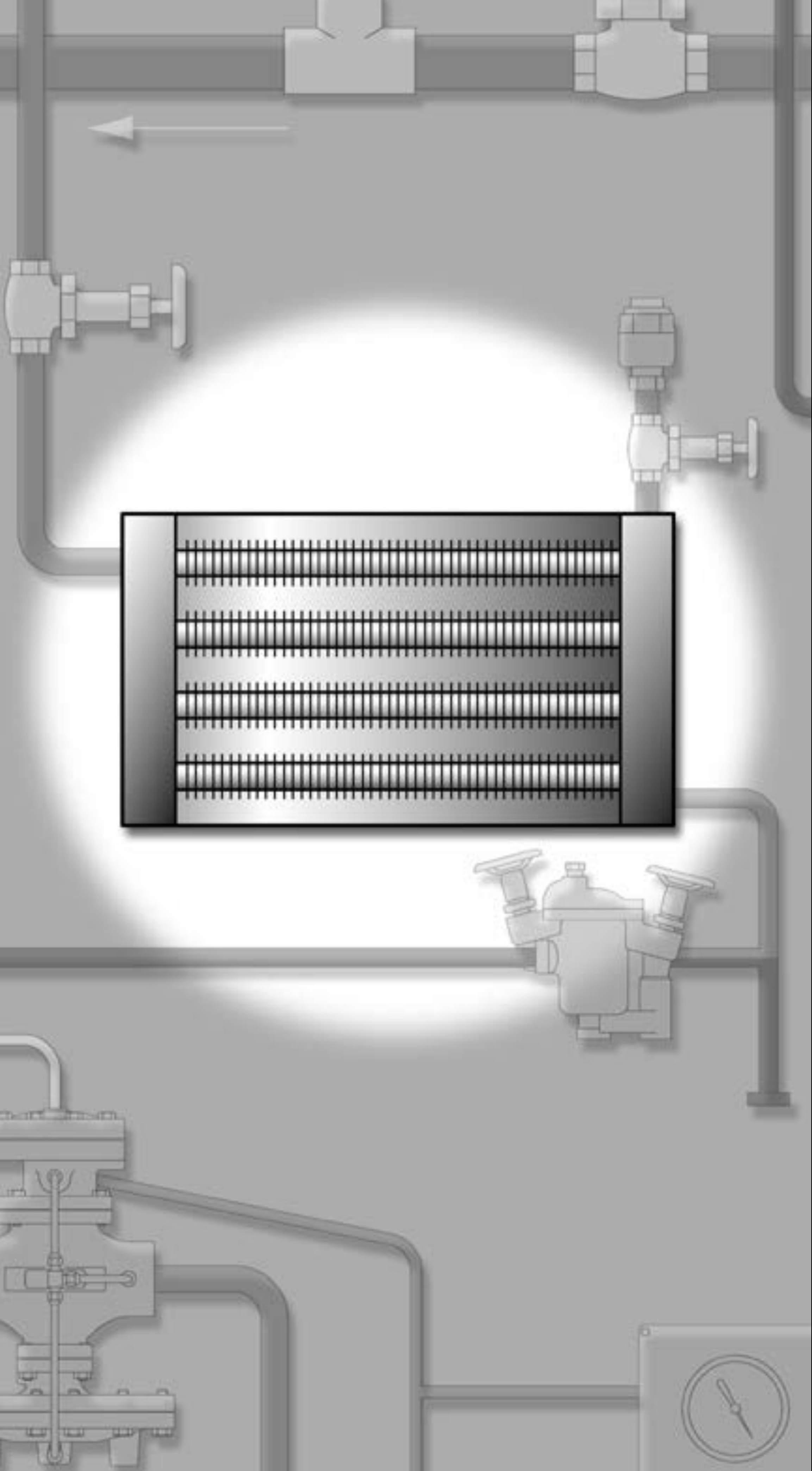


Heating and Cooling Coils

Why Leaky Coils Are a Losing Proposition

Leaky coils can be the beginning of the end for efficient heat transfer. Although coils may fail for a variety of reasons, mechanical failure and corrosion are the culprits in the majority of cases. When coils corrode, unwanted moisture and contaminants may foul the air stream or exhaust gases. And a steam leak from a badly corroded coil simply blows precious energy off into the atmosphere.

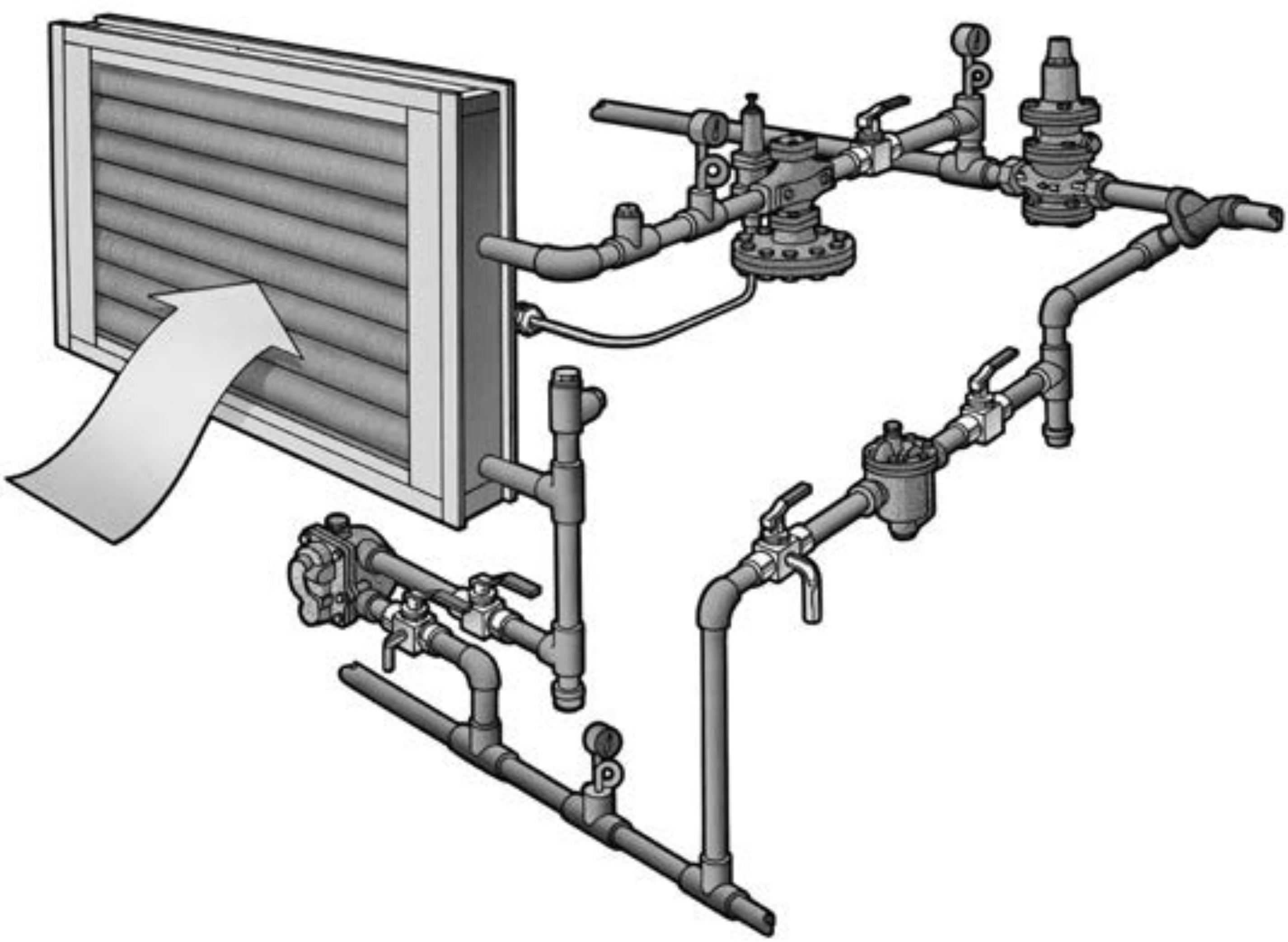
External corrosion. Contaminants in the airstream cause external corrosion. Dirt buildup intensifies corrosive action by trapping contaminants in concentrated pockets. And it's accelerated when dirt becomes strong airborne mist. Factors such as inappropriate fin pitch, fabricating techniques and material selection may also fuel external corrosion.

Internal corrosion. Retention of contaminated condensate or inadequate venting of non-condensable gases are major causes of internal corrosion. When CO_2 gas dissolves in condensate that has cooled below steam temperature, it forms highly corrosive carbonic acid. Likewise, oxygen left to stagnate in the system fosters corrosive action by pitting iron and steel surfaces. Joining pipes/tubes in headers of dissimilar materials may spawn galvanic action. Internal stresses due to improper welding may also hasten corrosion damage.

Armstrong to the Rescue

Armstrong's help in coil selection and design is one of the best defenses against external corrosion. We offer a wide selection of fin pitches to help combat dirt buildup. What's more, sturdy fins lend extra strength to withstand high-pressure cleaning without damage or distortion. As a defense against non-environmental factors, Armstrong fabricates coils in a full range of metals and alloys. You may also specify special coatings to increase external corrosion resistance.

Proper trapping and venting—a specialty of your Armstrong Representative—is where defense against internal corrosion



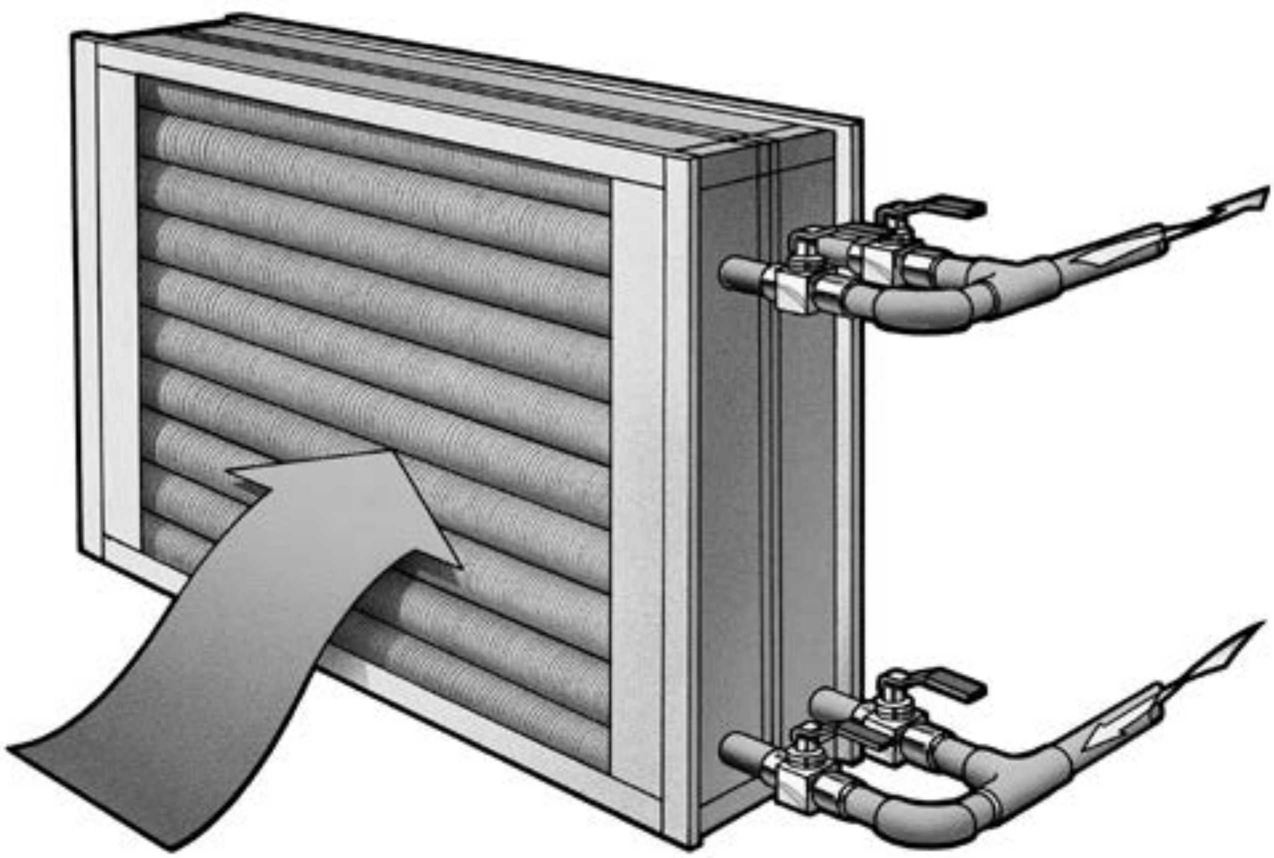
begins. Armstrong reps are steam specialists with more than 75 years of experience in properly sizing, locating and piping steam traps, strainers, vents and related equipment. That's why only Armstrong gives you quality steam coils—plus the installation and trapping help you need to make them work in your total system.

A System to Make Yours More Efficient

Today, the Armstrong "system" merges coil-building experience, practical knowledge and technical know-how from years of trapping coil installations. The result: coils that survive the rigors of high pressures, high temperatures and corrosive conditions.

For example, Armstrong fabricates standard steel heating coils from 1" OD 12 ga ERW Tube (.109" wall) helically wound with 0.024" thick steel fins at varying fin pitches. Each coil is tested during construction, and the completed unit is again tested hydrostatically to not less than 1.3 times the design pressure with a standard testing pressure at 450 psig for steel or stainless steel cores.

It's this simple: It takes one system to improve another. Exactly how the Armstrong system of product and service carefully matches coils to your specs and applications is the subject of the following pages.



Material Selection for Tubes, Headers and Connections

The choice of tube material depends upon several important factors:

- The corrosive quality of the steam or liquid medium
- The ability to pipe, trap and vent steam coils effectively
- The size and service requirements of the installation
- The external corrosion to which the coils are likely to be subjected

Generally speaking, the heat transfer characteristics of the tube material are of little consequence. The table on the next page illustrates the relative effect of tube materials on overall heat transfer. Because the fin area constitutes the vast majority of the heat transfer surface, it is the most important factor determining heat transfer effectiveness. Therefore, the choice of tube materials should be based on service requirements, not heat transfer efficiency.

Internal corrosion. The base material found in the 6000 Series coils is steel. The minimum wall thickness is .109" for steam coils and liquid coils, which affords both strength and corrosion resistance. All Armstrong coils are of monometallic design, which means that all wetted parts are made of the same materials. This precludes the likelihood of galvanic corrosion often experienced in coils made of dissimilar materials. For most applications, steel will provide very satisfactory service. In order to do this, however, steam coils must be carefully piped, trapped and vented to ensure good condensate and non-condensable gas evacuation.

The cross section of the coil on the right shows how internal corrosion caused by improper piping, trapping and venting may destroy coils from the inside out.

There are many cases where the steam cannot be conditioned enough to be non-corrosive or it is not possible to pipe, trap and vent the coils properly. For those areas, Armstrong recommends stainless steel wetted parts. Choosing which of these is most appropriate depends on the degree and type of problem as well as the steam pressure involved.

External corrosion. In the case of external corrosion, factors concerning the corrosiveness of the airstream enter into the decision. The choice of steel or stainless steel for the wetted parts depends on the compatibility of those materials with the contaminants in the airstream. In addition to the base materials available, Armstrong also offers hot dipped galvanizing, epoxy dip or baked phenolic coatings. These are frequently used when only external corrosion is a consideration.

Service requirements. These may be as important as the above considerations. Coil failures manifest themselves in many forms, but the most prevalent is failure of the tube-to-header joints. This failure occurs as a result of coil design defects, insufficient material at the tube-to-header joints or because of the method of connecting the tubes to the headers.

