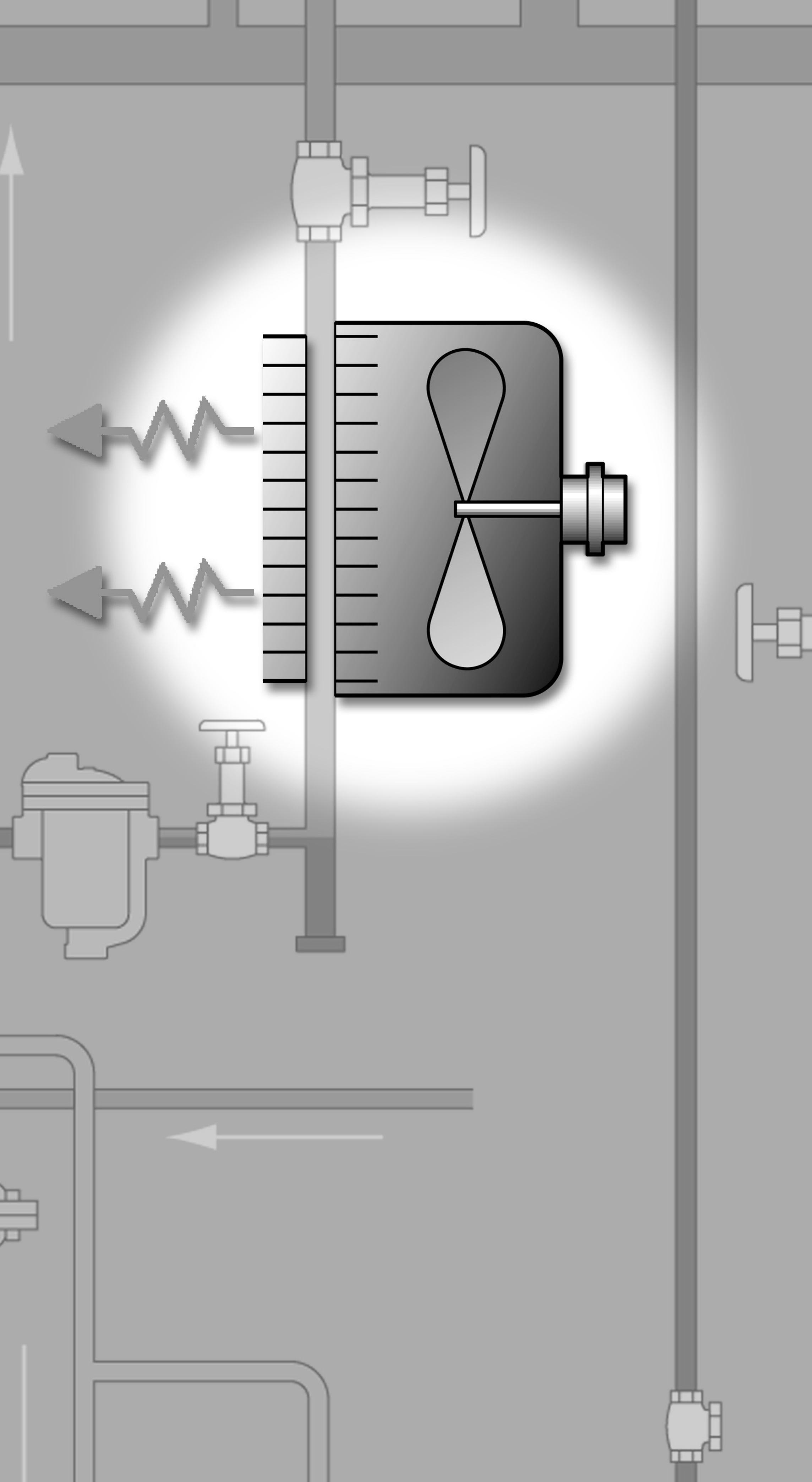


Unit Heaters

Armstrong

Armstrong®

Longer Life in the Harshest Environments

When it comes to long life under tough industrial conditions, Armstrong is all you need to know about unit heaters. Even in the most severe environments, where coil leaks and corrosion are costly problems, Armstrong coils maintain high efficiency and output.

Armstrong: Why and How

The ability to maintain heat transfer efficiency and resist corrosion—both internally and externally—is why Armstrong unit heaters are uniquely dependable. *How* we construct them is your assurance of lasting performance, even in severe operating environments.

Consider these measurable benefits at work in your facility:

- **Heavy gauge enclosures:** Fabricated from 14-gauge steel for protection and durability.

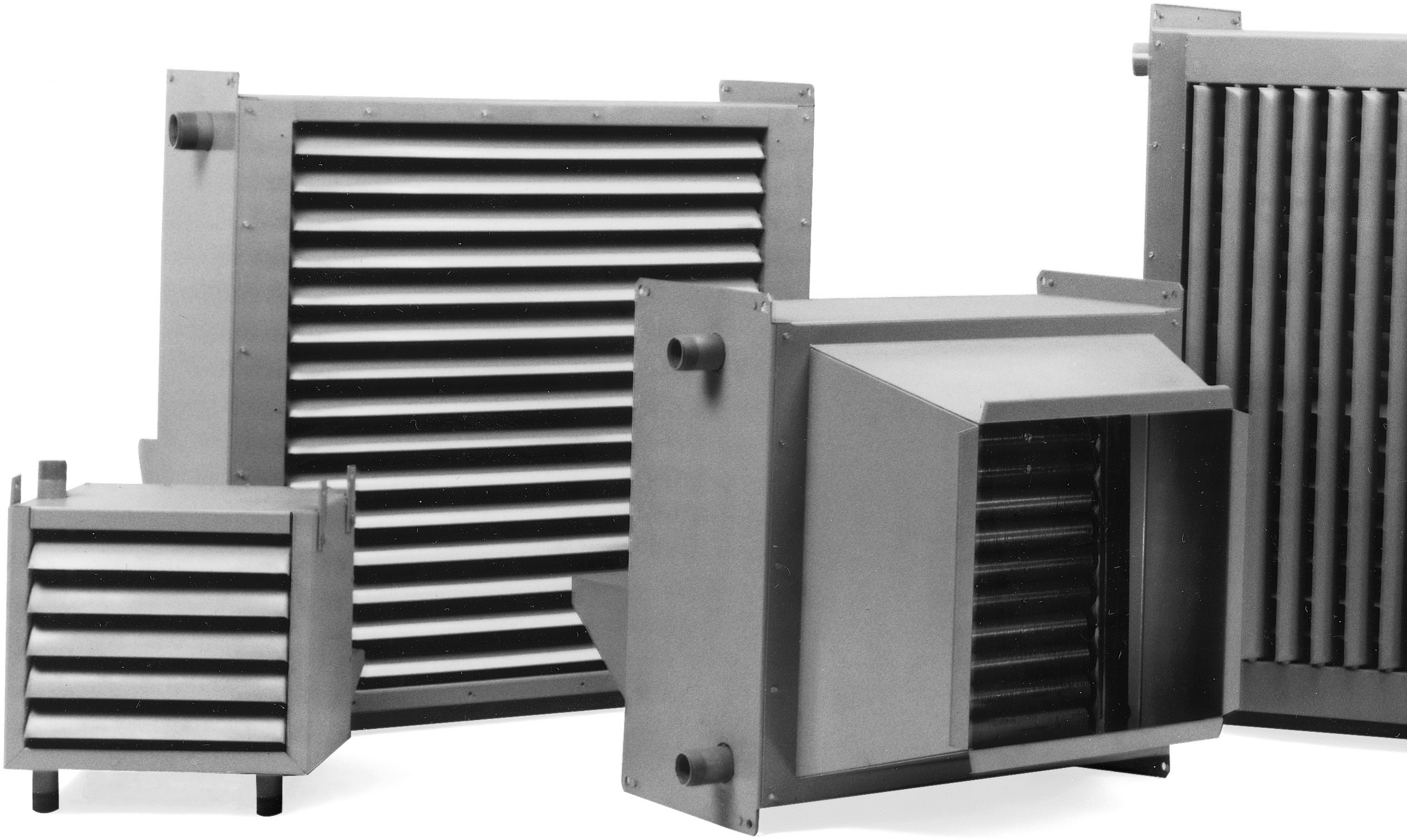
- **Corrosion-resistant heating cores:** Cores are fabricated in a full range of materials, including steel, stainless steel, copper and others. Special coatings may be applied to increase resistance to external corrosion. Cores feature all-welded construction for durability and ease of repair. Cores can be steam or liquid compatible and can be used for steam, hot water or glycol heating mediums.

- **Standard NEMA frame TEFC ball bearing motors:** Supplied on all sizes, these heavy-duty motors are totally enclosed to lock out dirt for smooth performance. Quick access to the motor permits easy replacement.

- Thick fins and tubes: Constructed of high-strength, corrosion-resistant materials. Fins are available in a wide variety of thicknesses and pitches to withstand high pressure cleaning without damage or distortion.

- **Customizing to your needs:** Fans range in size from 10" to 48", and the wide selection of component materials means long, trouble-free service life.

Lightweight coils don't stand a chance in harsh environments. Armstrong coils survive because they're built as tough as your meanest application.

