Performance of the ECH Transmission Lines and Launchers in DIII-D*

K. Kajiwara,[1] C.B. Baxi,[2] J. Lohr,[2] I.A. Gorelov,[2] M.T. Green,[2]
D. Ponce,[2] and R.W. Callis[2]
[1]*Oak Ridge Institute for Science Education, Oak Ridge, TN, USA*
[2]*General Atomics, San Diego, CA, USA*

The ECH/ECCD transmission system on the DIII-D tokamak is comprised of six corrugated wave guide lines and three launchers Each waveguide is designed for 1.0 MW, 10 s. pulses at 110 GHz and each launcher delivers power from two of the waveguides. Losses in the 31.75 mm diameter evacuated transmission system are expected theoretically to occur mainly at miter bends, approximately 1% per miter bend [1]. About 90% of the miter loss is due to mode conversion and 10% is resistive, which depends on the polarization orientation with respect to the plane of the miter bend. Low power efficiency tests of six miters in series gave 1.5% loss per miter. Measurements of the overall waveguide transmission efficiency, about 70% for all the lines, will be reported. At the launchers, the temperatures of the back surfaces of the flat steering mirrors are measured using resistance temperature detectors (RTDs). The peak mirror surface temperature was inferred from a simulation using the finite element code COSMOS with input from the RTD measurements. The simulation showed that for an RTD measurement of 300˚C on the back surface of the mirror the peak temperature on the face during the rf pulse was 700˚C and this was used to set the operational limit.

[1] J.L. Doane and C.P. Moeller, Int. J. Electronics **77**, 489 (1994).

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