Pipe Systems

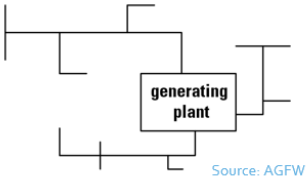
Installation methods & pipe varieties in District Heating

1 Basic facts about DH pipe systems

- **Water temperatures of DH-systems** range usually from 80°C to 120 °C of supply and 30 to 70 °C of return water (temperature levels depend on the used system and other conditions like outside temp., etc.)
- **LowTEMP-network** temperature levels range up to 80 °C supply temperature
- **Heat losses** of pipe systems range from approx. 5 to 10 % in proportion to the produced heat
- **Type of pipes** that are mostly used in DH- networks: plastic jacket pipes (PJP); Steel jacket pipes (SJP); FLEX-pipes

2 DH-network structure/design:

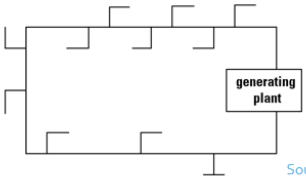
Radial network



Source: AGFW

- Flow and return line are dimensioned symmetrically
- shortest length in comparison to other network designs
- usually used in small heat networks with one central heat source

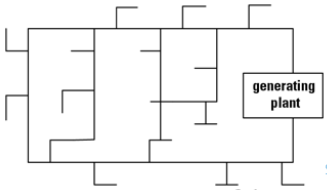
Ring network



Source: AGFW

- circular connected main distribution pipes
- facilitates the integration of other heat sources
- During maintenance, it is possible to ensure partial supply
- Combinations of radial and ring networks are possible

Mesh network



Source: AGFW

- Common version of the ring network
- distribution pipes and heating units are linked together in operation
- Ring with cross connections

3 Installation methods & pipe designs

- biggest part of DH-piping systems is usually **installed underground**
- sometimes huge **aboveground transport lines** can be found next to train tracks, bridges and very seldom also overland
- For underground lines two main installation methods are used:
    - Channel or in-duct laying methods
    - Trench laying methods

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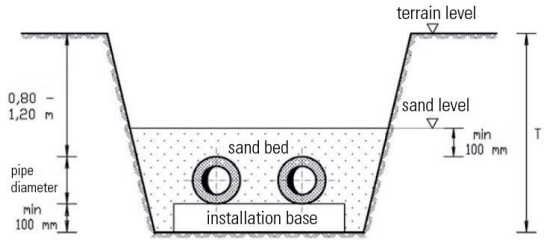
3.1 Channel or in-duct laying methods

- reliable protection against mechanical damages
- support against unwanted moisture
- but very cost intensive
- method is only being applied in very special cases nowadays
- shape of the channel can vary

Source: AGFW

3.2 The trench laying method

- trench laying methods are much more common than the construction of hooded-systems
- important that the pipes are implemented in **frost-free depths**
- risk of frost damaging the pipes is normally very low due to heat losses
- **installation base or bedding layers** are necessary to avoid pipe damages
- **drainage** of the trench must be ensured
- top laying sand bed is also called the **friction laye**r that must provide sufficient and stable resistance to axial pipe movement (implementation of adhesion zones necessary)



Cross-section through a DH-trench laying system (Source: AGFW)

3.3 Pipe designs

- **Steel jacket pipes-systems**
  - Reliable protection against external stresses – versatile applications
  - Thermal insulation per fiber insulation material and/or vacuum
  - Medium temperatures up to 400°C
- **Plastic jacket pipe-systems**
  - Minimum lifetime > 30 years
  - Water- and damage-proof against external stresses
  - Good thermal insulation
  - Constant operation temp. ≤ 120°C
- **Both operate with steel and plastic medium pipes**

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