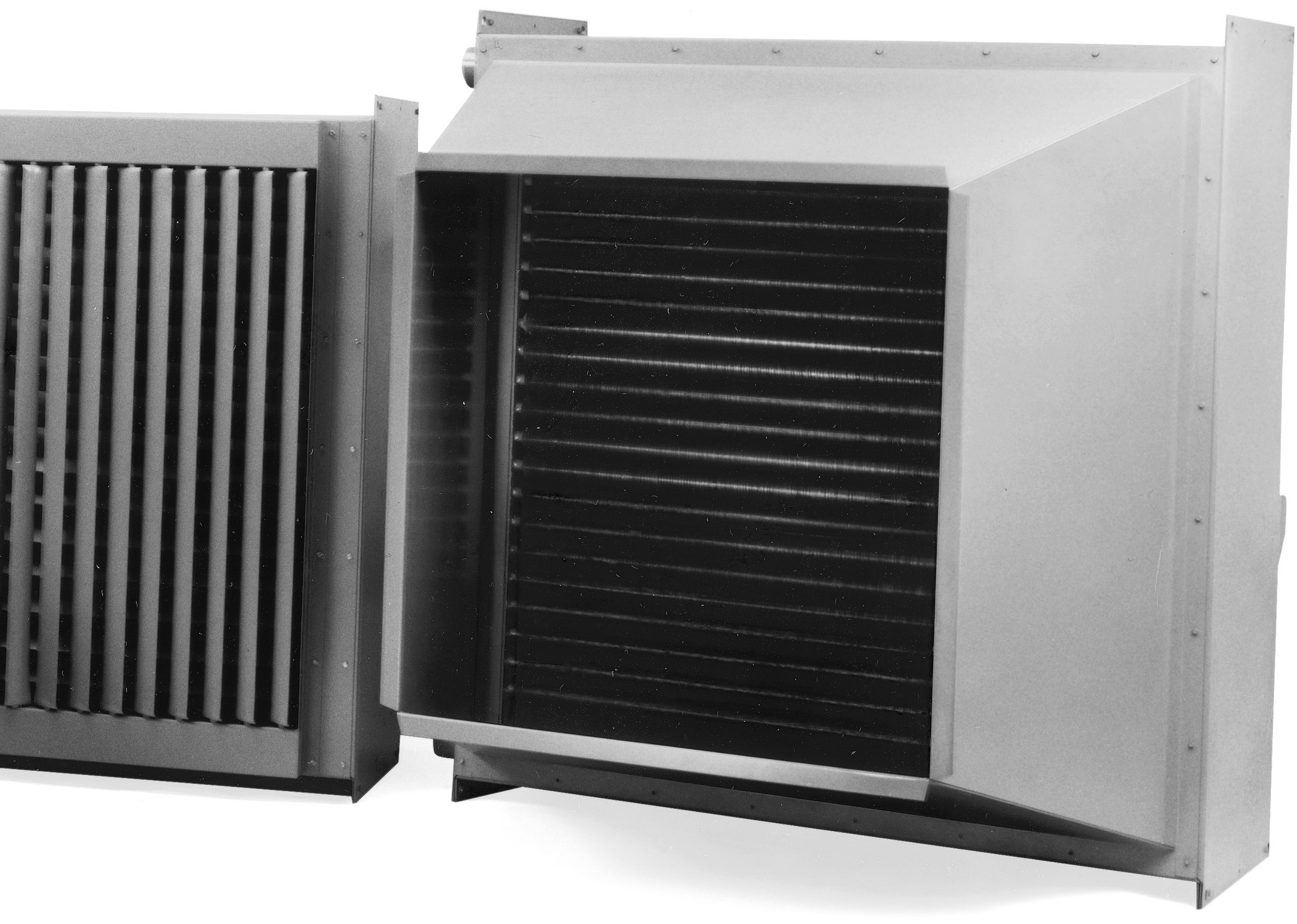


Your Steam Specialist

The first step toward ensuring trouble-free operation is proper unit selection. Your Armstrong Representative will help you select the right unit heater or door heater for any given application.

Our expertise as a manufacturer of unit heaters and door heaters is backed by over 70 years' experience in steam trapping, venting and condensate removal. To you, that means a superior product and an Armstrong Representative who understands how to make it work in your steam system.

If you're losing heat transfer due to deteriorating coils, contact your Armstrong Representative for a complete application analysis. You'll receive top-quality, reliable products from experts who know how to maximize your steam system efficiency.

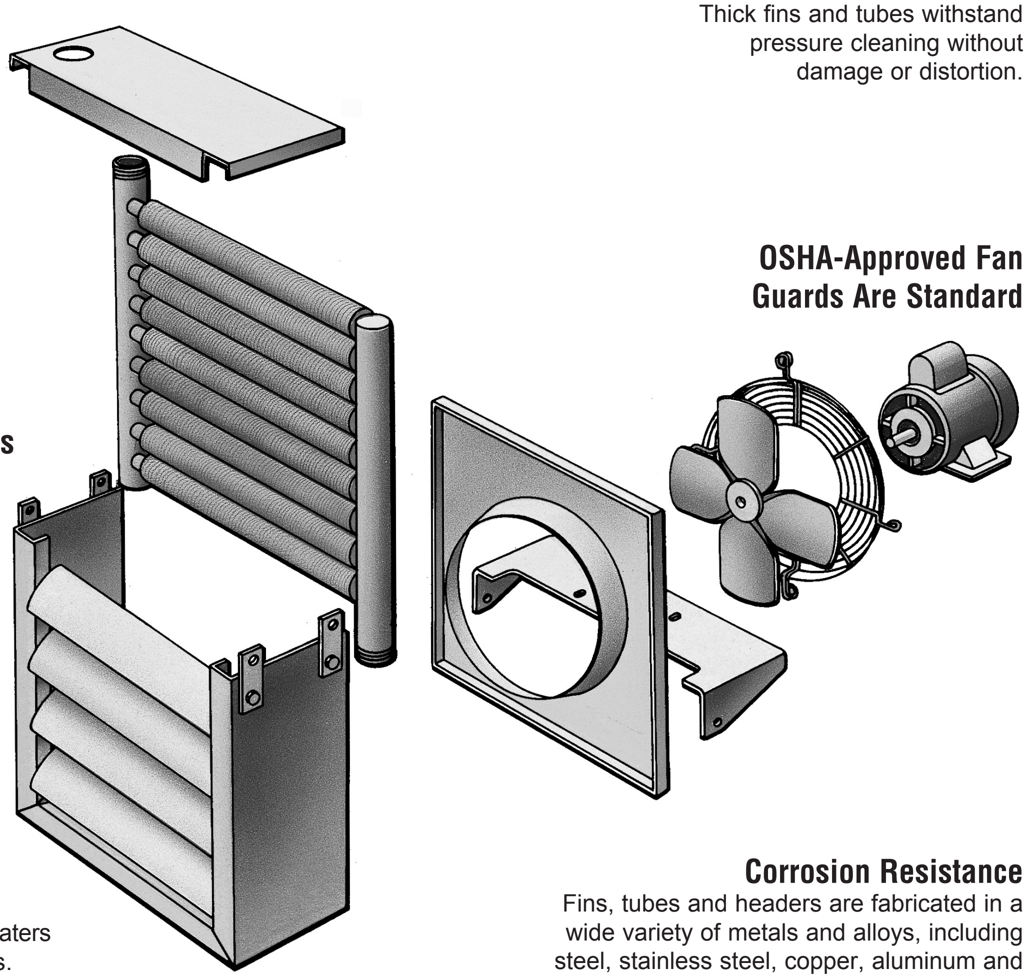


Compare the Benefits You Can't See

Many of the best reasons to insist on Armstrong unit heaters and door heaters are ones you never even see. Components like motors, bearings, tubes, enclosures and fins are built heavy-duty to ensure lasting performance.

Armstrong's options for fin material, pitch, height and type, for example, help explain why our heating cores last longer and perform with greater efficiency. These factors all have a bearing on heat transfer. Knowing how to balance these and other factors is the key to a cost-effective solution. That knowledge is perhaps the most important of Armstrong's many hidden benefits.

10"–20" Size



Sturdy Enclosures
Heavy-duty enclosures of 14-gauge steel provide a rigid structure. Aluminum, stainless steel and specially coated enclosures are also available as options.

Standard NEMA Frame TEFC Ball Bearing Motors
Supplied on all sizes, this rugged motor is built to last in tough industrial environments. If replacement is ever needed, motors are readily available from industrial supply dealers, and are easy to install.

Application Versatility
Because of their heavy-duty construction Armstrong unit heaters are used in many applications. These include product coolers, lube oil coolers, flash steam condensers, hot oil heaters and many others.

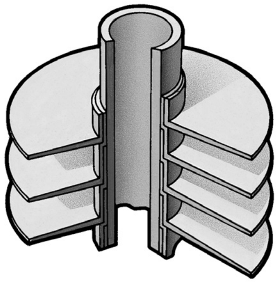
Cost-Reducing Strength
Thick fins and tubes withstand pressure cleaning without damage or distortion.

OSHA-Approved Fan Guards Are Standard

Corrosion Resistance
Fins, tubes and headers are fabricated in a wide variety of metals and alloys, including steel, stainless steel, copper, aluminum and others. Tubes and headers are of the same material to enhance strength and reduce the chance of leakage due to galvanic corrosion.

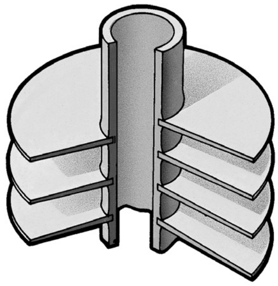
The L fin has a foot at its base and is tension wound on knurled tube material. The L-shaped base provides a large contact area between the tube and the fin, ensuring effective, long-lasting heat transfer. The L fin is recommended when tubes and fins are of the same material.

L Fin



The keyfin is manufactured by forming a helical groove in the tube surface, winding the fin into the groove and peening the displaced metal from the groove against the fin. This means a tight fit between the fin and the tube. The keyfin is the superior design for dissimilar tube and fin material.

