Name: HeatPumpFloorHeating_VDI6020

Identifier: 2.2

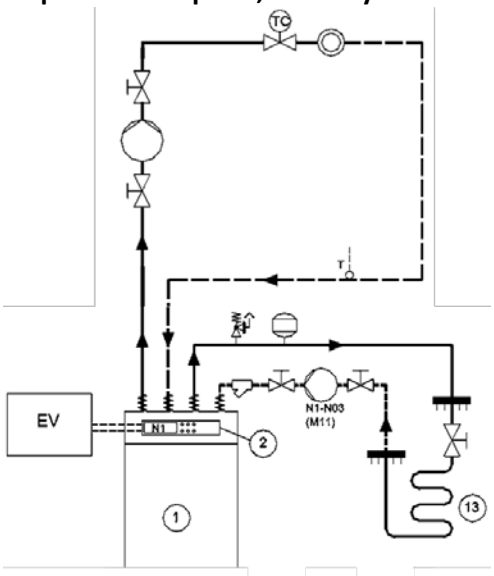
Short identification:
Single thermal zone, one room according to the German guideline VDI 6020.
The HVAC-system consists of a water/water heat pump for generation, pipes for distribution, and floor heating for emission. Furthermore the system contains an expansion vessel and a PID controlled valve.

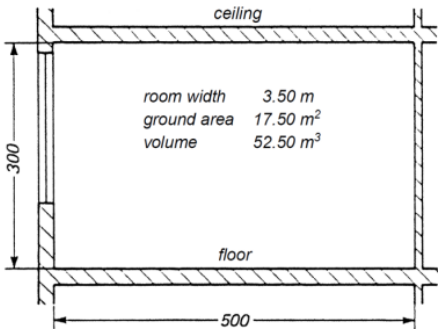
Objective:
This use case focuses on the HVAC system rather than the envelope, since this generic use case is used to investigate the needed data structure of a Modelica model compared to an ifc-file. Based in these models we establish the requirements for the dataflow from BIM to Modelica (depending on the information needed for the components of the specific library). Hence we highlight the difference between the different models and the gap of information that is needed to simulate.

Technical description thermal zone, according to the VDI 6020:
- One room with a window, on the second floor of a three storey-building:
  - Window area: 10,5 m²
  - Room type: S "difficult"
- Adiabatic (no heat transfer through) internal walls and slabs. Heat transfer only through the outer wall and the window (directed to the south)
- Inner Loads: Occupancy, Plug loads, Lighting
- Weather-data: TRY_dataset for Germany, zone 5 (Aachen)

Technical description HVAC-system:
- Heating loss: 1300 W (Θ_i= 21°C, Θ_e= -12°C)
- A water/water heat pump for heat-generation with energy supply
- Pump with night on off signal
- Variable pump for water flow, with a maximum head of 5m
- Floor Heating for heat transfer into the zone
- A PID controlled valve, coupled with the room air temperature and the set temperature (Θ_i= 21°C)

Graphical description, HVAC-system and thermal zone:





HVAC components needed in the specific BIM/Modelica library to build this use case:

- Water/ Water heat pump
  - The delta T for the source should not be too big, so that the COP works in a practical area
  - Possible sources:
    - Ground
    - Ground water
- Expansion Vessel
- Variable Pumps
- Valves
- Floor heating system
- Pipes for supply and return

Some components listed above are not necessary to run a simulation, but are needed to represent a realistic use case.