

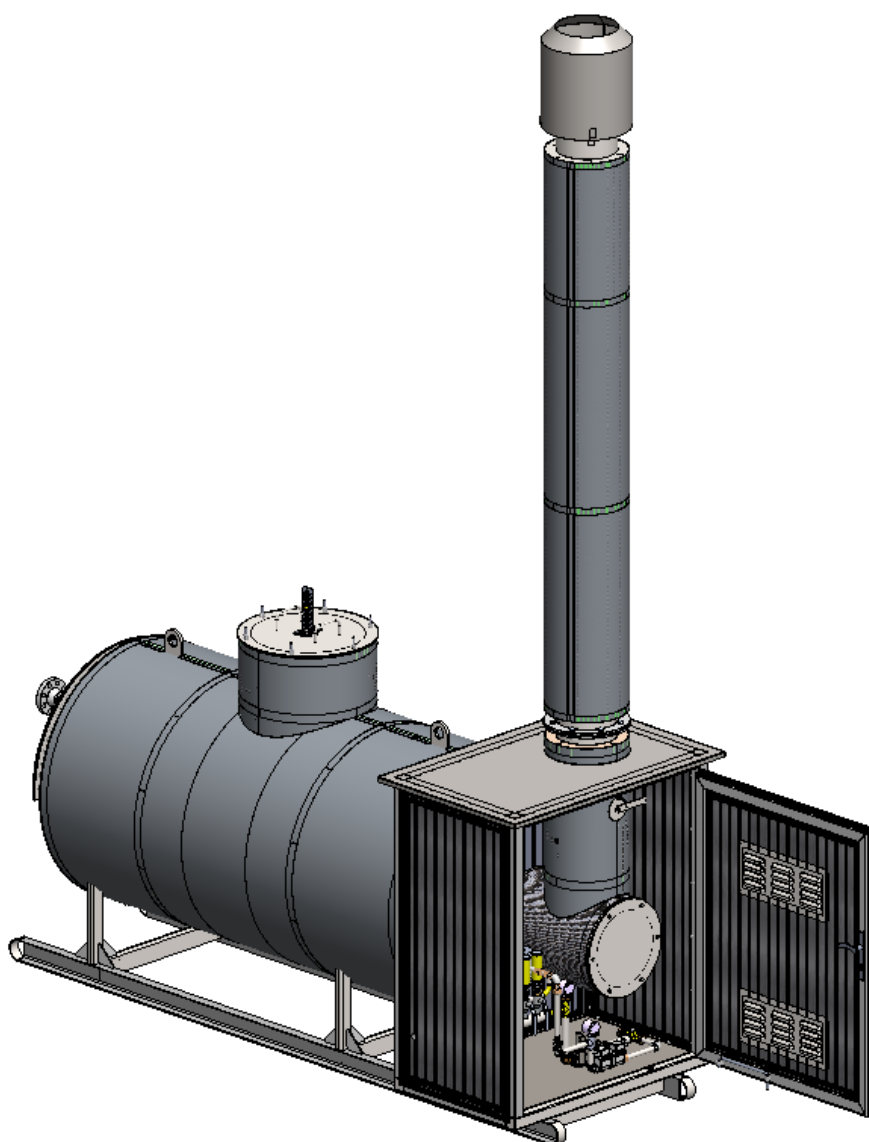
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INDIRECT HEATER WTG 634



Introduction

WTG 634 gas heater is an automatic indirect fired water bath heater, horizontally mounted. The heaters are designed to heat the gas prior to the pressure reduction. This prevents a defective equipment operation caused by the ice particles within the water vapour from the gas that can occur because of a substantial temperature drop during pressure reduction caused due to the Joule Thomson effect.

The natural gas must be heated so that after the pressure reduction the temperature is above 0°C.

In order to prevent unwanted condensation, WTG 634 heaters do not heat the high-pressure coil directly. In case high temperature gases and relatively low temperature tube bundles are allowed to come into direct contact, the condensing natural gas humidity within the tube bundles creates a corrosive liquid.

In order to completely use the water bath free convection, the firebox and the flue gases tube bundle are positioned beneath the high pressure coil.

Concerning the gas heating, the WTG 634 heater can be supplied in two constructive variants provided with:

- high-pressure U-tubes bundle;
- high-pressure coil.

