

Heating systems

Didactic Material

Contact

VIPSKILLS Project Coordinator:

[vipskills\[at\]pb.edu.pl](mailto:vipskills[at]pb.edu.pl)

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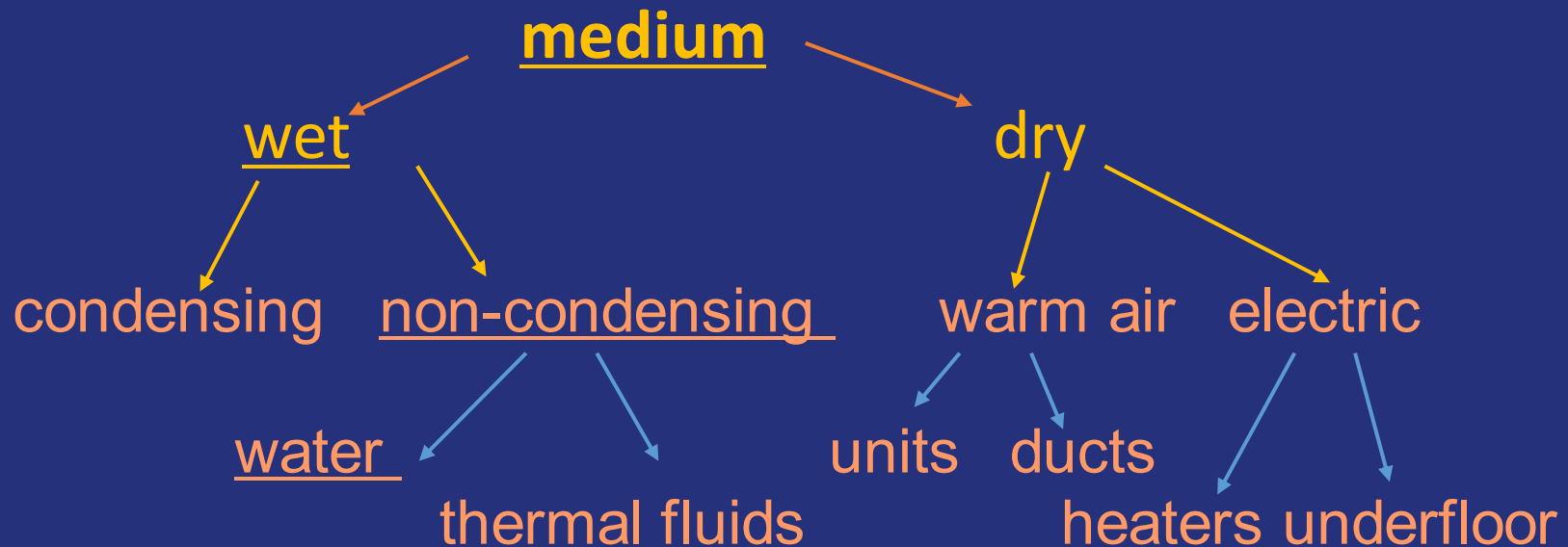
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Selection of a heating system:

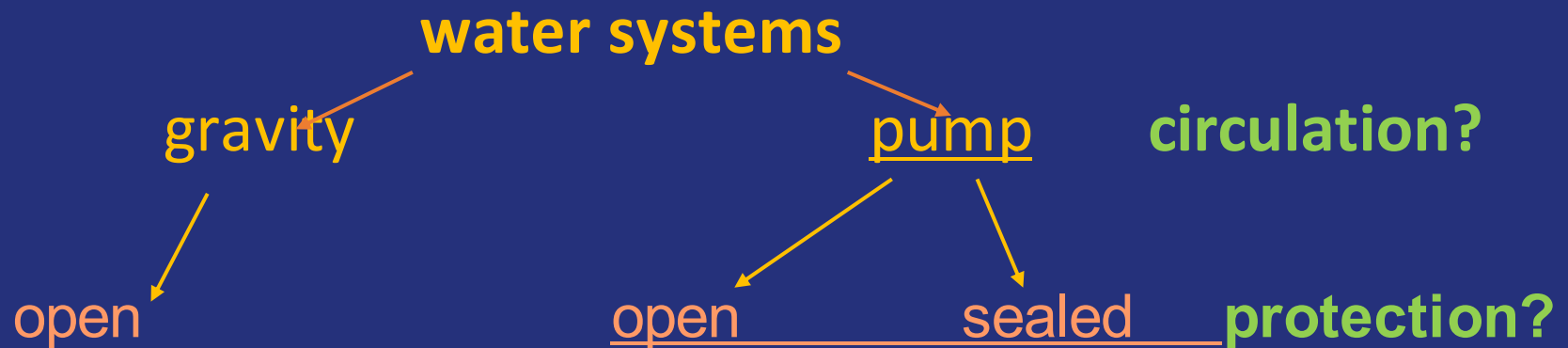
- wet or dry ?
- one or two pipes ?
- open or closed ?
- with upper or lower division of water ?
- horizontal or vertical ?



