Industrial Heating Solutions

Process Heating, Heat Exchange, Injection for Industrial Area

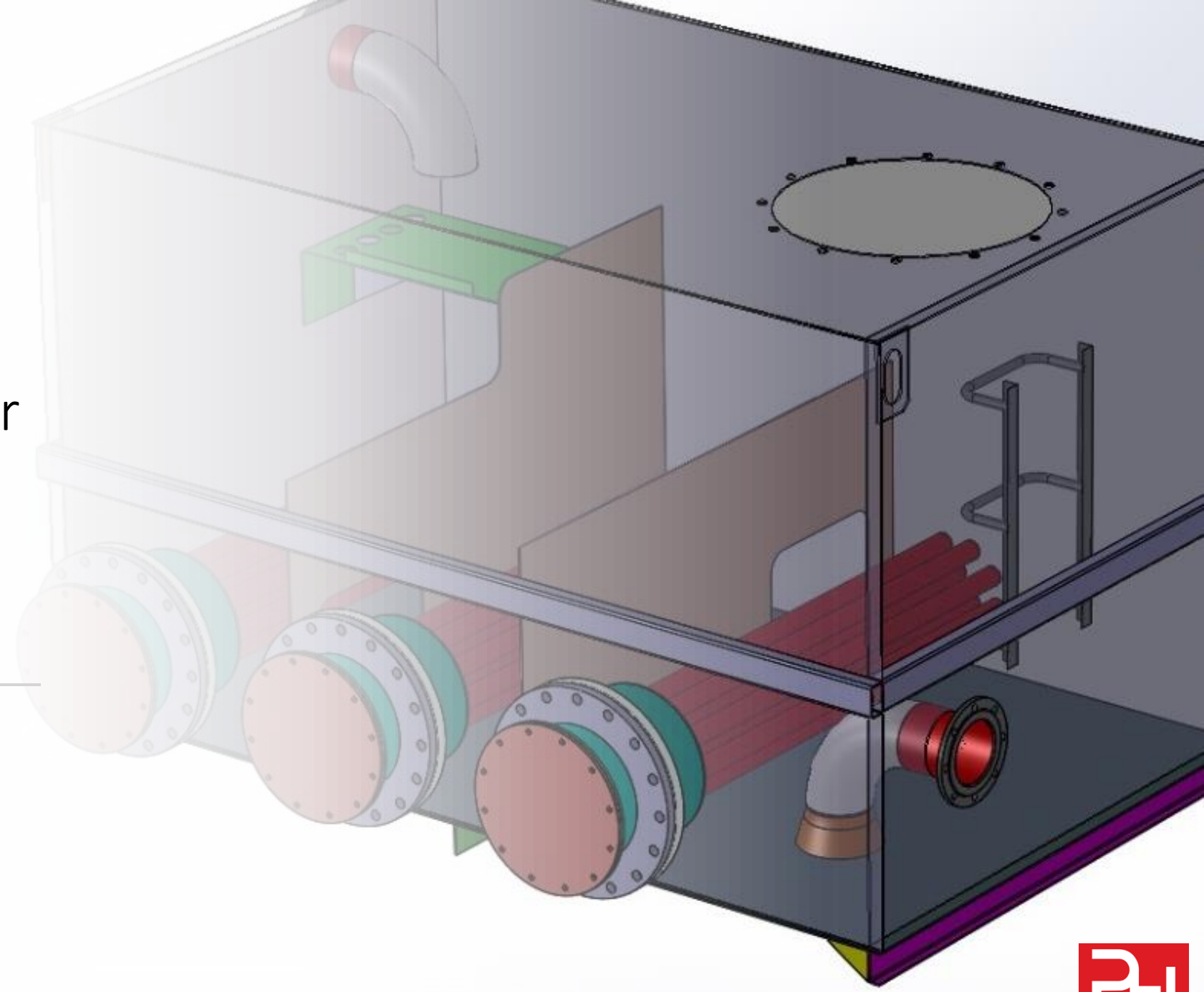
Omega Engineering LLC

OMEGA ENGINEERING

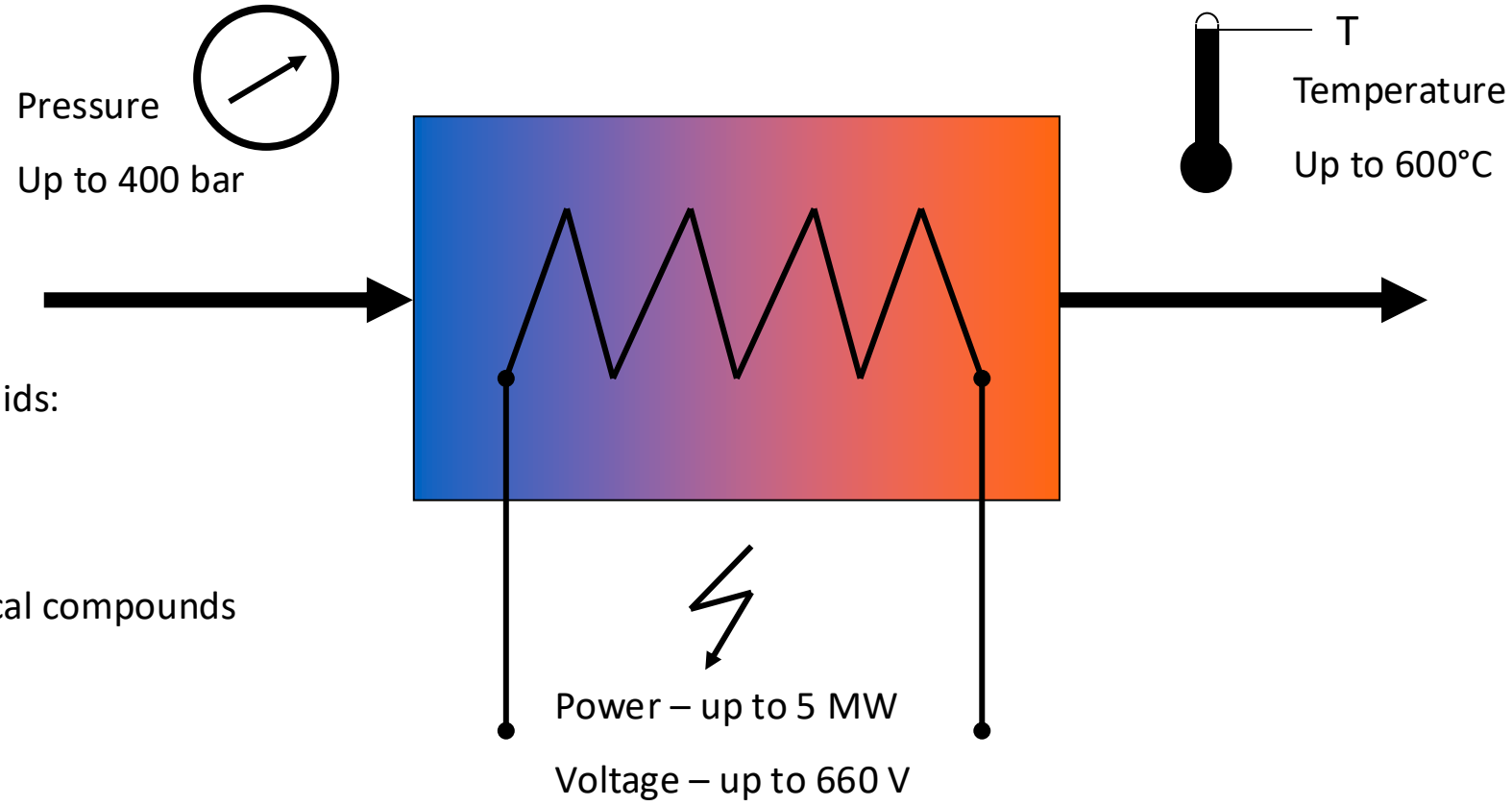
ProHeat
промышленный нагрев

Industrial Heating Equipment ProHeat for Various Process Fluids

Process Heating



Application Area of ProHeat Heating Equipment



Process fluids:

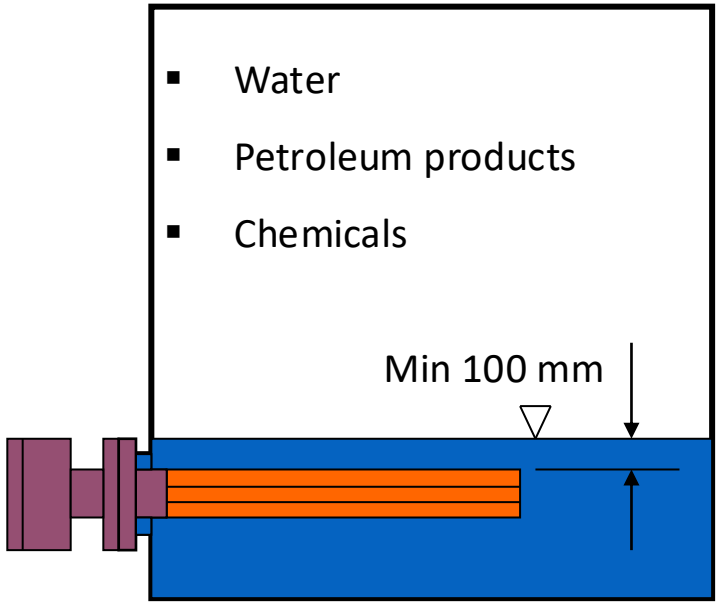
- Water
- Oils
- Chemical compounds
- Gas

Proheat Flanged Immersion Heaters for Liquid Process Fluid in General Industrial and Explosion-proof (Ex) Configurations

ProHeat PH-IH and PH-IH-Ex Flanged Immersion Heaters are designed for heating liquid process fluids (including viscous light and dark petroleum products: fuels, oils, fuel oil, bitumen, etc.) in tanks and storage facilities located in various zones, including hazardous (explosive) areas.

Ceramic Core Heaters or Tubular Heaters can be used as heating elements

Flanged heaters are mounted through the side wall of the tank via a welded connection or through a flange with/without a flange adapter.



PH-IH-Ex

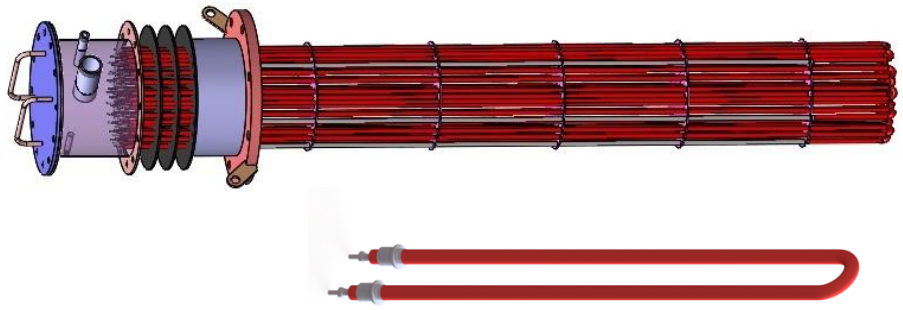
PH-IH

Heaters with Ceramic Core Heaters

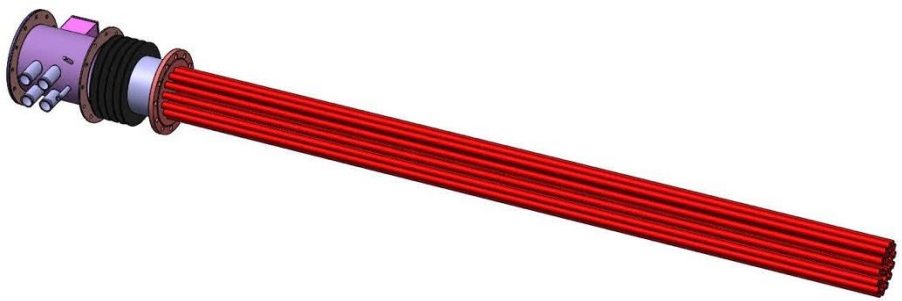
- This heating technology ensures high heat transfer and a uniform warm-up mode to the required temperatures without destroying the fractional composition of the heated fluid.
- The main advantage of such heaters is the absence of direct contact between the ceramic heating elements and the heated fluid, thanks to a tubular sheath made of carbon or stainless steel.

- The heater design consists of a flange with 1 to 12 tubes welded into it, each 1–3 meters long, with an outer diameter of 60 mm. A ceramic core heater is installed inside each tube, consisting of nichrome coils insulated from each other and from the heater body using ceramic insulators.
- This heater design offers high maintainability, as replacing ceramic heater does not require draining the heated product, which is particularly important when heating products in large-capacity tanks.

PH-IH-Ex



PH-IH



Heaters with Tubular Heaters

•This technology ensures direct contact between the tubular heaters and the heated fluid, resulting in significantly increased heat transfer.

•The main advantage of electric heaters utilizing tubular heating elements is their more compact size and the ability to achieve the required heater power within limited installation envelope constraints.

- The heater design consists of a flange with tubular heaters brazed into it, forming a bundle.
- The electrical conductors of the tubular heaters and temperature sensors are routed to a terminal junction box, which is an explosion-proof enclosure with a cover on its end face.
- Threaded openings are made on the lateral cylindrical surface of the terminal box for installing cable entries.
- The cable entries have an "flameproof enclosure (Exd)'" type of explosion protection.

