LAPCO
LYNCHBURG AIR PREHEATER CORP.
Custom Heat-Transfer Equipment

THERMAL PRODUCTS Inc.

Custom Solutions for Industrial Heat-Transfer Applications

Designed and manufactured in accordance with the requirements of ASME

ASME U ASME S ASME R ASME PP

Section VIII, Division 1 ('U' Stamp) • Section 1 ('S' Stamp)
Pressure Piping and Power Boilers ('PP' Stamp)

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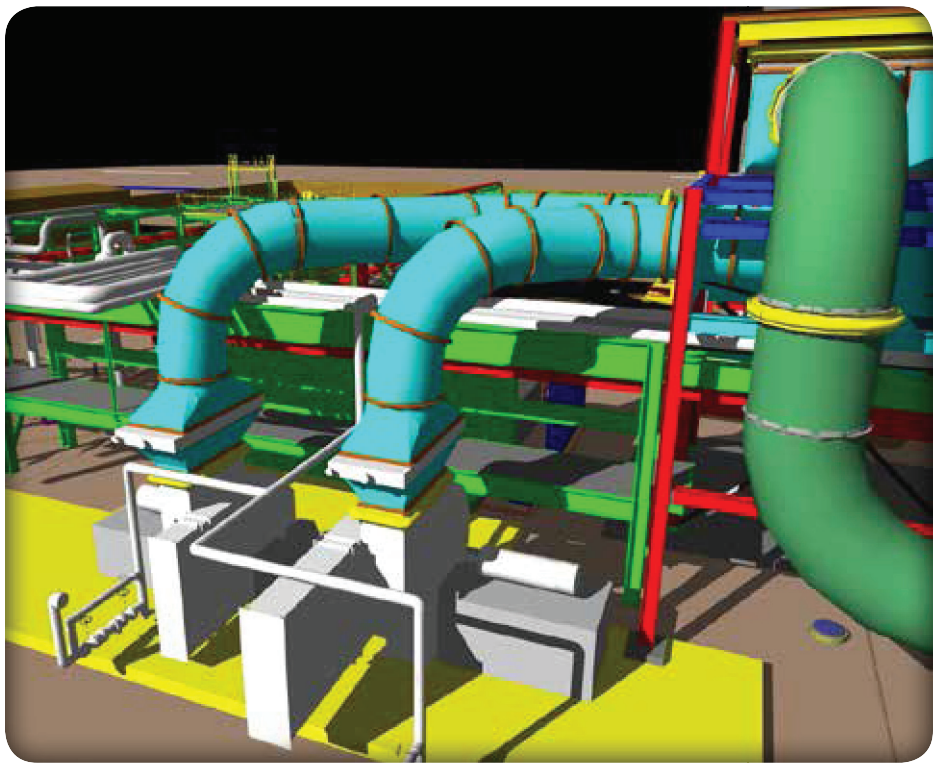
Expert Heat-Transfer Engineering

LAPCO is located in the "Hill City" of Lynchburg, Va., near the foot of the majestic Blue Ridge Mountains. Since 1990, LAPCO has been providing the highest level of technical expertise with an outstanding reputation for accuracy, service and reliability. In addition, LAPCO has partnered with the most capable quality manufacturers available, allowing your product to be designed and manufactured in accordance with the strict requirements of the ASME Section VIII, Division 1 ('U' Stamp), Section 1 ('S' Stamp) or the Certification of Pressure Piping and Power Boilers ('PP' Stamp).

With more than 50 years of combined experience, LAPCO engineers recognize the importance of proper communication and understand the necessity of great customer service.



LAPCO delivers expert heat transfer engineering with custom design and fabrication procurement solutions to every region of the United States, Canada and across the world, for even the most demanding applications, including:

- **Combustion Air Reheating**
- **Boiler Air Preheating**
- **De-superheating**
- **Pocket Vent Heating**
- **Fluid Bed Heating**
- **In-Bed Drying**
- **Economizers**
- **Wall Heaters**
- **Flue Gas Reheating**
- **Biomass Heating and Cooling**
- **Oil Coolers**
- **Turbine Inlet Heating & Cooling**
- **Sub-Cooling**
- **Generator Cooling**
- **Autoclave**
- **Air Cooled Condensers**

LAPCO's expertise has allowed for successful execution of challenging projects in every heat transfer related market, such as:

- **Fossil Fuel Power Generation**
- **Pulp & Paper**
- **Automotive**
- **Industrial Processes**
- **Oil & Gas**
- **OEM Dryer Manufacturing**

100% tin coated copper fin.

