

Abstract

Due to its excellent sealing capabilities, bentonite is considered as an ideal material for sealing a deep underground radioactive waste repository. An integral part of the planned repository is an engineered barrier, which can be made of pelletized bentonite.

First part of the thesis is focused on the basic characteristics of bentonite with regard to its use in deep storage and then on its selected hydromechanical properties, which are responsible for its sealing function. The main part of the research is focused on bentonite in the form of pellets, the basic knowledge about pellets, its characteristic properties, the possibilities of using pellets in the design of deep storage, the homogenization process and the comparison of hydromechanical properties with the homogeneous block.

The aim of the thesis is to assess the hydromechanical properties of pelletized bentonite and its comparison with homogeneous block. In order to verify these properties, laboratory tests were performed on samples of the pellet mixture and the homogeneous block, focusing on swelling pressure and hydraulic conductivity. The tested material was Czech bentonite BCV from the Černý vrch location.

On the basis of the obtained results, it can be concluded that the hydromechanical properties of the pelletized bentonite compared to those of the homogeneous block are generally in good agreement and are very close to the homogeneous state after saturation.