Armstrong 6000 Series coils are designed to accommodate the service requirements of the particular installation. They are built with enough material at the tube-to-header joints to make them strong. When differential expansion between tubes in steam coils is likely to over-stress the joints, centifeed type coils are recommended. Finally, Armstrong coils are always of welded construction, providing the best method of connecting the two parts together.

Computer-controlled equipment like this simplifies the process of drilling coil headers.

Tube Materials

The best combination of coil materials is the one that delivers maximum heat transfer and service life. Tubes, regardless of material, contribute little to heat transfer in extended-surface coils. It is the fins, fully exposed to the airstream, that provide the greatest contribution to heat transfer. Therefore, choose tube material on the basis of application.

Relative Heat Transfer Capacities of Identical Coils Using Different Tube Materials	
Tube Material	**Relative HT Capacity**
Copper	1.00
Aluminum	1.00
Steel	.98
Stainless Steel	.95

Material Selection for Fins

The heat transfer coil is essentially a tube on which fins are spirally wound or similarly attached. The fins produce an extended surface to improve heat transfer to or from air or other gases passing over the fins. The effective heat transfer of a coil is based on fin pitch (number of fins per inch), fin height, fin material and method of attachment.

Copper fins offer the best heat transfer, but aluminum fins provide the best overall value. Compared to aluminum fins, steel fins reduce heat transfer. Compared to aluminum and steel, stainless steel fins reduce heat transfer significantly. Fins may be of aluminum, copper, steel, or stainless steel, depending on contaminants, operating conditions and economic considerations.

The selection of fin materials should be based upon several considerations:
- The heat transfer characteristic desired
- The compatibility of the material with the air stream
- The amount and type of particulate matter in the air stream
- The frequency and aggressiveness of coil cleaning

The table below illustrates the heat transfer effectiveness of various fin materials with Armstrong coils. Note that these relative heat transfer capacities are for a specific set of conditions. The factors will vary with different conditions.

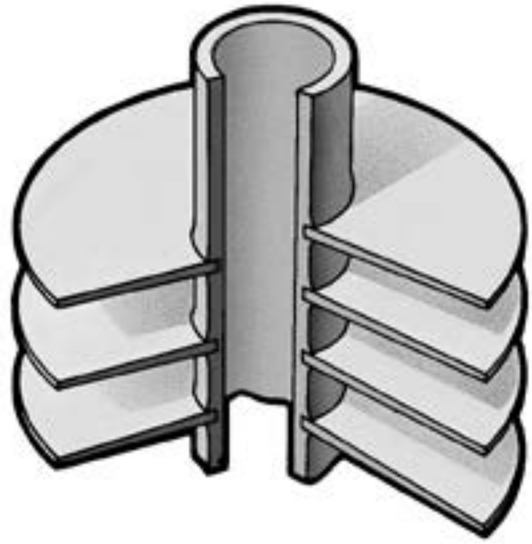
The fin/tube combinations available are listed on page 349.

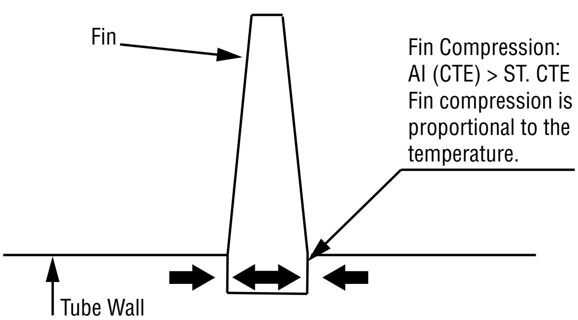
Relative Heat Transfer Capacities of Armstrong Coils With Tubes and Fins of Various Materials*		
Tube Material	**Fin Material**	**Relative HT Capacity**
Steel	Copper Keyfin	1.05
Steel	Aluminum Keyfin	1.00
Stainless Steel	Aluminum Keyfin	.94
Steel	Steel L Fin	.92
Stainless Steel	Stainless Steel L Fin	.58

*At 800 ft/min velocity, 7 fins/inch and 300°F steam temperature. Will vary at other conditions.

Keyfin

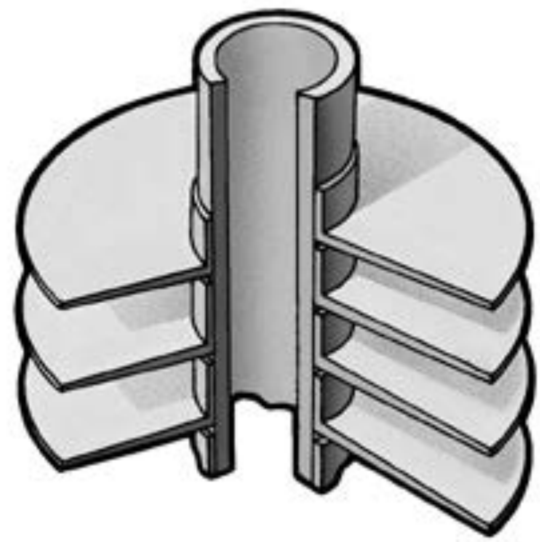
The keyfin is the standard design for Armstrong's most popular coils. Keyfin coils are manufactured by forming a helical groove in the tube surface, winding the fin into the groove and peening the displaced metal from the groove against the fin. This means a tight fit between the fin and the tube, providing for efficient operation over wide temperature ranges. Keyfin is the superior design for dissimilar fin and tube materials.





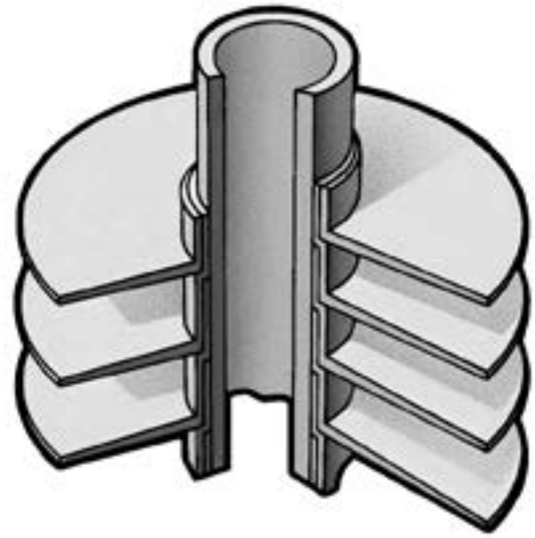
L Fin

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.



Overlap L Fin

The overlap L fin is simply an L fin with an extended base. Each fin overlaps the foot of the previous fin, completely covering the tube surface. The overlap technique makes it possible to create a completely aluminumized coil for applications where exposed steel would be vulnerable to corrosion.



Why Settle for What's "Available" When You Can Specify Exactly What You Need?

Armstrong

Armstrong manufactures heavy-duty industrial coils in a wide range of sizes and materials to meet virtually any application demand. Dimensionally duplicated to fit your exact requirements, Armstrong coils are what you need. Whether it's off the shelf or off the wall. Other materials will be considered upon request.

Construction Features		
Tubes/Pipes		
Carbon Steel Tubes	Standard	12 ga A-214 ERW
	Optional	10 ga A-214 ERW 12 ga A-179 seamless 10 ga A-179 seamless
Carbon Steel Pipes	Optional	Sch 80 seamless; A-106 Gr 'B'
Stainless Steel Tubes	Standard	14 ga (1" OD) 12 ga (1-1/2" OD) A-249 type 304L
	Optional	14 ga (1" OD) 12 ga (1-1/2" OD) A-249 type 316L
Fins		
Steel	Standard	0.024" thick on 3/4" NPS pipes 0.024" thick on 1" OD tubes 0.036" thick on 1-1/2" OD tubes & 1" NPS & larger pipe
Aluminum	Standard	0.020" thick on all tube sizes 0.016" thick on 1" OD
	Optional	0.030" heavy keyfin 1" & 1-1/2" OD steel and stainless steel tube
Stainless Steel		0.020" thick type 304 & 316 on all sizes
Copper		0.016" thick on all sizes
Connections		
Steel		Sch 80 (screwed), Sch 40 (flanged)
Stainless Steel		Sch 40 (screwed), Sch 10 (flanged)
Headers		
All coils have headers of the same material as tubing and are of welded construction.		
Casing		
Galvanized Steel	Standard	Minimum 12 ga galvanized for depth 7-1/2" and over Minimum 14 ga galvanized for depth under 7-1/2"
Stainless Steel	Optional	14 ga type 304 & 316 for all depths
Aluminum	Optional	12 ga for all depths
Other gauge material available on request. All casings have drilled flanges for duct mounting unless specified otherwise.		
Design Pressure		
Standard design pressure for steel coils is 300 psig @ 650°F, stainless steel coils 300 psig @ 500°F. Hot oil coil: 250 psig @ 750°F. Higher pressure and/or temperature construction is available on request. -20°F MDMT, lower MDMT available on request.		
Testing		
All coils are tested hydrostatically to at least 1.3 times the working pressure with a standard testing pressure at 450 psig on steel & stainless steel steam coils.		
Options		
Steel tube with steel fin coils can be supplied hot dip galvanized. Steel/steel and steel/aluminum coils can be supplied with baked phenolic or epoxy coatings. Coils are available with ASME Section VIII, Division I, "U" stamps or CRN approval.		

Model Number Selection Series 6000 Coils

MODEL NUMBER

S H 2 – A 09 – Q 08 – 30 x 72 x 6 –

TYPE OF COIL
- L = Liquid
- S = Standard
- C = Centifeed
- T = Tandem, Opposite-End Conns
- P = Tandem, Same-End Conns

PIPE/TUBE/AIRFLOW ORIENTATION
- H = Horiz. Tubes/Horiz. Air
- V = Vert. Tubes/Horiz. Air
- D = Horiz. Tubes/Vert. Down Air
- U = Horiz. Tubes/Vert. Up Air

ROWS DEEP IN DIRECTION OF AIRFLOW

FIN TYPE AND METALLURGY
- A = Aluminum Keyfin (.020")
- B = Aluminum Heavy Keyfin (.030")
- D = Aluminum G Fin (.020")
- E = Aluminum Overlap L Fin (.020")
- F = Copper Keyfin (.016")
- G = Steel L Fin (.024") on 3/4" NPS Pipe and 1" OD Tube (.036") on 1-1/2" OD Tube and 1” Pipe
- H = Steel G Fin (.024")
- J = 304 Stainless Steel L Fin (.020")
- K = 316 Stainless Steel L Fin (.020")
- U = Aluminum Keyfin (0.016”)

LIQUID COILS=NUMBER OF PASSES TH & PH TANDEM STEAM COILS= (L) OR (R) HAND OF COIL*

CASING DEPTH (INCHES)

CASING LENGTH (INCHES)

CASING WIDTH (INCHES)

PIPE NOMINAL BORE SIZE OR TUBE OD IN ONE-EIGHTHS OF AN INCH

PIPE/TUBE TYPE AND METALLURGY
- N = Sch 40 Seamless Steel Pipe (SA-106 Gr B)
- P = Sch 80 Seamless Steel Pipe (A-106 Gr B)
- Q = 12 ga Steel Tube (A-214 ERW)
- R = 10 ga Steel Tube (A-214 ERW)
- S = 12 ga Steel Tube (A-179 SMLS)
- T = 10 ga Steel Tube (A-179 SMLS)
- U = Sch 10 304L SS Pipe (A-312)
- V = Sch 10 316L SS Pipe (CA-312)
- W = 14 ga 304L SS Tube (A-249)
- X = 12 ga 304L SS Tube (A-249)
- Y = 14 ga 316L SS Tube (A-249)
- Z = 12 ga 316L SS Tube (A-249)

FINS PER INCH (FPI)

SPECIFY:

Number, Size and Type of Connections

Also call out non-standard items such as:
Header Inside or Outside of Casing
Special Casing Flange Width and Drilling
Airtight Casing
Mounting Plate (removable type)
Coatings, etc.
Number of Inlets
Connection Location
Fluid Circuiting (for Liquid Coil)

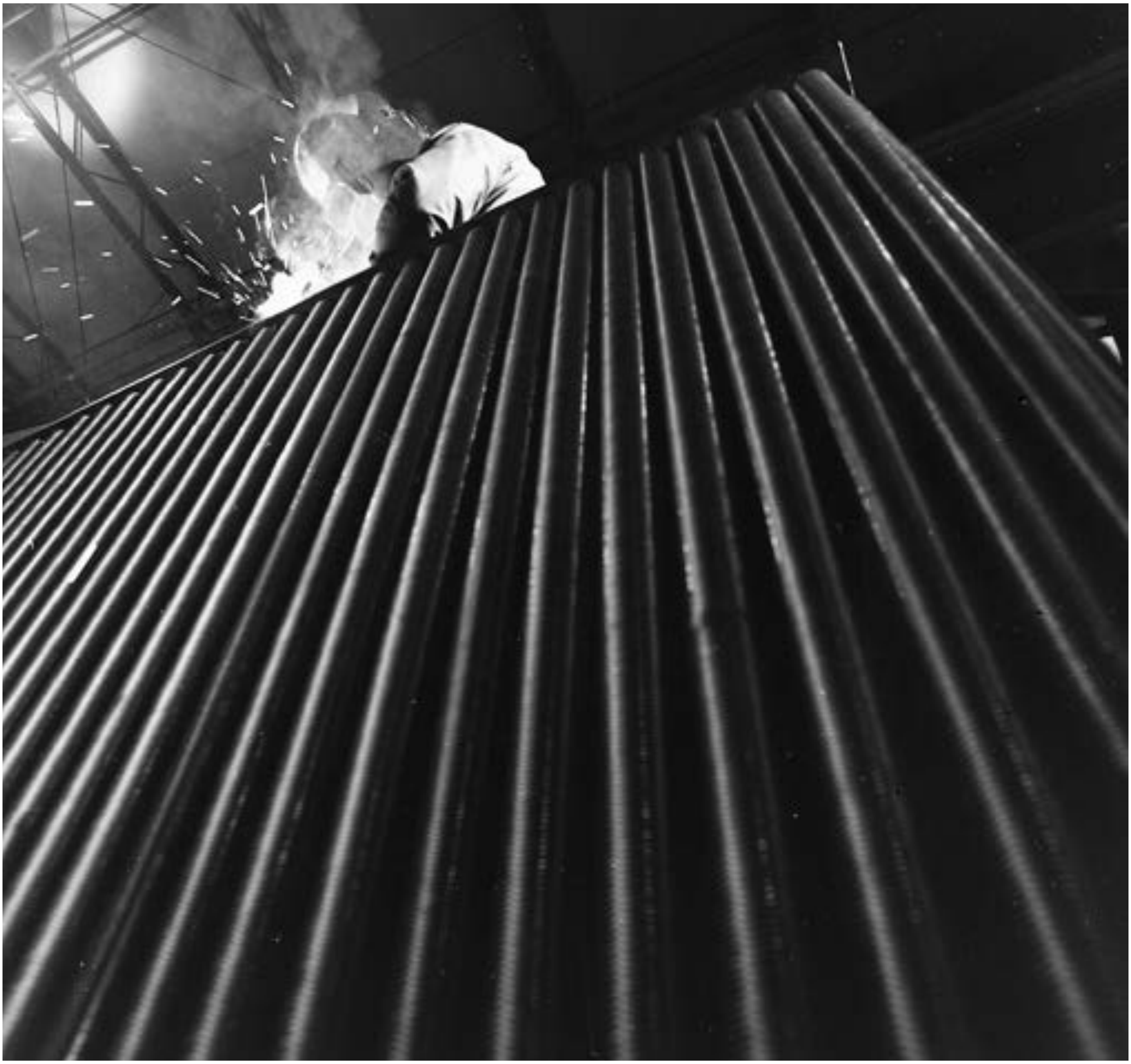
*Hand of coil is determined by the position of either the condensate connection or the leaving liquid connection when facing the coil with the airflow to your back.

