NEW COOLING SYSTEM WITH DIELECTRIC FLUID FOR MAGNETIZING WINDING OF RFX-MOD EXPERIMENT

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In order to improve the number of pulses per day in RFX-mod with plasma current up to 2 MA, an evaluation of the possible reintroduction of the cooling system of the magnetizing winding is presented.

The cooling system was built up in 1991, with ultrapure water used as coolant fluid, but unused from the restart of RFX-mod operations till now.

To avoid the problems due to the reintroduction of water with high voltages parts and the complexity of the maintenance of ultrapure characteristics of water, an assessment of alternative fluids has been carried out.

A plant has been designed trying to reduce the modifications of the existing cooling system. Gases, requiring for their usage components designed for higher pressure, have been avoided and dielectric fluids have been considered the more suitable alternative for this application. In particular RM101 produced by MITENI has been chosen as coolant. The RM101 presents good chemical and electrical stability properties but worst heat transfer capacities with respect to water.

An important issue was the adaptation of existing components sized on water to new application, considering the sensible reduction of cooling performance of dielectric fluid in comparison to the ultrapure water and the different compatibility with materials. The working conditions have been set to limit pressure drops and enhance heat transfer, taking into account the high density and the low specific heat of the new fluid.

In this work the deep renovation of the existing cooling system and its performances first results with the RM101 as coolant are presented.