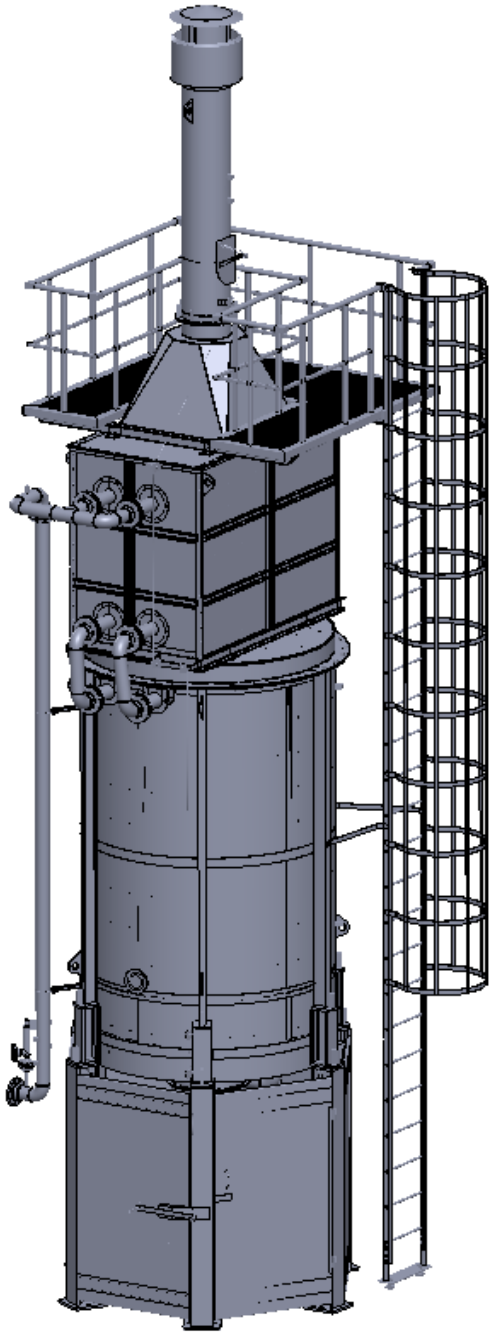
TOTALGAZ INDUSTRIE

DIRECT - FIRED GAS HEATER WTG 635



Introduction

WTG 635 heater is an automatic direct-fired gas heater of vertical type. WTG 635 direct-fired gas heaters are designed to be used in gas dehydration units (provided for desicant bed regeneration), in petroleum and chemical industry, and oil industry.

WTG 635 heaters comprise:

- Radiation heat transfer section;
- Convection heat transfer section;
- Coil;
- Stack.

The heater is designed to operate indoors, within enclosure comprising the main support, radiation shell, convection shell and the flare stack.
The radiation and convection coils are positioned in the enclosure, each of the coils in the corresponding heater section.
The preheated working fluid flows through the convection coil in lower temperature and through the radiation coil in higher temperature. The largest amount of heat is transferred to the radiation section, the coil tube predominantly absorbing the temperature mainly by means of radiation (ca. 90%) and partially (ca. 10%) by convection.
In the convection area, the coil tubes absorb the heat mostly by convection and partially by radiation (20% flue gases radiation and 10% closed wall radiation).
The heating can be achieved by direct flames, in liquid or gaseous fuel burning.
WTG 635 direct-fired gas heaters are designed to be mounted outdoors.

Main characteristics

WTG 635 direct-fired gas heaters main parameters:

Table 1- WTG 635 main characteristics

Inlet - outlet diameter	Flanges DN 50 ÷ DN 100
Working fluid	Natural gas or other non – corrosive gases / Oil
Ambient temperature [^{o}C]	-30 ÷ +60*
Design pressure [bar]	25
Fuel	Oil well/ Natural gas
Burner type	Atmospheric burner or forced draft burner

*On request, lower temperatures can be considered.

Materials

The main material types used for WTG 635 gas heaters are indicated in the table bellow:

Table 2 - Materials

Radiation shell	Carbon steel
Convection shell	Carbon steel
Radiation coil	Carbon steel
Convection coil	Carbon steel
Flanges	Carbon steel
Gaskets	BA55, AF-400
Thermal insulation	Mineral wool, refractory concrete

Design

WTG 635 is a vertical automatic direct-fired gas heater. The main components of the vertical heater WTG 635 type are indicated in Figure 1.