For air heating coils, steam is the preferred medium for heat transfer throughout much of industry. It affords advantages over liquids because it is easy and inexpensive to move from the boiler to the point of use and because it gives up so much energy at a constant temperature when it condenses. Process control is easily and quickly accomplished with essentially no lag time as is experienced with liquids.

The selection of coil construction and materials is a multi-step process that must take a number of factors into consideration. Armstrong's line of heavy-duty steam coils is designed and manufactured to provide the long life and efficient heat transfer that pays dividends over a long period of time.

Selection of Steam Coil Circuitry

The following pages show the four types of coil circuits offered by Armstrong and discuss the application parameters of each. The return bend type circuit is not covered because Armstrong feels that one of the four listed circuits is a better choice for most applications.



Armstrong can build coils to a wide variety of material and performance specifications and dimensionally duplicate replacement coils to fit your exact requirements.

Standard Coils (Type S)

This type of coil is used for most applications where entering air temperatures are above 35°F and steam is at constant pressure. It is used extensively in high-temperature process applications and for “reheat” in HVAC systems. It is not, however, recommended where even outlet air temperatures are required immediately after the coil, such as in multi-zone heating systems, or where a modulating steam control valve is used to control temperature.

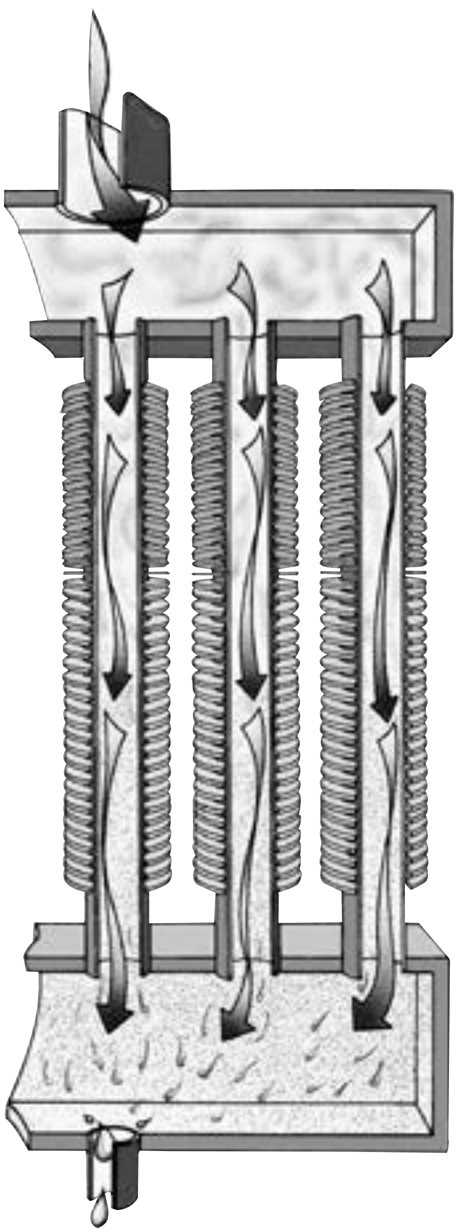
Centifeed Coils (Type C)

The single-row centifeed coil can be used where air is below freezing and/or modulating control is used. Recommended where:

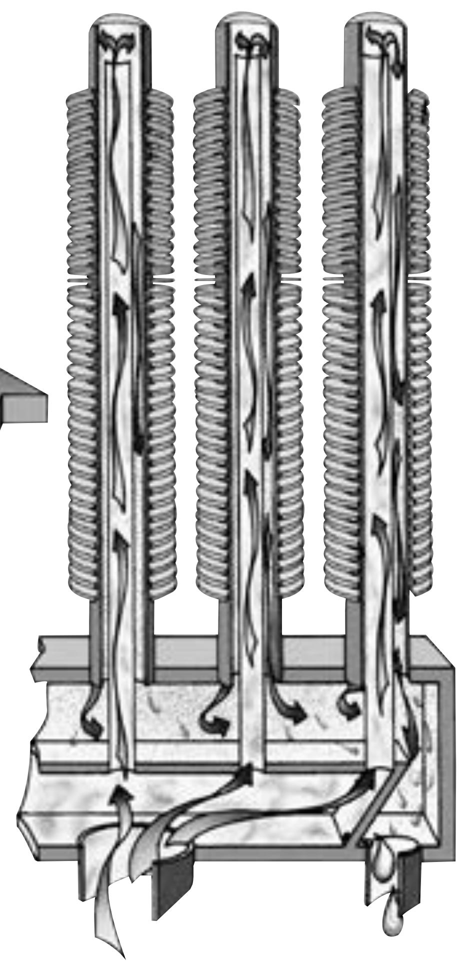
- **A** A single row delivers the required performance
- **B** A modulating steam control valve is used
- **C** Even outlet air temperatures are required over the whole coil face
- **D** Stainless steel tubes are used

Two-row centifeed coils are available where (B) and (C) are required, but tandem type coils are a better choice with freezing air temperatures.

A centifeed coil is one plain tube—called the inner steam distribution tube—inserted inside an outer finned tube. The center tube is fed with steam, which travels up this distribution tube and is then discharged into the outer tube. It then travels back between the outside wall of the distribution tube and the inside wall of the finned tube to the condensate header. The inner tube acts as a steam tracer to keep the finned tube warm along its total length.



AIRFLOW



Type S coils are available with opposite-end connections only.

Type C coils are available with same-end connections only.

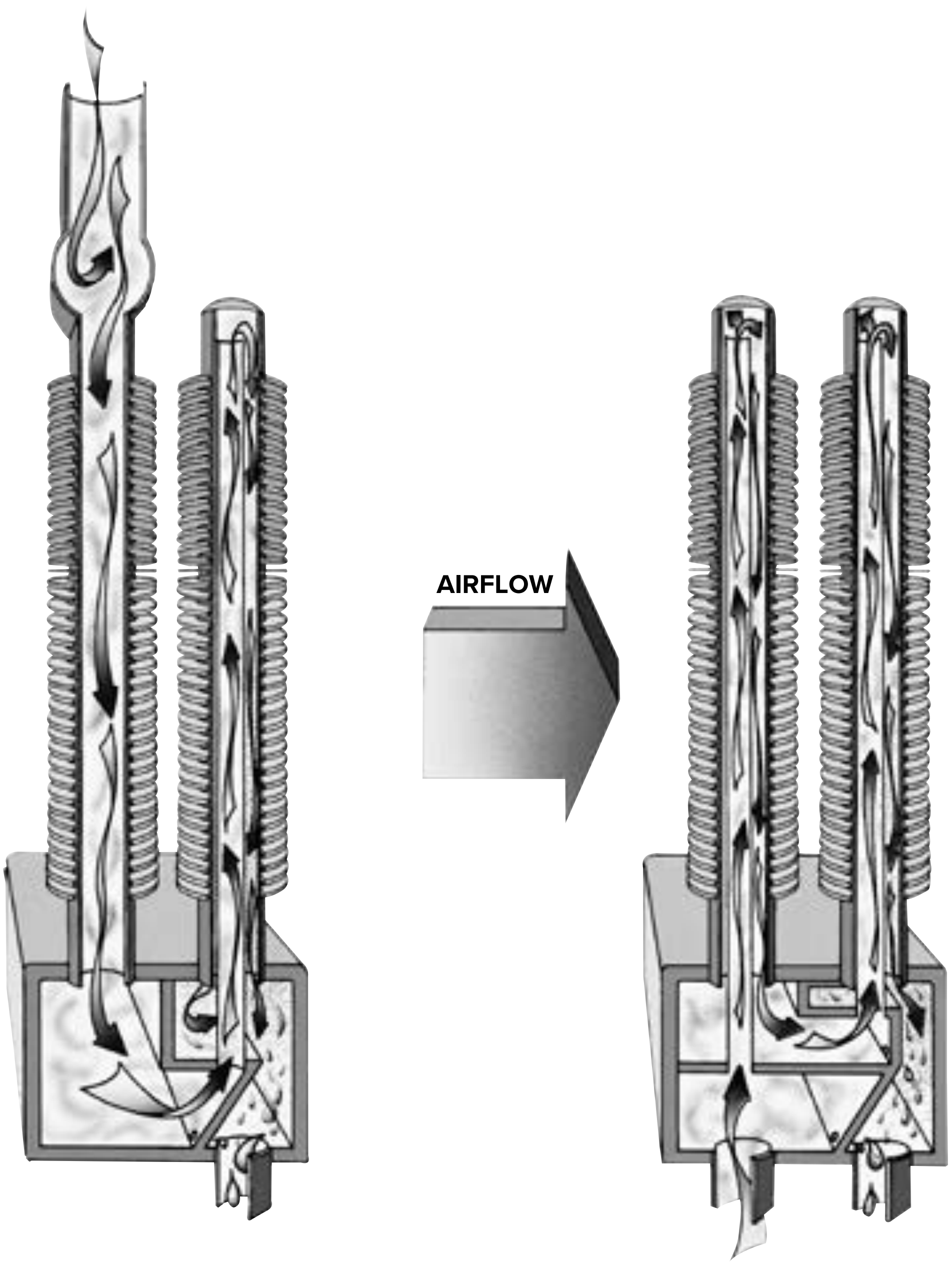
Tandem Coils (Types T and P)

Freezing applications requiring more than one row to achieve the desired final air temperature demand this type of coil.

The coil is designed so that the total amount of steam to be condensed by the whole coil is fed into the first row in the direction of airflow. This purges non-condensable gases and droplets of condensate from that part of the coil exposed to the coldest air. Channeling the steam from the header to the other rows in series has the same purging effect. This design ensures that air passing over the last row is at least 35°F.

The coldest part of the coil will always have steam in sufficient quantity to overcome unequal distribution and "backfeeding" due to differing steam loads and pressure drops in adjacent tubes. This eliminates freezing problems caused by condensate holdup.

The "series" feed characteristic of the tandem coil, as opposed to the "parallel" feed of the two-row centifeed coil, makes it the ideal choice for multi-row coils in freezing applications. If you want a stainless steel tube tandem, specify a P type.

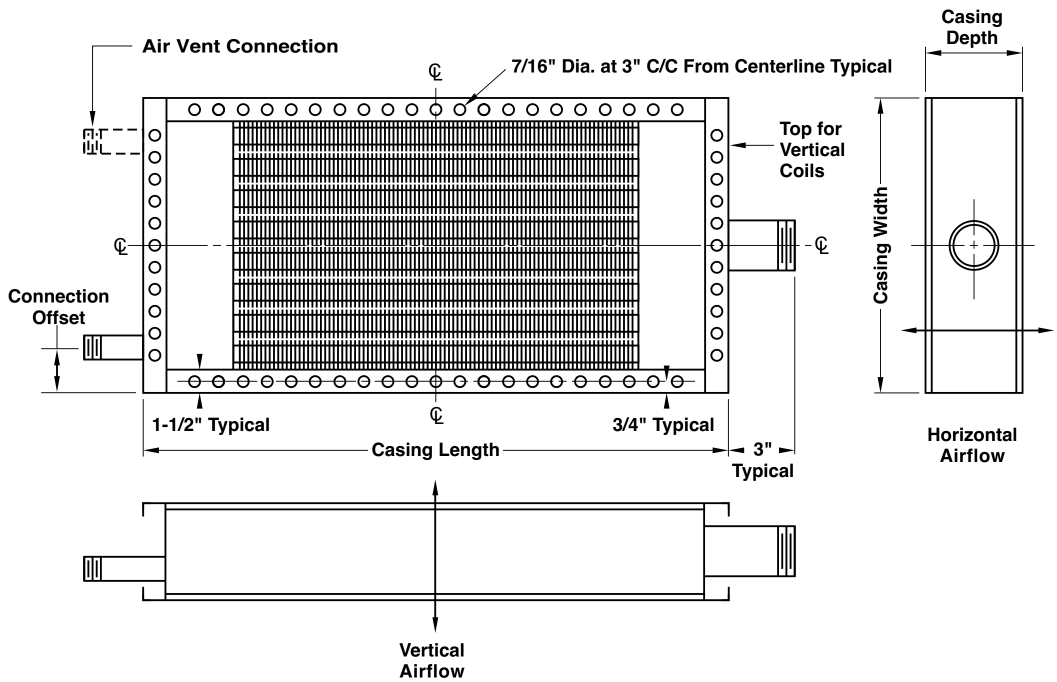


Type T coils have opposite-end connections.

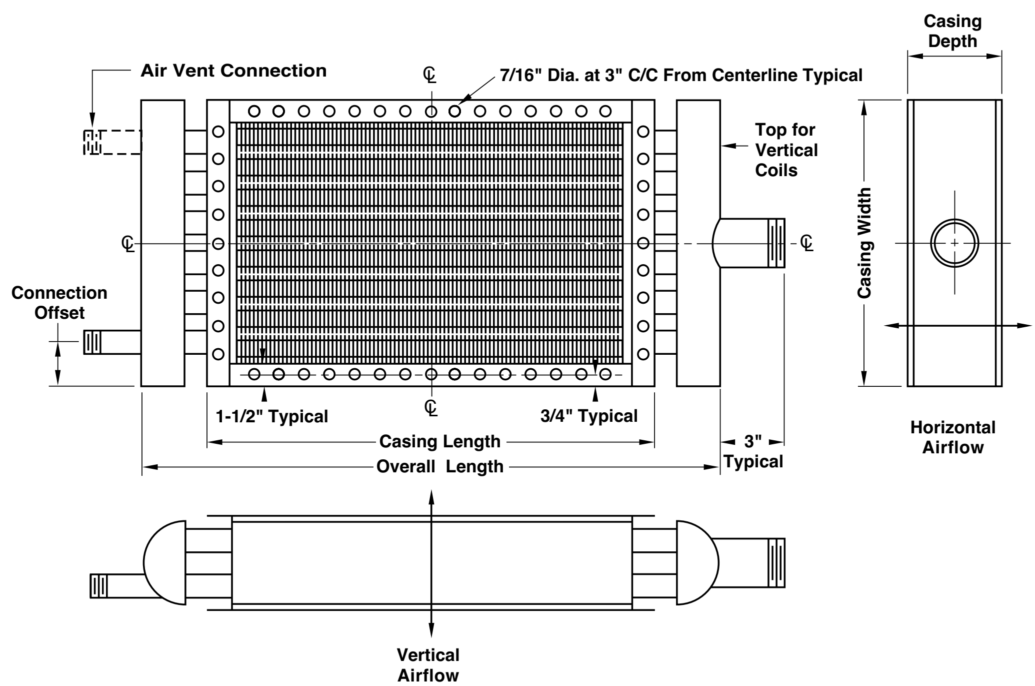
Type P units have same-end connections.

