

# Conditioned Steam Humidifiers

INDUSTRIAL PROCESSES  
OFFICE BUILDINGS  
PRINTING  
HOSPITALS  
WAREHOUSES



Armstrong



**Armstrong**<sup>®</sup>

Intelligent System Solutions<sup>™</sup>

STEAM • AIR • HOT WATER



# Armstrong International at a glance

For more than 100 years, Armstrong has been providing utility system solutions and optimization for our global partners through products, education, training aids and service. Because we know our customers are always looking for ways to make their facilities more efficient, we offer total system solutions for steam, air and hot water.

In addition to energy- and cost-saving products, Armstrong provides comprehensive services. We offer turn-key installation, operation and maintenance services; steam and compressed air system audits; steam trap management; process drying optimization; condensate system improvement; insect heat treatment; and hot-water solutions for process, safety, sanitation and domestic applications—all of which can be customized to help improve your bottom line.

Customers have been turning to Armstrong for more than 100 years because of a continuing need to optimize the efficiency of their industrial, institutional and commercial facilities. It is our intelligence and experience that separate us from other companies.

We're proud of the tradition we've established at Armstrong—merging energy and environment while sharing our vast knowledge, so future generations can benefit from a healthier, cleaner world.

Armstrong offers the following utility system and service solutions:

- **Steam and Condensate Solutions** – Steam trapping and steam tracing equipment, testing and monitoring, strainers, air vents, liquid drainers, and condensate recovery equipment
- **Hot Water Solutions** – Hot water heaters, balancing valves, radiator products, mixing valves and hose stations
- **Heat Transfer Solutions** – Heating and cooling coils, unit heaters, and tank heaters
- **Humidification Solutions** – Conditioned steam humidifiers, gas fired humidifiers, electric steam humidifiers and fogging systems
- **Pressure/Temperature Control Solutions** – Pressure reducing valves and temperature regulators
- **Armstrong Service Solutions** – Armstrong Service offers complete utility system optimization services for industrial, institutional and commercial facilities worldwide. We provide steam system audits and utility system performance evaluations; long-term operation and maintenance to ensure best-in-class performance; turn-key sustaining engineering that includes installation and continuing engineering solutions; utility optimization, which allows us to identify energy-saving projects within your utility system; and utility monetization, whereby we purchase your utility assets to free up cash for use elsewhere in your organization.

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# When It Comes to Improving Humidification... It Starts with Steam

## Why the Armstrong Series 9000 humidifier starts with steam

Armstrong's improvements in steam humidification are so fundamentally different they begin not with the humidifier but with the steam.

Unlike other units which simply **disperse** steam, Armstrong's Series 9000 humidifiers work with it, subjecting it to the first of many steps in a carefully engineered process. Why? Because at Armstrong, improving humidification is extremely basic. It starts with steam. And what we've learned at that starting point has taught us how to improve the design of hardware – humidifiers – which distribute steam.

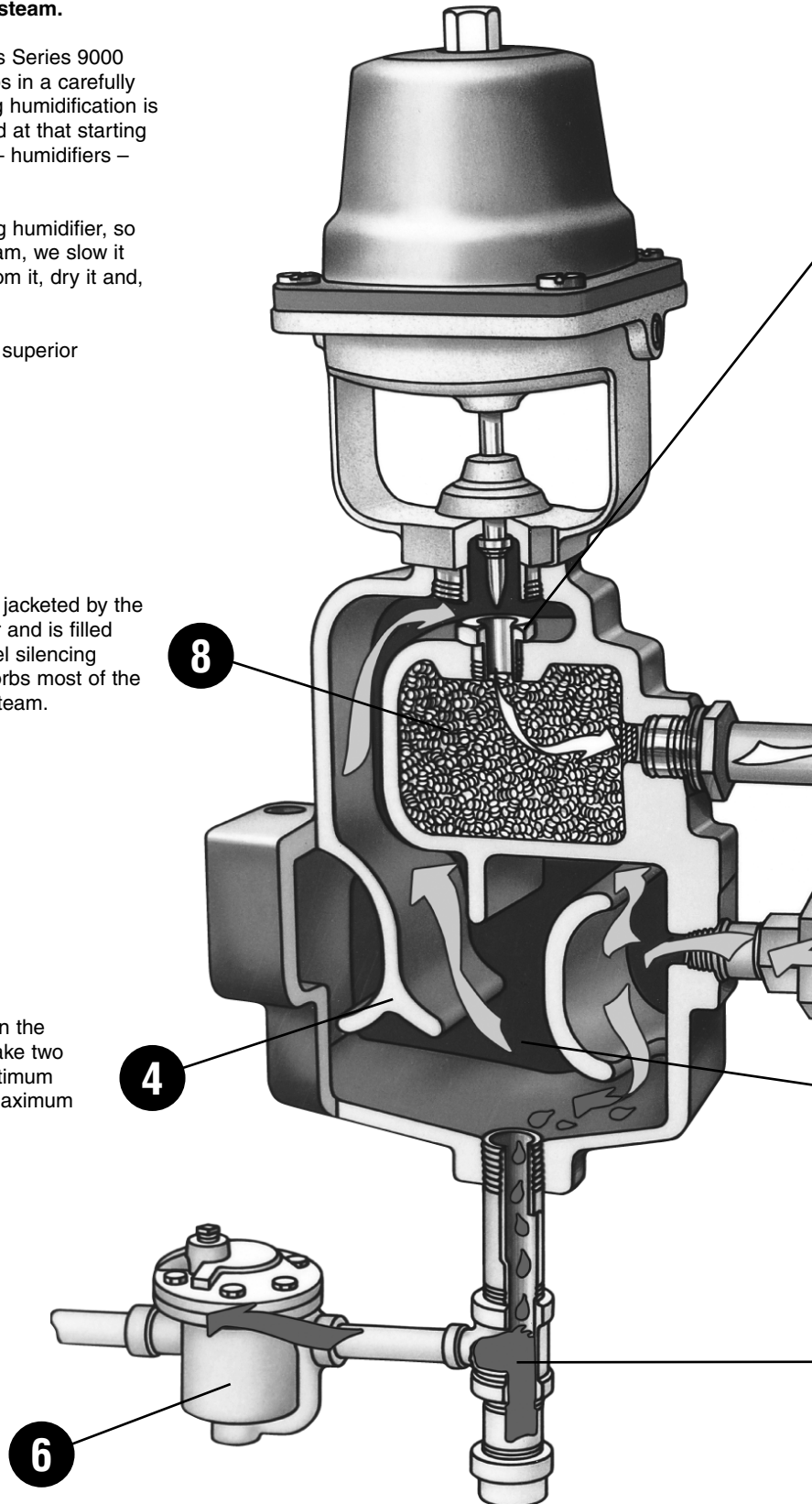
There's no name for what happens to steam in an Armstrong humidifier, so we've created one. We call it **conditioning**. To condition steam, we slow it down, remove its particulate matter, separate condensate from it, dry it and, finally, silence it.

