
TK04 Application Note

Preparing samples for 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. In order to keep waiting times short, it is recommended to place the samples in the laboratory several hours before starting measurements to allow them to adapt to room temperature.

Sample preparation for needle probes (Standard VLQ)

A long and narrow drill hole (2 mm in diameter, at least 70 mm long) is required to insert a Standard VLQ (needle 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. It is easier to apply the contact fluid if the hole is drilled through till the opposite sample side. If the sample material is soft, the needle probe can be pushed 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. 40 mm, the minimum length 85 mm.

Sample preparation for probes for plane surfaces (Standard HLQ, Mini HLQ)

A plane and smooth sample face is required for probes for plane surfaces. 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. 20 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 contact press with pressure 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 needle probe tests on solids cover the needle with a thin film of contact fluid. Then push the probe into the prepared bore hole (make sure that the needle is embedded completely and not partially exposed). Turn the probe a few times left and right, then lift it one or two centimeters and push it back. To check if enough contact fluid has been applied, fully withdraw the needle: it should be covered completely, otherwise apply more fluid and repeat the procedure. Then reinsert the needle.

As the contact paste contains silicone, 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 *Laboratory tests of soil samples and sand materials*.