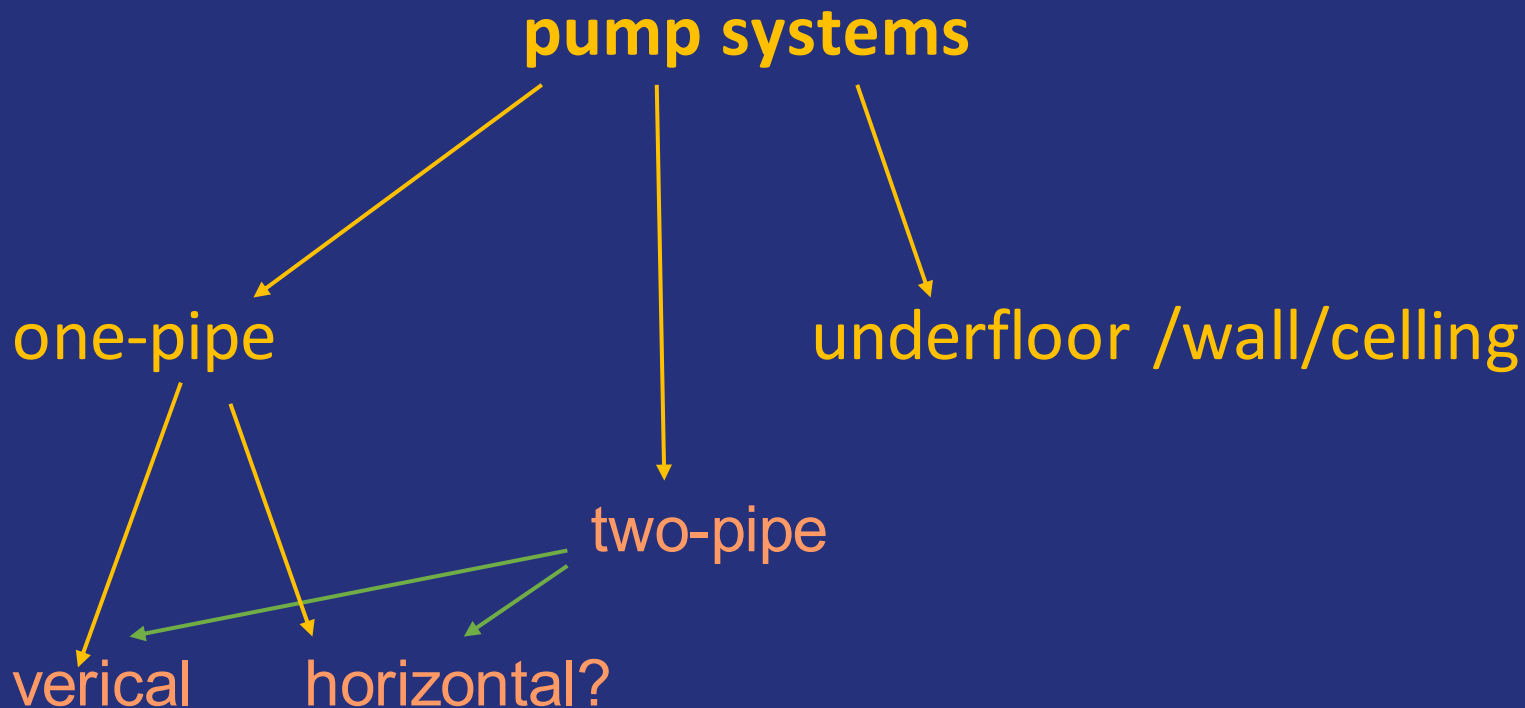
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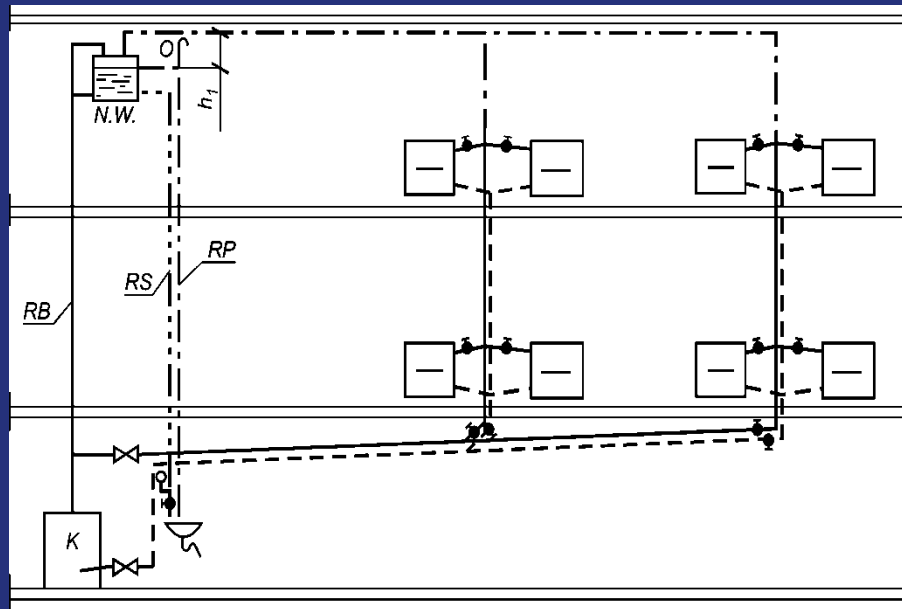
Selection of a heating system:



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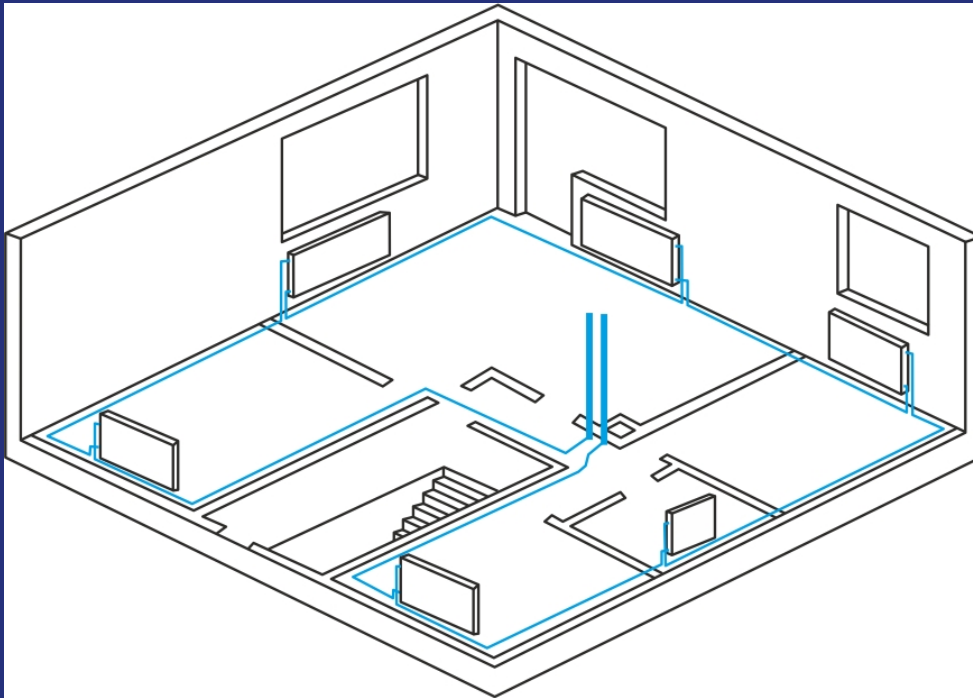
Vertical system



