

Chromalox® Tank Heaters with Replaceable Elements Prevents Costly Downtime by Eliminating Tank Drainage for Maintenance

Abstract

This white paper examines the limitations of both traditional immersion heaters and cumbersome stand pipe heaters. These limitations have led Chromalox engineers to the innovative solution of tank heaters with elements that can be removed and easily replaced without the need for draining the tank—allowing for continuous operation for critical applications.

This white paper also presents the benefits and advantages found in the ground breaking tank heater with replaceable elements and outlines the savings and convenience to be realized through this new technology.

Finally, this white paper lists various specifications and applications of the tank heaters with replaceable elements for both large and small tanks, known as the LTFX and STFX models.

The Challenge

For many years, the industry has been burdened with the weighty and difficult stand pipe heater design. The traditional stand pipe involves an extensive installation process, lengthy downtime for repairs and can potentially endanger workers and the environment causing significant damage and costly fines.

In the case of traditional immersion heaters, process manufacturers benefitted from a more safe and effective design, but many of the same limitations occurred, particularly when draining a tank was required for repairs.

The limitations of both the traditional immersion heater and the stand pipe heater were closely studied and researched by the engineers, designers and specialists at Chromalox.

The following list describes their findings regarding these costly limitations:

In the case of traditional immersion heaters,

- **Drainage:** Traditional heaters require tanks to be fully drained for inspection or repairs. A time-consuming and expensive process, it includes the cost of disrupted operations, the additional storage of the drained material, and the loss of downtime.
- **Maintenance:** Traditional heaters require extensive training and long service calls of specialized maintenance personnel, adding to the cost of downtime and lost man-hours.

In addition to the limitations listed above, the outdated stand pipe heater has the following significant and costly limitations as well,

- **Customization:** Stand pipe heaters require customized tanks where the heater is welded into the tank. This customization increases the overall complexity of setup by requiring the addition of multiple connection, which in turn requires additional capital for the production process. Often special modifications must be made to install a customized stand pipe.
- **Footprint:** Stand pipe heaters are large and unwieldy taking up significant operational space. For example, the expansion tank on a stand pipe design can be over ten feet high.
- **Oil:** Stand pipe heaters use oil to conduct heat. The cost of oil is continually on the rise and so becomes an additional expense.
- **Toxic:** Stand pipe heaters use toxic materials within the heating medium. In the heat and expansion process, toxic fumes are emitted from the expansion pipe endangering workers and the environment. Manufacturers can be fined as dictated by the Clean Air Act. As stated by the Clean Air Act—Article 185, fines are at least \$5,000 if emissions are above baseline standards. This fine will be incurred annually until levels are below baseline standards. For more information, about potential fines go to: <http://www.ilta.org/legislative-andregulatory/CAA185/CAA185info.htm>

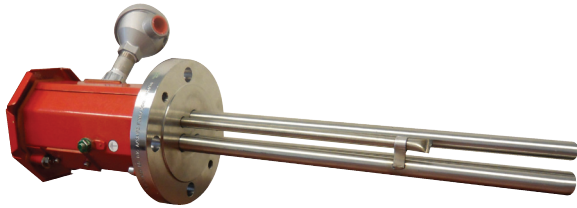
The Benefits of a Chromalox Immersion Heater with Replaceable Elements

The engineers and designers at Chromalox have designed an innovative tank heater with replaceable parts. For example, if a heating element must be changed, it can simply be removed and replaced in a matter of minutes without the need for specialized training of personnel. The tank does not need to be drained, contents do not need to be stored, and operations can continue.

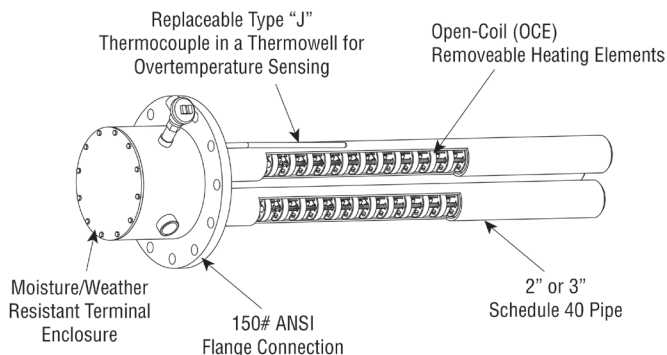
This state-of-the-art design of replaceable elements solves the problem of the costly limitations of traditional heaters while providing many additional advantages, savings and convenience for operations to realize.

Chromalox® Tank Heaters with Replaceable Elements (Continued)

- Choosing the right tank heater for your operation is important and options for tank heaters are vast. With a tank heater with replaceable elements, there is no tank draining required for repairs; they are easy to install and maintain; and they are environmentally friendly.



- Tank heaters with replaceable elements enable plant personnel to avoid an extensive installation process, to prevent lengthy downtime for repairs and to reduce overall operational costs associated with traditional heaters.
- By choosing the correct design of an immersion heater with replaceable elements, your firm can save money and improve production efficiency by reducing downtime and service costs.



The following list describes some of the benefits and advantages in choosing an immersion heater with a replaceable element design:

- **No Tank Draining Required**

Replaceable style heating elements, sometimes known as open-coil elements (OCE), can be inspected, maintained or changed without draining the tank. This fundamental difference drastically reduces costs and downtime. With replaceable elements, the tank contents remain within the tank with minimal disruption to service. Depending on the contents and tank size, savings will be realized the first time you do not need to waste time and money by draining a tank due to maintenance.

