

Heliflow

COOLERS & HEATERS

HELIFLOW[®] HEAT EXCHANGER

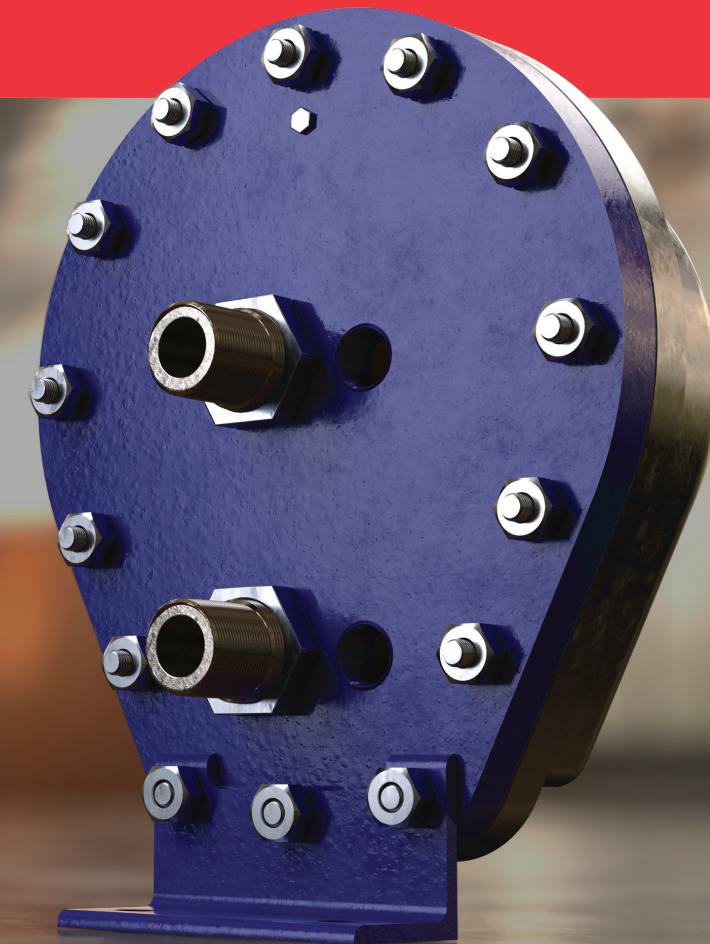


Proven Performance in INDUSTRY'S TOUGHEST APPLICATIONS

- Pharmaceuticals
- Supercritical CO₂ Extraction
- Sanitation
- Lyophilization
- Cryogenic
- Nuclear
- LNG Production and Distribution
- CNG Delivery
- Hydrogen
- Biofuel
- Chemical and Petrochemical
- Water Heater

Heliflow ADVANTAGES

- Transfers heat at a rate up to **40% greater** than an equivalent straight-tube heat exchanger
- A **compact and lightweight** unit that fits in locations where other heat exchangers have difficulty
- Heliflow operation pressure up to **15,000 psig** on tubeside and up to **5,000 psig** on shellside
- **Reliable service** and **easy maintenance**
- Heliflow is designed for **100% counter-current flow**, and close temperature approach can be maintained
- Has a **wide variety of material options** to suit most application requirements
- Heliflow design reduces the impact of thermal expansion, with an **extended life span**
- Available with the following certifications:
ASME, PED, CRN, DoSH, KGS, MOM, Others



APPLICATION Examples

Cryogenic Coolers and Vaporizers: Years of research and proven experience handling large temperature differentials make the Heliflow ideal for cryogenic applications.

Mechanical Seal Coolers: The unique design of the Heliflow provides superior cooling of seal fluid compared to traditional mechanical seal coolers.

Freeze Condensers: With experience in the field of freeze condenser technology, the Heliflow Heat Exchanger can be designed to match system requirements.

Feedwater Preheaters: Heliflow Heat Exchangers can save energy as heat recovery economizers when heat is recovered. They may also be utilized to preheat incoming make-up water that is then used in boilers or for other applications.