Conditioned steam. It's the cornerstone of the Series 9000's superior performance and control. Here's why.

**Drying chamber** is jacketed by the separating chamber and is filled with a stainless steel silencing medium which absorbs most of the noise of escaping steam.

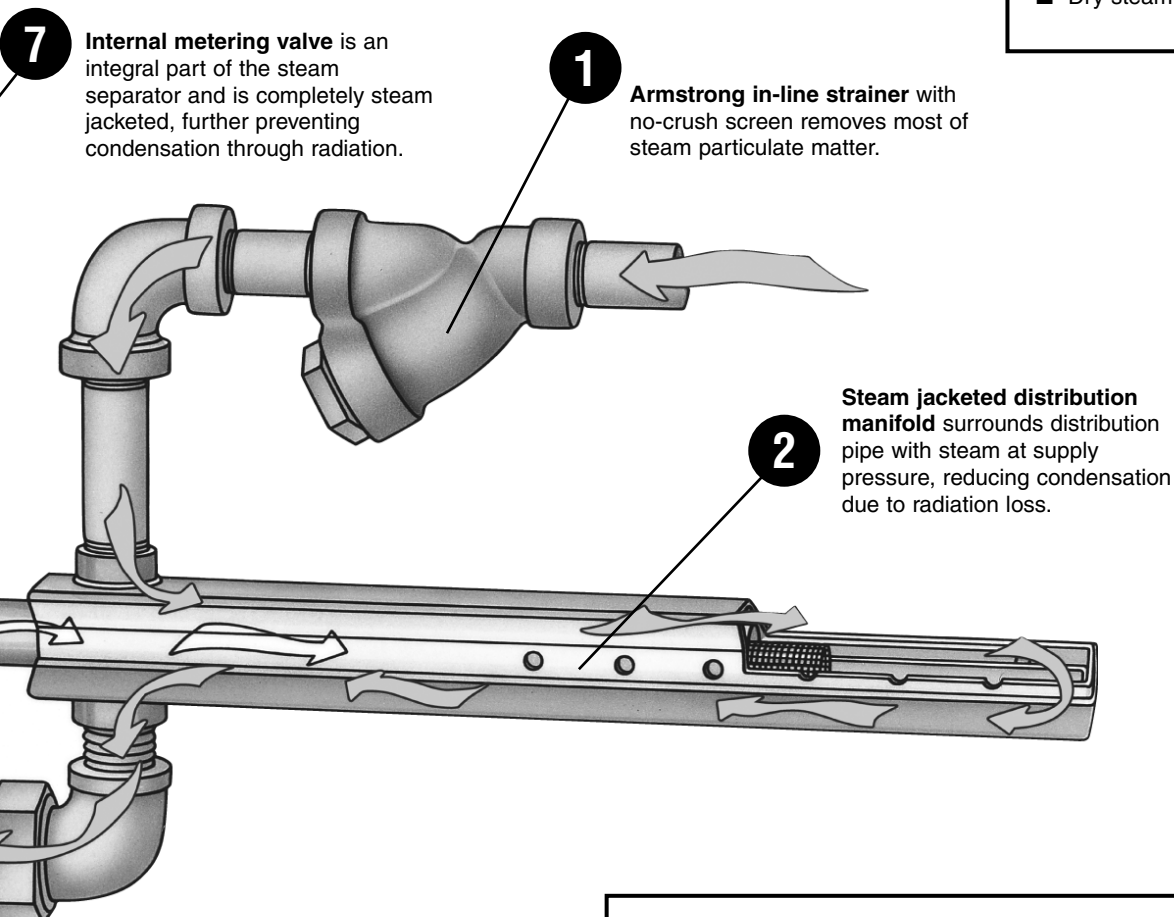
**Interior baffles** condition the steam by forcing it to make two 180° turns, providing optimum velocity reduction and maximum separation.

**Reliable cast iron inverted bucket steam trap** provides dependable draining because it has only two moving parts – and no fixed pivots or complicated linkage to stick, bind or clog.



### Features

- Full jacketed manifold.
- Runs up to 4 bars and 1823 kg/h.
- Fast response time and excellent rangeability (up to 123/1).
- Quieter than other systems.
- Dry steam released.



**7** **Internal metering valve** is an integral part of the steam separator and is completely steam jacketed, further preventing condensation through radiation.

**1** **Armstrong in-line strainer** with no-crush screen removes most of steam particulate matter.

**2** **Steam jacketed distribution manifold** surrounds distribution pipe with steam at supply pressure, reducing condensation due to radiation loss.

**3** **Strong cast iron separator** dampens noise and effects of vibration. Its thick walls mean better heat retention and therefore less condensation.

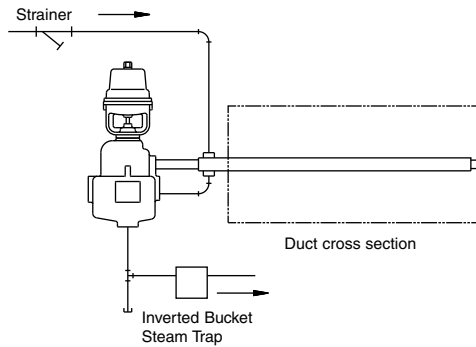
**5** **Large drain leg** collects condensate and discharges through the drain trap.

