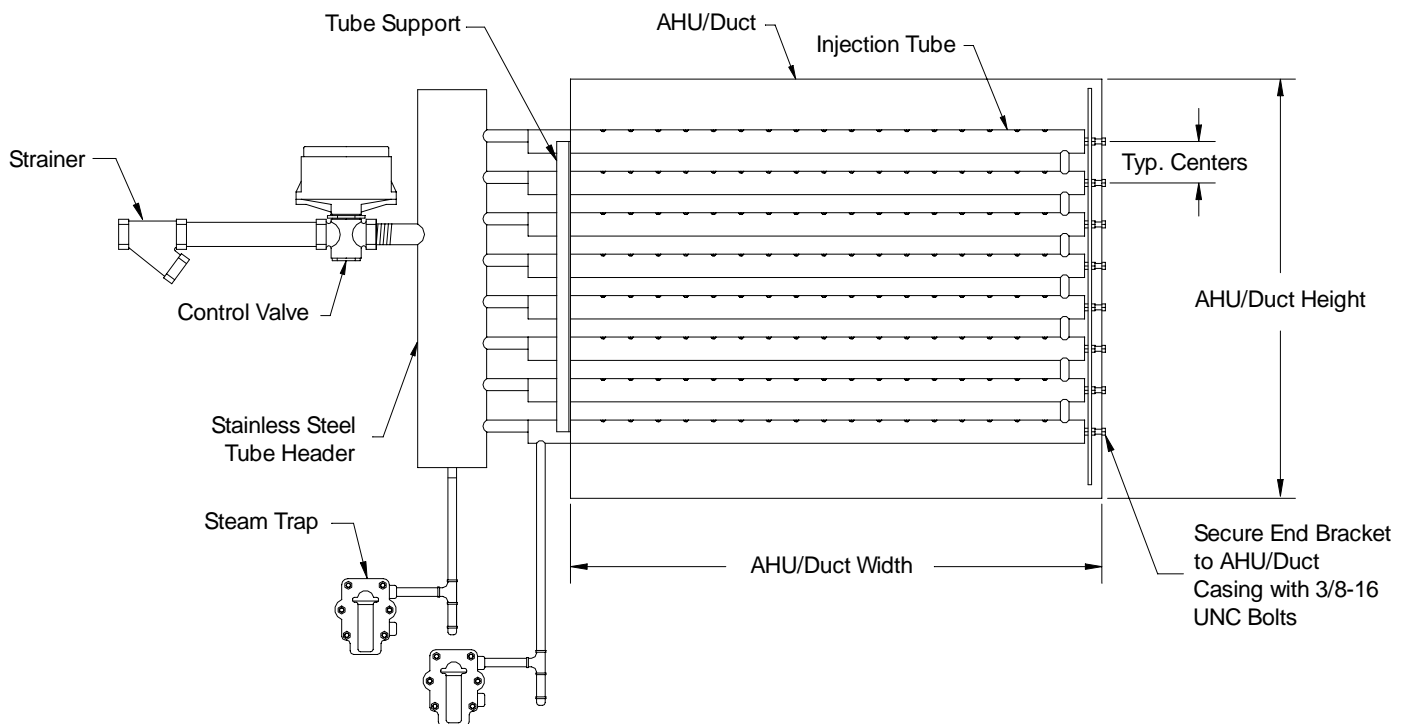


# INSTY-PAC EXTERNAL MOUNT WELDED MULTIPLE TUBE ASSEMBLY

## INSTALLATION AND ASSEMBLY INSTRUCTIONS

Fig. 1



### INSTALLATION

1. Install the assembly so that the injection tubes are **level** within the duct or AHU.
2. Install tube with orifices injecting steam up.
3. Insty-Pac condensate steam traps must drain by gravity to an open drain (condensate cannot be elevated).
4. Each condensate connection **must** have it's own steam trap. Condensate connections **cannot** be combined together to a common steam trap.
5. A common condensate drain line can be used **after** the individual steam traps.

## Introduction

### Table of Contents

Introduction	1
Non-Wetting Distance Charts	2
Mounting Instructions	3
Component Identification	4
Header & Bracket Support Detail	5
Installation Tips/Controls	6
Troubleshooting	7
Maintenance	8

### **To the user of PURE Humidifier Co.'s Electric Humidifiers**

We at PURE Humidifier Co. thank you for choosing one of our quality products. PURE Humidifier Co. humidifiers are simple to install, operate, and maintain. However, they must be maintained to provide maximum operating efficiency.