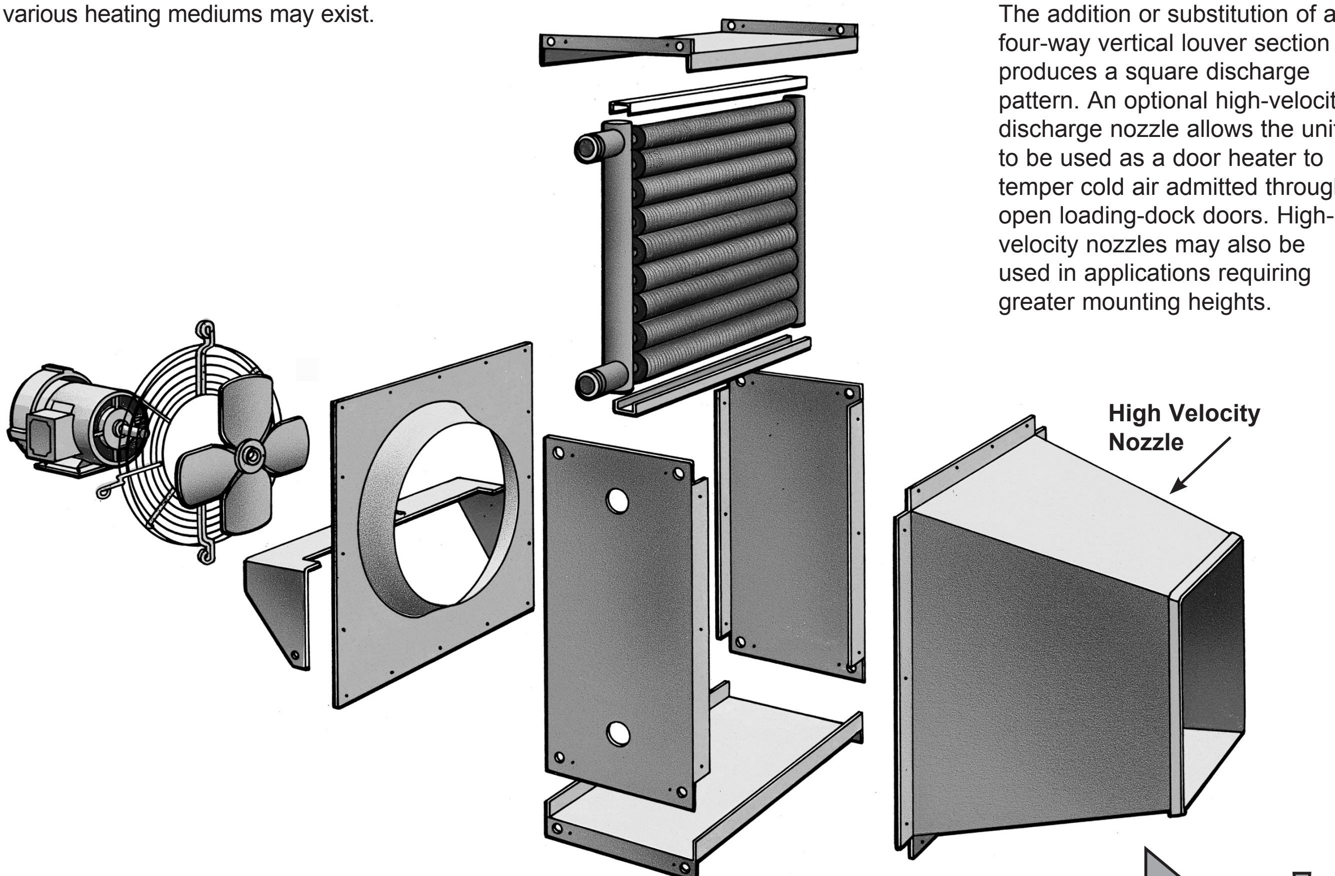
Keyfin



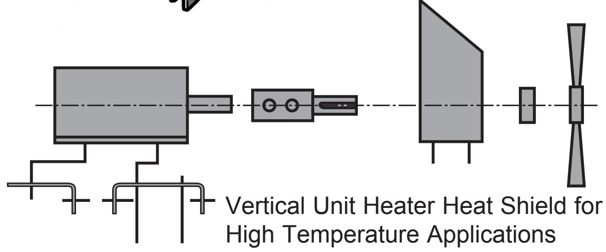
Steam or Liquid Compatible
Cores are available for steam or liquid, allowing units to be applied in different plant areas where various heating mediums may exist.

24"–48" Size

Mounting Flexibility
Basic units may be used in either horizontal or two-way vertical discharge configurations. The addition or substitution of a four-way vertical louver section produces a square discharge pattern. An optional high-velocity discharge nozzle allows the unit to be used as a door heater to temper cold air admitted through open loading-dock doors. High-velocity nozzles may also be used in applications requiring greater mounting heights.



Fan Size Flexibility
Armstrong unit heaters and door heaters are available in fan sizes ranging from 10" to 48".



Vertical Unit Heater Heat Shield for High Temperature Applications

Special purpose motor: 3b
(see page 383)

Model Number Selection

MODEL NUMBER

[ ] A [ ] Q – 182 – HS – T 58

HOTBREATH TYPE
D = Dual (2 Fans)
See note 4 below.
F = Fixed
See note 5 below.
= Standard
(not dual or fixed)

FIN TYPE
A = Aluminum Keyfin
B = Heavy Aluminum Keyfin
F = Copper Keyfin
G = Steel L Fin
J = 304 Stainless L Fin
K = 316 Stainless L Fin
P = Aluminum Platefin

NO. FINS/INCH (SEE NOTE 1)

TUBE MATERIAL
Q = 12 Ga. Steel Tube
R = 10 Ga. Steel Tube
W = 14 Ga. 304L SS Tube
(see note 3)
Y = 14 Ga. 316L Tube
(see note 3)

MODEL SIZE
Fan Diameter (in)

No. Rows of Tubes in Core

MOTOR ELECTRICAL CHARACTERISTICS (SEE NOTE 2)
*12 = 115-203/160
20 = 208/1/60
21 = 208/3/60
23 = 230-460/3/60
58 = 575/3/60

*Consult factory for single phase motor above 1hp. Additional charge could apply.

MOTOR TYPE
T = Totally Enclosed
Fab Cooled
X = Explosion Proof
M = Severe Duty
(3-phase motors only)
H = High Ambient Air
Temperature
(See note 7 below)

CORES
S = Steam Core
L = Liquid Core

DISCHARGE TYPE
H = 2 Way Louver
(Usually Hor. Discharge)
V = 4 Way Louver
(Usually Vert. Discharge)
N = High Velocity Nozzle
(Std. on Door Heaters)

OTHER OPTIONS
HS = Heat Shield
(See note 6 below)

Notes:

1. If the number of fins/inch is standard, the numbers between fin type and tube material will be missing.
2. If dual or triple voltage motors are supplied, the voltage shown on the model number will be the lowest specified. It is the responsibility of the installer to ensure that the motor is wired correctly in accordance with the motor manufacturer's instructions to preclude damage.
3. May be substituted with Sch. 10 SS pipe.
4. Add prefix 'D' for dual units (2 fans on wider core). For standard unit with one fan, the Hotbreath type will be missing.
5. F Models includes larger motors, cleanout lip, ports for sensors.
6. Required for vertical airflow or if heating medium temperature is above 300°F.
7. Required for ambient air above 104°F and only available with 3-phases motors.

Material Specifications

Unit Heater Core Material Specifications									
1" OD Tubes		Fins				Headers		Connections	
Material	Min. Wall Thickness	Material	Type	FPI	Minimum Thickness	Material	Minimum Thickness	Material	Minimum Thickness
Standard Materials									
Steel	.109"	Steel	L-Foot	11	.024"	Steel	.145"	Steel	.133"
Steel	.109"	Aluminum	Keyfin	11	.020"	Steel	.145"	Steel	.133"
Steel	.109"	Aluminum	Keyfin	13	.016"	Steel	.145"	Steel	.133"
Special Order Materials									
Steel	.109"	Copper	Keyfin	12	.016"	Steel	.145"	Steel	.133"
Stainless	.083"	Steel	L-Foot	11	.024"	Stainless	.109"	Stainless	.109"
Stainless	.083"	Stainless	L-Foot	10	.020"	Stainless	.109"	Stainless	.109"
Stainless	.083"	Aluminum	Keyfin	11	.020"	Stainless	.109"	Stainless	.109"
Stainless	.083"	Copper	Keyfin	11	.016"	Stainless	.109"	Stainless	.109"

NOTE: Stainless tubes available in either 304L or 316L.

Options:
- Special coatings such as powder coat epoxy, baked phenolic or hot dip galvanizing.
- Thicker tube walls.

Design Pressures and Testing Specifications

Core design pressure is 350 psig @ saturated steam temperature. (650°F for carbon steel and 500°F for stainless steel)
Standard testing pressure at 525 psig. Higher pressure ratings are available upon request.

Enclosures
Enclosures, louvers and high-velocity nozzles are fabricated from 14 ga galvanized steel, finished in gray enamel. Available material options include stainless steel or aluminum. Epoxy coatings and other protective finishes are available.

Fans
Fans are of stamped aluminum with steel hubs and spiders on unit sizes 30" and smaller. Cast aluminum fans are furnished on unit sizes 36" and larger.

Fan guards are OSHA-approved and constructed of bright zinc plated steel wire.

Motor Specifications

Standard Motors
Construction:
TEFC, NEMA frame, rigid mount, continuous duty, NEMA B design, Class B insulation, 1.0 service factor, sealed ball bearings and steel frame.

Electrical Characteristics:
Single Phase (standard through 3/4 HP—optional extra cost 1-1/2 HP) 115, 208 & 230 volts. Three Phase (all sizes)—208, 230, 460 & 575 volts.

Special Purpose Motors
1. Explosion-proof motors are available in all horsepowers and voltages. They are suitable for Class I Group D and Class II Groups F & G service.

2. Environmentally Protected. Known as “Mill & Chemical,” “Severe” and “Hostile” duty motors.

   a. Three phase 1/2 & 3/4 HP. Available with 1.15 service factor, Class F insulation, steel frame, cast iron end bells and conduit box, phosphatized or stainless steel shaft, shaft flingers and stainless steel nameplate.

   b. Three phase integral HP. Available with 1.15 service factor, Class F insulation, cast iron frame, end bells, fan cover and conduit box, stainless steel shaft, shaft flingers and stainless steel nameplate, epoxy coated. (Explosion proof motor S.F. = 1.0).

3. High Temperature Applications

   a. For horizontal discharge applications where high ambient temperatures are encountered (typically 140°F–150°F, 165°F maximum), motor HP or insulation class must be increased. Consult factory.

   b. For vertical units with on/off fan operation:

Heating Medium Temperature
300°F–375°F
Class F Insulation & Heat Shield

For explosion proof motor, consult factory.
375°F & Over
Class H Insulation & Heat Shield

4. Washdown duty motors also available.

Selecting Unit Heaters

A multi-step process is required to select the proper size, type and number of unit heaters to adequately heat a particular building. The process consists of the following steps:

1. Estimate the building heat loss.
2. Preliminarily select the number and type(s) of heaters to properly cover the area to be heated.
3. Select specific models and calculate the actual performance of equipment selected using actual heating medium conditions and inlet air temperatures.
4. Calculate actual throws, spreads and mounting heights and check to see that they will allow for complete coverage of the area to be heated.
5. If necessary, adjust selection and repeat steps 2 through 4.

Estimating Heat Loss

The ASHRAE Handbook of Fundamentals should be consulted to determine heat losses, taking into account specific building features. However, for an approximation of the heat loss from a typical modern industrial building, the following formula may be used.

