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Annual European part load profile of heating pumps in non residential buildings

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Summary

Within the realms of HVAC (Heating, Ventilation and Air Conditioning) implementation design heating pumps are laid out according to the maximum heat load, the difference between supply and return temperature of the heating water and the pressure differential that has to be surmounted for this specific mass flow.

During the yearly heating period the design conditions are changing significantly, so the pumps can be operated at the original layout point for only a short period of time. In a research project [1] it was shown that a specific part load profile is universally valid throughout Europe for residential buildings. Based on this annual European part load profile for HVAC circulation pumps a measuring system for test benches was developed that serves as a means of classification for an Energy-Efficiency-Index (EEI) in comparison with the default values. It constitutes a label for product related energetic characteristics [2].

In non residential buildings - especially in modern office buildings - the internal loads are much higher and the area of the windows is much bigger than in residential buildings, so that the heat gains will reduce the variable load dramatically if compared with the design load. In a new research project the influence of these heat gains are analyzed in different emission and control systems.

As a result of this research project the annual part load profile of circulation pumps in non residential buildings the lower part load is more frequent, resulting in a higher demand for controlled operation. This way the results of the former research project for residential buildings are confirmed. Since the operation of circulation pumps in non residential buildings in some applications are under load independent conditions, it is reasonable not to change the energy efficiency labelling procedure at this time.