

Radiant heaters

Basic values:

Parameter	Value
Dimensions	210 x 14.5 x 4.4 mm
Heated area	180 x 14.5 x 4.4 mm
T _{max}	1 000 °C

Details of with sensor hole Ø1.0 mm:

Description

Heating elements made of silicon nitride are very suitable as radiation heaters. The almost black silicon nitride used for the heating elements is a long-wave infrared radiator with a maximum radiation emission ($\epsilon > 0.8$) between 8 and 11 μm at 1 000 °C. Thus, a wide variety of materials can be heated effectively by radiation: Sheet metals to be selectively heated or held at temperature for subsequent re-forming processes, as well as plastics where the weld edges are to be melted for a subsequent sealing process. In addition, plastics can be selectively "glued", or sharp edges can be rounded or thermally deburred by radiant heat. Radiation heaters with the dimensions 210 mm x 14.5 mm x 4.4 mm are available in a large number of different power ratings. However, they can also be equipped with sensor boreholes for thermocouples, in order to be able to precisely control the temperature of the heating element. The robust design of these heating elements, in conjunction with the good oxidation resistance of the silicon-nitride ceramics, ensures a long service life - both during continuous operation and during cyclic demand.

The heating element has a blind hole, into which a temperature sensor with Ø1.0 mm, for example a mantle thermocouple, can be inserted.

* The actual power depends on resistance, temperature and voltage.

Parameter	Value		
Article no.	GLZ 100 165	GLZ 100 266	GLZ 100 265
Resistance @ 20 °C	132,25 $\Omega \pm 15 \%$	105,80 $\Omega \pm 15 \%$	83,97 $\Omega \pm 15 \%$
Nominal voltage	230 V	230 V	230 V
Nominal power @ 20 °C	400 W*	500 W*	630 W*
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Article no.	GLZ 100 262	GLZ 100 263	GLZ 100 264
Resistance @ 20 °C	66,13 $\Omega \pm 15 \%$	52,90 $\Omega \pm 15 \%$	42,32 $\Omega \pm 15 \%$

Parameter	Value		
Nominal voltage	230 V	230 V	230 V
Nominal power @ 20 °C	800 W*	1 000 W*	1 250 W*

Basic Material

Parameter	Scale unit	Si ₃ N ₄
max. temperature (T _{max})	°C	1 000
thermal conductivity (l)	W/mK	40
temperature shock resistance (ΔT)	K	500
emissivity (1 100 °C) (ε)	-	0.96
Young's modulus (E)	GPa	320
bending strength (δ _{BB})	MPa	400
compressive strength (δ _D)	MPa	2 000
coefficient of thermal expansion (α)	10 ⁻⁶ K ⁻¹	3
density (g)	g/cm ³	3.21
specific heat (c _p)	J/kgK	750
porosity (100 - % t.D.)	%	0
critical stress intensity factor (K _{IC})	MPa m ^{1/2}	6
Weibull - modulus (m)	-	7.9

The thermal shock resistance depends on the geometric shape of the heater.

Electrical parameters

Parameter	Scale unit	Si ₃ N ₄
resistivity	Ω cm	5 · 10 ⁻³ - 5 · 10 ⁻¹
isolation resistivity	Ω mm (20 °C)	10 ¹³
dielectric strength	kV/mm	25

Emission spectrum

Fully ceramic heating elements are long-wave infrared heaters with a maximum emission of 5 to 10 μm and a radiation coefficient of ε > 0.9.