Source: D.Krawczyk 2011

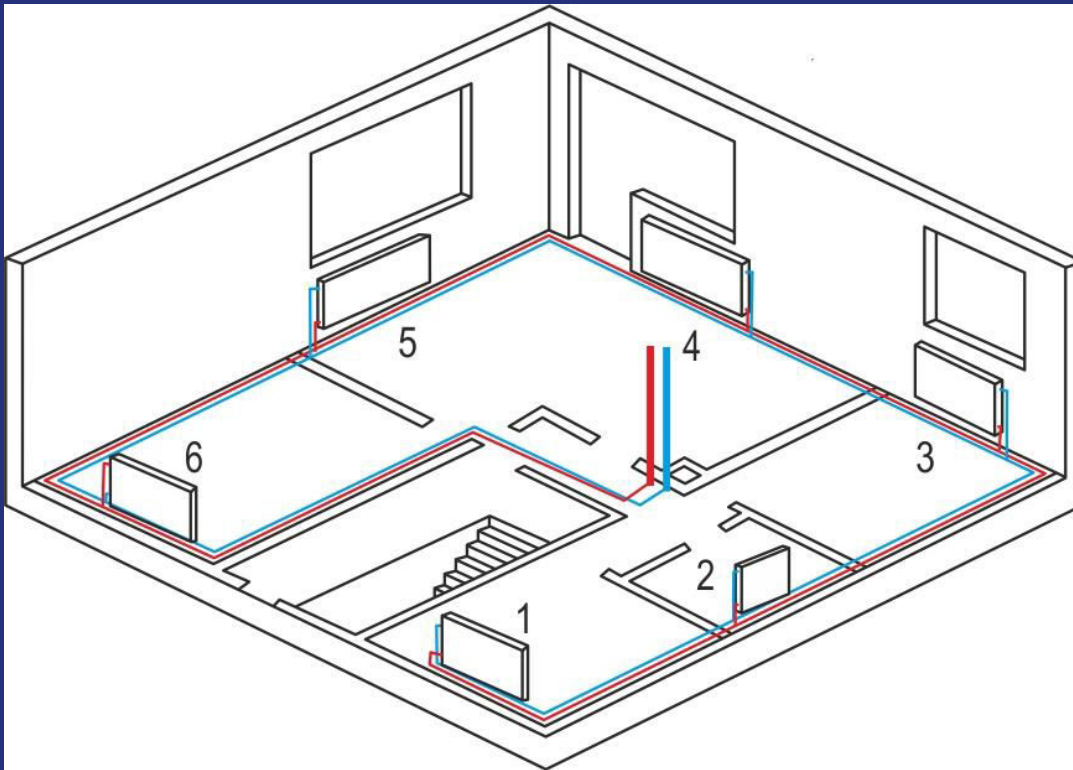
One-pipe system

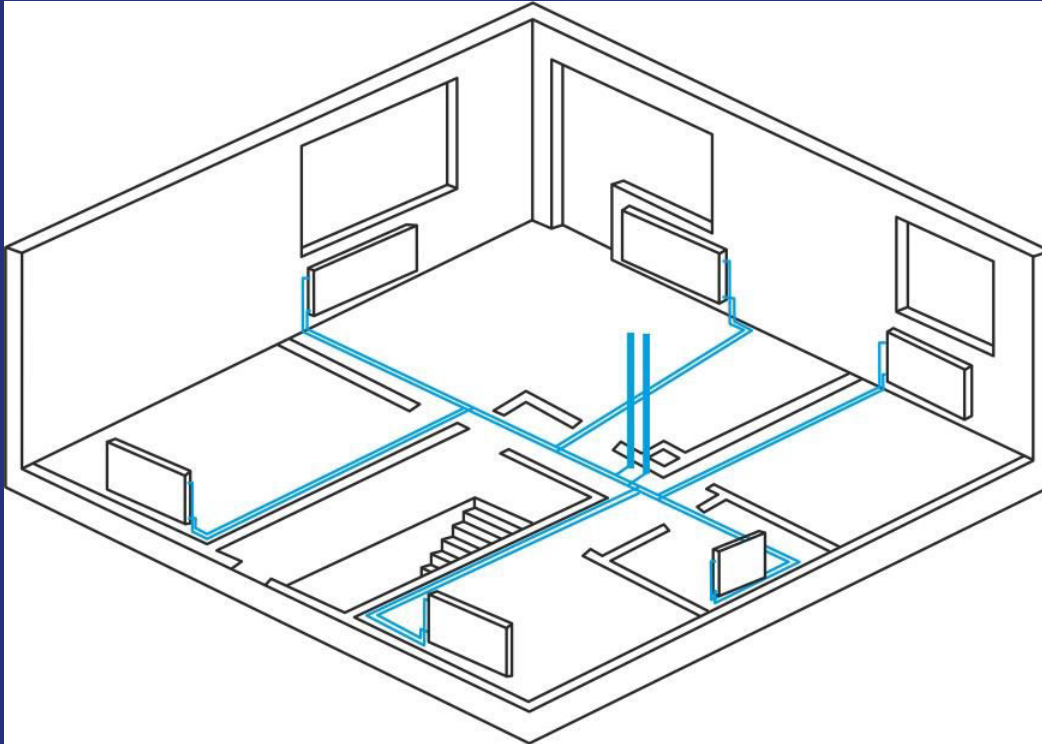
What is the temperature of the medium that supplies „n” radiator?



Two-pipe loop system

How to rebalance pressure for small radiators located at the beginning of the system?

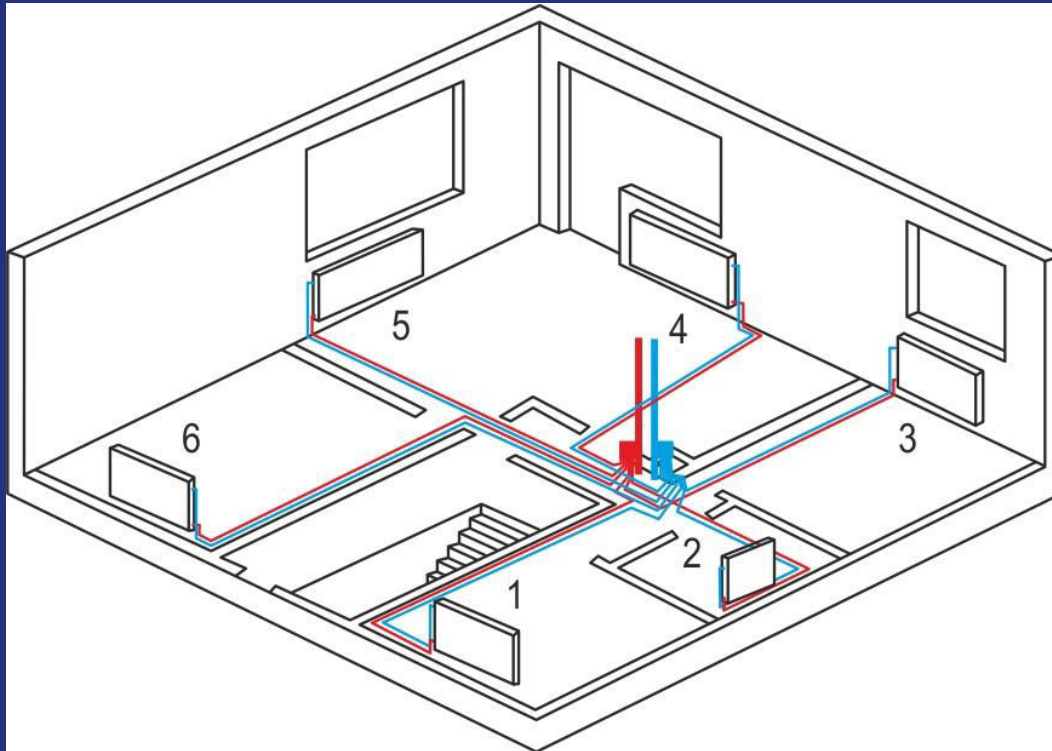




Two-pipe tee-system

Where are tees
located?