Technical Specifications of PH-IH Heaters

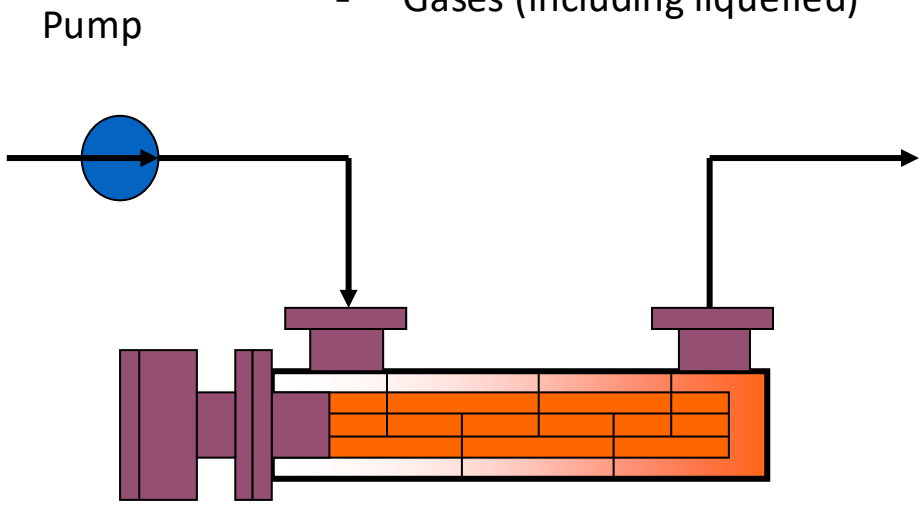
Supply voltage, V	220/380
Rated Power, kW	1-500
Specific load, W/cm^2	0,8 – 15,0
Overall dimensions, mm	
• **Length**	1200 – 3200
• **Flange diameter**	215 - 670
Heating element seamless tube material	Carbon steel, AISI304, AISI316, AISI321, INCOLOY
Maximum allowable operating pressure, MPa	10
Maximum allowable operating temperature, °C	600
Ambient temperature range, °C	-60 °C to +40 °C
Explosion-proof marking	1 Ex db IIB T6 GbX

Pipe-line Heaters for Liquid and Gaseous Process Fluid in General Industrial and Explosion-proof (Ex) Configurations

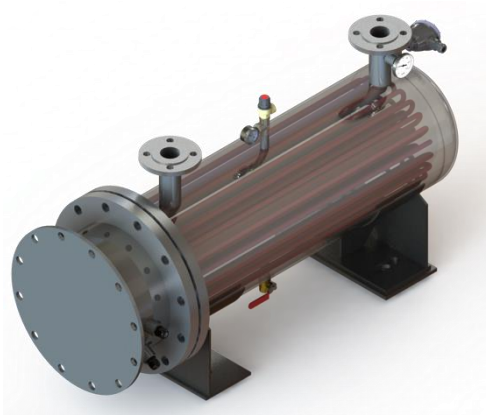
PH-PFH and PH-PFH-Ex (Process Heaters) pipe-line electric heaters are designed for heating liquids (including viscous light and dark petroleum products: fuels, oils, fuel oil, bitumen, etc.) in a flow-through mode.

Pipe-line heaters for liquid and gaseous process fluid are mounted on individual frames, with the supply of the heated fluid connected via inlet/outlet nozzles.

- Water
- Oil
- Chemical compounds
- Gases (including liquefied)



PH-PFH deactivation system pipe-line heater with tubular heaters

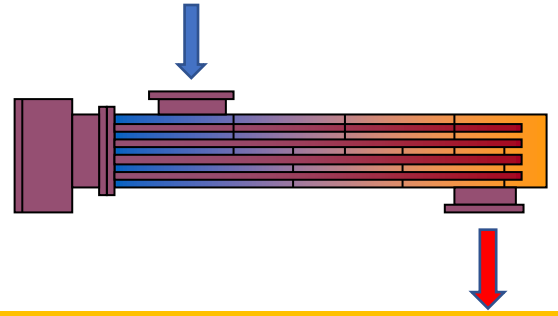


PH-PFH pipe-line heater with ceramic heating elements

The heater design consists of a horizontal or vertical high-pressure vessel mounted on a frame.

Heating of the process medium is accomplished using a PH-IH electric heater installed inside the vessel, or using horizontal tubes welded inside the vessel in which ceramic heaters are placed.

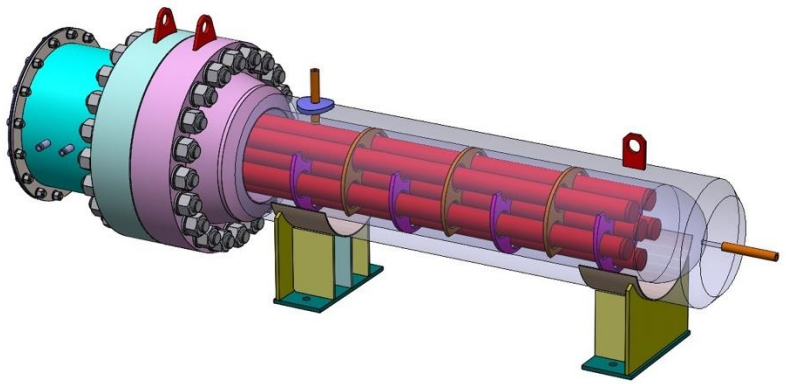
The heated product enters the heater body through the inlet nozzle, flows over the tubular heaters to reach the required temperature, and then flows through the outlet nozzle to the required process unit.



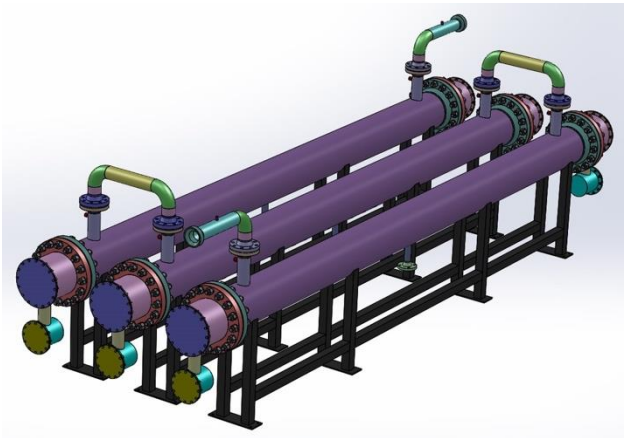
ProHeat Non-Standard Pipe-line Heaters for Liquid and Gaseous Process Fluids

Non-standard electric heaters are developed according to the customer's individual technical specifications, taking into account ensuring the safety of the heating process.