### Armstrong's four-step conditioning process

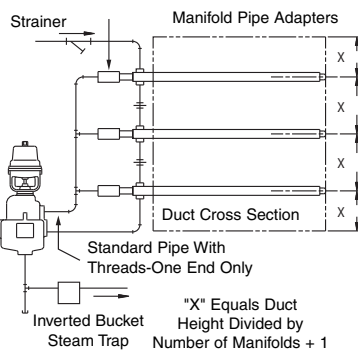
- **Straining.** The first step in steam conditioning, straining removes most of the steam's dirt and scale particles.
- **Separating.** In the cast iron separating chamber, a cupped baffle reverses the flow, forcing the steam back on itself. The outer walls of the chamber form another cup, and the same thing happens again. These two 180° turns reduce the velocity and separate the condensate from the vapor. The center baffle, positioned directly over the large drain connection, knocks down and further guides condensate out the drain.
- **Drying.** Steam entering the drying chamber is at supply temperature and essentially atmospheric pressure, so there is no condensation. Any remaining mist is re-evaporated before it leaves the humidifier.
- **Silencing.** The drying chamber is filled with a stainless steel silencing material which absorbs almost completely the noise of escaping steam as it is generated at the control valve.

## Steam Supply Methods

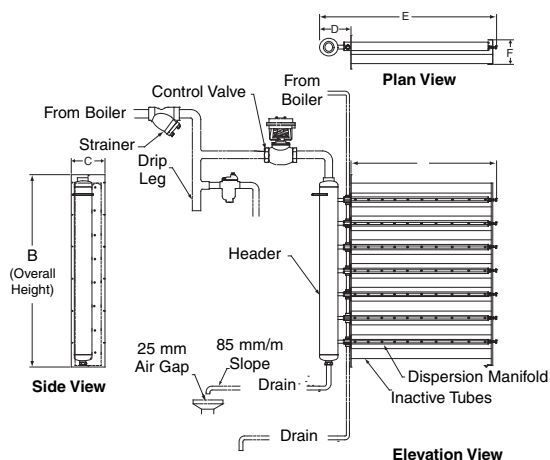
**Figure 4-1. Single manifold installation**



**Figure 4-2. Multiple manifold installation**



**Figure 4-3. Installation with Humidipack**



### How to Order

1. Mode of control pneumatic modulating – AM, electric modulating – EM

For industrial in-plant operation and for certain very limited duct applications, a solenoid actuator may be used to provide simple on-off operation. This type of actuator should not be specified for duct applications without a detailed analysis of the system – DSA.

2. Size of humidifier for duct installation – 91, 92, 93, 94
3. Manifold length from Table 7-2, Page 7.
4. Specify steam pressure and capacity required in accordance with Tables on Pages 8 and 9.
5. For electrically operated models, state electrical characteristics (control signal, and power supply voltage).

### Suggested Specification

Steam Humidifiers for pneumatic or electric modulating control: Humidifier shall be the steam separator type providing full separation ahead of an integral steam jacketed control valve which discharges through an internal steam jacketed drying chamber, a silencing chamber and a steam jacketed distribution manifold.

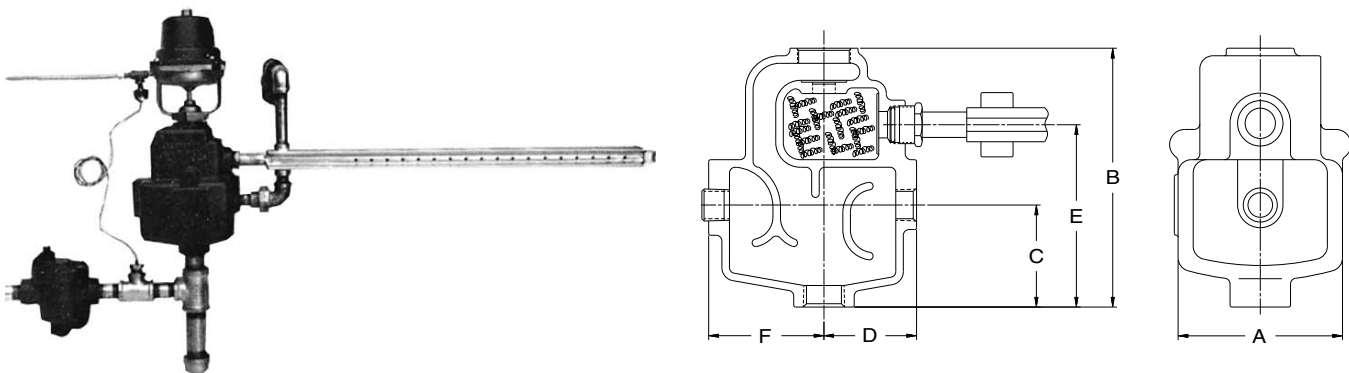
- A. Humidifier shall receive steam at supply pressure and discharge at atmospheric pressure. It shall be furnished with inlet strainer and external inverted bucket steam trap.
- B. Separating chamber shall be of a volume and design that will disengage and remove all water droplets and all particulate matter larger than 3 microns when humidifier is operating at maximum capacity.
- C. The stainless steel metering valve shall be integral within the body of the humidifier, and shall be jacketed by steam at supply pressure and temperature to prevent condensation.
- D. The stainless steel metering valve shall be a parabolic plug with a 19 mm stroke, providing the high rangeabilities required to achieve full and accurate modulation of steam flow over the entire stroke of the valve.
- E. The internal drying chamber shall receive steam at essentially atmospheric pressure and be jacketed by steam at supply pressure and utilize a stainless steel silencing medium.
- F. The distribution manifold shall provide uniform distribution over its entire length and be jacketed by steam to assure that vapor discharged is free of water droplets.
- G. Humidifier shall be equipped with an interlocked temperature switch to prevent the humidifier from operating before start-up condensate is drained.

# The Armstrong Series 9000 Humidifier

(physical data, dimensions and capacities)



Figure 5-1.



