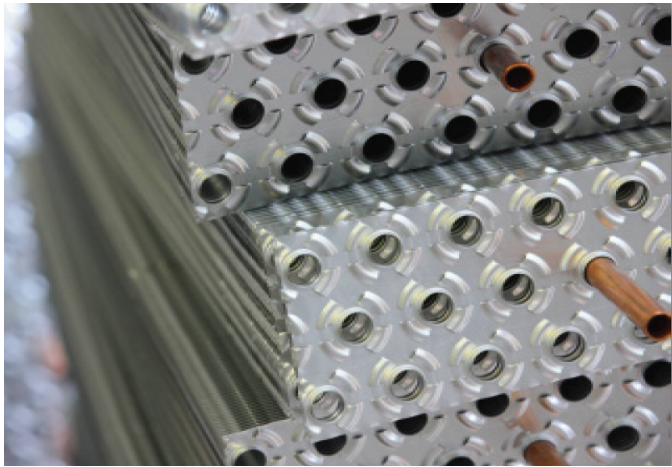


-9890	Ph2		Houma
-9899			
<hr/>			
	Ship Date:	Ship Via:	Confirmed To:
	6/10/2015	Our Truck	Roy Pennington
it:	Description:	Unit	
ch	Day Rental 6K Diesel Pressure Washer with 50" hose, gun, lance and nozzle set.		
ch	Day rental turbo nozzle		
ch	Gallon of Diesel		
			Sub
			9.50% Sale
			Fre
			Tot

FINNED TUBE OIL COOLERS:

FIN TUBE TECHNOLOGY BREAKDOWN

Two Main Types of Industrial Finned Tube Technology



Continuous/Plate/Compact Fin

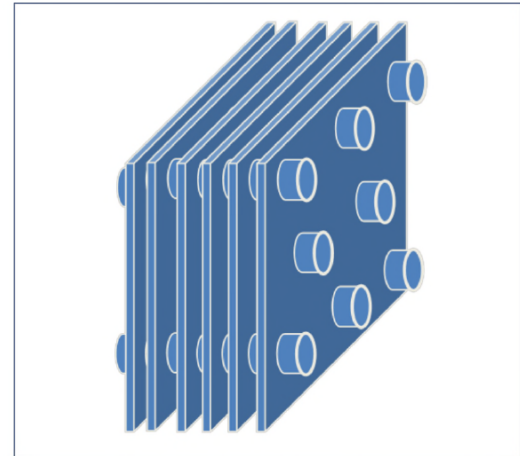
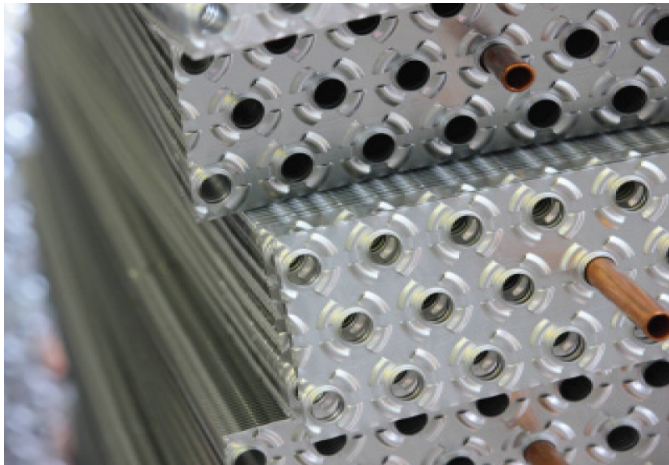
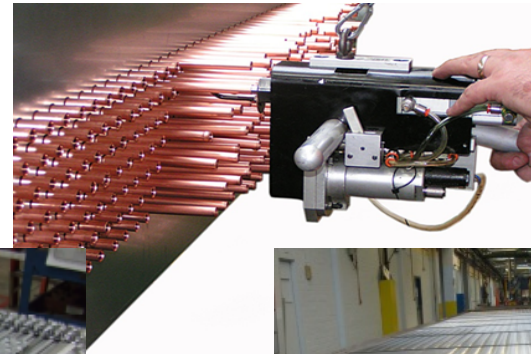


Figure B2.8-1. Typical bundle layout with continuous fins

A simple design heat exchanger with stamped plates and tubes

Continuous = tubes are not finned individually (round, spiral)

Continuous/Plate Fin



Metal sheet as wide as the specified coil is deep (1 row – 8 rows)
Die stamps coil with holes for the tubes
Hole are usually aligned or staggered
Dies are made with specific pattern geometry (waffle, etc)

Continuous/Plate Fin When To Use

Air/exhaust is outside media

Environment is suitable for fins

Heavily fouled air should use bare tubes (no fins)

Temperatures and pressures are within its limits

Not suitable for API (American Petroleum Institute) requirements

Outside air flow is usually provided by a fan when its in an open environment (so air pressure is low) or its provided by a fan/blower when its inside ductwork, then ductwork seams will likely be limiting factor for max air pressure.

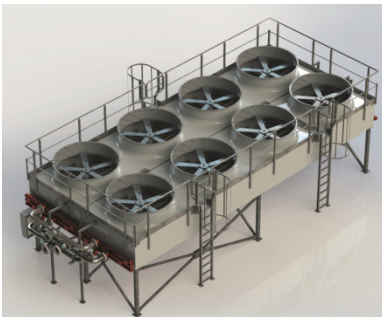
Continuous/Plate Fin

Industries

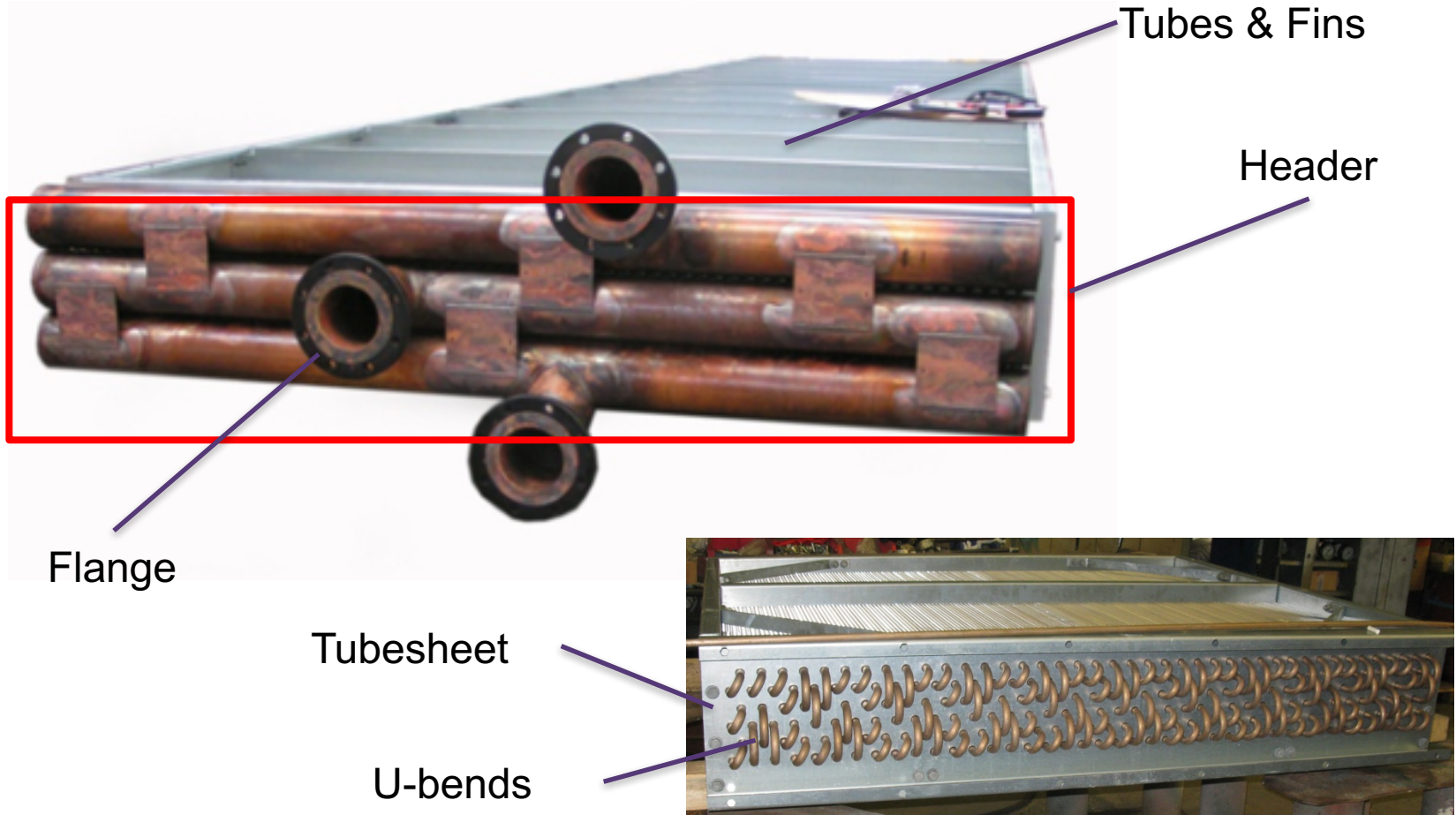
Power
Oil and Gas
Food and Beverage
Refrigeration
Chemical
Heavy and light industries

