

RF Tests of Chemical Additives for Water Cooled RF Loads

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This paper discusses the RF performance of high power RF water loads at 201.25 MHz for the LANSCE RF system using chemical additives to ionize the cooling water. RF loads at 201.25 MHz that dissipate the RF power directly into the water usually use some kind of additive to increase the number of free ions in the water and thus, increasing the RF absorption. Presently cooling water from a cooling tower is used in our 201.25 MHz load. The additional ions are obtained as the water passes through the evaporative cooling tower and is exposed to the outside elements. This water works well as an RF absorber, but it is very dirty and builds up a sludge in the water system that requires a cleaning every two years. The cleanings are time consuming and cleaning abrasives can potentially damage the components. In addition, a water glycol mixture has been historically used in loads, but this mixture can be difficult to dispose of because of environmental requirements. Two chemical additives, Corrshield MD401, made by GE, and West C-441, made by West, Inc, were tested in a high power RF water load at 201.25 MHz. The Corrshield MD 401 is the American equivalent to the European available Corrshield MD4151, tested by Ebert and Ullrich at DESY. It is a sodium molybdate based chemical used for corrosion protection in water systems. West C-441 is a sodium nitrate based chemical, that was developed by WEST, Inc for our specific application. Both of these chemicals are more environmentally friendly and easier to dispose of than options such as a water glycol mixture and do not create buildup problems like the cooling tower water. The RF performance was characterized by measuring the match of the RF load. This paper summarizes the low power test results of the two chemical additives.

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