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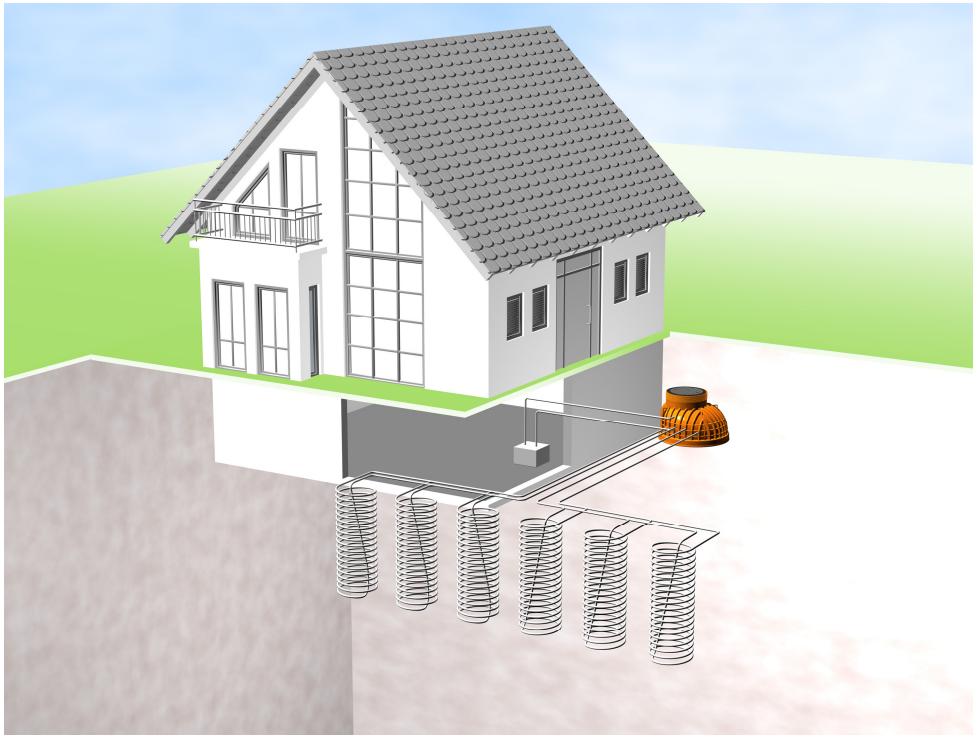

RAUGEO Helix Probe PE-Xa

THE ALTERNATIVE TO PROBES AND HORIZONTAL COLLECTOR

REHAU BUILDING SOLUTIONS

HOLISTIC APPROACH TO MEET ENERGY EFFICIENCY GOALS

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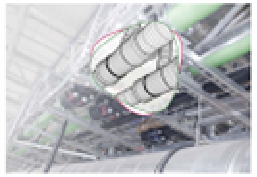
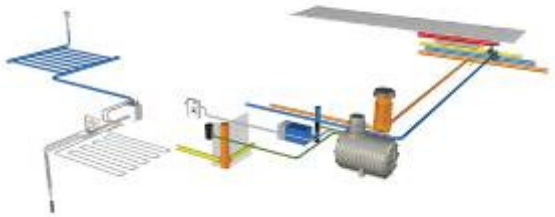
REHAU BUILDING SOLUTIONS