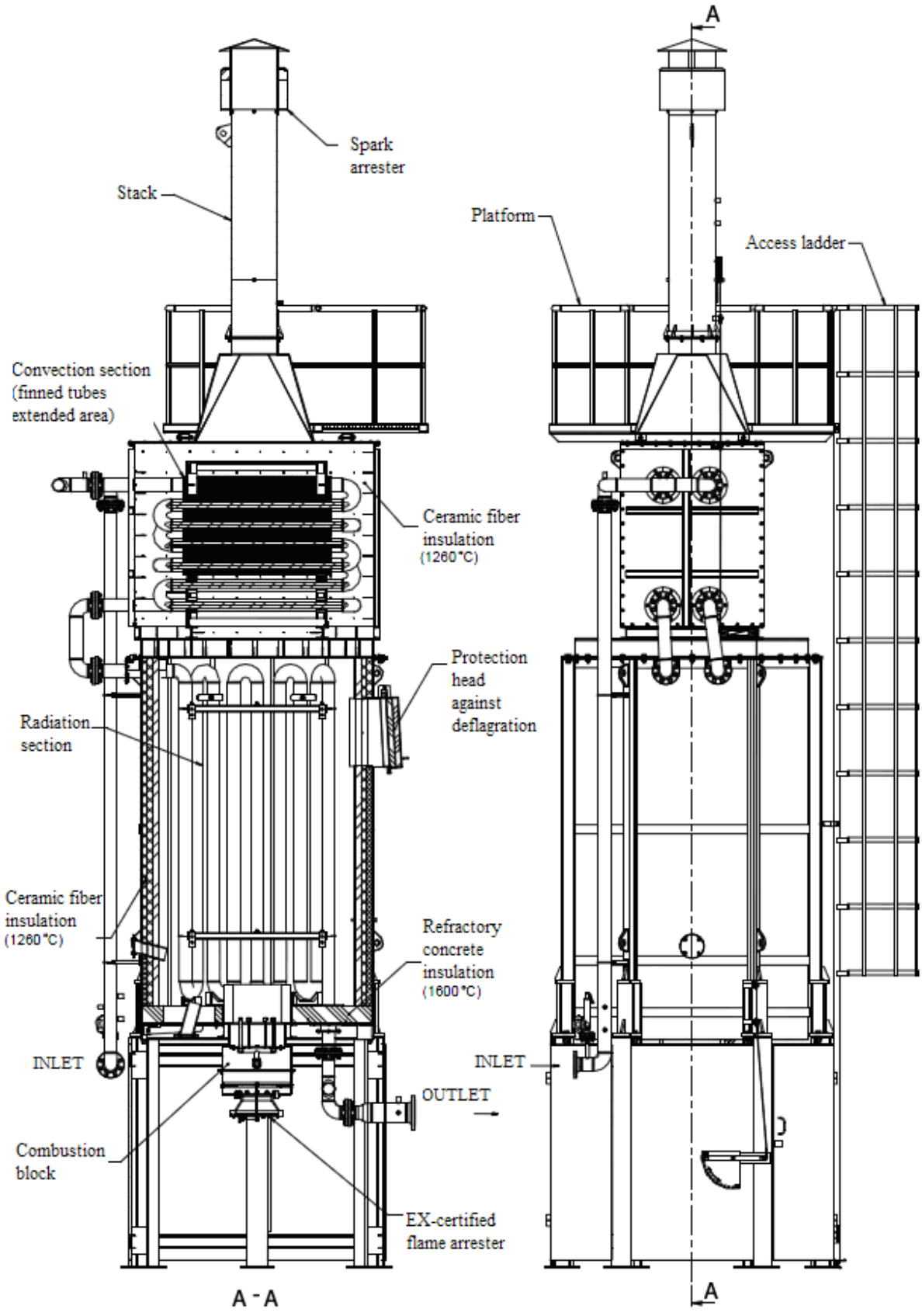


Figure 1 – WTG 635 vertical direct-fired heater

Operation

During normal operation of the tubular furnace, the following shall be particularly monitored: fuel burning process within fireboxes; flame colour and length; temperature and pressure values of the working fluids in convection and radiation coils; metal temperature values corresponding to the outside wall of the coil elements; physical status of the coil elements and tubular devices; general status of the thermal protection and thermal insulation compound system.

The fuel burning process can be monitored by means of an eye sight positioned in the radiation area. The burning control to the normal conditions shall be ensured by adjusting the air fuel flow, respectively by increasing or decreasing the draft in coordinated action upon the burner control elements and the draft control device.
In draft control, the flame colour and length shall be visually monitored. The flame must be white-blue; in case the length is too high, the flame comes into direct contact with the coil tubular devices and elements, causing local overheating.