Non-standard high-pressure PH-PFH heater



Connection of standard PH-PGFH sections



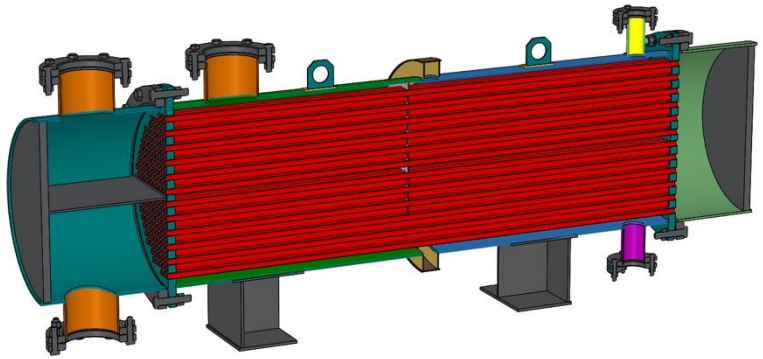
The design of non-standard electric flow heaters can be specially developed for specific technical heating and installation conditions, and can also consist of a series of standard flow-through heaters connected in parallel or in series.

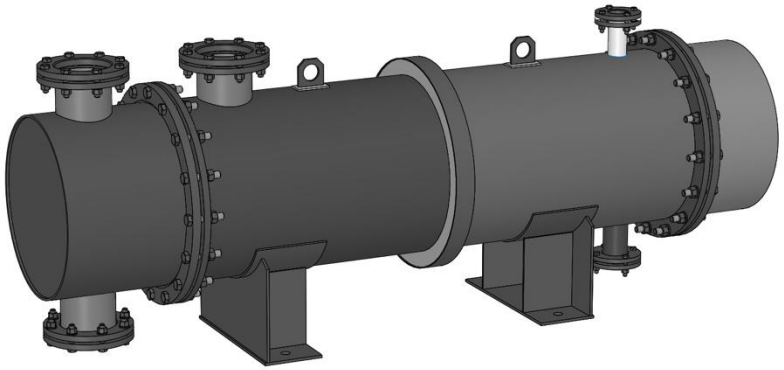
Non-standard electric flow heaters for liquid and gaseous process fluid are developed according to the customer's individual technical specifications based on the following initial data:

- Composition and properties of the heated medium;
- Inlet and outlet temperatures of the fluid;
- Operating pressure;
- Flow rate of the heated product;
- Environmental conditions;
- General industrial or explosion-proof design.

Supply voltage, V	220/380
Rated Power, kW	До 1000 и более
Specific load, W/cm²	До 20
Heating element seamless tube, pressure vessel material	Carbon steel, AISI304, AISI316, AISI321, INCOLOY
Maximum allowable operating pressure, MPa	Up to 40
Maximum allowable operating temperature, °C	Up to 900
Ambient temperature range, °C	-70 °C to +60 °C

Technical Specifications of Non-Standard Heaters



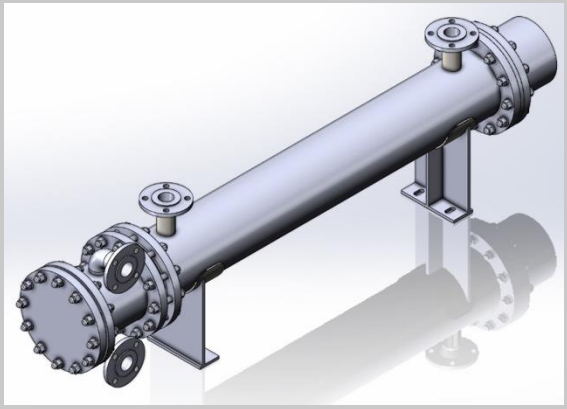


ProHeat Shell-and-Tube Heat Exchangers

Heat exchangers are designed to transfer heat between two fluids at different temperatures to support various technological processes in the oil refining, petrochemical, chemical, gas, refrigeration, and other industries.

General Technical Specifications of ProHeat Heat Exchangers

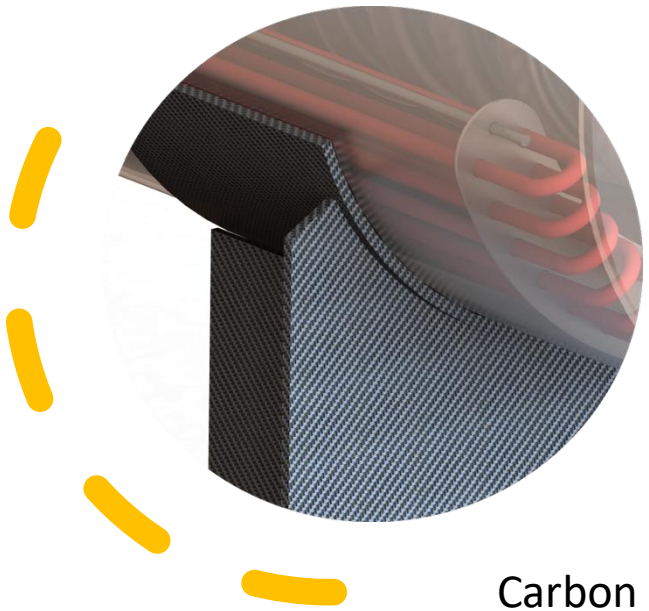
Operating temperature, °C	from -50 to +600 °C
Maximum allowable operating pressure , MPa	up to 20
Heat exchange surface, m^2	up to 200
Working fluids	Water, refrigerants, chemical reagents, air, flue gas, other fluids
Maximum process fluid flow rate, t/h	up to 300 (for liquids)
Minimum temperature difference between heating and heated product, °C	5