Steam Coil Typical Arrangements

- Standard Coils (Type S)
- Tandem Coils (Type T)
- For Vertical or Horizontal Airflow
- With Headers Inside the Casing



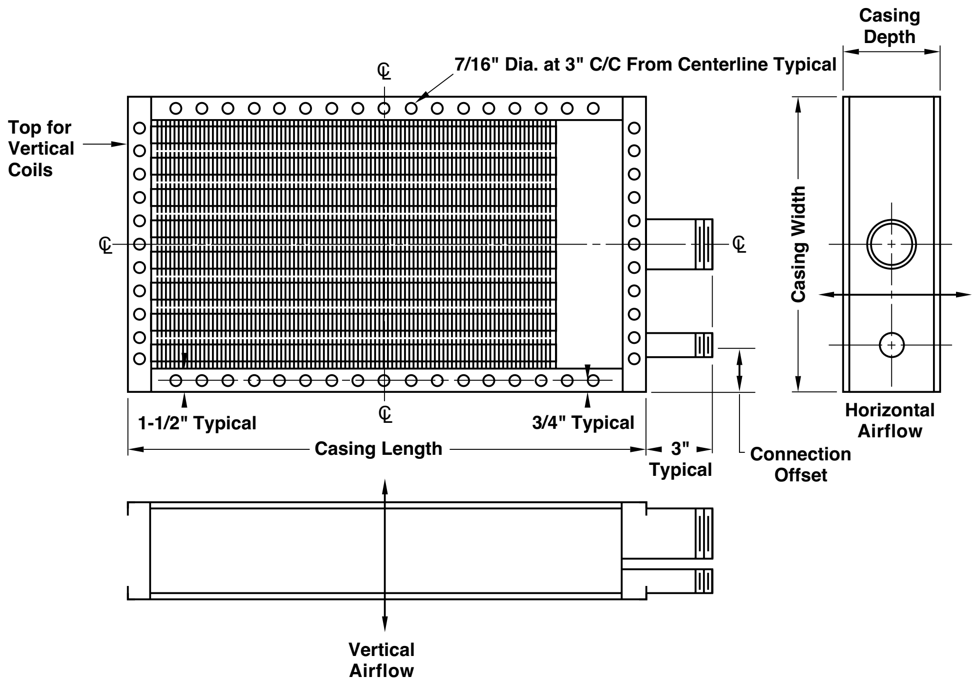
- Standard Coils (Type S)
- Tandem Coils (Type T)
- For Vertical or Horizontal Airflow
- With Headers Outside the Casing



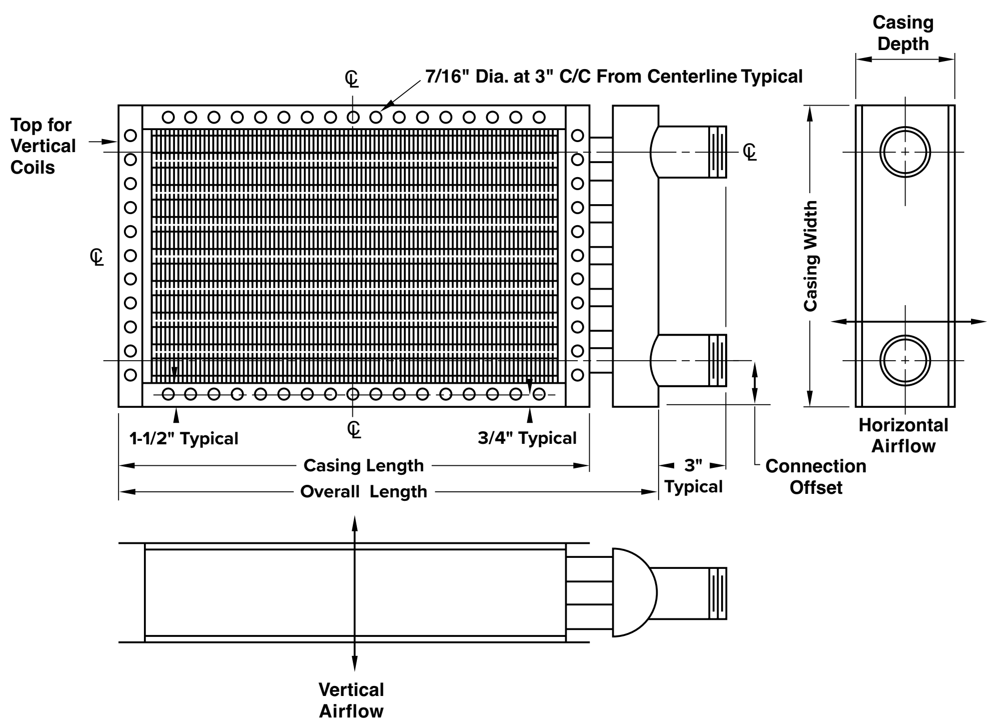
NOTES:
Always specify airflow directions and tube orientation when ordering coils.
Specify all dimensions for replacement coils, especially those varying from typicals above.
If coils are to be Tandem type, specify coil hand by facing the coil with airflow at your back and pointing to the condensate connection.

Minimum tandem casing depth is 7-1/2”, contact factory for details.

- Centifeed Coils (Type C)
- Centifeed Tandem Coils (Type P)
- For Vertical or Horizontal Airflow
- With Headers Inside the Casing



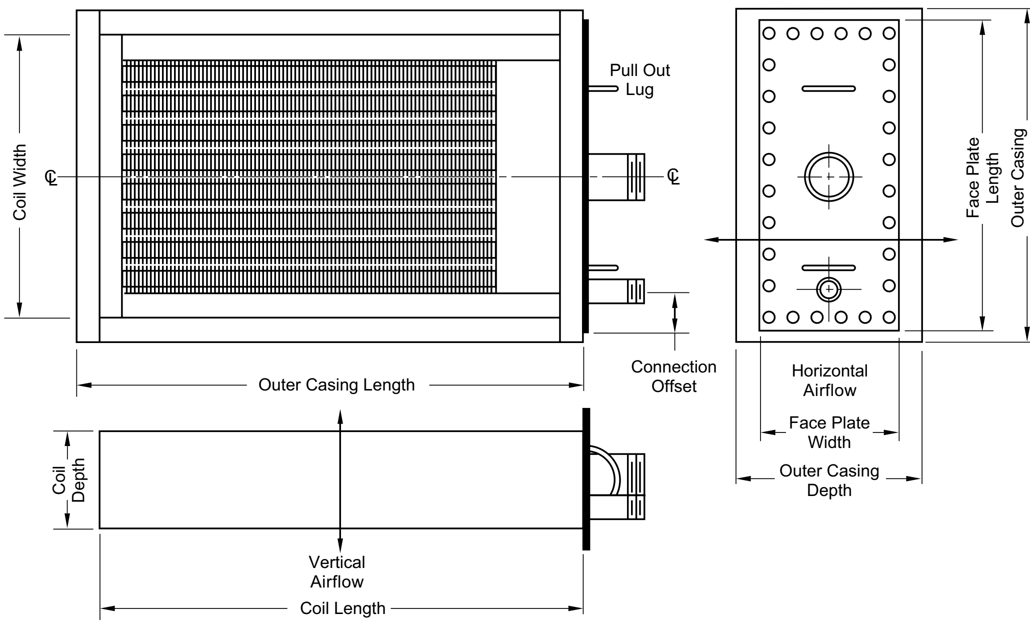
- Centifeed Coils (Type C)
- Centifeed Tandem Coils (Type P)
- For Vertical or Horizontal Airflow
- With Headers Outside the Casing



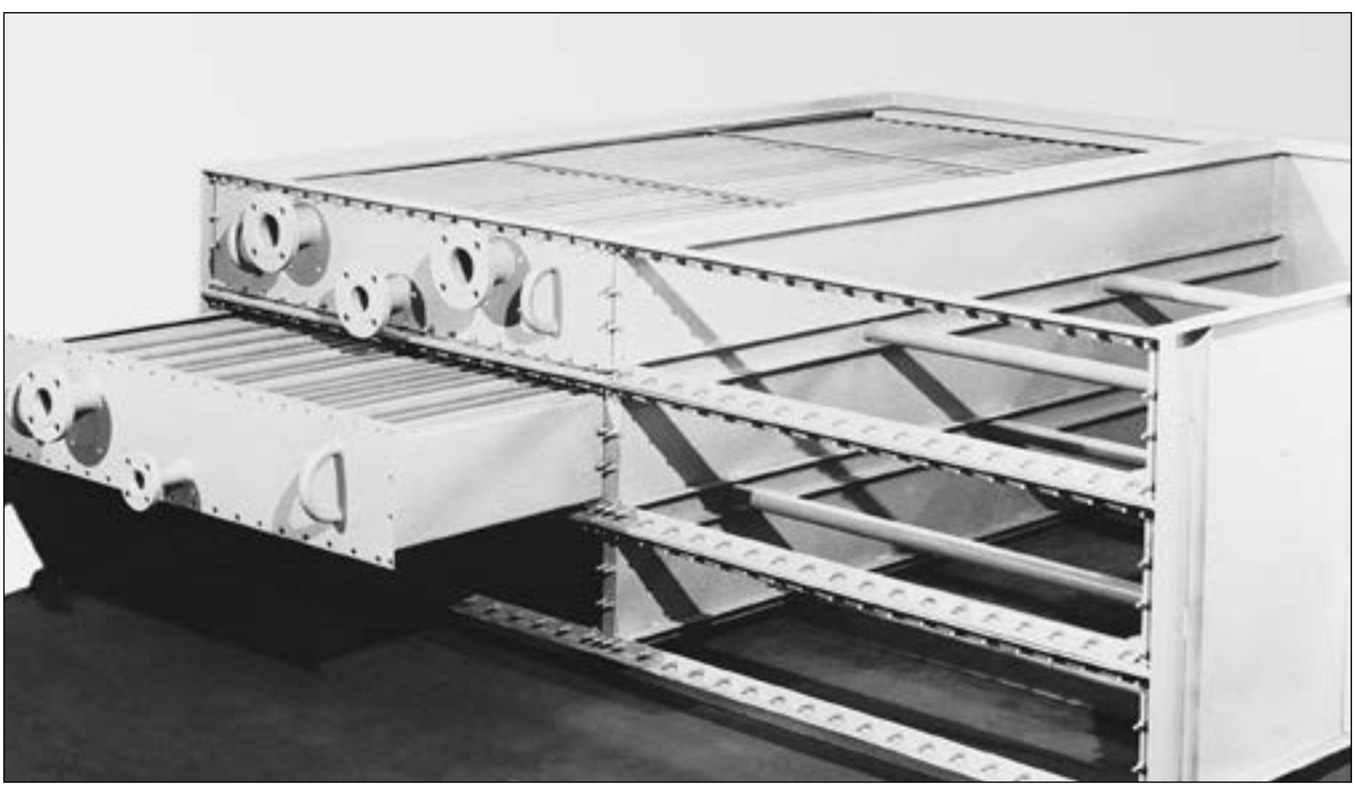
NOTES:
Always specify airflow directions and tube orientation when ordering coils.
Specify all dimensions for replacement coils, especially those varying from typicals above.
If coils are to be Tandem type, specify coil hand by facing the coil with airflow at your back and pointing to the condensate connection.

Steam Coil Typical Arrangements

- **Removable Coils**
- **Centifeed Coils (Type C)**
- **Centifeed Tandem Coils (Type P)**
- **For Vertical or Horizontal Airflow**
- **With Headers Inside the Casing**

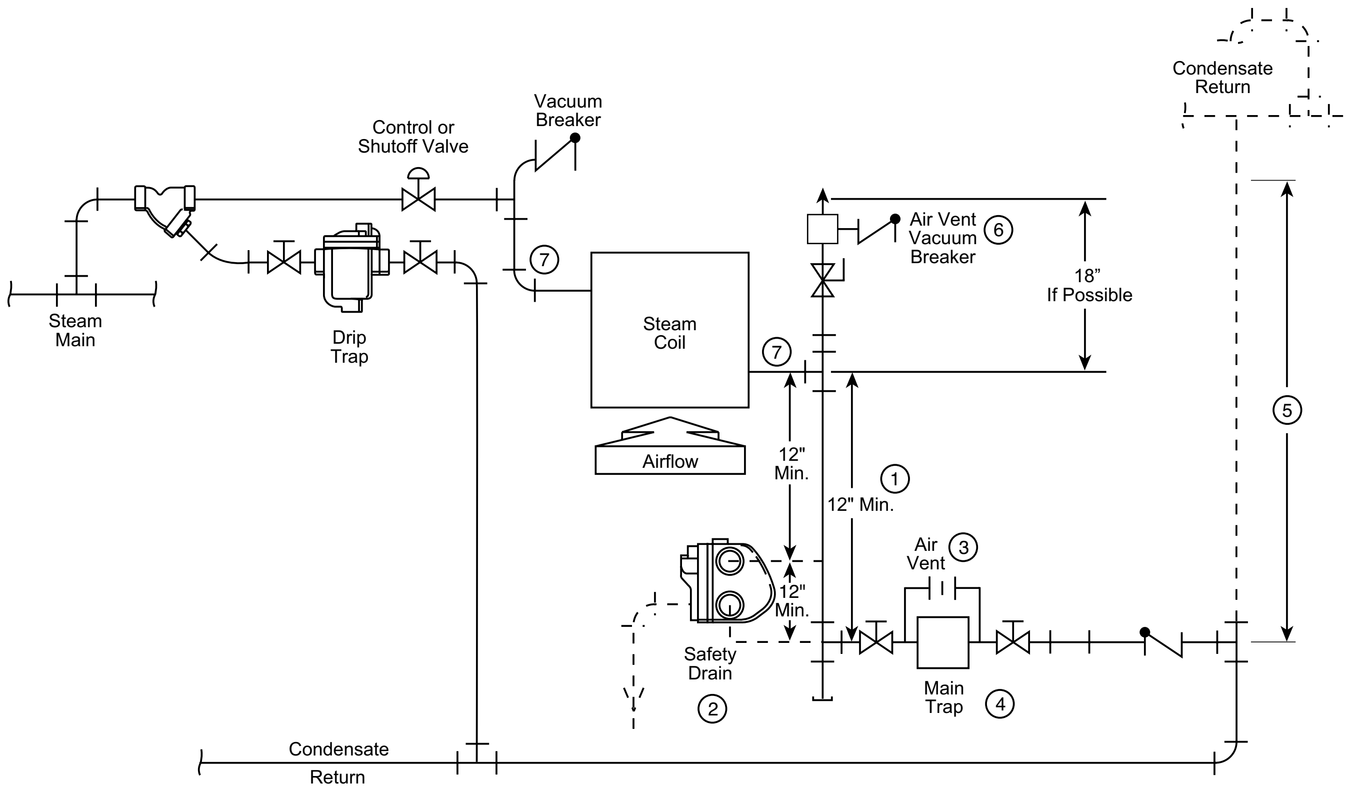


NOTES: Always specify airflow directions and tube orientation when ordering coils.
Specify all dimensions for replacement coils, especially those varying from typicals above.
If coils are to be Tandem type, specify coil hand by facing the coil with airflow at your back and pointing to the condensate connection.
Removable coils can be designed for removal from either connection end or end opposite connections.



Removable coils with outer casing (removable from connections end configuration shown above).

Recommended Piping Practices for Steam Heating Coils



1. 24" minimum if safety drain is used.
2. Safety drain is used if steam supply is modulated and the condensate system is pressurized or overhead. Armstrong’s pumping traps provide additional protection or may substitute for the safety drain, especially if condensate conservation is desired.
3. Air venting must be provided on all steam coils. The air vent may either be an orifice bleed or a thermostatically operated element, with the orifice bleed being the preferred choice. The air vent or orifice bleed should be piped so that it cannot be valved out independently of the trap.
4. The main trap may be either an inverted bucket or a float & thermostatic type depending upon the service conditions. See the chart below for recommendations.
5. Overhead condensate return system.
6. Required only on a modulated system.
7. Provide a flexible connection or swing joint at the coil inlet and outlet connections to isolate the coil from vibration, piping stresses and differential expansion within the coil.

NOTE: See Bulletin AH-825 for detailed operation and maintenance procedures. Recommended practice valid for all steam coils (Duralite, Series 6000 and Duramix.)

