Herrmidicool

Technical Manual

READ & SAVE THESE INSTRUCTIONS

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I. The Herrmidicool Humidification System

Answering the Need for New Technology

In the days of cheap fossil fuels, the easiest and most often used solution to a humidification problem was the installation of steam humidifiers, which, although inefficient and often difficult and expensive to install, provided a simple, trouble-free means of raising the relative humidity. As fuels became more expensive, awareness of energy efficiency increased and in the 1970's, with growing concern about cancer causing agents contained in many boiler treatment chemicals, engineers began to look actively at alternatives such as electronic steam and atomizing humidifiers.

The electronic steam humidifiers promised increased energy efficiency (most operate at an average of 94% efficiency as opposed to as low as 60% efficiency for conventional steam humidifiers) and freedom from the need for carcinogenic boiler treatment chemicals. However, as computers and electronic switching devices proliferated (they tend to create high internal heat loads), so did the requirement for a more efficient humidifier--one that could deliver evaporative cooling as well as efficient humidification. Air washers were considered, but because of their large size and open tanks of water, they could not easily be retrofitted to existing systems and presented a hazard for clean environments. The Herrmidicool is the only system able to answer all these challenges!

According to thermodynamic laws, evaporating one pound of water requires approximately 1075 BTU's. This energy must be obtained either from direct input (as in the case of steam humidifiers) or from the ambient air, as a result of converting sensible heat to latent heat. Quite simply, steam humidifiers increase enthalpy, atomizing humidifiers do not. Therefore, during some part of the year, the evaporative cooling provided by the Herrmidicool system can be of great benefit, particularly if the environment to be humidified has a relatively high internal heat load, such as in a computer room. Chart 1 shows the psychrometric path of a steam humidifier versus that of the Herrmidicool system. Pay particular attention to the enthalpy lines, the temperatures and the grains of moisture added.

The Psychrometric Chart is designed to show the moisture content, volume, relative humidity and enthalpy of air at various temperatures. The chart works somewhat like a nomograph, in that intersections of the lines represent various conditions. The vertical lines correspond to scale A along the bottom of the chart, which represents the dry bulb temperature of the air. There are three sets of diagonal lines on the chart, one set corresponding to scale B which represents the wet bulb temperature of the air, one set corresponding to scale C which represents the enthalpy of the air in BTU's per pound of dry air, and the other set representing the volume of the air in cubic feet per pound of dry air. The horizontal lines correspond to scale D, which represents the moisture content of the air in pounds of moisture per pound of dry air. Lastly, there is a set of parabolically curved lines, which represent the relative humidity in %.

To read the chart, you simply choose your known conditions, lay them out on the chart and read the corresponding intersection from the appropriate scale. Consider the following examples:.

1. If you have air at 700º F bulb and 60% RH, what is the resultant moisture content, enthalpy and wet bulb temperature? To find the moisture content, run up the vertical dry bulb temperature line at 700º F until it meets the parabolic % RH line at 60%. Now follow the horizontal line from this intersection to scale D and read the moisture content (.0094 pounds per pound of dry air).

2. To find the enthalpy, again find the intersection of 700 F dry bulb and 60% RH and follow the diagonal line from this intersection to scale C and read the enthalpy (27.2 BTU's per pound of dry air).

   To find the wet bulb temperature, again find the intersection of 700ºF dry bulb and 60% RH and follow the diagonal line from this intersection to scale B and read the wet bulb temperature (610º F).

3. If you start with air at 700ºF dry bulb and 20% RH and add steam humidification until you reach 60% RH, what is the starting and final enthalpy?
   To determine the starting enthalpy, locate the intersection of 700ºF dry bulb and 20% RH and follow the diagonal line from this intersection to scale C and read the enthalpy (20.3 BTU's per pound of dry air). Since steam humidification contains its own heat, to determine the final enthalpy, locate the intersection of 700 F dry bulb and 60% RH and follow the diagonal line from this intersection to scale C and read the enthalpy (27.2 BTU's per pound of dry air).

4. If you start with air at 700º F dry bulb and 20% RH and use the Herrmidicool system to add humidification until you reach 60% RH, what is the starting and final enthalpy?

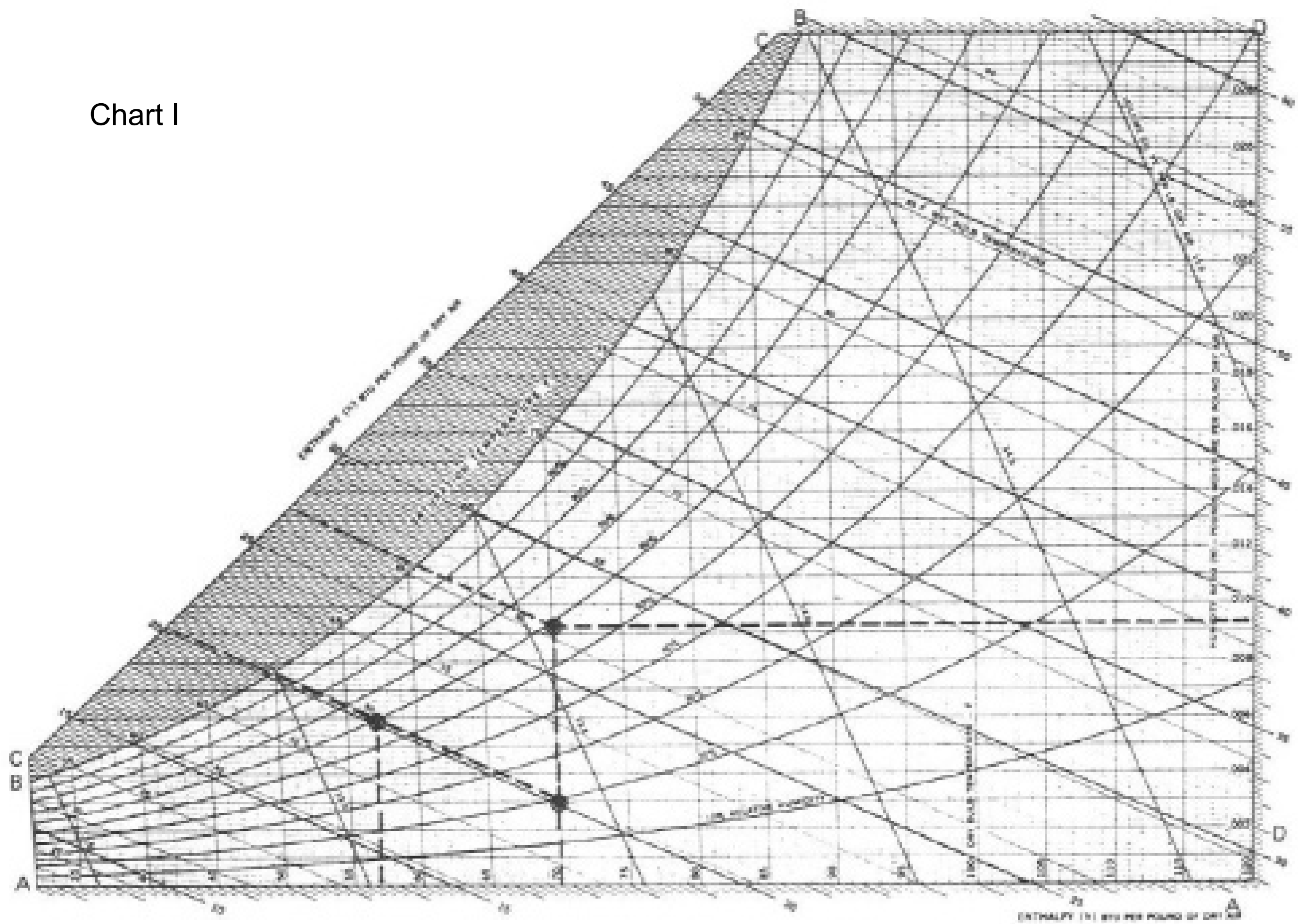
To determine the starting and final enthalpy, locate the intersection to 70OF dry bulb and 20% RH and follow the diagonal line from this intersection to scale C and read the enthalpy (20.3 BTU's per pound of dry air).