Applications

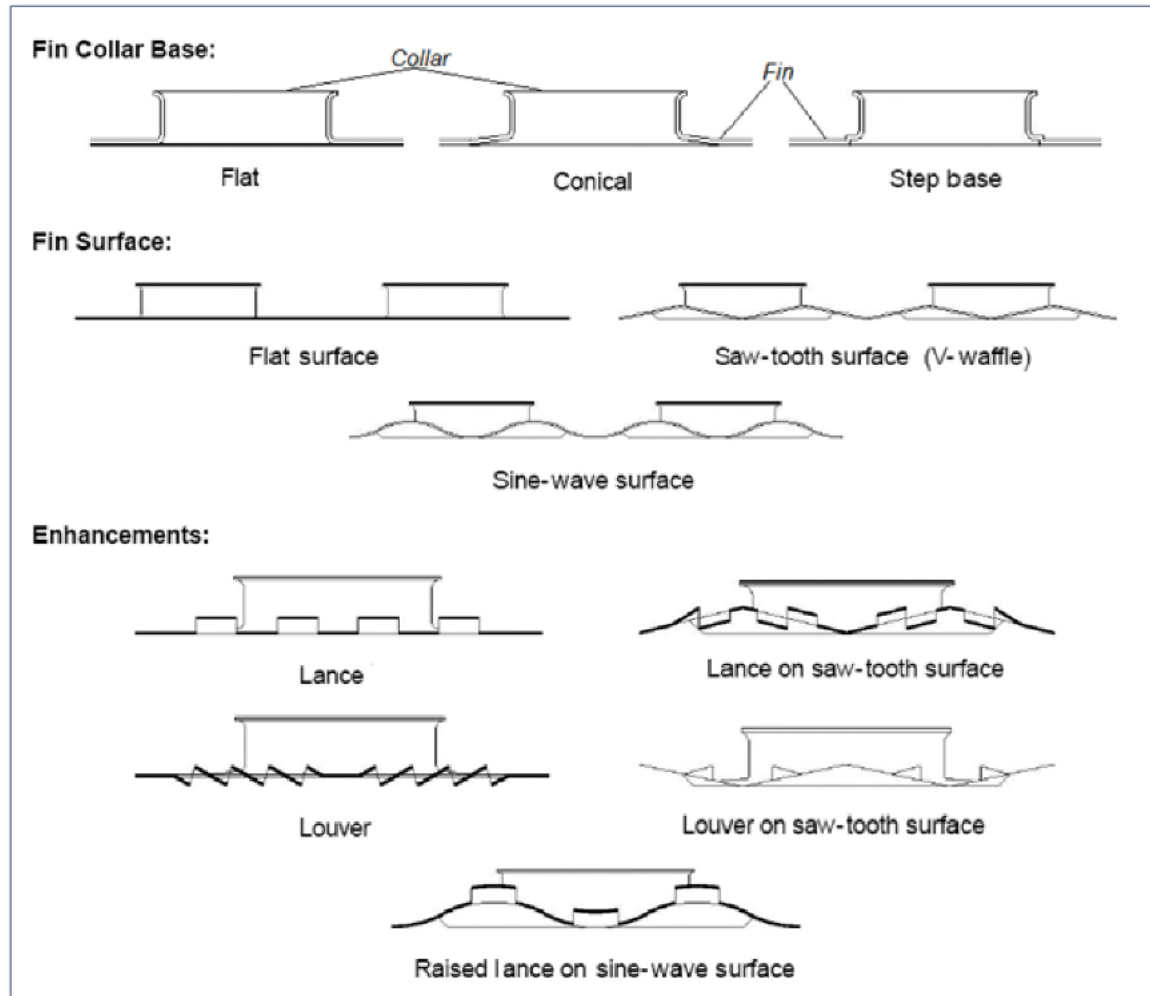
Gas and diesel gensets
Auxiliary cooling
Gas turbine lube oil cooling
Process cooling
Compressor cooling
Heat recovery
Steam coils (air preheaters)



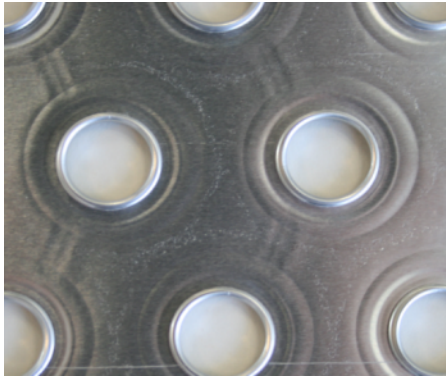
Continuous/Plate Fin Main Components



Continuous/Plate Fin



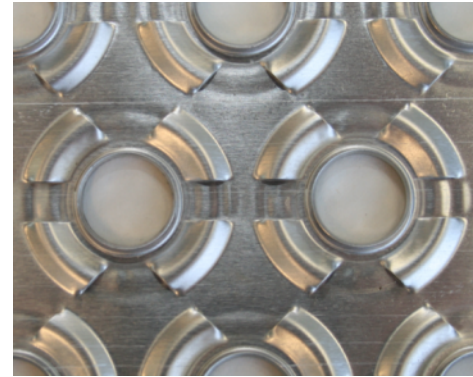
Continuous/Plate Fin



Flat

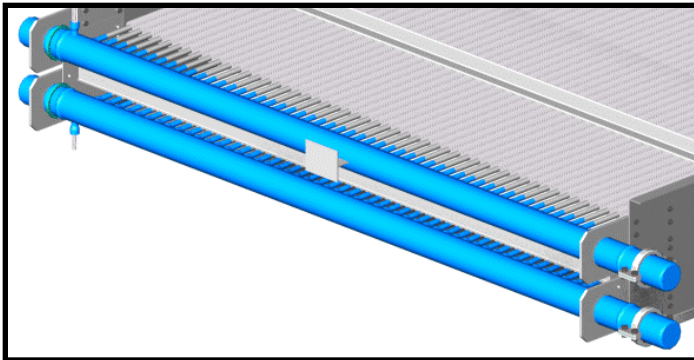


Waffle

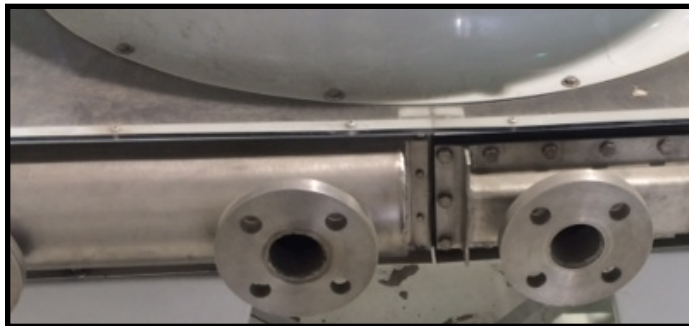


Advanced Ring

Continuous/Plate Fin Headers



Pipe

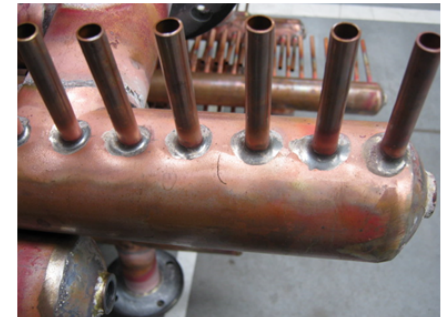


'Omega'



"Return bends"
(no header)

