

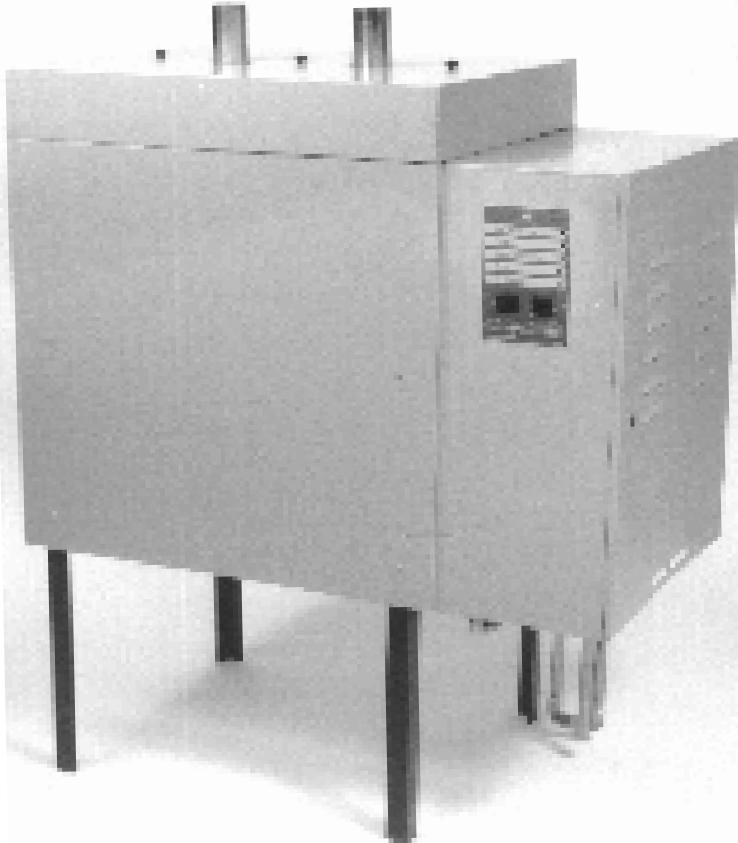
**Series GFH Gas Fired  
HumidiClean™**  
with Revolutionary  
Ionic Bed Technology™



**Armstrong**



# Series GFH Gas Fired HumidiClean with Ionic Bed Technology



**Note:** Painted steel tank enclosure shown above is optional.

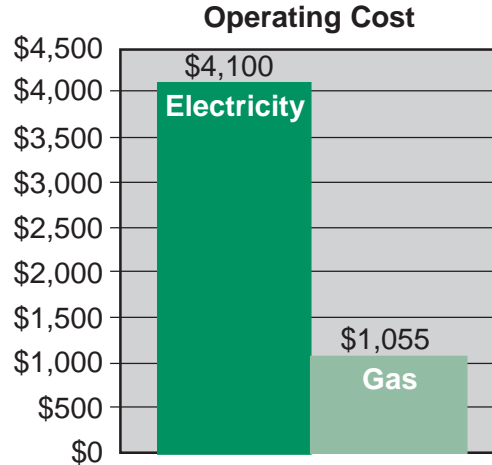
## Performance Features

- Uses natural gas or propane for economical operation
- Energy cost savings in comparison to electric humidifiers
- 100 lb/hr of humidity output
- Modulated control of steam output
- True minimum steam output turndown of 5:1
- Low NOx infrared burner
- 82% efficiency rating
- Ionic Bed Technology to reduce cleaning and maintenance

## What are Ionic Beds?

Ionic Beds consist of a fibrous medium which attracts solids from the water as its temperature rises, minimizing the buildup of solids on the heat exchanger and inner tank walls. Once the Ionic Beds have absorbed their capacity of solids, the humidifier tells you to change them. Changing the beds takes only about 15 minutes. Use of the Ionic Beds provides these benefits:

