

BS EN ISO 17628:2015



BSI Standards Publication

Geotechnical investigation and testing — Geothermal testing — Determination of thermal conductivity of soil and rock using a borehole heat exchanger

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National foreword

This British Standard is the UK implementation of EN ISO 17628:2015.

This document sets a standard for “geothermal testing”. It describes both the installation of closed loop ground heat exchanger boreholes, and the process to be adopted for “Thermal Response Testing” (TRT) on a closed loop borehole. Readers should be aware that there are other standards that describe the drilling and installation of closed loop borehole heat exchangers. The “geothermal testing” described in this standard should not be confused with other conventional geothermal testing, or with open loop borehole testing.

In the opinion of the UK committee, there is a lack of clarity regarding test results vs test data. The reader should appreciate that the outcome of a successful TRT will deliver thermal conductivity, ground equilibrium temperature and borehole thermal resistance, not just thermal conductivity as implied by the title.

The standard describes drilling rigs and drilling methods, which are of interest but are not related to the TRT procedure. Note that the standard is applicable to boreholes of up to 400m depth, but there is no reference to the additional care and attention that needs to be paid to hydrostatic pressure control during the installation of borehole heat exchangers to this depth. Readers should make themselves aware of these requirements separately. There are references in the document to multiple boreholes, when a TRT will in general only be carried out on a previously installed closed loop borehole. A prescriptive method of flow and pressure testing is provided, which is dealt with in other standards and is not of overriding consideration in the performance of a TRT.

Grout and grouting are referenced, which is routinely required in the UK, but there is no mention of a minimum requirement for the hydraulic permeability of the grout. This parameter is the overriding requirement as far as the UK environmental authorities are concerned, in order to provide the required level of hydraulic sealing.

The standard does not provide information on the accuracy requirements of the flow and return temperature measurements. These are critical to the final accuracy that can be obtained from the analysis of the temperature data and the user is advised to pay attention to this. The reader should make themselves aware of precisely which temperatures are to be measured and where. The test rig and associated connections to the borehole heat exchanger need to be adequately insulated from the impact of ambient temperatures. The reader should ensure that the delivered energy is measured to the required accuracy, and that the active depth of the heat exchanger is accurately recorded. The standard has a limited description of how the ground equilibrium temperature is to be measured, and a rudimentary description of how to obtain temperature depth profiles.

The “temperature graph” that is referred to is constructed by computing the average of the measured flow and return temperatures, and plotting this as the temperature difference from the ground equilibrium temperature against logarithmic time from the start of the test. Any analysis needs to reflect the use of natural log or log 10 on this graph.

The standard does not deal with how variable power can be dealt with, or what should happen if power or flow is lost during the test. The UK committee regard the recording of data related to the test, in Annex B, B1 and B4 to be unhelpful.