Continuous/Plate Fin Pipe Headers



Continuous/Plate Fin

- **Fin Materials**

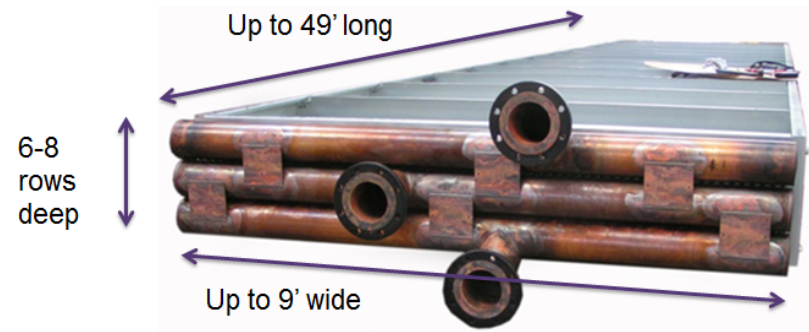
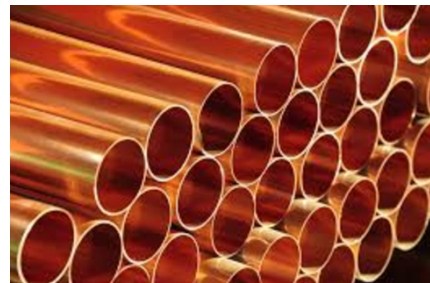
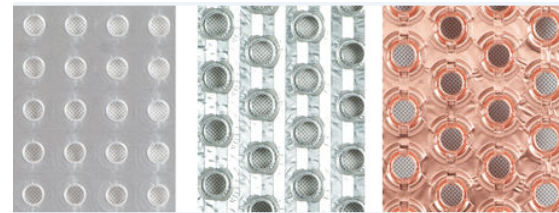
- Aluminum
- Copper
- Al Magnesium

- **Tube Materials**

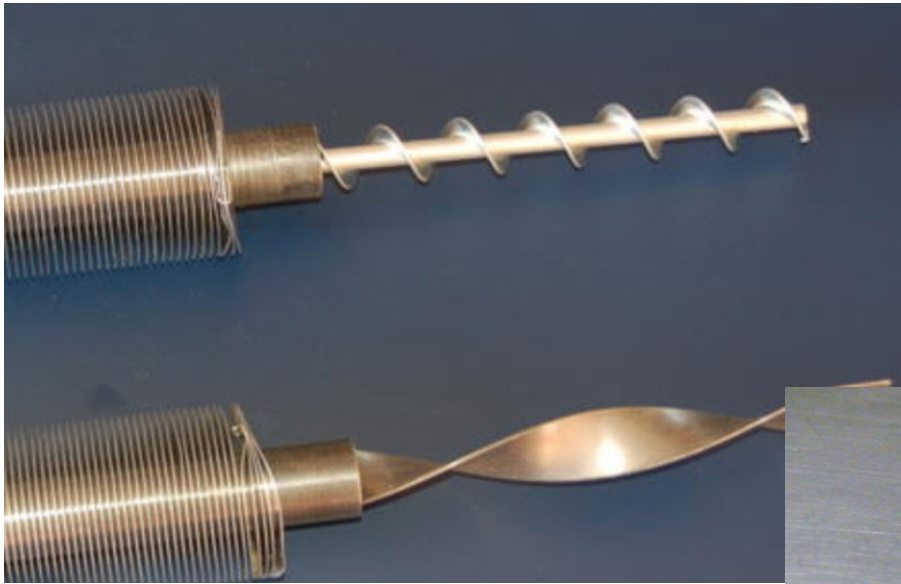
- Copper
- Stainless Steel
- Carbon Steel

- **Bundle Geometry**

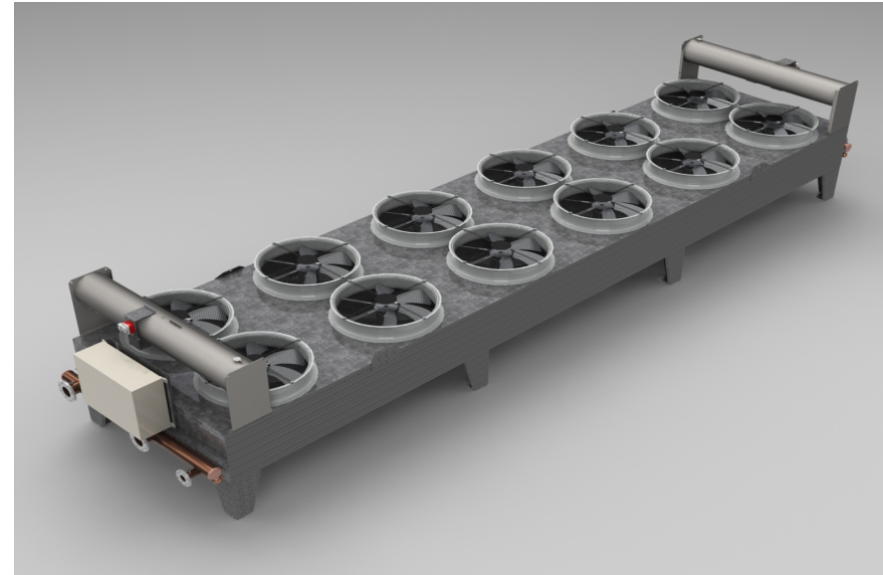
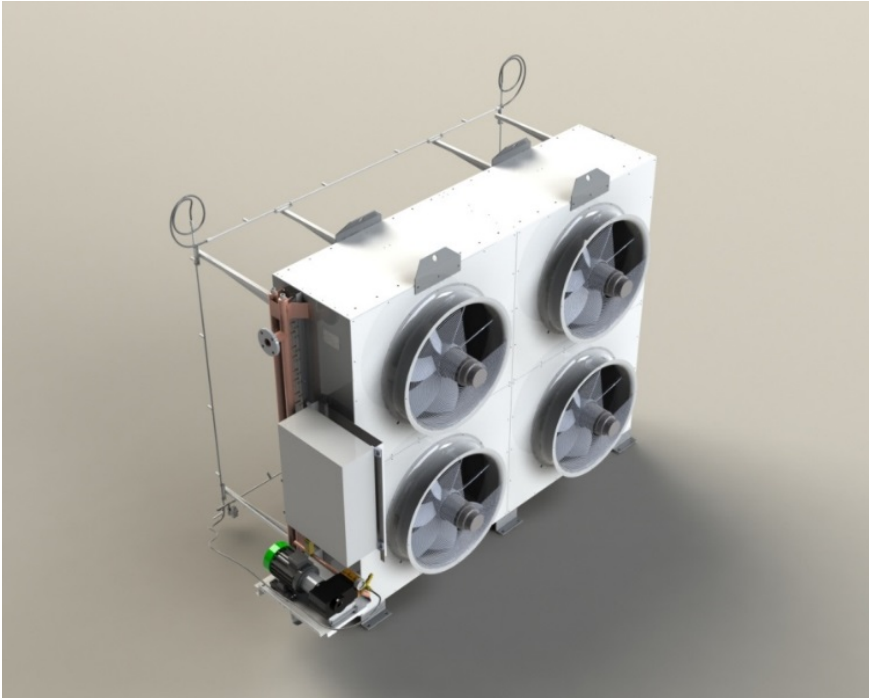
- Per vendors tooling
- # of tube rows thick
- Tube diameters
- Max coil length
- Max coil width



