

CERAMIC HEATING ELEMENTS

ROUND CERAMIC HEATING ELEMENTS

Round ceramic heating elements are primarily used to heat water, liquids, oil products, ovens and machinery. Specially suitable for use in applications where coke or calcium deposits must be reduced to a minimum. Ceramic building elements can be fitted in tubs and tanks, where the heating elements are mounted in a pouring tube that is either welded or screwed inside the tub or tank so that the heating element can easily be replaced without having to empty the tank first.

PRODUCT DESCRIPTION

A ceramic heating element consists of a main element attached to the connection box with a number of ceramic groove blocks with embedded heating spirals, ending in an end block. In addition to securing the column's stability, the end block prevents exposure of the heating spiral which would cause the heating element to short-circuit. The heating element is often constructed with a cold zone between the main element and the hot zone in order to reduce temperature at connecting points. All ceramic groove blocks are available in 50mm lengths. The lengths of cold and hot zones with therefore always be divisible by 50mm. The main and end blocks are always calculated in the total 50mm length

Diameter tolerance +/-2%	Pipe Ø inside	Guiding load watt per 50mm block		
		Air	Oil	Water
Ø 6.5	7.0 - 8.5	10	20	40
Ø 8.3	8.5 - 10.0	13	26	55
Ø 10.0	10.5 - 12.5	15	30	60
Ø 11.5	12.0 - 14.0	18	36	75
Ø 12.5	13.0 - 15.0	20	40	80
Ø 15.8	16.0 - 18.0	25	50	100
Ø 20.0	20.5 - 22.5	32	64	130
Ø 22.0	22.5 - 24.5	35	70	140
Ø 26.0	27.0 - 29.0	40	80	160
Ø 31.0	32.0 - 34.0	50	100	200
Ø 35.0	36.0 - 38.0	55	110	220
Ø 36.0	37.0 - 39.0	57	114	230
Ø 39.0	40.0 - 42.0	62	124	250
Ø 46.0	47.0 - 49.0	73	146	290
Ø 57.0	58.5 - 60.5	90	180	360

The wattages stated are guidelines only, for use when choosing physical dimensions. When preparing final dimensioning, it is important to compensate for the position of the heating element (capacity to radiate heat to the substance), operating conditions and ambient temperature.



Main and end block



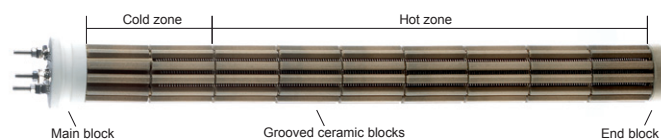
Grooved ceramic blocks



Connection M4/M5 terminals



Connection with flexible wires



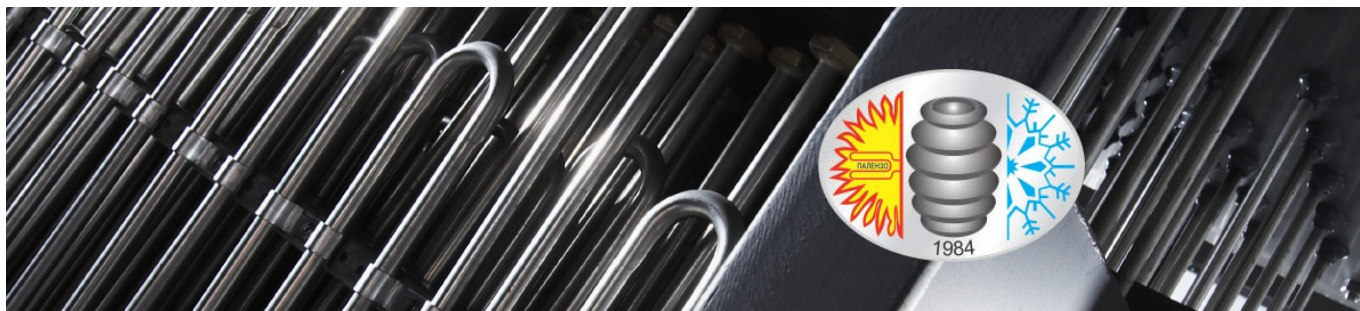
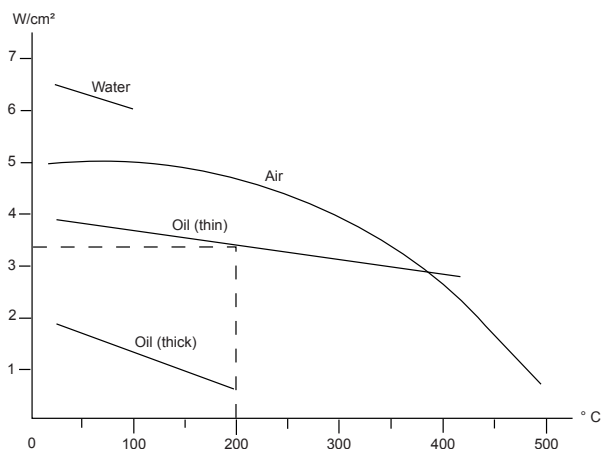