WINDOW AND CURTAIN WALLING TECHNOLOGY

BUILDING TECHNOLOGY

CIVIL ENGINEERING





GROUND-SOURCE ENERGY

VARIOUS SYSTEMS TO EXPLOIT GROUND-SOURCE ENERGY

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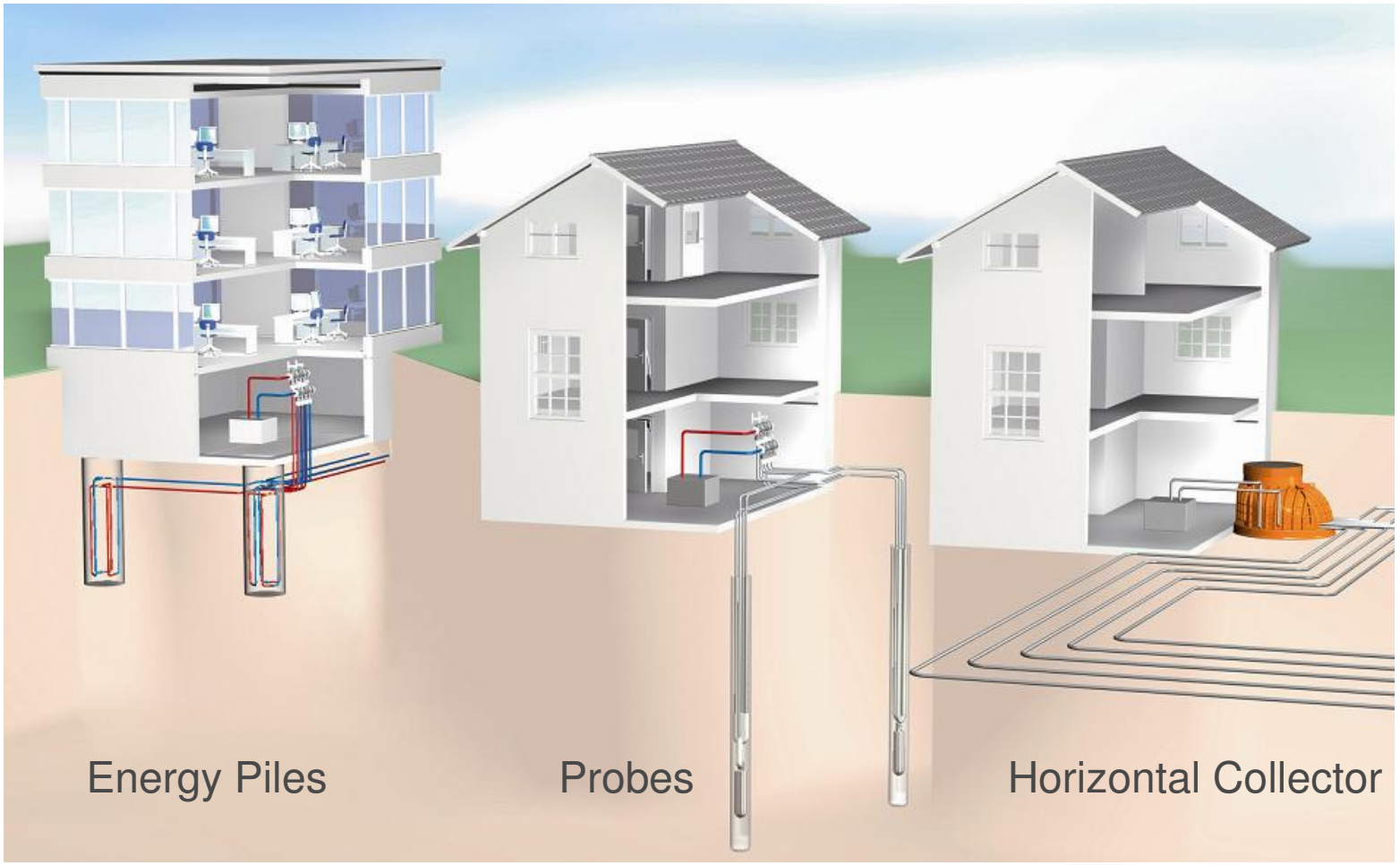

RAUGEO Helix-Sonde PE-Xa

COMPARISON OF SPACE REQUIREMENTS

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Example: Evaporater output of 8.25 kW

* 1.5m distance from the building required

	Probes	Helix-probe (1)	Helix-probe (2)	Horizontal collectors
Extracted output	50 W/m	550 W / probe	400 W / probe	25 W/m²
Calculated pipe requirement	165 probe metres	15 Helix probes	20.6 Helix probes	330 m²
Requirement	2 probes at 90m	15 Helix probes	21 Helix probes	500m pipe
Laying distance	6m	3m	3m	0.7m
Space requirement*	72 m²	135 m²	189 m²	415 m²