The burning process can be generated either by natural gas burner, gas-oil burner or mixed burner.

The heaters may be provided with the following types of burners:

- atmospheric burners which do not require electric power supply;
- forced draft burners which require electric power supply.

The heater coil is designed and manufactured according to standard *EN 13445 – Unfired pressure vessels*.

WTG 634 gas heaters are designed for outdoor mounting.

Main characteristics

The main parameters of the WTG 634 gas heaters are as follows:

Table 1- WTG 634 main characteristics

Inlet / outlet connection diameter	Flanges DN 25 ÷ DN 300
Working medium	Natural gas or other non-corrosive gases / Oil
Ambient temperature [°C]	-20 ÷ 80 (optionally, -30 ÷ 80)*
Design pressure [bar]	64, 100, 140, 210, 345, 690
Efficiency	About 75-88 %
Fuel	Well effluent / Natural gas / Diesel-oil
Burner type	Natural or forced draft burner
Bath content	Water or water/glycol mixture
Maximum bath temperature [°C]	90

*On request, lower temperatures can be considered.

Materials

The main material types used for WTG 634 gas heaters are indicated in the table bellow:

Table 2 - Materials

Shell	Carbon steel
Firetube	Carbon steel
Coils	Carbon steel
Flanges	Carbon steel
Gaskets	BA55, AF-400
Thermal insulation	Mineral wool
Shell thermal insulation	Stainless steel / Aluminium sheets

Construction

The indirect fired water bath heaters, horizontally mounted type comprise three basic components:

- shell;
- firebox;
- high-pressure coil.

Figure 1 indicates the currently manufactured constructive variant. Also, the main components are specified. Custom built gas heaters and other optional accessories are available upon request.

The heater can be supplied completely packaged (with fittings, instrumentation, piping, fuel gas filtration panel, skid mounted).

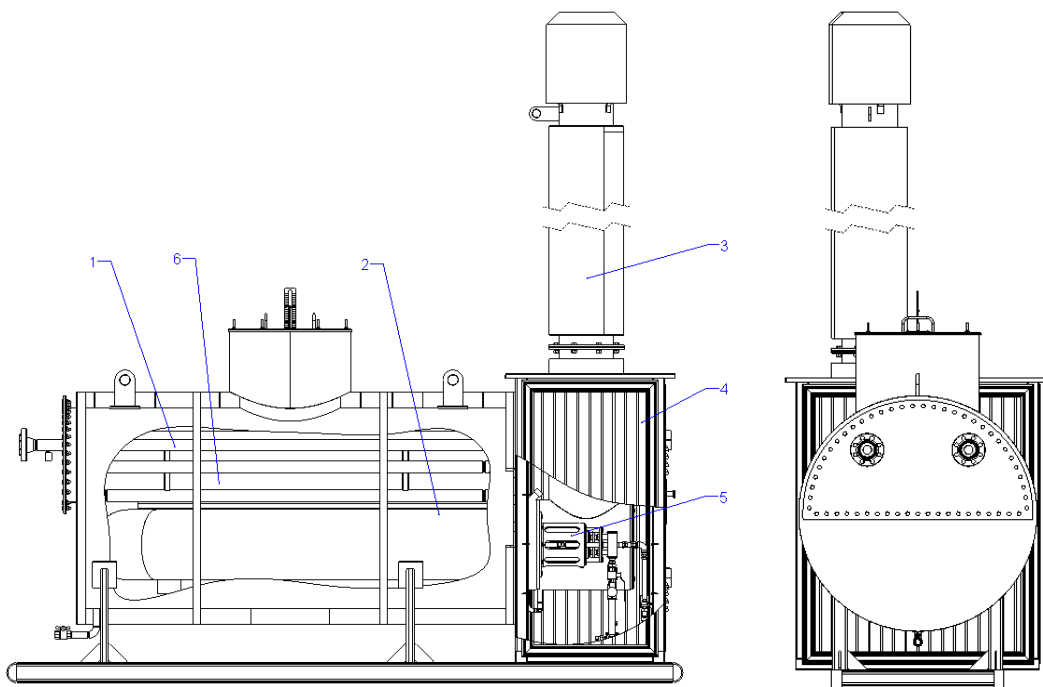


Figure 1- WTG 634 main components

1 – coil; 2 – firetube; 3 – stack; 4 – cabinet; 5 – burner;

6 – water bath.

