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D3.2 Documented numerical analysis of optimal heat exchanger performance Executive Summary

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1. PUBLISHABLE EXECUTIVE SUMMARY

The aim of Work Package 3 “*Cost-effective ground heat exchangers improvement*” of the GEOTeCH project is to advance the readiness of the ground heat exchanger technologies, so that their technical performance is further optimized and fully characterized for a range of applications. In addition, efficient and accurate design models and procedures are defined.

This report “**Documented numerical analysis of optimal heat exchanger performance**” is concerned with the work carried out to develop models of the spiral co-axial borehole heat exchangers, being innovated in this project.

The type of modelling undertaken in Task 3.2 “Vertical borehole heat exchanger component modelling and design optimization” has been detailed numerical modelling of the fluid flow and heat transfer processes within the components of the heat exchanger – chiefly the annulus between the inner and outer pipes.

The objective has been to develop an understanding of the conditions and identify ways to optimize the design. This work has been closely linked to that in the concurrent Task 3.3 “Vertical borehole heat exchanger component performance validation”. In fact, the latter task has provided data that have been used to validate the modelling in Task 3.2 and this is described in the present report.

Good agreement with the validation data has been found and the advantages of the novel features of the heat exchanger design have been verified. A range of design parameters have been investigated that will guide further optimization of the proposed product range.