

**BASCO®  
TYPE ES  
EXTENDED  
SURFACE PLATE  
FIN HEAT  
EXCHANGERS**

**API Heat Transfer**

*...world leaders in heat transfer technology*

# API Heat Transfer Basco® Type ES Extended Surface Plate Fin Heat Exchangers



## Everything you want in a heat exchanger...and less

API Basco's Type ES Extended Surface Plate Fin Heat Exchanger is the industry leader for intercooler and aftercooler performance. It's unique, patented, compact plate fin design gives you distinct advantages for centrifugal, axial or reciprocal compressor intercooler and aftercooler applications.

Type ES heat exchangers have more of the features you want for your applications, in an innovative design that results in:

- **Less Space**  
Compact package delivers maximum heat transfer with minimum space requirements.

- **Less Piping**  
Cooler design is readily adaptable to existing compressor systems.
- **Less Energy Consumption**  
Cools large volumes of air/gas at low pressure drop for lower energy costs.
- **Less Coolant**  
We also offer coolers that use two different coolant flows to minimize cooling water usage.
- **Less Maintenance**  
Tubes are easily accessible for inspection and cleaning.



*We give you more  
features in an  
innovative, patented  
design for maximum  
efficiency and  
design flexibility.*

API BASCO  
**ISO-9001**  
CERTIFIED

## Basco® Type ES Coolers give you these distinct advantages

- **Optimum nozzle location**

Gas inlet and outlet can be located almost anywhere along the shell surface. This feature simplifies piping system design because the ES is readily adaptable to existing requirements.

- **Easy bundle accessibility**

With the ES design, simply remove both the supply and the reversing bonnets for complete accessibility to the tube sheets for tube side cleaning. Other intercooler designs require complete removal of the bundle for similar operations.

- **Vibration free design**

Tubes are continuously supported over their entire length by plate fins.

- **Optimized air velocity**

The patented ES design easily accommodates standard compressor inlet and outlet line velocities. Unlike alternative designs, the ES requires no expensive piping enlargements to reduce line velocities for proper air distribution.

- **Integrated internal moisture separation**

The need for an external separator is eliminated through the use of internal agglomerator plates and precisely directed air flow. An optional internal mesh separator can be provided to further enhance moisture separation.

- **Rugged construction**

API Basco's built-to-be-tough equipment minimizes downtime. ES intercoolers and aftercoolers have a proven track record of durable, problem-free performance.

- **Absolute hot/cold compartment separation**

Continuous silicone rubber seals at the top and bottom of the tube bundle prevent any mixing of inlet and outlet gas.

- **Compact design**

Type ES heat exchangers maximize the heat transfer surface per unit volume of space.

## Basco® Type ES Coolers reduce your energy consumption

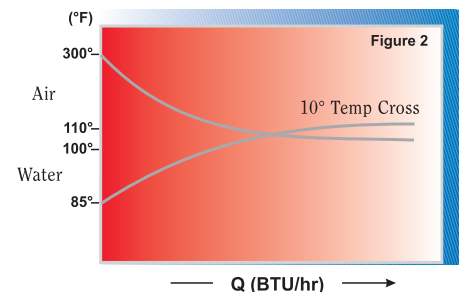
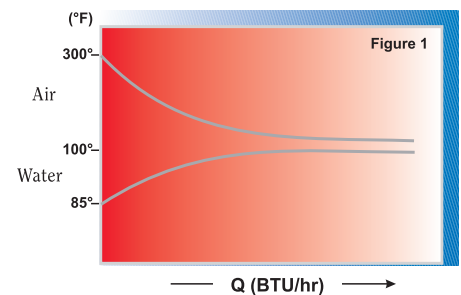
With the Basco® Type ES, minimized pressure drop significantly reduces the overall horsepower requirements of the compressor. In many cases pressure drop values of 1/2 psi or lower are realized. Generous flow areas, once-through-the-bundle cooling, and the absence of baffles permit large volumes of gas to be cooled in a compact space.

Unique approach temperature characteristics permit a relatively large rise in cooling water outlet temperature. Unlike some conventional shell and tube coolers, ES outlet water temperatures are not limited to the outlet gas temperature.

### Example...

Consider 100,000 lbs/hr of dry air being cooled from 300°F to 100°F, a heat load of 4,840,000 BTU/hr. and a coolant temperature of 85°F.