Process Condensers: Compact enough for small process applications, the through manifold design of the Heliflow also allows for separation of condensables and non-condensables. A top of the tower Heliflow can be installed

along with an ejector, providing maximum sub-cooling of non-condensable gas with minimum sub-cooling of condensate.

Sample Coolers: For periodic or continuous sampling, Heliflow sample coolers have a standard tubeside design pressure of up to 1800 psig, with higher pressure requirements easily accommodated.

Water Heaters: Heliflows can use steam or high temperature hot water as the energy source and be a compact and economical instantaneous water heater or side-arm heater on boilers.

Vaporizers: A compact vaporizer on the shellside or tubeside, the coiled tube bundle of the Heliflow promotes nucleate boiling and handles the stress of thermal expansion and cycling.

Vent Condensers: The countercurrent design of the Heliflow maximizes vapor removal. Chilled thermal fluids, refrigerants, or gases can be used to provide subzero cooling of process vent gases. The Heliflow

is an economical solution for storage tanks because it can be installed into existing equipment with little or no modifications required.

Clean Steam Generators: Heliflow Heat Exchangers meet the need for clean, chemical free steam from clean feedwater, using plant steam as the energy source. The coiled tube layout reduces problems caused by thermal expansion and cycling, promotes nucleate boiling and results in superior heat transfer efficiency.

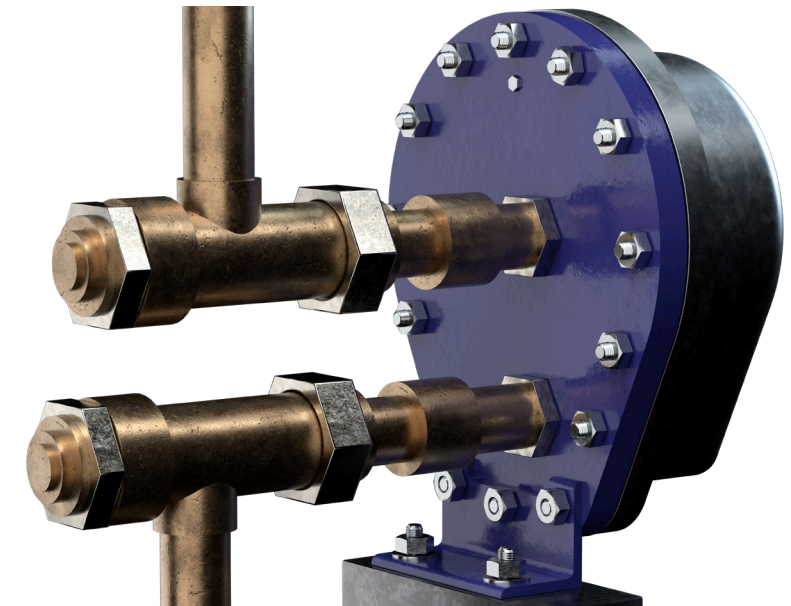
Lethal Service: Heliflow Heat Exchangers are built with special features to meet strict manufacturing, welding and quality control specifications in order to provide confidence when handling lethal fluids.

Hydraulics: The coiled tube geometry of the Heliflow Heat Exchanger provides increased heat transfer efficiency, making these units ideal for use as oil coolers.

Blowdown Coolers: True counterflow design provides almost complete heat recovery in blowdown heat exchange for boilers, evaporators, and other equipment that discharges hot fluids. To enable convenient cleaning, fresh feed is usually circulated through the tubeside while blowdown liquid goes through the shellside.

Compressor Inter/Aftercoolers: High pressure services using reciprocating type compressors use Heliflows as inter/aftercoolers. While typical design pressure is 2,500-5,000 psig, Heliflows can be designed for up to 15,000 psig on the tubeside.

Supercritical Fluids: In high pressure environments, the unique spiral tube design of the Heliflow enables it to move freely under thermal cycling as the tube bundle expands and contracts. A weld seal design allows the Heliflow to handle high pressure on the shellside.



