

P67

Determination of cavitation resistance of glass-ceramics based on basalt

Marko Pavlović¹, Marina Dojčinović², Ljubiša Andrić³, Ljiljana Trumbulović⁴, Zoran Čeganjac⁵, Aleksandar Milovanović⁴

1Kontrol Inspekt, Beograd

2University of Belgrade, Faculty of Technology and Metallurgy, Karnegijeva 4, 11 000 Belgrade, Serbia

3 Institute for Technology of Nuclear and Other Mineral Raw Materials, Franchet d'Esperey 86, 11 000 Belgrade, Serbia

4Academy of Vocational Studies Western Serbia -Užice, Serbia

5Academy of Vocational Studies Šumadija, Aranđelovac Department, Serbia

The paper examines the resistance to the effect of cavitation of raw basalt samples from the Vrelo-Kopaonik deposit and basalt-based glass-ceramics obtained by melting and casting of the basalt aggregate. A change in the sample mass in function of the cavitation time was monitored for the evaluation of cavitation resistance. The level of degradation of the surface of the sample was quantified using the image analysis. The change in the morphology of the sample surface with the test time was followed by scanning electron microscopy. In the case of raw basalt samples it is evident that the incubation period in the early phase of cavitation damage is short, because the period without mass loss is almost negligible. According to the selected test conditions in the first 15 min, the mass loss of these samples is up to 15 mg, for 120 min exposure is 88,5mg, with a cavitation rate of 0,7 mg/min and total surface area damage of 35%. Analyzing the progression of erosion samples of glass-ceramics, it can be concluded that the loss of mass is small, in the first 15 min the mass loss is 1,29 mg, for 120 min exposure is 3,53 mg, with a cavitation rate of 0.03 mg/min and total surface damage of the sample surface of 12%. The higher erosion rate of the raw basalt samples compared to glass-ceramic samples based on basalt can be interpreted by the rough structure of the olivine-pyroxene basalt from Vrelo-Kopaonik deposit, compared to the compact structure of the obtained glass-ceramic samples, with glass and fluid texture, very great hardness. Research has shown that the process of obtaining samples of glass-ceramic greatly influences cavitation resistance, especially relaxation cooling processes that eliminate internal stresses and reduce brittleness of samples. It has been shown that glass-ceramic samples based on olivine-pyroxene basalt from the test deposit can be applied in conditions in which high cavitation loads are expected.