Continuous/Plate Fin Turbulators



Continuous/Plate Fin Examples



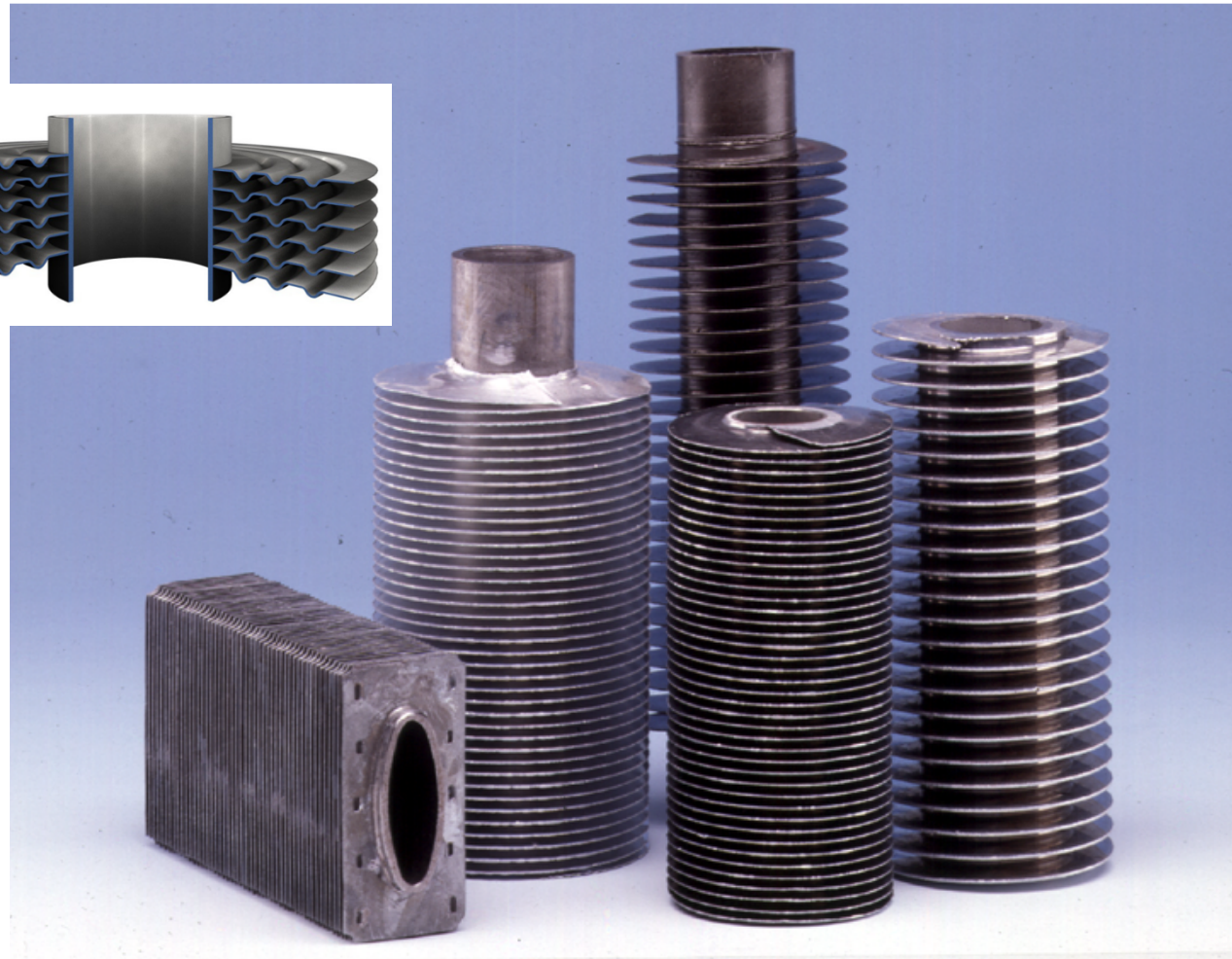
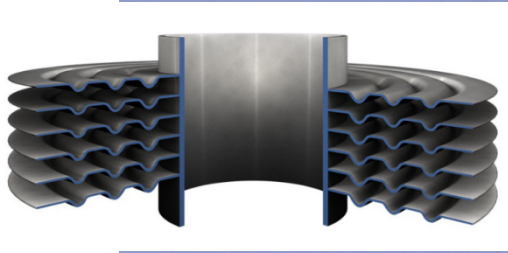
Continuous/Plate Fin Examples



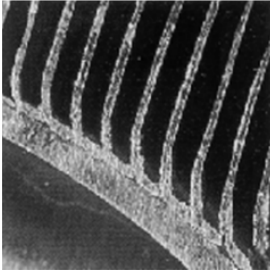
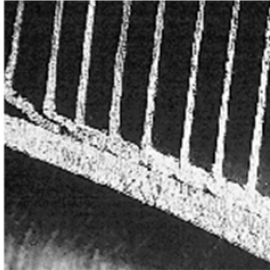
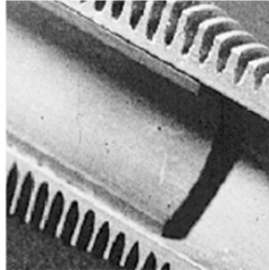
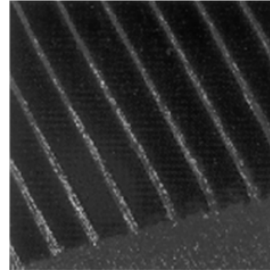

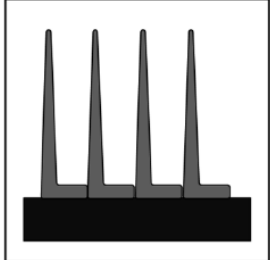
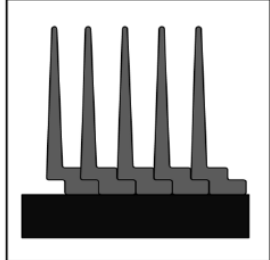
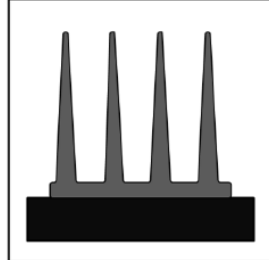
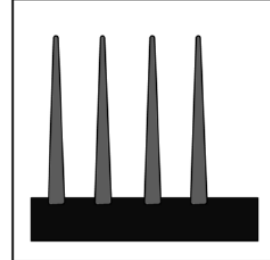
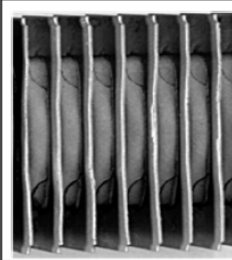
Continuous/Plate Fin Examples



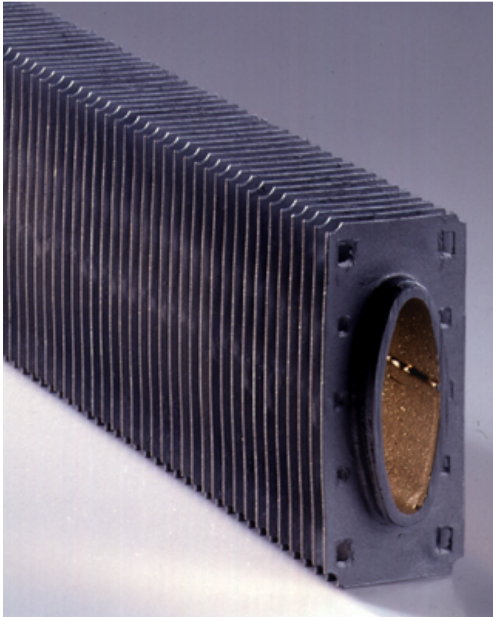
Individually Finned Tubes



Individually Finned Tubes

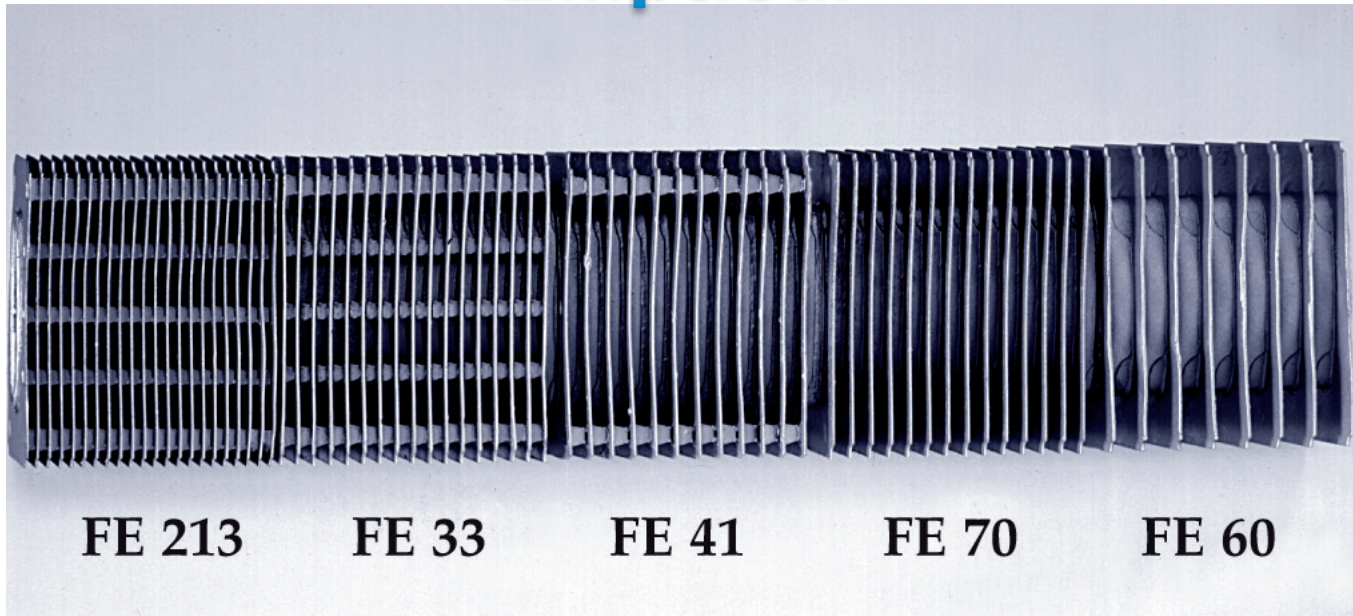
				
				
L	Overlap L	Extruded	Embedded	Elliptical
Max Temp	Max Temp	Max Temp	Max Temp	Max Temp
300°F	350°F	550°F	750°F	680°F
Tube Diameters	Tube Diameters	Tube Diameters	Tube Diameters	Tube Diameters
5/8", 3/4", 1", 1 1/4", 1 1/2", 2"	1", 1 1/4", 1 1/2", 2"	1", 1 1/4", 1 1/2"	5/8", 3/4", 1", 1 1/4", 1 1/2", 2"	1 1/2" X 1/2"
Fin Heights	Fin Heights	Fin Heights	Fin Heights	Fin Heights
7/16", 1/2", 5/8"	7/16", 1/2", 5/8"	1/2", 5/8"	1/2", 5/8"	2.1" X 1"
Fins / Inch	Fins / Inch	Fins / Inch	Fins / Inch	Fins / Inch
7, 8, 9, 10, 11	7, 8, 9, 10, 11	8, 9, 10, 11	7, 8, 9, 10, 11	4-12 With optional turbulators