With heated area size and outside design temperatures given:

A. Calculate the volume of the building in cubic feet:

Volume (cu ft) = floor length (ft) x floor width (ft) x average ceiling height (ft)

B. Calculate the area of walls and roofs that are exposed to outside temperature:

Exposed area (EA) = wall length (ft) x average ceiling height (ft) + floor area (sq ft)

C. Total heat load (MBH) =

$$\left(\frac{V}{25} + \frac{EA}{4}\right) \times \frac{\Delta T}{1000}$$

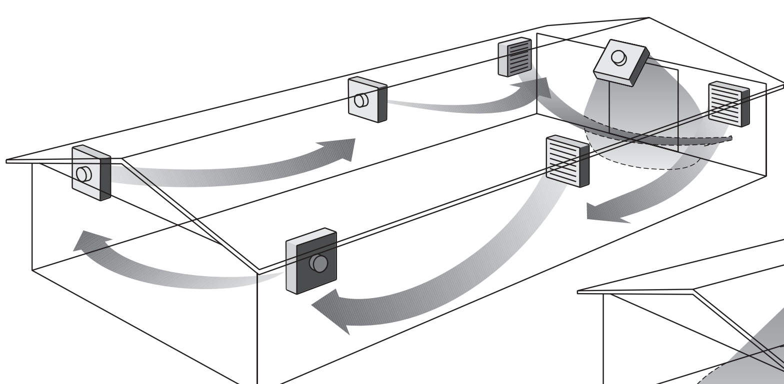
Where
- V = Building Volume (cu-ft)
- EA = Exposed Wall & Roof Area (ft²)
- ∆T = Inside Design Temperature (F) – Outside Design Temperature (F)

Selection of Number, Type(s) and Location of Unit Heaters

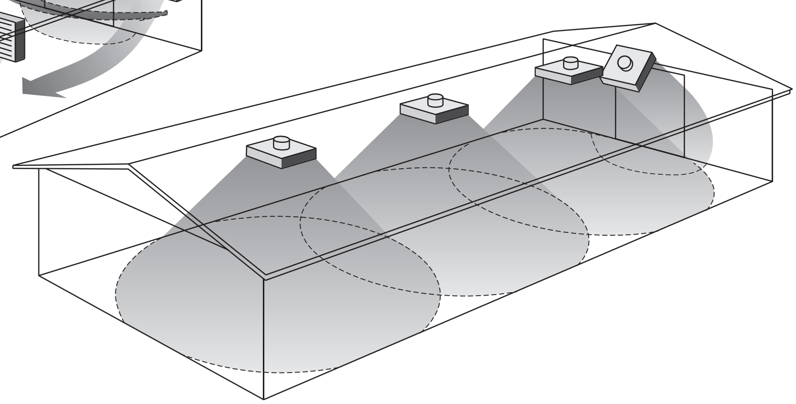
With the total heat loss calculated, the next step is to determine the number, type(s) and location of unit heaters. First, look at the layout of the building. From that, determine the general arrangement of the unit heaters. Some typical layouts are shown below, but any given arrangement should be tailored to the particular building. Some general rules to consider follow:

1. Horizontal unit heaters are used as a means to heat outside walls and should be directed to discharge toward or along walls to provide a wiping effect. Horizontal discharge units are generally sufficient to adequately heat most buildings except those with very large central floor areas or very high ceilings.

Typical Arrangements



Horizontal unit heaters provide a sweeping effect over outside walls and are sufficient to heat most buildings except those with large central floor areas.



Four-way vertical discharge units are used to heat large central areas and buildings with high ceilings or buildings with large heat loss through the ceiling.

2. Vertical unit heaters are used when a direct downward discharge to heat large central areas is needed. They may also be used if the mounting heights and throws allow for wiping of the walls with their discharge air. The discharge may be arranged for two-way airflow or four-way airflow with the addition or substitution of a four-way discharge section. A rectangular building might only need two-way discharge, whereas a square building would be better covered with a four-way arrangement.

   Vertical units are also used in buildings with high ceilings or where roof heat losses are exceptionally high. Hot air from the roof area is drawn into the units and directed down to floor level, minimizing temperature gradients and reducing fuel consumption.

   If fitted with a high-velocity discharge nozzle, units can be used at higher than normal mounting heights.

3. Door heaters simply use a high-velocity discharge nozzle to increase the air velocity to reach those areas that are hard to heat. These heaters can provide blankets of warm air to heat large open-loading doorways or busy entryways. They are also ideal for heating wide open plant areas. If door heater fans are activated only when doors are open, their Btu output should not be considered as part of the heat loss makeup. See page 386 for door heater selection guidelines.

4. Units should be directed toward the areas of greatest heat loss. Outside doorways and exposed windows require more careful consideration.

5. Unit heater airstreams should be minimally obstructed to allow for greatest heat distribution.

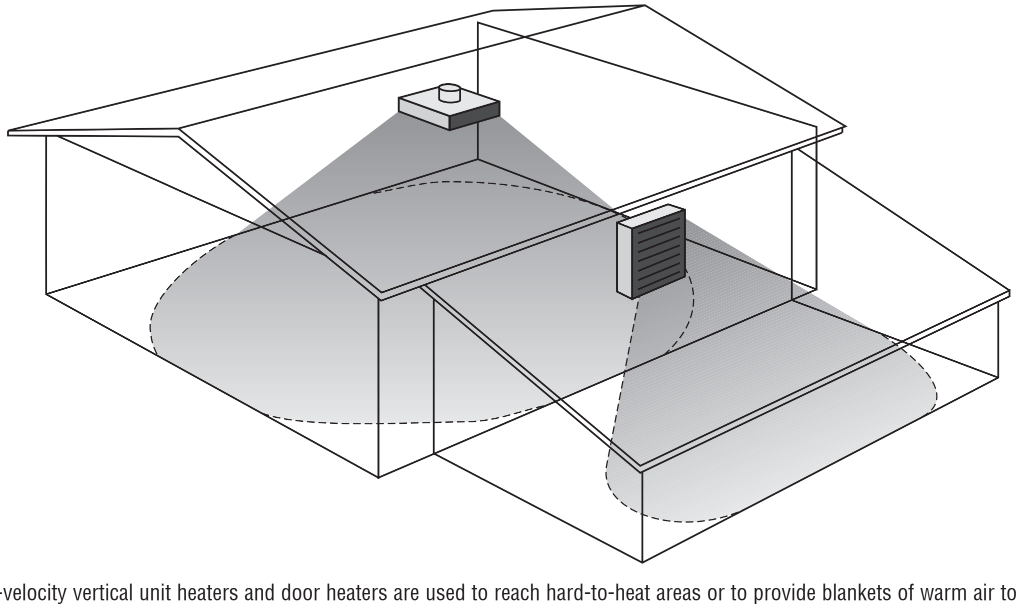
6. Unit heaters should be located to blow into open spaces such as aisles and along exterior walls rather than directly at personnel.

7. The mounting heights and throws specified on page 392 and corrected for outlet air temperature should be followed. Improper mounting height distance will result in poor heat distribution and reduced comfort.

Once the general layout has been determined, you can begin selecting the type of model required. First, select any door heaters that may be required. Then, select any vertical unit heaters. If the vertical unit heaters are to be directed toward center floor areas and used in conjunction with horizontal units, calculate the percentage of the total area it is intended to cover and divide that by 2. That will give you the percentage of the total heat that is required from the vertical units.

Lastly, select the horizontal units. The remaining heat load to be provided is divided by the number of units desired. Here your choice may be between a number of smaller units or fewer larger units. Notice that as the units increase in size and heating capacity their throw also increases. Generally, fewer larger units will result in the most economical installation as long as full coverage is provided.

After completing this preliminary selection process, you can calculate the actual throws, spreads and mounting heights to ensure the area will be adequately heated. If you find that the required coverage cannot be met with your initial selections, recalculate coverage by adjusting unit size or number of units.



High-velocity vertical unit heaters and door heaters are used to reach hard-to-heat areas or to provide blankets of warm air to large open areas such as loading dock doors.

Door Heaters

Door heaters are identical in design to unit heaters with the addition of a high-velocity nozzle. This nozzle helps direct airflow precisely to heat the door area required.

Door Heater Model Size Selection Chart

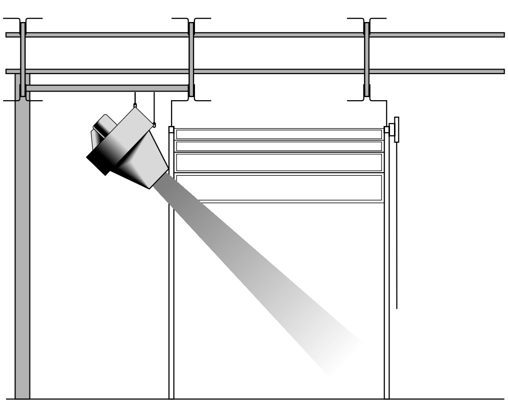
Door Size Width x Height (ft)	Outside Design Temperature							
	-40°F	-30°F	-20°F	-10°F	0°F	10°F	20°F	30°F
6 x 8	30	24	24	20	18	18	16	14
8 x 8	36	30	30	24	20	20	18	16
8 x 10	42	36	30	30	24	20	20	18
10 x 12	48	48	42	36	30	30	24	20
12 x 14	Two 42	Two 36	48	42	36	36	30	30
14 x 16	Two 48	Two 42	Two 36	48	42	42	36	30
16 x 18	Two 48	Two 48	Two 42	Two 36	48	48	42	36
18 x 20	Three 48	Three 42	Two 48	Two 42	Two 42	48	48	42
20 x 22	Three 48	Three 48	Three 42	Two 48	Two 42	Two 36	48	48
22 x 24	Four 48	Four 48	Three 48	Three 42	Two 48	Two 42	Two 36	48
24 x 26	Four 48	Four 48	Three 48	Three 48	Two 48	Two 42	Two 42	Two 36

How to Use This Model Size Chart:

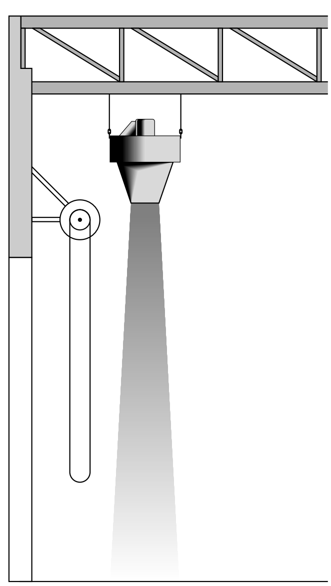
This chart gives the recommended size of door heaters. Select either a single- or double-row heating core from the appropriate performance chart (pages 386 to 392) to give a final air temperature within the 100°F to 130°F range.

- For roll-up or sliding doors, mount unit(s) to discharge vertically with the bottom of the discharge directly above the top of the door. For overhead doors, mount unit(s) back into the building at a distance to give sufficient clearance from the door in the open position. Aim the discharge toward the bottom of the door.
- For doors facing prevailing winds, select one size larger.
- If negative pressure exists in the building, consult factory. Additional capacity could be required.

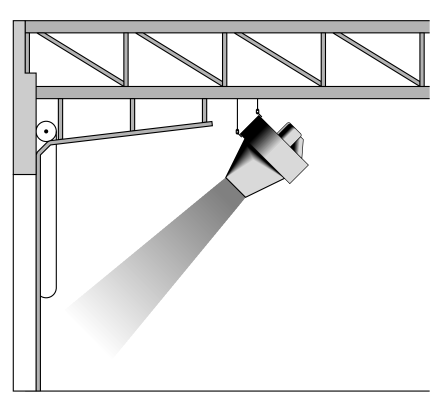
Typical Door Heater Arrangements



Side-mounted 45° discharge for low ceiling applications.