By means of the thermocouples mounted or placed in the corresponding control points, the following shall continuously be monitored and logged: the coil working fluid temperature at inlet and outlet of the convection and radiation areas; the burning chamber temperature, the convection and stack area; the metal temperature of the outside walls of the coil tubes that must not exceed the indicated maximum admissible pressure.
The regeneration gases flow under pressure through the heater coils and come out heated at temperature values between 180 ÷ 220 °C, depending on particular characteristics of every dehydration unit.

Optional accessories

WTG 635 direct heater can be provided with the following optional accessories:

1. flame arrester
2. temperature sensors – to record inlet/outlet gas temperature
3. pressure sensors – to record inlet/outlet gas pressure
4. temperature sensors – to record the radiation temperature coil
5. temperature sensors – to monitor the flare stack gases temperature
6. thermometer – to indicate inlet / outlet gas temperature
7. pressure gauges – to indicate the gas pressure in the outlet/inlet pressure installation

Coil types

- **Convection coil**

Figure 2 – Convection coil

- **Radiation coil**

Figure 3 – Radiation coil

Ordering code

WTG 635 heater can be ordered by specifying the inlet/outlet connection nominal diameter, nominal working pressure and coil location diameter. Certain details are established together with the beneficiary when launching production.

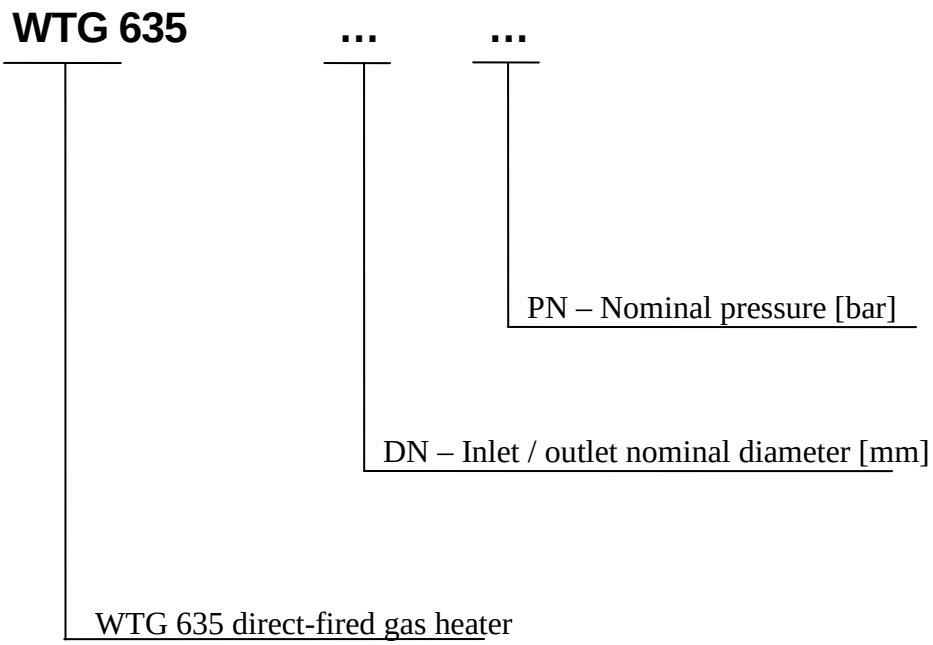


Table 3 – Ordering code

Model	Inlet / outlet nominal diameter DN[mm]	Coil location diameter D[mm]	Nominal pressure PN[bar]
WTG 635 direct-fired gas heater	50	1000	64/100/140/210/345
	50	1500	
	50	2000	
	80	1000	
	80	1500	
	80	2000	
	100	1000	
	100	1500	
	100	2000	
	150	1000	
	150	1500	
	150	2000	
	250	1000	
	250	1500	
	250	2000	
	300	1000	
	300	1500	
	300	2000	

For example, the ordering code WTG 635-80-64 designates WTG 635 direct-fired gas heater, inlet-outlet nominal diameter 80 mm, maximum working pressure 64 bar.

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

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IBAN: RO28BRDE240SV13842272400
B.R.D. G.S.G. Iaşi

Şos. Păcurari, nr. 128,
Iaşi, cod 700545, România
Tel. : 0040-232-216.391(2)
Fax : 0040-232-215.983
E-mail: office@totalgaz.ro
Web: www.totalgaz.ro

Certified Management System