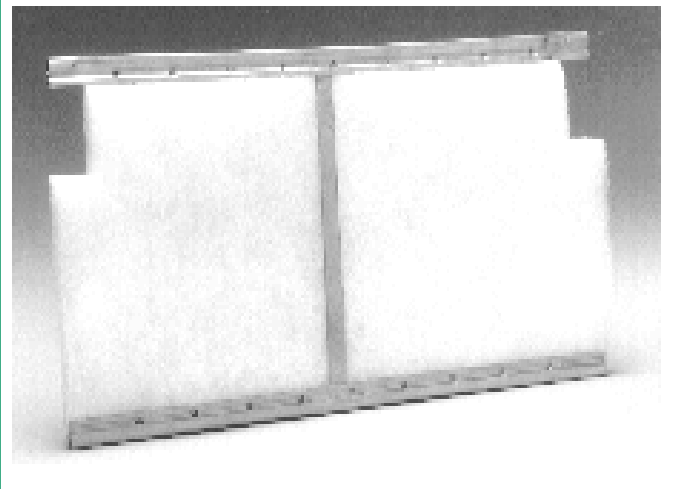
- Reduced cleaning of the tank heat exchanger
- Drain screen stays cleaner longer – allowing for effective tank blowdown
- Humidifier output maintained without building excessive heat exchanger surface temperatures
- Less frequent blowdown required...conserving water and energy
- Eliminates the need for wasteful surface skimmers
- Reduces downtime
- Years of field proven success in thousands of humidifier applications



Based on average operation of a 100 lb/hr unit with electrical cost at \$0.05/kWH and gas cost at \$0.34/Therm.

## Ionic Bed Technology

These microscopic photos show how the ionic bed fibers (magnified 52.5x) collect solids throughout their service life. A new ionic bed weighs approximately 1/2 pound. When it reaches its capacity, an ionic bed may weigh more than 2-1/2 pounds. A light on the control panel indicates when to replace the HumidiClean's six Ionic beds.



# Series GFH Gas Fired HumidiClean with Ionic Bed Technology

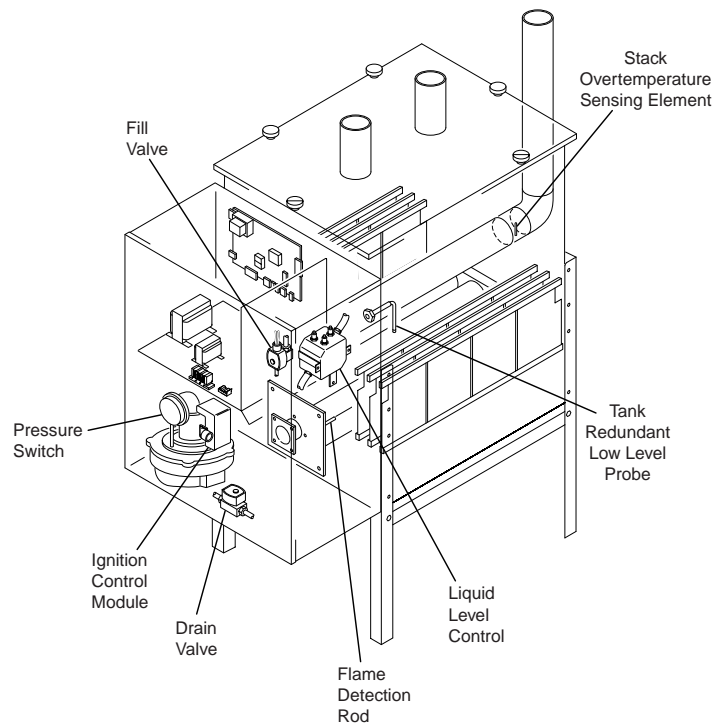
## How Armstrong's Gas Fired HumidiClean Works

Upon a call for humidity, the pre-combustion safety check confirms that the duct pressure switch, duct high limit humidistat, and liquid level control circuits are satisfied. The microprocessor then signals the blower to turn on and air movement is sensed by the humidifier's internal blower pressure switch. The unit then signals the ignition

control module to perform a purge cycle. The hot surface igniter comes on and, after it comes up to temperature, the gas valve opens and gas ignition occurs. The flame detection rod senses the presence of the flame and combustion is underway. The humidifier accepts a 0-10 Vdc control signal and provides proportional output in response.

