



## Watts Robbing Your Service Life?

Is your electric heater's watt density causing your system more harm than good? Watt density can have a serious impact on the life of your fluid, so it's important to understand what it is and how to make sure your system is working within acceptable limits.

### What is watt density?

Basically, it refers to the amount of watts packed into a square inch of a heater or in other words, the intensity of heat that a heater emits per square inch. Having a heater with the right watt density is essential to maintaining the service life of your fluid.

### What happens to the fluid when watt density is too high?

The fluid will [thermally degrade](#) and create a hard layer of carbon build-up on the heater surface (Fig. 1). The carbon is very difficult to remove and it impedes the amount of heat transferred to the fluid because it acts as an insulator.

### What's the right amount?

In general, circulated systems can handle a higher watt density than systems that aren't circulated since the fluid will be flowing past the heater. That said, there are a lot of variables to consider, like [fluid viscosity](#), [flow rate](#) and wattage output vs. heater size. As a rule of thumb, however, 20-22 watts/inch is the recommended limit for a system that has fully turbulent flow past the heater. For a system that is not circulated, such as an open bath, maximum recommendation would be 10-12 watts/inch<sup>2</sup>.

If you'd like a more in-depth look at watt density and heaters, check out Gordon Hollander's [article](#) in Process Heating.

If you have any questions or comments please let us know.

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