
TK04 - Sample Preparation

Instructions for preparing samples for TK04 laboratory tests

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Ambient and sample temperature

The temperature at the place where the samples are positioned should be as constant as possible. Avoid open windows, moving air, sun rays, radiators etc. which could disturb the high resolution temperature measurements. We recommend to put sample and probe in a thermally insulated container, e.g. a cardboard box lined with styrofoam.

The software starts measuring as soon as the temperature drift is sufficiently small or predictable. For short drift phases, it is recommendable to place the samples in the laboratory several hours before starting measurements to allow them to adapt to room temperature.

Sample preparation for full-space laboratory probes

A long and narrow drill hole (2 mm in diameter, 70 mm long) is required to insert a Standard VLQ (laboratory full-space probe) into a solid sample. Since the diameter of such a hole will not be exactly constant, the use of contact fluid is recommended to ensure good contact between probe and sample material. If the sample material is soft, the needle probe can be stuck cautiously (without effort) directly into the sample; drilling or the application of contact fluid are not necessary in this case. The minimum sample diameter is approx. 30 mm, the minimum length 75 mm.

Sample preparation for half-space laboratory probes

A plane and smooth sample surface is required for half-space measurements. The surface of solids should be grinded and smoothed. The sample diameter should be at least equal to the probe diameter (88 mm for the Standard HLQ, 50 mm for the Mini HLQ), the minimum sample thickness is approx. 15 mm. Moderate contact pressure (approx. 5 to 10 bar) should be applied to ensure good contact between the probe and the sample surface. Contact fluid is recommended.

Caution: Never exceed the maximum pressure of 10 bar / 1.7 kN, as this will damage the probe. We recommend to use the hydraulic pressure device with gauge which is available as an option for TK04.

Contact fluid

The use of contact fluid usually improves the contact between sample and probe and hence the quality of results considerably. We recommend silicone thermal compound (included in the TK04 measuring kits).

For half-space tests of solids apply the contact paste sparingly to the underside of the probe where the line source is located, put the probe on top of the sample and apply moderate contact pressure during the test (**not more than 10 bar / 1.7 kN**).

For full-space tests of solids fill a bit of contact paste into the drill hole where the probe will be inserted and distribute it evenly with a thin wire or needle. Additionally you can cover the outside of the probe with contact fluid.

As the contact paste contains silicone, you should clean your hands after use. Stains can be easily removed with alcohol.

Soil samples

For sample preparation instructions and other hints regarding thermal conductivity tests of soil samples and other porous materials, please refer to the application note *TK04 - Testing Soil Samples*.