CONDUCTIVITY IS KING

Traditionally, radiant systems have used concrete to transfer heat into a home. Warmboard's aluminum is 240 times more conductive, ensuring much faster response and constant comfort.

All too often the term "thermal mass" is used when discussing radiant heat. In this context, it is referencing the ability of a high mass radiant floor assembly to store heat.

The concept originally made sense during the trend of designing passive solar homes back in the 1960's and 70's. A dark colored, high-mass slab, made of Portland cement, or gypsum concrete, would sit under south facing windows and soak up the sun's rays all day long. Once the sun went down, the slab would release its stored heat into the space, essentially extending the release of the sun's heat for about 12 hours. This delay was a benefit to these systems precisely because the sun gave off its greatest amount of heat about 12 hours before the need for heat arose.

Because passive solar could rarely supply all of a home's heat, the concrete slabs often had tubing embedded into them so the hot water could heat the slab when there was insufficient stored heat from the sun. Effectively, they evolved into combination radiant floor heating systems and passive solar systems. Because this combined system was common during this era, the terms "thermal mass" and "radiant heat" are often synonymous.

However, the same thermal mass that is so essential to a passive solar home is actually the main cause of complaints against radiant heat – it's too slow. In any home, the heating requirements can change rapidly making it impossible for high mass systems to respond quickly.

It is common for owners of homes heated with high mass radiant to be too cold in the morning and too hot in the afternoon (overshoot or undershoot). Or, if they are returning to a home after an extended absence, they may have to wait a day or more for their home to reach a comfortable temperature.

While the history of passive solar with radiant heat is interesting, given a blank sheet of paper, no one would design a radiant system to be a heat storage device. The job of a radiant system to deliver heat, not to store it. Because the quantity of heat that must be supplied by a radiant panel is constantly changing, the ideal radiant system is able to adjust its heat output up or down, in real time, creating a constant and consistent temperature environment.

Paradoxically, the advantages of radiant often originate from with high-mass, slab systems. Yet the fact that this type of system does not vary much in output is precisely its Achilles heel. In high-mass systems, the conditioned space temperature is often misaligned to the needs of the occupant. The extremely slow response causes the system to overshoot, and undershoot, consistently, causing discomfort and wasted energy. Highly conductive, low mass, radiant floor systems provide greater comfort with a consistent temperatures.

Remember – conductivity, not mass, is king!