Vertical discharge for roll-up or sliding doors.



Front-mounted 45° discharge for overhead doors.

Performance Data With 2 psig ① Steam, 60°F Entering Air Temperature													
	Model Size	Common Data			Steel Tube / Aluminum Fin 11 FPI			Steel Tube / Steel Fin Stainless Tube / Steel Fin 11 FPI			Stainless Tube / Stainless Fin 10 FPI		
		Motor		CFM ②									
		HP	RPM		MBH ③	Leaving Air (°F)	Cond. (lb/hr)	MBH ③	Leaving Air (°F)	Cond. (lb/hr)	MBH ③	Leaving Air (°F)	Cond. (lb/hr)
Standard Models	101	1/3	1,725	810	36	102	38	29	93	30	17	80	18
	121	1/3	1,725	1,350	53	97	55	42	89	44	25	77	26
	141	1/3	1,725	2,590	80	89	83	64	83	66	37	73	39
	161	1/2	1,725	3,330	102	88	105	87	84	90	51	74	53
	181	3/4	1,725	4,420	128	87	133	109	83	113	64	73	66
	201	3/4	1,725	5,430	156	87	161	131	82	136	77	73	79
	241	1-1/2	1,125	7,020	205	87	212	179	84	185	105	74	108
	301	2	1,125	10,660	322	88	333	276	84	286	162	74	168
	361	2	1,125	13,440	406	88	420	351	84	363	206	74	213
	421	3	870	16,530	536	90	555	444	85	459	261	75	270
	481	3	870	22,110	692	89	716	593	85	614	349	75	361
High Outlet Air Temperature Models	102	1/3	1,725	700	55	133	57	45	119	47	28	98	29
	122	1/3	1,725	1,320	88	122	91	71	110	74	44	91	45
	142	1/3	1,725	1,980	122	117	126	100	107	103	61	88	63
	162	1/2	1,725	2,910	166	113	171	143	106	148	87	88	90
	182	3/4	1,725	3,900	212	110	219	182	103	189	110	86	114
	202	3/4	1,725	4,560	253	111	262	217	104	224	131	87	136
	242	1-1/2	1,125	6,000	343	113	355	304	107	315	186	89	192
	302	2	1,125	9,400	548	114	567	477	107	494	291	89	301
	362	2	1,125	12,160	722	115	747	622	107	643	380	89	393
	422	3	870	15,160	950	118	983	802	109	830	492	90	509
	482	3	870	20,040	1,234	117	1,277	1,063	109	1,100	652	90	675

NOTES:

① Steam pressure as supplied to unit heater. Valve and line losses must be subtracted from steam main pressure.

② Standard CFM measured at 70°F with density of .075 lb/cu ft.

③ Heat load in thousands of Btu/hr.

NOTE:
Leaving air temperature and MBH from table above must be corrected for steam pressures other than 2 psig and entering air temperatures other than 60°F.

Table below lists the correction factors. To determine correction factors falling between those shown, use the next lowest steam pressure and the next highest air temperature shown.

MBH (corrected) = MBH (above) x Correction Factor
LAT (corrected) = EAT + (MBH [corrected] x 926/CFM)
Condensate Load = MBH (corrected) x 1,000/Latent Heat of Steam

Correction Factors Based on 2 psig ① Steam, 60°F Entering Air														
Steam ① Pressure (psig)	Temperature of Entering Air (°F)												Saturated Steam Temp. (°F)	Steam Latent Heat (Btu/lb)
	-10	0	10	20	30	40	50	60	70	80	90	100		
2	—	—	—	—	—	1.16	1.08	1.00	0.93	0.85	0.78	0.71	219	966
5	1.64	1.55	1.46	1.37	1.29	1.21	1.13	1.05	0.97	0.90	0.83	0.76	227	960
10	1.73	1.64	1.55	1.46	1.38	1.29	1.21	1.13	1.06	0.98	0.91	0.84	239	953
15	1.80	1.71	1.61	1.53	1.44	1.34	1.28	1.19	1.12	1.04	0.97	0.90	250	945
20	1.86	1.77	1.68	1.58	1.50	1.42	1.33	1.25	1.17	1.10	1.02	0.95	259	939
30	1.97	1.87	1.78	1.68	1.60	1.51	1.43	1.35	1.27	1.19	1.12	1.04	274	929
40	2.06	1.96	1.86	1.77	1.68	1.60	1.51	1.43	1.35	1.27	1.19	1.12	286	920
50	2.13	2.04	1.94	1.85	1.76	1.67	1.58	1.50	1.42	1.34	1.26	1.19	298	912
60	2.20	2.09	2.00	1.90	1.81	1.73	1.64	1.56	1.47	1.39	1.31	1.24	307	906
70	2.26	2.16	2.06	1.96	1.87	1.78	1.70	1.61	1.53	1.45	1.37	1.29	316	898
75	2.28	2.18	2.09	1.99	1.90	1.81	1.72	1.64	1.55	1.47	1.40	1.32	320	895
80	2.31	2.21	2.11	2.02	1.93	1.84	1.75	1.66	1.58	1.50	1.42	1.34	324	891
90	2.36	2.26	2.16	2.06	1.97	1.88	1.79	1.71	1.62	1.54	1.46	1.38	331	886
100	2.41	2.31	2.20	2.11	2.02	1.93	1.84	1.75	1.66	1.58	1.50	1.42	338	880
125	2.51	2.41	2.31	2.21	2.11	2.02	1.93	1.84	1.76	1.68	1.59	1.51	353	868
150	2.60	2.50	2.40	2.30	2.20	2.11	2.02	1.93	1.84	1.76	1.67	1.59	366	857
200	2.75	2.65	2.55	2.45	2.35	2.25	2.16	2.07	1.98	1.89	1.81	1.72	388	837
250	2.87	2.77	2.67	2.57	2.46	2.36	2.27	2.18	2.09	2.01	1.92	1.81	408	820

Performance Data With 200°F① Water, 60°F Entering Air Temperature

	Model Size	Common Data Motor HP	Motor RPM	CFM ②	Steel Tube / Aluminum Fin 11 FPI Water Temp. Drop	MBH ③	Leaving Air (°F)	USGPM	Pressure Drop (ft wg)	Steel Tube / Steel Fin, Stainless Tube / Steel Fin 11 FPI Water Temp. Drop	MBH ③	Leaving Air (°F)	USGPM	Pressure Drop (ft wg)	Stainless Tube / Stainless Fin 10 FPI Water Temp. Drop	MBH ③	Leaving Air (°F)	USGPM	Pressure Drop (ft wg)
Standard Models	102	1/3	1,725	700	10	45	119	8.9	2.01	10	33	104	6.7	1.02	10	25	93	5.0	.54
					20	39	112	3.9	.39	20	29	99	2.9	.20	20	22	89	2.2	.10
					30	34	106	2.3	.13	30	25	93	1.7	.07	30	19	86	1.3	.04
	122	1/3		1,320	10	62	103	12.4	4.01	10	52	96	10.4	1.87	10	38	87	7.6	.95
					20	55	99	5.5	.79	20	46	92	4.6	.37	20	34	84	3.4	.19
					30	49	94	3.2	.27	30	40	88	2.7	.13	30	30	81	2.0	.07
	142	1/3		1,980	10	90	102	18.0	1.95	10	76	96	15.2	.94	10	55	86	11.0	.46
					20	78	97	7.8	.37	20	66	91	6.6	.18	20	48	82	4.8	.09
					30	67	92	4.5	.12	30	57	87	3.8	.06	30	42	79	2.8	.03
	162	1/2		2,910	10	119	98	23.9	2.77	10	97	91	19.3	1.24	10	70	82	14.0	.62
					20	105	94	10.5	.54	20	85	87	8.5	.24	20	61	80	6.1	.12
					30	92	89	6.1	.18	30	75	84	5.0	.08	30	54	77	3.6	.04
	182	3/4		3,900	10	156	97	31.2	3.89	10	132	91	26.5	1.77	10	94	82	18.9	.85
					20	137	93	13.7	.75	20	116	88	11.6	.34	20	83	80	8.3	.17
					30	121	89	8.1	.26	30	102	84	6.8	.12	30	74	78	4.9	.06
	202	3/4		4,560	10	190	99	38.0	4.88	10	161	93	32.2	2.25	10	115	83	23.1	1.08
					20	170	95	17.0	.97	20	144	89	14.4	.45	20	103	81	10.3	.22
					30	150	91	10.0	.34	30	127	86	8.4	.15	30	91	79	6.1	.08
	242	1-1/2	1,125	6,000	10	284	104	56.8	8.39	10	237	97	47.4	3.87	10	169	86	33.7	1.82
					20	258	100	25.8	1.73	20	214	93	21.4	.79	20	153	84	15.3	.37
					30	232	96	15.5	.62	30	196	90	13.1	.29	30	137	81	9.2	.13
	302	2		9,400	15	437	103	58.2	4.10	10	380	97	75.9	6.36	10	267	86	53.4	2.94
					20	416	101	41.6	2.79	20	345	94	34.5	1.31	20	245	84	24.5	.62
					30	381	98	25.4	1.04	30	315	91	21.0	.49	30	222	82	14.8	.23
	362	2		12,160	15	575	104	76.7	5.84	10	491	97	98.2	9.20	10	352	87	70.4	4.41
					20	552	102	55.2	4.19	20	452	95	45.3	1.96	20	324	85	32.4	.94
					30	506	99	33.7	1.56	30	419	92	27.9	.74	30	297	83	19.8	.35
	422	3	870	15,160	10	748	106	149.7	3.05	10	612	97	122.5	1.43	10	452	88	90.4	.70
					20	675	101	67.5	.62	20	552	94	55.2	.29	20	406	85	40.6	.14
					30	603	97	40.2	.22	30	490	90	32.6	.10	30	364	82	24.2	.05
	482	3		20,040	10	989	106	197.8	4.36	10	820	98	164.1	1.97	10	547	88	119.5	.98
					20	892	101	89.2	.89	20	745	94	74.5	.41	20	539	85	53.9	.20
					30	801	97	53.4	.32	30	667	91	44.4	.14	30	487	83	32.5	.07
Low Outlet Air Temperature Models	101	1/3	1,725	810	10	28	92	5.6	3.80	10	21	84	4.2	2.09	10	16	78	3.1	.86
					20	25	88	2.5	.74	20	19	82	1.9	.43	20	14	76	1.4	.17
					30	22	85	1.5	.26	30	17	79	1.1	.15	30	12	74	.8	.06
	121	1/3		1,350	10	41	88	8.2	6.20	10	32	82	6.3	3.54	10	23	76	4.6	1.4
					20	36	85	3.7	1.24	20	29	80	2.9	.73	20	20	74	2.0	.28
					30	32	82	2.2	.44	30	25	77	1.7	.25	30	18	73	1.2	.10
	141	1/3		2,590	10	60	81	12.0	3.13	10	47	77	9.5	1.85	10	33	72	6.6	.68
					20	52	79	5.2	.58	20	41	75	4.1	.35	20	29	70	2.9	.13
					30	45	76	3.0	.20	30	36	73	2.4	.12	30	25	69	1.7	.04
	161	1/2		3,330	10	76	81	15.3	4.15	10	63	78	12.7	2.19	10	45	73	9.0	.84
					20	67	79	6.7	.80	20	57	76	5.7	.44	20	40	71	4.0	.16
					30	58	76	3.9	.27	30	49	74	3.3	.15	30	35	70	2.3	.06
	181	3/4		4,420	10	97	80	19.5	5.62	10	81	77	16.1	3.03	10	57	72	11.4	1.15
					20	86	78	8.6	1.09	20	73	75	7.3	.61	20	50	71	5.0	.22
					30	75	76	5.0	.37	30	64	74	4.3	.21	30	45	69	3.0	.08
	201	3/4		5,430	10	119	80	23.8	7.14	10	98	77	19.6	3.85	10	69	72	13.7	1.44
					20	106	78	10.6	1.40	20	88	75	8.8	.78	20	62	71	6.2	.29
					30	94	76	6.3	.49	30	79	74	5.3	.28	30	55	69	3.7	.10
	241	1-1/2	1,125	7,020	15	160	81	21.4	4.47	10	136	78	27.1	4.76	10	95	73	19.0	2.16
					20	153	80	15.3	2.28	20	123	76	12.3	.97	20	86	71	8.6	.45
					30	137	78	9.1	.80	30	111	75	7.4	.36	30	78	70	5.2	.16
	301	2		10,660	15	249	82	33.2	6.66	10	208	78	41.7	7.22	10	149	73	29.7	3.41
					20	236	81	23.6	3.37	20	190	77	19.0	1.50	20	137	72	13.7	.74
					30	215	79	14.4	1.25	30	173	75	11.5	.55	30	124	71	8.3	.27
	361	2		13,440	15	327	83	43.6	9.87	10	269	79	53.7	10.43	10	190	73	38.0	4.88
					20	312	82	31.2	5.07	20	247	77	24.7	2.20	20	177	72	17.7	1.06
					30	285	80	19.0	1.87	30	226	76	15.1	.82	30	161	71	10.7	.39
	421	3	870	16,530	10	425	84	85.0	3.74	10	337	79	67.5	1.66	10	234	73	46.8	.74
					20	380	81	38.0	.75	20	300	77	30.0	.33	20	211	72	21.1	.15
					30	336	79	22.4	.26	30	266	75	17.7	.11	30	186	70	12.4	.05
	481	3		22,110	10	559	83	111.8	5.33	10	451	79	90.3	2.30	10	315	73	63.0	1.03
					20	502	81	50.2	1.07	20	406	77	40.6	.46	20	284	72	28.4	.21
					30	451	79	30.1	.39	30	365	75	24.4	.17	30	253	71	16.9	.07

