HCI HEATERS

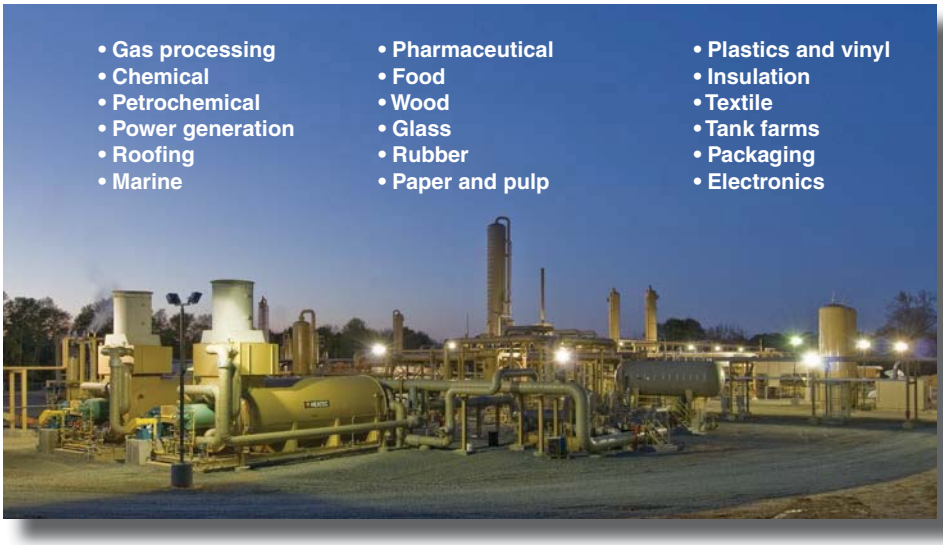
HELICAL COIL HEATERS FOR INDUSTRIAL APPLICATIONS

THERMAL PRODUCTS Inc.

HEATEC®

AN ASTEC COMPANY

Thermal Products, Inc. / Phone: (518) 877-0231 **/ Email:** sales@thermalproducts.com **/ Website:** www.thermalproducts.com



Heatec's helical coil heaters are used in a wide variety of industries.

HEATEC HCI HEATERS are used mainly by companies engaged in manufacturing and processing. The heaters feature helical coils built to ASME code. The coil is heated by burner gases. The coil can be used to heat thermal fluid for heating other equipment. Or it can be used to directly heat a product that flows through the coil.

Our helical coil heaters are our most popular heaters due to their simplicity, efficiency, low maintenance and relatively low cost.

Made to meet your needs

Our HCI heaters are available in both horizontal and vertical configurations. They are also available with various coil configurations and a wide range of thermal outputs. All can be customized to meet your specific needs.

COVER PHOTO

A Heatec vertical heater used at a gas processing facility in Long Beach, CA. It is used in a process that removes CO_2 in treatment of natural gas. The heater is upfired with an output of 13.4 million Btu/hour and fits into a space of only 14 x 15 feet. It meets stringent limits on emissions and requirements for safe operation in an explosive atmosphere. Its structural design meets the requirements of a Seismic 4 earthquake zone.

High Efficiency Reduces Costs

A hallmark of our HCI helical coil heater is high thermal efficiency. This conserves fuel to greatly reduce operating costs. Thermal efficiencies of our heaters range up to 85 percent LHV, depending upon fluid outlet temperature, fuel and options. Optional economizers (heat exchangers) provide even higher efficiencies.