Since atomizing humidification does not increase enthalpy, the final enthalpy will be the same.

However, if you follow the diagonal line from 70OF dry bulb and 20% RH to its intersection with 60% RH and then follow the vertical line from this intersection to scale A you will now read a dry bulb temperature of 57.20F.

You will note that the dry bulb temperature will have been reduced while the enthalpy has remained constant. This evaporative cooling effect is what makes the Herrmidicool invaluable in applications where full or partial year-round cooling is required.

Chart I



PHYCHROMETRIC CHART

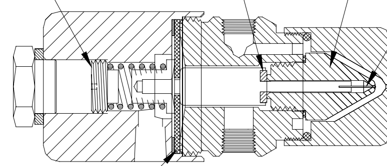
Proven Method with Advanced Design

The Herrmidicool system is a sophisticated, modulated atomizing system based on an enhanced 40-year-old proven design. It incorporates a control technique that monitors not only the room humidity conditions, but also the supply duct conditions and can provide accurate modulation for even the most precise environments. The controls are electronic and can be interfaced with existing environmental control systems to provide the most efficient operation at any given moment. Precise control is what makes this system superior! The Herrmidicool system consists of two major components: the Water / Air Manifold and the Control Cabinet.

The Control Cabinet of the Herrmidicool system contains all necessary valves, regulators and gauges to properly control the air and water flow and pressures for consistent, efficient atomization. Special controls insure that no water can flow without proper air pressure and also prevent the heads from dripping and spitting. Failure of the air, water or electrical services is never a cause for concern with the Herrmidicool system.

The Control Cabinet also contains all the controllers, set point adjusters and interfaces required for any system. The controls and devices used are always chosen on a custom basis for each project to produce the most efficient, accurate and cost effective scheme. Control options such as direct digital interface, interlocks to A/C compressors, outdoor air dampers, heating or cooling coils and even central computer systems are supported.

The heart of the Herrmidicool system is the unique patented Herrmidicool Atomizing Head, which is designed to be self-cleaning, dripless and extremely efficient. The internal atomization design requires only 0.12 SCFM at 30 psi for every pound of water per hour atomized--a 100 lbs/hr system requires only 12 SCFM! The stainless steel cleaning needle coupled with special controls insures self-cleaning of all orifices and drying of the head on shutdown. This self-cleaning technique makes the head impervious to mineral content and ambient contaminants. A special spring-loaded silicone seat insures positive shut off of the pressurized potable water line on shut down and eliminates any possibility of viral or bacterial contamination. The atomizing head is modulated through means of a modulating valve producing a full 30:1 turndown, with droplet sizes ranging from 0.3 to 10 microns.



An optional “blow-down” assembly completely empties the lines of all water on shutdown - positive freeze protection for roof top installations.

Two basic version of the control cabinet are available: the AH-1200 (includes necessary sensor and air proving switch) and the AH-1205 (Designed for DDC Interface).

AH-1200 Series (Stand-alone Proportional + Integral)

1. When the relative humidity drops below the predetermined set-point, the return air plenum sensor will send a signal to the controller in the HERRMIDIFIER Control Section.
2. When a high limit duct sensor is used, a signal is transmitted to the controller with a decreasing signal as the relative humidity in the discharge plenum approaches the high limit set point.
3. The controller will compare the two input signals with the humidity setpoint and supply the appropriate signal to the modulating water valve.
4. If the system employs a two-stage output system, the control logic will provide modulating signals to each water valve.

A duct airflow sensor provided with AH-1200, will shut down the system automatically if there is no movement of air in the duct.
If so desired, the Herrmidicool system will be interlocked to preclude simultaneous operations of mechanical cooling and evaporative cooling.

AH-1205 Series (DDC)

1. When the relative humidity drops below a predetermined set- point, the Building Management System will send a signal to the controller.
2. When a high limit duct sensor is used, a signal is transmitted to decrease the control signal as the relative humidity in the discharge plenum approaches the high limit set point.
3. The DDC controller will compare the two input signals with the humidity setpoint and supply the appropriate demand signal to the Herrmidicool Control Cabinet. The Herrmidicool controller will condition the signal and transmit it to the modulating water valve.
4. If the system employs a two-stage output system, the control logic will provide modulating signals to both water valves.

It is recommended that a duct airflow sensor be used in the application,it will shut down the system automatically upon a loss of airflow in the plenum
If so desired, the Herrmidicool system will be interlocked to preclude simultaneous operations of mechanical cooling and evaporative cooling.

II. Designing a Herrmidicool System

Such things as airflow patterns, velocities, proximity to coils and filters, cleanliness requirements, mineral content of the feed water and the size and shape of air handlers must be taken into account when designing a Herrmidicool system. Because of the relative complexity of all these factors, we recommend that you work closely with your TRION/HERRMIDIFIER representative in the planning stages of any Herrmidicool project. He can review your requirements; size the system and provide a quotation with recommendations.

Determining Humidification Load

After you have performed the humidity load calculation, (see Load Calculator Guide) you should then determine if the desired psychrometric end result is possible. The evaporative cooling effect of atomized water will lower the system air temperature reducing its ability to hold moisture. You must be sure that your air handling system can handle the moisture you wish to introduce. To determine this, use the Psychrometric Chart on page 3 by locating first the point directly on scale A that corresponds to the dry bulb temperature of the air being humidified. Then follow the diagonal line left to its intersection with 85% RH on the parabolic relative humidity scale. Now follow the horizontal line right from this point until it intersects with the vertical line from scale A representing the dry bulb temperature of the area to be humidified and read the resulting relative humidity. If it is lower than what you desire, you will not be able to put that much moisture in your air handling system without some reheating of the air prior to the Herrmidicool system.

Selecting Herrmidicool Location Within Air Handler System

Critical measurements are the distance from the heads to the duct surface and the straight duct run required for total evaporation. The second measurement is critical only if the system is not installed prior to a cooling coil, mist eliminator or evaporative media (Consult Factory if this describes your application). Since the heads are usually installed with the discharge at 90 degrees to the air flow, the distance from the heads to the duct surface is also important as any live mist that hits a surface will impinge on that surface and coalesce, eventually running. For that reason, it is important also to see that no sensors, seams, cross bars or other obstructions are in the path of the atomized spray, with the exception of a cooling coil, mist eliminator or evaporative media.

