

LOCA Laboratories in Research Centre Řež

R.Mohyla¹, M.Rabochová¹ and V.Rosnecký¹

¹: Research Centre Řež, a. s., Husinec-Řež 130, 250 68, Czech Republic

Roman.mohyla@cvrez.cz, Michaela.rabochova@cvrez.cz, vit.rosnecky@cvrez.cz

Abstract

The safety systems and equipment in nuclear power plant have to stay functional during normal operation and also under harsh conditions that may occur in case of an accident. Essential equipment for safety systems may be subjected to harsh conditions. They have to be tested and qualified to ensure their long-time durability. The process of testing involves subjecting the equipment to harsh conditions, comparable to a real accident. LOCA laboratories are designed to test equipment located in the containment of a nuclear power plant. LOCA laboratories consist of LOCA facility, Gamma irradiation facility and High Voltage test laboratory.

The purpose of LOCA facility is to create the same environment as in the containment of a nuclear power plant during Loss-of-coolant Accident. The laboratory is used for testing and development of new components for current and future generations of nuclear power plants

Our gamma irradiation facility is capable to irradiate samples or components made of various materials for research and commercial activities. Thanks to its recent modernization, which involved installation of an experimental box, it is possible to conduct experiments under temperatures ranging from -196 to 400 °C and pressures approaching high-vacuum. Such conditions allow to performing diverse experiments, for example, a simulation of space or reactor environment and so on. The synergy of irradiation, temperature and pressure induces structural changes lead to material degradation. This is used for material aging before material test. Obtained knowledge is then applicable in multiple engineering fields like nuclear, aerospace and biological engineering.

High Voltage test laboratory allows us to perform testing electrical components and cables. It is used in synergy with LOCA facility and gamma irradiation facility to verify electrical properties of tested components and specimens.

Keywords: Loss of Coolant Accident, testing, harsh conditions, containment, gamma irradiation, High Voltage