Humidifier Model Number	Dimensions in mm						Connection Sizes			Drain Trap Model	Weight in kg † (less operator and manifold)
	A	B*	C	D	E	F	Inlet	Drain	Trap		
91	115	218	86	78	154	97	1/2"	1"	3/4"	800	11
92	141	218	86	97	154	97	3/4"	1"	3/4"	800	14
93	171	302	117	121	229	121	1 1/4"	1 1/4"	3/4"	811	24
94	276	435	175	203	321	203	2"	2"	3/4"	812	66

Shade indicates products that are CE Marked according to the PED (97/23/EC). All the other sizes comply with the Article 3.3 of the same directive.

\* Add height and weight of operator for overall data. All dimensions are in millimeters.

† Weight includes drain trap, strainer, and fittings.

For Physical Data on Series 1000 Stainless Steel Humidifiers, see Page 6.

Component	Material	Component	Material
Steam Chamber	Cast Iron	Manifold Fittings	Brass
Bonnet Assembly	Brass	Manifold Coupler	Brass
Valve & Stem	18-8 Stainless Steel	Nut	Brass
Valve Seat	18-8 Stainless Steel	Strainer	Cast Iron
Manifold	304 Stainless Steel	Steam Trap	Cast Iron

Armstrong Conditioned-Steam Humidifiers for air handling systems are manufactured to meet the needs of central station humidification or booster humidification. Operation and control may be pneumatic or electric.

### Standard Package

All Armstrong Conditioned-Steam Humidifiers are supplied in standard "packages" which include the following:

### Pneumatically Controlled (AM) Models:

1. Humidifier with integral operator (when specified).
2. Distribution manifold of length specified.
3. "Y" type strainer.
4. Armstrong inverted bucket trap.

### Electric Motor Controlled (EM) Models:

1. Humidifier with integral operator (when specified).
2. Distribution manifold specified.
3. "Y" type strainer.
4. Armstrong inverted bucket trap.

### Recommended Option

A pneumatic or an electric temperature switch is offered as an optional extra and is recommended in any system where the steam supply to the manifold jacket and humidifier body may be interrupted or turned off.

All dimensions and weights are approximate. Use certified print for exact dimensions. Design and materials are subject to change without notice.



# The Armstrong Series 1000 Humidifier, continued...

(physical data, dimensions and capacities)

## Humidifier Operators.

- Pneumatic Modulating
- Electric Modulating
- Electronic Modulating

## Standard Package.

All Armstrong conditioned-steam humidifiers are supplied in standard "packages" which include the following.

### Pneumatically controlled (AM) models:

1. Humidifier with integral operator (when specified).
2. Distribution manifold of length specified.
3. "Y" type strainer.
4. Armstrong inverted bucket trap.

### Electric motor controlled (EM) models:

1. Humidifier with integral operator (when specified).
2. Distribution manifold of length specified.
3. "Y" type strainer.
4. Armstrong inverted bucket trap.

**Recommended option:** A pneumatic or an electric temperature switch is offered as an optional extra and is recommended in any system where the steam supply to the manifold jacket and humidifier body may be interrupted or turned off.

## How To Order.

1. Mode of control:  
pneumatic modulating – AM  
electric modulating – EM
2. Size of humidifier for duct installation – 1100, 1200, 1300 or 1400.
3. Manifold length from Table 7-2.
4. Specify steam pressure and capacity required in accordance with appropriate table on Pages 8 and 9.
5. For electrically operated models, state electrical characteristics (control signal and power supply voltage).

Figure 6-1.

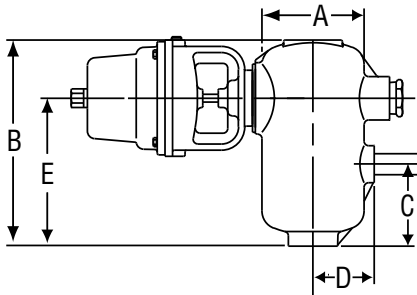


Table 6-1. List of Materials

Steam Chamber	T-316 CF8M Stainless Steel (model 1100 only)
	T-304 Stainless Steel (models 1200, 1300 and 1400)
Bonnet & Assembly Valve & stem Valve Seat Manifold & Fittings	18-8 Stainless Steel
Operator	See Specifics
Strainer	ASTM 351 (T-316 SS)
Inverted Bucket Steam Trap	T-304 Stainless Steel

Table 6-2 and 6-3. Physical Data

Humidifier Model Number	Dimensions in mm					Connection Sizes			Drain Trap Model	Weight in kg † (less operator and manifold)
	A*	B	C	D	E	Inlet	Drain	Trap		
1100	105	211	84	63	153	1/2"	1"	3/4"	1811	14
1200	114	262	101	97	170	3/4"	1"	3/4"	1811	14
1300	168	417	152	141	262	1 1/4"	1 1/4"	3/4"	1811	15
1400	273	613	227	236	373	2"	2"	3/4"	1812	36

Model 1400: PMA is limited to 1,85 bar. All sizes comply with the article 3.3 of the PED (97/23/EC).

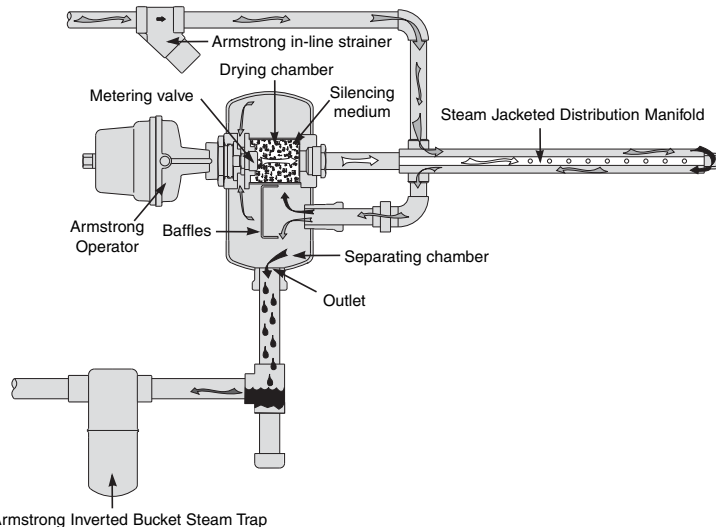
\* Add height and weight of operator for overall data. All dimensions are in millimeters.