NOTES:

① Water temperature at the unit heater.
② Standard CFM measured at 70°F with density of .075 lb/cu ft.
③ Heat load in thousands of Btu/hr.

NOTE:
Leaving air temperature and MBH from table on previous page must be corrected for water temperatures other than 200°F and entering air temperatures other than 60°F. Liquid flow rates and pressure drops are not corrected.

Table below lists the correction factors. To determine correction factors falling between those shown, use the next lowest water temperature and the next highest entering air temperature shown.

MBH (corrected) = MBH (from page 390) x Correction Factor

LAT (corrected) = EAT + (MBH (corrected) x 926/CFM)

Water ∆T = MBH (corrected) x 2.00/USGPM

Correction Factors Based on 200°F① Entering Water, 60°F① Entering Air

Entering Water Temp. (°F)	Temperature of Entering Air (°F)										
	0	10	20	30	40	50	60	70	80	90	100
160	1.23	1.14	1.05	0.96	0.88	0.80	0.72	0.63	0.57	0.48	0.41
170	1.31	1.21	1.12	1.04	0.95	0.87	0.79	0.70	0.63	0.55	0.48
180	1.38	1.29	1.20	1.11	1.02	0.94	0.86	0.77	0.70	0.62	0.55
190	1.46	1.36	1.27	1.18	1.10	1.01	0.93	0.85	0.77	0.69	0.62
200	1.54	1.44	1.35	1.26	1.17	1.09	1.00	0.92	0.84	0.76	0.68
210	1.61	1.52	1.42	1.33	1.25	1.16	1.07	0.99	0.91	0.83	0.75
220	1.69	1.59	1.50	1.41	1.32	1.23	1.14	1.06	0.98	0.90	0.82
230	1.77	1.67	1.57	1.48	1.39	1.30	1.22	1.13	1.05	0.97	0.89
240	1.84	1.75	1.65	1.55	1.47	1.37	1.29	1.20	1.12	1.04	0.96
250	1.92	1.82	1.72	1.63	1.54	1.45	1.36	1.27	1.19	1.11	1.03

Performance Data With 300°F① Water, 60°F Entering Air Temperature

	Model Size	Common Data: Motor HP	Common Data: Motor RPM	Common Data: CFM ②	Steel Tube / Aluminum Fin 11 FPI: Water Temp. Drop	MBH ③	Leaving Air (°F)	USGPM	Pressure Drop (ft wg)	Steel Tube / Steel Fin, Stainless Tube / Steel Fin 11 FPI: Water Temp. Drop	MBH ③	Leaving Air (°F)	USGPM	Pressure Drop (ft wg)	Stainless Tube / Stainless Fin 10 FPI: Water Temp. Drop	MBH ③	Leaving Air (°F)	USGPM	Pressure Drop (ft wg)
Standard Models			1,725		40	69	151	3.4	.30	40	51	127	2.5	.15	40	38	111	1.9	.08
	102	1/3		700	60	64	145	2.1	.16	60	45	119	1.5	.05	60	34	106	1.2	.03
					80	60	140	1.5	.06	80	40	113	1.0	.02	80	30	99	.7	.01
					40	96	128	4.8	.61	40	79	116	4.0	.25	40	59	101	2.9	.14
	122	1/3		1,320	60	86	120	2.9	.21	60	71	110	2.4	.10	60	53	97	1.8	.05
					80	75	113	1.9	.09	80	62	104	1.6	.04	80	47	93	1.2	.02
					40	137	124	6.8	.28	40	116	114	5.8	.14	40	84	99	4.2	.07
	142	1/3		1,980	60	120	116	4.0	.10	60	101	107	3.4	.05	60	74	95	2.5	.02
					80	103	108	2.6	.04	80	86	100	2.1	.02	80	63	90	4.6	.01
					40	185	119	9.2	.41	30	148	107	7.4	.18	40	108	94	5.4	.09
	162	1/2		2,910	60	162	112	5.4	.14	60	131	102	4.4	.06	60	94	90	3.1	.03
					80	140	105	3.5	.06	80	114	96	2.8	.03	80	82	86	2.1	.01
					40	240	117	12.0	.58	40	203	108	10.2	.26	40	146	95	7.3	.13
	182	3/4		3,900	60	213	111	7.1	.20	60	179	103	6.0	.09	60	129	91	4.3	.04
					80	185	104	4.6	.09	80	158	97	3.9	.04	80	113	87	2.8	.02
					40	296	120	14.8	.74	40	251	111	12.5	.34	40	178	96	8.9	.16
	202	3/4		4,560	60	264	114	8.8	.26	60	224	106	7.5	.12	60	161	93	5.4	.06
					80	233	107	5.8	.11	80	197	100	4.9	.05	80	141	89	3.5	.03
			1,125		40	444	129	22.2	1.00	40	373	118	18.6	.60	40	264	101	13.2	.28
	242	1-1/2		6,000	60	405	123	13.5	.37	60	336	112	11.2	.22	60	238	97	7.9	.10
					80	363	116	9.1	.17	80	301	107	7.5	.10	80	214	93	5.4	.05
					40	721	131	36.0	1.57	40	596	119	29.8	.98	40	421	102	21.1	.46
	302	2		9,400	60	660	125	22.0	.59	60	543	114	18.1	.36	60	383	98	12.8	.17
					80	599	119	15.0	.27	80	493	109	12.3	.17	80	348	94	8.7	.08
					40	950	132	47.5	2.24	40	781	120	39.1	1.46	40	557	102	27.8	.69
	362	2		12,160	60	873	127	29.1	.84	60	714	114	23.8	.54	60	511	99	17.0	.26
					80	799	121	20.0	.40	80	654	110	16.4	.25	80	465	95	11.6	.12
			870		40	1,167	131	58.4	.32	40	956	118	47.8	.22	40	704	103	35.2	.11
	422	3		15,160	60	1,048	124	34.9	.12	60	856	112	28.5	.08	60	632	99	21.1	.04
					80	933	117	23.3	.05	80	763	107	19.1	.03	80	560	94	14.0	.02
					40	1,543	131	77.2	.45	40	1,294	120	64.7	.31	40	939	103	47.0	.15
	482	3		20,040	60	1,392	124	46.4	.16	60	1,158	114	38.6	.11	60	848	99	28.3	.05
					80	1,255	118	31.4	.07	80	1,045	108	26.1	.05	80	753	95	18.8	.02
Low Outlet Air Temperature Models			1,725		40	43	109	2.1	.56	40	33	98	1.7	.32	40	24	88	1.2	.13
	101	1/3		810	60	38	104	1.3	.20	60	30	94	1.0	.11	60	21	85	.7	.05
					80	34	98	.8	.09	80	26	90	.7	.05	80	19	82	.5	.02
					40	63	103	3.2	.93	40	49	94	2.5	.53	40	35	84	1.8	.21
	121	1/3		1,350	60	57	99	1.9	.33	60	45	91	1.5	.20	60	32	82	1.1	.08
					80	50	95	1.3	.15	80	39	87	1.0	.08	80	28	79	.7	.03
					40	91	93	4.6	.45	40	71	86	3.6	.26	40	50	78	2.5	.10
	141	1/3		2,590	60	80	89	2.7	.15	60	63	83	2.1	.09	60	44	76	1.5	.03
					80	69	85	1.7	.06	80	55	80	1.4	.04	80	38	74	1.0	.01
					40	117	93	5.8	.61	30	98	87	4.9	.33	40	69	79	3.5	.13
	161	1/2		3,330	60	103	89	3.4	.21	60	87	84	2.9	.12	60	61	77	2.0	.04
					80	89	85	2.2	.09	80	77	81	1.9	.05	80	54	75	1.4	.02
					40	150	91	7.5	.83	40	126	86	6.3	.46	40	87	78	4.4	.17
	181	3/4		4,420	60	133	88	4.4	.29	60	112	83	3.7	.16	60	78	76	2.6	.06
					80	117	84	2.9	.18	80	99	81	2.5	.07	80	69	74	1.7	.03
					40	185	92	9.2	1.07	40	153	86	7.6	.58	40	107	78	5.4	.22
	201	3/4		5,430	60	164	88	5.5	.38	60	138	84	4.6	.21	60	96	76	3.2	.08
					80	144	85	3.6	.16	80	122	81	3.1	.09	80	84	74	2.1	.03
			1,125		40	263	95	13.2	1.68	40	214	88	10.7	.74	40	149	80	7.4	.33
	241	1-1/2		7,020	60	239	92	8.0	.62	60	192	85	6.4	.26	60	135	78	4.5	.12
					80	212	88	5.3	.27	80	173	83	4.3	.12	80	121	76	3.0	.05
					40	408	96	20.4	2.53	40	329	89	16.7	1.13	40	234	80	11.7	.54
	301	2		10,660	60	372	92	12.4	.93	60	298	86	9.9	.41	60	213	79	7.1	.20
					80	334	89	8.4	.42	80	269	83	6.7	.19	80	192	77	4.8	.09
					40	537	97	26.9	3.75	40	425	89	21.3	1.64	40	302	81	15.1	.77
	361	2		13,440	60	494	94	16.5	1.41	60	389	87	13.0	.61	60	276	79	9.2	.29
					80	447	91	11.2	.65	80	356	85	8.9	.29	80	250	77	6.2	.13
			870		40	661	97	33.0	.57	40	528	90	26.4	.25	40	362	80	18.1	.11
	421	3		16,530	60	586	93	19.5	.20	60	466	86	15.5	.09	60	323	78	10.8	.04
					80	520	89	13.0	.09	80	411	83	10.3	.04	80	286	76	7.1	.02
					30	876	97	43.8	.82	40	700	89	35.0	.35	40	492	81	24.6	.16
	481	3		22,110	60	783	93	26.1	.29	60	630	86	21.0	.12	60	442	79	14.7	.06
					80	693	89	17.3	.13	80	564	84	14.1	.06	80	392	76	9.8	.02

