



The effect of elevated temperature on the physical properties of Mauthausen Granite (Austria) and Mórágý Granite (Hungary); a comparative study

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Elevated temperature cause changes in the physical properties of rocks. The current study provides information on the behaviour of two granitic rocks that were subjected to high temperatures. The two studied lithologies were: i) grey Mauthausen Granite from Upper Austria and a ii) pinkish granite from Mórágý Granite Formation, southern Hungary. The latter one is the host rock of the Hungarian National Radioactive Waste Repository, which is located at Bábaapáti. To assess the changes in physical properties test were made in four conditions: air-dry room temperature (23°C); water saturated room temperature (23°C); after heat shock of 300°C and 600°C, respectively. For the heat tests a furnace was used, in which the temperature was hold on 300°C and 600°C for six hours. The physical parameters were measured according to EN standards or to ISRM guidelines. These included density, determination of ultrasound speed propagation (EN 14579:2005), uniaxial compressive strength (EN 1926:2007), indirect tensile strength (ISRM) and water absorption (EN 13755:2001). The results indicate that there were only minor changes in the densities of both granite types when the samples were heated up to 600°C. To the contrary, the strength parameters showed a clear trend. From room temperature until ~300°C, the uniaxial compressive strength, the modulus of elasticity and the indirect tensile strength showed a slight increase compared to the initial values. This elevated strength decreased significantly when the samples were heated to 600°C. This trend is in good agreement with the previous tests that were made on Indian granites (Dwivedi et al. 2008).

Reference:

Dwivedi, R. D., R. K. Goel, V.V.R. Prasad, A. Sinha 2008. Thermo-mechanical properties of Indian and other granites. *Int. J. Rock Mech. Min. Sci.*, 45, 3, 303-315.