROBE SYSTEM
 B= FILL SOLENOID VALVE
 C= PNEUMATIC AIR FLOW PROVING SWITCH
 D= PNEUMATIC HUMIDISTAT
 E1= PNEUMATIC HIGH LIMIT HUMIDISTAT
 F= HARNESS RECEPTACLE
 T21= TRANSFORMER _____ VA
 G= POWER BLOCK MAX. WIRE GAUGE #
 H= INDEX TABS

WARNING

FOR SUPPLY CONNECTIONS USE COPPER CONDUCTORS ONLY AND GAUGE WIRE SIZE AT 75°C RATING. THEN USE SUITABLE CONDUCTORS FOR 105°C ENVIRONMENT.
 GROUND HUMIDIFIER SYSTEM TO AN APPROVED EARTH GROUND
 FIELD WIRING TORQUE REQUIREMENTS: (POUND/INCHES)

CONTROL BLOCK: _____ POWER BLOCK: _____
 GROUND LUG: _____

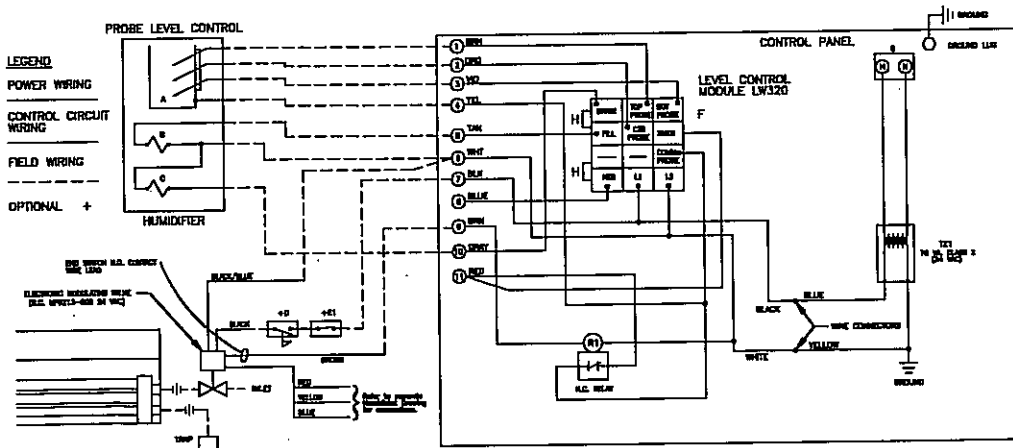
JOB: _____
 MODEL NO: _____
 ORDER NO. _____
 CONTROL VOLTAGE: 24 VAC
 STEAM PRESSURE: _____ PSI
 STEAM OUTPUT (LBS/HR): _____

Note: All wiring to be per local and national codes.

STS Humidifiers Electronic Modulation Steam Valve Wiring Diagram

NOTE: ALL WIRING TO BE PER LOCAL AND NATIONAL ELECTRICAL CODES

SUPPLY
120 VOLT, 1 PHASE, 60/50 HZ
SEE WIRE SIZE



- LEGEND**
- POWER WIRING
 - - - CONTROL CIRCUIT WIRING
 - · · FIELD WIRING
 - OPTIONAL +
- A= HUMIDIFIER TANK & PROBE SYSTEM
 B= FILL SOLENOID VALVE
 C= DRAW SOLENOID
 D= ELECTRIC AIR FLOW PROVING SWITCH
 E1= ELECTRIC HIGH LIMIT HUMIDISTAT
 F= HARNESS RECEPTACLE
 T21= TRANSFORMER _____ VA
 G= POWER BLOCK MAX. WIRE GAUGE #
 H= INDEX TABS

