



TWISTED TUBE® HEAT EXCHANGERS

COMMON QUESTIONS

1 How much does a TWISTED TUBE® Heat Exchanger bundle cost compared to a conventional plain tube bundle?



When comparing similar diameter and length configurations, a TWISTED TUBE® Heat Exchanger bundle may cost approximately 1.4 to 2 times more than a conventional plain tube bundle. The increased cost is primarily due to higher tube counts, the addition of a shroud, and the specialized in house tube twisting process.

However, the more important consideration is the overall value delivered. In many applications, two TWISTED TUBE® Heat Exchangers can reliably achieve the same heat duty as three conventional bundles. This can reduce installation, maintenance, and lifecycle costs by requiring fewer units.

In debottlenecking and retrofit applications, additional value is realized through avoided piping and foundation modifications, increased throughput, improved energy recovery, and the potential for reduced CO2 emissions.

2 How's the shell-side and tube-side pressure drop affected with TWISTED TUBE® Heat Exchangers?



Shell side pressure drop is significantly lower in a TWISTED TUBE® Heat Exchanger due to its baffle free design, which reduces flow restriction and associated losses.

On the tube side, if the same number of tubes and passes are compared to a plain tube design, pressure drop may be higher because of the twisted tube geometry. However, TWISTED TUBE® exchangers accommodate a higher tube count within the same shell diameter, increasing total flow area and offsetting much of the additional pressure drop.

In many retrofit applications, existing multi pass exchangers can be converted to single or two pass configurations while achieving a higher overall heat transfer coefficient within acceptable pressure drop limits.

3 Is a TWISTED TUBE® Heat Exchanger a good fit for high-fouling applications?



We recognize that fouling mechanisms are complex, and TWISTED TUBE® Heat Exchangers are not intended for every application. Each service is carefully evaluated for fouling tendencies before recommendations are made.

Because the design is baffle free, there are no stagnant zones where fouling typically accumulates. The twisted tube geometry creates strong turbulent swirl flow, increasing shear velocity at the tube wall and reducing fouling rates. More uniform velocity profiles also promote even temperature distribution, which can help reduce coking of heavy oils and hydrocarbons. Documented case studies show lower fouling rates and significantly extended operating cycles between cleanings.



4 Can TWISTED TUBE® bundles be cleaned using conventional methods?

A TWISTED TUBE® bundles can be effectively cleaned using conventional hydro blasting on both the outer and inner tube surfaces. The shell side design includes defined cleaning lanes that provide direct access for thorough bundle cleaning. On the tube side, the primary consideration is selecting a lance size compatible with the non circular internal tube geometry. Metalforms provides guidance to ensure safe and effective cleaning procedures.

As an alternative, full bundle immersion cleaning using ultrasonic bath technology is available. This method uses ultrasonic energy to remove fouling and deposits from the entire bundle surface.

5 What inspection methods are available for TWISTED TUBE® Heat Exchanger bundles?

A Several inspection methods are available to evaluate the integrity of TWISTED TUBE® bundles.

Acoustic Pulse Reflectometry Inspection System

Acoustic Pulse Reflectometry is a non invasive, non destructive testing method that introduces sound pulses into the tube and analyzes reflected signals to identify internal defects. The technology is effective in detecting blockages, holes, pitting, and erosion. It is commonly used for quality assurance of new tubes and for in service inspections during shutdowns.

Eddy Current Testing

Eddy Current Testing can be used on bundles manufactured from conductive alloys such as stainless steel, brass, titanium, Hastelloy, and Inconel. Standard probes are typically suitable for most common TWISTED TUBE® sizes, although inspection capability may vary depending on tube diameter and twist geometry.

Plain Inspection Tubes

Customers may also include plain round tubes within the bundle to allow conventional non destructive testing methods. These inspection tubes are typically positioned at the corners of the bundle configuration to monitor overall condition.

6 How does TWISTED TUBE® technology impact exchanger weight and foundation loads?

A In retrofit applications, a TWISTED TUBE® bundle may increase bundle weight compared to a conventional straight tube design. However, shell and channel weights remain unchanged, and any added weight is typically limited to the bundle itself. In most cases, this increase falls within the allowable limits of existing saddles and foundations, subject to standard load verification.

For new exchanger designs, TWISTED TUBE® technology often allows for a smaller shell diameter and or shorter length to achieve the same heat duty. This can result in a more compact and often lighter exchanger, reducing foundation loads and installation requirements compared to traditional shell and tube designs.

