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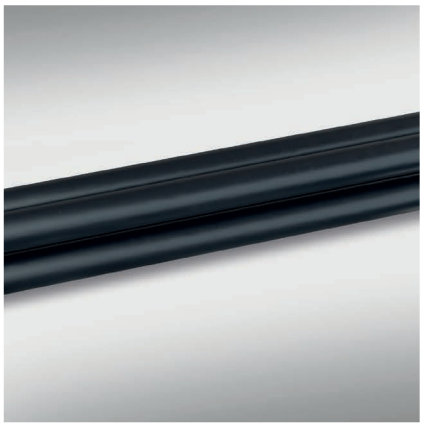
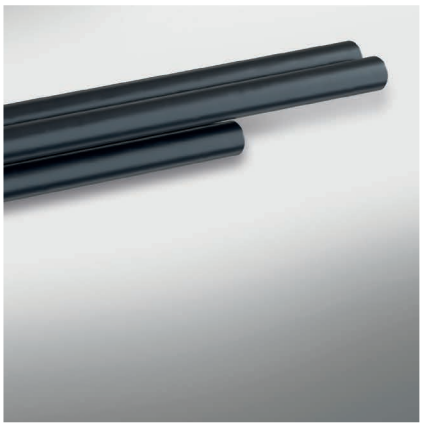




GEROtherm® VARIO

The conical, pressure loss-optimised geothermal probe

The conical, pressure loss-optimised GEROtherm® VARIO geothermal probe is ideal for drilling depths of up to 250 metres. It combines the positive features (material, pipe diameter, transport size, installation accessories) of the familiar standard geothermal probes, plus an increased energy efficiency.

Design

The optimised and patented GEROtherm® VARIO geothermal probe is the evolution of the PN16/PN20 geothermal probes and offers significant advantages over these solutions:

- The hydraulic pressure drop is lower than the familiar geothermal probes.
- The internal pressure resistance is guaranteed in the lower section of the drill hole.

These advantages are achieved by manufacturing a conical geothermal probe inner pipe – its wall thickness is reinforced in the lower section of the geothermal probe. Table 1 shows which variants are available.

Variants of the GEROtherm® VARIO geothermal probe

Pipe diameter	Probe length	Pressure ratings
de 32 mm	100–160 m	PN13.5–PN16
de 40 mm	100–160 m	PN13.4–PN16
de 40 mm	170–250 m	PN16–PN20
de 50 mm	170 – 250 m	PN16 – PN20

Table 1

Installation

The geothermal probe is delivered on a pallet. It can be installed using conventional equipment. The geothermal probe is compatible with all installation aids, such as GEROtherm® PUSH-FIX, UNI-FIX, weight system, etc.

Certification

The GEROtherm® VARIO geothermal probe is certified and monitored:
SKZ certificate No. A278
KIWA KOMO certificate No. K84665/02

Service life and patent

The GEROtherm® VARIO geothermal probe is a full-plastic solution, and is thus corrosion-resistant with a service life of over 50 years in compliance with SIA 384/6.

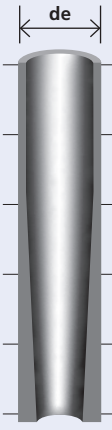
The patent number for this geothermal probe is EP 2 706 308.

Internal / buckling pressure resistance

An overview of the wall thickness distribution depending on the depth is shown in Figure 2.

The GEROtherm® VARIO 100 – 160 metres meets the internal pressure resistance requirements. Depending on the depth, it can be loaded up to 16 bar.
In the lower section, the buckling pressure resistance corresponds to a PN16 geothermal probe; in the upper section, the load limit is adapted depending on use.

Wall thickness variation with internal and buckling pressure resistance of the GEROtherm® VARIO geothermal probes 100 – 160 metres up to PN16



Length (m)	Wall thickness de 32 (mm)	Wall thickness de 40 (mm)	Internal pressure resistance [1] (bar) de 32	Internal pressure resistance [1] (bar) de 40	Buckling pressure resistance [2] (bar) de 32	Buckling pressure resistance [2] (bar) de 40
0	2.50	3.10	13.5	13.4	5.7	5.6
–50	2.50	3.10	13.5	13.4	5.7	5.6
–80	2.50	3.10	13.5	13.4	5.7	5.6
–100	2.63	3.25	14.2	14.1	6.5	6.3
–130	2.81	3.48	15.4	15.2	7.6	7.5
–160	3.00	3.70	16.0	16.0	8.6	8.6

[1] According to DIN 8074/75. [2] At 20 °C / 60 h according to SIA 384/6.

Figure 2

Pressure loss comparison: GEROtherm® VARIO and standard geothermal probe PN16

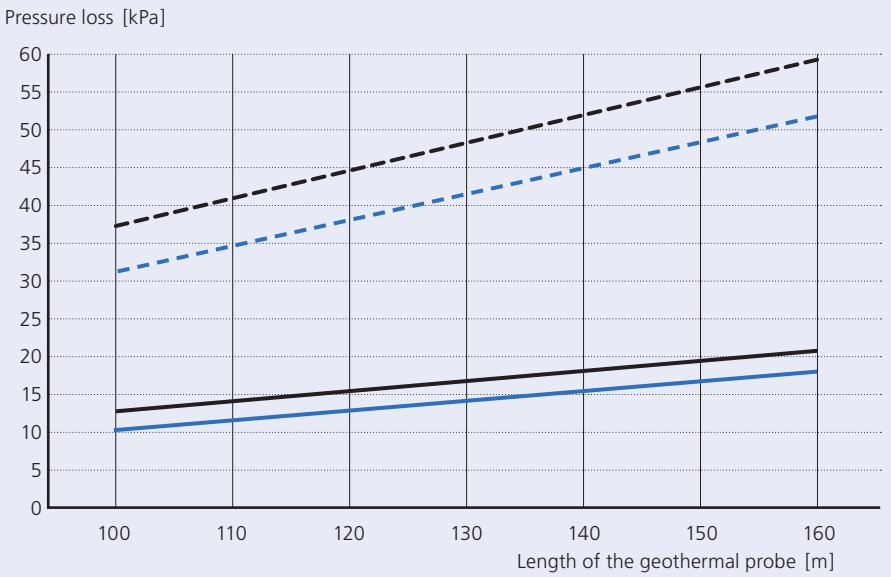
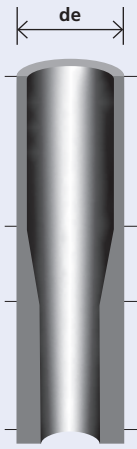


