Brine and pipes
including relevand QC-activities during installation

Morten Kjærgaard

GEO – Danish Geotechnical Institute

EKSPERTER I JORD OG VAND

Brine and pipes

- What pipe materials can be used and what are their thermal properties end lifetimes?
- What are the advantages and disadvantages of different types of U-pipes?
- What are the advantages and disadvantages of different type of brines – toxicity?
- What QC-procedures are relevant at installation?

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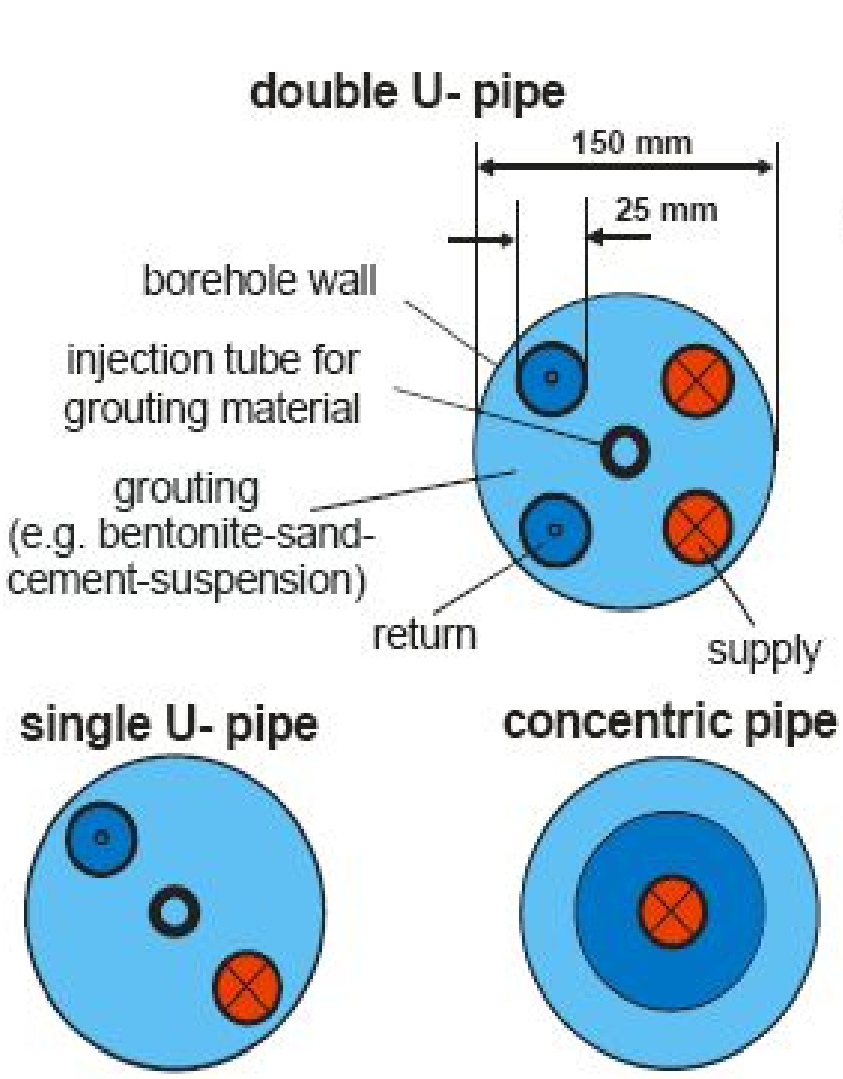
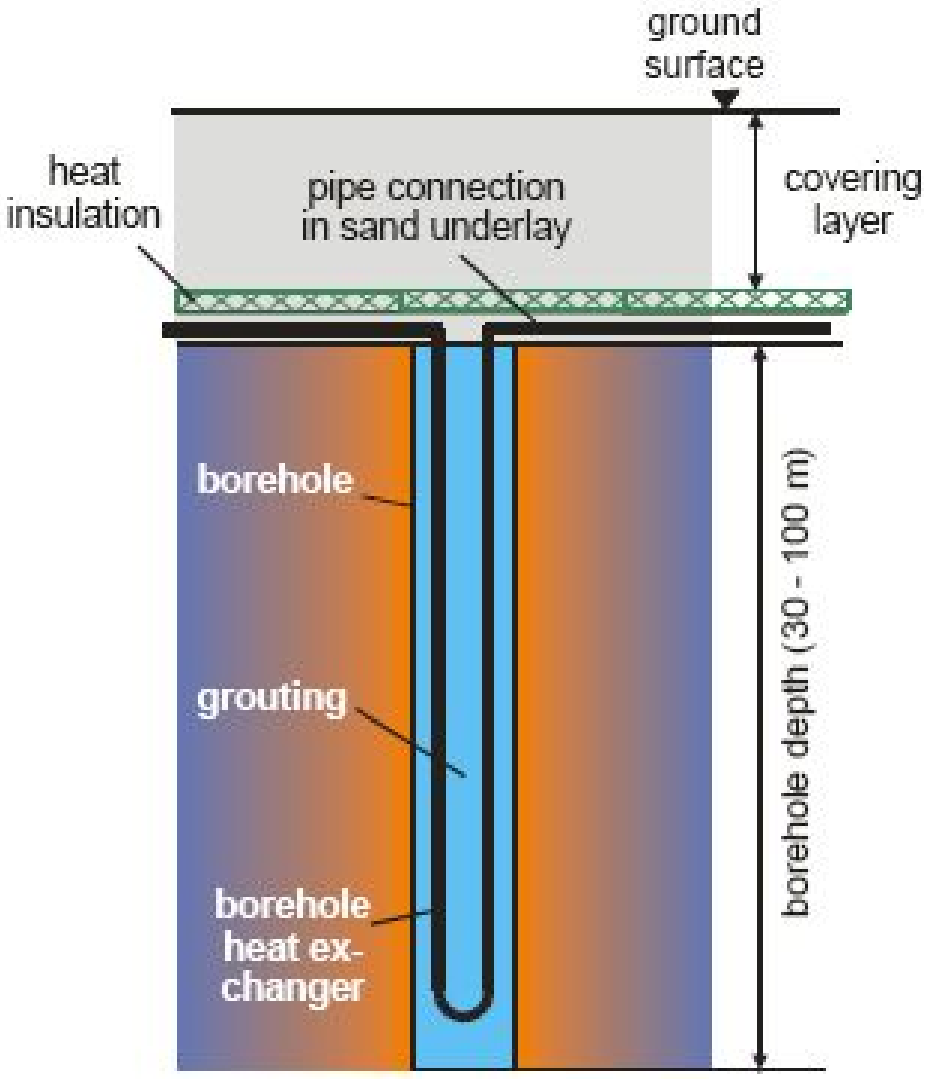
Different kind of pipes