## Safety Features

- Pressure Switch - senses air movement in the blower and back pressure on the unit
- Ignition Control Module - monitors combustion of the unit
- Flame Detection Rod - senses flame during combustion
- Liquid Level Control - prevents a low water condition
- Tank Low Level Probe - redundancy to avoid low water condition
- Stack Overtemperature Sensing - prevents overheating
- Tank Insulation - prohibits access to hot tank surface
- End of Season Drain - prohibits standing water during periods of no demand



## Selection & Ordering Procedure

- **Compute capacity required** - Armstrong's Humidification Handbook (HB-501) or Armstrong Humid-A-ware Sizing and Selection Software are useful tools in sizing load requirements. Both may be downloaded from Armstrong's web site at [www.armstrong-intl.com](http://www.armstrong-intl.com).
- **Specify fuel gas to be used** - Natural gas or propane
- **Humidity Control Selection** - The standard Armstrong humidistat is 0-10 Vdc control and is adjustable by a front mounted dial from 5-95% RH. Specify room or duct type humidistat. If you are providing your own controller, specify the control signal type.
- **Specify spare ionic bed inserts** - Armstrong recommends the purchase of a spare set of ionic beds if the humidifier is to be in service on a year-round basis (not applicable for DI or RO water).
- **Duct Unit** - Specify steam dispersion tubes (See Table 6-2). Alternatively, specify HumidiPack and indicate the following:
  - Specify water source** - Indicate if the water service will be tap, deionized, demineralized, softened or reverse osmosis water
  - Specify options required - Duct high-limit humidistat (Recommended)**. We suggest use of the high limit humidistat. Typical setting for the high limit humidistat is 85% RH. Stat opens when relative humidity exceeds settings. A modulating high-limit humidistat is also available for VAV systems.
  - Fan interlock. (Recommended)**. A duct pressure switch is one form of a fan interlock to activate the humidifier by sensing air flow in the duct system. The pressure switch prevents humidifier operation if there is insufficient air movement in the duct system.

# GFH Gas Fired HumidiClean Installation Concepts

**Gas Fired HumidiCleans must be installed in locations that allow routine inspection and accessibility for maintenance operations.**

**Do not place Gas Fired HumidiCleans in locations where unusual instances of malfunction of the humidifier or the system might cause damage to non-repairable, unreplaceable or priceless property.**

## Duct Type Distribution

Where an existing air handling system is available, steam is commonly discharged into the system through two or more dispersion tubes. Selection of the dispersion tubes should meet the duct requirements in Table 6-2. If the steam dispersion tubes are to be located below the humidifier, install a drip with water seal (See Figure 5-4).

## Alternative for Shortened Non-Wettable Vapor Trail . . . HumidiPack™

Use of traditional dispersion tubes (See Figure 5-1) typically provides satisfactory non-wettable vapor trail performance in duct applications with the Gas Fired HumidiClean. However, for applications with particularly limited downstream absorption distance, HumidiPack may be considered. HumidiPack is a prefabricated separator/header and multiple dispersion tube assembly (See Figure 5-3). It provides uniform distribution and a shortened non-wettable vapor trail. Consult Bulletin 565 or contact your Armstrong Representative for more information.

## Area Distribution Method

The Armstrong EHF-3 fan package provides humidity distribution where an air handling system is not