RAUGEO Helix probe PE-Xa

COMPARISON OF SPACE REQUIREMENTS

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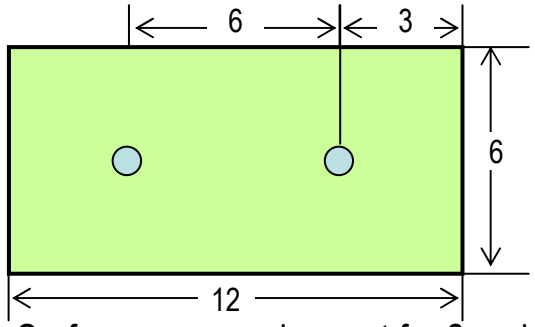
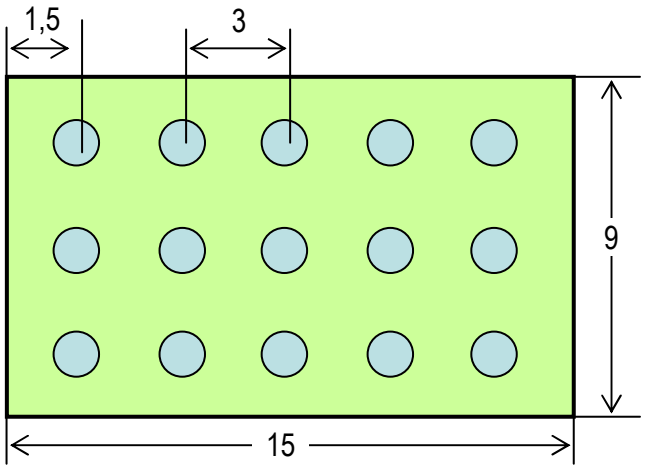
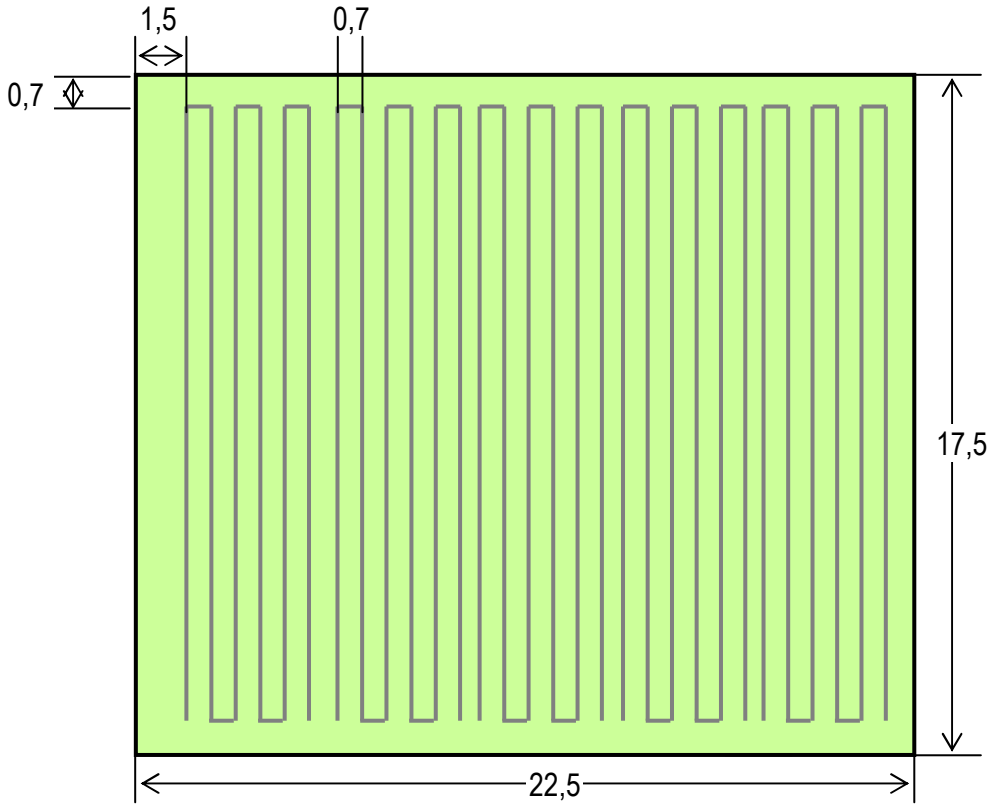


Surface area requirement for 2 probes:
12x6 = 72 m²



Surface area requirement for 15 Helix:
15x9 = 135 m²



Surface area requirement for 500m collector:
17,5 x 22,5 = 415 m²

RAUGEO Helix Probe PE-Xa

THE ALTERNATIVE TO PROBES AND HORIZONTAL COLLECTORS

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- Designed for new build (particularly low-energy houses) but also for refurbishments