Operation

WTG 634 heaters operate based on indirect heating. In the fire tube located at the lower part of the heater the fuel gas is burned by means of burner.

The heat caused by the fuel gas burning process is transmitted through the firebox wall to the water-glycol mixture in the water bath.

The flue gases from the tubes are driven through the collecting chamber to the stack. A spark arrestor and a baffle cover are provided at the stack outlet and allow flue gas exhaust, irrespective of environment conditions.

The blower burner, corresponding valves, the control panel and the other equipment are mounted in the burner chamber, weather-protected.

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The blower burner, corresponding valves, the control panel and the other equipment are mounted in the burner chamber, weather-protected.

Natural gases flow through the high pressure coil and are heated by means of water bath heat transfer. The high pressure coil is located at the upper part of the heater, above the firebox. This places the coil in the hottest area of the water bath, thereby assuring rapid and efficient heat transfer.

In order to minimize heat loss, the shell, the flue gas collector chamber, and the stack are thermally insulated by means of a thermal insulation layer. They are also covered with stainless steel or aluminium sheets.

The insulation has also the role of protection against personal injuries.

The heater is mounted on a fixed skid on which the fuel control elements, burner and automation and control cabinet are placed.

Burning process

WTG 634 natural gas heaters can function with either atmospheric burners, or forced draft burners.

The atmospheric burners do not need an external electric supply source, while the forced draft burners always need such a source.

Both burner types can ensure an efficiency of up to 92%.

The atmospheric burners comprise a Venturi type tube in which a part of the combustion air is drawn by using the available fuel gas pressure. The rest of required air is injected by means of the negative pressure in the fire tube. It is extremely important that the firebox and the exhaust stack to be correctly sized in order to ensure adequate draft in the fire tube.

The forced draft burners are modern high performance devices that meet the latest environment provisions and can be easily controlled.

The forced draft burners types:

- natural gas burner;
- Diesel oil burner;
- mixed burners.

The component parts are comprised by a compact unit. All components necessary to control the fuel gas flow and the combustion air can be easily accessed.

Safety devices

In most cases, the flue gas is provided directly from the main gas flow. The gas to be preheated is conducted through a pipe which is immersed in the water bath, before entering the pressure regulator. The gas pressure is reduced until reaching the safety level the burner requires.

Depending on the main gas pressure, either a one-phase or two-phase pressure reduction regulator is used.

Depending on the type of the burner and prior to entering it, the fuel gas flows through many control devices and safety accessories (filter, safety shut-off valve, pressure regulator, safety solenoid valves).

- Safety thermostat – intended to protect the coil against water temperature increase above the maximum value;
- Temperature sensor – records the temperature instantaneous value in the water jacket;
- Level indicator – indicates the water level in the water bath and signals the minimum level limit;
- Pneumatic level transmitter – (optionally) – intended for monitoring the level of the water from the water bath;
- Depending on the burner type, the flame of the pilot burner provided with ultraviolet sensor or ionization sensor is monitored;
- Safety shut-off valve – intended for protecting the high-pressure coil against overpressure;
- Temperature transmitter – used for measuring the inlet / outlet gas temperature;
- Pressure transmitter – used for measuring the pressure of the gas within the high-pressure coil.
- Various levels of automation;
- Gas detector provided with light and sound alarm;
- Other accessories:
 - Skid
 - Flame arrester.

Constructive variants

WTG 634 indirect water bath heaters have different constructive design depending on the type of the pressure installation (tube bundle or coil).