Figure 3

Pressure loss

The pressure loss of a GEROtherm® VARIO geothermal probe is reduced compared to a PN16 geothermal probe according to Figure 3. This leads to lower energy consumption for the circulation pump.

Wall thickness variation with internal and buckling pressure resistance of the GEROtherm® VARIO geothermal probes 170–250 metres up to PN20



Length (m)	Wall thickness de 40 (mm)	Wall thickness de 50 (mm)	Internal pressure resistance [1] (bar) de 40mm	Internal pressure resistance [1] (bar) de 50mm	Buckling pressure-resistance [2] (bar) de 40mm	Buckling pressure-resistance [2] (bar) de 50mm
0	3.70	4.60	16	16	8.5	8.5
-160	3.70	4.60	16	16	8.5	8.5
-200	4.50	5.60	20	20	12.8	12.8
-250	4.50	5.60	20	20	12.8	12.8

[1] According to DIN 12201/2. [2] At 20 °C/60 h according to SIA 384/6.

Figure 4

The concept of the conical pipes is applied based on the PN20 geothermal probes. Figure 4 shows the progression of the wall thicknesses of these GEROtherm® VARIO products.

Double-U geothermal probe VARIO de 50mm

Pressure loss comparison: GEROtherm® VARIO and standard geothermal probe PN20

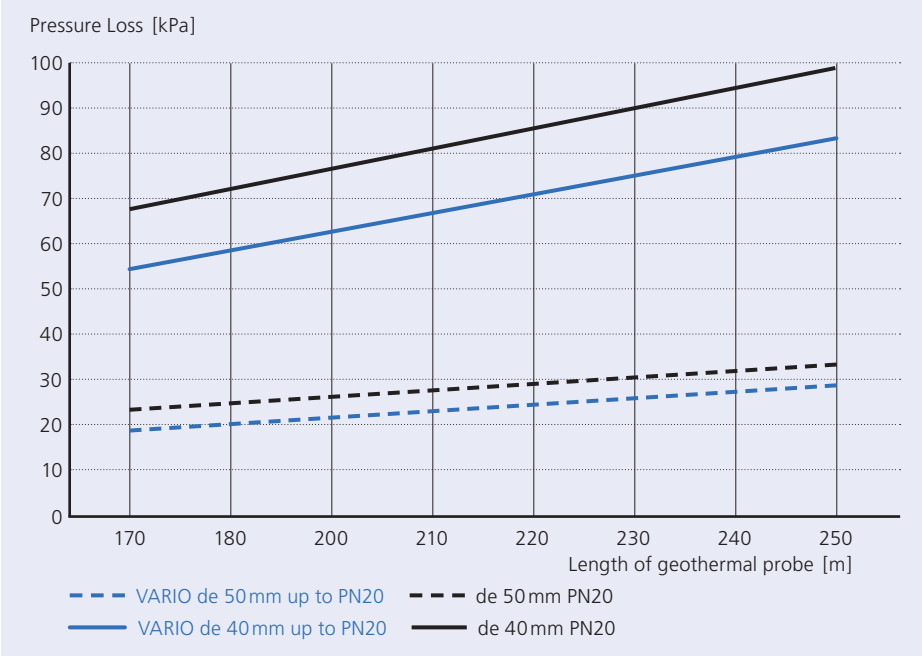


Abbildung 5

The pressure loss of a GEROtherm® VARIO geothermal probe is reduced compared to a PN20 geothermal probe according to Figure 5. This leads to lower energy consumption for the circulation pump.

Calculation basis: double-U; Filling (antifreeze) ethylene glycol 25%;
Ø Temperature frost protection (Ø VL,RL): 3°C;
Flow through the probe: 3000 L/h

Conclusion

The GEROtherm® VARIO geothermal probes, which are coordinated to the respective depths, address the current trends in the use of geothermal energy. These quality products offer high **safety** and increased **energy efficiency.** The handling and installation of the products remain unchanged and are accordingly uncomplicated.

For conical geothermal probes up to 500 m, we recommend the GEROtherm® FLUX. You are welcome to contact one of our consultants.

Advantages at a glance

- Optimised hydraulic pressure loss and therefore more efficient overall systems
- Pressure-resistant geothermal probes up to 16 or up to 20 bar @20°C
- Optimum heat transfer and performance
- 100% plastic material, thus corrosion-resistant
- Significantly improved buckling pressure resistance in the lower section
- Installation conditions similar to those for standard probes
- Compatible with installation aids such as GEROtherm® PUSH-FIX, UNI-FIX, weight system, etc.
- Use of conventional tools
- Same diagonal dimension as GEROtherm® DUPLEX geothermal probes
- Delivery on pallets
- SKZ-certified and monitored. Certificate No. A278
- KIWA KOMO-certified and monitored. Certificate No. K84665/02
- Patent No. EP 2 706 308

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