- Optimal for projects with limited space and where a standard probe installation is not feasible

- 5m deep borehole with a spiral drill, in which the Helix probe can be installed and backfilled

- Less approvals required and lower installation costs for contractors and clients

- Extracted outputs up to 700 W/Helix probe, on average 400 W/Helix

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TECHNICAL DATA

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Helix Probe Data:

Spiral height (for transport)	approx. 1.1 m
Spiral height (for installation)	approx. 3.0 m
Outer diameter	approx. 38 cm
Pipe length	40 m
Pipe size	25 x 2.3
Pipe material	PE-Xa
Weight	7.5 kg
Volume (for water / antifreeze)	13 Litres

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SIMPLY UNIQUE – UNIQUELY SIMPLE

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Telescopic concept:

- Extendable from 1.1m (transport) to 3m (for installation)
- With that, low transportation and storage costs
- Low installation costs
- Defined pipe spacing in the spiral and a fixed probe diameter of 38cm due to attached permeable PE membrane

RAUGEO Helix Probe PE-Xa

SIMPLY UNIQUE – UNIQUELY SIMPLE

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High performance material PE-Xa

- Complete system made of PE-Xa for flow and return
  → No connections on probe tip

- High resistance against mechanical damage, ensuring maximum reliability during transport, installation and in operation:
  - No reduction in pipe lifespan even when notches / grooves travel 20% into pipe wall
  - Resitant to stress crack formations (puncture loads)

- Temperature resistance to +95°C, which allows (also retrospective) combination with solar thermal systems for ground regeneration and better thermal efficiency

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SYSTEM DESIGN

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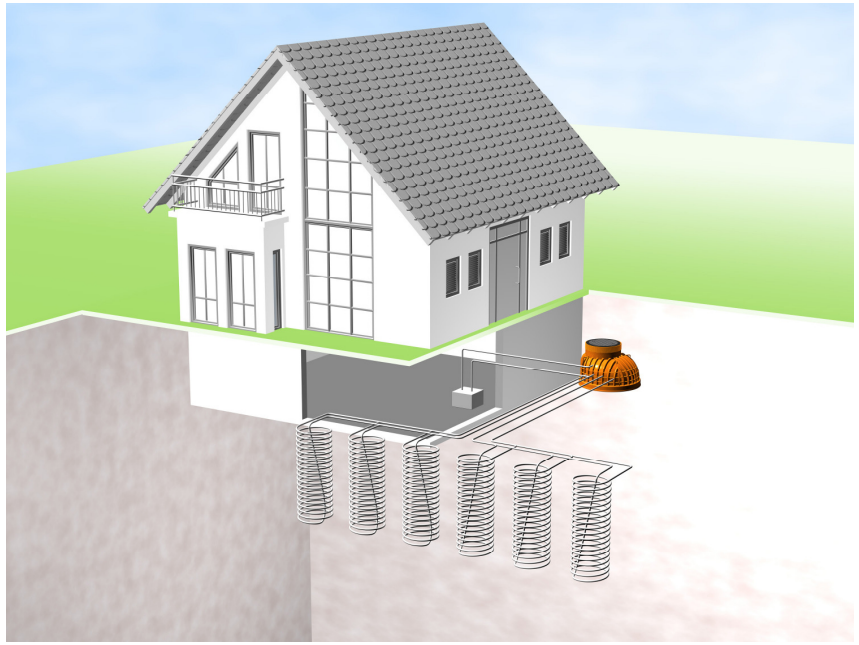
Sizing:

- Fundamentals:
  - Heat load of building
  - Heat pump type (COP)
  - >> Necessary evaporator loads

- Influencing factors:
  - Soil type
  - Groundwater levels
  - Operating hours



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ESTIMATED OUTPUTS PER PROBE

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Estimated outputs:

Helix probe performance based on 1800h operation for different soil / grounwater conditions

Orientation value: Ø 400 W/ Helix probe

Soil type	Specific heat extraction in W / Helix probe
Sand (dry)	200 – 300 W
Sand (wet)	400 – 700 W
Silt (dry)	250 – 350 W
Silt (wet)	400 – 650 W
Clay (dry)	250 – 350 W
Sandy clay (dry)	300 – 400 W
Sandy clay (wet)	450 – 700 W