NOTES:

① Water temperature at the unit heater.
② Standard CFM measured at 70°F with density of .075 lb/cu ft.
③ Heat load in thousands of Btu/hr.

NOTE:
Leaving air temperature and MBH from table on previous page must be corrected for water temperatures other than 300°F and entering air temperatures other than 60°F. Liquid flow rates and pressure drops are not corrected.

Table below lists the correction factors. To determine correction factors falling between those shown, use the next lowest water temperature and the next highest entering air temperature shown.

MBH (corrected) = MBH (from page 390) x Correction Factor

LAT (corrected) = EAT + (MBH [corrected] x 926/CFM)

Water ∆T = MBH (corrected) x 2.08/USGPM

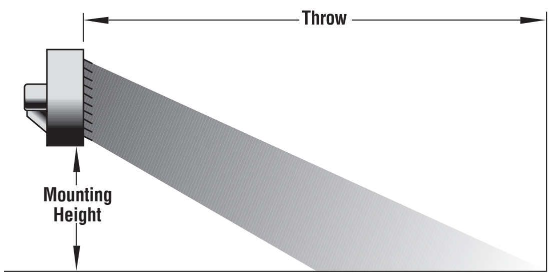
Correction Factors Based on 300°F① Entering Water, 60°F Entering Air

Entering Water Temp. (°F)	Temperature of Entering Air (°F)										
	0	10	20	30	40	50	60	70	80	90	100
260	1.15	1.10	1.04	0.99	0.94	0.88	0.83	0.78	0.73	0.69	0.64
270	1.19	1.14	1.08	1.03	0.98	0.93	0.88	0.82	0.78	0.73	0.68
280	1.23	1.18	1.13	1.08	1.02	0.97	0.92	0.87	0.82	0.77	0.72
290	1.27	1.22	1.17	1.12	1.07	1.01	0.96	0.91	0.86	0.81	0.76
300	1.31	1.26	1.21	1.16	1.11	1.05	1.00	0.95	0.90	0.85	0.80
310	1.35	1.30	1.25	1.21	1.15	1.10	1.04	0.99	0.94	0.89	0.84
320	1.41	1.36	1.30	1.26	1.19	1.14	1.09	1.03	0.98	0.93	0.88
330	1.45	1.40	1.34	1.30	1.23	1.18	1.13	1.07	1.02	0.97	0.92
340	1.49	1.44	1.39	1.34	1.27	1.22	1.17	1.11	1.06	1.01	0.95
350	1.54	1.48	1.43	1.38	1.33	1.26	1.21	1.15	1.10	1.05	1.00
360	1.58	1.52	1.47	1.42	1.36	1.30	1.25	1.20	1.14	1.09	1.04
370	1.62	1.57	1.51	1.46	1.40	1.35	1.29	1.24	1.18	1.13	1.08
380	1.66	1.61	1.55	1.50	1.44	1.39	1.33	1.28	1.22	1.17	1.12
390	1.71	1.65	1.60	1.54	1.49	1.43	1.37	1.32	1.27	1.21	1.16
400	1.74	1.69	1.63	1.57	1.53	1.47	1.42	1.36	1.31	1.25	1.20

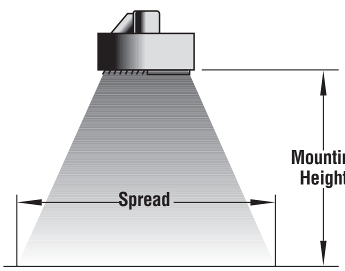
Mounting Heights, Throws and Spreads

The mounting heights, throws and spreads listed below are based on an air temperature rise (ΔT) of 40°F. To arrive at these values for temperature rises other than 40°F, first determine the actual temperature rise from the appropriate performance data page. Then multiply the values from table below by the correction factors shown.

NOTES:
1. Minimum mounting height is 7 feet.
2. Mounting height is measured from bottom of unit to floor.
3. Values in the table were determined with louvers at 45°.
4. If four-way discharge louvers are used for horizontal applications, multiply throws by 0.8.
5. Values given are based upon average conditions and could be severely affected by such factors as obstructions, cross drafts, etc.

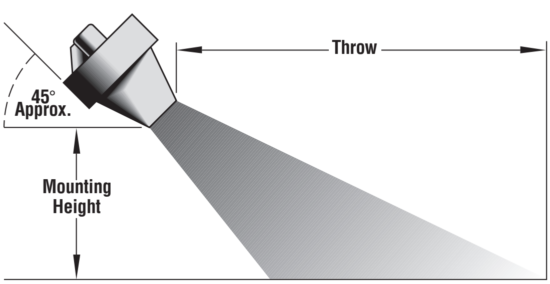


Horizontal Discharge—Standard Louvers

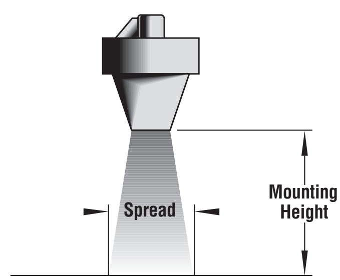


Vertical Discharge—Four-Way Louvers

Discharge Temperature Correction Factors	
Actual ΔT	Correction
10	1.18
20	1.12
30	1.06
40	1.00
50	0.94
60	0.88
70	0.82
80	0.76
90	0.70
100	0.64
110	0.58
120	0.51
130	0.45
140	0.39
150	0.33



Horizontal Discharge—High-Velocity Nozzle



Vertical Discharge—High-Velocity Nozzle

Unit Heater Mounting Heights, Throws and Spreads

Model Size	Horizontal Louvered			Vertical Louvered			Horizontal High Velocity			Vertical High Velocity		
	Outlet Velocity FPM	Max. Mounting Height (ft)	Throw (ft)	Outlet Velocity FPM	Max. Mounting Height (ft)	Spread (ft)	Outlet Velocity FPM	Max. Mounting Height (ft)	Throw (ft)	Outlet Velocity FPM	Max. Mounting Height (ft)	Spread (ft)
101	600	10	30	660	10	25	2,310	12	40	2,310	17	15
121	750	12	44	820	13	38	2,050	14	58	2,050	22	20
141	1,090	14	53	1,200	16	48	2,620	17	72	2,620	27	25
161	1,110	15	66	1,220	17	52	2,290	18	88	2,290	29	27
181	1,200	16	72	1,320	18	55	2,270	19	94	2,270	31	29
201	1,220	17	76	1,340	18	56	2,380	20	101	2,380	31	29
241	1,360	18	82	1,500	19	59	2,340	22	109	2,340	32	30
301	1,340	20	84	1,500	20	62	2,270	24	112	2,270	34	32
361	1,220	21	88	1,340	21	65	2,210	25	122	2,210	36	34
421	1,110	21	118	1,230	21	66	2,180	25	158	2,180	36	34
481	1,140	22	118	1,270	22	70	2,210	26	160	2,210	37	35
102	550	9	22	600	9	24	2,000	11	30	2,000	15	13
122	730	12	37	800	13	38	2,000	14	49	2,000	22	20
142	840	13	45	920	15	46	2,000	16	62	2,000	26	24
162	970	15	56	1,060	17	51	2,000	18	75	2,000	29	27
182	1,050	16	66	1,160	18	55	2,000	19	86	2,000	31	29
202	1,030	16	69	1,130	18	56	2,000	19	92	2,000	31	29
242	1,170	17	73	1,280	19	59	2,000	20	97	2,000	32	30
302	1,180	19	74	1,320	20	62	2,000	23	98	2,000	34	32
362	1,100	20	78	1,210	20	62	2,000	24	110	2,000	34	32
422	1,020	21	110	1,130	21	66	2,000	25	145	2,000	36	34
482	1,040	22	110	1,150	22	70	2,000	26	147	2,000	37	35

Sound Data

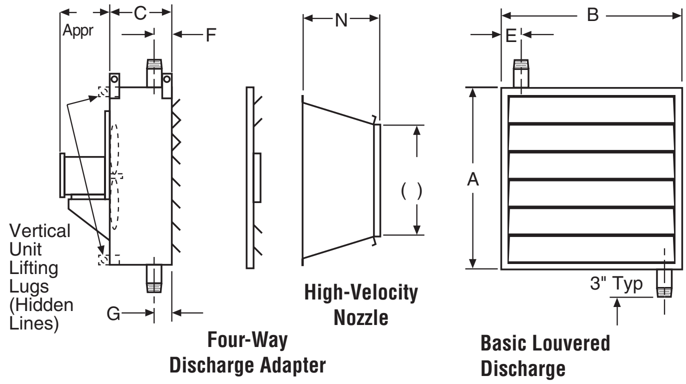
Since unit heaters use fans and motors to move air, sound is a natural result. The sound rating of a particular unit may limit its use in a given application. The following sound rating table is presented to allow you to select a unit based upon an acceptable sound level.