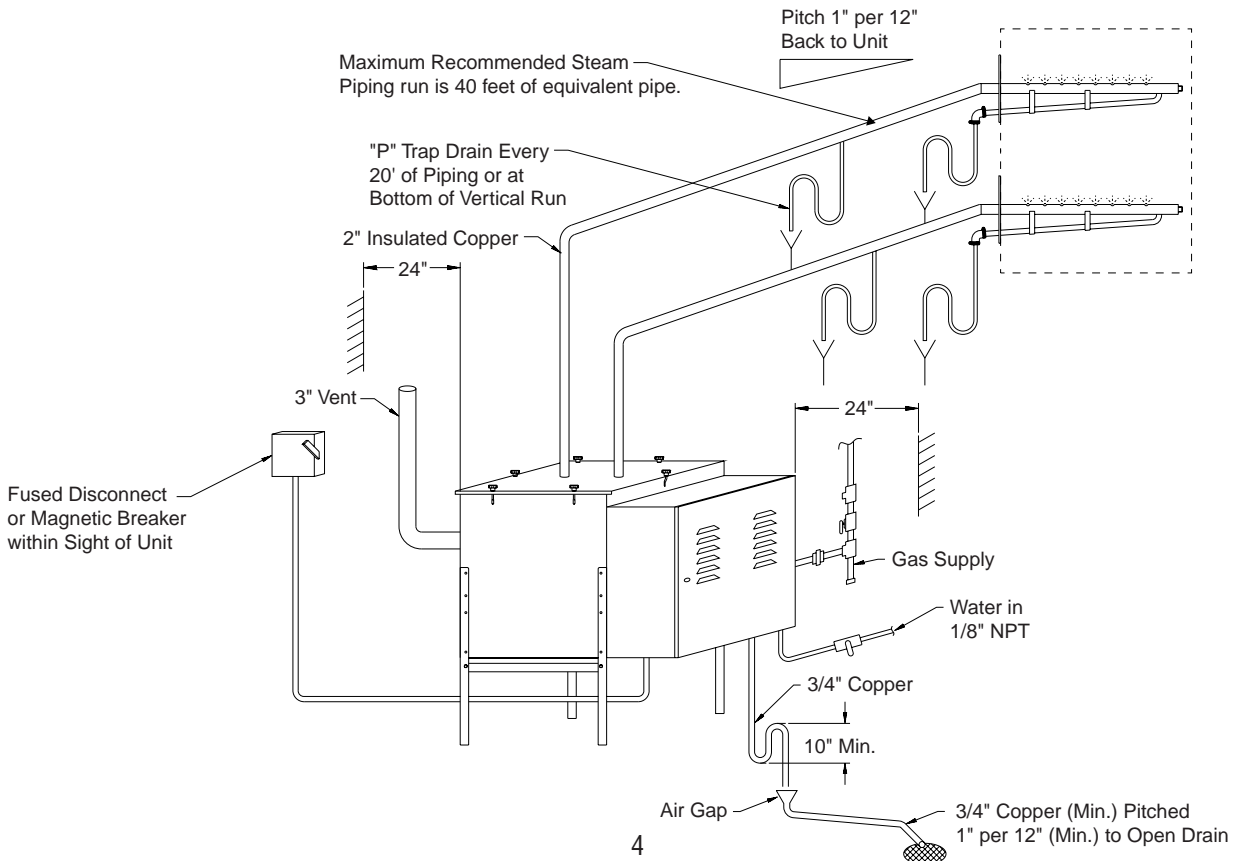
available. The fan package (See Figure 5-2) is designed to be hung on a wall to operate as a remote-mounted, direct area discharge option for use with Gas Fired HumidiClean. The EHF-3 incorporates a blower rated at 120 V-2.90 amps. CFM rating is 465. The standard fan package requires a separate 120 volt power supply.

**Note:** A minimum of two EHF-3 fan units are required for the Gas Fired HumidiClean Model GFH-100.

**Note:** The Model GFH-100 is shipped as a free standing unit. It is not intended to be wall mounted.

**Note: For all GFH-100 Gas Fired HumidiClean units: Please contact factory for duct applications offering high static pressure (>4" W.C.) or velocities over 2,000 FPM. Avoid placing dispersion tubes in downward, high velocity airflow. Please contact your local Armstrong Representative with questions.**

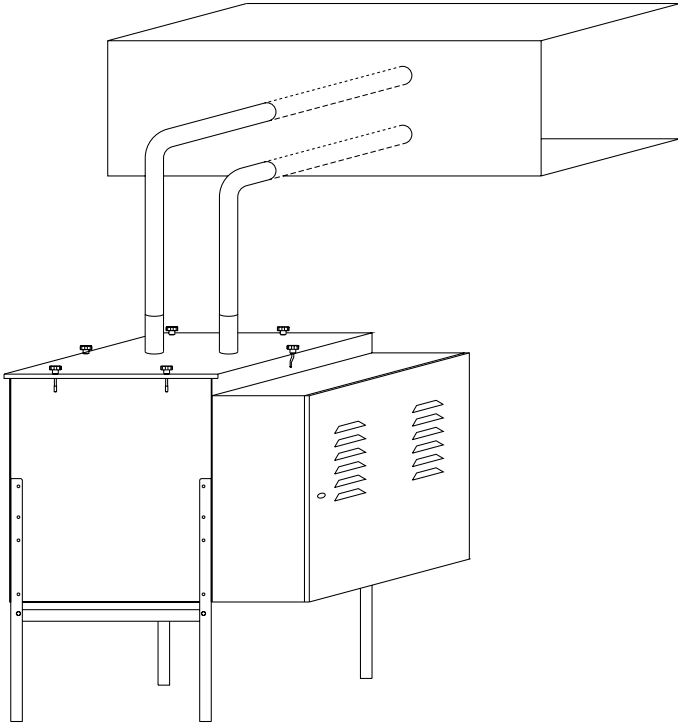
**Figure 4-1**  
**General Installation Concepts**