What's inside Heliflow MAKES ALL THE DIFFERENCE

DESIGN OPTIONS

Basic Heliflow: For heat transfer from one fluid to another. Standard units come equipped with 1/4" to 3/4" diameter tubes. The tube spacing can be adjusted to minimize pressure drop and optimize heat transfer.

Vented, Double-wall Heliflow: The double-wall, tube-in-tube design provides a vented pathway between hot and cold fluids for detection of cross contamination. This is ideal for protecting process purity, especially when required by state and local regulations.

Weld Seal: Weld Seal design allows for a high shellside design pressure and eliminates gasket joints.

Custom Heliflow: Guaranteed to meet specs of unique applications. Special designs can accommodate an operation pressure up to 15,000 psig. Options for reverse and through manifolds, special fittings, pipe connections and other special arrangements are available.

Tube Options: Copper, Stainless Steel, Duplex Stainless Steel, Copper-Nickel, Admiralty and Specialty Alloys.

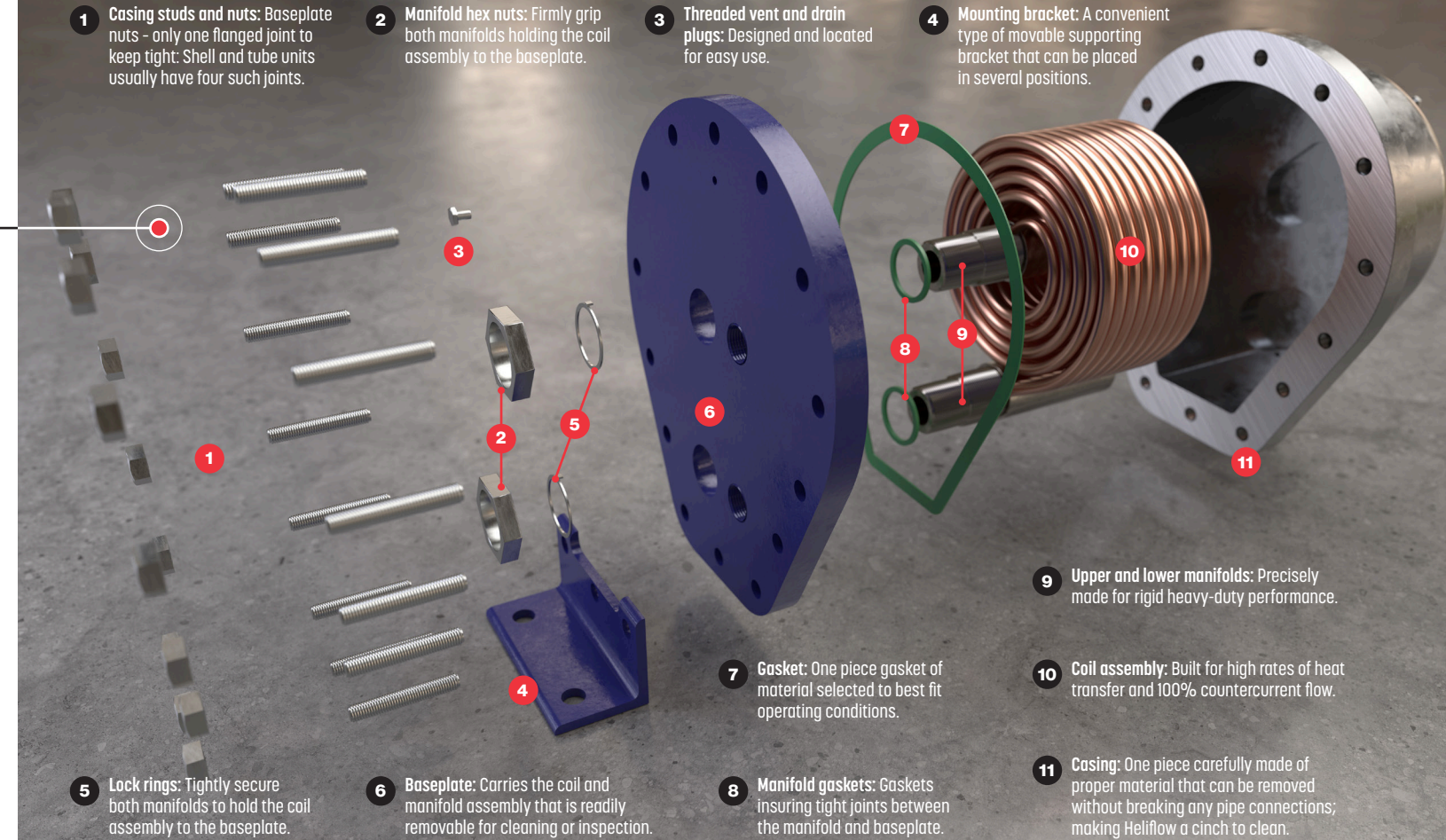
Connection Options: NPT, Flanges and other specialty fittings.