† Weight includes drain trap, strainer, and fittings.

- Notes:**
1. For manifold lengths and duct widths with which they may be used, see Table 7-2, Page 7.
  2. All wetted parts are 300 Series stainless steel.

**KEY:**

- STEAM SUPPLY AT SUPPLY PRESSURE
- STEAM AT ATMOSPHERIC PRESSURE
- CONDENSATE



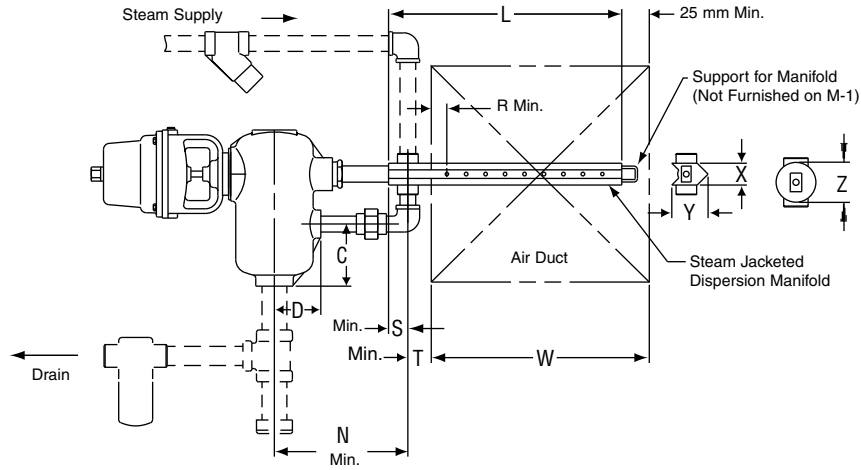
All dimensions and weights are approximate. Use certified print for exact dimensions. Design and materials are subject to change without notice.

# Armstrong Distribution Manifolds for Air Handling Systems

(physical data, dimensions and capacities)



Figure 7-1. Steam Distribution Manifold Data



Model	N	R	S	T	X	Y	Z	Steam Supply
91	145	51	25	25	32	48	46	1/2"
1100	217	51	25	25	32	48	46	1/2"
92 & 1200	218	51	25	25	44	67	52	3/4"
93 & 1300	230	51	41	41	54	79	-	1 1/4"
94 & 1400	343	51	41	41	83	108	-	2"

91 thru 94 Size and 1000 Manifold Model No.	M-1	M-1,5	M-2	M-3	M-4	M-5	M-6	M-7	M-8	M-9	M-10	M-11	M-12
L - Length (Meters)	0,30	0,45	0,61	0,91	1,22	1,52	1,83	2,13	2,44	2,74	3,05	3,35	3,66
W - Duct Width	(Minimum)	0,20	0,38	0,53	0,79	1,09	1,36	1,66	1,97	2,27	2,58	2,88	3,18
	(Maximum)	0,36	0,51	0,76	1,07	1,32	1,63	1,93	2,24	2,54	2,84	3,15	3,45
Approximate Shipping Weight (in kg)	91 Size	1,4	1,8	2,3	2,7	3,6	4,5	5,4	6,3	6,8	7,7	8,6	9,5
	92 Size and 1200	1,8	2,3	2,7	4,0	5,0	5,9	7,2	8,2	9,5	9,8	11,3	12,7
	93 Size and 1300	2,7	3,6	4,5	5,9	7,7	9,5	10,9	13,1	14,5	16,8	18,6	19,5
	94 Size and 1400	Consult Factory				10,9	13,6	15,4	18,1	20,4	23,1	24,9	27,2

All sizes comply with the article 3.3 of the PED (97/23/EC).  
 Note: Insulated manifolds are available. Consult factory.

Duct Height in mm	No. of Manifolds
900 - 1 500	2
1 500 - 2 000	3
2 000 - 2 500	4
2 500 - Up	5 or more

If you have specific vapor trail considerations, please contact the Armstrong HVAC Application Engineering Department.

Humidifier Size	Manifold Pipe Adapter No.	Pipe Connection Size
91	A-4967-B	1/2"
92	A-4967	3/4"
93	A-4967-L	1**
94	A-5002	2"
1100	A-4967-5	1/2"
1200	A-4967-P	3/4"
1300	A-4967-R	1**
1400	A-5002-C	2"

\* Manifold tube is 1". Jacket connections are 1 1/4".

All dimensions and weights are approximate. Use certified print for exact dimensions. Design and materials are subject to change without notice.





# Capacities of Armstrong Humidifiers

**Table 8-1. Sizes 91 and 1100, Continuous Discharge Capacities in kg of Steam Per Hour**

Orifice Size (In.)	Steam Pressure in bar																		
	0,15	0,20	0,25	0,35	0,40	0,50	0,55	0,60	0,70	0,75	0,80	0,90	1,00	1,40	1,70	2,00	2,50	3,00	4,00
1/16"	0,6	0,7	0,8	1,0	1,1	1,2	1,3	1,4	1,5	1,6	1,7	1,8	2,0	2,5	2,9	3,5	3,8	4,5	5,6
5/64"	1,0	1,2	1,4	1,6	1,8	2,0	2,1	2,3	2,4	2,5	2,7	2,8	3,0	3,8	4,8	5,0	5,6	6,7	8,6
3/32"	1,4	1,7	1,9	2,3	2,6	2,8	3,0	3,3	3,5	3,7	3,9	4,0	4,3	5,4	6,0	6,5	7,8	9,6	11
7/64"	1,9	2,2	2,6	3,1	3,6	4,0	4,1	4,5	4,6	5,0	5,2	5,4	6,0	7,2	8,0	8,6	9,5	12	15
1/8"	2,5	3,1	3,3	4,0	4,5	5,0	5,5	5,9	6,3	6,3	6,8	7,2	8,0	10	11	13	14	16	20
5/32"	3,6	4,5	5,1	6,3	7,2	7,7	8,6	9,0	9,5	10	11	12	13	14	16	18	20	24	29
3/16"	5,5	6,8	7,7	10	11	12	12	13	14	15	16	17	18	22	24	27	29	35	42
7/32"	7,5	10	11	13	15	16	17	18	19	20	21	22	24	28	32	35	38	44	64
1/4"	10	13	14	17	19	21	22	24	25	27	28	29	31	37	41	46	52	61	77
9/32"	12	15	16	20	21	23	25	26	28	29	30	32	34	40	48	52	57	68	84
5/16"	15	17	19	23	25	27	29	31	33	35	37	39	42	48	56	61	67	90	114
11/32"	16	20	22	25	30	33	35	37	39	41	43	44	49	58	67	78	86	104	126
3/8"	19	23	25	30	32	35	37	42	44	48	50	52	57	68	77	86	96	115	143

