INCREASING THE GEOTHERMAL HEAT EXCHANGERS AREA OF OIL-WELLS BOTTOM BY HEAT-CONDUCTING CALMATICS

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The most effective technical solution to increase the coefficient of performance (*COP*) of downhole geothermal systems is the fins and the development of the thermal surface of heat exchange tubes [1]. For heat exchangers of type «Straight finned tube», the calculated increase the *COP* is 40 %, and for type «Meridian ribbed sphere» (Fig) – 95 % ((with an increase in the heat exchange surface by 3 times, the total length of the pipe sections is 2 km, the diameter of the heat exchanger sphere is about 10 m). The key parameters affecting the heat conversion coefficient *COP* of a geothermal heat exchanger are: fluid drainage radius during the heat exchange process, radius of pipelines with circulating coolant, diameter of the cluster heat exchanger, heat exchange area, parameters of thermal resistance of rocks in the bottomhole heat-receiving zone [2]. The authors suggested to carry out the development of the heat-exchange surface by hardening (calming) of the ribs and needles, geometrically fitting to the pipe sections. The influence of the finning factor (needle frequency, texture, roughness) of the heat exchanger surface on the thermal resistance of the fluid saturated rock in the intercostal space is noted. In subsequent studies, it is advisable to consider the effect on *COP* of the spatial incorporation into the geometric topology of intermediate heat exchangers, the profiling of heat-conducting intrusion elements into the rock (fins, needles, ribbons, pimples), the mesh parameters of the embedding elements (mesh density and spacing) and nanostructured heat exchange coatings surface.

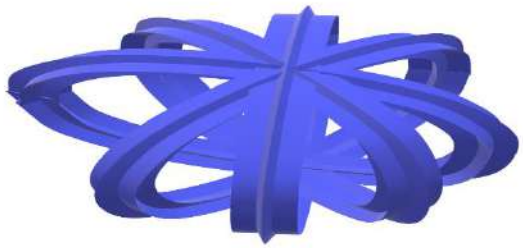

Fig.

References:

1. N. Nickolas et al (2017) review on improving thermal-hydraulic performance of fin-and-tube heat exchangers. IOP Conf. Ser.: Mater. Sci. Eng. 257 012049A.

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