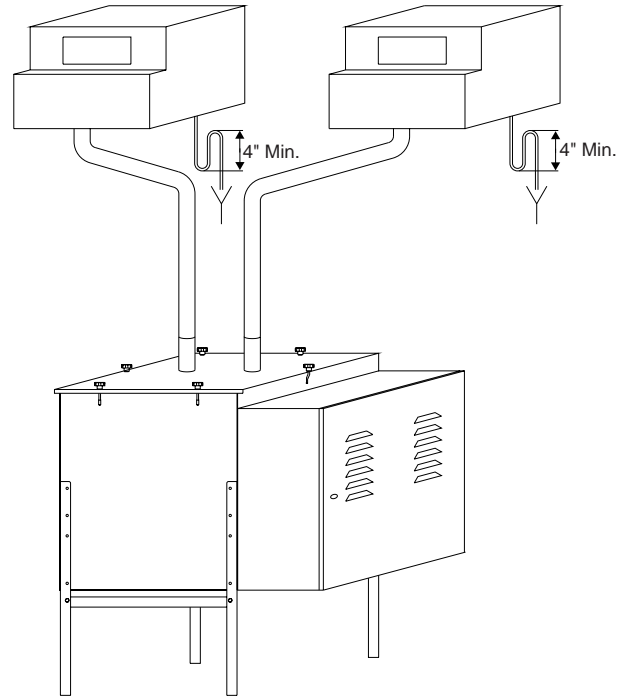
# GFH Gas Fired HumidiClean Installation Concepts

Please see Bulletin 548 for more complete installation details.

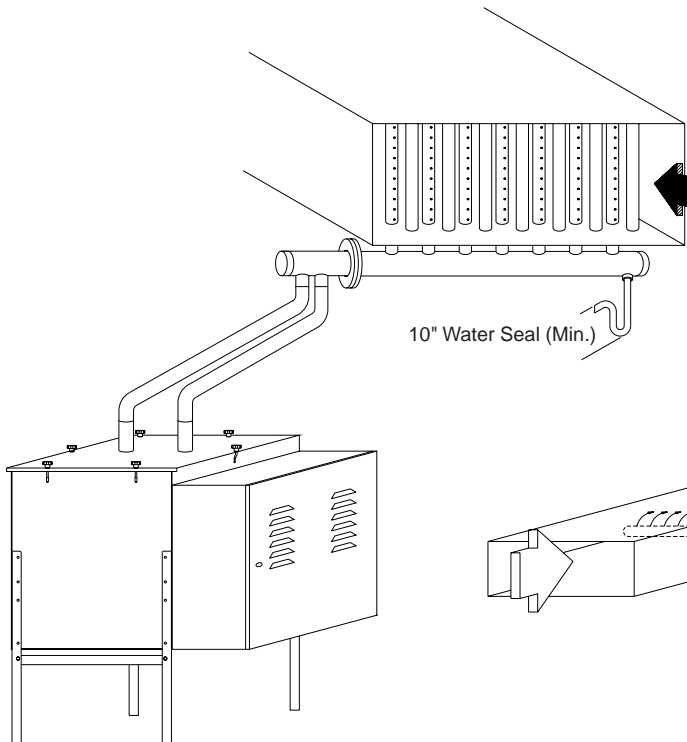
**Figure 5-1**  
Duct Type Steam Distribution