WARNING

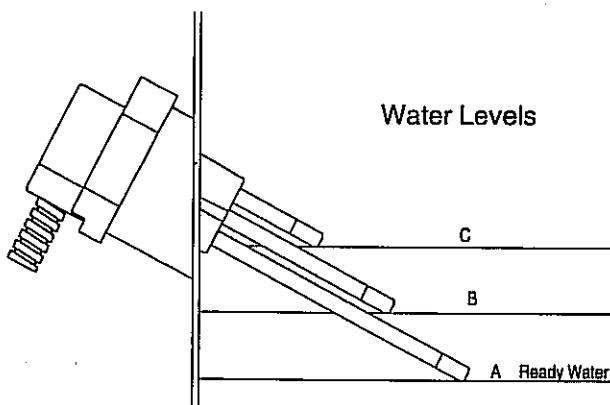
FOR SUPPLY CONNECTIONS USE COPPER CONDUCTORS ONLY AND GAUGE WIRE SIZE AT 75°C RATING. THEN USE SUITABLE CONDUCTORS FOR 105°C ENVIRONMENT.
 GROUND HUMIDIFIER SYSTEM TO AN APPROVED EARTH GROUND
 FIELD WIRING TORQUE REQUIREMENTS: (POUND/INCHES)

CONTROL BLOCK: _____ POWER BLOCK: _____
 GROUND LUG: _____

JOB: _____
 MODEL NO: _____
 ORDER NO. _____
 CONTROL VOLTAGE: 24 VAC
 STEAM PRESSURE: _____ PSI
 STEAM OUTPUT (LBS/HR): _____

OPERATION

Reliable Electronic Probe Control Maintains Water Level



Startup and Checkout Procedures (LW310 Level Control Module)

1. Mounting - Check mounting to see that unit is level and securely supported before filling with water.
2. Piping - Verify that all piping connections have been completed as recommended and that water pressure is available.
3. Electrical - Verify that all wiring connections have been made in accordance with the STS wiring diagram.
4. Control circuits
 - a) Adjust humidistat to "call" setting.
 - b) Open shut off valve on water supply line.
 - c) Set control module switch of LW310 to "standby" position.
 - d) Set main disconnect switch to "on" position; control module "power" lamp should now light.
 - e) Set control module switch in "normal op" position. For unit with LW320, set module switches to "auto" and "normal op" positions. The "fill" lamp should now light and the makeup valves should now open.
 - f) When water level reaches point A, the "ready water" lamp should light. Filling should continue until the uppermost electrode (point C) has been in water contact for two seconds. At that point, the fill lamp should go out.
 - g) Fill water seal in drain line by setting control module switch in "skimmer blowdown" position until water flows from drain pipe, reset to "normal op." and unit is ready to operate. Open shut off valve on steam line.
 - h) Check out function of field installed safety controls such as high limit humidistat, fan proving switch; steam valve should close.
 - i) Inspect installation for leaks by operating the STS. Any steam or air leaks should be sealed.

Note: Preferably this humidifier should be supplied with softened water. However, the probe type level control system requires water conductivity of 100 micromhs/cm (2 gr/gal) minimum to function and may not operate in water treated by the reverse osmosis or deionizing process. Specially designed STS Model DI humidifiers are available for use with these water types.

Optional: Timer-Operated Drain/Flush Operation

(LW320 Level Control Module)

This option, in addition to the features of the standard control module, provides a drain and flush sequence at preset intervals. This feature effectively reduces the frequency of cleaning associated with STS humidifiers. It is recommended when the water supply contains a large quantity of dissolved minerals and softened water for make-up is not available.

An integral electronic timer accumulates the "on" or "humidifying" time of the unit. When this accumulated time reaches the hours pre-selected by the user (field adjustable between 5 and 50 hours), an electronic programmer automatically activates the drain/flush cycle.

Then this cycle, which is also field adjustable (between 1 and 30 minutes), is activated the drain valve opens, beginning the drain-off of the humidifier water. When 50% of the pre-set drain duration time has elapsed the fill valve opens for the remainder of the time, completing the flushing action.

At the end of the flushing time the control module closes the drain valve, keeps the fill valve open which refills the unit, restarts the cumulative timer and allows the humidifier to resume operation normally.

When draining the humidifier prior to servicing, the "manual drain" feature of this control module is used. Placing the three-position switch in the "manual drain" position deactivates the fill valve and opens the drain valve.

