

## Flat heating elements

### Basic values:

| Parameter        | Value                |
|------------------|----------------------|
| Dimensions       | 55 x 35(16) x 4.0 mm |
| Heated area      | 25 x 35 x 4.0 mm     |
| T <sub>max</sub> | 1 000 °C             |

### Details of with sensor hole Ø1.5 mm:

#### Description

With a maximum temperature of 1 000 °C and a heated zone of 35 mm x 25 mm, the type RDB is a very universally applicable heating element: It can be used both as a contact heating element and for radiator-type heating. In addition, this heating element type is also available in many different configurations for different operating voltages and outputs as well as with and without drilling holes for an optional temperature sensor. The type RDB finds application, for example, as a heating element for sample heating in R&D applications, as a radiator heater for welding of plastics and as a high-temperature heater for coating applications.

The heating element has a blind hole, into which a temperature sensor with Ø1,5 mm, for example a mantle thermocouple, can be inserted.

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

| Parameter             | Value        |             |
|-----------------------|--------------|-------------|
| Article no.           | FLE 100 692  | FLE 100 693 |
| Resistance @ 20 °C    | 58,7 Ω ±25 % | 16 Ω ±25 %  |
| Nominal voltage       | 230 V        | 110 V       |
| Nominal power @ 20 °C | 900 W*       | 756 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.



