DELTA T HEAT EXCHANGERS
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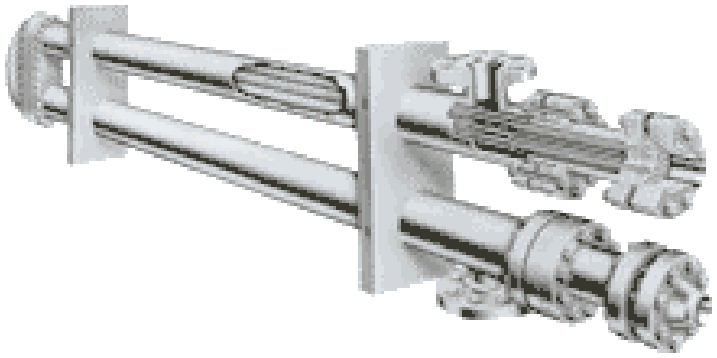
When To Use Koch Heat Transfer Hairpin Heat Exchangers

Process Considerations

A temperature cross exists –
A temperature cross exists when the outlet temperature of the cold fluid is higher than the outlet temperature of the hot fluid. The 1 pass tubeside, 1 pass shellside countercurrent flow of a hairpin results in fewer shells than 2-pass tubeside, 1 pass shellside conventional shell & tube designs.

A temperature cross is desired –
Sometimes process engineers increase the flow rates of utility fluids (cooling water, hot oil, etc.) to avoid a temperature cross, or they will split the duty to different exchangers with different utility fluids. By using countercurrent flow, the flow rate of the utility fluid can often be reduced saving pumping costs and utility fluid allocation. Also, multiple shell and tube exchangers can be combined into single hairpin sections saving installation and operating costs.

A low shellside pressure drop is required –
By using our Low Pressure Drop (LPD) tube supports, longitudinal fintubes or Twisted Tubes we can design for low shellside pressure drop in smaller shell diameters than conventional shell & tube designs. We also guarantee our designs against vibration.



High ratio of shellside flow rate to tubeside flow rate –
If this ratio is 2:1 or greater, by using our LPD tube supports, longitudinal fintubes or Twisted Tubes, we will often result in a smaller shell diameter than conventional shell & tube designs.

Tubeside fluid is viscous (>1 cp) or complete vaporization is required –
These services benefit from the use of our tubeside heat transfer enhancement devices like tube inserts and Twisted Tube. These devices increase turbulence and can reduce the size of an exchanger significantly when the tubeside fluid is in laminar flow. Complete vaporization can also be achieved by using tube inserts or Twisted Tube to generate swirl flow to ensure a wetted tube wall.

Heating or cooling low-pressure vapours –
Our Fintube technology in either a hairpin configuration or a LBEU design is well suited for heating or cooling low-pressure vapours on the shellside.

Solids are present (slurries, etc.) –
Our double pipe designs use a single large diameter innertube to effectively pass sold particles with minimal fouling and are easy to clean.

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Mechanical Considerations

Brown Fintube Separated-Head closures feature independent tubesheets, closure Flanges and bolting to effectively handle these mechanical design challenges:

High pressure –
Our Taper-Lok closure can be designed for tubeside pressures in excess of 10,000

Thermal shock as a result of immediate introduction of a fluid with a large temperature difference (250 F) than the ambient temperature – Can result in leakage in single bolted designs.

High terminal temperature differences (>300 F) –
Can result in warping and leakage in the single tubesheet designs used for shell & tube.

Cyclic service –
Can result in leaks with single bolted designs where common bolts seal both tubeside and shellside gaskets.

Construction Considerations

All connections are on the same end –
Shell and tube designs with single pass shells have connections on both ends making piping more complex and costly.

No internal bolting –
Unlike floating head shell & tube designs, the shellside fluid is not in contact with any bolting in our hairpin designs.

Large radius U-bends –
Our U-tubes can be cleaned around the u-bends where shell & tube u-tube designs cannot. Large radius u-bends are also more effective at handling differential expansion than small radius u-bends.

All welded baffle cages –
These are more rugged than sleeves and threaded rod baffle cages used in conventional shell & tube designs.

No expansion joints –
All thermal expansion is taken in the U-bends, no expansion joints are needed.

No sliding plates needed –
Since our support brackets can slide on the shell sliding plates between the support brackets and foundation are not needed to accommodate thermal expansion of the shell.