The chart below shows recommended hours of operation for various water hardness. Refer to the table on page 14 for recommended drain duration settings.

Grains/Gal.	Hours of Op. Time*	Grains/Gal.	Hours of Op. Time*
14	24	24	14
16	22	26	13
18	19	28	12
20	18	30	11
22	16	32	10

* Note: Due to various waters, these are starting points. Field adjustments may be made to suit a particular water condition.

Operation

Testing the Drain/Flush System

As a part of final checkout the installer should always verify the operation of the (optional) drain/flush system. To test:

1. Set the "drain interval" timer dial to "0" hours or fully CCW.
2. Set the "drain duration" timer dial to "10" minutes. In 30 to 45 minutes (varies) the drain valve should open, 5 minutes later the fill valve should open which creates the flushing action. After an additional five minutes the drain valve should close. The fill valve should remain open until the unit is refilled to the level of the top probe.

If all of the above takes place as described, the drain/flush system is functioning correctly. The drain interval timer dial (hours) should then

be returned to 20 hours and the drain duration timer dial (minutes) should be set to agree with the table below. The unit will then be ready to resume humidifying.

Total (Lbs/Hr)	DrainDuration (minutes)
6-24	5
27-72	10
84-120	15
126-180	20
192-240	25
240 and higher	30

RECOMMENDED MAINTENANCE

STS is designed to deal with dissolved minerals in one of two ways depending on the degree of hardness. For light to moderate hardness (up to 10 grains per gallon) the surface skimmer action plus periodic cleaning is usually adequate. For high mineral content water (above 10 grains per gallon) a time clock and motorized ball type "dump" valve are recommended in addition to the surface skimmer, and along with periodic cleaning. If the STS was originally purchased without a timer and drain valve they usually can be added in the field. Consult factory (1-800-328-4447) for details.

The frequency of cleaning will be dictated by water condition and evaporation load.

Note: When performing maintenance on the STS always turn off electric power to control panel. Close steam stop and water makeup valves.

MONTHLY OR AS REQUIRED

1. Cleaning Tank

Remove loose scale in humidifier tank before the build-up reaches the underside of the heat exchanger.

2. Cleaning Probes

Remove cap assembly and unscrew the probe holder from the STS unit. The scale will easily flake off from the TEFLON coated sensing probes. The uncoated sensing portion (bottom 3/8") of the probe should be brushed clean with stainless steel wool. Re-install the probe holder with arrows up and "top" marking at the top.

3. Cleaning Skimmer Tube

Remove the elbow section of the skimmer and rotate tube so that loosened material will drop out. Loosen deposits with a long tool such as a screwdriver or section of small diameter pipe and reassemble elbow. Skimmer drainage should be verified by visual inspection once per week. Some water should drain from skimmer drain pipe after each fill cycle.

4. Replacement Gasket Procedure

Refer to Supplement.

SUMMER MAINTENANCE

At the conclusion of the humidification season, clean the probe control, skimmer and water chamber. (CAUTION) Do not use a sharp object when cleaning the TEFLON coated heat exchanger. Cuts or scratches impair its ability to shed scale during operation, and could cause the TEFLON® to separate from the metal.

ADJUSTING THE SURFACE SKIMMER

The elevation of the lip of the skimmer tube in respect to the water line; determines the quantity of "skimming" that takes place with each fill cycle. The height is field adjustable by a small amount of rotation of the tube.

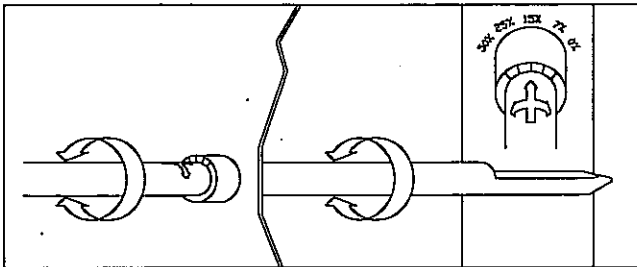
As evaporation takes place, a portion of the dissolved minerals precipitate (come out of solution) and float on the water surface. Each time the STS refills, it fills to an elevation above the lip of the skimmer tube. A portion of the refill water then flows to drain, carrying the floating material with it. This action constantly 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 a cost, as well as an inconvenience. It is therefore recommended that the user, at the time of the initial start-up, observe and adjust the skimming quantity. By doing so, a balance between minimized mineral build-up and water conservation can be achieved.