- *With a conventional multi-pass shell and tube heat exchanger, the outlet temperature of the coolant can not be greater than 99.9°F. This translates to about 645 GPM which requires a 6" line. (Fig. 1)*
- *With an API Basco® Type ES cooler, the coolant temperature rise can be 20-25 degrees and higher. With a typical rise of 25°F, the amount of coolant required is reduced to 390 GPM which requires a 4" line. This lower coolant requirement translates to lower pumping costs and less expensive piping. (Fig. 2)*



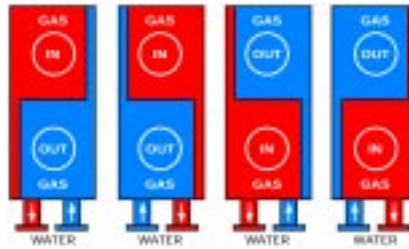
# Basco® Type ES Plate Fin

## More options give you more application flexibility

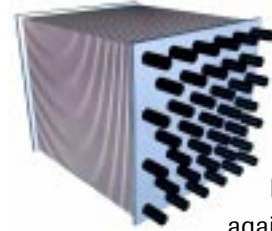
No other intercooler or aftercooler design offers such ready adaptability to your existing compressor systems as the Basco Type ES.

### • Flexible flow arrangement

Four configurations of water and air connection combinations are available permitting optimum positioning of ES equipment and reduced system engineering.



### • Tailorable fin-spacing



Variations in fin spacing (8 to 20 fins-per-inch) optimize thermal performance against pressure loss.

▲ Typical Plate-Fin Construction

## Material Options

### Tube Side

• *Tubes* — carbon steel, 304 stainless, admiralty, 90/10 copper-nickel, 70/30 copper-nickel, or commercially available materials where customer specified. 3/8" and 5/8" tube diameters are available.

### Shell Side

• *Fins* — aluminum, coated aluminum or copper.

### Shell Materials

• *Shell and bonnets* — carbon steel or any commercially available and weldable material where customer specified. A full range of internal shell coatings is available to meet customer specifications.

**Shell Diameters** — 20" to 120"

**Shell Length** — 3' to 35'

## Design Capabilities

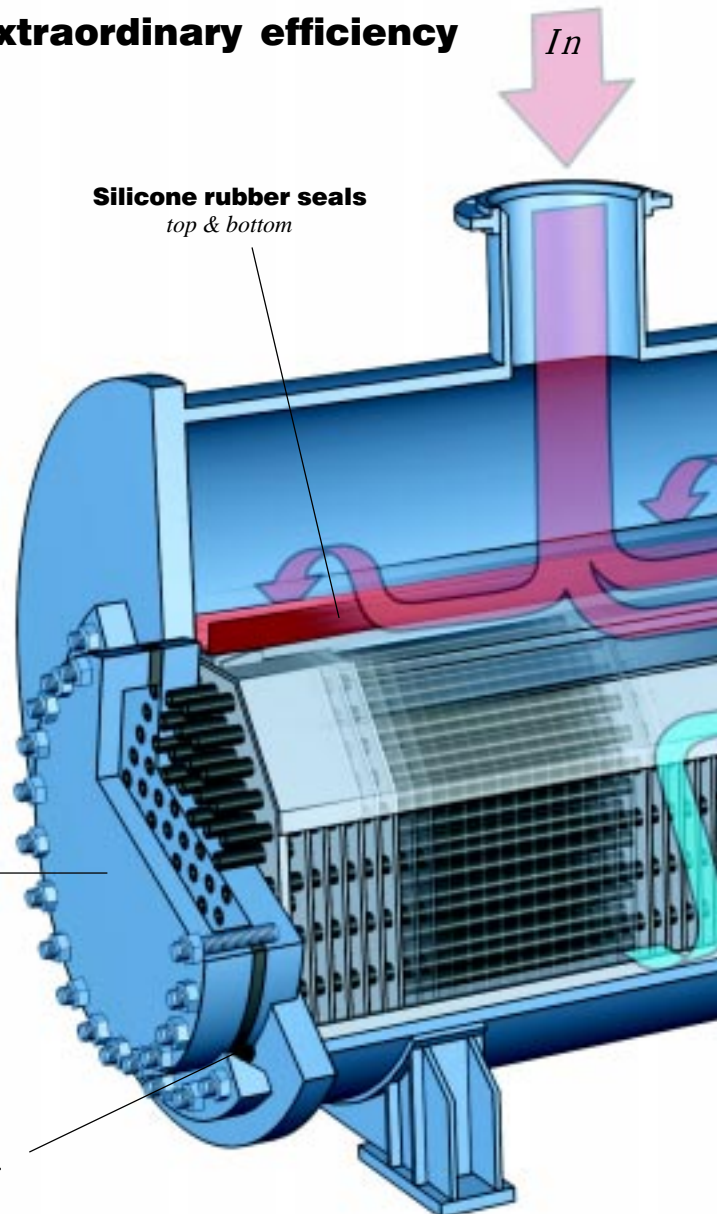
- ASME
- TEMA C, B and R
- API
- ISPESL
- AD-Merkblatt (TUV)
- PR of China (SQLO)

