Technical Paper

Building applications; Innovative solution

Session 15-3

Decentral pumps in heating systems – a new hydraulic approach

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Summary

The standard (state of the art) heating systems in most European countries the field of emission and control comprises radiators and thermostatic valves. The distribution system with a circulation pump at the center delivers heating water, mostly with outdoor controlled supply temperature, to the emission system. Calculation methods to design the whole system and to determine the energy performance are available.

Decentral pumps installed locally at the emission system - respectively in the single heating circuit of the emission system - are a brand new approach in the design of heating systems.

The fundamental differences of the new approach compared to standard systems and their influences are disclosed. According to existing calculation methods rough calculations are made to estimate the possible energy savings.

The effect shows that the potential of energy to be saved in heating systems with decentral pumps compared to a standard distribution systems can be expected as follows:

Electrical energy demand:

- 31,1 % in one-family houses (if an additional central pump is necessary)
- 61,1 % in one-family houses (with well designed distribution to the distributor part)
- 23,1 % in non residential buildings (with an additional central pump).

Thermal energy demand:

- 18 % in general compared to emission systems with proportional controller

A lot of research remains to be done in order to tap these new resources and to develop design and calculation guidelines for heating systems with decentral pumps.