Two-pipe radical system with manifolds

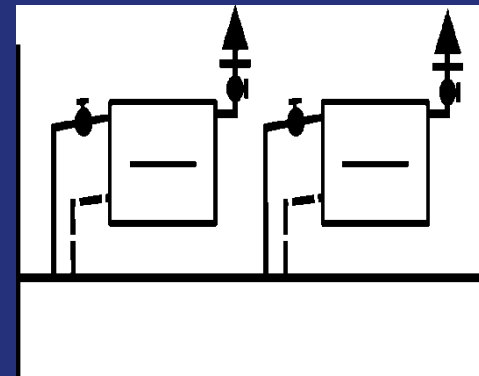
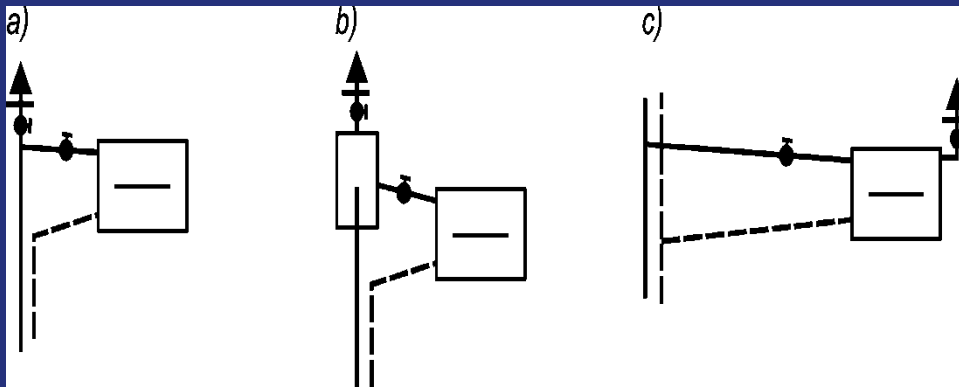
Where to locate the manifold?



Source: KAN materials

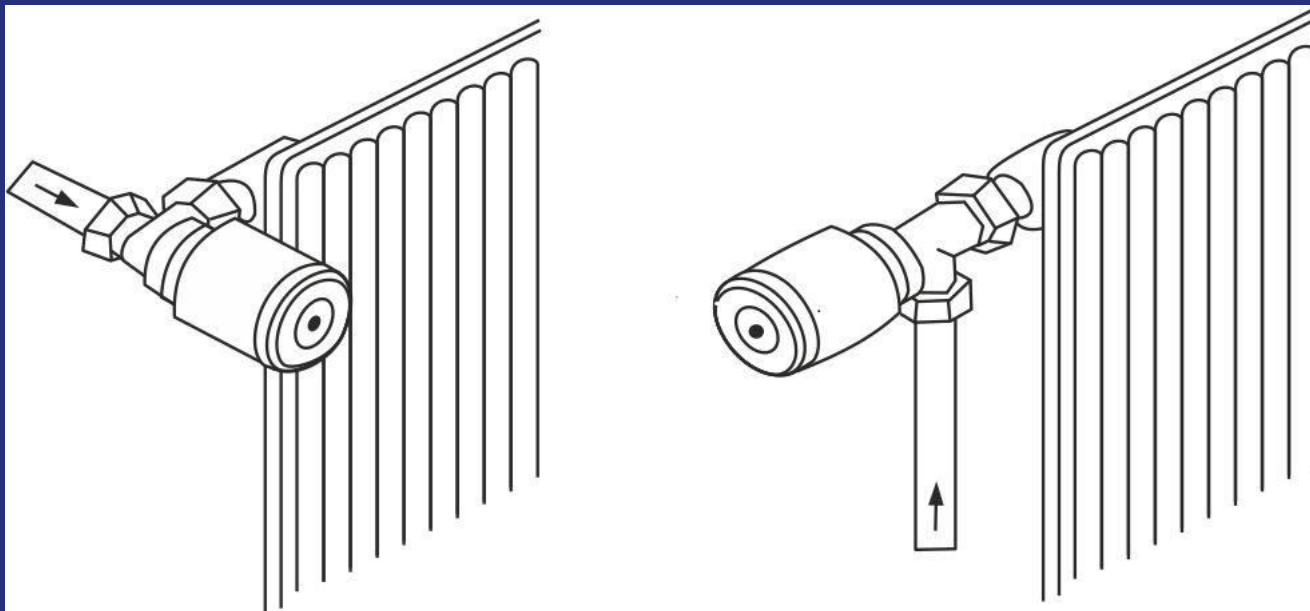


Venting



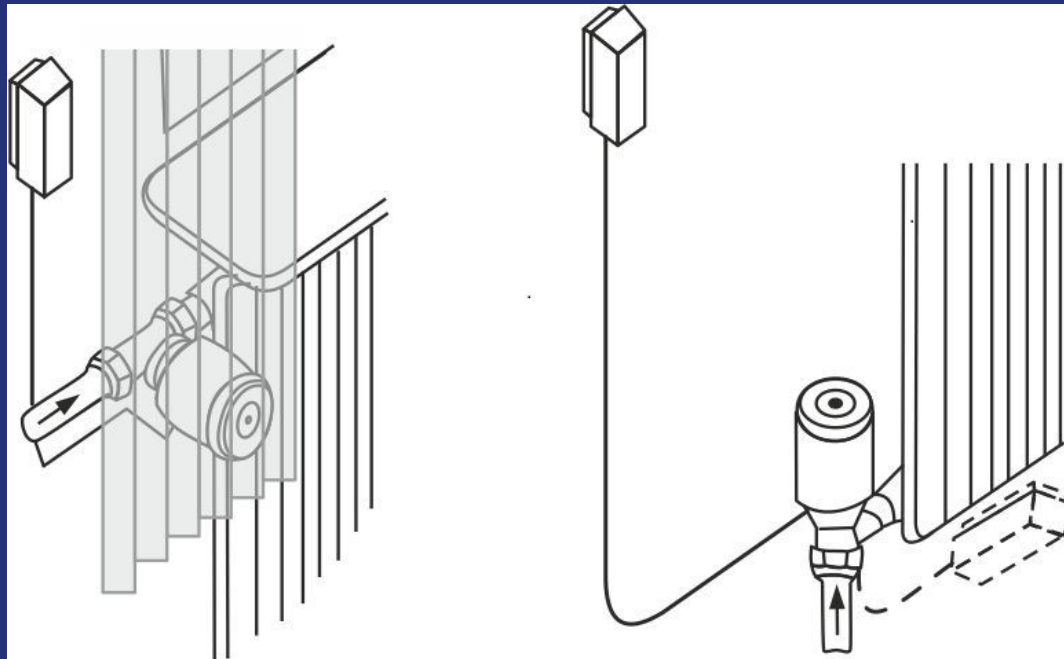
Source: K.Pieńkowski, D.Krawczyk, W.Tumel Ogrzewnictwo 1999

