

NEW HIGH POWER CW TEST FACILITIES FOR ITER ICRH COMPONENTS TESTING

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In the framework of the ITER ICRF R&D program, the qualification of RF components (vacuum windows, rear vacuum transmission line) requires dedicated facilities to provide relevant test conditions in term of thermal cycling (baking and cooling), vacuum and RF power. In order to support the ongoing ICRF developments, the CEA/IRFM test bed facilities are being upgraded.

These test stand facilities, designed for CW operation, consist in a cooling/baking water loop, high power 35-80 MHz RF sources (the existing TS RF amplifier), an RF matching system and a vacuum tank.

The water loop will provide high pressurized water matching ITER operation conditions, in baking mode and cooling mode, with a RF power exhaust capability up to 500 kW cw.

The matching system is designed to allow testing the so-called High Power Prototype (a module of the ITER launcher, i.e. a quarter of the antenna) at high current and voltage level (up to 3 kA, 50 kV separately in the 55 MHz range), but also various components: the RF window, the Rear Vacuum Transmission Line. All these components will be mounted in a common dedicated vacuum vessel (size diameter 2.8 m, length 4.5 m) to be qualified under realistic vacuum and temperature condition.

The vacuum vessel is indeed designed to provide ITER relevant vacuum condition, with dimensions compatible with each component to be tested. This equipment is composed of a vacuum tank, a vacuum pumping system, a heating system, a control and safety system, and diagnostics like thermocouple and infrared camera. The front flange will match with the component to be tested.

The whole test stand will be surrounded by a safety barrier to provide personal protection for eventual leak of high pressure water.

This paper presents a technical overview of these facilities and discusses their future operations in the framework of the ITER ICRH European R&D program.