**PLEASE READ AND FOLLOW ALL INSTRUCTIONS CAREFULLY. PROPER OPERATION AND HUMIDITY CONTROL IS POSSIBLE ONLY WITH PROPER INSTALLATION AND MAINTENANCE.**

To ensure proper installation of this product, it must be installed by qualified HVAC and electrical contractors, and must be in compliance with local, state, federal, and governing codes. If installed improperly this product may cause damage to property, severe personal injury, or death as a result of electric shock, burns, and/or fire.

High chloride content in boiler steam condensate carryover can cause chloride stress cracking and chloride pitting in stainless components. Chloride stress corrosion cracking (CSCC) and chloride pitting of stainless steel components is not covered by warranty. Do not use hydrochloric acid descalers or bleach to clean the tank. Consult the factory if you are unsure about which chemical descaler to use.

### **The PURE Humidifier Co. Warranty**

PURE Humidifier Co. guarantees its products to be free from defects in material and workmanship for a period of two years from the date of shipment; provided the product is properly installed, serviced, and put into the service for which it was intended.

PURE Humidifier Co. is obligated under the terms of this warranty to the repair or replacement of the defective part(s), excluding any labor charges, or to refund the purchase price at our option. PURE Humidifier Co. assumes no obligation for incidental or consequential damages. The above provisions are in lieu of all other guarantees, obligations, liabilities or warranties, expressed or implied.

## Non-Wetting Distance With a Insty-Pac Tube Assembly Having 3" Centers

Relative Humidity Leaving	90%	30"	15"	13"	11"	8"	7"	5.5"	2"	1"
	85%	15"	11"	10"	9"	7"	5"	4"	1"	
	80%	10"	8"	7"	6"	5"	3"	2"		
	70%	8"	6"	5"	4"	3"	1"			
	60%	6"	4"	3.5"	2.5"	0.75"				
	50%	4"	3"	2"	0.75"					
	40%	2"	1.5"	0.5"						
	30%	1"	0.5"							
	20%	0.25"								
	10%	20%	30%	40%	50%	60%	70%	80%	85%	

Relative Humidity Entering

## Non-Wetting Distance With a Insty-Pac Tube Assembly Having 6" Centers

Relative Humidity Leaving	90%	60"	30"	27"	24"	20"	16"	14"	13"	9"
	85%	50"	24"	21"	17"	13"	12"	10"	8"	
	80%	40"	19"	15"	13"	9"	8"	7"		
	70%	30"	15"	11"	9"	6"	4"			
	60%	15"	11"	8"	5"	3"				
	50%	9"	8"	4"	2"					
	40%	5"	4"	1"						
	30%	2.5"	1"							
	20%	0.5"								
	10%	20%	30%	40%	50%	60%	70%	80%	85%	

Relative Humidity Entering

The above is based on air conditions of 55°F duct temperature at a velocity of 500 feet per minute. Dissipation distance may vary depending on airflow and temperature characteristics.

### Air Pressure Loss in Inches of Water Column

Air Velocity	3" Tube Spacing	6" Tube Spacing
500 fpm	.025	.015
750 fpm	.060	.020
1000 fpm	.085	.030
1250 fpm	.130	.043
1500 fpm	.180	.055

**Note:** Tube spacing greater than 6" has no measureable air pressure loss.

## Insty-Pac Injection Tube Assembly External Mounting Instructions

The Insty-Pac tube assembly supplied is designed for rapid dissipation of steam. The tube assembly is designed for *external* AHU or duct mounting.

### Verify Components

Unpack the components from the shipping container. Verify all components are checked off according to the packing list and the *COMPONENTS IDENTIFICATION DRAWING* (Fig. 2). Report any missing pieces to your local PURE Humidifier Co. representative immediately.

### Location

1. Mount the injection tube assembly in the AHU or duct work as shown on the project plans or as indicated by the engineer.
2. Install the injection tube with the 3/4"-NPT drain connection, located on the tube header, directed towards the bottom of the AHU or duct.
3. Install the tube assembly so that the injection tubes are **level** within the AHU or duct.
4. Install the tube assembly with the steam discharge ports facing upwards.
5. The tube assembly should be centered in the AHU or duct height with an even distance between the bottom tube and the casing floor and the top tube and the casing ceiling.