Two pass vs three pass

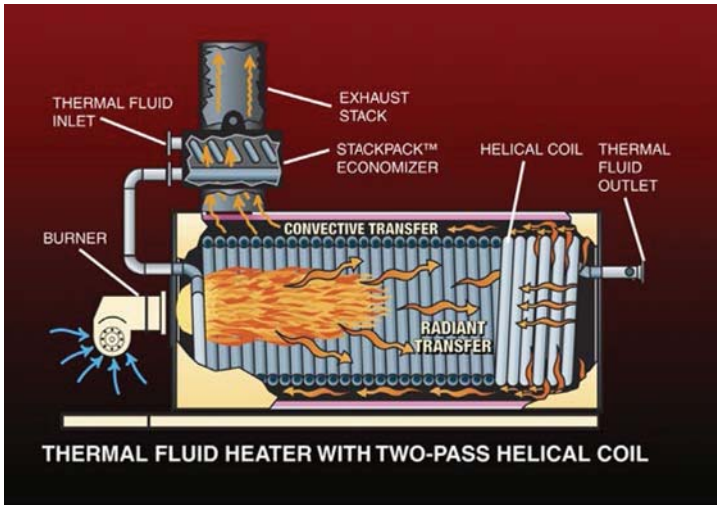
The illustration below shows the flow of burner gases in a heater with a single helical coil. It is known as a two-pass heater because the burner gases make two passes around the coil. Three-pass heaters have two coils, one inside the other. Their burner gases make three passes around the two coils. Each design has advantages that should be considered when making a choice. We build both types, so we can provide you with unbiased recommendations based on your needs.

Fuels

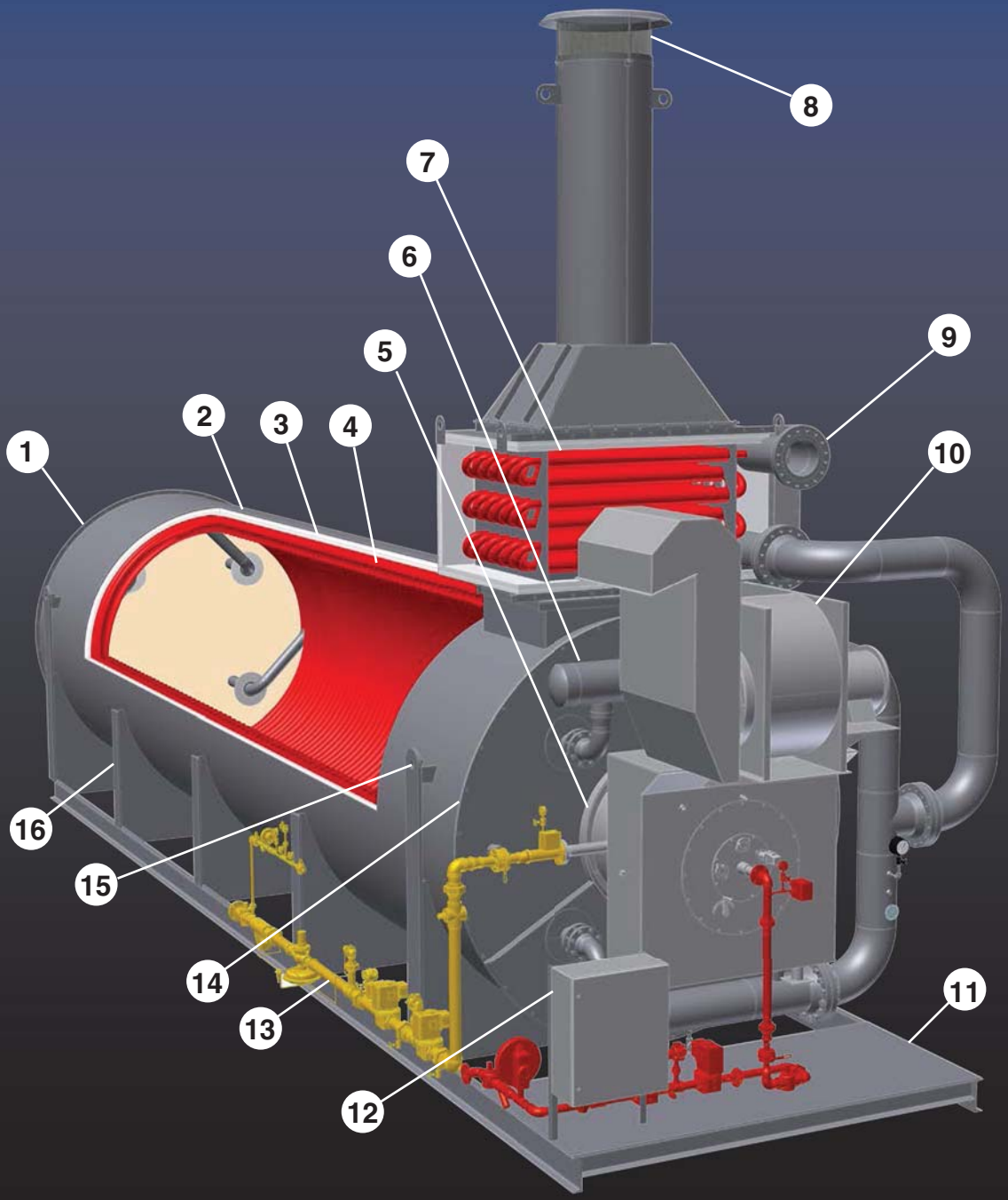
The heaters can operate on natural gas, LPG, commercial grade fuel oils, or waste oils, depending on the burner used. Combination burners are also available.

