



Energy stored below the surface of the earth's crust in the form of heat is known as geothermal energy. A PFT G 4 mixing pump helped to install geothermal probes designed to make use of this energy source.

## Geothermal Energy and the PFT G 4 Mixing Pump

Numerous people regard "geothermics" - the utilisation of the earth's heat - as the energy source of the future. The exploitation of the geothermal energy potentials existing at various depths has been given a worldwide boost by the great deal of positive experience gained in pilot projects and extensive field tests. Even among private building owners, this method of heat generation has become popular.

One of them is the builder-owner of a single-family home near Bamberg (South Germany). On his plot of land, four geothermal probes were buried in drill holes 100 metres in depth. The Bamberg-based well construction firm Osel Brunnenbau GmbH drilled the holes and installed the probes.



### The Principle of Geothermal Probes

Geothermal probes withdraw heat from the ground and supply it to

With the aid of an injection line, the PFT G 4 filled the cavities, ensuring that the geothermal probe was in direct contact with the surrounding earth.

the heating system of a building by means of heat pumps. The geothermal probes used in this case were two U shaped tube loops, inserted in the drill holes together with an injection tube. After the insertion of the probes, the PFT G 4 mixing pump performed its task. The PFT G 4 mixed the filling material "Brunnen-Dämmer" - a well sealant made by AZBUT in Ennigerloh (Northwest Germany) - and pumped it into the 100 metre drill hole, filling the hole from the bottom to the top. In this method, the sealant flows into the cavity containing the probe tubes and fills all cracks and fissures. This void-free back-filling is of decisive importance, because it ensures that the geothermal probe is in direct contact with the surrounding earth.

### Modified PFT G 4 Mixing Pump

To make sure that it conveyed materials over a distance of 100 metres, the PFT G 4 mixing pump had to be modified. PFT representative Otto Iff greatly helped Osel Brunnenbau with this problem.

The injection line for the filling of the holes was only  $\frac{1}{2}$  inch in diameter; therefore the pump unit of the PFT G 4 had to be adapted to the drill-hole cross section and the tube length.



At a pressure of approx. 22 bar, the PFT G 4 injected the AZBUT well sealant into the drill hole.

The PFT G 4 was not equipped with the standard screw pump, the PFT TWISTER D 6-3, but with a D 7 2.5 rotor and stator assembly. In this way, the well sealant could be pumped as far as 100 metres at a pressure of approx. 22 bar. Since the sealant offered an optimal lubricating effect, it was possible to pump it over such distances. The PFT G 4 applied about 4 tonnes of material per drill hole. From time to time, the injection line was pulled out of the drill hole to a certain extent, to ensure a perfect thermal contact between the probe tube and the earth. Once again, PFT equipment kept things moving smoothly - this time to a depth of 100 metres! ■