Armstrong Steam Trap Selection Guide

Equipment	Selections	Constant Pressure		Modulated Pressure	
		0 - 30 psig	Above 30 psig	0 - 30 psig	Above 30 psig
Unit Heaters	1st Choice 2nd Choice	IBLV F&T	IBLV F&T	F&T IBLV	F&T IBLV
Air Handlers	1st Choice 2nd Choice	IBLV F&T	IBLV F&T	F&T IBLV	F&T IBLV
		0 - 250 psig	Above 250 psig	0 - 30 psig	Above 30 psig
Process Coils	1st Choice 2nd Choice	IBLV F&T	IBLV IBLV	F&T IBLV	F&T IBLV
Duramix	1st Choice	IBLV	IBLV	Not Recommended	

Steam Coil Sizing
Not for Retrofit

Date: ______________________ **Representative:** ______________________

Salesperson: ______________________ **Application:** ______________________

Customer: ______________________ **Customer Location:** ______________________

Performance Requirements

Air Flow Quantity ___________ ❑SCFM ❑ACFM ❑lb/hr (check one)

Altitude _______________ feet above sea level

Humidity Ratio ___________ lb. moisture/lb. dry air (process applications only)

Design Entering Temperature _______ °F

Design Leaving Temperature ________ °F

Steam Pressure at the coil(s) ___________ ❑psig ❑psia

Steam Pressure ❑Modulated ❑Constant

Maximum Air Pressure Drop______ in wg

Special Requirements Not Covered Above ______________________________________

____

System and Coil Configuration Requirements

Air Flow Direction: ❑Horizontal ❑Vertical UP ❑Vertical DOWN (check one)

Fan Location: ❑Before Coils ❑After Coils (check one)

Coil Tube Orientation: ❑Horizontal ❑Vertical ❑Optional (check one)

Type of Coil: ❑Standard ❑Centifeed ❑Tandem ❑Centifeed-Tandem ❑Optional

Connection Type: ❑MPT ❑FPT ❑Flanged

Connection Location: ❑Opposite End ❑Same End ❑Optional

Tube Material: ❑Steel ❑304L Stainless ❑316L Stainless (check one)

Fin Material: ❑0.020” Aluminum Keyfin ❑0.030” Aluminum Keyfin
❑0.016” Copper Keyfin ❑Steel/L-Fin ❑Stainless Steel/L-Fin

Coils to be: ❑Duct Mounted ❑Removable with Outer Case ❑Core Only(check one)

Special Requirements Not Covered Above ______________________________________

____

Steam Coil Sizing
Replacement for Existing Coils

Armstrong®

Date: ______________________________ **Representative:** ______________________________

Salesperson: ______________________________ **Application:** ______________________________

Customer: ______________________________ **Customer Location:** ______________________________

Performance Requirements

Air Flow Quantity __________ ❑SCFM ❑ACFM ❑lb/hr (check one)

Altitude ______________ feet above sea level

Humidity Ratio __________ lb. moisture/lb. dry air (process applications only)

Design Entering Temperature ______ °F

Design Leaving Temperature ______ °F

Steam Pressure at the coil(s) __________ ❑psig ❑psia

Steam Pressure ❑Modulated ❑Constant

Maximum Air Pressure Drop_____ in wg

Special Requirements Not Covered Above ______________________________________

____

System and Coil Configuration (Existing Installation)

Air Flow Direction: ❑Horizontal ❑Vertical UP ❑Vertical DOWN (check one)

Fan Location: ❑Before Coils ❑After Coils (check one)

Coil Tube Orientation: ❑Horizontal ❑Vertical ❑Optional (check one)

Type of Coil: ❑Standard ❑Centifeed ❑Tandem ❑Centifeed-Tandem ❑Optional

Connection Type: ❑MPT ❑FPT ❑Flanged Inlet:______ inches Outlet:______ inches

Connection Location: ❑Opposite End ❑Same End ❑Optional

Tube Material: ________________________

Fin Material: ______ ; Fin Thickness: ___ in; Fins/in _____ (count spaces)

Fin Type: ❑Plate ❑Spiral Wound ❑Extruded ❑Welded

Number of Rows of Tubes in Each Coil: ❑One ❑Two ❑Three ❑Other

Number of Coils of Parallel ______; Number of Coils in Deep in Airstream ______

Coils to be: ❑Duct Mounted ❑Removable with Outer Case ❑Core Only(check one)

Special Requirements Not Covered Above ______________________________________

____

Coil Requirements (Replacement Coil)

Type of Coil: ❑Standard ❑Centifeed ❑Tandem ❑Centifeed-Tandem ❑Optional

Connection Location: ❑Opposite End ❑Same End ❑Optional

Tube Material: ❑Steel ❑304L Stainless ❑316L Stainless (chek one)

Fin Material: ❑0.020” Aluminum Keyfin ❑0.030” Aluminum Keyfin

❑0.016” Copper Keyfin ❑Steel/L-Fin ❑Stainless Steel/L-Fin

Special Requirements Not Covered Above ______________________________________

____

Heating and Cooling Coils

Installation, Operation and Maintenance Instructions

In steam coils, successful operation and a long, trouble-free service life depend on:

1. The manner of installation, including the design of coil mounting and piping—with particular emphasis on trapping and air venting.
2. Operating conditions that are within design parameters.
3. The method of operation.
4. The thoroughness and frequency of cleaning required.

Following these simple guidelines will help you achieve maximum coil performance.

Receipt and Storage

1. Upon receipt, inspect coils and notify carrier immediately of an damage sustained in transit.
2. If coils are not installed immediately, store under cover in a heated area free of potential damage from personnel and/or equipment.

Installation

1. **Support coils and piping individually** to prevent undue strains on the steam and condensate connections. Use swing joints or flexible connections for freedom of movement.
2. Steam and condensate pipes should be the same size as coil connections. Maintain connection size from the coil back to the steam main and from the coil to the steam trap takeoff.
3. **Install a drip trap** prior to the coils (and before a control valve if there is one) to prevent the introduction of condensate.
4. **Install strainers** with blowdown valves before all control valves and traps.
5. To avoid hunting and maintain control, use only modified linear or equal percentage (vee-port) valves when a modulating control valve regulates the steam supply. Consult Armstrong for proper applications.
6. **Never oversize control valves. Bigger is NOT better.**
7. **Install a vacuum breaker** in the steam piping prior to the coil to prevent retention of condensate during shutdown. Also install a vacuum breaker on the downstream side of the coil when steam pressure is to be modulated. If you use check valves as vacuum breakers, they should be 15-degree swing checks.
8. Provide venting of non-condensable gases individually on each coil to ensure maximum heat transfer and minimum internal corrosion. In order of effectiveness, venting can be with a fixed orifice bleed, independent thermostatic vent or by using a float and thermostatic steam trap.
9. Trap all coils individually. Locate trap as close to coil as possible. Otherwise, inadequate drainage may damage the coil and/or interfere with effective heat transfer.
10. Use only traps such as the inverted bucket or float and thermostatic which drain continuously. When steam to the coils is modulated, a float and thermostatic trap is preferred. See the previous page for selection guidelines.
11. **Install a dirt pocket** prior to the steam trap. You may also install a gate valve at the bottom of the dirt pocket to facilitate drainage during shutdown periods.
12. Use the same size trap on all coils when they are in parallel across the duct opening. Coils mounted in series (one behind the other in the direction of the airflow) typically have lower condensing rates at the downstream end of the system. Size traps to handle the maximum calculated load for individual coils. Avoid oversizing. Consult your Armstrong Representative if you need assistance.
13. Modulating control valves are best used with gravity flow vented condensate return systems. If the condensate return system is overhead or pressurized, the use of pumps or Armstrong pump traps is highly recommended. If this is not possible a safety drain as illustrated on page 357 should be installed.
14. **Install filters** at the coil inlet if possible. Simple filter systems permit easy cleaning or replacement and ensure efficient operation.
15. Refer to the previous page for an illustration of piping practices for steam heating coils.
16. Provide uniform air velocity and uniform air temperature at the face of the coil. This is very important for good coil performance.

Operation

Once coils are installed properly, their performance and service life depend on a few simple guidelines for maintenance and operation.

1. To prevent plugging of tubes, clean the piping system and blow down all strainers prior to initial startup.
2. On startup, feed steam to the coils slowly to avoid thermal shock loadings.
3. Make sure the steam has been on for a minimum of 15 minutes prior to starting fans or opening dampers.
4. Make sure operating pressures are kept within design limits.
5. During initial startup, tighten all bolted connections once the system stabilizes at operating temperature.
6. To provide maximum freeze protection, maintain a minimum steam pressure of 5 psig to coils exposed to air temperature below 40°F (5°C). If this is impossible, consult your Armstrong Representative.
7. Drain during shutdown to prevent internal corrosion.

Maintenance

1. If filters are installed, clean regularly to maintain adequate airflow across the coils and to keep fan loadings at design.
2. If filters are not used, inspect and clean coils periodically. Clogged filters and plugged coils have the same result.

Liquid Coils

Although steam may be the preferred heating medium for coils, liquids such as water, glycol solutions and high temperature heat transfer fluids are coming into wide use. Some of the reasons for the popularity of water and glycol systems are:

- Heat recovery systems are becoming more popular, and hot water or glycol solutions are ideal for that duty
- Hot water may be readily available from such sources as condensate systems or other processes, and it makes sense to use the available heat from those sources
- Users have a preference for liquids over steam

The use of high temperature heat transfer fluids has a number of practical advantages over water and steam when process air has to be heated to high temperatures. These fluids can operate in the 500°F to 750°F range at or near atmospheric pressure as opposed to steam, which would have to be over 1 500 psig in order to achieve a saturation temperature of 600°F.

Systems capable of operating at high pressures are expensive to construct and maintain. Corrosion caused by steam and water and the need for water treatment to minimize scale formation result in high maintenance costs. The absence of any need for supervisory staff to be on constant duty is a further advantage of the high temperature heat transfer fluid system.

To meet the needs of industry for heavy duty liquid coils, Armstrong has introduced a line of standardized sizes in seven widths from 16-3/4" to 57-3/4" in 21 lengths from 24" to 144". These are available with fin pitches from 5 to 11 FPI and in 2 or 3 rows. Many circuiting options are available.

As with all Armstrong coils, liquid coils are built to withstand the rigors of tough industrial applications in contrast to the commercial grade coils frequently misapplied in industrial environments.

In addition to the standardized line, custom coils in sizes to fit existing installations and in materials to fit particular applications are also available.

Materials of Construction	
Tubes	1" OD 12 ga (.109" wall thickness) A-214 ERW carbon steel tubes (seamless tubes optional), 10 ga tube also available.
Fins	.020" or .030" thick aluminum keyfin (imbedded).
Headers	Schedule 40 steel or fabricated.
Connections	Water and glycol solutions: • Schedule 80 steel screwed MPT (flanges optional) — same end High temperature heat transfer fluids: • Seamless Schedule 40 steel with 300 lb raised face weld neck flanges—same end
Assembly	All wetted parts are welded into a monometallic structure, affording the greatest strength and corrosion resistance.
Design	250 psig at 750°F. Hydrostatically standard testing pressure at 450 psig.
Casing	Minimum 14 ga galvanized steel primed after manufacture.
Coatings	Special coatings such as baked phenolic or epoxy powder are available as options. These coatings are suitable for temperatures up to 400°F.

Liquid Coil Sizing
Not for Retrofit

Date: ____________________ **Representative:** ____________________

Salesperson: ____________________ **Application:** ____________________

Customer: ____________________ **Customer Location:** ____________________

Performance Requirements

Air Flow Quantity ____________ ❑SCFM ❑ACFM ❑lb/hr (check one)

Altitude __________________ feet above sea level

Humidity Ratio ____________ lb. moisture/lb. dry air (process applications only)

Design Entering Temperature _______ °F

Design Leaving Temperature________ °F

Liquid Type ______________________

Entering Liquid Temperature ________ °F

Leaving Liquid Temperature_________ °F (or liquid flow rate _________ gpm)

Liquid Characteristics at Average Liquid Temperature:________________________

Specific Gravity: ______________________________

Specific Heat:________________________________

Viscocity: ________________ ❑cp ❑lb/ft-hr (check one)

Thermal Conductivity __________________________

Special Requirements Not Covered Above ____

____

____

System and Coil Configuration Requirements

Air Flow Direction: ❑Horizontal ❑Vertical UP ❑Vertical DOWN (check one)

Fan Location: ❑Before Coils ❑After Coils (check one)

Coil Tube Orientation: ❑Horizontal ❑Vertical ❑Optional (check one)

Tube Material: ❑Steel ❑304L Stainless ❑316L Stainless (chek one)

Fin Material: ❑0.020” Aluminum Keyfin ❑0.030” Aluminum Keyfin ❑0.016” Copper Keyfin ❑Steel ❑Stainless Steel

Coils to be: ❑Duct Mounted ❑Removable with Outer Case (check one)

Special Requirements Not Covered Above ____

____

____

Liquid Coil Sizing
Replacement for Existing Coils

Armstrong®

Date: ______________________ **Representative:** ______________________

Salesperson: ______________________ **Application:** ______________________

Customer: ______________________ **Customer Location:** ______________________

Performance Requirements

Air Flow Quantity ____________ ❑SCFM ❑ACFM ❑lb/hr (check one)

Altitude _________________ feet above sea level

Humidity Ratio ____________ lb. moisture/lb. dry air (process applications only)

Design Entering Temperature _______ °F

Design Leaving Temperature ________ °F

Liquid Type _______________________

Entering Liquid Temperature ________ °F

Leaving Liquid Temperature_________ °F (or liquid flow rate _________ gpm)

Liquid Characteristics at Average Liquid Temperature:________________________

Specific Gravity: _______________________________

Specific Heat:_________________________________

Viscocity: ________________ ❑cp ❑lb/ft-hr (check one)

Thermal Conductivity __________________________

Special Requirements Not Covered Above ____

____

System and Coil Configuration (Existing Installation)

Air Flow Direction: ❑Horizontal ❑Vertical UP ❑Vertical DOWN (check one)

Fan Location: ❑Before Coils ❑After Coils (check one)

Coil Tube Orientation: ❑Horizontal ❑Vertical ❑Optional (check one)

Fluid Circuit:____

Connection Type: ❑MPT ❑FPT ❑Flanged Inlet:_______ inches Outlet:_______ inches

Connection Location: ❑Same End ❑Optional Connection Size: _____________ inches

Tube Material: ____________________________

Fin Material: ________ ; Fin Thickness: ____ in; Fins/in ______ (count spaces)

Fin Type: ❑Plate ❑Spiral Wound ❑Extruded ❑Welded

Number of Rows of Tubes in Each Coil: ❑One ❑Two ❑Three ❑Other

Number of Coils of Parallel _______; Number of Coils in Deep in Airstream ________

Coils to be: ❑Duct Mounted ❑Removable with Outer Case ❑Core Only(check one)

Special Requirements Not Covered Above ____

____

Coil Requirements (Replacement Coil)

Type of Coil: ❑Standard ❑Centifeed ❑Tandem ❑Centifeed-Tandem ❑Optional

Connection Location: ❑Opposite End ❑Same End ❑Optional

Tube Material: ❑Steel ❑304L Stainless ❑316L Stainless (chek one)

