

# WATT DENSITY CALCULATION

The durability and performance of a heater depends on selecting the appropriate wattage. Exceeding the maximum allowable watt density for the specified heater size will result in premature heater failure. While calculating watt densities, we should remove the area of the cold section from the overall calculated surface area of the heater.

$$\text{Watt Density (W/in}^2\text{)} = \frac{\text{Wattage}}{\text{(3.14 x ID x Width) - (Cold Section)}}$$

COLD SECTION	
CONSTRUCTION	DESCRIPTION
One piece	1" x width
Two piece	2" x width
Holes, Cutout	(Size + 1/2") x width

## Points to Consider while Selecting Watt Density

- Select narrower heaters where possible, as their heat transfer is superior to wide heaters. 1" to 2.5" wide heaters are ideal.
- The watt density should be selected in accordance with the operating temperature. A table that shows the maximum allowable watt density is provided as a guideline.
- To avoid short cycling and inefficient operation, select a wattage as close to the needed capacity as possible.
- The wattage should be in accordance with the voltage and current rating of the controls.
- The safe heating pattern of the material heated, thermal conductivity and coefficient of expansion of the cylinder are other factors that should be taken into consideration while deciding wattage.