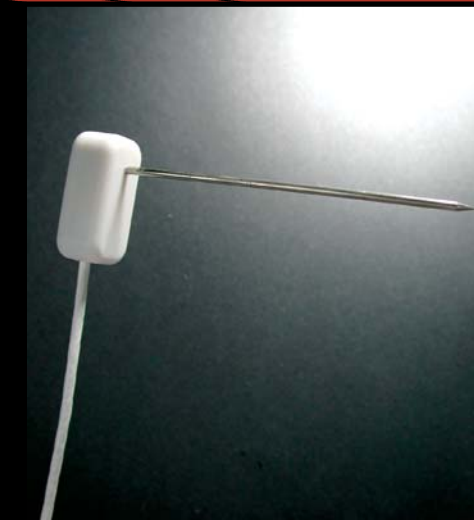


Thermal Sensors Comply with Published Standards



RK-1

Accurate thermal conductivity measurements require good contact between the needle and the material being measured. That can be challenging in rock and concrete.

The RK-1 rock needle package allows you to drill a hole precisely sized for the rock needle.

The package includes a rock needle along with a rotohammer and specialized drill bits.

RK-1 SENSOR SPECIFICATION

Size 3.2 mm diameter x 60 mm long

Range

0.10 to 4.00 W/(m °K)
(thermal conductivity)
25 to 1000 °C cm/W
(thermal resistivity)

Accuracy of Conductivity

±10% from 0.2 to 4 W/(m °K)
±0.02 W/(m °K) from 0.1 to 0.2W/(m °K)

Cable length 0.8 m

SH-1

The SH-1 is used to measure thermal diffusivity and specific heat.

Dual needles 3 cm long, 1.28 mm in diameter, and 6 mm apart are ideal for measuring thermal diffusivity and specific heat.

One needle is the heating needle; the other monitors temperature change.

SH-1 SENSOR SPECIFICATION

Size 1.28 mm diameter x 30 mm long

Range

0.1 to 1.0 mm²s⁻¹
(Thermal Diffusivity)
0.5 to 4 MJ m⁻³ C⁻¹
(Specific Heat)

Accuracy

Diffusivity ±10%
Specific Heat ±5%

Cable length 0.8 m

TR-1

The TR-1 needle is used to measure thermal conductivity in soil, concrete, and other granular or solid materials.

100 mm long and 2.4 mm in diameter, the TR-1 needle conforms to specifications in IEEE 442-03 Guide for Soil Thermal Resistivity Measurements.

TR-1 SENSOR SPECIFICATION

Size 2.4 mm diameter x 100 mm long

Range

0.10 to 4.00 W/(m °K)
(thermal conductivity)
25 to 1000 °C cm/W
(thermal resistivity)

Accuracy of Conductivity

±10% from 0.2 to 4 W/(m °K)
±0.02 W/(m °K) from 0.1 to 0.2W/(m °K)

Cable length 0.8 m



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THERMAL CONDUCTIVITY AND THERMAL DIFFUSIVITY



FOR HORIZONTAL GROUND-LOOP



- Better Long-term Efficiency
- Reduced Installation Size
- Lower Installation Costs



Standard for TR-1



Thermal Grease



Cement Pilot Pin



62 page User's Manual

5/32" Bit and Rotohammer Drill for Rock and Cement

Ruggedized Case

Utility Software

Compliance Documents

Download Cable

Benchtop Stand



Inside the Carrying Case
SENSORS INCLUDED



STANDARD D5334-00



STANDARD D5930-01



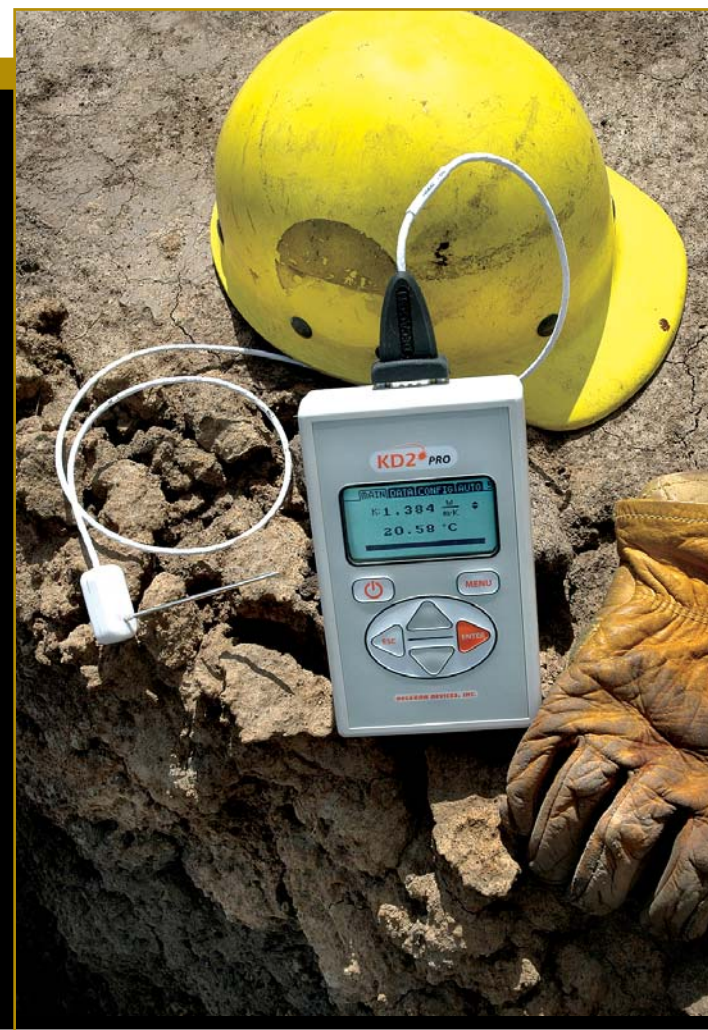
METHODS OF SOIL ANALYSIS

Get a Handle on Heat Transfer

The KD2 Pro is a fully portable field and lab thermal properties analyzer. It uses the transient line heat source method to measure thermal conductivity, thermal diffusivity, and specific heat (heat capacity). Its sophisticated data analysis is based on 30+ years of research experience on heat and mass transfer in soils and other porous materials.

Excellent Accuracy

The compact KD2 Pro controller is much more than a simple readout for time and temperature. A proprietary algorithm fits time and temperature data with exponential integral functions using a nonlinear least squares method. This full mathematical solution delivers thermal conductivity to within ±5%.



Corrects for Temperature Drift

Temperature changes of a thousandth of a degree per second—the sun warming the soil, for example, or someone walking into the lab—destroy the accuracy of thermal properties calculations. Unlike other thermal needle systems, the KD2 Pro corrects for linear temperature drift that can account for large errors.

Complies with Standards

When used with the TR-1 thermal needle for rock, soil, and concrete, the KD2 Pro fully complies with IEEE 442-10, ASTM D5334-08, and the Soil Science Society of America Methods for Soil Analysis.

KD2 Pro Specifications

Operating Environment

Controller 0 to 50 °C.
Sensors -50 to +150 °C.

Power 4, AA cells.

Battery Life 500 readings in constant use.

Case Size 15.5 cm x 9.5 cm x 3.5 cm.

Display 3 cm x 6 cm, 128 x 64 pixel graphics LCD.

Keypad 6 key, sealed membrane.

Data Storage 4095 measurements in flash memory.

Interface 9-pin serial.

Read Modes Manual and Auto Read.