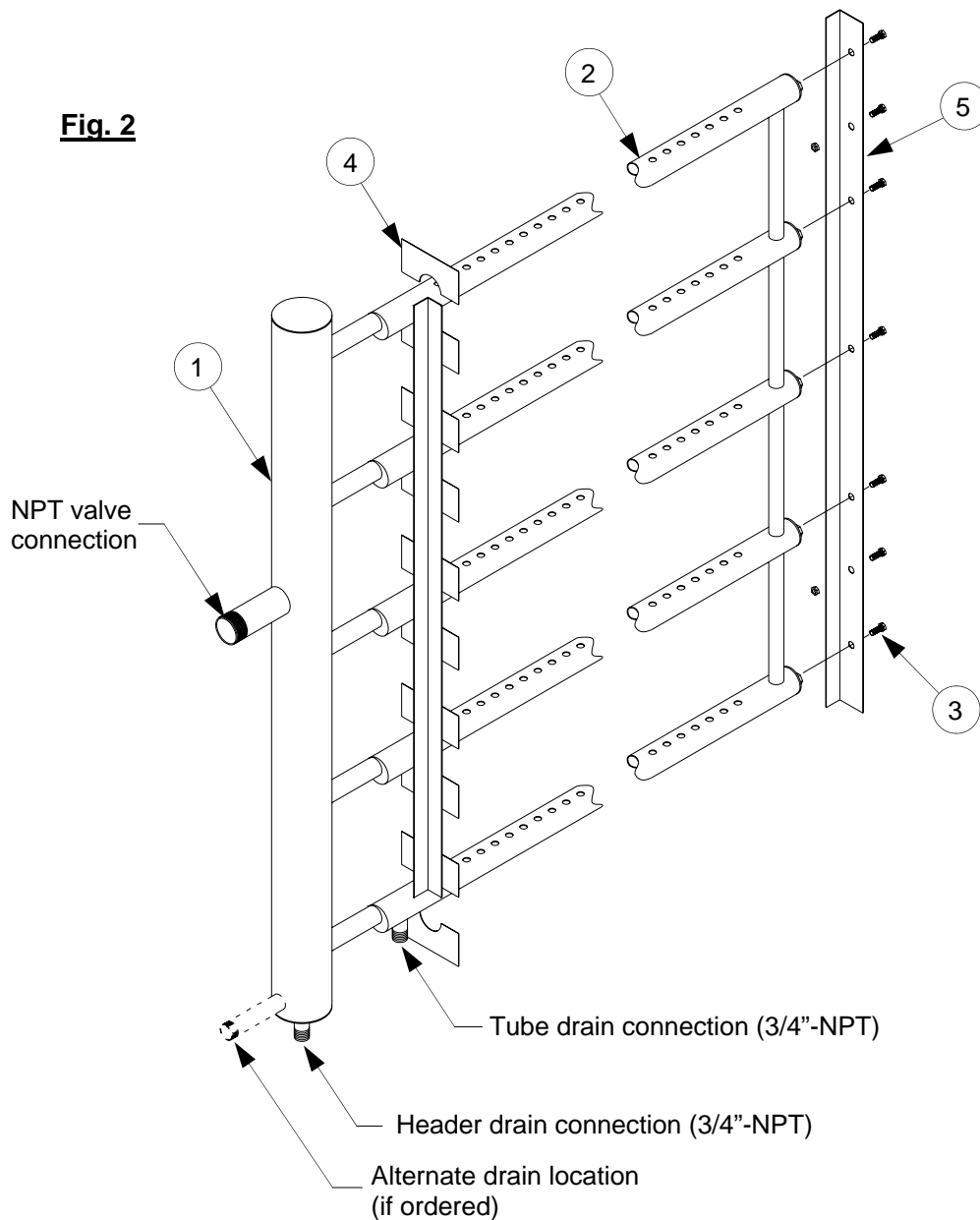
### MOUNTING

1. Cut a slot in the AHU or duct wall that is the same height as the HEADER and 1 1/2" wide (see Fig. 3).
2. Slide the injection tube assembly through the access slot (cut in steps above). Secure the END BRACKET to the AHU or duct wall with 3/8-16 UNC fasteners (by others). The END BRACKET must be located so that the tubes are **level** (see Fig. 3).
3. Seal the openings where the injection tubes penetrate through the AHU or duct wall with the duct plates provided (see Fig. 3).
4. Supply piping, valve and strainer require independent support (by others in field).
5. Control valve, traps and strainer are shipped loose for field installation (by others). All condensate and supply piping is by others.

