How Hot Does A Data Furnace Heating System Need To Be?

Abstract

When designing a data furnace based heating system for domestic hot water and space heating, how hot does the output of the heating system need to be to satisfy the needs of the home and its users?

Hot Water

A standard domestic hot water tank needs to produce water for users at 49ºC / 120ºF. If the temperature is cooler there is the risk of pathogens, particularly Legionella which causes Legionnaires' disease. If the temperature is hotter there is the risk of scalding skin.

To provide this output temperature from a hot water tank and to allow stratification to occur within it (layering of hot and cold water), its heating coil needs to be fed with water heated to around 56ºC / 133ºF or more. This temperature is readily available from water cooled computer processors so heating of hot water tanks is well suited to a data furnace based system.

Space Heating Using Under Floor Heating

Solid floor under-heating systems typically require feeding with water heated to 40–45ºC / 104-113ºF. A temperature limit of 55˚C / 131ºF is imposed by the European Standard for UFH (underfloor heating) to protect against damage being caused to screeded floors.

Suspended, batten or floating floors (non-screed systems) typically require water heated to 55–60ºC / 131-140ºF. The Domestic Building Services Compliance Guide 2010 recommends that for any floor type, whether screeded, joisted, or other, the underfloor heating (UFH) system should limited to a maximum temperature of 60˚C / 140ºF.

These temperatures are readily available from water cooled computer processors so under floor space heating is well suited to a data furnace based system.

Space Heating Using Radiators

Traditionally boilers heat radiator water up to around 80°C / 176ºF. This high temperature is not a requirement however, and significantly lower water temperatures can be used when combined with the use of modern insulation materials in a building or simply larger sizes of standard wall radiators. This has been proven with the use of other new technology heat sources, such as heat pumps and solar storage systems, where panel radiators used with water at 40-50°C / 104-122ºF will still quickly achieve a room temperature of 20°C.

Radiators for lower temperature systems are physically and technically the same as traditional panel radiators. The only key factor which changes is sizing, as the same size of radiator will not produce the same heat output with a lower temperature system as it will with a high temperature system. Using a radiator with a larger surface area solves this difference and achieves the same heat output.

Whilst 80°C / 176ºF is not as easily available with a green processing system, lower temperatures of 50-60°C / 122-140ºF are readily available from water cooled computer processors, so radiator based space heating is well suited to a data furnace based system.

Author: Adam Pulley

Date: 28th January 2015

Green Processing Ltd
http://greenprocessing.tech