Regulation



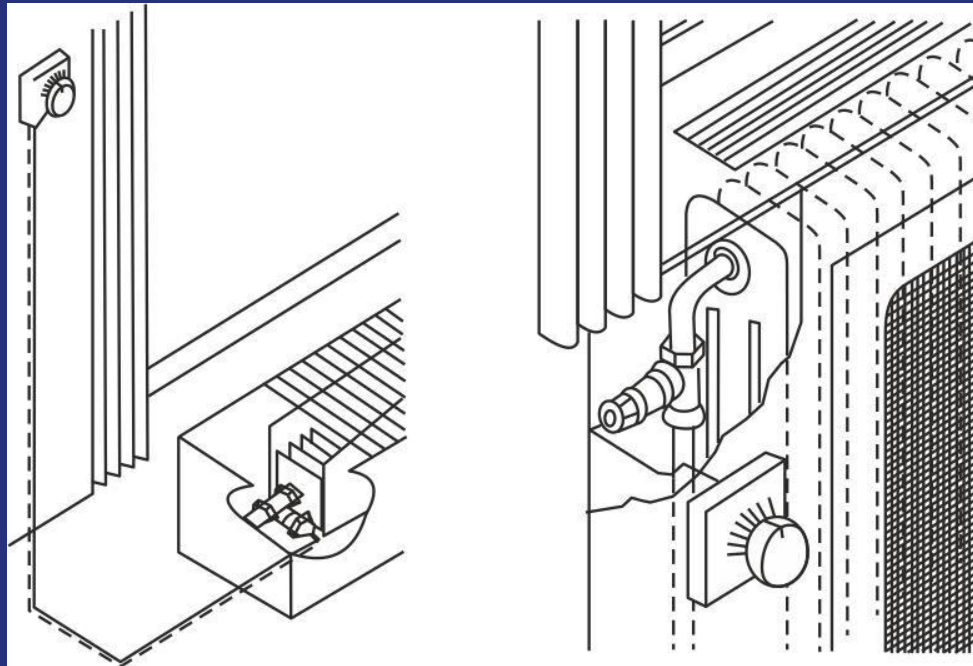
Thermostat with a built-in sensor

Regulation



Thermostat head with a remote temperature sensor

Regulation



Thermostat head with a remote temperature control

Radiators

Column



Panel



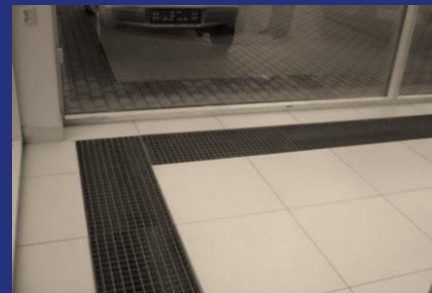
Tube



Natural Convectors



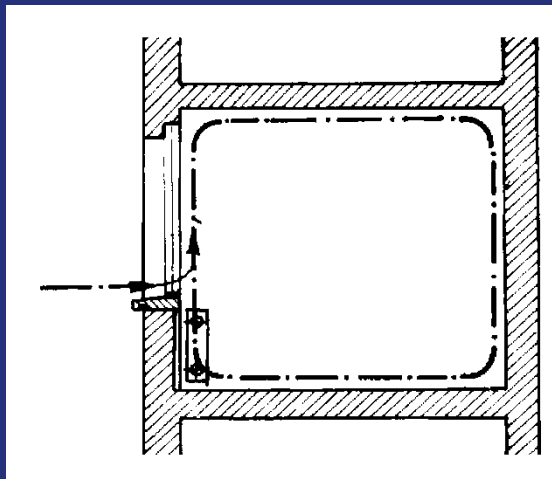
Floor trench convectors



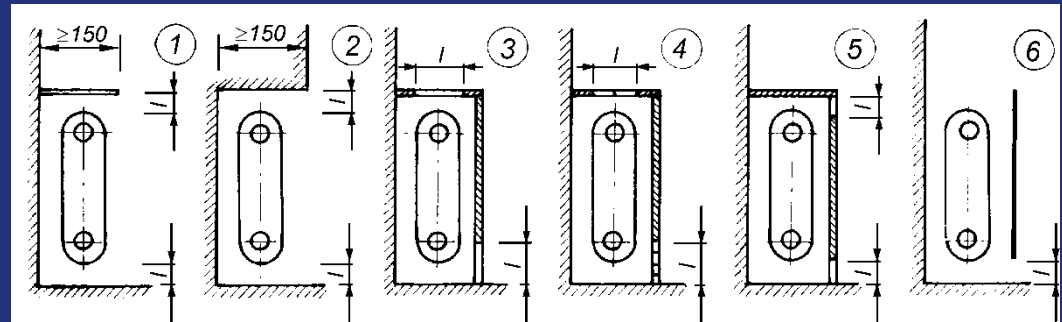
Source: D.Krawczyk 2011, M.Andruszkiewicz, D.Krawczyk 2015