Individually Finned Tubes Elliptical



- Aerodynamic, less pressure drop, less noise & less soiling than round finned tubes
- Higher heat transfer per unit of area than round tubes means smaller coil
- Very durable with long life spans (20-30+ years)

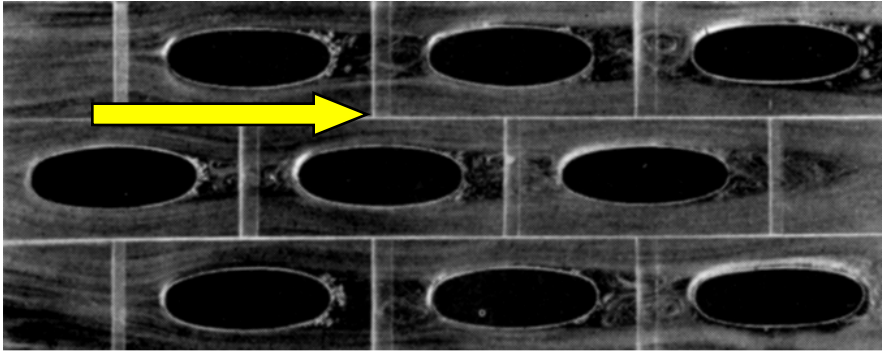
Individually Finned Tubes Elliptical



- Carbon steel tube is elliptical shape
- Carbon steel fins are pressed onto tube
- Fins are then galvanized onto the tube
- Application range up to 680F

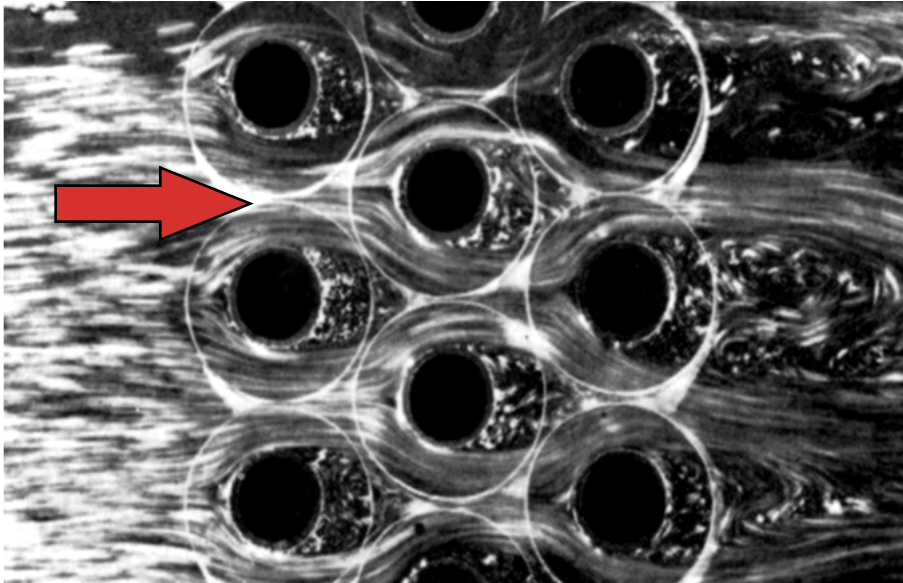
- Broad range of fin spacing and external turbulators

Individually Finned Tubes Elliptical



Elliptical tubes

- Homogeneous air flow
- 3-10 times less pressure drop

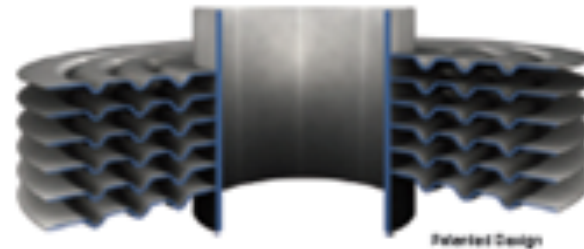
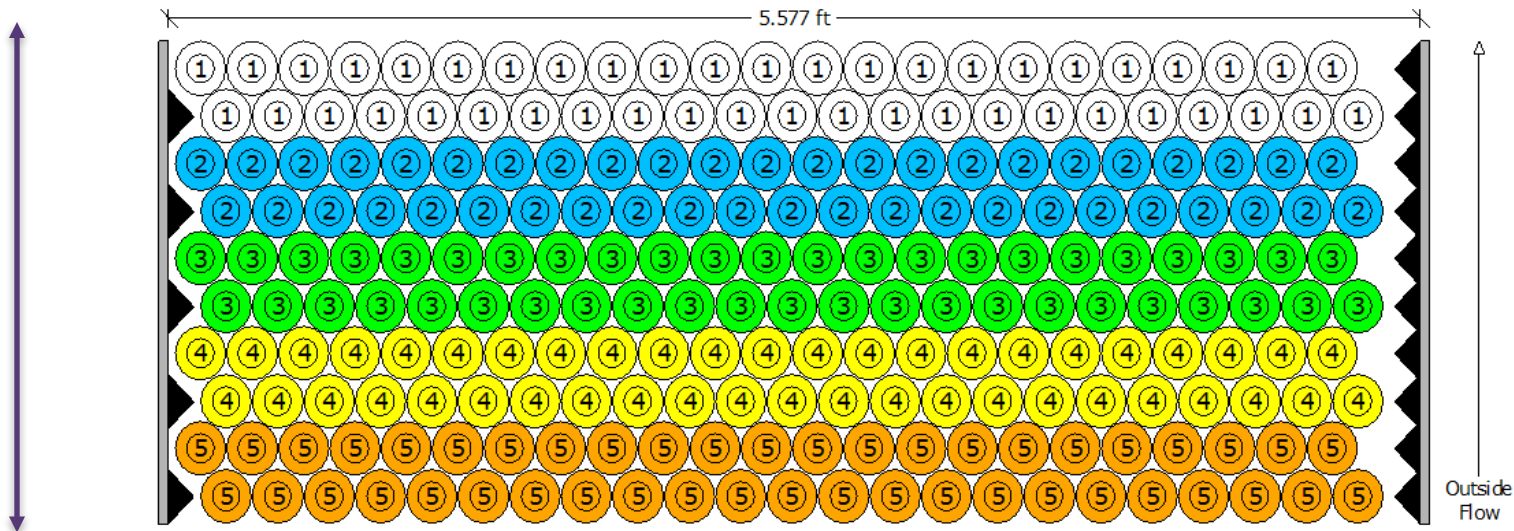


Round tubes

- Turbulent air flow
- Higher pressure drop

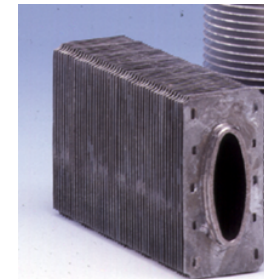
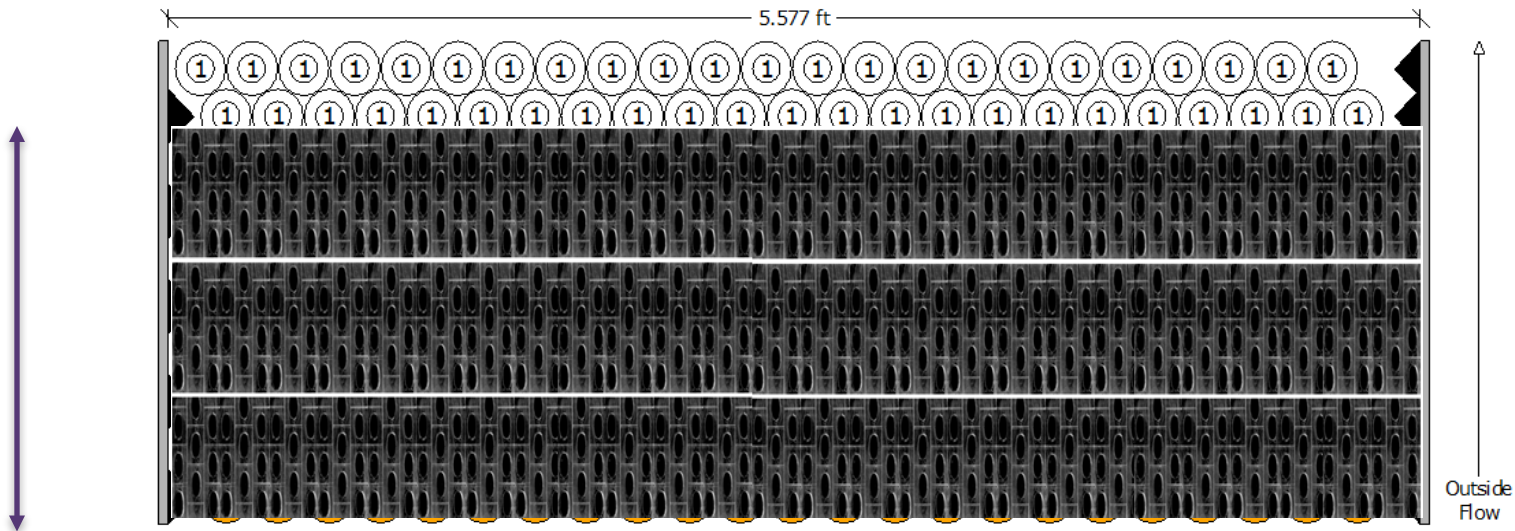
Individually Finned Tubes Round