**Table 8-2. Sizes 92 and 1200, Continuous Discharge Capacities in kg of Steam Per Hour**

Orifice Size (In.)	Steam Pressure in bar																		
	0,15	0,20	0,25	0,35	0,40	0,50	0,55	0,60	0,70	0,75	0,80	0,90	1,00	1,40	1,70	2,00	2,50	3,00	4,00
1/8"	2,2	3,2	3,6	4,0	4,5	5,0	5,5	6,0	6,8	7,0	8,0	9,0	10	11	12	13	14	16	20
5/32"	3,6	4,5	5,5	6,3	7,3	7,7	8,6	9,0	9,5	10	11	12	13	14	16	18	20	24	29
3/16"	5,4	6,8	8,2	9,5	10	11	12	13	14	15	16	17	18	21	24	27	29	35	42
7/32"	7,2	9,5	11	13	15	16	17	18	19	20	21	22	24	28	32	38	41	47	61
1/4"	10	11	15	17	19	21	22	24	25	27	28	29	31	37	41	46	52	61	77
9/32"	12	16	19	22	24	26	29	30	32	34	36	37	40	47	53	59	69	80	97
5/16"	15	20	23	27	30	32	35	37	39	42	44	45	49	57	65	72	85	96	118
11/32"	18	24	28	32	35	38	41	44	46	49	52	54	59	69	78	87	101	114	142
3/8"	24	27	29	35	38	42	45	47	52	54	56	58	63	74	83	93	103	122	151
7/16"	34	38	41	45	49	53	56	60	62	65	68	72	77	89	102	114	126	157	190
1/2"	40	43	45	47	51	55	60	64	68	72	76	79	88	104	121	136	151	181	220

**Table 8-3. Sizes 93 and 1300, Continuous Discharge Capacities in kg of Steam Per Hour**

Capacities when Steam Supply is Through the Manifold																			
Orifice Size (In.)	Steam Pressure in bar																		
	0,15	0,20	0,25	0,35	0,40	0,50	0,55	0,60	0,70	0,75	0,80	0,90	1,00	1,40	1,70	2,00	2,50	3,00	4,00
13/32"	32	38	45	50	55	60	63	67	69	73	77	78	84	96	112	122	135	161	200
7/16"	35	43	49	57	59	63	66	70	77	80	86	89	97	112	129	142	152	182	225
15/32"	38	55	59	66	68	71	76	82	88	92	96	102	108	128	145	161	175	203	248
1/2"	45	58	66	73	78	84	90	92	98	103	110	115	123	146	165	185	197	227	282
9/16"	47	62	72	84	89	94	102	108	117	121	123	128	141	163	185	207	234	279	342
5/8"	53	67	79	92	97	106	114	124	131	134	144	153	167	194	221	248	275	328	408
3/4"	58	79	92	105	116	130	140	153	164	170	173	186	208	249	289	338	385	452	576

*All dimensions and weights are approximate. Use certified print for exact dimensions. Design and materials are subject to change without notice.*

**Table 9-1. Sizes 93 and 1300, Continuous Discharge Capacities in kg of Steam Per Hour**

Capacities when Steam Supply is Direct to Separator. (Manifold Trapped Separately)																			
Orifice Size (In.)	Steam Pressure in bar																		
	0,15	0,20	0,25	0,35	0,40	0,50	0,55	0,60	0,70	0,75	0,80	0,90	1,00	1,40	1,70	2,00	2,50	3,00	4,00
13/32"	32	38	45	50	55	60	63	67	69	73	77	78	84	96	112	122	135	161	200
7/16"	35	43	49	57	59	63	66	70	77	80	86	89	97	112	130	142	152	182	225
15/32"	38	55	59	66	68	71	76	82	88	92	96	102	108	128	145	161	175	203	248
1/2"	45	58	66	73	78	84	90	92	98	103	110	115	123	146	165	185	197	227	282
9/16"	47	62	72	84	89	94	102	108	117	121	123	128	141	163	185	207	234	279	342
5/8"	57	73	83	95	102	112	119	129	139	142	152	162	173	209	232	261	291	343	443
3/4"	62	85	100	119	122	136	152	171	186	195	210	225	238	288	336	375	422	500	620

**Table 9-2. Sizes 94 and 1400, Continuous Discharge Capacities in kg of Steam Per Hour**

Capacities when Steam Supply is Through the Manifold																	
Orifice Size (In.)	Steam Pressure in bar																
	0,15	0,20	0,25	0,35	0,40	0,50	0,55	0,60	0,70	0,75	0,80	0,90	1,00	1,40	1,70	2,00	
5/8"	62	76	86	97	102	114	121	131	142	148	159	169	188	217	245	275	
3/4"	84	103	117	132	140	154	164	177	193	201	215	229	252	310	350	390	
7/8"	110	135	153	171	184	202	215	232	251	264	282	300	344	396	452	503	
1"	126	156	177	198	212	234	248	269	290	304	326	347	386	450	514	575	
1 1/8"	145	180	204	230	245	269	286	310	339	351	376	400	422	507	591	666	
1 1/4"	156	190	215	251	259	284	302	327	361	371	396	422	448	536	631	711	
1 1/2"	177	222	253	282	303	334	354	384	417	435	465	496	523	633	729	824	