- **WTG 634 F**

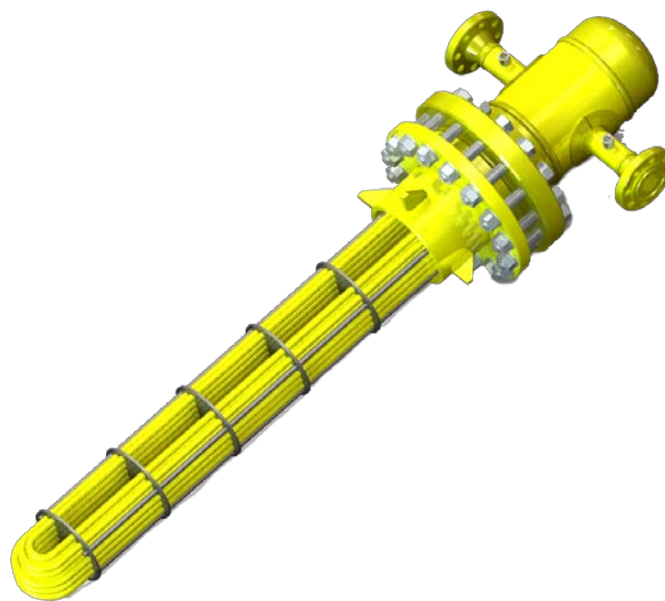
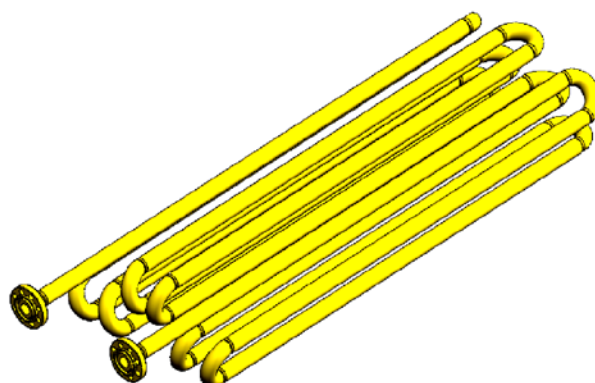


Figure 2 - WTG 634 F tubebundle

- **WTG 634**



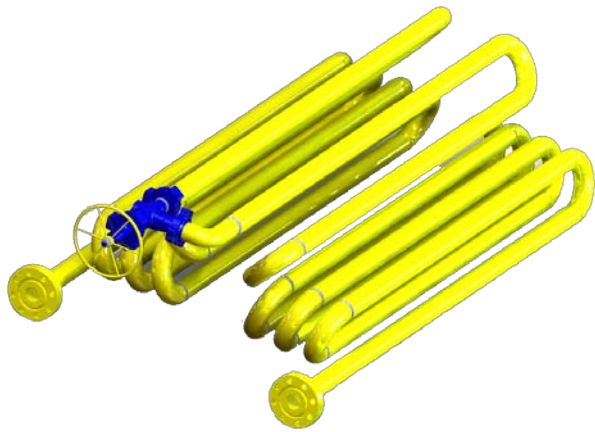


Figure 3 – WTG 634 gas heaters provided / not provided with adjustable choke valve

