

## Hot plates

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### Basic values:

| Parameter        | Value            |
|------------------|------------------|
| Dimensions       | 210 x 210 x 6 mm |
| Heated area      | 210 x 210 x 6 mm |
| T <sub>max</sub> | 500 °C           |

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### Details of Standard:

#### Description

With outside dimensions of 210 mm x 210 mm, the heating element of the SJ type is suitable for quickly and evenly heating large areas up to 500 °C. The heating plates can also be arranged side by side like tiles, so that almost unlimited surface areas can be heated up - all with a very small thickness of only 6 mm. This makes the heating plate optimally suited, for example, to be used as a space heater in metal 3D printing systems, or to heat metal sheets over a large area. Of course, when using several heating elements, these can also be controlled separately - in this way, temperature profiles in the surface can be set precisely.

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

| Parameter             | Value         |
|-----------------------|---------------|
| Article no.           | FLE 100 950   |
| Resistance @ 20 °C    | 42,32 Ω ±25 % |
| Nominal voltage       | 230 V         |
| Nominal power @ 20 °C | 1 250 W*      |

## Basic Material

| Parameter                                           | Scale unit                       | Si <sub>3</sub> N <sub>4</sub> |
|-----------------------------------------------------|----------------------------------|--------------------------------|
| max. temperature (T <sub>max</sub> )                | °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 <sub>BB</sub> )                 | MPa                              | 400                            |
| compressive strength (δ <sub>D</sub> )              | MPa                              | 2 000                          |
| coefficient of thermal expansion (α)                | 10 <sup>-6</sup> K <sup>-1</sup> | 3                              |
| density (g)                                         | g/cm <sup>3</sup>                | 3.21                           |
| specific heat (c <sub>p</sub> )                     | J/kgK                            | 750                            |
| porosity (100 - % t.D.)                             | %                                | 0                              |
| critical stress intensity factor (K <sub>IC</sub> ) | MPa m <sup>1/2</sup>             | 6                              |
| Weibull - modulus (m)                               | -                                | 7.9                            |

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

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## Electrical parameters

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

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## 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.



