



ap
van den
berg

ICONE THERMAL MODULE

For accurate thermal soil measurements



- Plug-and-play module for the standard Icone system
- Fast measurements
- High accuracy
- Robust and reliable modeling approach
- Innovative sensor technology (patent pending)
- Compatible with multiple click-on modules

Available for order from the start of Q4 2026.

**PROBE
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FUTURE**

ICONE THERMAL MODULE

The Icone Thermal Module provides an innovative solution for measuring soil thermal conductivity (λ , W/mK) directly in-situ, saving time, reducing costs, and improving the reliability of results. By eliminating the need for expensive and time-consuming laboratory testing, it also avoids the disturbances associated with traditional soil sampling.



Accurate measurements at any depth

The Icone Thermal Module measures soil thermal conductivity from approximately 0.5 meters depth and at any required depth thereafter. During testing, the module remains stationary to ensure precise results. Its modular click-on design allows easy integration with other Icone modules, like Seismic, Conductivity and Magneto, enabling multiple datasets to be collected in a single CPT, improving field efficiency.



Principle of Operation

After penetration, the module is allowed to stabilize, reducing the influence of frictional heating. It is then heated by approximately 3°C (5–10 W) for 1.5–3 minutes, depending on soil conditions. Thermal conductivity is determined during this heating phase, after which penetration can continue. Natural cooling follows as heat dissipates into the surrounding soil, ensuring consistent and repeatable results.

Thermal Conductivity Sensor Technology (patent pending)

The Icone Thermal Module uses a thermal resistance-sensor based approach, overcoming limitations of traditional methods. By controlling heat flow through a defined thermal gap, it creates a larger, stable measurement window. The resulting temperature difference provides a direct measurement of soil thermal conductivity through system calibration. Under calibrated lab conditions, testing demonstrates around 95% accuracy and high repeatability, with RSD values typically below 2.5%, significantly improving reliability compared to conventional techniques.

Technical specifications

Feature	Icone Thermal module
Length total module	350 mm
Diameter module	Ø 37 mm
Measurement range	0,1 - 4 W/mK
Accuracy	≥ 95%
Total measuring time	Approx. 20–30 minutes (soil specific)
Max. work load	75 kN
Soil temperature range	0 - 50 °C