Casing Options: Cast Iron, Cast Carbon Steel, Fabricated Carbon Steel, Stainless Steel, Copper-Nickel and Specialty Alloys.

BUILD

CONSTRUCTED FOR RELIABLE SERVICE AND EASY MAINTENANCE

- 1 Casing studs and nuts
- 2 Manifold hex nuts
- 3 Threaded vent and drain plugs
- 4 Mounting bracket
- 5 Lock rings
- 6 Baseplate
- 7 Gasket
- 8 Manifold gasket
- 9 Upper and lower manifold
- 10 Coil assembly
- 11 Casing

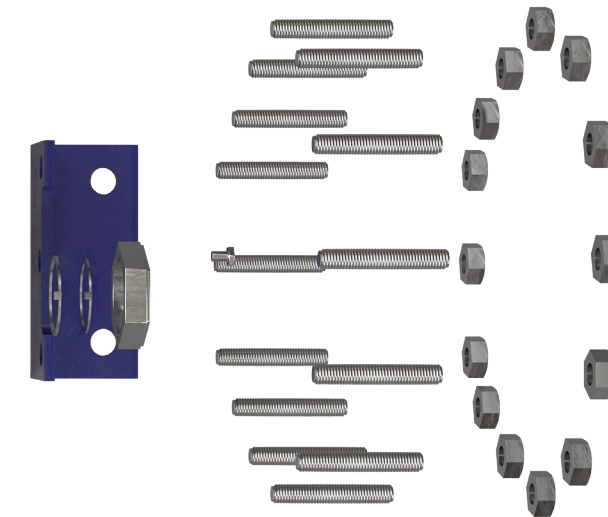
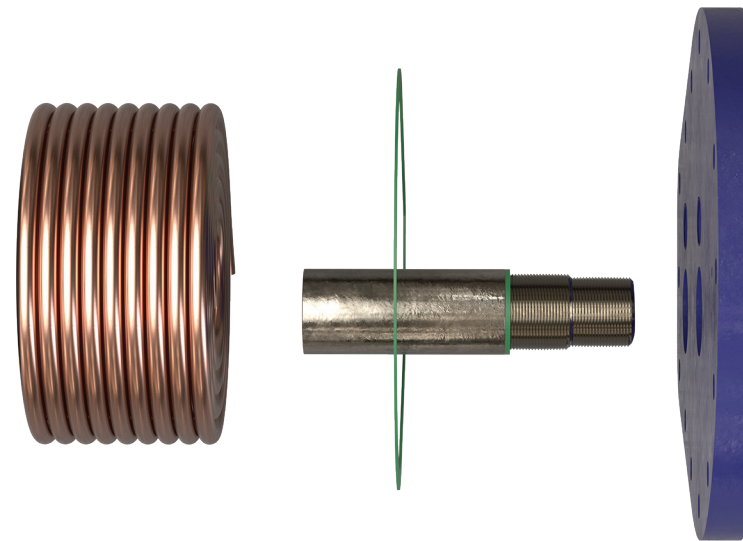