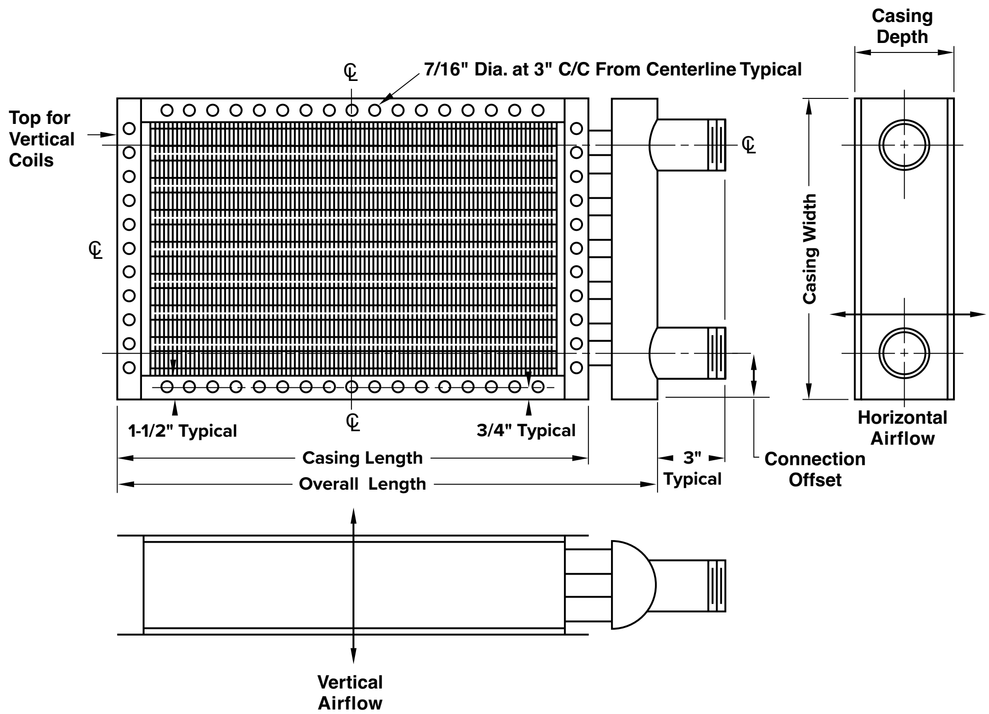
Fin Material: ❑0.020” Aluminum Keyfin ❑0.030” Aluminum Keyfin

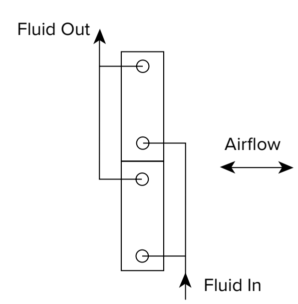
❑0.016” Copper Keyfin ❑Steel/L-Fin ❑Stainless Steel/L-Fin

Special Requirements Not Covered Above ____

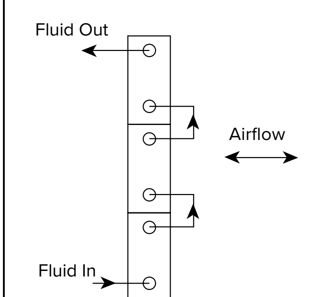
____

Liquid Coil Sizing
Not for Retrofit

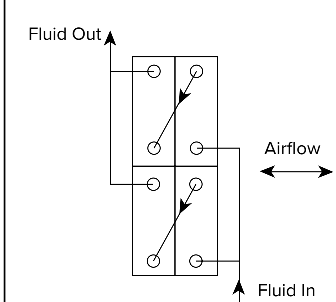




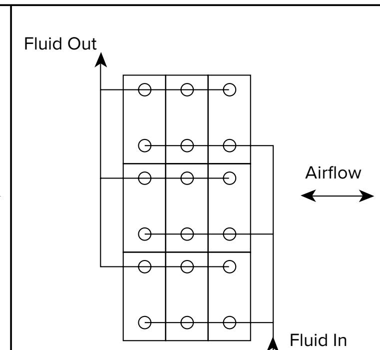
Airflow: 2 in Parallel
Fluid Flow: 2 in Parallel



Airflow: 3 in Parallel
Fluid Flow: 3 in Series



Airflow: 2 in Parallel x 2 in Series
Fluid Flow: 2 in Parallel x 2 in Series



Airflow: 3 in Parallel x 3 in Series
Fluid Flow: 9 in Parallel

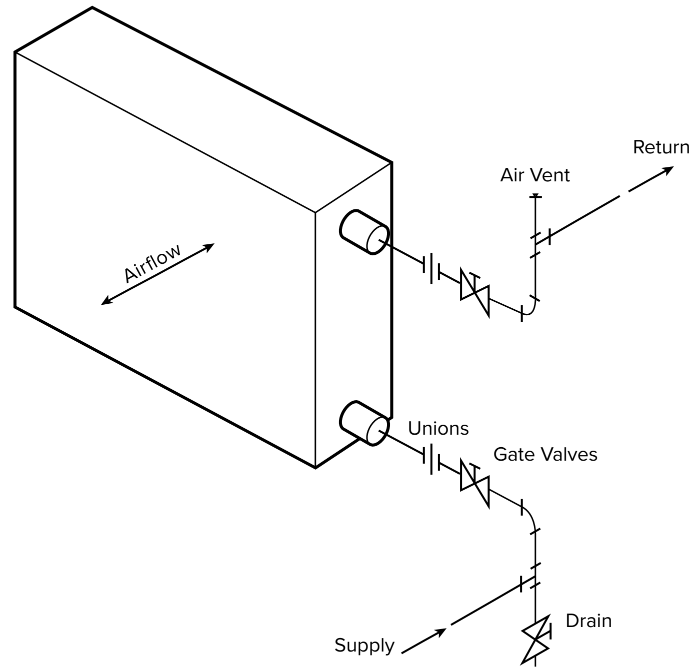
Casing Width: ____________________

Casing Length: __________________

Casing Depth: ____________________

Note: Casing width is always measured along the header.
Casing length is always measured along the tube length
Hole sizes and placement are Armstrong standards. Please not variances.

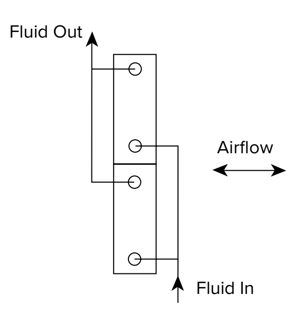
Piping Diagram for Water and Ethylene Glycol



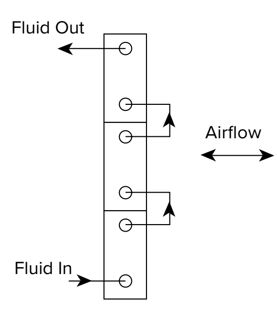
1. Install coils level to assure complete drainage.
2. Supply water to the bottom connection and return through the top connection.
3. Carefully vent coils, either individually or through an air manifold.
4. Armstrong recommends that coil isolation valves be fitted to take out coils without disturbing the whole system.
5. Ensure that water supply to coils is as clean as possible to avoid potential blockage and excessive fouling. Settling tanks and strainers can be used for this purpose.
6. Do not support piping from the coils. Install adequate hangers and expansion joints to prevent undue stresses.
7. Armstrong recommends the use of low pressure air or flushing with ethylene glycol to prevent freeze damage when draining.
8. Do not use throttling controls in hot water heating service if there is a possibility of below-freezing air passing through the coil. Use an air by-pass system at full water flow rate for control.

NOTE: Keep finned tube surface clean and free of all foreign matter in order to maintain the design heat transfer and pressure drop ratings. Install filters upstream of the coils to keep actual coil maintenance to a minimum.

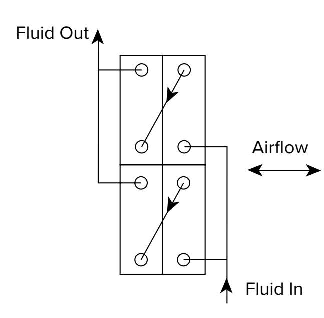
Examples of Multi-Coil Arrangements



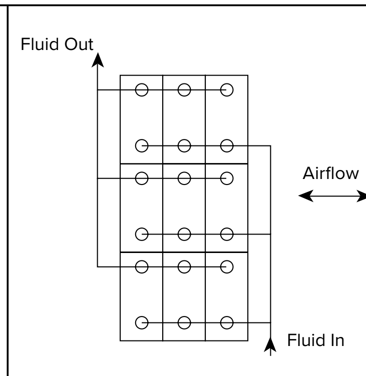
Airflow: 2 in Parallel
Fluid Flow: 2 in Parallel



Airflow: 3 in Parallel
Fluid Flow: 3 in Series



Airflow: 2 in Parallel x 2 in Series
Fluid Flow: 2 in Parallel x 2 in Series



Airflow: 3 in Parallel x 3 in Series
Fluid Flow: 9 in Parallel

How to Specify Armstrong Series 6000 Steam Coils

Heavy-duty construction/fabrication is why Armstrong Series 6000 coils last longer, saving maintenance and frequent replacement costs.

Think about it. Less expensive coils are also less durable and are commonly misapplied in heavy industrial service. As a result, they actually become more expensive when measured by down time, maintenance and replacement over a period of time. It's really a very simple fact: Higher initial costs are justified when they secure a lower life cycle cost.

The sample specifications below will help you in detailing coil construction for your heavy-duty application. These samples cover the most popular of the various material combinations. For assistance with other options, consult your Armstrong Representative.

Steel Tube/Aluminum Keyfins

- Tubes—minimum 12 ga carbon steel
- Fins—minimum 0.020" thick aluminum (imbedded type)
- Headers—minimum Sch 40 carbon steel pipe
- Connections—minimum Sch 80 carbon steel pipe
- Casings—minimum 14 ga galvanized steel
- Tubes, headers and connections shall be welded together to form monometallic joints.

Steel Tube/Steel Fins

- Tubes—minimum 12 ga carbon steel
- Fins—minimum 0.024" thick carbon steel ("L" fin)
- Headers—minimum Sch 40 carbon steel pipe
- Connections—minimum Sch 80 carbon steel pipe
- Casings—minimum 14 ga galvanized steel
- Tubes, headers and connections shall be welded together to form monometallic joints.

Stainless Steel Tube/Aluminum Fins

- Tubes—minimum 14 ga 304L stainless steel
- Fins—minimum 0.020" thick aluminum (imbedded type)
- Headers—minimum Sch 10 304L stainless steel pipe
- Connections—minimum Sch 40 304L stainless steel pipe
  Casings—minimum 14 ga galvanized steel
- Tubes, headers and connections shall be welded together to form monometallic joints.

NOTE: 0.030" thick aluminum keyfin is an available option for imbedded type only.

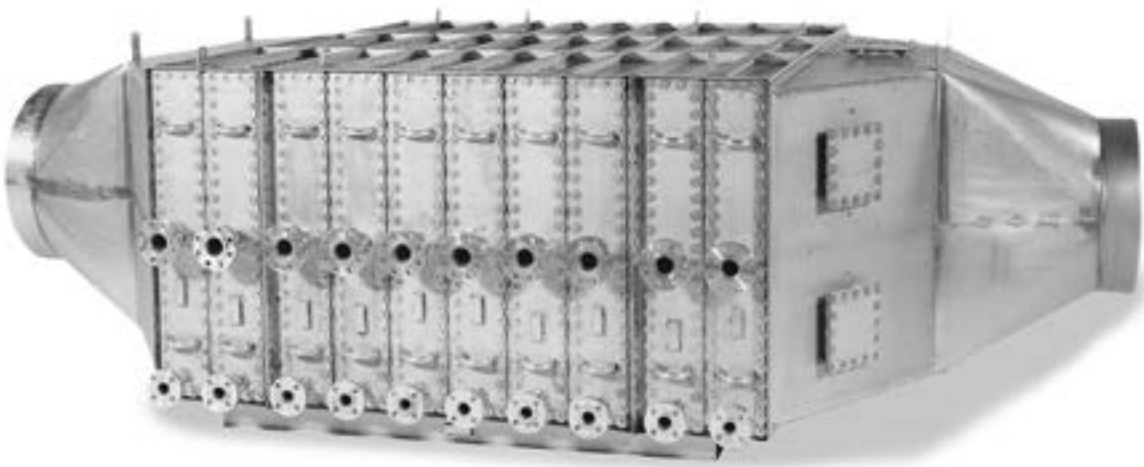
Typical Coil Applications

Armstrong can manufacture coils in any configuration necessary to meet your requirements.

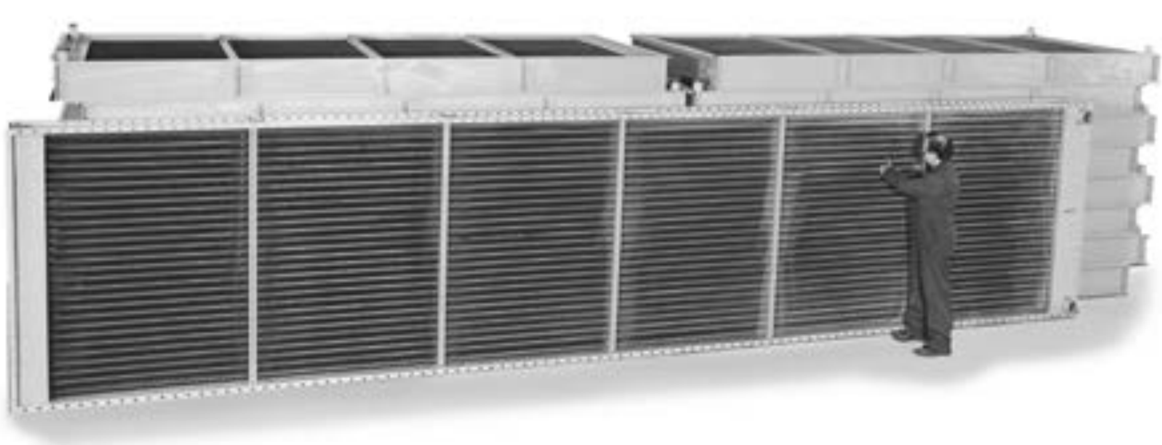
- Pulp dryer coils
- Veneer dryer coils
- Pocket ventilation coils
- Smokehouse coils
- Yankee hood drying coils
- Pasteurizer coils
- Air makeup coils for comfort heating
- Char coolers
- Carpet dryer coils
- Boiler air preheater coils
- Grain dryer coils
- Boiler feedwater runaround systems
- Starch dryer coils
- Textile dryer coils
- Dry kiln coils
- Paint spray booth coils
- Drying ovens
- Steam condenser coils
- Unit heaters for comfort heating
- Door heaters
- Tank heating coils
- Unit coolers and condensers
- Fluid Bed Dryers
- Direct Contact Fluid Bed Dryers

Air heaters using high pressure steam.

Blast air coolers and heaters.



Stainless steel boiler air preheaters used in the pulp and paper industry.



Air heaters using thermal oils.

Quality Construction

"Designed to Perform & Built to Last"

Armstrong Preheat Coils outlast thin-finned and thin-walled lightweights because of superior engineering and robust construction. Thicker tube walls and fins provide greater resistance to coil damage and wear from high pressures, temperatures and corrosive conditions.