- **WTG 634 MC**

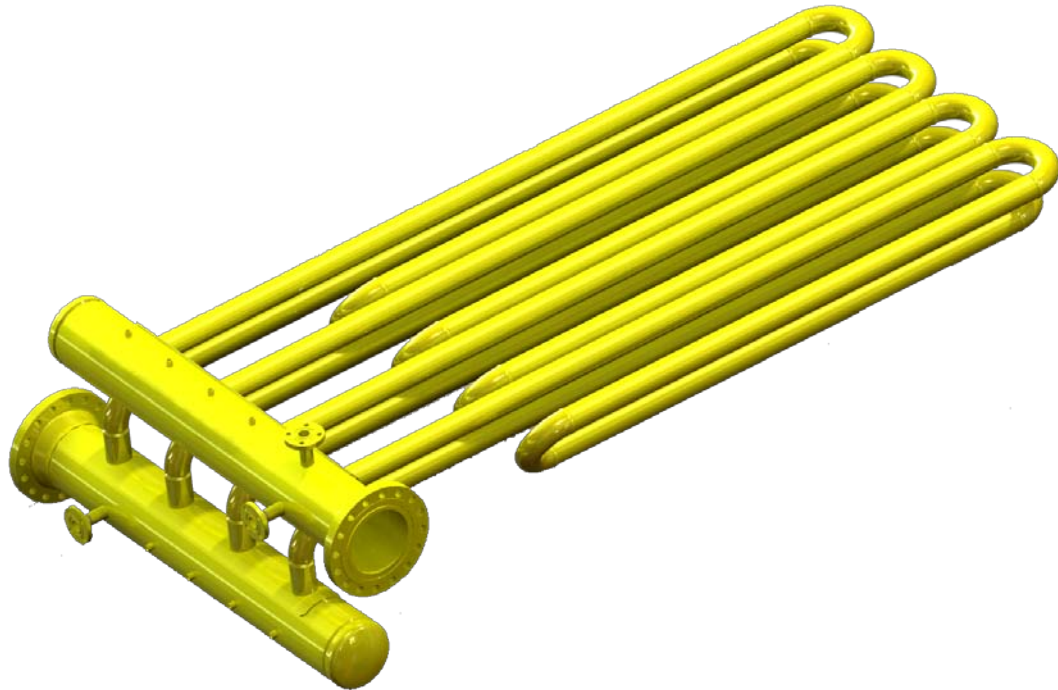
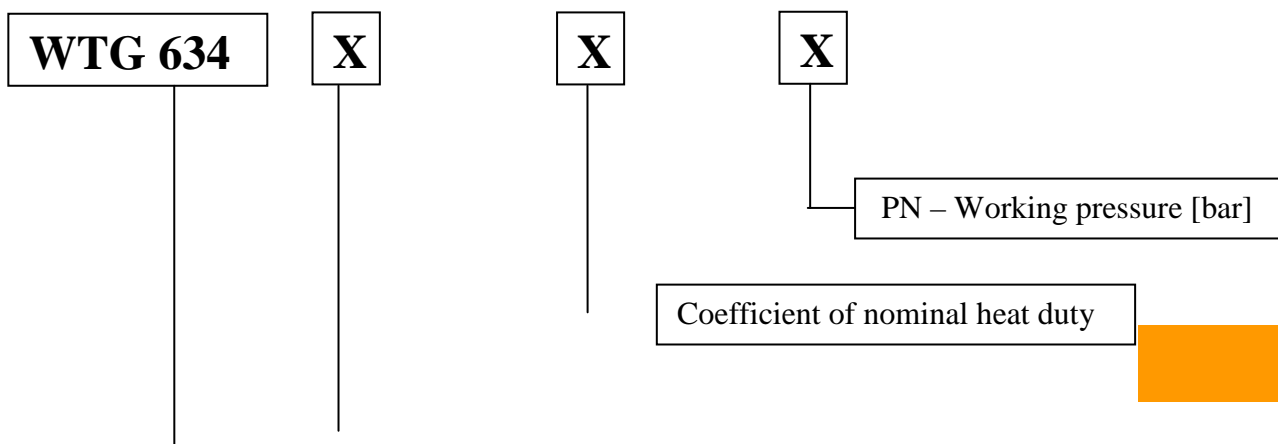


Figure 4 – WTG 634 MC multiple coil provided with collector and distributor

Ordering code

The WTG 634 heaters can be ordered by specifying the constructive form, inlet-outlet connection diameter, and maximum working pressure. Certain details are established together with the beneficiary when launching production.



Constructive variant (F, C, MC)

Indirect gas heater

Table 3 – Ordering code

Type	Characteristics Heat duty – Heat duty coefficient	PN (bar)
WTG 634 F indirect gas heaters	50.000-0050; 70.000-0070; 80.000-0080; 100.000-0100; 200.000-0200; 300.000-0300; 400.000-0400; 500.000-0500; 600.000-0600; 800.000-0800; 1.000.000-1000; 1.200.000-1200; 1.400.000-1400; 1.600.000-1600; 1.800.000- 1800; 2.000.000-2000; 2.200.000-2200; 2.400.000-2400; 2.600.000-2600; 2.800.000-2800; 3.200.000-3200; 3.600.000-3600; 4.000.000-4000; 4.400.000- 4400; 4.800.000-4800; 5.200.000-5200	64/100/140/210/345/690
WTG 634 C indirect gas heater	50.000-0050; 70.000-0070; 80.000-0080; 100.000-0100; 200.000-0200; 300.000-0300; 400.000-0400; 500.000-0500	
WTG 634 MC Indirect gas heater	600.000-0600; 800.000-0800; 1.000.000-1000; 1.200.000-1200; 1.400.000- 1400; 1.600.000-1600; 1.800.000-1800; 2.000.000-2000; 2.200.000-2200; 2.400.000-2400; 2.600.000-2600	

For example, the ordering code WTG 634 F-0050-064 designates an indirect water bath heater of WTG 634 type, tube bundle provided, heat duty 50.000kcal/h, maximum working pressure 64 bar.

Custom built WTG 634 gas heaters are also available upon request.

The manufacturer reserves the right to make modifications without any prior notification.

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