The recommended distance from the heads to the top of the duct is shown on Chart II and is based on the air velocity in the duct or air handler.

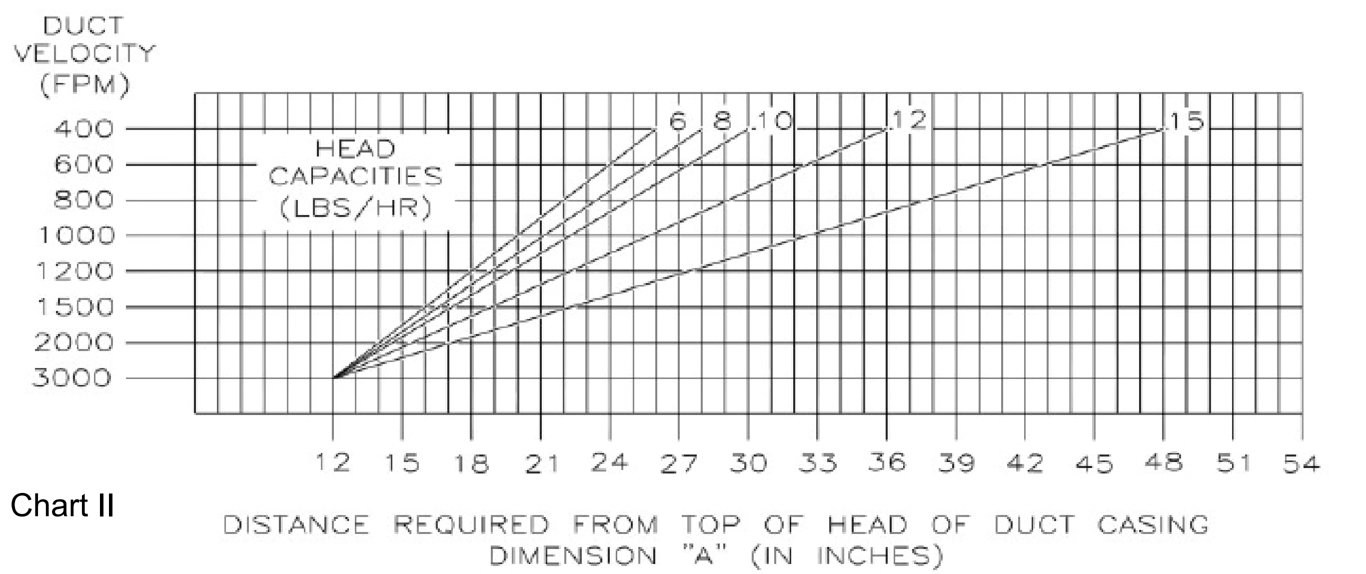


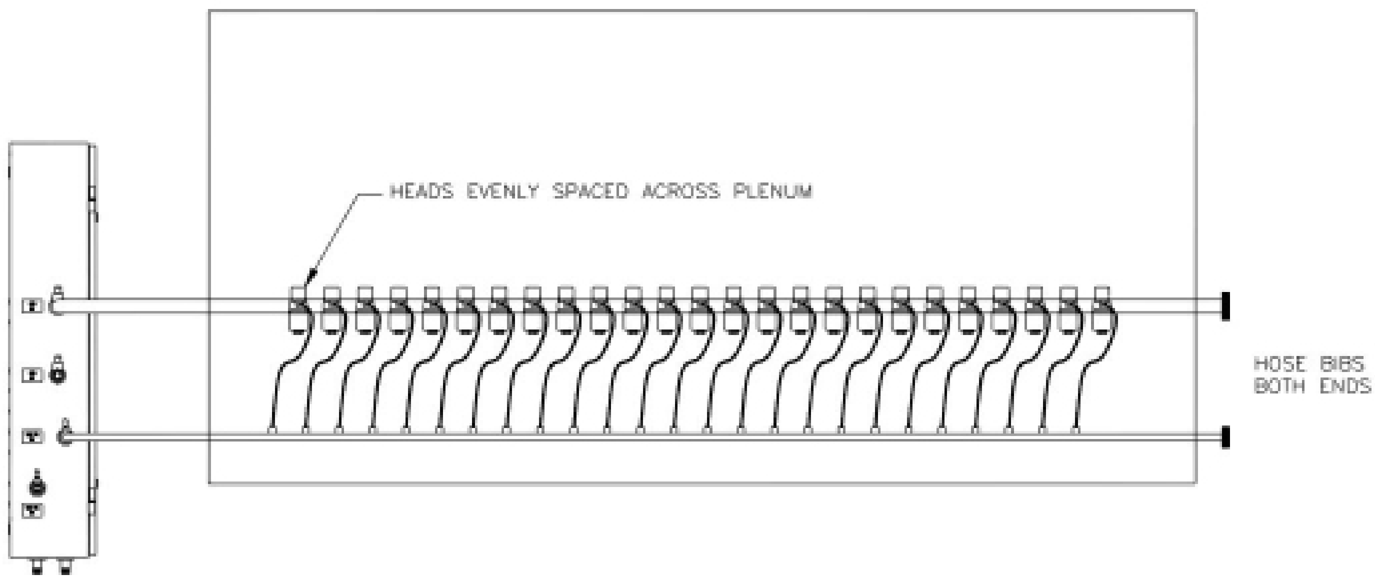
Chart II

The optimum location for the Herrmidicool manifold is in the air handler itself, upstream of the cooling coil with four or more rows. The cooling coil insures a velocity of less than 600 FPM with a large cross sectional surface area and provides a natural mist eliminator and drain.

In this type of installation, the size of the heads used is not so important and can be chosen based on availability of installation space for the equipment and distribution patterns. (See Fig. 6)

Selecting a Head Size Quantity

The atomizing heads are available in 6, 8, 10, 12 & 15 lbs./hr. capacities. As a rule, the larger the head, the greater the moisture concentration and the greater the distance required for evaporation. The water droplet size created is approximately 30 micron on the Dv90 scale at full output. The heads should be arranged so they are mounted on a single manifold across the duct. NEVER arrange the heads so that the spray of one hits the spray of another as the water droplets will coalesce and become larger, increasing the evaporation distance required. Always try to use the smallest head than can be fitted into the system, in order to enhance evaporation. Chart II should be used as a guideline. The trick, of course, is to insure evaporation. Larger droplets will take longer to evaporate and will require more distance. On a cooling coil or mist eliminator, larger droplets will mean more water down the drain. Since increasing the output of an atomizing head increases the droplet size, merely turning up an undersized system will not accomplish the desired effect and may even worsen the total evaporation. The best design is one that uses the smallest possible head size with the best distribution possible. The following figure shows good design and spacing.



Selecting Control Section

Control Cabinets are available in three different output sizes as well as raw and DI/RO water. All connection sizes, as shown in Table I are the same.