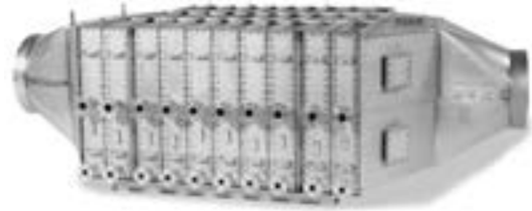
Armstrong's Typical Heavy Duty Air Heater Specifications:

- Fins - Keyfin - Embedded, Spiral Wound Aluminum or Copper
- Fin Thickness - Minimum 0.020" thickness or optional 0.030" Heavy Keyfin
- Tubes - 1" OD x 12 Ga Carbon Steel or 14 Ga St.Stl. (1-1/2" OD Available)
- Inner Tubes - 1/2" - 7/8" OD Carbon or St. Steel (no perforations or holes)
- Headers - Heavy Wall (Carbon Steel or St.Steel) Fabricated
- Tube/Header Joints - All Welded - Multi-Pass Full Penetration
- Tube Sheets - NC Machined, and Chamfered Tube Holes - Heavy Gauge
- Mono-Metallic Construction on all wetted parts reducing potential for galvanic corrosion
- Coil Casings - Min 14ga or 12 Ga Galvanized Steel or St. Steel
- Outer Casings - Drawer Type Construction with Airtight Outer Casings for ease of coil removal or replacement
- Cleanout/Inspection/Access Spacer Sections - Available on request
- Inlet/Outlet Transitions - Per Specification
- Pre-Piped Options - On Application
- Extended Warranties - Available on Application
- Design and Construction in Accordance with ASME SECTION VIII Div. 1. (All Armstrong 6000 Series Coils are built to this standard whether or not ASME is required - unlike other manufacturers).
- U Stamp Available on request
- Special Materials and Coatings available on request
- Manufacturing done in Armstrong factories, not subcontracted. Armstrong controls all QA/QC in-house.

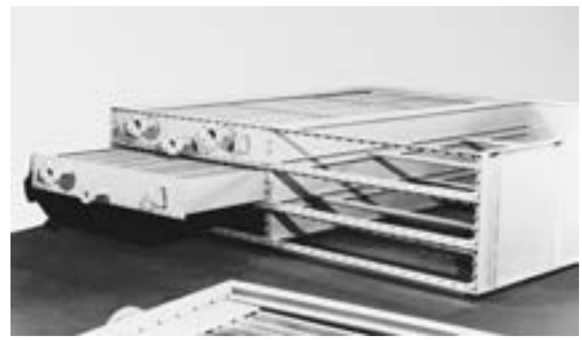
Whether you need a standard replacement coil or custom-built unit, you'll get the same built-in quality.

During construction each section of the coil is checked for compliance with detailed, written QA/QC procedures available for your review. And, finally the complete coil is tested hydrostatically to ASME standards.

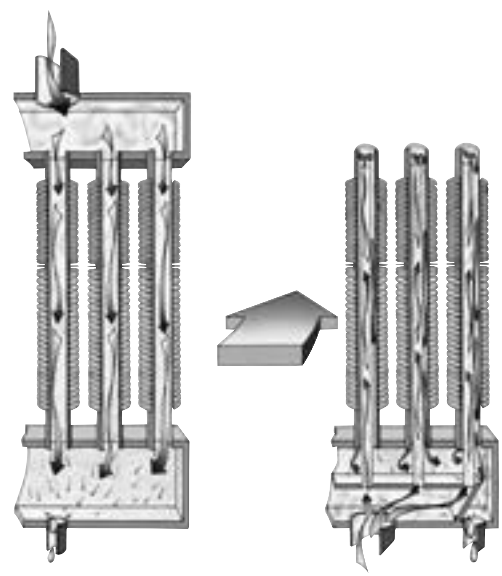
Armstrong offers total steam expertise and manufacturing capability that can help you identify and solve coil problems. In addition, Armstrong's steam system package approach is a blueprint for blending superior products, knowledge and judgment into plans for effective energy management and pinpointing Heat Rate improvements.



Full Systems with Transitions



Drawer Type Air Preheat Coils



Specialized Coil Designs

"KEYFIN" (embedded) Fin Tube

System Solutions for Boiler Air Preheating

Solutions Through Experience.

For power and large industrial plants, producing electricity, generating steam, energy efficiency, air preheating and protection of important heat transfer equipment and systems, go hand in hand. Coordinating design and performance of various system components requires a review of the entire energy usage loop from turbine extraction, through air preheating, to condensate collection, return, and re-use of available flash energy and hot condensate.

Combustion and boiler air preheating is no longer just a simple need to heat air to prevent dew point issues on tubular or regenerative air pre-heater surfaces. The advent of SCR's, SNCR's, WET/DRY SCRUBBERS – FGD'S, BAGHOUSE UPGRADES, AND STACK GAS REHEATING, have positioned the steam or fluid coil air pre-heater as a key component to the overall combustion efficiency and equipment life extension planning.

For more than a century, Armstrong has been synonymous with steam system innovation and solutions. Armstrong understands efficient generation and effective use of steam throughout the power/utility, large industrial boiler operations, from Coal/Fossil fired, through Biomass, Hog Fuels, Black Liquor Recovery (B.L.R.B.) and Fluid Bed designs to packaged fire tube boiler requirements.

Combustion air preheating heat source options we work with include, extraction or auxiliary steam source, thermal oils, glycol or hot water (from d/a etc.).

Armstrong leads the industry in rugged, robust coil designs that extend life of equipment and reduce downtime and lost energy production hours. With reduced staffing in most facilities, you can relax and focus on your base operations and be assured that the systems we provide will deliver years of continuous, optimized performance.

ARMSTRONG IS ALSO THE ONLY GLOBAL MANUFACTURER WITH THE ABILITY TO SUPPLY KEY SYSTEM COMPONENTS INCLUDING STEAM SUPPLY CONTROL VALVES, HEAVY DUTY COILS, CONDENSATE TRAPPING, VENTING COLLECTION AND RETURN SYSTEMS FROM THE SAME CORPORATE SOURCING! THIS MAKES ARMSTRONG YOUR ONE-STOP SOLUTION SOURCE!

Armstrong partners are air preheat and coil system specialists.

Combine our combustion air preheat coil-building know-how with the expertise of a decades-old steam specialist and what do you get? Preheat coils specifically designed for the rigors of power plant applications.

Armstrong: The power to improve on every energy front.

Why add Armstrong to your energy team? Our applications expertise in the key areas of combustion air preheating and efficient use of extraction steam and flash recovery is well documented. Our steam trapping and condensate recovery/handling knowledge in both saturated and superheated steam applications extends over 100 years. Even your HVAC, plant heating/cooling and hot water requirements are within the scope of the products and services from Armstrong.

Armstrong is a problem solver.

At Armstrong, we consider the entire system. We don't simply duplicate the coils within it. Flexibility—in material, engineering and construction—is the key to Armstrong's problem-solving. We carefully match coil characteristics to specific applications, on a case-by-case basis.

You can depend on Armstrong for custom engineering and quality construction.

Coil problem: Armstrong solution. We can manufacture coils in a range of sizes and in a variety of metals and alloys, including steel, stainless steel, copper, copper-alloy and other metals. A blend of custom engineering and quality construction results in an extended life cycle for your combustion air or process system coil/service package with a focus on heat rate improvement for power generation applications.

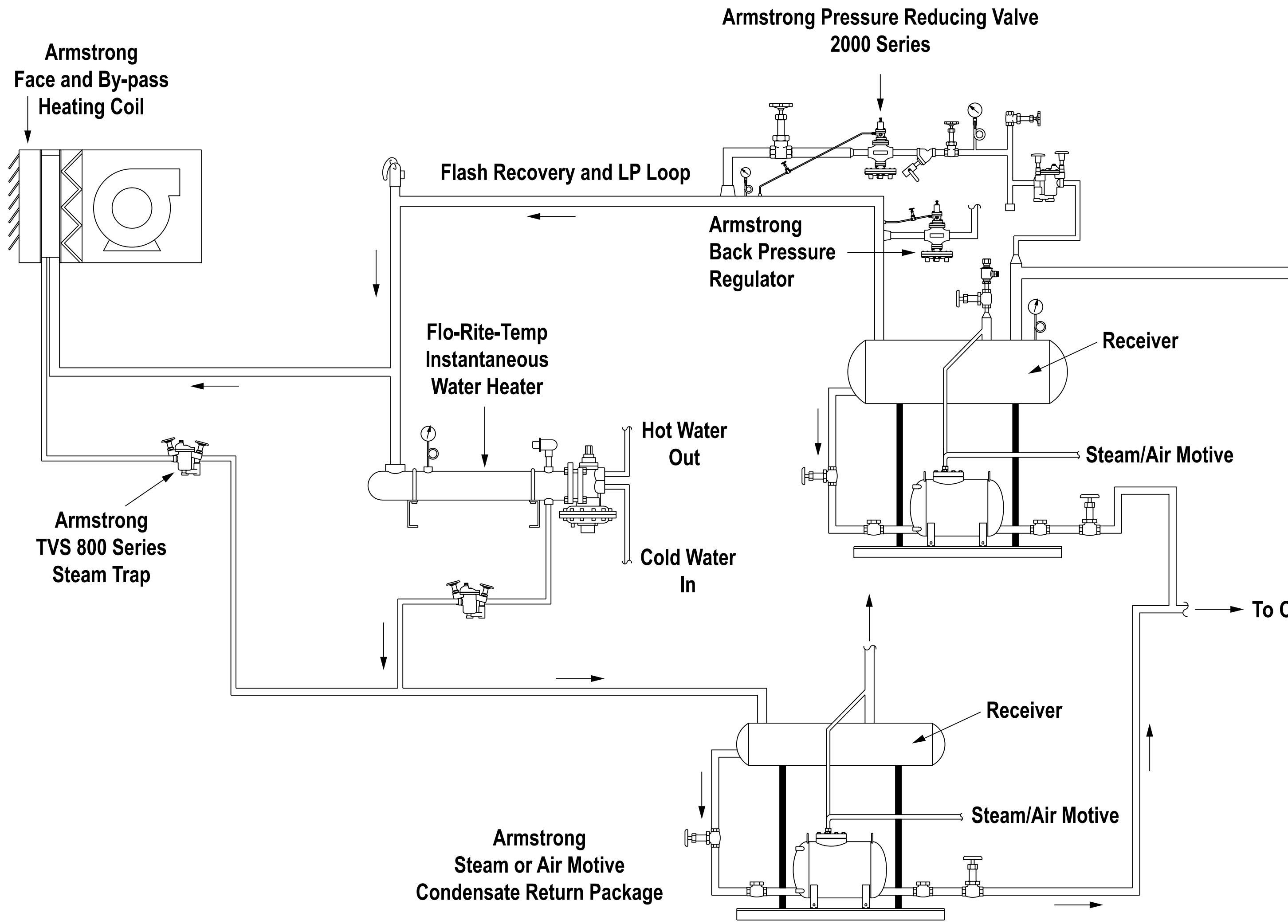
Armstrong has a complete range of service options.

Specialists from Armstrong can visit your location for walkthroughs and follow up with comprehensive system assessments. While there may be more than one course of action for you, we will recommend and—if you choose—implement the one(s) that will deliver the greatest benefit.

Although the cost of fossil fuels fluctuates, Armstrong can help you use it more efficiently. Our experience and total coil air preheating system capability can be the beginning of your transition from necessary parasitic load preheating to maximizing your combustion air preheating system's effect on improving overall system efficiency and reliability.

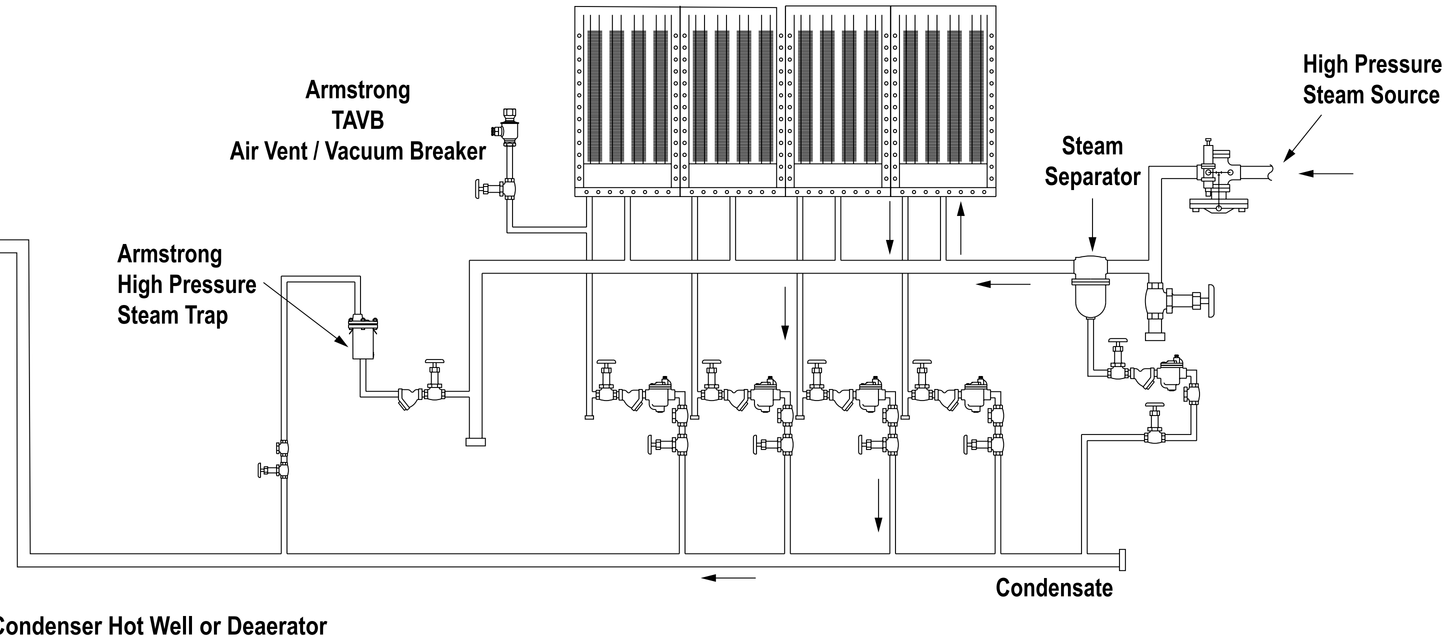
CONTACT US TODAY!