DIAGRAM FOR ROUND CERAMIC HEATING ELEMENTS

Use the diagram to read off the maximum permitted power (W) per 50mm groove block under optimum operating conditions and at normal operating temperatures. The power stated should be considered only as a guideline for use in choosing physical dimensions. When preparing final dimensioning, it is important to compensate for the position of the heating element (capacity to radiate heat to the substance), operating conditions and ambient temperature (high temperatures require low surface load), and whether the heating element is to be fitted vertically or horizontally. If fitted vertically, the grooves must be moulded in ceramic material so that the heating spiral does not collapse when hot. Similarly, power (W) per 50mm block must be reduced to avoid excessive temperatures at the top of the element.



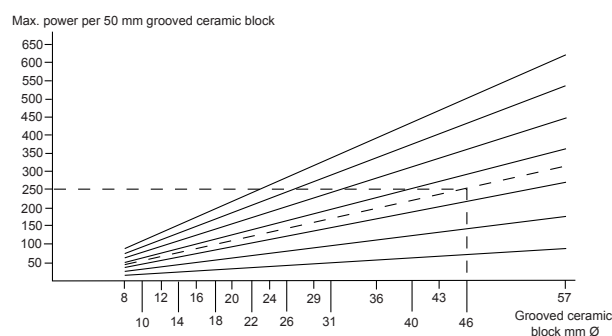
Example

A tub containing thin oil is to be heated to 200°C. The maximum immersion length for the heating element is 200mm. The required power output is calculated at 1000W. Use the table on the left to read recommended load in W/cm² at 200°C (in this case, about 3.5W).

Then calculate the desired power (W) per 50mm ceramic groove block.

$$(1000\text{W} \times 50) : 200 = 250\text{W} / 50\text{mm block}$$

Use the table on the right to draw a horizontal line through the 250W point on the vertical axis. The point at which the line cuts the 3.5W arc gives the minimum diameter of the groove block = Ø46.





FLAT CERAMIC HEATING ELEMENTS

Flat ceramic heating elements are used for heating the ends and sides of vessels. The units are available in a selection of widths and, like round ceramic heating elements, they can be built together to achieve the desired dimensions. If several heating elements are fitted side by side, highly efficient heat distribution can be achieved over a large area. This is often required in vessels containing liquids with high viscosity.

Flat ceramic heating elements are also suitable for use in constructing small heating and hardening furnaces.

PRODUCT DESCRIPTION

Flat ceramic heating elements are constructed of a heat-resistant resistance wire and flat ceramic groove blocks that both support the resistance wire and function as electrical insulation. The ceramic parts are modular units. The ceramic material has excellent heat-resistant properties and high insulating properties at temperatures of up to about 1000°C.

Voltage, power output, cold zone, connection (with/without insulation) are all available to meet customer specifications.

Dimensioning ceramic groove blocks:

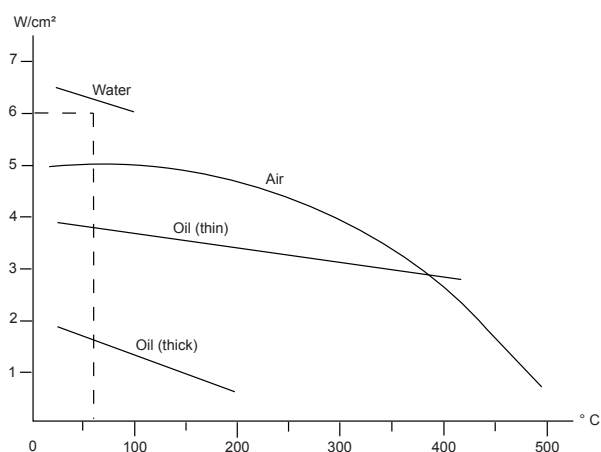
Width mm	Length mm	Height mm	No. of grooves	Area cm ²
40	50	12	4	20
47	50	10	4	23.5
47	100	10	4	47
53	100	10	4	53



Flat groove block

DIAGRAM FOR FLAT CERAMIC HEATING ELEMENTS

The table shows the maximum permitted power (W) per cm² at various operating temperatures. When dimensioning, it is important to consider the position of the heating element and its capacity for radiating the heat it produces.



Example

A vessel containing water is to be heated to an operating temperature of 60°C. The power output required is calculated at 6kW. The diagram shows that at 60°C, the heating element can radiate 6W/cm². In relation to the 6000W output, it is obvious that the heating element must consist of at least 1000cm² flat ceramic groove blocks. If we choose the 53mm wide groove block (surface area 53cm²), the heating element must comprise 20 blocks. In this case, we recommend building the heating element as 3 x 2000W independent heating elements.



Flat groove block with wire connection