

When designing a fuel gas heater which performs optimally there are several characteristics to take into account.

**Heat transfer:** the heat dissipated by the heating elements has to be transferred to the medium that flows through the heater. The design can be compared to a 'shell and tube' exchanger. Thermal process calculations using the medium properties such as specific heat ( J/kgK ) and thermal conductivity ( W/mK ) will ensure a perfect heater layout. The process calculations provide an indication of the heating element temperatures along the length of the heater. This will aid in determining the watt density guarantying a long element life.

**Pressure vessel:** the pressure vessel has to comply with the pressure equipment directive (PED) and will have to be designed according to one of the standards. In most cases fuel gas heaters are designed and calculated according to ASME VIII Division 1. But of course other standards can be applied

**Explosion proof equipment:** as almost all fuel gas heaters are placed in a hazardous area the equipment has to comply with ATEX.

**Electrical layout:** the electrical layout of the heater is normally specified. It is preferred to have the whole heater laid out in one group. This requires only a single connection system and if the power is also thyristor controlled longevity of the heater is guaranteed.

**Temperature control and safety devices:** in most cases the heater is fitted with RTD elements for monitoring and safeguarding temperatures in the heater. The RTD sensors are installed into a thermowell. When the function is to safeguard maximum temperatures the thermowell is coupled directly to the surface of a heating element at the hottest part of the heater. The process calculations for the heater specify the temperature for the high-high temperature settings.