Round finned tube – thickness required to meet performance



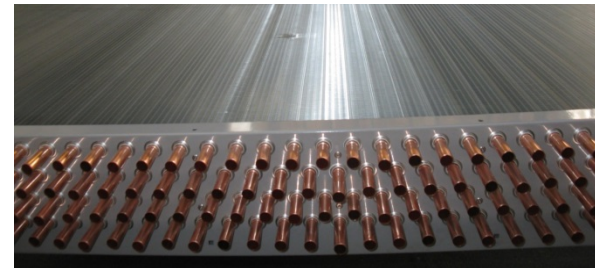
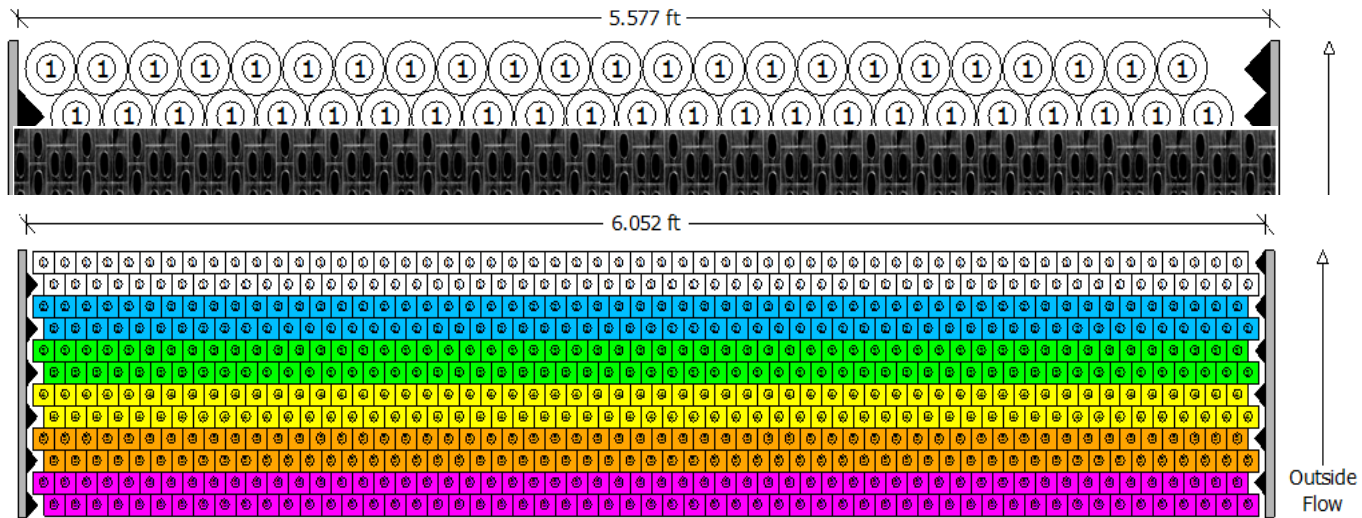
Individually Finned Tubes Round vs Elliptical

Elliptical finned tube – thickness required to meet performance



Individually Finned Tubes Round vs Elliptical vs Plate Fin

Plate finned tube – thickness required to meet performance



DOUBLE TUBE SAFETY HEAT EXCHANGERS:

PROS AND WHERE TO USE THEM

FIELDS OF APPLICATION

Energy / Power

Oil & Gas

Chemical Industry

Marine

Refrigeration Industry

Process Technology

Pharmaceutical Industry

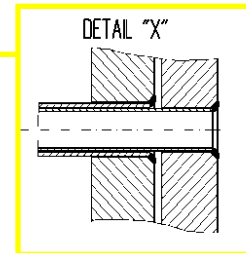
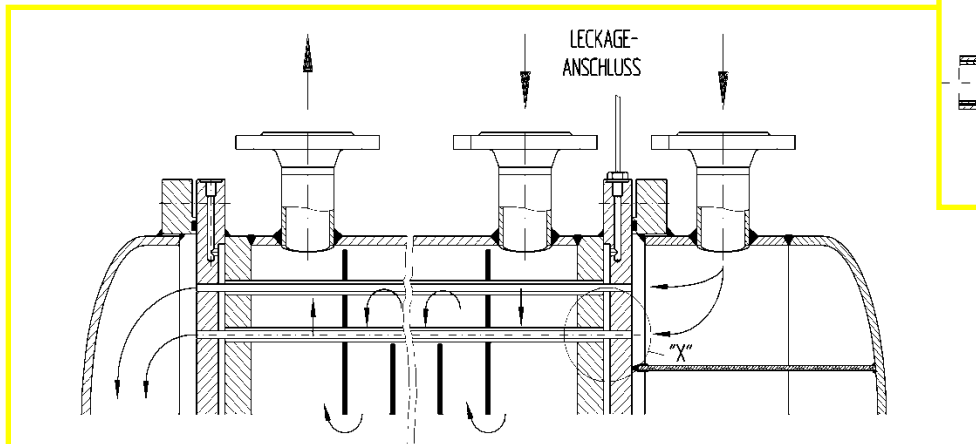
Food Industry

TYPICAL APPLICATIONS

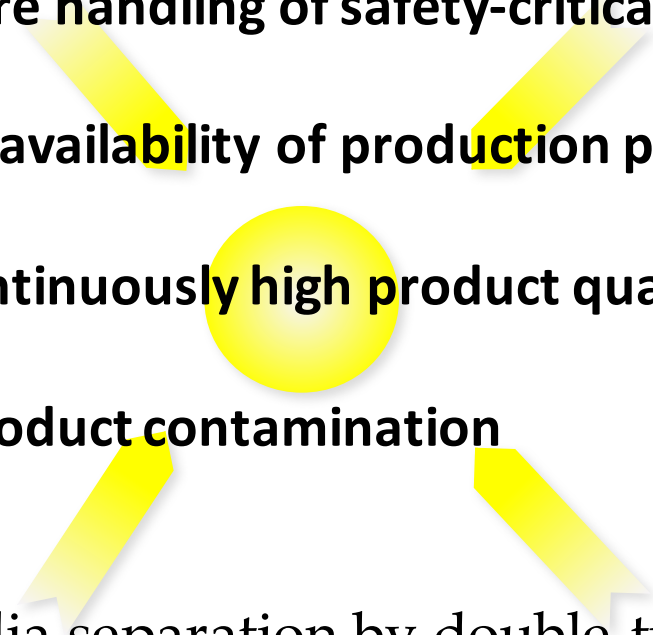
- Natural gas heating (Gas pressure relief stations; Underground storage; “Performance” heating in front of gas turbines) and cooling
- LNG heating and evaporation
- Chlorine liquefaction / Ammonia evaporation
- Production of chemical products (safety critical operations), e.g. polysilicon
- Transformer oil cooling
- Direct cooling of gear oil and turbine oil
- Thermal oil heating and cooling

FUNCTION

- Tube bundle of double-wall design, each end fitted with two tube sheets
- If a tube wall develops a defect on the primary side, medium enters a interbarrier space chamber through small channels between the two tubes inserted into each other and triggers a check signal
- Release of an alarm signal
- Separation of products / fluids by a second, intact tube wall
- Continued operation of the system possible until next regular maintenance
- Avoidance of cost-intensive downtimes, extensive cleaning, contamination / pollution of complete batches