## Designed for extraordinary efficiency

**TEMA "C" Vessel**  
*designed and stamped to ASME. TEMA B, TEMA R, and other design options are available*

**Removable tubeside reversing bonnet**  
*allows tubeside cleaning without removing bundle*

**Shell side seal**  
*Outside O-ring packed. Fully gasketed options are also available*

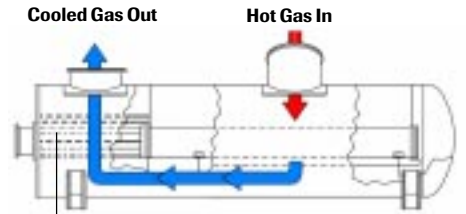


# Unique flow arrangement provides advantages

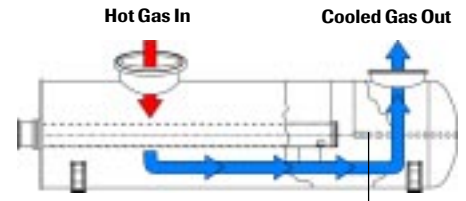
Hot gas is distributed throughout an absolutely discrete inlet compartment along the entire length of the plate fin tube bundle. Note the absence of baffles which can inhibit gas flow. The gas passes through the bundle only

once to the cold compartment and exits to the subsequent compressor stage. Dramatic changes in gas flow direction and strict velocity controls facilitate internal moisture separation.