Thomas Schmidt, Solites, Stuttgart

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Accepted pipes (Regulations)

Horisontal systems with brine:

- PE40, SDR11
- PE80, SDR17

DS-approved, ”SBC”-approved and marked”EN13244”

Vertical systems:

- PE100RC, SDR11 and EN12344 approved

…..or better. PEX is used.

The head og the loop

Fra Rehau's priskatalog

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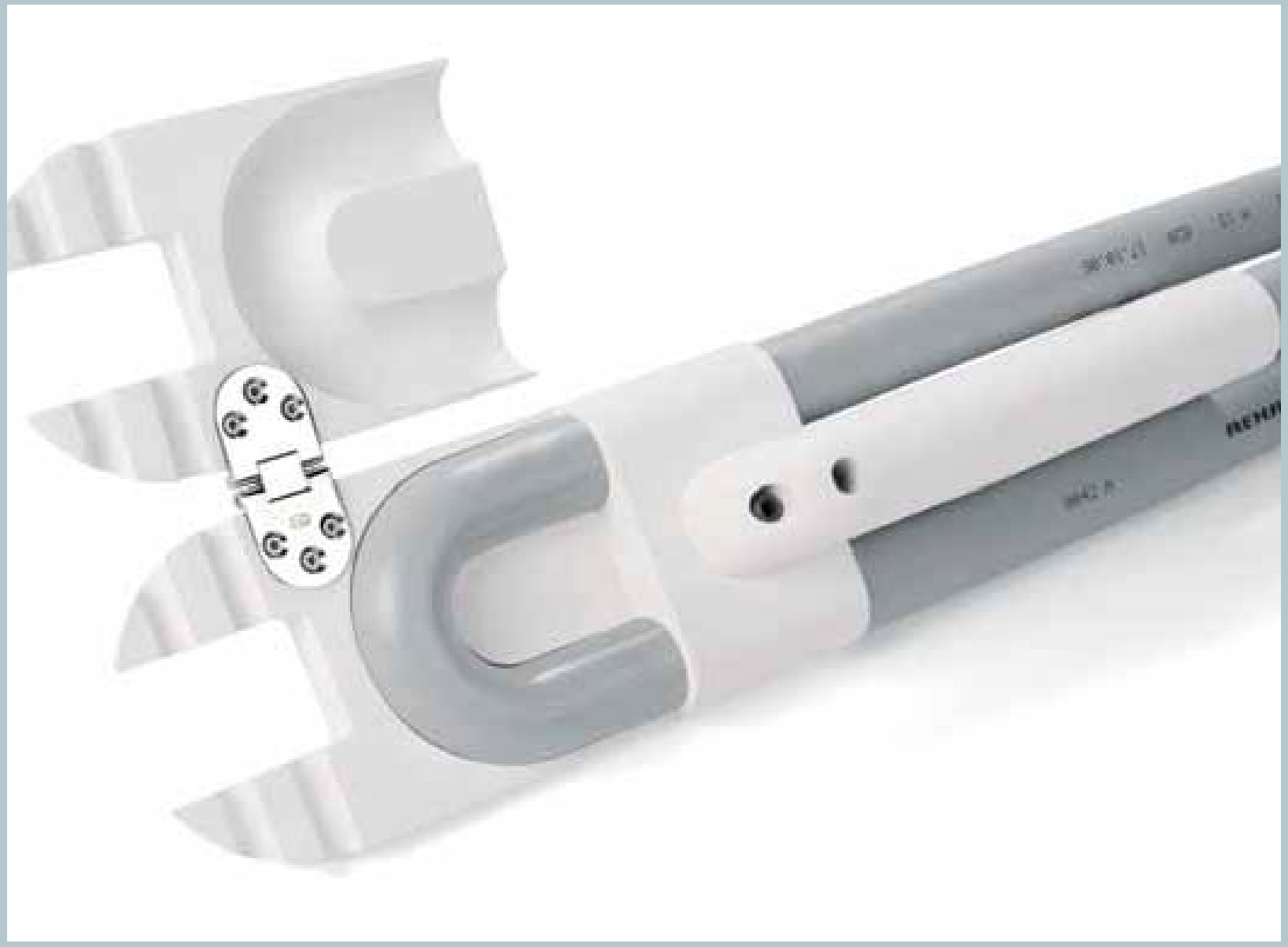

Raugeo - probe

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Accept-distances (from regulations)

Horisontal systems (with brine):

- 50 m to wells for drinkingwater
- 5 m to other waterproducing wells
- 0,6 m from

Vertical systems:

- 300 m to drinkingwater wells
- 50 m to other wells

Pipes situated less than 1,5 m from buildings and less than 1 m from water or wastewater pipes must be insulated.
Pipes must be covered by at least 0,6 m soil.

The distance between vertical pipes must be at least 20 m.

Comparison of oil tanks and heatpipes in soil

Parameter		Oiltanks	Heatpipes in soil
Content	Volume	Up to 100.000 l	60-30 l (up to 1000 l)
	Compounds	Dieseloil, gasoline etc.	25-30% glycoles/alkoholes
	Solubility	Small	Water miscibily
	Mobility	Some sorption	No sorption
	Degradation	Degradable	Easy degradable
	Toxicity	Can give cancer	Environmentally compatible
Oiltanks/ heatprobes	Permission demanded	No	Yes
	Standard approval	Yes	No
	Corrosion safe	Eventuelly	Yes
	Alarm	Eventuelly	Yes
	Annual controle	No	Yes
	Known leaks	Lots	No

Fra Bente Villumsen, COWI

Brine

Brine is allowed to contain up to 35% antifreeze compounds.

Some of the brines are allowed to contain anti-corrosives.

Acceptet antifreeze compounds and anticorrosives (from regulations)

1980-12-02	2009-10-25
Antifreeze compounds Ethylenglycole Propylenglycole Natriumchloride Mixtures of calcium- and magnesiumchloride	Ethanole IPA-spirit (ethanole with 10% propylengly.) Ethylenglycole Propyleneglycole
Anti corrosives 0,4% natriumnitrit 4% natriumbenzoat 4% borax 0,2% benzotriazol Natriumcarbonate (soda) Natriumhydroxide	Allowed for ethylenglycole and propylenglycole when you give a complete declaration

Anticorrosives used for now (2011)

The Danish EPA have knowledge of the use of:

- Ethylhexan-acid: Recommended
- Natrium-2-ethylhexanoat: Recommended
- NaOH: Recommended
- Tolyltriazol: Not recommended

Tolyltriazol is not easy-degradable and is highly toxic for organisms living in water.