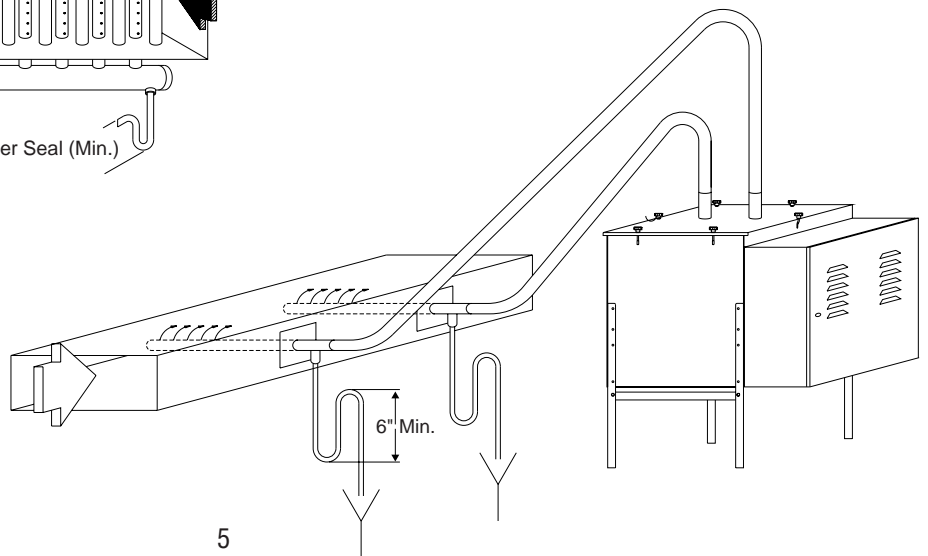
**Figure 5-2**  
With EFH-3 Fan Packages Mounted on Wall



**Figure 5-3**  
Piped to a HumidiPack™



**Figure 5-4**  
Duct Mounted Below Humidifier



# Series GFH Gas Fired HumidiClean with Ionic Bed Technology

**Table 6-1. Capacities**

Model Number	Steam Capacity		Max. Input btu/hr
	lb/hr	kg/hr	
GFH-100	100	45	133,000
GFH-100DI	100	45	133,000

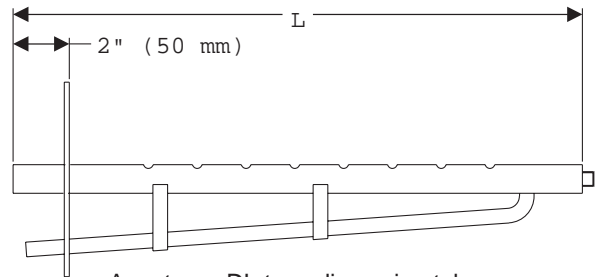
**Table 6-3. Physical Data**

	in	mm
"A" Width	22-5/8	575
"B" Height	50-1/4	1276
"C" Depth	43-1/8	1095
"D" Steam Outlet - Side	21-13/16	554
"E" Steam Outlet - Between	10	254
"F" Steam Outlet - Front	11-3/8	289
"G" Exhaust Vent - Bottom	31-1/2	800
"H" Drain - Back	3-3/4	95
"J" Water Supply - Bottom	32	813
"K" Water Supply - Back	5-1/2	140
"L" Drain - Side	9-3/4	248
"M" Gas Supply - Side	5-11/16	144
"N" Gas Supply - Bottom	25	635
"P" Drain - Bottom	11-3/4	298
Water Inlet	1/8" NPT	3
Drain Connection	3/4"	20
Gas Inlet	1/2" NPT	15
Vent Size	3"	75
Steam Outlets	2-3/8" OD	60

