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**Health and Comfort Benefits from Radiant and Hydronic Systems**

**Improving health**

* Radiant systems improve air quality by not contributing to the amount of dust and other suspended particles in the air. In a forced-air system, air is blown throughout the building to achieve a desired temperature. Unfortunately, inhaling dust can cause allergic reactions. To complicate matters, when air is heated above 130 degrees Fahrenheit, the particles get more reactive and irritating from the higher temperatures that occur around the heating elements on conventional systems (dust singe). These heated particles become even more reactive and irritating to humans. Radiant systems not only prevent dust singe from occurring but also result in less dust and fewer other particles in the air.1
* Spreading dust and other particles impacts families and workers. In a field study in Finland, visible dust on floors was found to correlate to such neurotic complaints as headache, fatigue and concentrating problems. Radiant systems were found to contribute to less eye irritation and fewer throat disorders and other mucous diseases.[[1]](#footnote-1)
* Many studies show a positive effect from radiant floor heating on reduction of the mite population in dwellings. The lower relative humidity in the boundary layers above the floor (within the floor covering) is characteristic of radiant hydronic systems.1

**Improving Comfort**

* Radiant systems so effectively radiate heat that the thermostat can be lowered by 2 to 4 degrees Fahrenheit and still provide the warmth and comfort level of other systems. It is presumed that radiant heat transfer (e.g., relatively cool air and warm surrounding surfaces) better satisfies the comfort needs of human beings because it is more “natural” (like solar radiation on the skin).1
* The room feels more comfortable and the air seems better with radiant systems. Several studies show a better performance for stuffiness and perceived air quality at lower air temperatures. Mucous irritation complaints increase significantly at air temperatures over 72-75 degrees Fahrenheit. The annoyance of unhealthful emissions is correlated to the air temperature, and further correlation has been found with Sick Building Syndrome and the air temperature.1
* Temperatures are more consistent from the floor to the ceiling with radiant and hydronic systems. Commonly with a forced-air system, your head will be warm while your feet are cold. In computer simulations, laboratory experiments and field studies, a clear difference is found in vertical temperature gradients between radiant and other heating systems. With radiant heating, practically no temperature differences are found between the floor and ceiling. That is not the case with forced-air systems, where temperatures normally differ from 3 to 5 degrees Fahrenheit F between floor and ceiling, while poorly designed systems show gradients up to 13 degrees Fahrenheit. In particular, the difference in temperature between ankle and head levels influences the perceived thermal comfort.1

1. IEA Energy Conservation in Buildings and Community Systems, Technical Presentations, Zurich July 12, 2000. *Annex 37: Low Exergy Systems for Heating and Cooling of Buildings*. Page 6-7. Leskinen, M.; Simonson, C. and Virtanen, M. [↑](#footnote-ref-1)