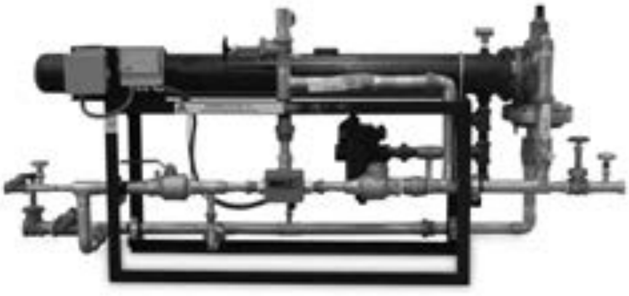
System Solutions for Boiler Air Preheating



Pre-piped/Package Air Preheater Coil System

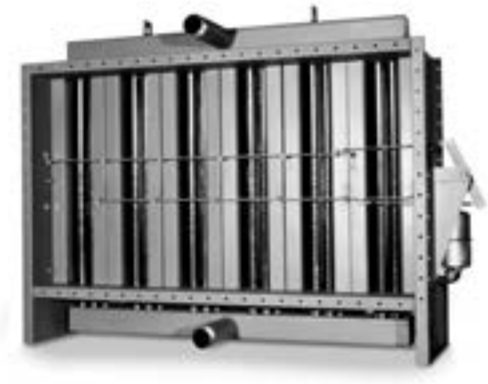
Heavy Duty Steam and Fluid Unit Heaters & Door Heaters





Flo-Rite-Temp Instantaneous Water Heater

Condensate Recovery Systems

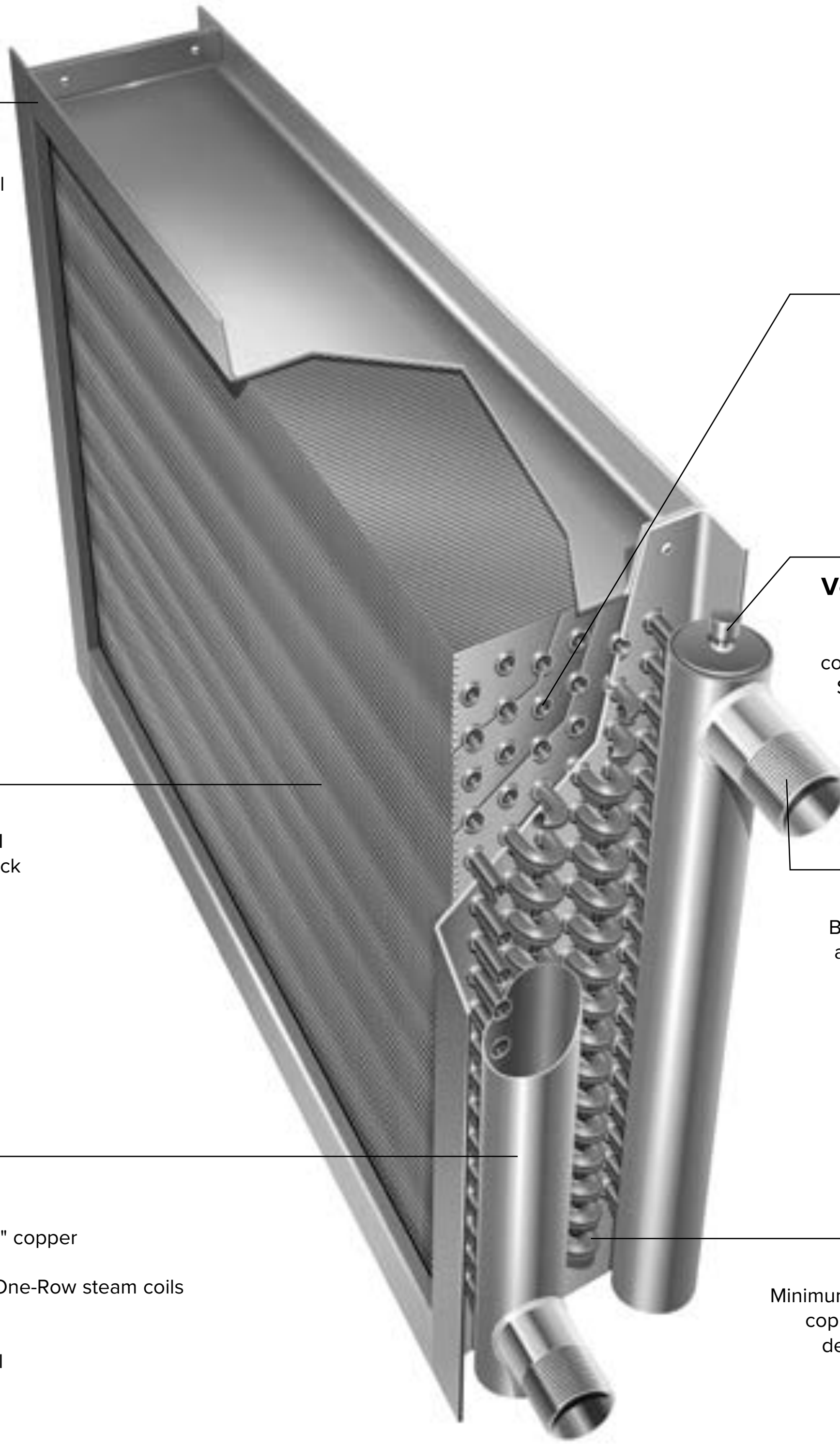


Heavy Duty Face & Bypass Steam Coil Pre-Heating Systems

If you are NOT following Best Practices, you may not be getting the Most out of your Air Preheating System!

Armstrong Duralite™ Plate Fin Coils

Armstrong is a full-line coil supplier with application knowledge and experience you'll find nowhere else in the industry. For nearly half a century, our heavy-duty industrial coils have been serving the process needs of heavy industry. Building on that tradition of quality and dependability, our plate fin coils meet the diverse needs of the HVAC and light industrial markets.



Casings
14 or 16 Ga galvanized steel, depending on size and material
Options: aluminum or stainless steel

Casing holes
Drawn to minimize tube wear

Vent connections
Top and bottom on all liquid coils, top of condensate header on Standard steam coils

Fins
V-waffle, HTE or flat: 6 to 14 FPI
Aluminum: .008", .010", .012" thick
Copper: .006", .009" thick

Connections
Brass MPT for cooling applications, steel for heating applications
Options: brass or steel flanged

Tubes
5/8" OD x .028" thick copper
Options: .020" or .035" or .049" copper

1" OD x .032" thick copper on One-Row steam coils
Option: .049" thick copper

5/8" OD x 0.049" copper nickel

Headers
Minimum .060" to .134" thick copper or copper nickel, depending on coil size

MODEL NUMBER

HH2 - AA11 - B05 - 36X72x5 - F - L

Coil Type
- H = Liquid Heating Coil
- K = Liquid Cooling Coil
- S = Standard Steam Coil
- C = Centifeed Steam Coil
- R = Return Bend Steam Coil
- B = Booster
- E = Centifeed Coil, steam fed from both ends
- D = Centifeed Opposite Ends

Fin Tube/Air Direction
- H = Horizontal Tubes/Horizontal Air
- V = Vertical Tubes/Horizontal Air
- D = Horizontal Tubes/Vertical Down Air
- U = Horizontal Tubes/Vertical Up Air

Number of Rows in Direction of Airflow

Fin Type and Metallurgy
- AA = Aluminum V-waffle (.008")
- AB = Aluminum V-waffle (.010")
- AC = Aluminum V-waffle (.012")
- AD = Aluminum Flat (.008")
- AE = Aluminum Flat (.010")
- AF = Aluminum Flat (.012")
- AR = Aluminum HTE (.008")
- AS = Aluminum HTE (.010")
- AT = Aluminum HTE (.012")
- CA = Copper V-waffle (.009")
- CB = Copper Flat (.009")
- CC = Copper HTE (.009")
- CD = Copper V-waffle (.006")
- CE = Copper Flat (.006")
- CF = Copper HTE (.006")

Number of Fins/Inch

Pipe/Tube Type and Metallurgy
- A = Copper (.020")
- B = Copper (.028")
- D = Copper (.035")
- E = Copper (.049")
- N = Copper Nickel (.049") 5/8” OD only

Tube OD in 1/8'' Increments

Casing Width

Casing Length

Casing Depth

Circuiting if Liquid Coil

D = Double	Q = Quarter
F = Full	T = 3/4
H = Half	U = 1-1/2

Hand of Coil if a Liquid or Horizontal Return Bend Steam Coil
- **L = Left Hand**
- **R = Right Hand**

How to Identify the Circuiting of a Return Bend Coil

1. Identify the inlet header and count the number of tubes fed from it.
2. Count the number of tubes in the face of the coil.
3. Divide the number of tubes fed from the header by the number of tubes in the face.
4. The result is the identification of the coil’s circuit.

How to Identify the Hand of a Return Bend Coil

1. Face the coil with the airflow at your back (or imagine this).
2. Point to the outlet connection (it will be at the top of a liquid coil and should be closest to you). On a return bend steam coil, it will be the condensate return connection and should be farthest from you. If the reverse of the above exists, the coil may be installed incorrectly.
3. The connection on your right indicates a right-hand coil.
4. The connection on your left indicates a left-hand coil.

Coil-A-ware™ Sizing Program

Armstrong coils, both heavy duty and plate fin, are available on a Windows*-based computer program that is extremely user friendly. To obtain a copy through your Armstrong Representative, visit our Web site at armstronginternational.com and supply the requested information. Your local representative will personally deliver it to you. Updates will be available and downloadable from the Web site.

*Windows is a registered trademark of Microsoft.

How To Order Armstrong Duralite™ Plate Fin Steam Coils

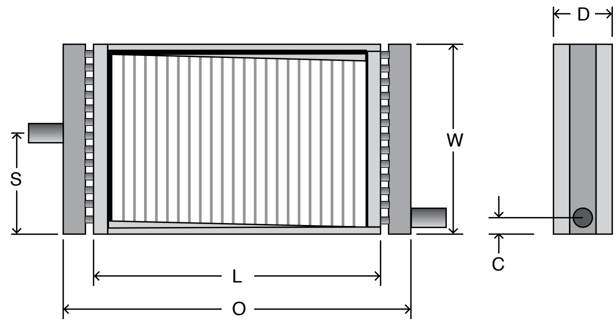
Armstrong Duralite™ Plate Fin Steam Coils are available in Centifeed (Steam Distributing Tube Type), Standard (Opposite End Connections) and Two-Row Return Bend Construction.

Centifeed, Standard and Return Bend coils are made of 5/8" OD tubes as a standard.

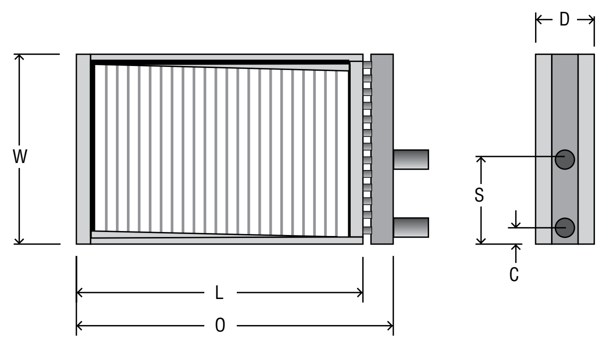
One-Row coils are available optionally with 1" OD tubes.

Depending upon steam flow, long Centifeed coils may require steam to be fed from both ends to eliminate cold tube ends and subsequent freezing potential.

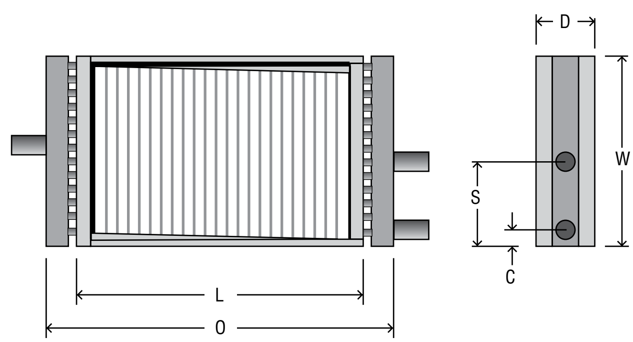
To ensure that a replacement coil will fit in the same location, and that it will perform the same as the coil it replaces, the dimensions and other data requested below must be obtained prior to sizing and pricing.



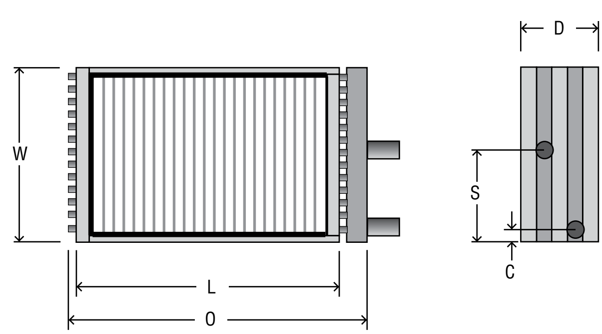
Standard Steam Coils



Centifeed Steam Coils



Centifeed Steam Coils Fed From Both Ends



Return Bend Steam Coils

Dimensions

W	L	D	O	S*	C*

*Not required if Armstrong Standard Dimensions are acceptable.

Performance Information

Airflow rate: ____________________________________

❒ Fan CFM ❒ SCFM ❒ lb/hr

Fan location: ❒ before coil(s) ❒ after coil(s)

Steam pressure: ________________ psig

Entering air temperature: ________________° F

Leaving air temperature: ________________° F

Altitude: __________ ft. above MSL

Coil Information

Coil type (specify): ______________________________

Fin type: ❒ flat ❒ V-waffle ❒ HTE

Fin material: ________________

Fin thickness: ________________in.

Fins per inch: ________________

Tube material: ________________

Tube OD: ________________ in.

Tube wall: ________________in.

Steam connection size: ________________in.

Condensate connection size: ________________in.

Casing material: ________________

Number of tubes in coil face: ________________

Number of tubes fed by each header: ________________

Number of rows of tubes in direction of airflow: ________________

Hand of coil if Return Bend: ❒ left ❒ right

Special features:________________________________

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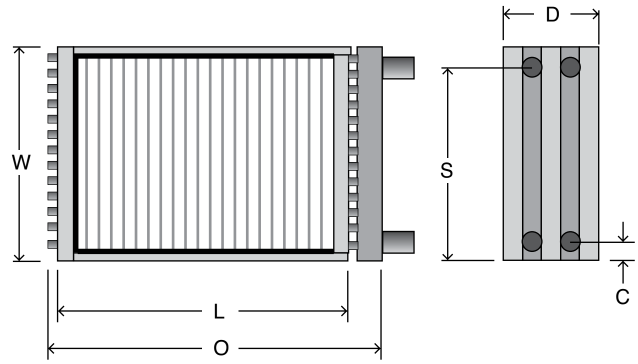
Designs, materials, weights and performance ratings are approximate and subject to change without notice. Visit armstronginternational.com for up-to-date information.

How To Order Armstrong Duralite™ Plate Fin Liquid Coils

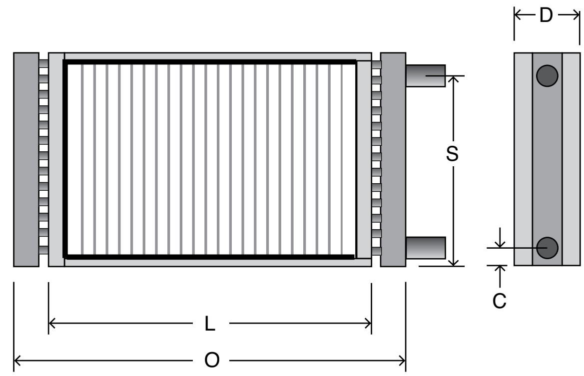
Armstrong Duralite™ Plate Fin Heating Coils are available in Return Header design in one- or two-row configurations and Return Bend design in two or more rows. Liquid coils are made of 5/8'' OD copper tube.

Cooling coils can be built from 2 to 12 rows and with double, full or 1/2 circuits. Custom circuits are also available.

To ensure that a replacement coil will fit in the same location, and that it will perform the same as the coil it replaces, the dimensions and other data requested below must be obtained prior to sizing and pricing.



Return Bend Heating & Cooling Coils



Return Header Heating Coils

Dimensions

W	L	D	O	S*	C*

*Not required if Armstrong Standard Dimensions are acceptable.

Performance Information

Airflow rate: ______________________________

❒ Fan CFM ❒ SCFM ❒ lb/hr

Fan location: ❒ before coil(s) ❒ after coil(s)

Entering air temperature: ____________ ° F

Wet bulb or RH (if cooling): ____________

Leaving air temperature: ____________ ° F

Heating or cooling medium: ____________

Entering liquid temperature: ____________ ° F

Leaving liquid temperature: ____________ ° F

or liquid flow rate: ____________ GPM

Altitude: ______ ft. above MSL

Coil Information

Coil type (specify): ____________

Fin type: ❒ flat ❒ V-waffle ❒ HTE

Fin material: ____________

Fin thickness: ____________ in.

Fins per inch: ____________

Tube material: ____________

Tube OD: ____________ in.

Tube wall: ____________ in.

Inlet connection size: ____________ in.

Outlet connection size: ____________ in.

Casing material: ____________

Number of tubes in coil face: ____________

Number of tubes fed by each header: ____________

Number of rows of tubes in direction of airflow: ____________

Hand of coil if Return Bend: ❒ left ❒ right

Special features: ______________________________

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Heating and Cooling Coils