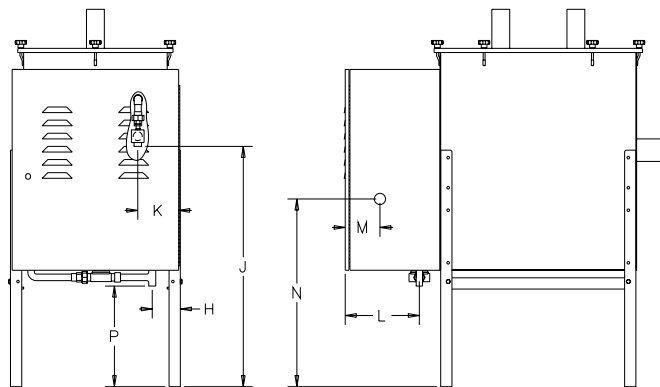
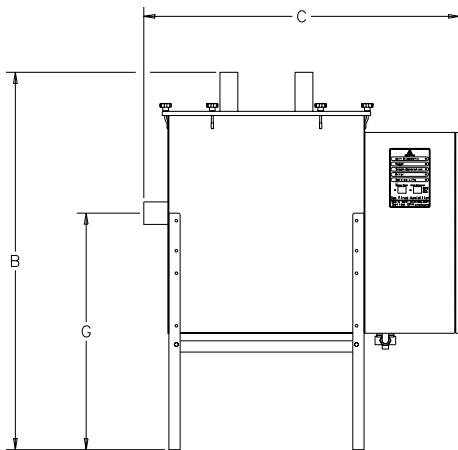
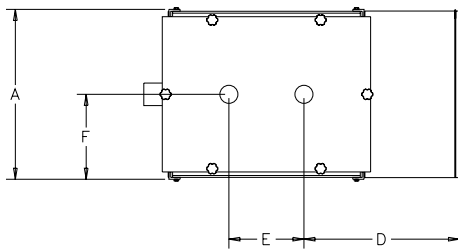
**Table 6-2. Selecting Proper Steam Dispersion Tube**

Steam Disp. Tube Model No.	Steam Disp. Tube Length		Duct Width				Weight	
	in	cm	Min.		Max.		lb	kg
			in	cm	in	cm		
DL-1	12	30	11	28	16	41	3	1.4
DL-1.5	18	46	17	43	22	56	3	1.4
DL-2	24	61	23	58	34	86	4	2
DL-3	36	91	35	89	46	117	6	3
DL-4	48	122	47	119	58	147	8	3.6
DL-5	60	152	59	150	70	178	9	4
DL-6	72	183	71	180	82	208	10	4.5
DL-7	84	213	83	211	94	239	11	5
DL-8	96	244	95	241	106	269	12	5.5
DL-9	108	274	107	272	118	300	13	6
DL-10	120	302	119	302	130	330	14	6.4

Minimum of two DL type dispersion tubes required.



Armstrong DL type dispersion tube.  
Minimum of two required. See Table 6-2 above.



40 Inch Minimum Clearance Front  
24 Inch Minimum Clearance Back Side, Left Side and Right Side

# Series GFH Gas Fired HumidiClean with Ionic Bed Technology

## Suggested Specifications

- A.** Humidifier shall generate steam from demineralized, deionized (DI), reverse osmosis (RO), softened, or ordinary tap water (specify DI model for DI or RO water).
- B.** Humidifier shall utilize disposable ionic bed inserts for tap water service to attract solids from boiling water. Ionic beds ensure controllability through responsiveness and consistent humidity output regardless of water quality and minimize downtime required for tank cleaning. Ionic beds not utilized on DI or RO water.
- C.** Full top surface of tank removeable for easy access to ionic beds.
- D.** Internal components contained in a steel enclosure with key locked access doors to prevent unauthorized access.
- E.** **Optional** painted steel cabinet tank enclosure.
- F.** Heat exchanger constructed of stainless steel.
- G.** Infra-red burner.
- H.** Forced draft combustion system.
- I.** Humidifier shall include variable speed combustion blower.
- J.** Humidifier shall be CSA certified and CGA approved.
- K.** Humidifier shall monitor tank operating history, and display will indicate when unit needs ionic bed replacement. Service life cycle may be field adapted to match water quality.
- L.** Humidifier shall provide modulated output and is field adaptable to 0-10 Vdc, 4-20 milliamp, 1.9-3.9 Vdc, 0-5 Vdc or an on/off input signal.
- M.** Tank drain cycle shall be based on operating history in order to conserve water and energy. Drain cycle shall be field adjustable.
- N.** After 72 hours of no demand, humidifier will drain the tank.
- O.** Unit shall monitor tank water level and will shut down power to the gas train to prevent unsafe operation upon failure of the drain system or fill system.
- P.** Humidifier shall utilize a thermal safety switch to monitor stack temperature and prevent overheating.
- Q.** Humidifier shall incorporate stainless steel conductance actuated probes with Teflon insulation for liquid level control on tap water service. For DI or RO water, humidifier shall use float switches for liquid level control.
- R.** Humidifier shall include lights indicating the unit has power on, is in the process of steam generation, has a diagnostic error, or that the ionic beds are at the end of their service life.
- S.** Humidifier fill water line shall have an air gap to prevent back-flow (siphoning) of tank water into the potable water supply system.
- T.** Humidifier shall incorporate electrical terminals for installation of controlling stat, duct high-limit stat, fan interlock switch, and Class 2 alarm device.
- U.** Humidifier shall be supplied with two or more stainless steel dispersion tubes which provide uniform steam distribution over the entire tube length and shall be supplied at various lengths (through 10 feet) to adequately span the widest dimension of the duct. Alternatively, humidifier shall be supplied with HumidiPack prefabricated separator/header and multiple dispersion tube assembly designed for the application in order to shorten the non-wettable vapor trail.
- V.** When applicable, humidifier shall have provisions for discharging steam vapor directly into room area using factory available fan distribution units as an accessory. These units shall be designed for remote mounting.
- W.** Humidifier shall be supplied with hose cuffs for connection to hard copper tube (customer supplied).
- X.** Tank insulation supplied standard with each unit.

