

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/inch².

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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