## Optional Designs — Model L

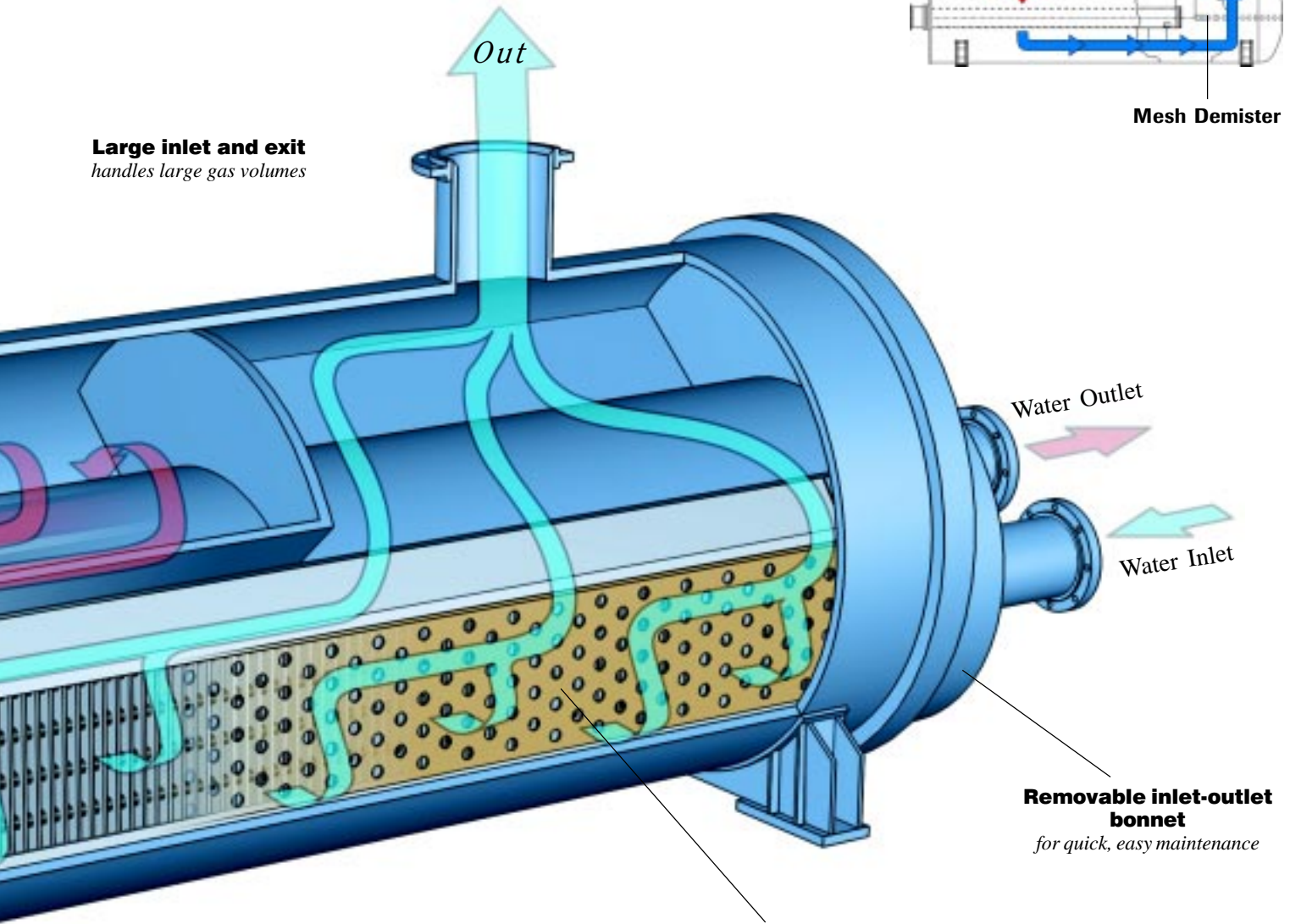


Mesh Demister



Mesh Demister

**Large inlet and exit**  
*handles large gas volumes*



**Removable inlet-outlet bonnet**  
*for quick, easy maintenance*

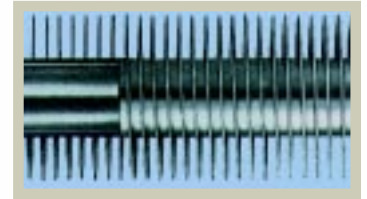
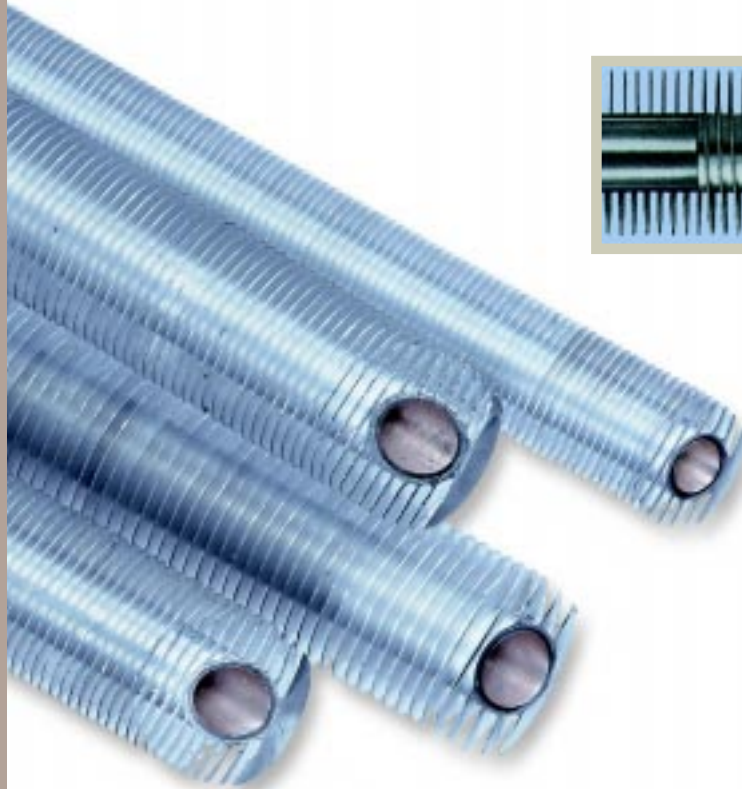
**Agglomerator**  
*distribution plate*  
*(demister pads available)*

**Model S**

*When required,  
API Heat Transfer  
can supply our  
Basco® Type HF  
Heat Exchangers  
equipped with  
unique finned tubes.*

## **Basco® Type HF Heat Exchanger with finned tubes**

**High efficiency and more versatility**



### **Basco® Type HF gives you these advantages**

- ***More tube diameter options***  
More tube diameter options provide greater design flexibility.
- ***More tube material options***  
With no expansion limitations, the Type HF can be supplied in a wide range of tube materials including copper alloys, stainless steels, titanium, hastelloy and other commercially available materials.
- ***Higher allowable operating pressures***  
Shell side operating pressures over 1,000 psi (69 bar) are possible with the Basco® Type HF models.
- ***More tube & fin material combinations***  
When different tube and fin materials are preferred, the Type HF allows a wider variety of material combinations.
- ***Positive tube support***  
Internal supports provide positive positioning of tubes without the need for baffles, while insuring excellent air-side flow conduction.