Table I

Control Cabinet	Air Connection	Water Connection	Capacity
All	¾“ (19mm)	½” (13mm)	Up to 1000 lbs/hr (454 kg/h)

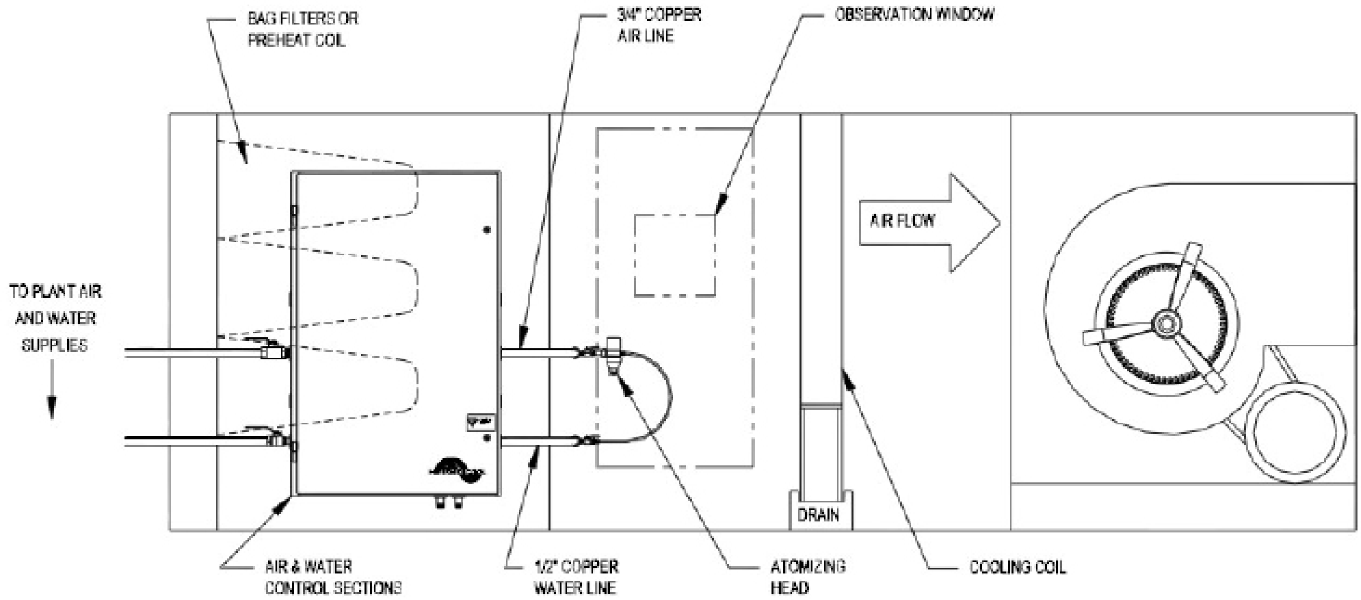


Figure 1

When installed ahead of a cooling coil, the rule of thumb is that if the heads are placed 3' upstream of the coil, 1% of the total capacity of the system will go down the drain, at 2', 2.5% will drain away at 1' or less, >5% will be lost. A small amount of run down on the coil is good and tends to keep the coil clean and free of any mineral deposits (see section on mineral content in water). (See Fig. 1)

Since the object is to utilize the cross-sectional surface area, more than one manifold should be used on tall, multiple coil sections. (Each manifold would be staged and modulated). The heads on each manifold may be angled up and/or down as required to enhance the distribution of the spray. (See Fig. 2)

