

Elstein panel heaters FSG are ceramic infrared heaters, which are designed for the use in glass bending furnaces to manufacture glass for cars, buildings and architectural purposes.

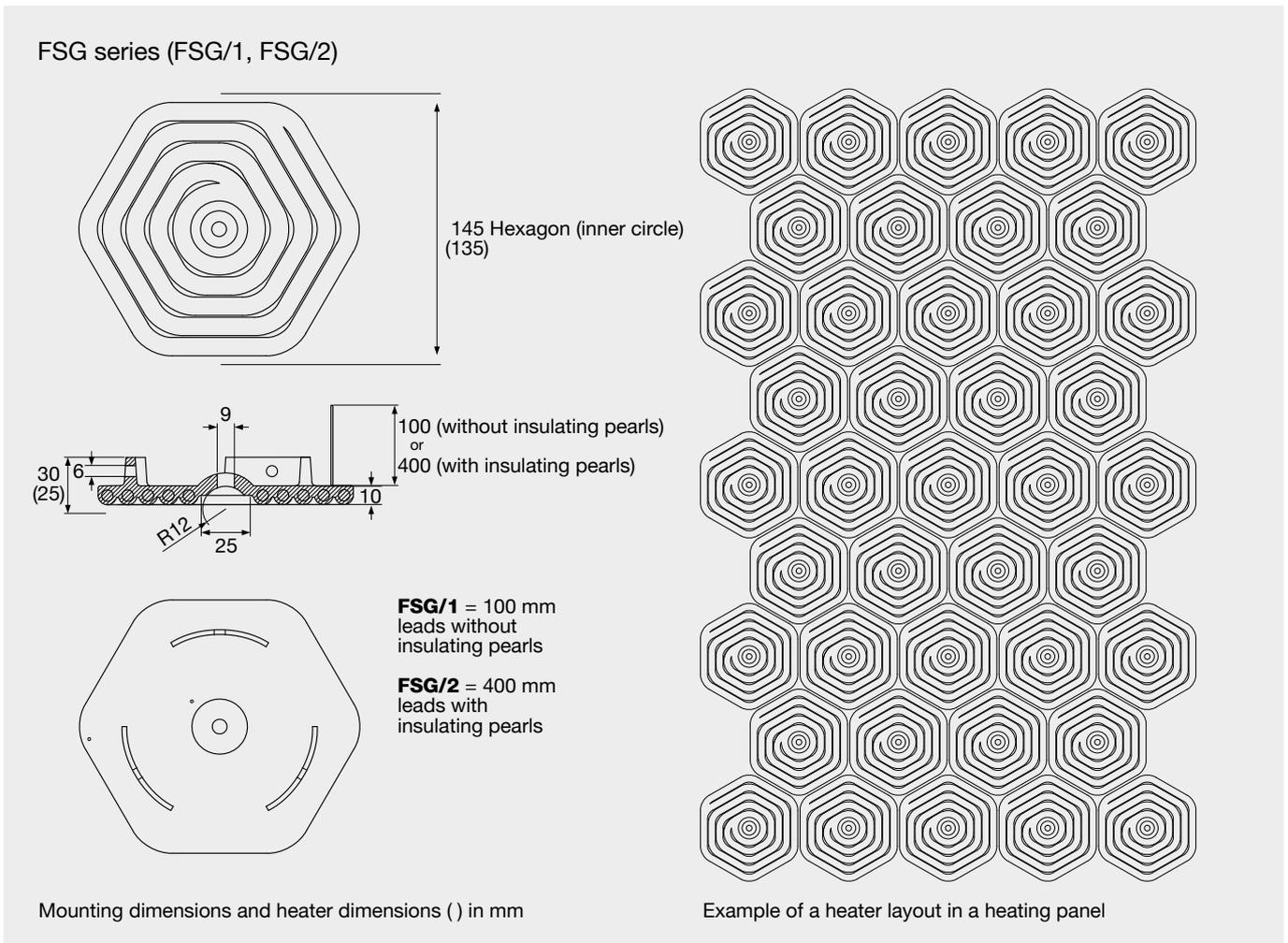
They replace other current heating technologies, such as block-like heating modules with open heating coil, because Elstein FSG significantly improve the product quality as well as the furnace's efficiency.

FSG heaters emit within an infrared wavelength range, that corresponds largely to the IR absorption range of glass, between 2 - 10  $\mu\text{m}$ .

The FSG heaters can be used for both, the upper and lower heating panel. As the heating coil is embedded completely into the ceramic body of the heater, the FSG heaters can be operated independent of their position.