Sound Data

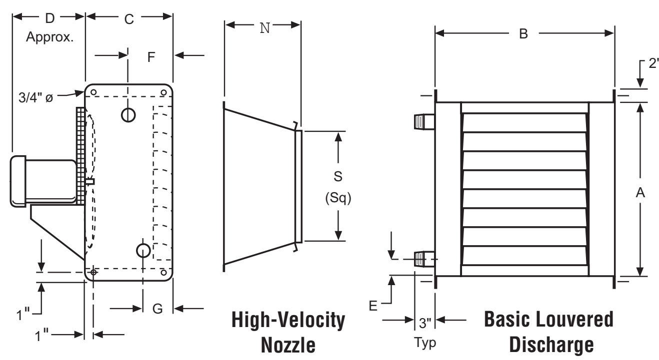
Unit Heater Size	dBA Sound * Pressure Level at 3 Feet from Unit
101 102	63 63
121 122	63 63
141 142	66 65
161 162	74 73
181 182	77 76
201 202	81 81
241 242	82 82
301 302	84 83
361 362	85 85
421 422	84 83
481 482	85 85

* Per fan.

10"–20" Units



24"–48" Units



NOTE: Connections are MPT

(Four-way louver section *replaces* basic louver section)

Dimensions and Weights

Model Size	Dimensions (in)										Basic Unit With Horizontal or Vertical Louvers Weights by Core Type (lb)			Additional Weight for High-Velocity Discharge Nozzle (lb)
	A	B	C	D	E	F	G	Conn. MPT	N	S	ST/AL	ST/ST	SS/SS	
101 102	15	17-3/4	12	9	1-3/8	4-1/2	4-1/4	1-1/2	10	7	95 135	105 155	95 145	11
121 122	17-1/4	19-3/4	12	9	1-3/8	4-1/2	4-1/4	1-1/2	10-3/4	9-3/4	105 150	120 180	110 165	14
141 142	19-1/2	21-3/4	12	9	1-3/8	4-1/2	4-1/4	1-1/2	11-1/2	11-3/4	120 175	140 210	125 190	16
161 162	22	23-3/4	12	9	1-3/8	4-1/2	4-1/4	1-1/2	12-1/4	14-1/4	135 195	165 240	145 220	19
181 182	24-1/4	25-3/4	12	9	1-3/8	4-1/2	4-1/4	1-1/2	13	16-3/4	150 220	185 280	160 250	22
201 202	26-1/2	27-3/4	12	9	1-3/8	4-1/2	4-1/4	1-1/2	13-3/4	18	170 245	210 315	180 285	24
241 242	32	34-1/4	18	12	2-7/16	6-3/4	4-1/4	2	14-1/2	20-3/4	290 360	350 470	320 420	17
301 302	39-1/4	40-1/4	18	12-1/2	1-13/16	6-3/4	4-1/4	2	18-13/16	26	360 460	460 650	410 550	31
361 362	45-1/4	46-1/4	18	12-1/2	2-5/8	6-1/2	4-1/2	2-1/2	22-7/8	29-1/2	440 550	560 800	500 680	47
421 422	52-1/4	52-1/4	22	15	2-5/8	6-1/4	4-3/4	3	29-3/8	33	680 830	850 1,150	770 1,010	35
481 482	59-1/4	58-1/4	22	15	2-3/8	6-1/4	4-3/4	3	31-1/4	38	800 990	1,030 1,430	920 1,240	47

* Dual units have two fans and two motors and, therefore, have twice the width and weight.

Designs, materials, weights and performance ratings are approximate and subject to change without notice. Visit armstronginternational.com for up-to-date information.

Installation Guidelines

Below are some abbreviated installation guidelines. Consult Armstrong for more detailed installation, operation and maintenance instructions.

General Piping Guidelines

1. Provide adequate support from the building structure to eliminate piping stresses.
2. Allow movement of the piping to provide for expansion and contraction. Use swing joints where possible.
3. Adequately support all piping. Do not use unit heater for this purpose.

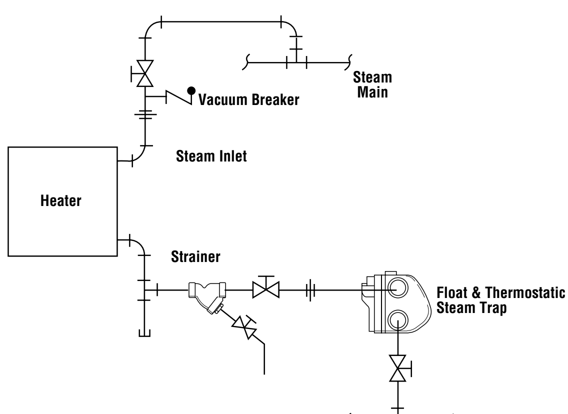
Steam Piping

1. Slope steam piping under 10' long toward the steam main. If steam pipe is longer than 10', slope toward the unit and install a drip trap before the unit.
2. All steam and condensate lines must be of the proper size to carry the calculated loads.
3. Only continuously draining traps such as inverted bucket or float and thermostatic types should be used. If an inverted bucket trap is used, an air vent should be installed downstream of the unit and before the trap.
4. Maintain the unit heater outlet size to the trap takeoff.
5. If condensate is to be lifted or if the return system is pressurized, use a check valve after the steam trap and provide a gate valve on the strainer to drain the heater in the off season.

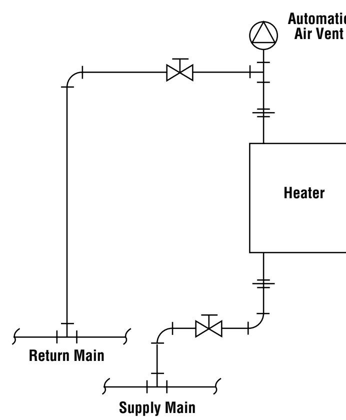
Liquid Piping

1. Supply return mains must be sloped for adequate venting.
2. Provide air vents at all high points.
3. Circulating pumps must be of adequate size to provide the required liquid flow and to overcome the system pressure drops.

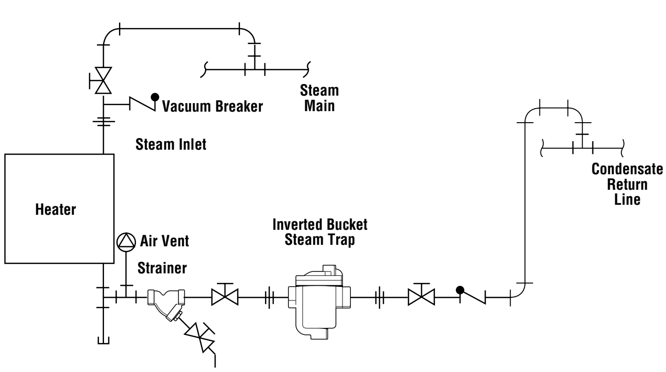
Typical Piping Arrangements



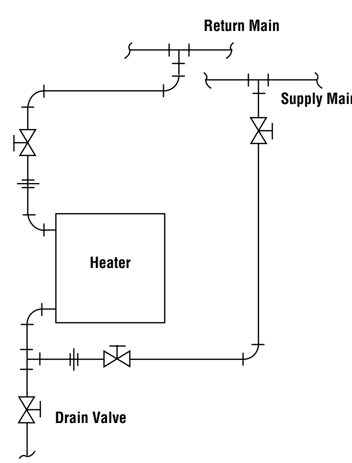
Recommended piping arrangement for steam when draining heater to gravity return.



Recommended piping arrangement for liquids to lower mains.



Recommended piping arrangement for steam when draining heater to overhead return.



Recommended piping arrangement for liquids to overhead mains.

Sample Specifications

Armstrong®

Unit heaters supplied shall be manufactured with the methods and materials specified as follows:

General

Enclosures and Louvers—Shall be of minimum 14 ga galvanized steel and finished in gray enamel. (Epoxy coatings and other protective finishes are available.) Fans shall have aluminum alloy blades with steel hubs. (Epoxy coatings and other protective finishes are available.)

Motors—Shall be heavy-duty industrial type TEFC, ball bearing, standard NEMA frame motors. Electrical supply shall be ______ phase ______ volts 60 Hz. (Explosion-proof and other motor types available.)

Fan Guards—Shall be provided with each unit and be OSHA approved.

Core Type Specific

Steel tube/steel fin:

Tubes—Shall be 1" OD 12 ga steel tube. Minimum wall thickness shall be .109".

Fins—Shall be helically wound L-footed and of minimum .024" thick steel.

Headers—Shall be of carbon steel not less than .145" thick.

Connections—Shall be of Schedule 80 carbon steel pipe.

Assembly—Shall be welded to form a monometallic, internally wetted surface. Standard testing pressure at 525 psig. Pressure parts all welded.

Steel tube/aluminum fin:

Tubes—Shall be of 1" OD 12 ga steel tube. Minimum wall thickness shall be .109".

Fins—Shall be helically wound embedded type and of minimum .020" thick aluminum.

Headers—Shall be of carbon steel not less than .145" thick.

Connections—Shall be of Schedule 80 carbon steel pipe.

Assembly—Shall be welded to form a monometallic, internally wetted surface. Standard testing pressure at 525 psig.

Stainless steel tube/stainless steel fin:

Tubes—Shall be 304 L (or 316 L) 1" OD 14 ga stainless steel tube. Minimum wall thickness shall be .083".

Fins—Shall be helically wound L-footed and of minimum .020" thick 304 (or 316) stainless steel.

Headers—Shall be of the same stainless steel as the tubes not less than .109" thick.

Connections—Shall be of Schedule 40 stainless steel pipe.

Assembly—Shall be welded to form a monometallic, internally wetted surface. Standard testing pressure at 525 psig.

Stainless steel tube/steel fin:

Tubes—Shall be 304 L (or 316 L) 1" OD 14 ga stainless steel tube. Minimum wall thickness shall be .083".

Fins—Shall be helically wound L-footed and of minimum .024" thick steel.

Headers—Shall be of the same stainless steel as the tubes not less than .109" thick.

Connections—Shall be of Schedule 40 stainless steel pipe.

Assembly—Shall be welded to form a monometallic, internally wetted surface. Standard testing pressure at 525 psig.