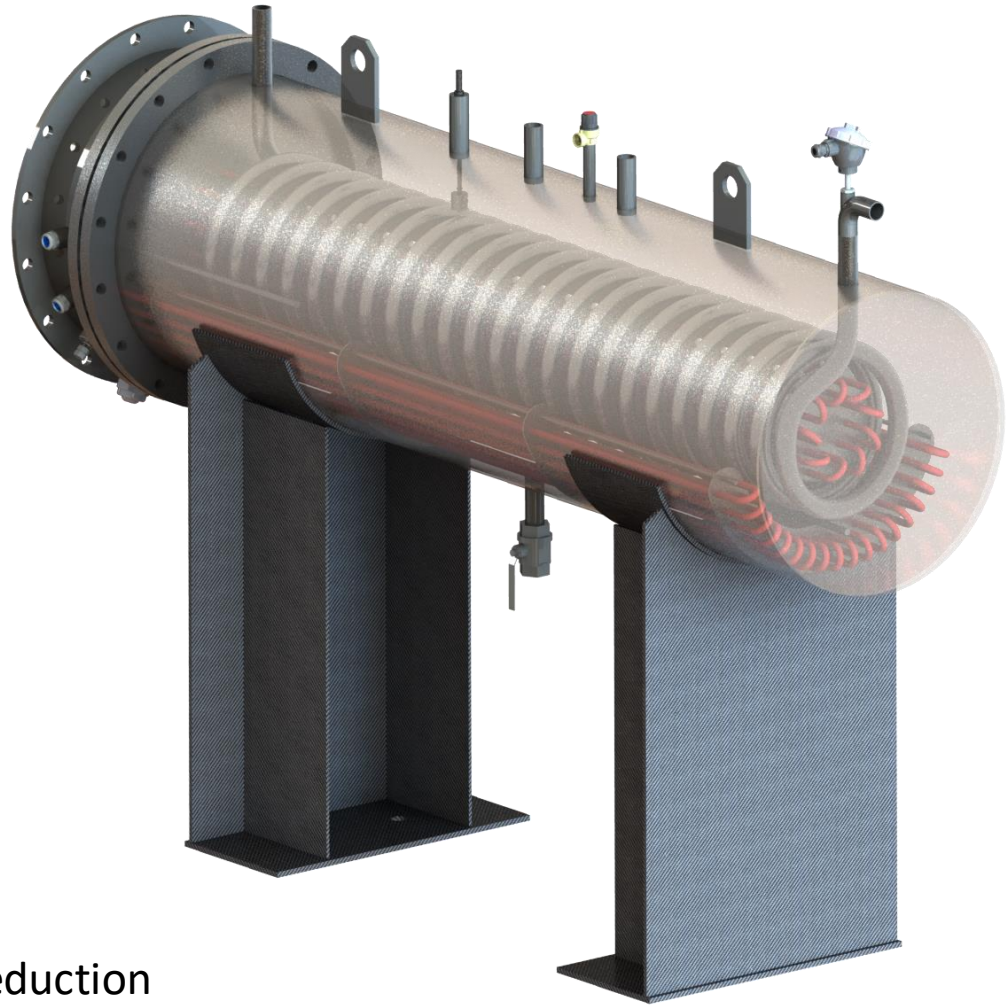
Complex Projects

Complex combined equipment is developed for specific technical tasks related to heating various process fluids and can consist of a combination of electric heaters and heat exchangers.

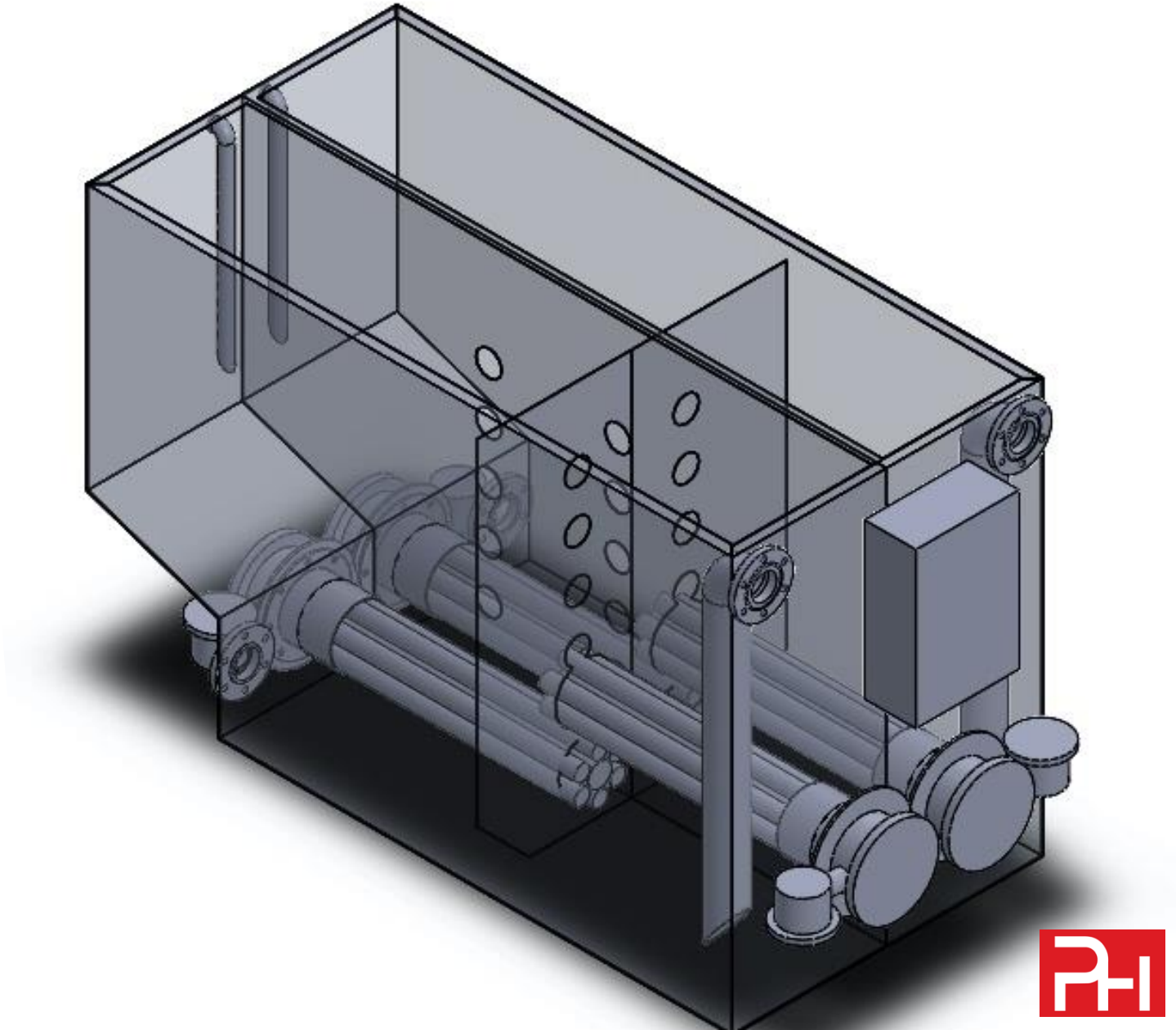
Flow heater PH-FH for gaseous carbon dioxide with an intermediate heat-transfer fluid on a composite frame