Service IS A SNAP

The casing is removable without disturbing the piping and fully exposes the coil for inspection and cleaning. If the tubeside fouls and chemical cleaning is not possible, **it is fast and easy to replace the coil.**

TO REPLACE THE TUBE BUNDLE

- Disconnect all pipes
- Remove all baseplate nuts
- Separate the casing from the baseplate
- Remove the manifold nuts and lock rings to allow the coil assembly to be removed
- When re-assembling, remember to install the manifold gaskets between the manifold shoulder and baseplate, as well as the lock rings between the manifold nuts and the baseplate. The lock rings prevent the manifolds from turning when re-piping



History IS ON OUR SIDE

Graham Corporation's earliest roots extend back to 1936 when Harold M. Graham first incorporated Graham Manufacturing Company. While the company's headquarters has remained in Batavia, New York since 1942, its reputation has extended around the globe.

During World War II, Graham supplied steam ejectors, surface condensers and heat exchangers for shipboard applications. After the war, the company shifted to the engineering and manufacturing of customized vacuum systems, surface condensers, and heat transfer products for industry. It developed a broad customer base in the oil refining, petrochemical, chemical, fertilizer, and power generation market.

Today, Graham Corporation has operations in Batavia, New York and two wholly-owned subsidiaries: Graham Vacuum and Heat Transfer Technology (Suzhou) Co., Ltd. in Suzhou, China, and the other Graham India Private Limited ("GIPL") based in the northwest region of India, in Ahmedabad. These subsidiaries expand market presence and provide sales, engineering and project oversight locally to the customer. In total, Graham Corporation has approximately 350 employees.



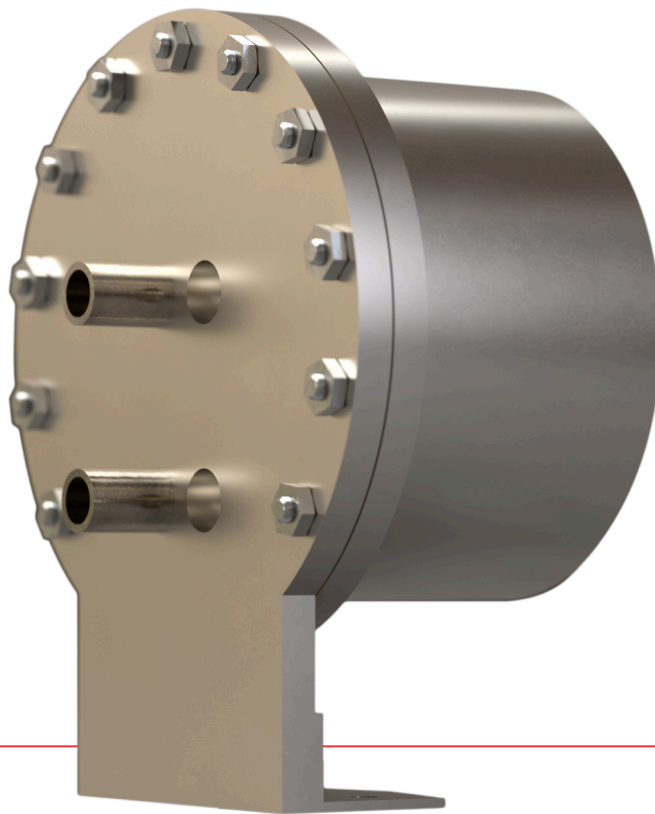
Today, Graham Corporation is recognized as a leader in the design and manufacture of vacuum and heat transfer products for industries worldwide.





graham-mfg.com | 585.343.2216
20 Florence Ave | Batavia, NY 14020

NYSE: GHM



Heliflow

COOLERS & HEATERS

The compact, efficient heat exchanger that has proven invaluable in a wide variety of applications since 1936.

For nearly a century, Graham Corporation has designed and built vacuum and heat transfer equipment for process industries and energy markets worldwide.