RAUGEO Helix probe PE-Xa

INSTALLATION PROCESS

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1. Drilling

- Min. diameter of borehole: 400 mm
- Laying depth ca. 4-5m from ground level (drilling ca. 3m)
- Carried out with a JCB digger (ca. 8-16t), on which a spiral drill bit is attached
- If required, use borehole casing

2. Preparation of Helix probe

- Extend probes to installation length of ca. 3 m
- Fix in extended position e.g. with a timber batten (as an installation aid)

RAUGEO Helix probe PE-Xa

INSTALLATION PROCESS

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3. Insertion of Helix probe

- Insert the completely extended Helix probe, with insertion aid, into the borehole
- Securing Helix probe in the borehole, e.g. with sand at base of borehole

4. Backfilling of borehole

- Backfill by hand, so that no voids exist between the pipe and the borehole wall
- Due to the properties PE-Xa, it is possible to use the excavated material as a backfill, although it is recommended to mix with sand
- After successful insertion of the probe, it must be flow- and pressure tested

RAUGEO Helix Probe PE-Xa

INSTALLATION

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Pipe connections:

- Connection options:
  - Parallel to manifold
  - Up to 3 Helix probes in series

- Connection of PE-Xa pipes possible with:
  - Compression sleeve and protective tape
  - Electrofusion joints

- Connect to manifold at highest point

- Pressure test at end of installation

RAUGEO Helix Probe PE-Xa

TEST FIELD

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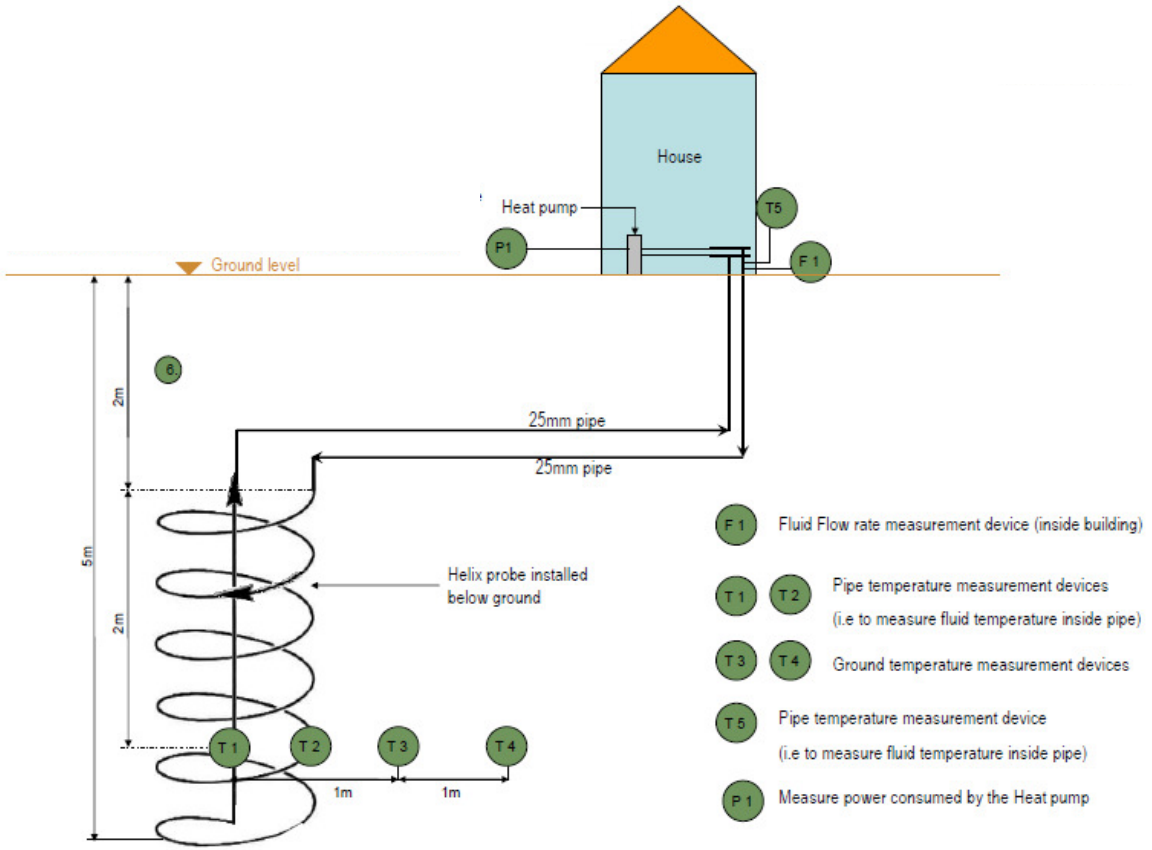