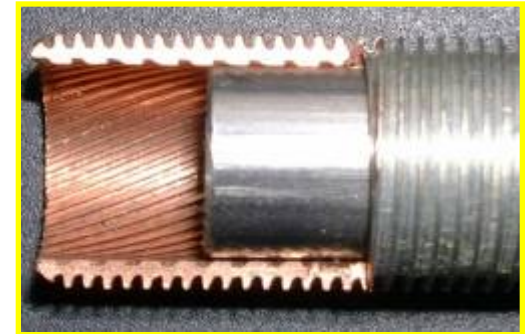
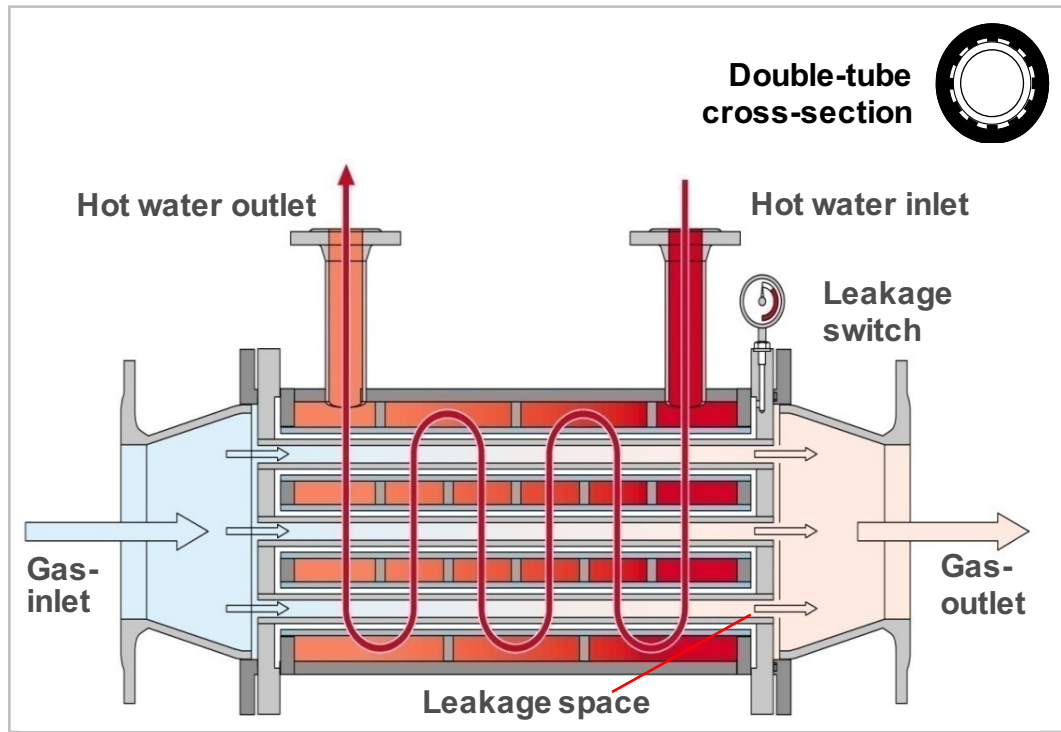
FOCUSES

1. Assuring of secure handling of safety-critical media
 2. Assuring of high availability of production plants
 3. Assuring of a continuously high product quality
 4. Prevention of product contamination
- 

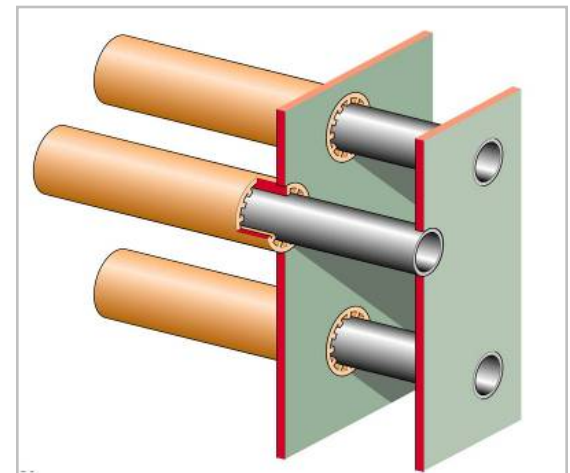
Conclusion

The controlled media separation by double-tube technology protects your company from economic damage, liability by your employees and loss of image. Furthermore, our system prevents your company from negative consequences in the context of compliance regulations.

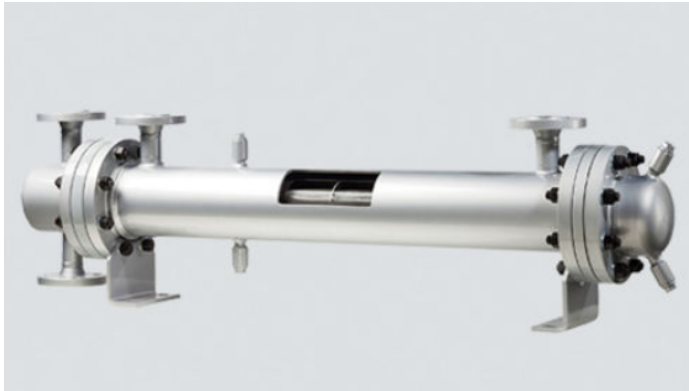
DTSHX TECHNOLOGY - FEATURES



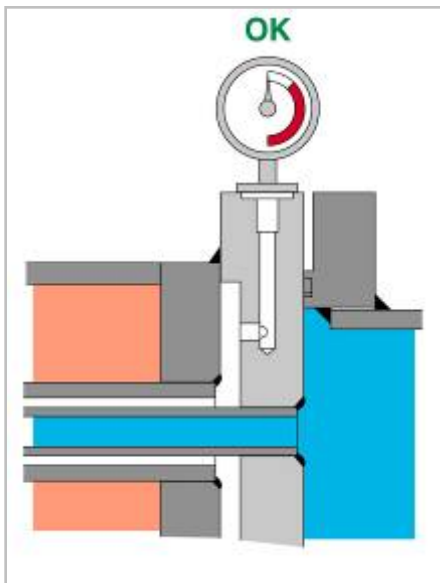
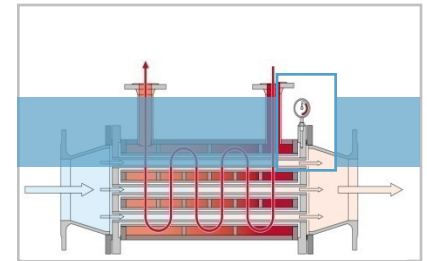
**Cross Section
Double Tube**



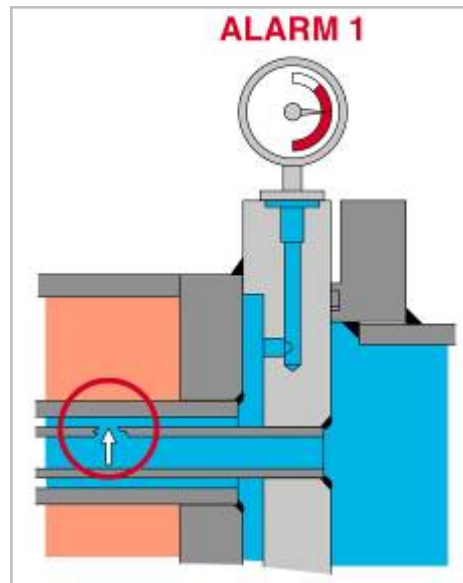
INSIDE THE SHELL – PLATE FIN OPTION



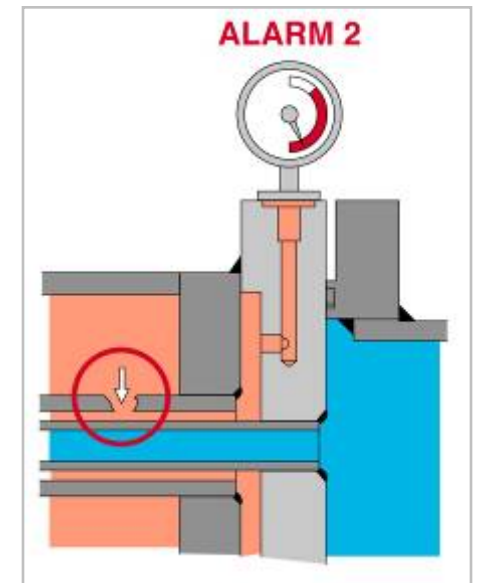
DTSHX TECHNOLOGY - LEAKAGE MONITORING



Normal operation



Leakage inner tube

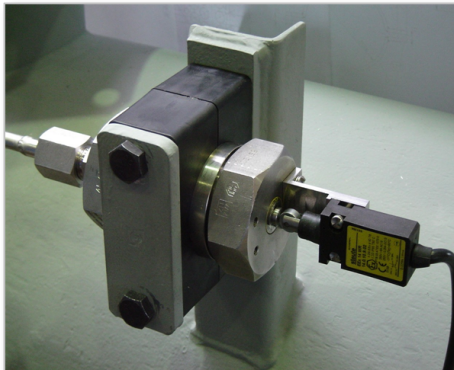


Leakage outer tube

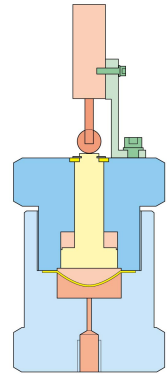
TYPES OF LEAKAGE SWITCHES

Selection acc. to media demands for plant operation

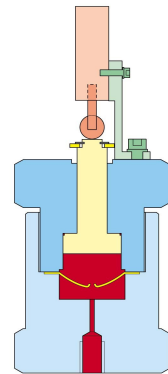
- Visual display device
- Display device with magnetic float switch
- Display device with magnetic float switch and auxiliary electrode monitoring function to identify the leakage medium
- Pressure monitoring device (vacuum or overpressure)