Parameters that reduce radiators' power

Location 0-20%

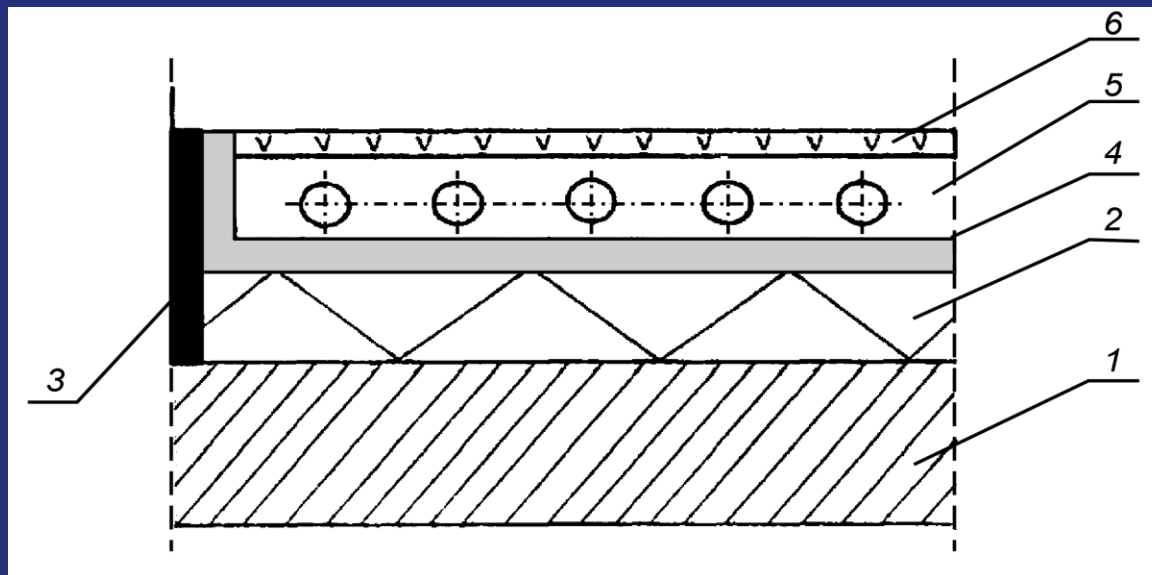


Cover 0-40%



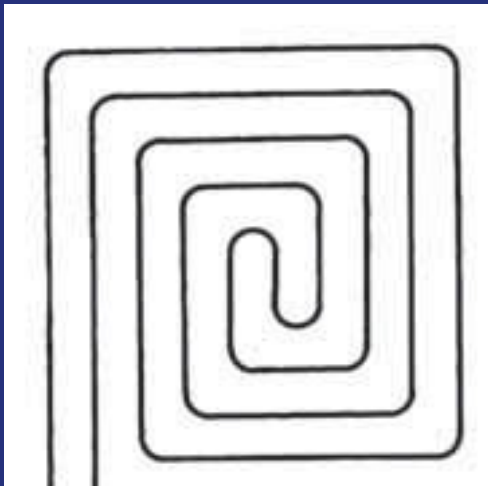
Source: Directives COBRTI Instal 1995

Underfloor heating

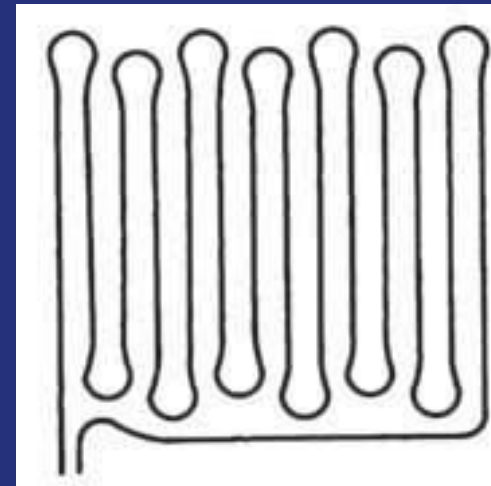


- 6 - floor coverings
- 5- cement screed
- 4- foil
- 3 –edge isolation
- 2- rigid isolation
- 1- floor construction

Types of a piping loop arrangement



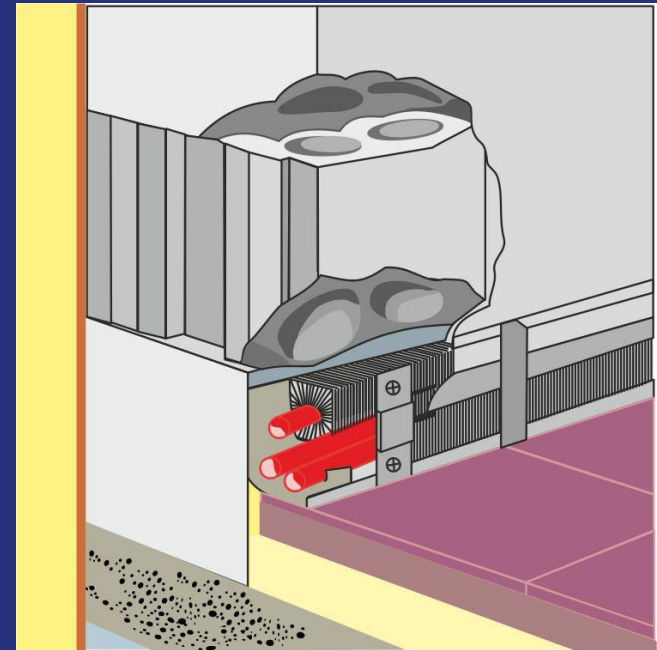
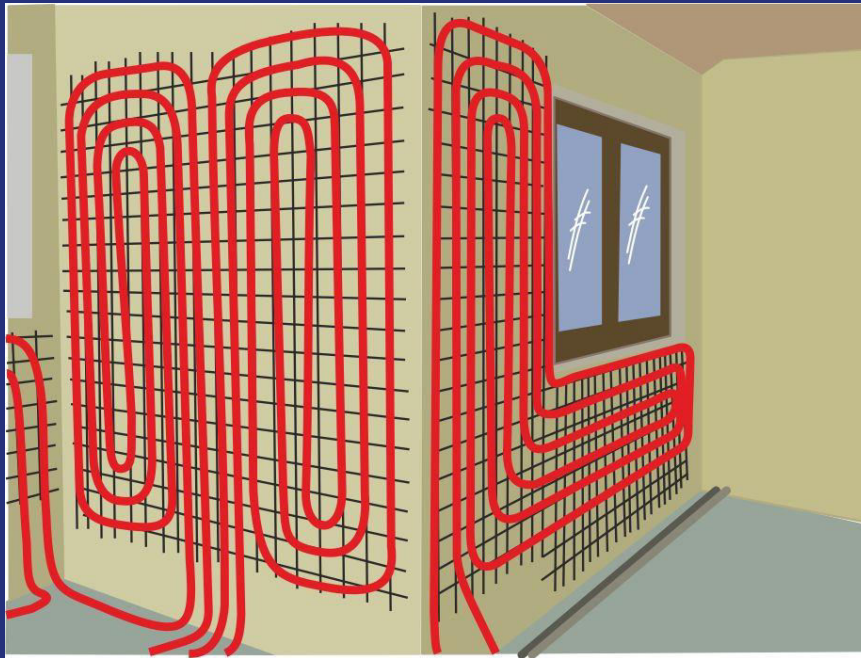
Spiral pattern



Series pattern

Where can be obtained more regular temperature profile?

Wall heating



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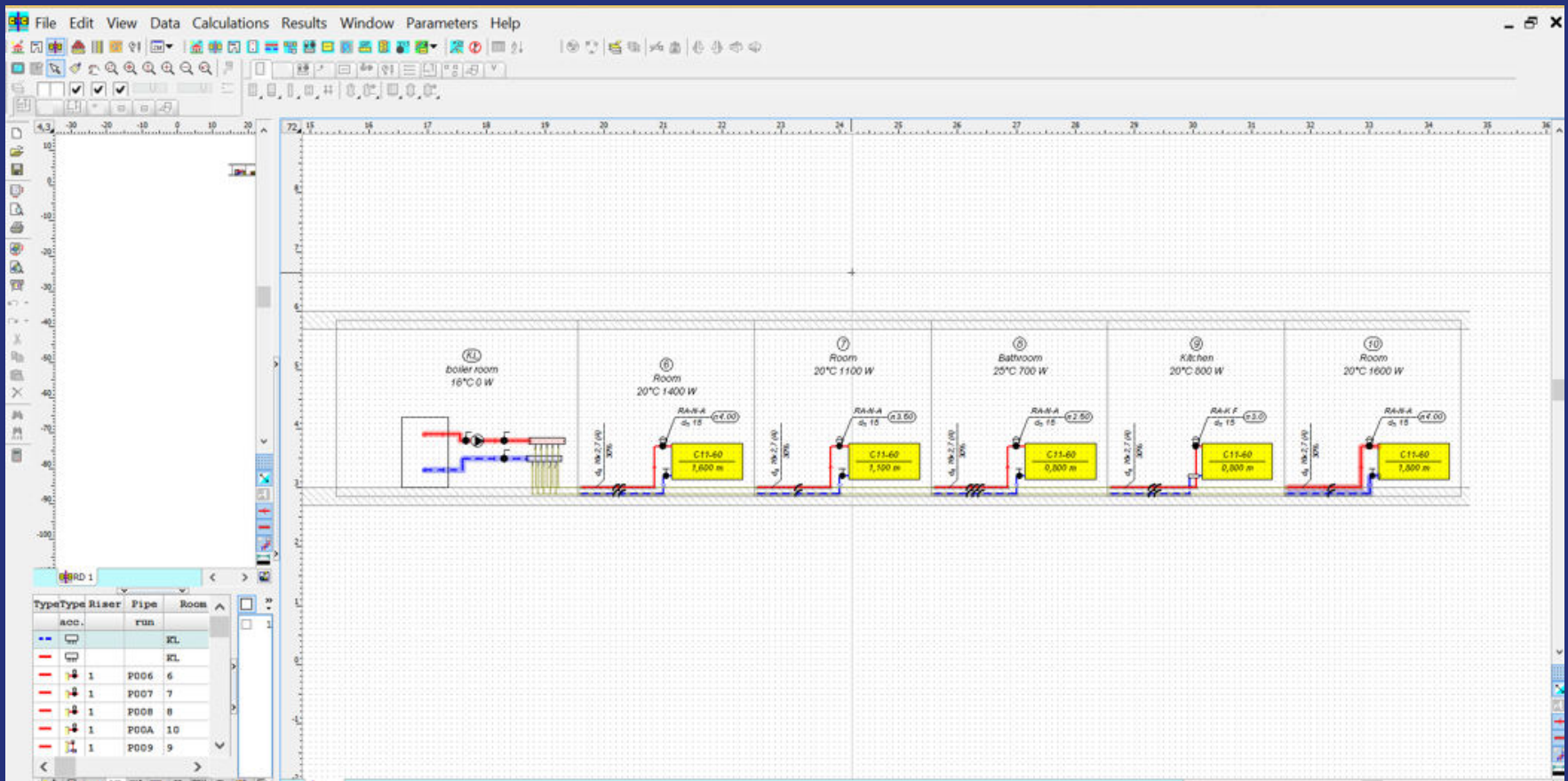