Things that enhance value

- No blending of fluid from separate coils to achieve set temperatures.
- Pipe connection is provided for hookup of inert gas to snuff burner flame.
- Plated bolts and assembly hardware to resist rust and corrosion.
- Documentation furnished includes heater general arrangement, control wiring, piping and instrumentation, expansion tank arrangement, pump package arrangement, and component list.
- Electrical and electromechanical checkout before shipment.



Heatec two pass heater with an optional economizer.



1. End plate. Bolted to heater shell and insulated with 5-inch ceramic fiber blanket. Easily removed for access to heater coil. Has peep sight for inspection of coil and flame pattern. Larger heaters also include a manway.
2. Heater shell. All-welded construction of 1/4 to 3/8-inch thick A-36 steel plate, depending on size of heater.
3. Ceramic fiber blanket insulation. Three-inches thick. Additional thickness is optional.
4. Helical coil. Built to ASME code.
5. Burner with optional low NO_x feature.
6. Manifold that distributes thermal fluid to four interwound helical coils
7. Economizer that captures heat from exhaust gases to boost thermal efficiency.
8. Exhaust stack with rain cap and protection screen.
9. Inlet connection for thermal fluid.
10. Combustion air blower with silencer
11. Rigid skid fabricated from structural steel channels (or I-beams). Has skid extension for added support of fuel train and burner controls.
12. Electrical panel. Meets NEC and UL. Houses switches, controllers and flame monitor. Panel wiring is run in raceways. Wiring and terminals are numbered. All controls are prewired.
13. Fuel train including pilot fuel train. Assembled and tested at Heatec.
14. Burner end plate. Insulated with 6-inch ceramic fiber blanket.
15. One of four lifting eyes. Integral with shell support saddles.
16. Fabricated steel saddle. Two or more are used to support the heater, depending on its size.

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This picture illustrates the differences in heater sizes available with helical coils. Although we build numerous other types and varations, these are our most popular ones. They can also be built in a vertical configuration. Available outputs range from 0.5 to 75 million Btu/hour.

Heatec designed and built this thermal fluid heater to heat special presses used to print food packaging. It is designed for a high thermal effieciency of 91.5 percent (low heating value). And it is designed to fit into a building with very limited height. Its high efficiency is achieved by using two extra heat exchangers to capture heat from the exhaust gasses. One preheats the thermal fluid. The other preheats the combustion air. The output of the heater is 9.4 million Btu/hour.

The pictures shown above show two popular ways to configure the pumps and expansion tank. The heater on the left has the expansion tank and pumps mounted on a separate skid. The heater on the right has them mounted on the same skid. We make them to suit your needs.

This large helical coil heater heats thermal fluid and is used in the gas processing industry. It has an output of approximately 38 million Btu/hour. It is a two pass heater with four interwound helical coils that provide required flow rates while minimizing pipe coil diameter. Each coil is approximately 10 feet in diameter and 39 feet long. The unit weighs 75,000 pounds. It is one of six identical units that we built recently.

