

Innovative electric heater for high-temperature heating of process gases (e.g. hydrogen, syngas)

Supplementary information (supplied by SMS Group to INCITE – 11/09/2025)

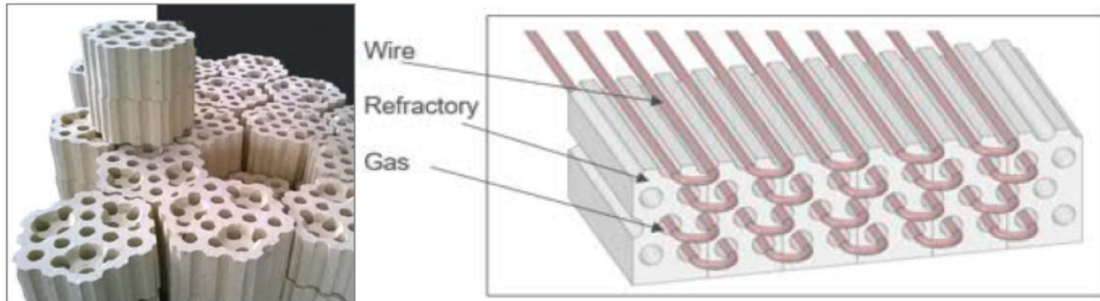


Figure 1. Checker bricks used in blast furnace hot blast stoves (Left) and schematic of the electric heater inner geometry with heating elements (Right).



Figure 2. Electric heater prototype control logic including its Automatic Voltage Regulator



Figure 3. Electric heater prototype (Italy)

Table 1: Performance achieved by the electric heater developed by Paul Wurth compared to other fossil fuel-based process gas heaters.

Gas heating technologies for high temperature heating	Values for continuous operation in nominal conditions		
	Gas temperature (°C)	Thermal efficiency (%)	Power factor ¹
Process fired heater	Up to 1050	80 - 90	Not applicable
Regenerative heater	Up to 1250	70 - 85	Not applicable
Electric heater	Up to 1080²	>97	>0.999

¹Fraction of supplied electric power converted into heat instead of futile inductive/capacitive effects.

²As temporary operation, the equipment has been tested also for heating gas up to 1200°C.

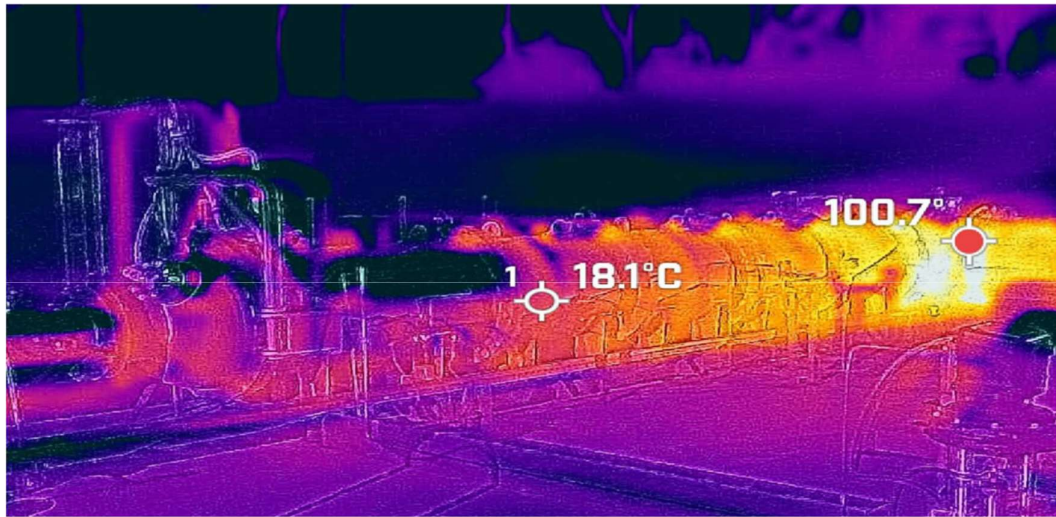


Figure 4. Thermography of the electric heater, showing particularly low vessel temperature of approximately 100 °C in its hottest portion during tests realised with hydrogen at 1000 °C.