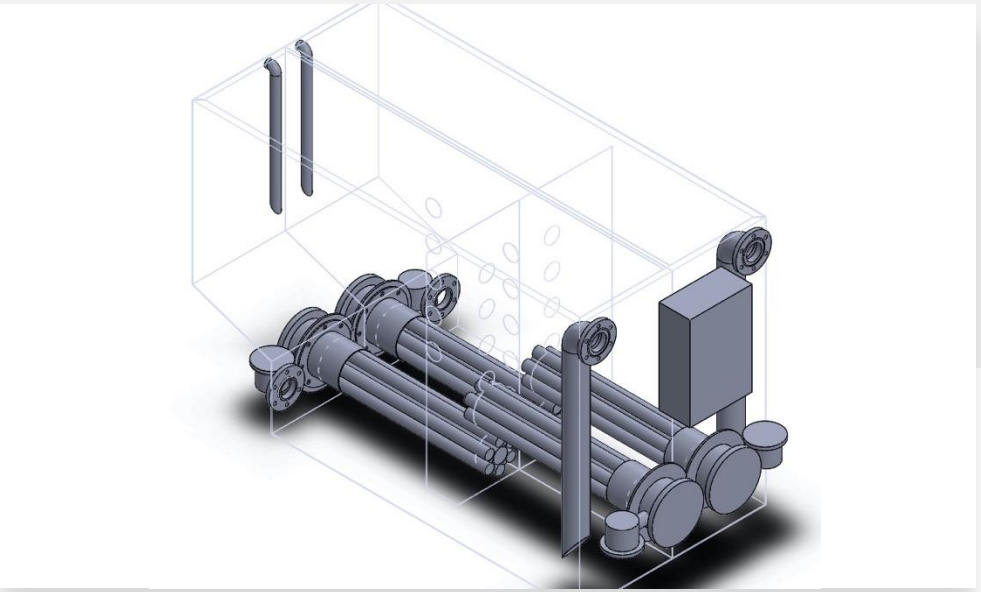


Carbon fiber frame for weight reduction



ProHeat Oil Heating Systems





PH-OHS and PH-OHS-Ex Oil Heating Systems are designed to create and maintain a set temperature of various oils to control viscosity, as well as to heat transfer fluids to ensure cleaning and other technological processes that require precise temperature control.

The oil/heat transfer fluid is heated using PH-IH electric heaters installed in the oil tank, which contain ceramic heating elements or tubular heaters.

The heated product enters the tank of the oil heating station through the inlet nozzle, flows over the tubular heaters to reach the set temperature, and is then pumped via the outlet nozzle to the required process unit.

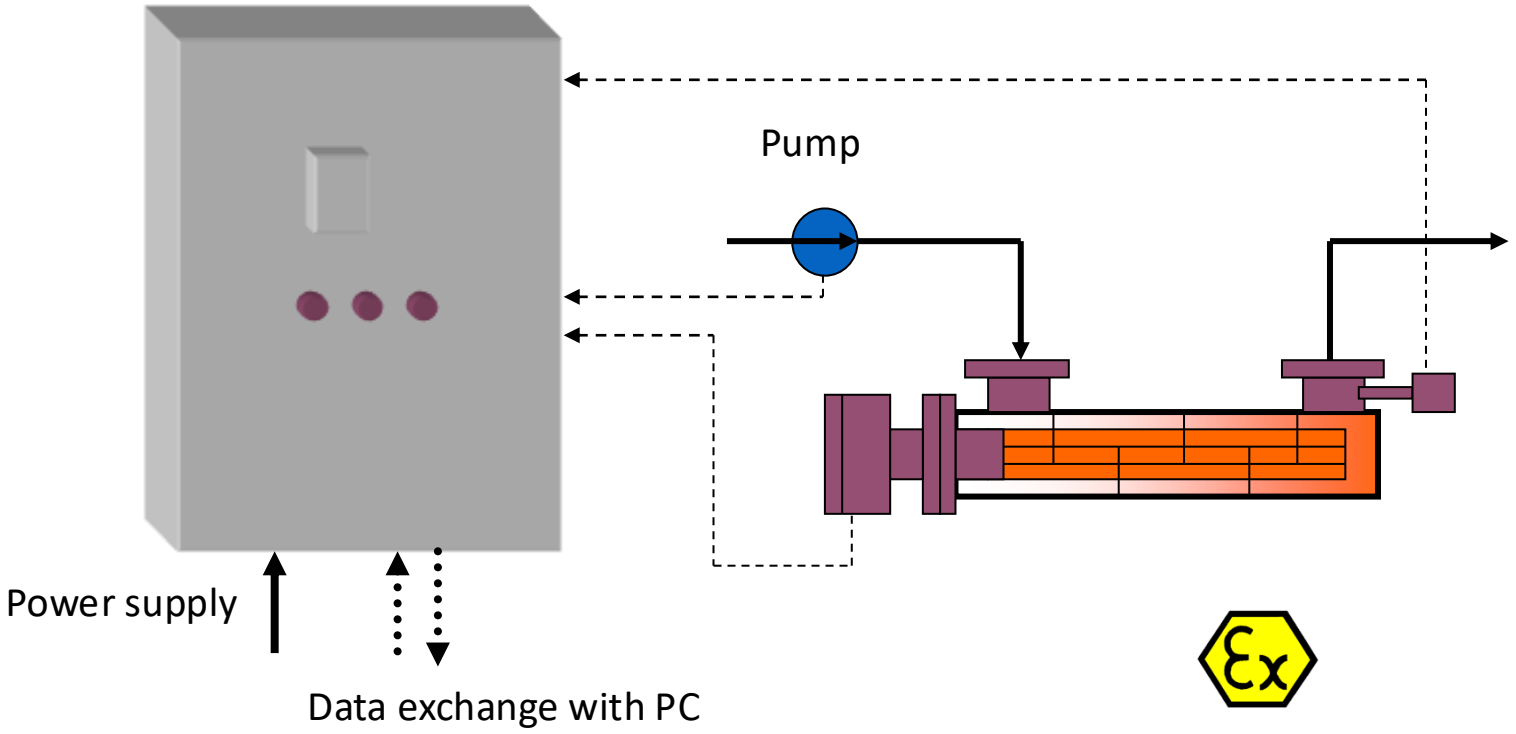
A heating control panel is used to control the heating process.

Configuration - general industrial or explosion-proof (Ex).