- **Quick and Easy Installation**

Standard 150# ANSI-style flange provides a straightforward mating connection with no special modifications required. This ingenious design provides a significant capital savings in the setup and

installation of a tank. Immersion heaters with replaceable elements can be used in nearly any tank design because they are attached to the tank rather than welded onto or within the tank.

- **Easy Element Maintenance**

Replaceable style elements can be easily changed by one person with no special training required. All element parts are standardized making any diagnostic tests easy to perform and problems easy to repair. This quick and easy way to maintain reduces any potential downtime that is often associated with a malfunctioning element.

- **Allows for Continuous Operation and Storage**

Since replaceable style elements can be taken out and repaired without draining the entire tank, you now have the ability to continue operations after the problem is solved. There is no need to store contents in other tanks, no need to then drain the storage tank or refill the first tank. By eliminating the need for these storage and drainage tasks, you are up and running quickly while minimizing costs and downtime.

- **Lowered Service Costs and Stocked Replacement Elements**

Standardized heater cores allow for multiple heater elements to be replaced with a minimum number of parts. When considering the ease of repairs, service time is also significantly reduced. Since there are no specific qualifications needed to make repairs on immersion heaters with replaceable elements, it will take less time to perform the repair. Also, a faster troubleshooting process is enacted providing lower repair costs overall for your operating system.

- **Reduced Footprint and Envelope Size**

If operational space is an issue, an immersion heater with replaceable element design is much more compact than a bulky stand pipe. This efficient design provides additional room that could be used for other parts of the production process. For example, the Chromalox Large Tank Flange Heater (LTFX) requires only a minimal element removal distance. The open-coil style elements can be bent to a vertical plane during removal requiring only 36 inches of clearance between tanks, walls or other obstructions allowing for more efficient use of factory floor space.

- **Reduced Use of Natural Resources**

Immersion heaters with replaceable elements are designed to use air to conduct heat, so there are no hidden costs incurred for running the heater. Unlike stand pipe heaters that use oil to conduct heat with unknown future costs.

- **Pollution-Free**

In stark contrast to stand pipes that use toxic materials as a heating medium with an expansion process where toxic fumes are emitted and can endanger the environment and result in costly fines, immersion heaters with replaceable elements were designed specifically to be pollutant free. There are no dangerous by-products and they are in complete accordance with the requirements of the Clean Air Act.

- **Matching Control Panel**

Each unit may be paired with a compatible control panel, which may be mounted in a remote location or installed directly on the LTFX heater, allowing for seamless installation and control.

- **Overtemperature Sensor**

Each unit comes equipped with a sensor for temperature sensing on a pipe wall.

- **Third- Party Certifications**

All terminal housings are CSA approved.

Conclusion: Reduced Operation Costs

In conclusion, traditional heater designs impose dramatically higher operational costs for firms. The added cost of a customized tank, increased downtime for services, draining and content storage, and potential EPA fines will cause your firm's return on investment to take significantly longer than with a replaceable element design. The Chromalox team is dedicated to creating efficient, cost-saving and innovative solutions of the highest quality, such as our immersion heaters with replaceable elements.

Specifications and Applications of Immersion Heaters with Replaceable Elements for Both Large and Small Tanks (LTFX and STFX models).

LARGE TANK FLANGE HEATER (LTFX)

The LTFX provides low-watt-density, which delivers even heating with precise control across the length of a tank.

The LTFX with its replaceable elements is particularly ideal for operations that need 24-hour readiness. Specifically, the LTFX is designed for such applications as fire water storage, asphalt, bio-diesel fuel, diesel lube oils, ethanol, glycerin, vegetable oils, fuel oils, animal fats, and similar types of liquids.

Equally important, LTFX units may be adapted to fit a custom installation which saves on-site fabrication time.

GENERAL SPECIFICATIONS

Connection Size:	4 to 14 in., 150# ANSI Flange
Immersion Length:	5 to 25 ft
Operating Temperatures:	0° to 750°F
Element Rating:	4 to 240 kW
Voltage:	240, 480, 600 Vac., 3-Phase

Complete with Chromalox controls, the LTFX may be operated with little or no manual attention. Heat can be controlled by using strategically located sensors to monitor tank temperatures and to energize the heaters. The heating operation may be fully automated by using timers and controllers to program the start and stop of both off-peak and daytime heating functions.

SMALL TANK FLANGE HEATER (STFX)

The STFX is available in multiple designs with varying watt densities which allows it to meet a variety of applications ranging from viscous fluids, such as asphalt or Bunker C oil, to free-flowing oils, such as hydraulic fluids or lube oil. The STFX can also be used for water, and water/glycol or acidic mixtures.

Also, The STFX is compliant with API-614 standards and is CSA certified.

As with its larger counter-part, the STFX is available in a variety of standard designs for the most common applications.

GENERAL SPECIFICATIONS

Connection Size:	3 to 12 in., 150# ANSI Flange
Immersion Length:	18" (457 mm) to 48" (1219 mm)
Element Rating:	1 to 25 kW
Voltage:	240, 480, 600 V., 3-Phase, Single Circuit

To learn how your firm can directly benefit by an immersion heater with replaceable elements, contact Chromalox at:

1-800-443-2640

www.chromalox.com