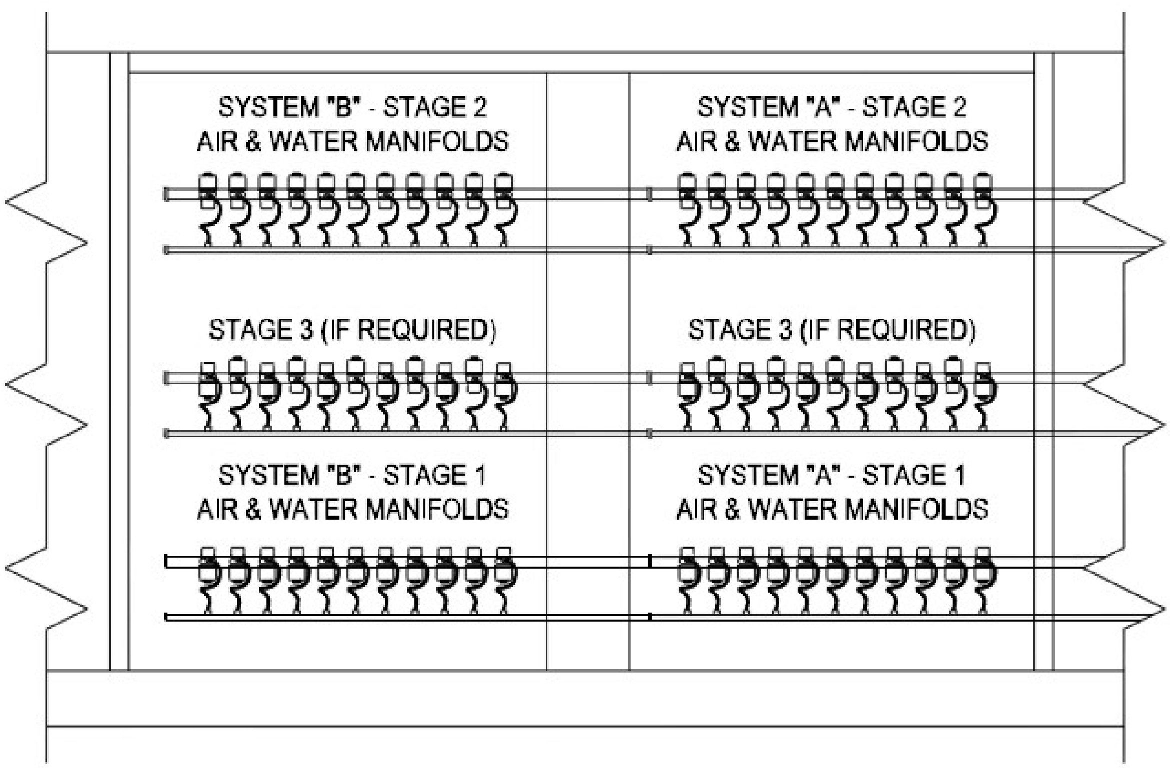


Figure 2

EXPANDED DUCT SECTION TYPICAL LAYOUT

EXTERNAL DUCT PLATE OPTION SHOWN
DEPENDING ON CONDITIONS AND DIMENSIONS
TRADITIONAL MOUNTING INSIDE DUCT MAY BE FEASIBLE

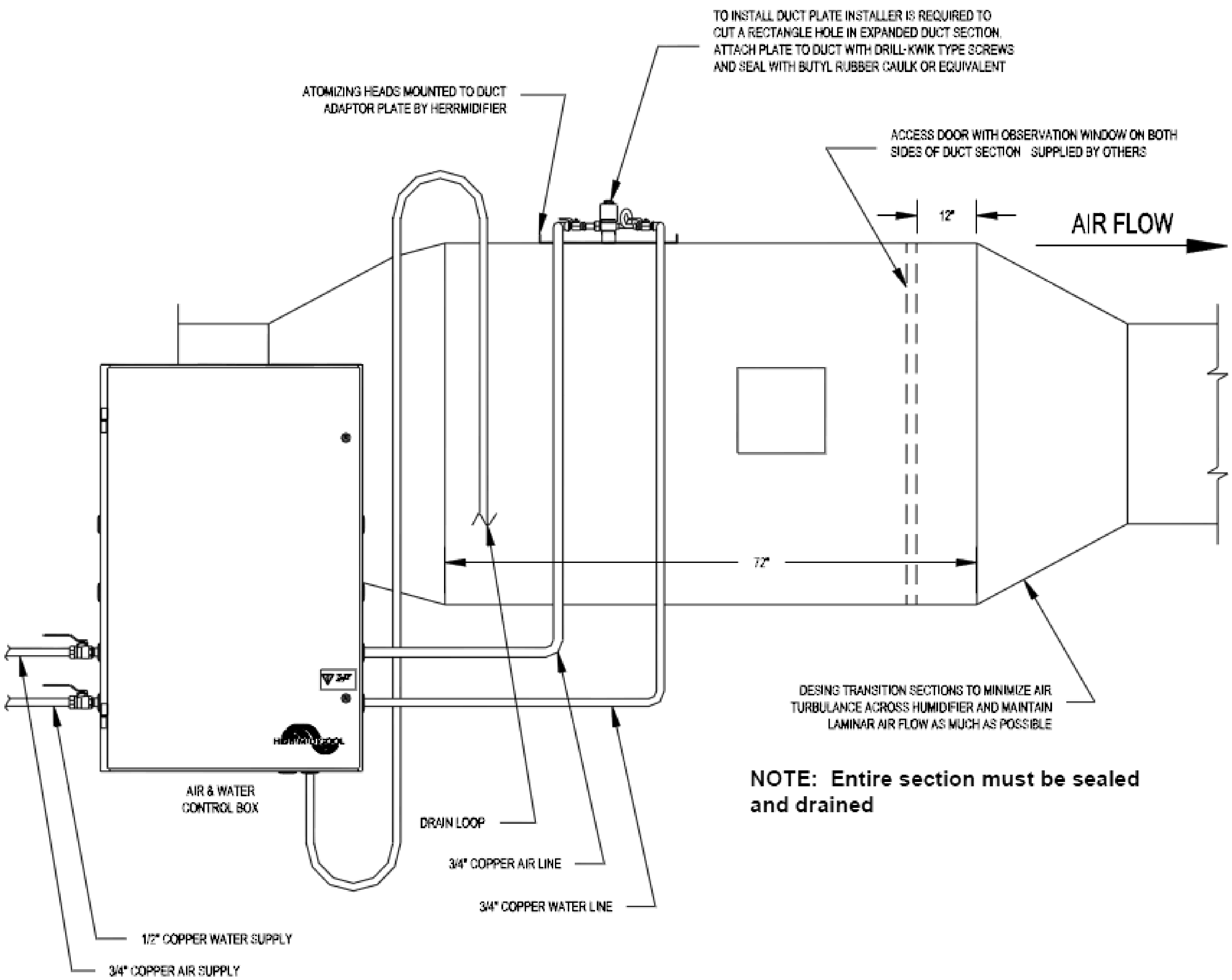


Figure 3

External Duct Plate Applications

If the duct is not high enough for proper turning of the spray to prevent impingement, the atomizing heads may sometimes be mounted to an “External Duct Adapter Plate” which suspends the manifold and atomizing heads outside the duct and thus may gain the necessary distance for proper turning of the spray in the air stream.

This technique has the added feature of increasing the ease of maintaining the system. This is only possible with the Herrmidicool atomizing heads because of their high discharge velocity. This technique also permits the use of the Herrmidicool system in ducts carrying contaminated, corrosive or high temperature air.

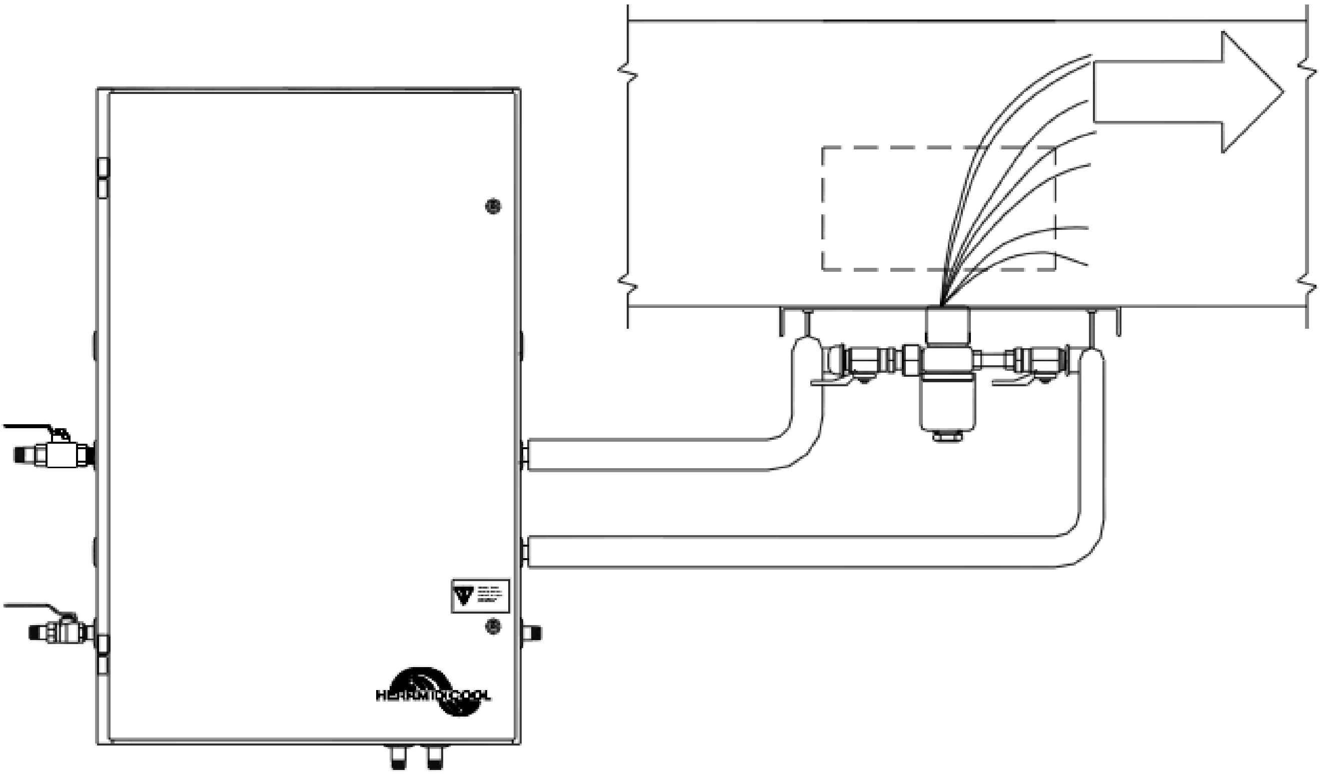


Figure 4

General rules on placement of the Herrmidicool system in air handlers:

The minimum distance between each of the heads is 3”. The minimum distance between the end heads and the side of the duct or air handler is 12”.

To determine the proper head spacing on the manifold, subtract 24” from the duct width and divide the difference by the number of heads minus one. If this is less than 3”, multiple manifolds must be used, or the head capacity increased, to reduce the number of heads.