The quantity of skimming water drained off per fill cycle is adjusted by rotation of the skimmer tube which alters the height of the overflow lip. It is factory set to skim about 5-10% of the total evaporating capacity of the unit.

RECOMMENDED MAINTENANCE

Surface Skimmer (not used in D.I. models)



To adjust, loosen the union nut and rotate the tube to the desired percentage of skimming rate. Markings on the unit indicate the following:

50%	25%	15%	7%	0%
-----	-----	-----	----	----

Allow the STS to operate five or ten days and then inspect it. If a mineral build-up is evident, increase the skim amount. If not, it should be reduced. Repeat the above process several times or until it is felt the proper adjustment has been attained.

STS-D.I. START-UP AND CHECKOUT PROCEDURES

1. Mounting

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

2. Piping

Verify that all piping connections have been completed as recommended and that steam and water pressures are available.

3. Electrical

Verify that all wiring connections have been made in accordance with the STS wiring diagram.

4. Control Circuits

- Adjust humidistat to "call" setting.
- Open shut-off valve on water supply line. Water should flow through float valve.
- Turn electric power on to control cabinet.

- Fill the water seal in drain line by manually opening drain valve for a few seconds.
- Open steam stop valve. Steam should be heard passing through the automatic steam valve into the humidifier heat exchanger.
- Check out function of field installed air flow switch, high limit duct humidistat, and controlling humidistat to ensure that they are in control of steam valve.

Recommended Maintenance-STS-DI System

STS-DI SYSTEM (deionized water)

The STS-D.I. humidifier does not require regular maintenance. A periodic visual inspection is recommended to identify gasket or piping leaks. Control circuit and safety switches should be checked to verify they properly control the steam valve.