Technical Specifications of PH-OHS and PH-OHS-Ex Oil Heating Stations

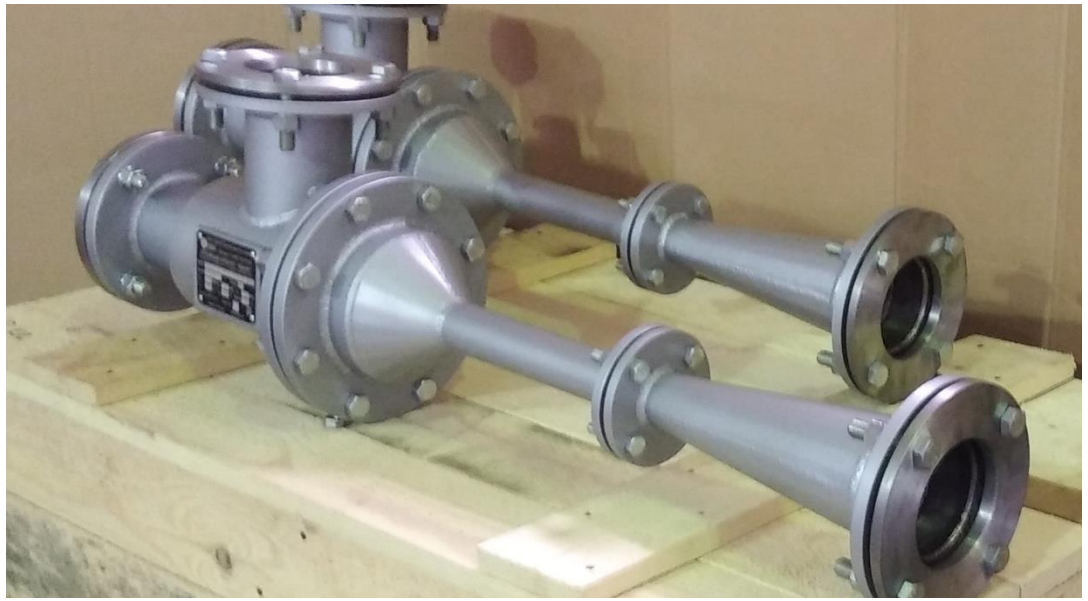
Supply voltage, V	220/380
Rated Power, kW	up to 100
Specific load, W/cm²	1,1 – 3,0
Heating element seamless tube, oil tank material	Carbon steel, AISI304, AISI316, AISI321, INCOLOY
Maximum allowable operating pressure, MPa	up to 1,6
Ambient temperature range, °C	-60 °C to +40 °C
Explosion-proof marking	1 Ex db IIB T6 Gb X

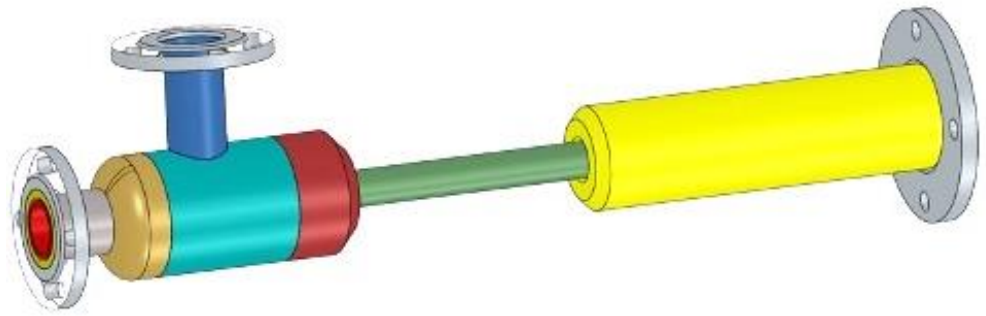
To control product heating, HCP-PNT heating control panels equipped with microprocessor controllers are used. If smooth heater power adjustment is required, the HCP-PNT is equipped with thyristor regulators.



HCP-PNT panels can provide the following controls:

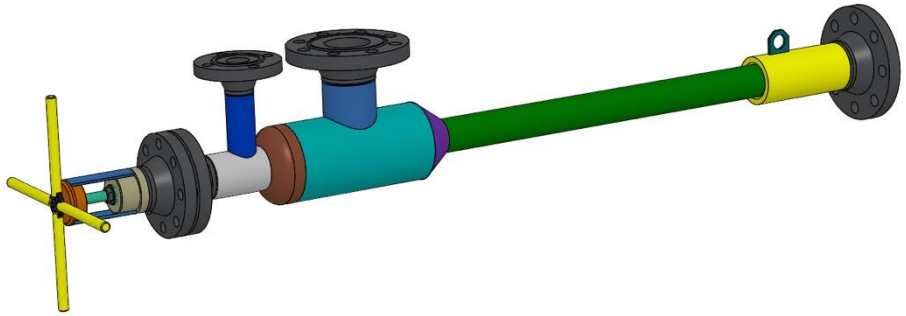
- Control of electric heaters based on temperature sensor signals to maintain the heated fluid at a set level;
- Emergency shut down of heating in case of product overheating;
- Monitoring capability of the heating elements;
- Transmission of signals to the upper control level via the process control system.

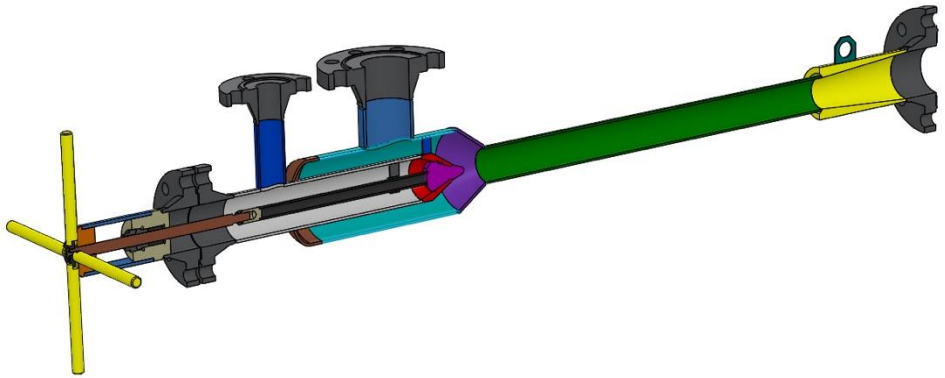




ProHeat Ejection-Type Jet Devices

An ejector is a classic jet device in which the pressure of the injected flow is increased without direct expenditure of mechanical energy (no moving parts)





Applications of ejectors:

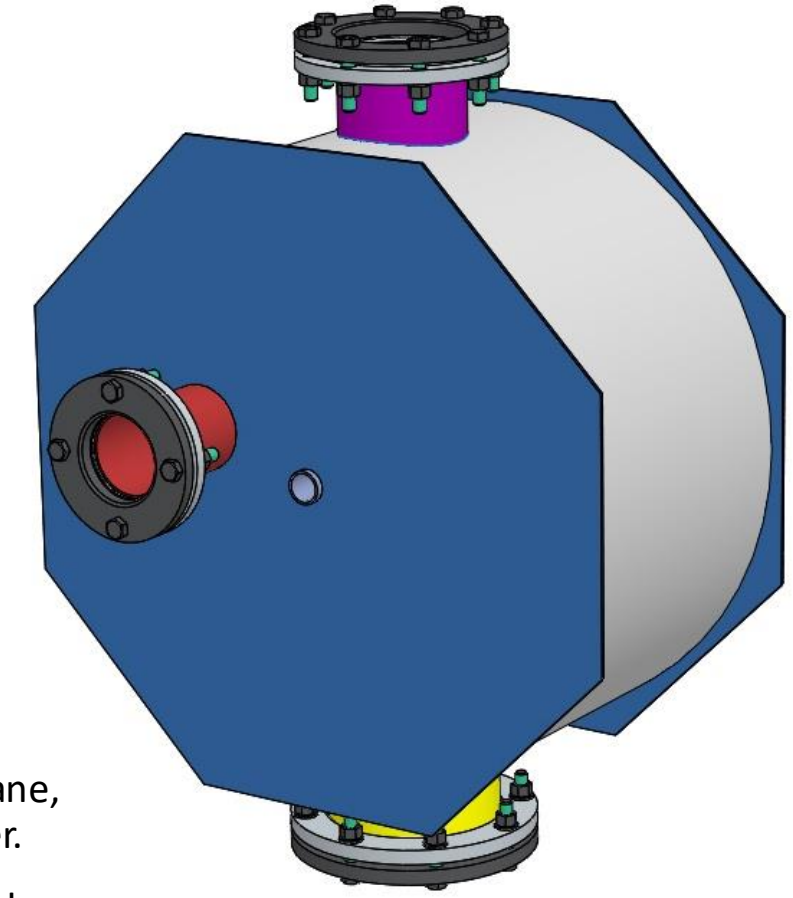
- Creating a vacuum in the condenser for starting steam turbines at thermal power plants;
- Removing air from the condenser during normal turbine operation at TPPs;
- Utilizing associated petroleum gas (APG);
- Utilizing hydrocarbon vapor from oil and petroleum product storage tanks;
- Creating a vacuum in deaerators of industrial plants;
- Creating a vacuum in vacuum chambers/molds in metallurgical plants;
- Creating a vacuum in distillation columns, chemical reactors, and other process equipment;
- Pumping contaminated liquids with dissolved aggressive impurities;
- Preparing and injecting fine-dispersed foam and hydro-suspended ballast into wells;
- Supplying high-temperature flue gases to drying units;
- Ventilating enclosed spaces, dead ends, wells, collectors;
- Extracting hot, dusty, explosive, radioactive gases and air with volatile ether, alcohol, phenol, and similar aggressive compounds;
- Increasing the pressure of low and medium potential steam;
- Increasing liquid pressure using steam energy;
- Heating water using steam energy.

Technical Specifications of ProHeat Ejectors

Capacity by evacuated gas, kg/h	**0,01-1000**
Attained vacuum, Pa abs.	up to 65 (0,5 mmHg)
Temperature of evacuated medium, °C	up to 1200
Operating medium pressure, MPa	0,1 – 35
Discharge mixture pressure, MPa	0,1 - 10
Material construction	Carbon steel, AISI304, AISI316, AISI321, titanium alloys
Coating	PTFE, polypropylene

ProHeat Water Treatment Equipment

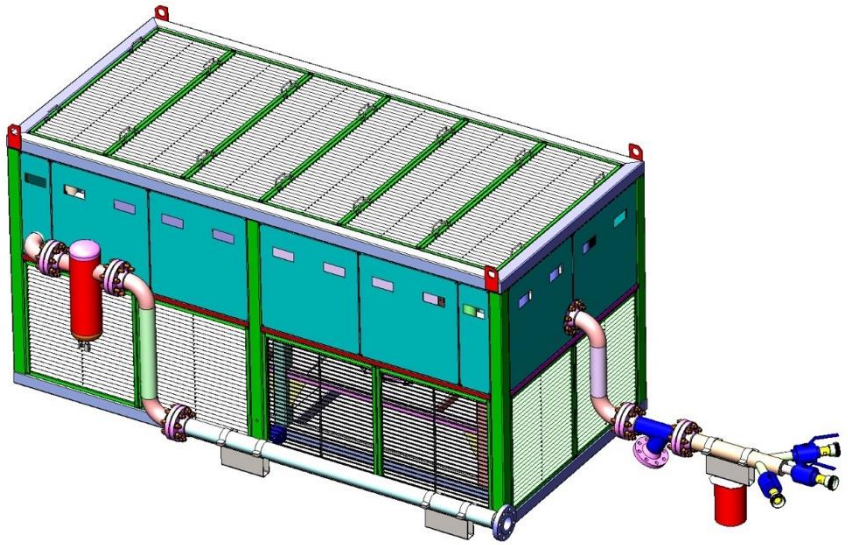
Deaerators
Decarbonators
Iron removers

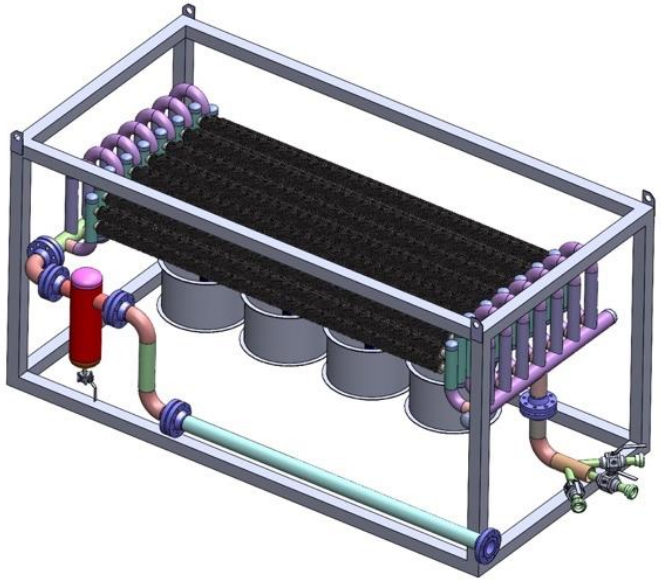


- Deaerators – designed to remove dissolved air, methane, hydrogen sulfide, and other dissolved gases from water.
- Decarbonators – designed to remove free (excess) carbon dioxide CO_2 from water.
- Iron removers – designed to remove divalent iron Fe^{2+} from water.

Flow rate production, t/h	1-600
CO_2 concentration, mg/kg	
- at equipment inlet	up to 300
- at equipment outlet	3-5
Fe^{2+} concentration, mg/kg	
- at equipment inlet	up to 50
- at equipment outlet	0,3
Material construction	AISI304, AISI316, AISI321

Technical Specifications of ProHeat Water Treatment Equipment





Air-to-Air Cooler

The cooler is a recuperative air-to-air heat exchanger.

It is used to cool a flow of compressed hot air with a flow rate of 4000 m^3/h by forcing atmospheric air over the heat exchange surface. The cooler maintains the working medium outlet temperature at 10°C above the ambient temperature.

OMEGA ENGINEERING

- Omega Engineering LLC
- 194100, Russia, Saint-Petersburg.
- info@omegatherm.ru
- www.omegatherm.ru
- www.proheat.ru

ProHeat
промышленный нагрев