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There is often confusion as to how a Tulikivi (Masonry Heater) transfers heat to the interior living area versus how a wood stove transfers heat to the same space. It is critical to understand and not confuse the differences in order to address and diagnosis any heating problems with one system versus the other. As a wood stove burns its fuel load the exterior surface temperatures typically rise to the 400-600 degree range. The very intense (hot) radiation from surface heats the air surrounding the woodstove and causes it to expand and rise to the ceiling resulting in air convection within the room. As the air circulates against cooler surface in the room it gives up its heat to those surfaces.
As a masonry heater burns its fuel load the thermal mass (3000-9000 lbs) absorbs most of the heat from fire and the surface temperatures typically are in the 100-200 degree range. The gentle (warm) radiation form the surface radiates (like sunshine) to all the surfaces of the room and warms them directly. The air temperature in the room is determined by the collective surface temperatures of the room. The masonry heater causes very little air convection versus that of a woodstove.

For a masonry heater to heat well it must be able to over time raise the room mass temperature to a comfortable level. How long and how much fuel this takes depends on the area, mass and insulation of the room in which it is located. Other rooms connected to the room in which the masonry heater is located will also impact how much fuel will need to be burned. Some considerations are as follows:

1) A slab on grade will take longer and more fuel to heat than an insulated wood floor over an enclosed basement or crawl space. However, once the slab is heated there will be less fluctuation of temperature over time than with the lower mass insulated wood floor.
2) Un-insulated logs (6-8 inches thick) will take longer and more fuel to heat than an insulated wall. The difference in time and fuel determined in the difference of the R value of the logs versus the R value of the insulated wall. Again, once the logs are heated there will be less fluctuation of temperature over time than with the lower mass insulated wood walls.
3) Un-insulated stone walls will take longer and more fuel to heat than a log wall that has a higher R-value.
4) The percentage of window surface area in the room will impact the amount of time and fuel needed to heat the room.

For a masonry heater to heat well the infiltration of outside air (leaks) must be held to a minimum. If there are significant drafts through windows and doors when the wind blows outside comfort will not be achieved. Draftiness will be more noticeable with a radiant masonry heater than the convention of a woodstove. Typically, comfortable air temperatures run cooler in a radiantly heated room than in room heated by the convection of a wood stove. The convection (draftiness) and higher air temperatures of a woodstove mask the problem of air infiltration from doors and windows.