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Heatec built these two helical coil heaters used at a gas processing facility in Louisiana. Each has an output of 51.4 million Btu/hour. An econimizer is mounted in the exhaust stack of each heater to recover heat from the exhaust gases and boost thermal efficiency. Each is a two pass heater with four interwound helical coils to provide a high flow rate.

Heatec provided this helical coil heater and four pump skids to heat a mixture of materials used to make roofing shingles. The heater has an output of 6 million BTU/hr. It is a two pass heater with two interwound coils. The hallmarks of this heater are that it is simple to operate and is designed for long life and economy of operation.

This facility uses two Heatec REGEN heaters to regenerate its gas treatment system. Each heater has an output of 7.1 Btu/hr. One of the REGEN heaters is in the foreground.

This is a Heatec thermal fluid heater at the Lion Oil Terminal in Eldorado, AR. It heats a thermal fluid system that heats four asphalt tanks with a capacity of 150,000 barrels. It is built to ANSI B31.3 specifications and has an output of 23 million Btu/hour. It has an economizer that recovers heat from the exhaust stack to boost thermal efficiency an additional 3 percent. It has an Eclipse Vortometric 16V low NO_x burner, which burns natural gas and waste gas. Its turndown ratio is 20:1.

The Ceredo Electric Generating Station in West Virginia uses a Heatec system to heat natural gas from 50 to 115 degrees F. Natural gas fuels the turbine engines that produce electricity. Heating the gas prevents ice formation when its pressure is reduced for the engines. Ice causes numerous problems such as clogging fuel lines and freezing control valves. Even small ice particles in the fuel can cause extensive damage to turbine engines.

This Heatec heater is on its way to Singapore where it will be used in the production of plastics. This is a 3-pass heater with an output of 26.2 million Btu/hr. It raises the temperature of thermal fluid to 460 degrees F at 3,800 gpm. Its life expectancy is double that of other 3-pass heaters. To achieve longer coil life we designed the heater with a much lower flux rate than the typical 3-pass heater. Thus its thermal fluid will have a much lower film temperature so both the helical coil and thermal fluid last longer.

Heatec vertical heaters such as the one shown above and on the front cover are popular at gas processing facilities and petro-chemical plants where limited space is available. They are also found on offshore oil and gas platforms where they heat reboilers and towers for processing oil and natural gas. These heaters are also used in a variety of other manufacturing industries such as automotive, roofing, packaging, food and engineered-wood products.

Horizontal vs. vertical heaters

FEATURE	HORIZ	VERT
Small foot print	NO	YES
Gravity drain of helical coil	NO	YES
May need special foundation	NO	YES
Mounts expansion tank	YES	NO
Needs ladders/platforms	NO	YES
Natural flow of burner gases	NO	YES

Design and Construction

We take special care to design our heaters for optimum geometry of the combustion chamber and the flux density of the helical coil. Thus, our coil has a large heat transfer surface area to provide much lower heat flux rates than those commonly used by others. And the coil diameter and length are sized to virtually eliminate flame impingement and provide optimum flame pattern. The diameter of pipe used for the coil is sized for an ideal fluid velocity of 5 to 13 feet per second. The coil is built to ASME code.

The heater has a steel cylindrical shell that houses a helical coil. Oversized stainless pads inside the shell support the coil leaving an annular space between the coil and the shell. The inner surface of the shell is covered with ceramic blanket insulation that has low thermal conductivity and low heat storage.

Control panels

We offer a variety of control panels for use on heaters that operate in locations classified as hazardous in NFPA code. Please refer to Heatec Tec-Note 3-10-228 for more information on panels used in hazardous locations..

Heatec products are designed and manufactured at our modern facility in Chattanooga, Tenneesee. Moreover, we do code work and make our own heating coils, control panels and tanks. We also do our own painting, packaging and quality control.

A typical NEMA Type 7 panel suitable for Class I, Division 1 areas. These panels can also be used for Class I, Division 2 areas to eliminate the need for purging.

A typical NEMA Type 4 panel for areas temporarily exposed to combustible gases. Panel is equipped for Type Z pressurization and also purges the small panel on the left.

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