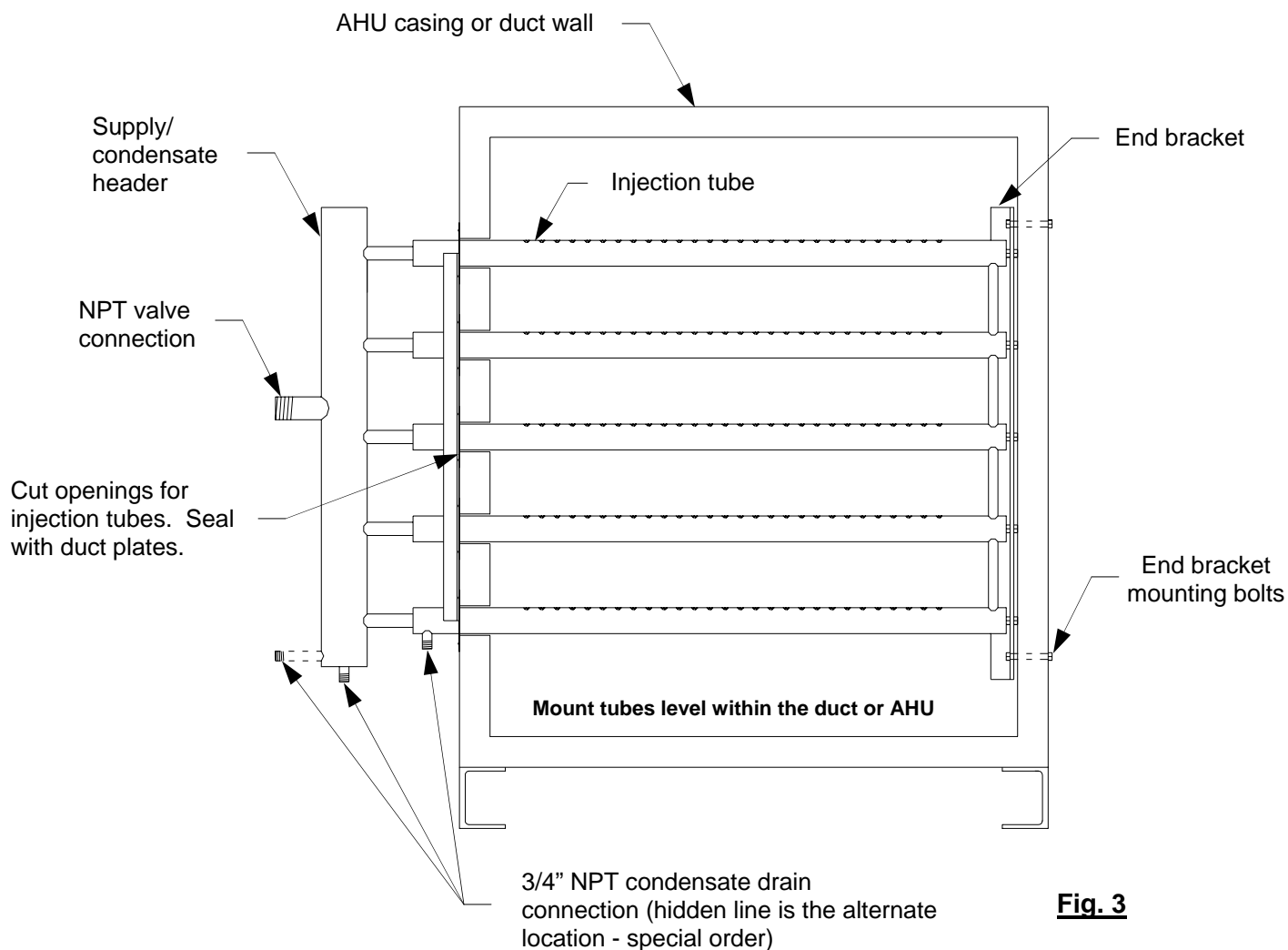
NOTE: For tube assemblies over 48" (122 cm) in length, allow for 1/2" (1.3 cm) of linear expansion of tubes. Not allowing for this expansion could cause system performance issues or cracking of welds.