Finning Methods:

- Edge Wound
- Footed 'L' Fin
- Embedded
- Extruded
- Welded Fin

Heat Transfer Surface

Applications vary from project to project and require multiple types of fluids and fluid flow rates. Whether the application involves steam, water/glycol mixtures, oil or gas, LAPCO will provide the proper heat transfer surface every time.

Finned tubing is available in various materials including aluminum, copper, copper nickel, carbon steel, stainless steel, hasteloy, Inconel, duplex stainless and other unique materials. Fin thickness and tube diameter selections take several important considerations into account, such as design pressure, design temperature and customer specification. LAPCO designs using helically wound fins, plate fins and bare tubes.

Helically wound fins provide engineering flexibility with low air side pressure drop while providing the capability to design for optimal efficiency. Helically wound fins can be used with a wide array of tube and row centers typically associated with highly fouled air streams.

Unlike helically wound fins, plate fins use a drawn collar to permanently bond the fin to the tube using a mechanical or hydrostatic expansion process. With multiple types of corrugations available, both efficiency and air resistance requirements can be met using a continuous fin providing maximum heat transfer surface per square foot of face area.

Although not as common as extended surfaces, bare or non-finned tubing can be used for applications involving highly fouled air streams where minimal plugging is required. The amount of heat transfer surface is exponentially increased due to the lack of fins; however, air side pressure drop can still be maintained.

Headers & Connections

Heating and cooling medias enter and exit through the connections and header of a coil, which allows it to be distributed to the series of tubes in the finned bundle. Headers and connections come in a wide variety of types and arrangements, most commonly fabricated boxes, rectangular tube or round pipe barrels.

In all cases, each header is fitted with a round pipe supply and return connection. The connections can be supplied with a number of different mating styles, including:

- **Raised Face Slip On (RFSO)**
- **Raised Face Weld Neck (RFWN)**
- **Raised Face Threaded (RFTHD)**
- **Male Pipe Thread (MPT)**
- **Victaulic Grooves**
- **Plain or Butt Weld Ends**

When specifying a header type, considerations must given to the volume of fluid flow and the design pressure / design temperature at which the coils will operate. For most typical applications, round pipe barrels or rectangular tube barrels will be the logical and cost effective choice.

For applications requiring access to the inside of the header for cleaning or tube maintenance, fabricated box headers may be used. Fabricated box header designs will have removable plugs located opposite each tube for plugging individual tubes. Or, they will have removable cover plates that allow for complete access to the inside of the header for inspecting, cleaning or plugging tubes. Fabricated box headers may also be used on the opposite end of the coil to replace return bends if access is required.

Joining Methods:

- **Brazing**
- **Rolling**
- **Welding**
- **Orbital Welding**

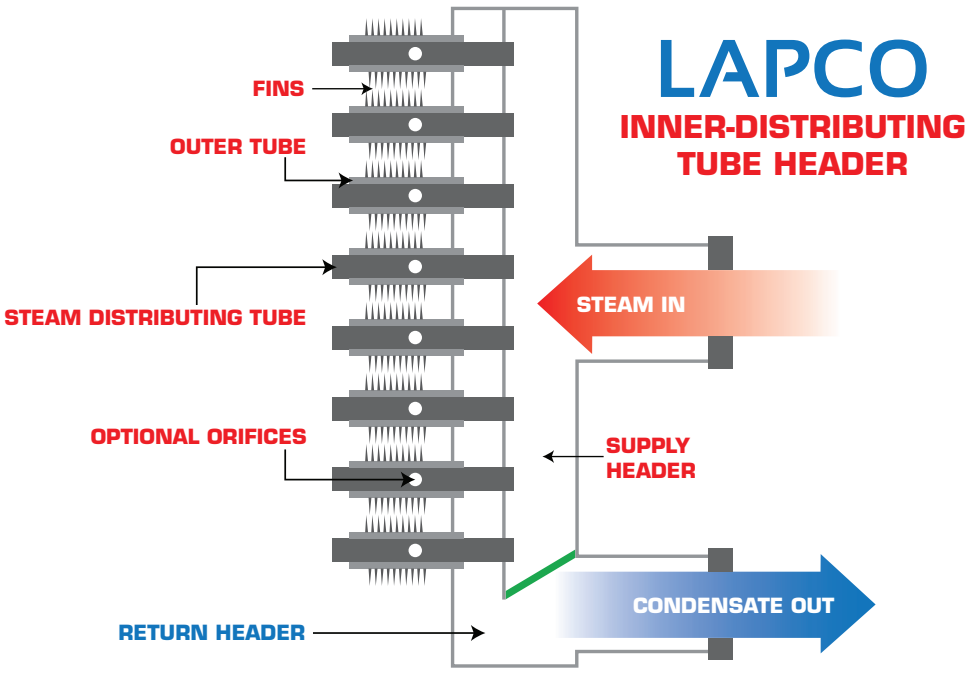
Inner Distributing Tube Steam Coils

It is important to note that inner distributing tube steam coils are not freeze proof. Commonly referred to as a "non-freeze" coil throughout the industry, this label creates the misconception that a steam coil will not freeze. However, if a piping system is not properly designed or installed, condensate can back up into the coil allowing the coil to freeze during operation or after shut-down. LAPCO can engineer, fabricate and provide a piping skid package that is accurately designed for your installation. Please see the footnote below regarding the installation of inner distributing steam coils and proper piping installation.

A "non-freeze" coil is defined as a steam coil that comes complete with an inner distributing tube design that protects the condensate during operation. This type of coil is typically specified anytime an application is using 100% outside air that is 32°F or below. The design incorporates the tube-within-a-tube arrangement that allows the inner tube to evenly heat air along the entire length of the outer tube eliminating cold spots and stratification. It protects the condensate as it travels back the length of the outer tube to the return header by minimizing the potential for sub-cooling.

Inherently, this design allows the steam supply header to be attached adjacent to the return header, which continues to prevent the condensate from sub-cooling as it exits to the return piping.

Like all of LAPCO's steam coil designs, the tubes are pitched within the casings, allowing the coil to be installed level, simplifying the installation.



** Condensate must be properly removed to prevent freezing of steam coils. Special considerations must be given to the piping system to ensure condensate does not back-up to the coils. LAPCO does not warrant against corrosion, erosion, abrasion or detrimental effects due to excessive vibration, water hammer or freezing. Therefore, it is imperative that you consult a LAPCO engineer or piping professional to discuss your application and site requirements. Failing to do so may result in premature failure. Other areas of concern are carbonic corrosion when proper venting of non-condensable gases does not occur or means for vacuum breakers are not provided.*

Airtight Outer Frames & Transition Assemblies

LAPCO works closely with customers to determine what type of coil casing is appropriate. Typically, a standard casing that is designed to be duct mounted with means for thermal expansion and contraction is suitable. However, certain applications require coil casings to be welded airtight for specific duct pressures or some times require an outer frame housing to be welded into the ductwork or require transition assemblies that allows the duct to connect to a larger coil cross sectional area.

Coils can be provided with outer frame assemblies that allow each one to be removed in a drawer like fashion for maintenance and accessibility during outages. The frame is also designed to allow each coil to be removed without disturbing the connecting ductwork or piping.... down time and maintenance costs are minimized.

Transition assemblies can be provided as part of the outer frame. This allows the ductwork to seamlessly transition to the face of the coils with a calculated transition in air flow, minimizing the potential for stratification that can de-rate performance.

Whether a standard casing, outer frame or transition assembly is required, LAPCO will provide them to the material specifications required and welded air tight for the specific duct pressure.

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