**Table 9-3. Sizes 94 and 1400, Continuous Discharge Capacities in kg of Steam Per Hour**

Capacities when Steam Supply is Direct to Separator. (Manifold Trapped Separately)																			
Orifice Size (In.)	Steam Pressure in bar																		
	0,15	0,20	0,25	0,35	0,40	0,50	0,55	0,60	0,70	0,75	0,80	0,90	1,00	1,40	1,70	2,00	2,50	3,00	4,00
5/8"	62	76	86	97	102	114	121	131	142	148	159	169	188	217	245	275	303	357	461
3/4"	90	110	125	140	150	165	175	190	205	215	230	244	275	321	358	404	445	533	656
7/8"	114	140	159	178	191	210	222	241	260	273	292	311	358	412	461	520	576	697	847
1"	136	170	193	222	231	254	270	293	326	332	355	378	425	488	559	632	693	832	1 038
1 1/8"	168	210	238	267	286	314	333	362	378	410	438	467	505	605	698	769	859	1 026	1 280
1 1/4"	187	235	267	300	320	352	373	405	435	459	490	523	551	674	784	883	979	1 182	1 454
1 1/2"	245	299	340	381	408	449	476	517	547	585	626	667	699	843	961	1 096	1 201	1 448	1 823

Model 1400: PMA is limited to 1,85 bar.

Shaded capacities are valid for model 94 only.

**All dimensions and weights are approximate. Use certified print for exact dimensions. Design and materials are subject to change without notice.**

### With Fan.

For direct discharge into area humidified at steam supply pressures from 0,15 to 4 bar. Integral air-open spring-close operator opens steam discharge valve on signal from pneumatic hygrostat. Integral air powered fan provides rapid, uniform distribution of moisture. Electric fans are also available.\*

### Without Fan.

For direct discharge into area humidified at steam supply pressures from 0,15 to 4 bar. Integral air-open spring-close operator opens steam discharge valve on signal from pneumatic hygrostat. Discharge velocity of steam is used for dispersion. Auxiliary air movement is desirable.

Figure 10-1. AMAF humidifiers with air powered fans

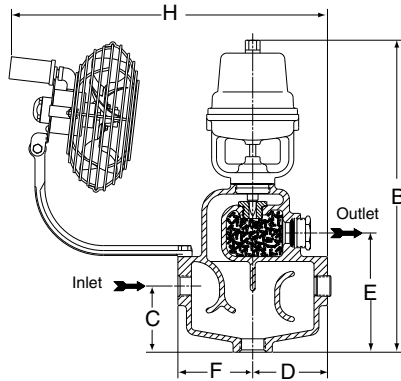
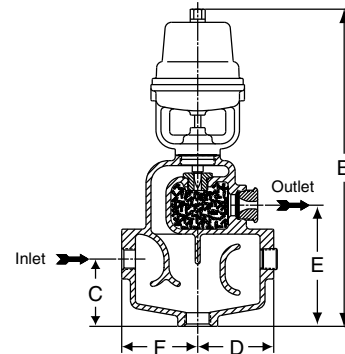


Figure 10-2. AM humidifiers



Model N°	B	C	D	E	F	H
AMAF-91A	406	86	97	154	78	370
AMAF-92A	406	86	97	154	97	389
AMAF-93	486	117	121	229	121	451

\* AMEF models have same dimensions except "H".  
For Sizes 91 & 92, H = 400 mm; for Size 93, H = 464 mm.

Model N°	B	C	D	E	F
AM-91A	406	86	97	154	78
AM-92A	406	86	97	154	97
AM-93A	486	117	121	229	121

All AM sizes are available with electric fans identical to those furnished with FSA models. These humidifiers are designated as AMEF models.

Model Number	FSA-91	VSA-91	FSA-92	VSA-92	FSA-93	VSA-93
Air Pressure Max. (bar)	1,4	1,4	1,4	1,4	1,4	1,4
Air Required for Fan @ 1,4 bar	–	3,4 m³/h	–	3,4 m³/h	–	3,4 m³/h
Drain Connection	1"	1"	1"	1"	1 1/4"	1 1/4"
Drain Trap No.	800	800	800	800	811	811
Shipping Weight (kg)	15	17	17	20	28	30
Steam Inlet & Strainer	3/4"	3/4"	3/4"	3/4"	1 1/4"	1 1/4"

Orifice Size	AM-91A, AMAF-91A							AM-92A, AMAF-92A					AM-93A, AMAF-93A			
	1/16"	3/32"	5/32"	7/32"	9/32"	3/8"	3/16"	1/4"	5/16"	3/8"	1/2"	13/32"	15/32"	9/16"	3/4"	
0,15	0,7	1,4	3,7	7,5	12	19	5,4	10	15	22	36	32	38	47	62	
0,30	0,9	2,1	5,7	12	17	25	8,2	15	23	34	45	45	59	72	100	
0,40	1,1	2,5	6,9	14	21	31	10	19	29	42	56	55	68	89	122	
0,60	1,4	3,2	8,8	17	25	–	12	22	35	49	65	63	76	102	–	
0,70	1,5	3,5	9,7	19	28	–	14	25	39	55	73	69	88	117	–	
0,80	1,6	3,8	10	20	29	–	16	28	44	62	82	77	96	123	–	
1,00	1,9	4,2	12	23	33	–	18	31	49	70	94	84	108	141	–	
1,40	2,5	5,4	14	28	–	–	21	37	58	82	–	96	128	–	–	
1,70	3,1	6,0	16	31	–	–	23	41	65	–	–	112	–	–	–	
2,00	3,4	6,5	18	34	–	–	26	46	72	–	–	122	–	–	–	
2,50	3,8	7,8	20	–	–	–	28	49	–	–	–	135	–	–	–	
2,75	4,2	8,7	22	–	–	–	30	53	–	–	–	–	–	–	–	
3,50	5,0	10,4	27	–	–	–	34	61	–	–	–	–	–	–	–	
4,00	5,6	11,1	29	–	–	–	38	67	–	–	–	–	–	–	–	

All dimensions and weights are approximate. Use certified print for exact dimensions. Design and materials are subject to change without notice.