Installation Example



Normal operation status without failure



Rupture disc broken: optical and electrical indication of failure

DTSHX FOR THE CHEMICAL INDUSTRY



Condensation of
THF vapors

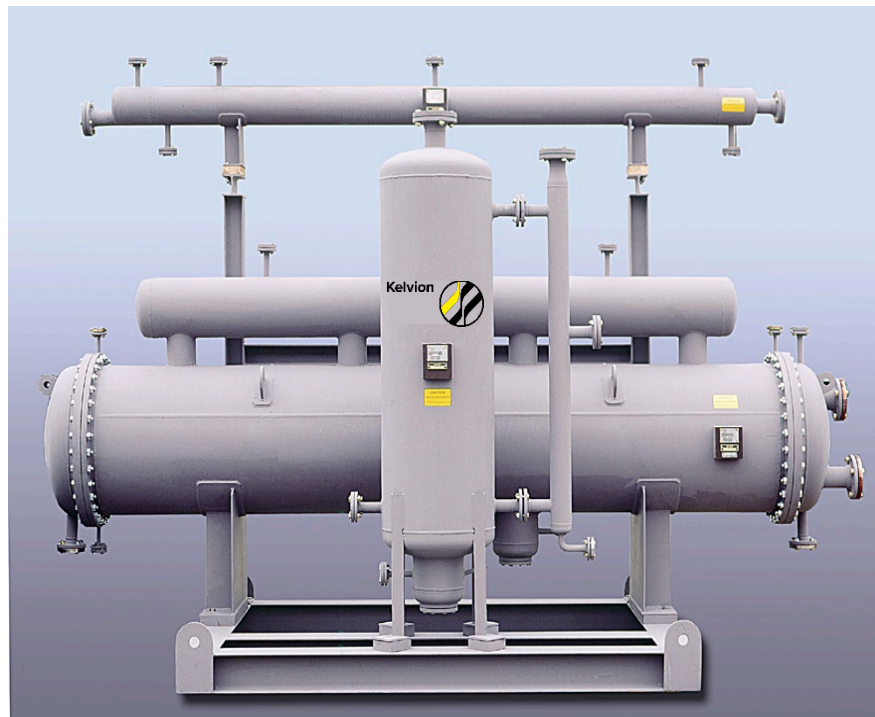
THF vapors/water

6 bar / 200 °C and
-30 °C (on tube side)

10 bar / 200 °C and
-30 °C (on shell side)

**Double Tube Safety Heat Exchanger for the
Chemical and Pharmaceutical Industry**

DTSHX FOR THE CHEMICAL INDUSTRY



Condensation of a
chlorine gas mixture

chlorine gas mixture/
ammonia

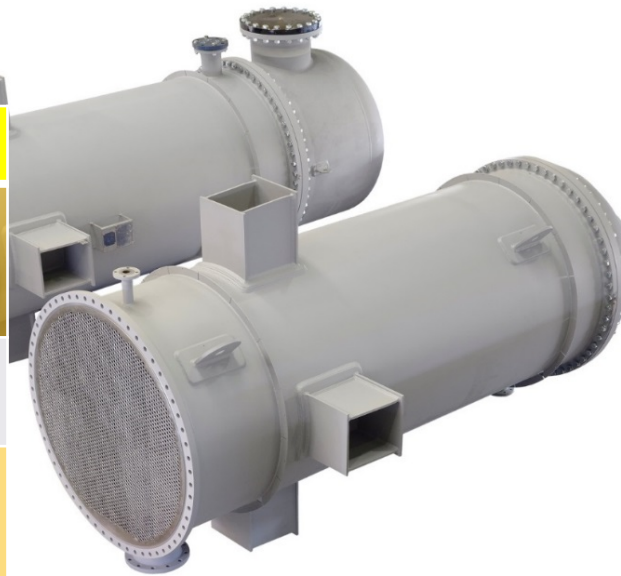
10bar / 100 °C and
60 °C (on tube side)

16 bar / 100 °C und
-60 °C (on shell side)

**Double Tube Safety Heat Exchanger for the
Chemical, Food and Refrigeration Industry**

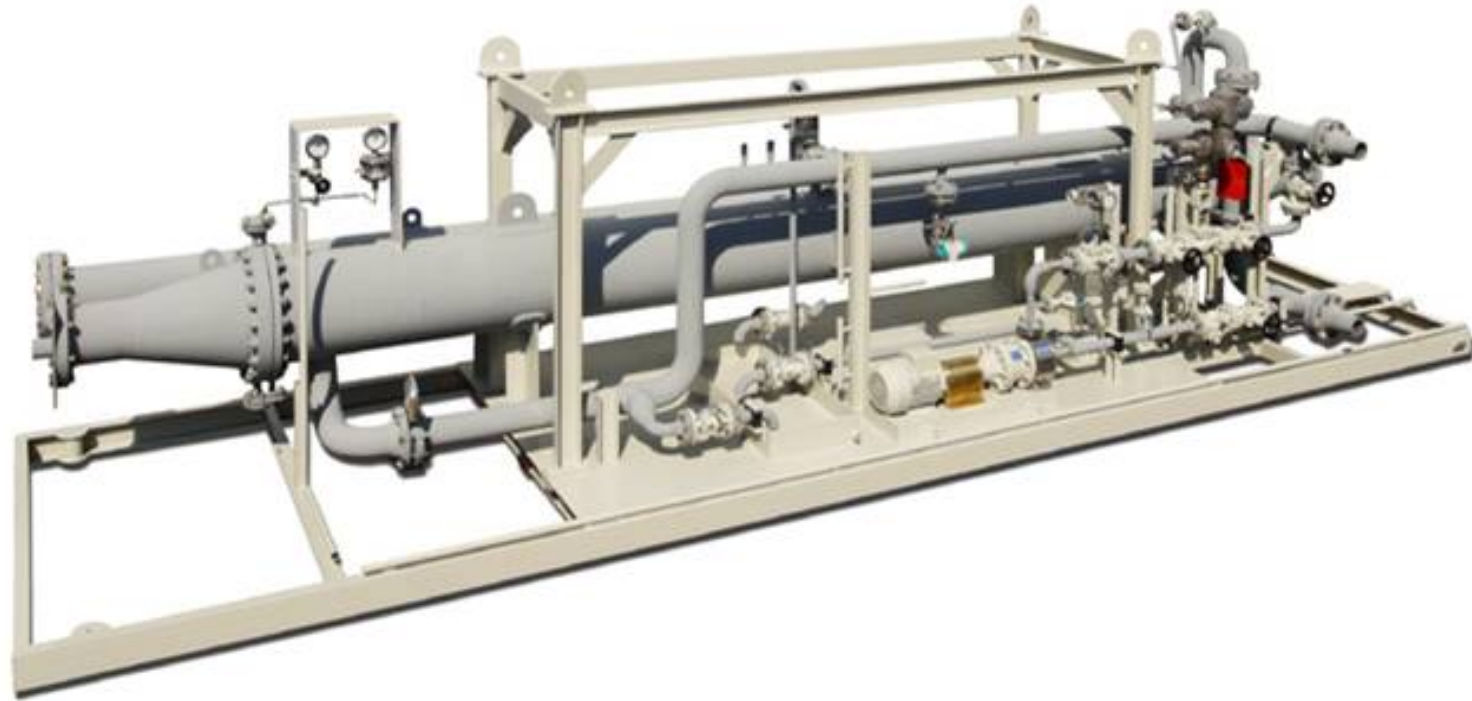
DTSHX FOR THE CHEMICAL INDUSTRY

Example	
Application	Condensation of a Chlorosilane mixture within natural circulation
Media	Chlorosilane mixture/ water vapor
Design Conditions	9.1 bar / 160 °C and -10 °C (on tube side)
	9.1 bar / 160 °C and -10 °C (on shell side)



**Double Tube Safety Heat Exchanger for the
Chlorosilane Industry**

GAS PREHEATER SKID



**Natural gas preheater skid with
Renzmann Double Tube Safety Heat Exchanger**











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