If multiple manifolds are used, alternate and stagger the location of the heads between successive manifolds to provide and an interlocking spray pattern. (See Fig. 2)

If duct height is greater than (2 x Distance from top of head to duct casing) (ref. Dim. A) the head manifold may be centered in the duct with the heads alternately spraying up and down. Otherwise, the head manifold must be placed as low or as high as possible in the duct with the heads spraying 900 to the airflow. The minimum duct height for installation of atomizing head within the duct is Dimension A + 12.

If the duct height and head size do not allow for the manifold to be mounted in the duct, the manifold may be mounted externally be means of an external duct adapter plate. Warning: Before obtaining access to terminals, all supply circuits must be disconnected. (See Fig. 4) 4

Placement of the Herrmidicool manifold in a return plenum should be avoided as most air handler systems involve some amount of exhaust. The atomizing head manifolds should NEVER be placed in a lined duct, as the droplets will impinge on the liner.

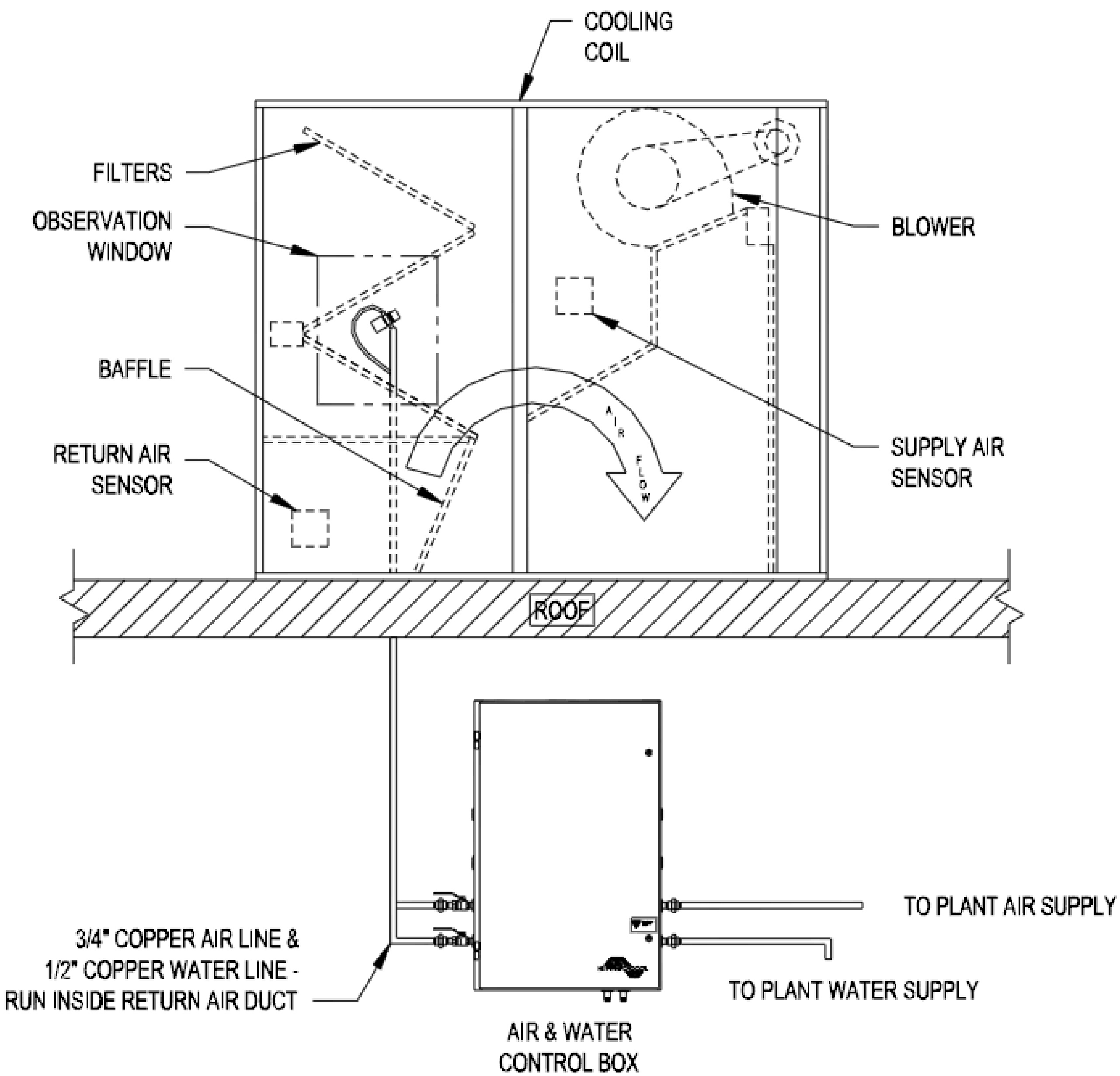
If the manifold is placed upstream of the cooling coil and interlock to prevent the A/C system from operating simultaneously is recommended. This takes full advantage of the evaporative cooling provided by the Herrmidicool system. If the manifold is placed down-stream of the cooling coil, you should specify an interlock to prevent the Herrmidicool from operating when the A/C is on, which could cause condensation in the duct.

Special Applications - Roof Top Air Handlers

In many cases, the air handlers, in which the Herrmidicool system will be installed, will be located on the roof of a building, exposed to the weather. In these cases, it is important to keep freeze protection in mind. Although the water lines of the system may and should be heat traced, it is also wise to remove the water from the system when it is not in use to prevent freezing in a power failure. HERRMIDIFIER makes available such features as a freeze-stat interlock and blow-down capability. This special system drains all water out of the system on any shut down, whether caused by a power failure, freeze-stat alarm or normal shut down.

Figure 5 shows a typical roof top installation with the heads mounted ahead of the cooling coil, in the folds of the filters.

Because of the cone-shaped discharge pattern from the Herrmidicool heads, such installations are possible. Note that the Control Cabinet is mounted below the roofline in the warm air space of the building. This is recommended as the system will only clear out the water in the lines BETWEEN the control section and the atomizing manifolds. It is also recommended that the air and water lines be run through the supply or return plenums into the unit. This keeps the lines warm and prevents their exposure to outside freezing conditions. As with all installations, Chart II should be used in laying out this type of system. Again it is wise to contact TRION/HERRMIDIFIER.



