

CISCC Resistance Test and Threshold K Evaluation of Dry Storage Canister Materials under Immersion Condition

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Dry storage canisters made of austenitic stainless steel for spent nuclear fuel are exposed to a chloride environment due to the location of the nuclear power plant. During this time, chloride induced stress corrosion cracking (CISCC) can occur, and it is necessary to evaluate the CISCC resistance of the canister materials. It is also important to evaluate the weld on the canister as it is susceptible to CISCC. In this study, the CISCC resistance test of CT specimens was tested under immersion conditions using a developed tester. The materials for testing are SS304L, SS316L and newly developed material ADCS#3 from Korea Advanced Institute of Science and Technology to improve the CISCC resistance. The weld specimen was also evaluated. The corrosion crack on the specimen cross section was measured using a microscope and the CISCC crack growth of the specimens was determined over time and the threshold K was evaluated for each material. As a result, it was found that the SS316L has a higher resistance than the SS304L, and the ADCS#3 is similar to the SS316L, and the probability of CISCC in the weld was lower than in the base metal. This allowed to determine the threshold K value of each base and weld material when no CISCC occurs.