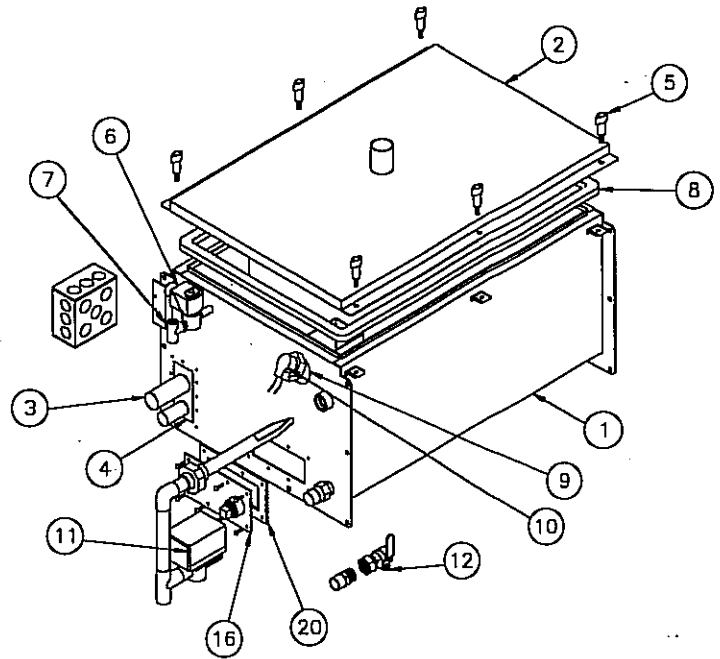
TROUBLE SHOOTING GUIDE

Symptom	Possible Cause	Recommended Action
Humidifier will not heat	<p>No control transformer output. Humidistat is not calling.</p> <p>Safety controls open (high limit, air proving, etc...) Faulty level control board.</p> <p>Probe corrosion. Steam stop valve closed. Steam trap plugged. Low or no steam. Steam strainer plugged.</p>	<p>Verify control voltage. Set humidistat to "call" Inspect for faulty humidistat. Check safety controls.</p> <p>Verify control voltage and probe. Wires are connected correctly. Replace probes.* Verify valve is opened. Clean trap body. Verify steam is present. Clean strainer.</p>
Humidifier will not fill	<p>No water pressure.</p> <p>Faulty water fill valve.</p> <p>Plugged water strainer. Plugged valve. Faulty level control board.</p>	<p>Verify manual water supply valve open.</p> <p>Verify action of fill solenoid valve, verify control voltage present at coil. Audible click should be heard as solenoid operates.</p> <p>Open strainer. Clean valve. Verify control voltage.</p>
Humidifier does not stop filling	<p>Lack of tank-to-probes continuity. Water conductivity 100 micromhos/cm minimum (2 grains per gallon)</p> <p>Manual Drain is not fully closed.</p> <p>Fill valve is stuck open.</p> <p>Fill valve installed backwards.</p>	<p>Jumper terminals 1 & 3 if water stops, verify tank ground to term 3; check water supply conductivity; then consult factory.</p> <p>Close manual ball valve.</p> <p>Check valve for foreign matter.</p> <p>Check for correct water flow, through valve, note arrow.</p>
Low output	<p>Automatic drain valve not seating.</p> <p>Manual Drain is not fully closed.</p> <p>Excessive skimming amount.</p> <p>Fill valve is stuck open.</p> <p>Low steam pressure.</p> <p>Steam valve.</p> <p>Steam trap.</p> <p>Scale coated heat exchanger.</p>	<p>Clean ball and seat of valve.</p> <p>Close manual ball valve.</p> <p>Reduce skimmer drain amount.</p> <p>Check valve for foreign matter.</p> <p>Check steam supply pressure.</p> <p>Not opening fully.</p> <p>Not passing condensate.</p> <p>Clean heat exchanger.</p>
Makeup water valve short circuits	<p>Electrode probes may be incorrectly wired.</p> <p>Probes are scale coated.</p>	<p>Confirm that wiring agrees with diagram.</p> <p>Clean probes.</p>

*Although the three stainless steel electrode probes will eventually erode due to corrosion they are usually functional for up to approximately 5000 hours of operation.

REPLACEMENT PARTS

No.	Description	Qty.	Part No.
1	STS-200 Tank	1	164405-003
1	STS-50,100 Tank	1	164405-002
1	STS-25 Tank	1	164405-001
2	STS-200 Cover	1	164418
2	STS-50, 100 Cover	1	164417
2	STS-25 Cover	1	164416
3	STS-200 Heat Exchanger-TEFLON	1	164430-104
3	STS-100 Heat Exchanger-TEFLON	1	164430-103
3	STS-50 Heat Exchanger-TEFLON	1	164430-102
3	STS-25 Heat Exchanger-TEFLON	1	164430-101
4	Heat Exchanger Gasket	1	308220
5	Utility Knob/STS-200	10	700725
5	Utility Knob/STS-50, 100	8	700725
5	Utility Knob/STS-25	4	700725
6	1/4" NPT Fill Valve	1	505080
7	1/4" NPT Fill Valve	1	300050
8	Cover Gasket	1	309955
9	Probe Assembly	1	406060
10	Probe Plug	1	406050
11	3/4" Electric Drain Valve	1	505400
12	3/4" Ball Valve Manual Drain	1	505010
16	Condensate Return/Clean Out Plate	1	165470-002
20	Clean Out Plate Gasket	1	308220