In addition fragments of broken glass falling on the lower heating panel during the operation of the furnace, neither cause any damage of the heating element nor disturb the function of the furnace.

The position of the heating coil of heaters with an open heating coil can vary over the time. This is not possible with ceramic heaters; their heating coil maintains



its place, so that the result is a complete homogenous and unchanged heat distribution.

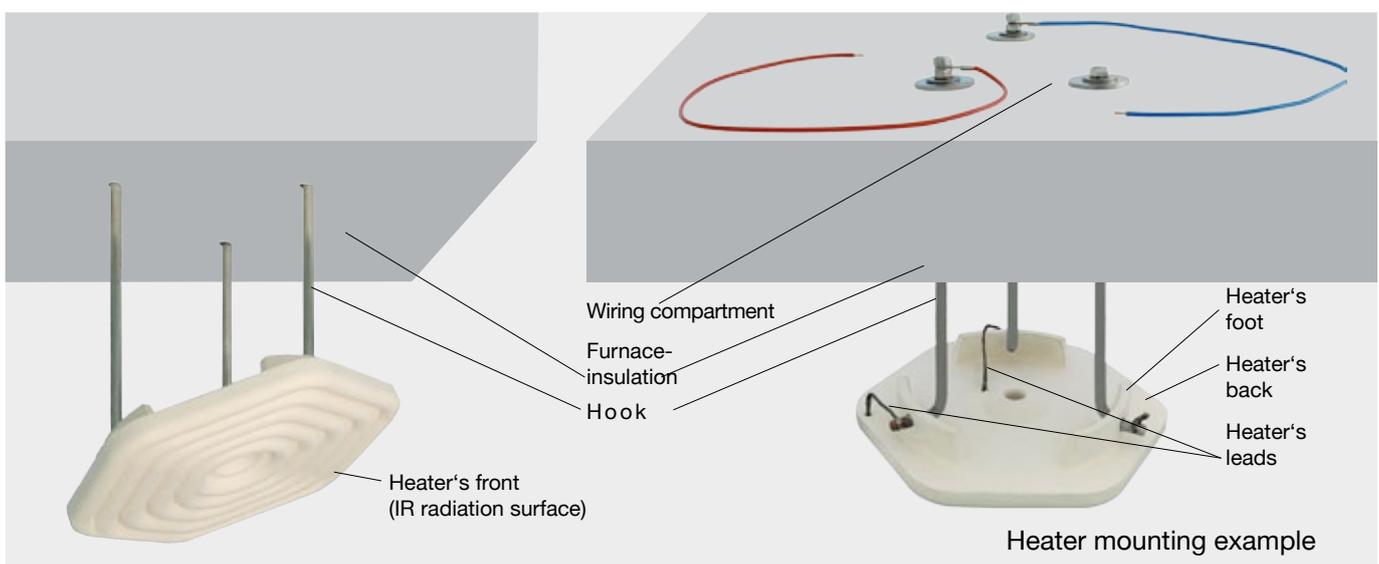
The four holes, three of them are located in the feet and one in the center of the heater, are used for mechanically fixing the heater by using three or alternatively two hooks. At the same time two of the hooks are used for electrically connecting the heaters by welding the heater's leads to the hooks. The following picture shows the installation variant with three hooks.

By using this special method of installation upper heating panels can be built up in a three dimensional geometry and enable due to this precise contours on the glass,

even if small bending radii are required.

For building up the lower heating panel, FSG heaters have electrically insulated leads and are placed without hooks onto the insulation of the furnace. The three ceramic feet take over a spacer function.

Elstein FSG heaters are designed for temperatures up to 1000 °C. They generate a very homogeneous heat distribution over the single heater as well as over the whole heating panel surface when assembled together. Due to this the high optical quality specifications of the premium segment of the automobile industry are fulfilled.



Type, weight, wattage	FSG/1 FSG/2	290 g 330 g	1200	W
Installable surface rating			70,0	kW/m <sup>2</sup>
Typical operating temperature			950	°C
Maximum permissible temperature			1000	°C
Wavelength range			2 - 10	µm

<p><b>Standard design</b></p> <p>Operating voltage 230 V Ceramic full-pour casting Three feet with one hole each One center hole Unglazed</p> <p><u>Leads</u> For upper heating panel 100 mm For lower heating panel 400 mm with insulating beads</p>	<p><b>Thermocouple heaters</b></p> <p>Designation T-FSG/1, T-FSG/2 Integrated thermocouple Type K (NiCr-Ni) TC leads 400 mm</p>	<p><b>Variants</b></p> <p>Special wattages Special voltages Extended leads</p>
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