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TEST FIELD

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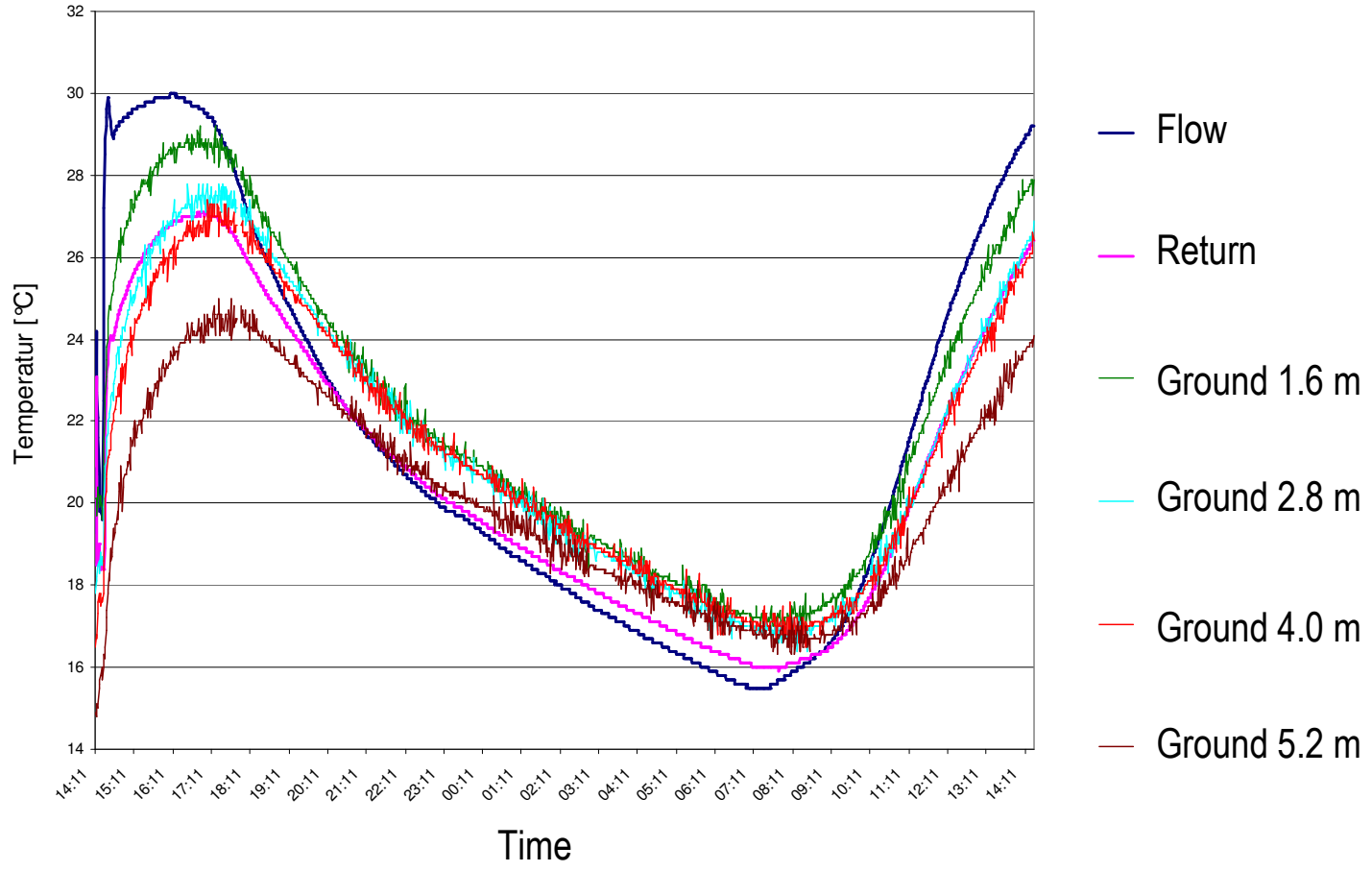

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TEST FIELD

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