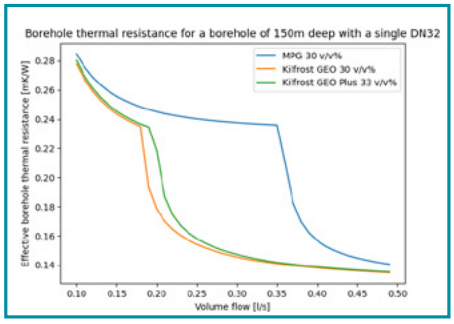
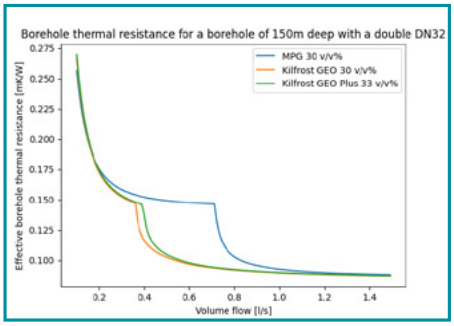
Kilfrost GEO, improving the performance of closed loop ground source heat pumps

The viscosity of Kilfrost GEO and GEO Plus is better than that of MPG - when compared to the same freeze protection.

This has a major advantage, as the fluid enters a turbulent state at a lower flow rate, therefore decreasing the borehole thermal resistance, which in turn improves the thermal efficiency of your system.

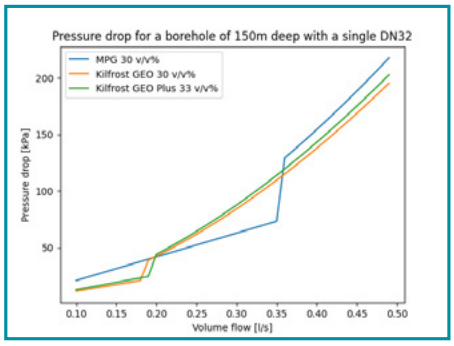


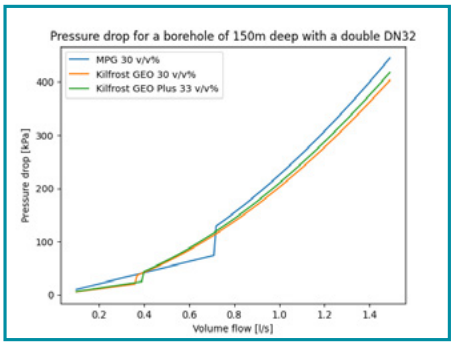


NB. This drop occurs at different flow rates for the double and the single pipe, as a borehole with a double U heat exchanger requires more flow to achieve the same Reynolds number as a single U.

As well as increasing thermal efficiency, lowering the borehole resistance can reduce the required borehole meters, further reducing the investment cost.

The low viscosity of Kilfrost GEO and GEO Plus also has a benefit on the pressure drop, which again is typically lower than MPG. An exception to this is only seen when transitioning from a laminar to a turbulent flow, as the Kilfrost fluid is already turbulent, and MPG is not.





NB: Both graphs show that all fluids experience a 'jump' when there is a different flow regime, because a turbulent flow has a higher friction factor and hence pressure drop.

The benefits of a low viscosity fluid, when compared to MPG

- GEO and GEO Plus offers better thermal performance at the same flow rate, owing to the faster rate at which it reaches turbulence
- GEO and GEO Plus will always perform better than MPG at the same Reynolds number and will have a lower pressure drop for equal Reynolds numbers

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GHEtool is a comprehensive geothermal software that supports the development of accurate and efficient borefield designs – it is maintained by energy advisors, Enead.

GreenWatt Zrt. provides heat pump solutions and had committed to a project using Kilfrost fluid, which was used for the test.

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