

# **The Estimation of Basic Brine Parameters Alteration, Disposed in Underground Reservoir After Construction Completion**

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## **ABSTRACT**

After finishing the construction of an underground reservoir by the method of dissolving rock salt by water the aftersaturation of brine filling the underground cavern occurs until the ultimate concentration is achieved. In the process, the concentration and volume of the brine increase and the temperature decreases due to endothermic dissolution. At the same time heat transfer goes on between the brine and the rock surrounding the cavern. As a result the temperature of the brine increases and, consequently, its volume increases, too. Thus, when the well is shut, the pressure in the reservoir tends to decrease due to aftersaturation of the brine and simultaneously tends to grow due to an increase in the temperature of the brine.

In the report an analytic formula is suggested for the determination of the difference of the increments of the volume of the brine and the volume of the cavern during aftersaturation depending on the density and concentration of the brine as well as the density of the rock salt mass. The results are given of the experiments aimed at the determination of changes in the difference of the volume of the brine and the volume of the cavern during aftersaturation. The results proved the correctness of the use of the analytic relationship.

To study changes in the brine's temperature in working conditions two reservoirs of capacity 43 and 50 thousand m<sup>3</sup> were used. In those reservoirs the temperature of the brine was measured immediately after finishing the construction and on expiry of 57, 328, 610, 735 and 879 days.

The results of the experiments show that the stabilization of the brine's temperature occurs on the expiry of three years after finishing the construction of the reservoir.

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