## Humidipack®

The Armstrong Humidipack® is a pre-fabricated steam humidifier system that is ready for insertion into the duct. The Humidipack consists of a separator/header and multiple tube dispersion assembly when supplied for use with Armstrong steam generators. A steam supply control valve, strainer, steam trap, and a header drain trap are added when Humidipack is used on pressurized steam. The Humidipack accepts steam, separates entrained moisture from it, and admits it into a duct or air handler air stream via the dispersion assembly in a manner which substantially reduces mixing length distance when compared to traditional humidifiers.

## Humidipack® CF

The Armstrong Humidipack® CF is a Grid with no steam jacketing but with internal piping to help steam and condensate flow. Only used with pressurized steam and with a vertical header which can be installed inside or outside. Maximum dimension is 1820 mm for header and 3650 for tubes.

## HumidiPackPlus®

HumidiPackPlus® combines the mixing length distance shortening performance of HumidiPack with the additional feature of **steam jacketed** “active” tubes which allows a condensate recovery. It can be installed horizontally or vertically.

## Simplified Installation

The HumidiPack and HumidiPackPlus dispersion assemblies slide neatly into ductwork or air handling units. This frequently reduces the time and labor required for field installations. Units with horizontal tubes and vertical headers offer all piping on one side of the ductwork or air handler to simplify piping.

## Stainless Steel Construction

HumidiPack and HumidiPackPlus rugged designs offer stainless steel construction of wetted parts including the header/separator and dispersion assembly for a long trouble-free operating life. Tube to header joints consist of welded stainless steel rather than assembled plastic adapters with o-rings, minimizing service requirements.

## Compatible With Many Steam Sources

HumidiPack may be used with Armstrong Steam-to-Steam, gas and electric steam generating humidifiers, also with some systems including packaged boilers or central steam supply to 4 bar. HumidiPackPlus may be used with packaged boilers or central steam supply to 4 bar.

## Application Flexibility

Many sizes and configurations of HumidiPack and HumidiPackPlus are available to meet new installation or retrofit needs.

Figure 11-1. Horizontal HumidiPack Plus

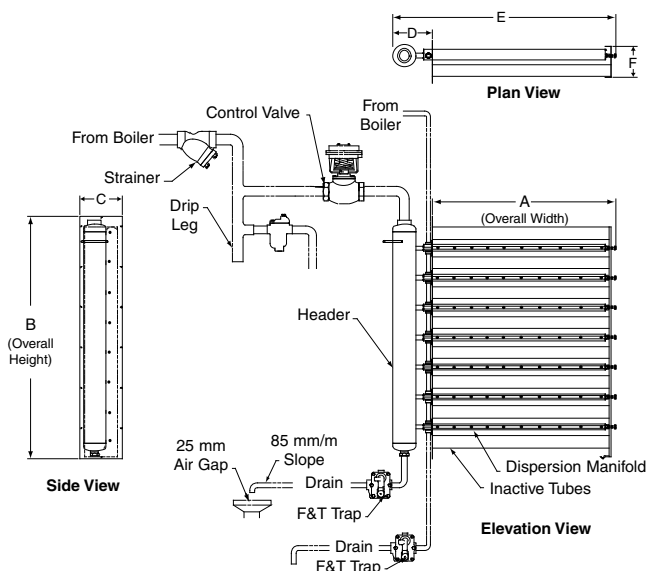
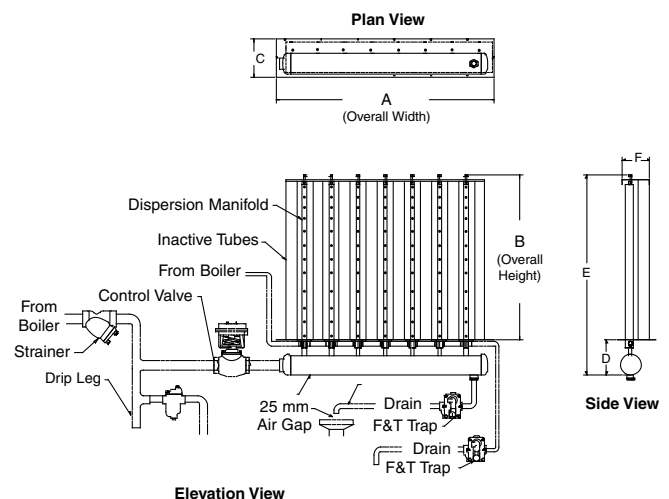


Figure 11-2. Vertical HumidiPack Plus



### Electrode Steam Humidifier

EHU series converts ordinary tap water to steam. It is ideal for providing humidification where no steam is available or where a steam source is too remote for easy or economical.



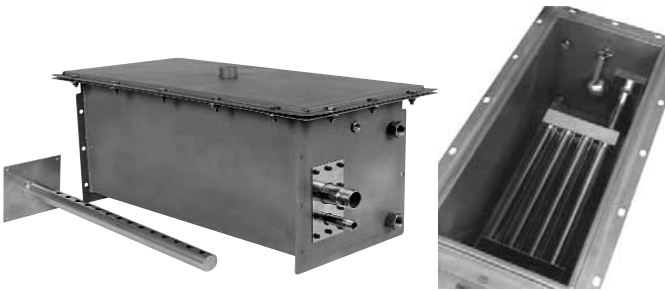
### Resistance Steam Humidifier

HC-6000 series use submerged electric heating element with a unique Ionic Bed technology to generate steam with lower maintenance cost.



### Clean Steam Humidifier

The series CS-10 is a steam-to-steam device which uses existing boiler steam to produce clean steam from untreated water.



### Gas Fired Unit

GFH series is using gas for economical operation to provide wide range of humidity output with a high efficiency burner.



### Steam Shower Manifold

Armstrong steam showers are designed to create a stratum of high humidity in close proximity to a fast moving sheet, film or product. Adjustable manifold is also possible.



**Armstrong** provides intelligent system solutions that improve utility performance, lower energy consumption, and reduce environmental emissions while providing an «enjoyable experience.»



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