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Schemas of system prepared in Audytor CO Pro Software



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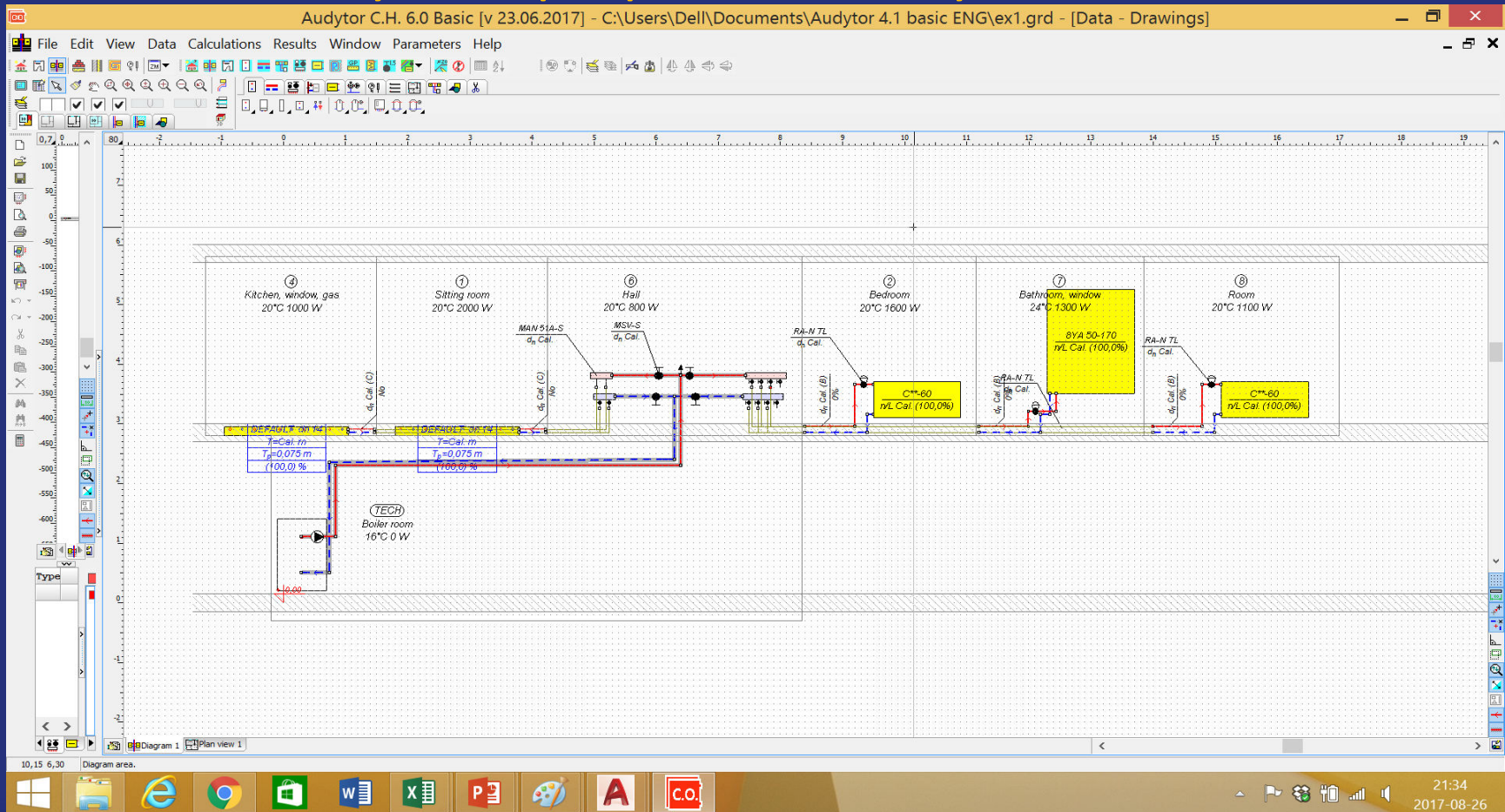
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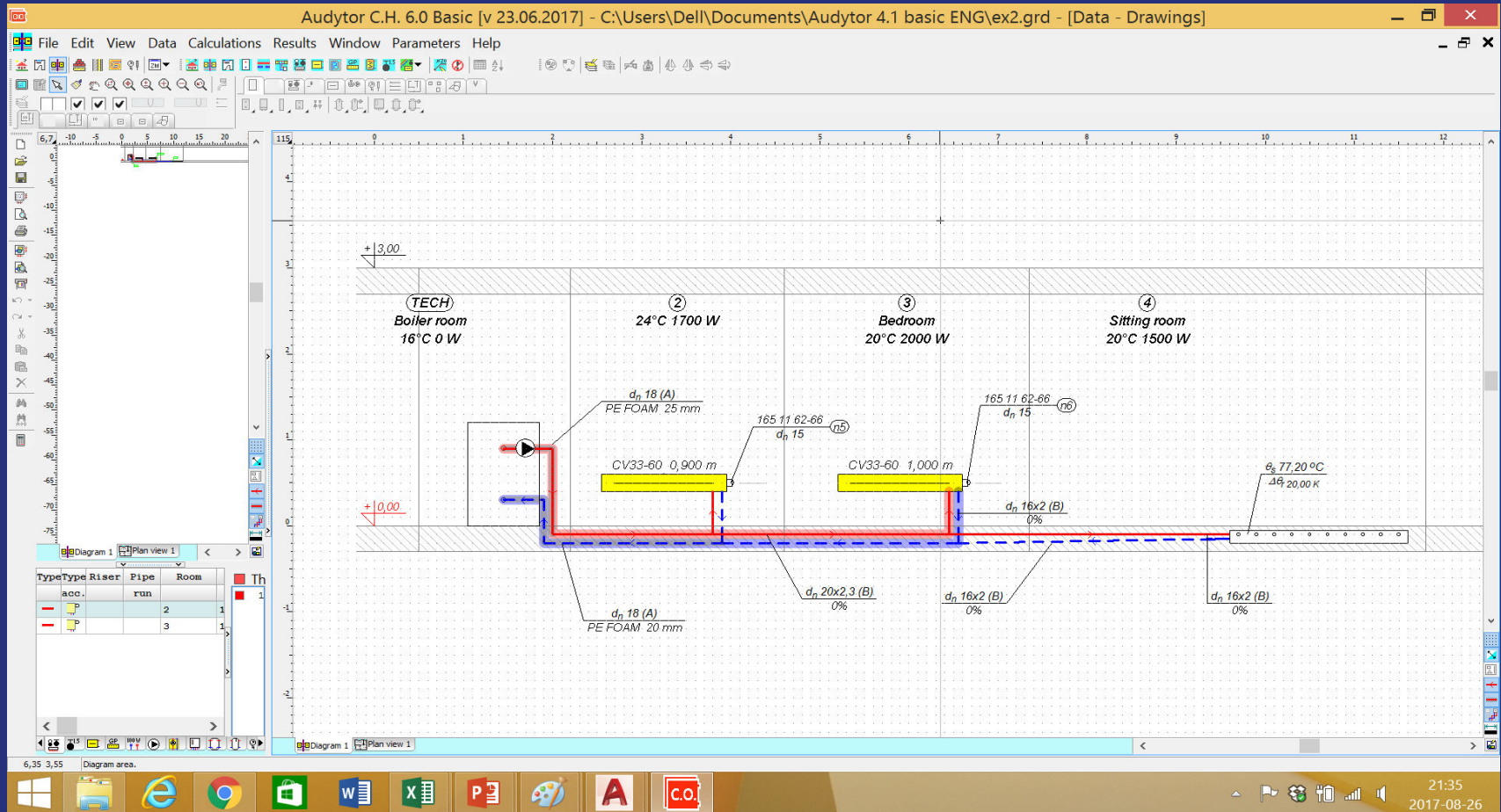
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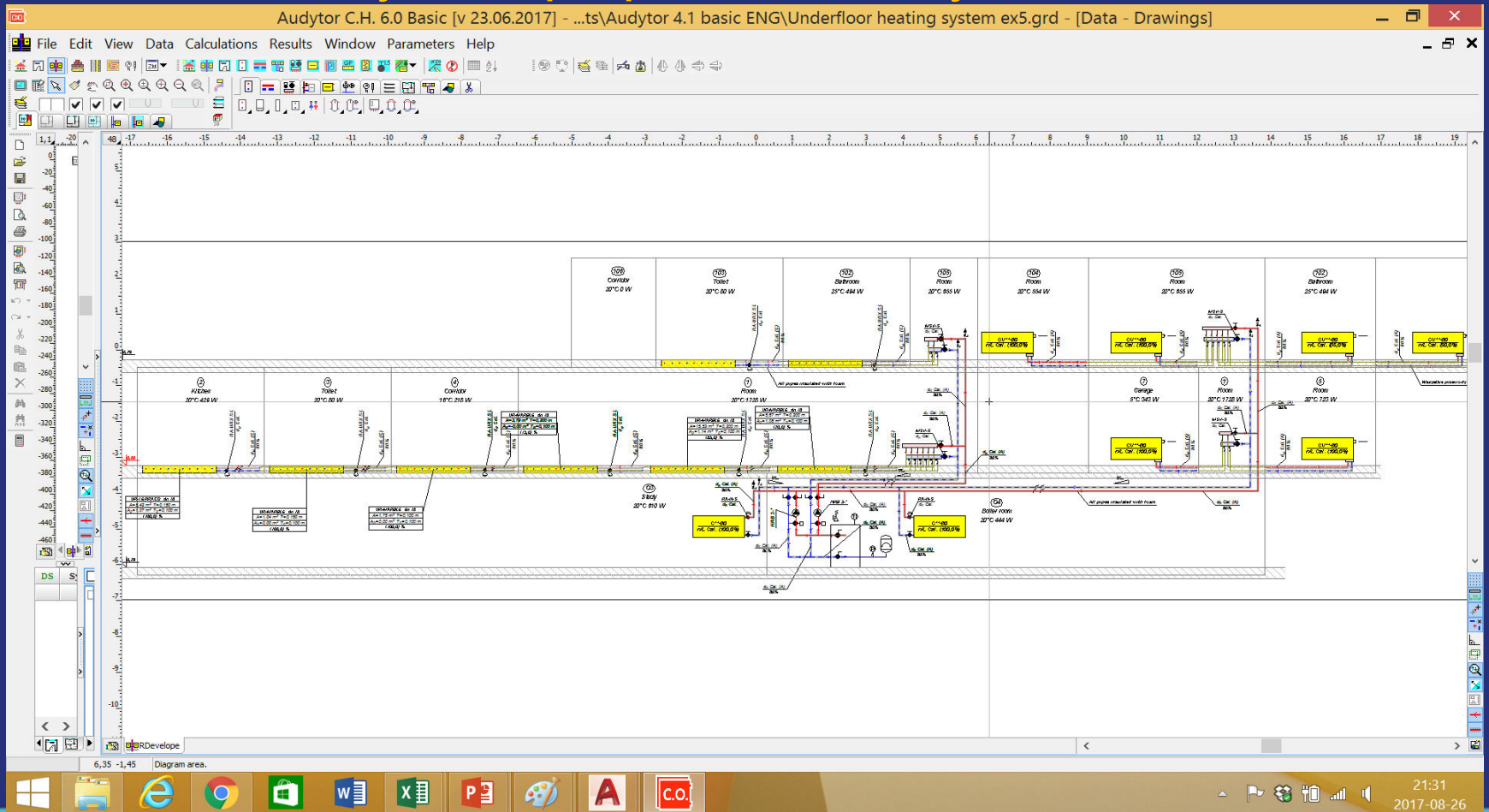
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2017-08-26

References

1. **D.Krawczyk Certyfikacja energetyczna budynków 2011**
2. **M.Andruszkiewicz, D.Krawczyk The analysis of factors influencing the choice of radiators 2015**
3. **K.Pieńkowski, D.Krawczyk, W.Tumel. Ogrzewnictwo 1999**
4. **D.E.Watkins Heating Services in Buildings 2011**
5. **Materials delivered by KAN and PURMO companies**

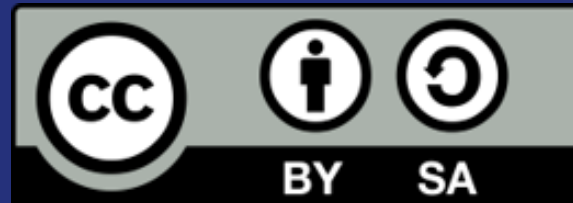
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Presentation prepared by
Dorota Anna Krawczyk, Bialystok University of Technology
Antonio Roderro Serrano, University of Cordoba



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