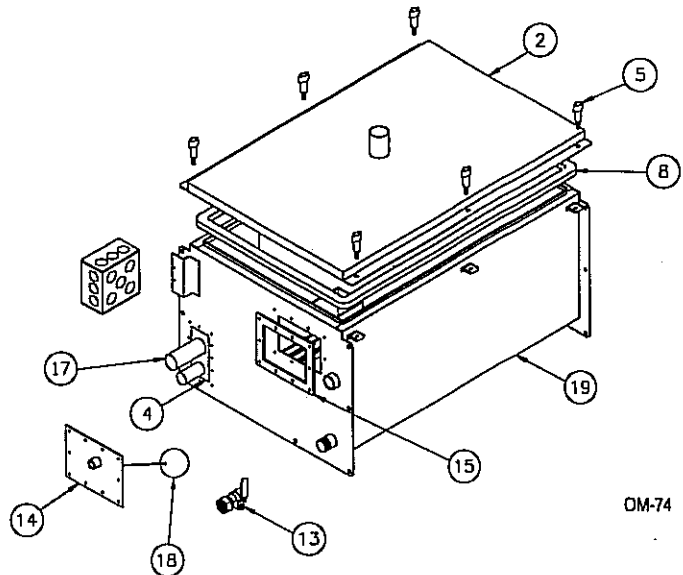
Notes:

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

OM-518

STS DI Humidifier

No.	Description	Qty.	Part No.
2	STS-200 Cover	1	164418
2	STS-50, 100 Cover	1	164417
2	STS-25 Cover	1	164416
4	Heat Exchanger Gasket	1	308220
5	Utility Knob/STS-200	10	700725
5	Utility Knob/STS-50, 100	8	700725
8	Cover Gasket	1	309955
13	3/4" SST Ball Valve	1	505000
14	Float Plate	1	164409
15	Float Plate Gasket	1	380260
17	STS-200 Heat Exchanger-SST	1	164430-004
17	STS-100 Heat Exchanger-SST	1	164430-003
17	STS-50 Heat Exchanger-SST	1	164430-002
17	STS-25 Heat Exchanger-SST	1	164430-001
18	Float Valve	1	505210
19	STS-200 Tank-DI	1	164406-003
19	STS-50, 100 Tank-DI	1	164406-002
19	STS-25 Tank-DI	1	164406-003



Notes:

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

OM-74

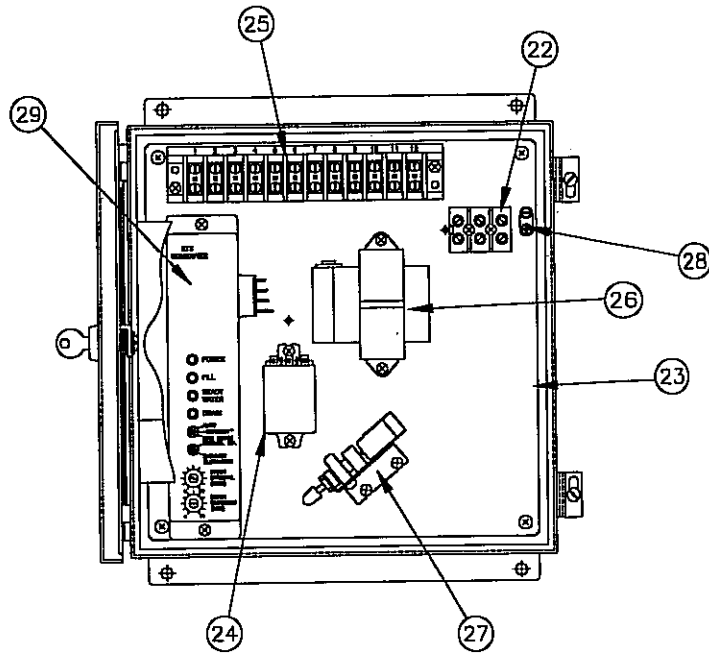
REPLACEMENT PARTS

STS Control Cabinet

No.	Description	Part No.
22	Power Block	408300-001
23	11" x 11" Subpanel	165720-002
24	Relay 1	407900-001
25	Terminal Block (9 or 12)	408250
26	Transformer	408960
27	Pneumatic Electric Switch	408100
28	Ground Lug	408250-017
29	LW320 Level Control 1	408520
29	LW310 Level Control 1	408510

Note: When ordering specify humidifier model and serial numbers.

1 Varies with specific order.



2 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

14949 Technology Drive, Eden Prairie, MN 55344
PH: 1-800-328-4447 • In MN: (612) 949-2415
Fax: (612) 949-2933