# Series GFH Gas Fired HumidiClean

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## Additional Armstrong Humidifiers with Ionic Bed Technology

Armstrong Series HC-4000 electrically powered HumidiClean includes ionic bed technology and provides steam output ranging to 216 lb/hr.

Series CS-13CB steam-to-steam humidifiers incorporate ionic beds in a humidifier that uses the heat of chemically treated steam to boil non-treated water for purposes of humidification. Output of the ionic bed version extends to 240 lb/hr with a 15 psi steam supply.

## Humid-A-ware Humidification Sizing and Selection Software for Microsoft® Windows® 95 and Windows® NT (4.0)

With a single keystroke Armstrong's Humid-A-ware can:

- Calculate humidification load
- Determine correct humidifier model number
- Create and customize equipment and data schedule
- Indicate psychrometric properties of air
- Calculate non-wetting distance
- Print the complete humidification application specification

## Limited Warranty and Remedy

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Armstrong International, Inc. ("Armstrong") warrants to the original user of those products supplied by it and used in the service and in the manner for which they are intended, that such products shall be free from defects in material and workmanship for a period of one (1) year from the date of installation, but not longer than 15 months from the date of shipment from the factory, [unless a Special Warranty Period applies, as listed below]. This warranty does not extend to any product that has been subject to misuse, neglect or alteration after shipment from the Armstrong factory. Except as may be expressly provided in a written agreement between Armstrong and the user, which is signed by both parties, Armstrong **DOES NOT MAKE ANY OTHER REPRESENTATIONS OR WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR ANY IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE.**

The sole and exclusive remedy with respect to the above limited warranty or with respect to any other claim relating to the products or to defects or any condition or use of the products supplied by Armstrong, however caused, and whether such claim is based upon warranty, contract, negligence, strict liability, or any other basis or theory, is limited to Armstrong's repair or replacement of the part or product, excluding any labor or any other cost to remove or install said part or product, or at Armstrong's option, to repayment of the purchase price. As a condition of enforcing any rights or remedies relating to Armstrong products, notice of any warranty or other claim relating to the products must be given in writing to Armstrong: (i) within 30 days of last day of the applicable warranty period, or (ii) within 30 days of the date of the manifestation of the condition or occurrence giving rise to the claim, whichever is earlier. **IN NO EVENT SHALL ARMSTRONG BE LIABLE FOR SPECIAL, DIRECT, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES, INCLUDING, BUT NOT LIMITED TO, LOSS OF USE OR PROFITS OR INTERRUPTION OF BUSINESS.** The Limited Warranty and Remedy terms herein apply notwithstanding any contrary terms in any purchase order or form submitted or issued by any user, purchaser, or third party and all such contrary terms shall be deemed rejected by Armstrong.

**Special Warranty Periods are as follows:**

**Series EHU-700 Electronic Steam Humidifier, Series HC-4000 HumidiClean Humidifier and**

**GFH Gas Fired HumidiClean with Ionic Beds:**

Two (2) years after installation, but not longer than 27 months after shipment from Armstrong's factory.



**Armstrong International, Inc.**

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