## State-of-the-art ISO 9001 facilities



API Heat Transfer's ISO-9001 certified plant and fabrication resources are extensive. The manufacturing facility located in Buffalo, NY has over 80,000 square feet, a well equipped machine shop and an array of support equipment. These include advanced computer based thermal and mechanical modeling tools for design and engineering, CNC machining centers, automated welding systems, certified

Demand-Flow<sup>®</sup> work cells and advanced inventory management control systems.

API Heat Transfer is renowned for our design, manufacturing and delivery flexibility, enabling us to better meet your standard or custom requirements. We design and build to satisfy virtually any industry standard, U.S. or international.

### Quality that is second to none

API Heat Transfer's advanced quality program is ISO-9001 certified. Each stage of manufacturing is subjected to rigorous inspection and testing— from incoming materials to completed assembly.

### API Heat Transfer will deliver your solution

API Heat Transfer is a comprehensive resource, providing fast turnaround for heat exchanger solutions. API Heat Transfer's staff is highly knowledgeable in all phases of heat transfer and can help you put all the advantages of our products to work for your specific application.

Advanced designs such as the patented ES intercooler have been generated by a research and development program dedicated to finding new, more efficient solutions to customer requirements.



# API Heat Transfer

API Heat Transfer Inc.  
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(716) 684-6700

## Divisions:

### API Airtech ISO-9001 Certified

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91 North Street • P.O. Box 68  
Arcade, New York 14009-0068  
(716) 496-5755 • Fax: (716) 496-5776

### API Basco ISO-9001 Certified

*Basco/Whitlock Shell & Tube Heat Exchangers*  
2777 Walden Avenue  
Buffalo, New York 14225  
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### API Ketema

*Acme® Refrigeration Equipment*  
2300 West Marshall Drive  
Grand Prairie, Texas 75051  
(972) 647-2626 • Fax: (972) 641-1518

### API Schmidt-Bretten

*Plate Heat Exchangers and  
Thermal Process Systems*  
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Buffalo, New York 14225  
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API directly toll-free at 1-877-API HEAT.**

**Visit us at [www.apiheattransfer.com](http://www.apiheattransfer.com) or  
e-mail us at [sales@apiheattransfer.com](mailto:sales@apiheattransfer.com)**

## Other Products Available from API Heat Transfer

*OptiDesign®*



Straight-tube, removable bundle exchangers made from standard components. Floating tube sheet for seal leak detection and easy maintenance. Diameters from 3" (7.62 cm) to 42" (106.68 cm). ASME, API, TEMA, ABS and other codes available.

*TEMA Shell and Tube*



A wide variety of TEMA types are available using pre-engineered or custom designs in various sizes and materials. Shell diameters from 6" (15.24 cm) to 60" (152.4 cm), ASME, TEMA, API, ABS, TUV, ISPEL and other code constructions available.

*Pipeline Aftercoolers*



Straight tube, counterflow aftercoolers designed to yield cool, dry compressed air. Available with or without accompanying moisture separators and constructed to a wide variety of design codes. Diameters from 6" (15.24 cm) to 42" (106.68 cm).

*Plate Heat Exchangers*



Compact units provide excellent heat transfer and small size. Plates are pressed from stainless steel, titanium and other alloys. Gaskets of nitrile, EPDM, Viton®, compressed fiber and Teflon® are used. Gasket-free welded and brazed designs available.

*Type 500 Shell and Tube Heat Exchangers*



General purpose exchangers designed to cool oil, compressed air and other industrial fluids. A variety of constructions, port configurations and materials are available. ASME and TEMA-C available. Diameters from 3" (7.62 cm) to 12" (30.48 cm).

*Brazed Plate Heat Exchangers*



Off-the-shelf, standard units reflect the latest in plate heat exchanger technology for maximum performance and low cost. Ideal for OEM or aftermarket applications. Many models stocked and ready to ship. Models for process or refrigeration applications.

*Air-Cooled Heat Exchangers*



High efficiency, brazed aluminum coolers for cooling a wide variety of liquids and gases with ambient air. Lightweight, yet rugged. Capable of cooling multiple fluids in single unit. Models can be supplied with cooling fan and a variety of drives.

*ACME® Packaged Chillers*



Packaged chillers with or without pumping systems from 3 to over 400 tons with PLC controls available. Standard and custom designed chiller-barrels and condensers to 2,500 tons with same-day shipment on many units. DX and flooded evaporators available.