Figur

Figure 5

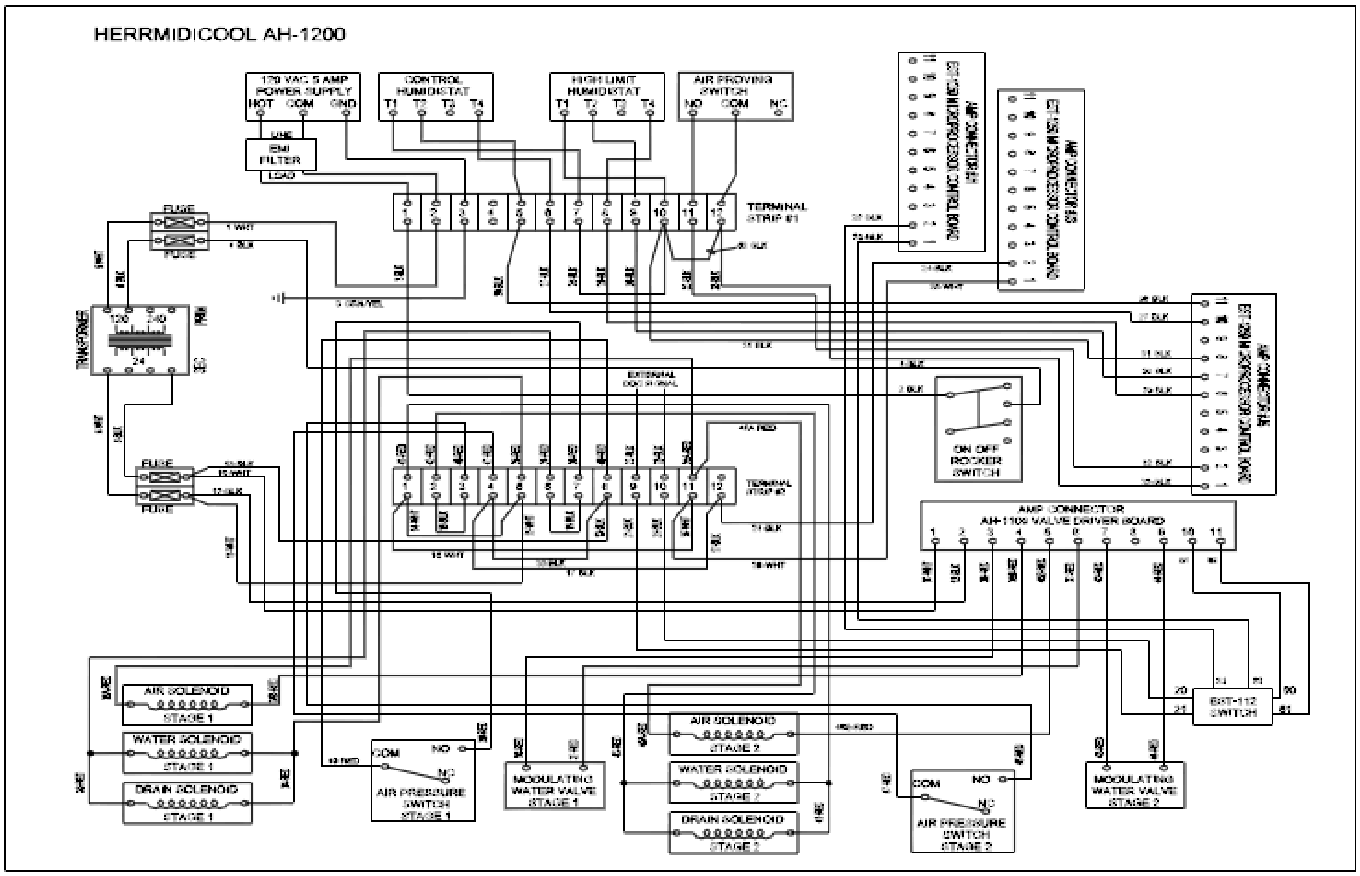
Select the Control Section

HERRMIDIFIER makes available two standard control schemes one using electronic controls and sensors, and the other using direct digital interface that accepts a demand signal from an existing controller or energy management system and operates the Herrmidicool accordingly. All Control Sections require a 110/1/60 volt power supply.

Options, such as special blow-down control sections, delayed on or off, enthalpy compensation, and freeze and A/C interlocks are available on request. These options are useful for rooftop air handlers such as shown in Fig. 5. Other options are available on a customized basis. All optional controls should be specified as to who will supply them. (See suggested specifications at back of this manual.

The typical control scheme involves the use of “double input modulation” which is a technique using both a high limit duct sensor and a control sensor (placed either in the room or return duct), played off against each other to produce the maximum use of the system without “short cycling”. This technique takes maximum advantage of the potential evaporative cooling effect of the Herrmidicool system and insures accuracy for critical applications.)

e 5



For special applications or interface problems, contact your local TRION/HERRMIDIFIER representative or contact TRION/HERRMIDIFIER directly. Special applications are our specialty

Place the Order

At this stage, TRION/HERRMIDIFIER representatives will review your application and plans to insure that the Herrmidicool system is in fact the best possible humidifier for your application, and that the system as designed will work to the maximum benefit for you. The engineering after the sale is no less important than the engineering before the sale.

15781 HUMIDIFIERS

PART 1 GENERAL
A. SCOPE

1. Furnish and install as indicated on the drawings an in-duct atomizing humidification and evaporative cooling system complete with Controls Cabinets with Modulating Control Sections, and Atomizing Manifold Assembly. Note: Manifolds are designed to introduce moisture into an airstream. This airstream may be either a traditional duct or AHU or the discharge of an air turnover unit.
2. Warranty system for a period of two years from date of shipment.
3. Provide owner's manual to cover installation, startup, operating and maintenance instructions.
4. Water quality is essential to operation of unit. Complete water analysis to be provided to manufacturer for recommendations to enhance performance and minimize maintenance.
5. Refer to schedule on drawings for capacities.

PART 2 PRODUCT
A. CONTROL CABINET

1. Factory fabricated and tested.
2. All internal components prewired and prepared to terminals, ready for field connections.
3. ON-OFF switch with "Power ON" lamp.
4. Standalone systems provide supply and return air humidity readings. DDC Interface system will accept a 0-100% demand signal from building automation system.
5. Relays for each stage (where applicable) of control allowing stages to be controlled in parallel or series.
6. Controls to incorporate a clean-out cycle time to keep the heads clean and in working order.
7. Electrical requirements are 120 volt, single phase. Maximum amp draw will be 5 amps per control section or stage. Other voltages are available.
8. Optional - The system shall incorporate an automatic blow-down technique to empty the water lines of all liquid on shutdown to prevent freezing.

B. MODULATING CONTROL SECTIONS (In Control Cabinet)

1. Each humidification system shall consist of two control sections; one for compressed air supply
2. The water control section shall consist of a ball valve, pressure regulator with strainer, pressure gauges, water modulating valve and a solenoid valve(s). Water pressure to the control section shall be 50 psi and water pressure to duct manifold shall be maintained at 40 psi minimum.
3. The air control section shall consist of a ball valve, pressure gauge, solenoid valve, pressure regulator with strainer, and an air pressure switch. Compressed air to the control section shall be 60 psi and air pressure to the duct manifold shall be maintained at 30 psi.
4. If aggressive water is supplied, the water control section will be constructed of 300 series stainless steel components that resist degradation.
5. All air & water piping shall be type "L" copper or stainless steel.

C. ATOMIZING HEAD MANIFOLD

1. Manifold shall be factory assembled unit consisting of air and water piping and atomizing heads. Materials used will be based on water quality.
2. Atomizing head capacity shall be (6), (8), (10), (12), (15) pounds of water per hour. Larger capacity heads will not be accepted. Heads will be positioned to provide the maximum possible distribution.
3. Atomizing heads shall be of materials not adversely affected by the purity or aggressiveness of the water, easily disassembled for servicing with self-cleaning and purging feature to provide a complete drip-free operation. Average droplet size will not exceed 30 micron at 100% output (on the Dv90 Scale) and will decrease as the system modulates downward. Documentation of droplet size available on request.
4. Atomizing heads will work on the internal mix method.
5. External mix heads and heads with external appendages are not acceptable.
6. Each head will not exceed 81 dBA when in operation.
7. Single manifold systems to have full modulation with a 30:1 turndown ratio. Dual manifold systems to have full modulation on each stage.
8. Air/water ratio will increase as the system modulates, which will reduce the droplet size. Increasing or constant air/water ratios on modulation will not be accepted.
9. Manifold length shall be as indicated on the drawings or sized by the manufacturer to meet the calculated load.
10. Air consumption shall be a maximum of 12 SCFM free air per 100 pounds of water atomized. Compressor shall include an appropriate safety factor.