**External Mount Insty-Pac Tube Assembly**  
**Component Identification**

ITEM NO.	DESCRIPTION	QUANTITY
1	Supply/condensate header	1
2	Injection tubes	varies with order
3	Tube mounting bolts	1 per tube
4	Duct plate (injection tube)	1 per tube
5	Tube support bracket	1



## Header & Support Bracket Mounting Detail



**Fig. 3**

### Notes:

1. Center the multiple injection tube assembly in the duct height.
2. The injection tubes should be mounted **level** within the duct or AHU.
3. Install injection tubes with the orifices injecting upwards.
4. All condensate drain piping is by others.
5. Condensate must drain by gravity to an open drain. Condensate cannot be elevated.
6. Each condensate connection must have it's own steam trap. Condensate connections cannot be combined together to a common steam trap.
7. A common condensate drain line can be used after the individual steam traps.

## Installation Tips

### **Condensate Return Line**

Condensate from the header or tubes cannot be elevated. Do not connect steam traps to pressurized condensate return lines. If gravity drain is not possible please use a condensate pump rated for 212°F or PURE Humidifier Company Part No. 16033 Hartell A3X-115 condensate pump.

### **Laminar air flow**

Tube assembly must be installed in a location that allows for laminar air flow across entire grid. A minimum velocity of 300 feet per minute is required to avoid saturation and excessive fog travel.

### **Plug fan installations**

Install tube assembly as close as possible to the upstream coil to ensure laminar airflow and proper absorption.

### **Insulated ducts**

Internally insulated ducts must be lined with a non-absorbent material to avoid saturation. If the duct is lined it must be removed three feet (3') upstream and ten feet (10') downstream of tube assembly.

### **Final Filters**

Tube assembly must be installed a minimum of ten feet (10') upstream of final filters.

### **VAV Systems**

Low velocity will cause long fog trails and steam will rise wetting the top of the AHU/duct casing. Modulating VAV high-limit humidistat is required. A minimum velocity of 300 feet per minute is required to avoid saturation and excessive fog travel.

## Controls

### **Fan Interlock Switch**

PURE Humidifier Co. recommends the use of an air flow proving switch or fan interlock to prove air flow prior to humidifier cooperation. Humidifier operation without air flow will result in over-saturation of the air stream. Air flow proving switches are available as optional equipment from your PURE Humidifier Co. representative.

### **High-Limit Humidistat**

PURE Humidifier Co. recommends the use of a duct high-limit humidistat to prevent humidifier operation when the duct humidity level exceeds 85% relative humidity. Humidifier operation above 85% relative humidity can result in over-saturation of the air stream. High-limit humidistats are available as optional equipment from your PURE Humidifier Co. representative. The high limit humidistat should be 12 to 14 feet (365-427 cm) downstream from the humidifier injection tube.

### **Smoke Alarms and Temperature Sensors**

Smoke alarms should be located 12 to 14 feet (365-427 cm) upstream from the humidifier injection tube.

Temperature sensors should be located 12 to 14 feet (365-427 cm) downstream from the humidifier injection tube, or past any visible fog travel that may be greater than this distance.

## Troubleshooting

### **Too Much Humidity**

1. Humidity controller out of calibration.
2. Valve stem sticking.
3. Valve spring broken.
4. Foreign matter preventing valve from closing.

### **Too Little Humidity**

1. Strainer screen plugged.
2. Stop valve not fully open.
3. Humidity controller out of calibration.
4. Inadequate steam pressure.
5. Undersized humidifier.
6. Automatic control valve not opening fully.
  - A) Pneumatic valve operator leaking air.
  - B) Valve stem sticking.

### **Humidifier Discharges Water**

1. Faulty drainage:
  - A) Return line pressure greater than humidifier pressure.
  - B) Return line flooded.
  - C) Dirty steam trap.
  - D) Vertical lift.
  - E) Wrong type steam trap, float type must be used.
  - F) Tube assembly not level.
2. Faulty steam supply:
  - A) Humidifier supply not taken from top of main.
  - B) Long, un-trapped supply line.
  - C) Steam main flooded due to priming boiler.



## Maintenance

1. **Header**– No maintenance required.
2. **Injection Tube** – No maintenance required.
3. **Valve - Pneumatic**– Should be inspected annually to be sure that a) the diaphragm in the actuator is not leaking air, b) the valve closes off tightly, c) the stem packing is not leaking steam.

**Valve - Electric**– Should be inspected annually to confirm that the stem packing is not leaking and that the valve closes tightly.

**Valve-Solenoid**– Requires no maintenance.

4. **Strainer**– Clean screen a few days after humidifier is put in operation and annually thereafter.
5. **Steam Trap** - Inspect annually







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