D. OPERATING SEQUENCE

1. On a fall in relative humidity (in the space or return air duct), the space or return air transmitter shall send a signal to the controller.
2. A discharge high limit controller shall supply a signal to the controller.
3. The controller shall have an adjustable setpoint for both the return air (or space) and high limit, and shall compare the sensed relative humidity to the respective setpoints.
4. The controller shall output a proportional signal based on the humidity input, which is closest to its respective setpoint.
5. On multi-manifold applications, the manifolds will be modulated in parallel or stages depending on the application.
6. On DDC system, sensors and control algorithm provided by other. 0-100% demand signal provided to HERRMIDIFIER Control Cabinet.
7. The system will automatically shutdown if the airflow switch, located in the discharge duct, is deactivated.
8. A power failure or compressor failure will automatically shut the system down.
9. If water pressure is lost or reduced, the atomizing heads shall sputter with no drippage. Complete loss of water supply will cause the atomizing heads to blow air only.

PART 3 EXECUTION
A. GENERAL

1. Install system(s) as detailed on the drawings and/or as recommended by the manufacturer. Shop drawings, indicating manifold sizes and atomizing head capabilities shall be provided by manufacturer. Certified independent air consumption (at various output levels) and noise data shall be available.
2. Manufacturer's representative shall provide analysis, design and startup support of the custom engineered humidification system(s).
3. Factory personnel will start system.
4. Compressed air shall be oil free and dry. Air shall be filtered to a maximum of 0.3 micron. Dryers and aftercoolers "applied" as the compressor manufacturer recommends.
5. Water treatment, if supplied, demonstrates a satisfactory water supply to the humidifier.

Herrmidicool Systems are manufactured by:
TRION/HERRMIDIFIER
101 McNeill Road
Sanford, NC 27330

Water Quality Considerations

The Herrmidicool atomizing head was developed over 40 years ago and, because of its self-cleaning capability, has operated on water as hard as 68 grains/gal. with routine maintenance. However, when atomized water droplets evaporate, they leave behind mineral residue in the form of a fine dust. In an environment such, this dust may not be a concern since the printing operation may put more contaminants in the air than atomization. In a computer room or cleanroom, mineral dust could be disastrous.

Historically, water quality under 50 ppm Total Dissolved Solids (TDS) and balanced on the Langelier Saturation Index (LSI: -0.5 to +0.5), has been used successfully in general office applications. However, the increased sensitivity to IAQ will further restrict applications where raw water can be used. The minerals can be removed from the water or from the airstream downstream of the humidifier. ALWAYS send a copy of the water analysis from your site to TRION/HERRMIDIFIER for review if you plan on using raw water. Many sites have demineralized water available for use in the humidification equipment. If this is the case, simply confirm the water supply has been for the humidifier has been demineralized or will be provided as part of the humidification project. Your application may contain sensitive equipment that dictates what water treatment path is followed. Planning in the design stages is far easier than reworking after the fact!

If according to the results of your consultation with TRION/HERRMIDIFIER, the water is deemed unusable in raw form, the water can be treated through a variety of techniques including nanofiltration, reverse osmosis, deionization or a combination thereof. Depending on your application, TRION/HERRMIDIFIER can suggest the most cost effective method to solve your water related problems. The proper selection of water treatment for a Herrmidicool system is a very important step in the design process, and should not be discounted.

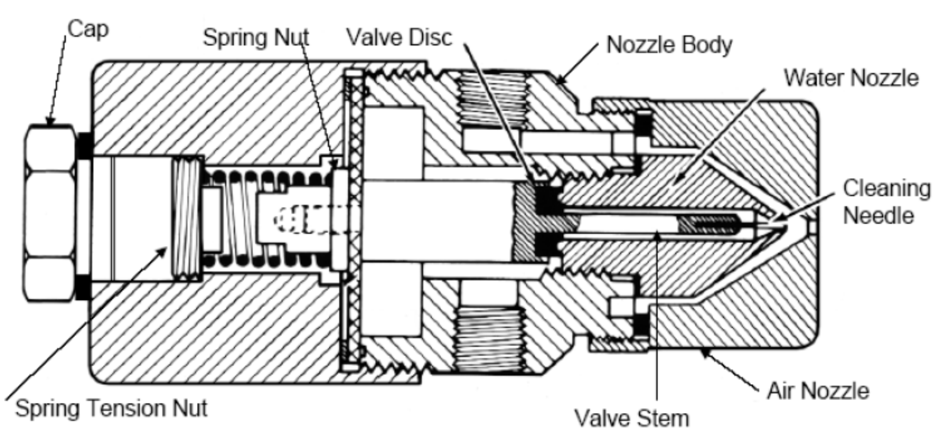
Manifold and Nozzle Spare Parts List

RAW WATER – BRASS		DEIONIZED/RO WATER - SS	
Part #	Description	Part #	Description
AH-940-1-“X”	Atomizing Head	AH-940-2-“X”	Atomizing Head
AH-47	Shutoff Valve	AH-47	Air Shutoff Valve
AH-388	Tubing Insert	254257-001	SS Shutoff Valve
AH-163	Nylon Ferrule	AH-388	Tubing Insert
AH-44	Tubing	AH-44	Tubing
		AH-163	Nylon Ferrule

Note: “X” Denotes nozzle rating in pounds/hour (6, 8, 10, 12 or 15 lb/hr).

BRASS Nozzle Consists of:		SS Nozzle Consists of:	
Part #	Description	Part #	Description
253205-001	Nozzle Body	253205-002	Nozzle Body
253209-001	Bonnet	253209-002	Bonnet
AH-941-1	Air Nozzle	AH-941-2	Air Nozzle
AH-942-1	Water Nozzle	AH-942-2	Water Nozzle
253206-001	Cap	253206-002	Cap
253207-001	Spring Tension Nut	253207-002	Spring Tension Nut
253208-001	Spring Nut	253208-002	Spring Nut
AH-12	Valve Stem	AH-12SS	Valve Stem
AH-19-A	Air Port	AH-19-ASS	Air Port
AH-18-A	Union Tail Piece	AH-18-ASS	Union Tail Piece
AH-20	Union Nut	AH-20SS	Union Nut
AH-1RK (Note 1)	Rebuild Kit	AH-1RK	Rebuild Kit

Notes:
1. AH-1RK Kit includes: AH-122 “O” Ring, AH-14 Air Nozzle Gasket, AH-15 Water Nozzle Gasket, AH-16 Valve Disk, AH-21 Strainer Screen, AH-23 Diaphragm Washer, AH-8 Spring, FV-17-1 Union Washer
2. Always specify nozzle rating in pounds per hour on any nozzle parts order.



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