

Design and Qualification of Precision Support Structure for Diagnostics

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The ECE diagnostic is planned to be used for the measurements of plasma electron temperature profile with good spatial and temporal resolutions. Secondary objectives are to obtain information on non-thermal electron populations and the power loss due to ECE.

One of the major requirements of ITER like Fusion Device is to study the plasma parameter to ascertain and control the fusion reaction. These diagnostic systems need to be assembled in the constrained space around the machines with tight tolerance for optical accuracy in many cases.

The ECE diagnostic is planned to be used for the measurements of plasma electron temperature profile with good spatial and temporal resolutions. Secondary objectives are to obtain information on non-thermal electron populations and the power loss due to ECE. This diagnostics system has about 40m long multiple wave-guides to transmit the signal from the ITER Diagnostic building for data acquisition and assessment. For which the Design and qualification of Wave-guide Support Structure has been carried out.

This paper elaborates on the Cost effective Design and Qualification of precision alignment cum support structures for the wave-guides which needs to be aligned accurately.

The cost effective design has been developed using off the shelf components. This design reduces the ± 25 mm tolerances on the building to only ± 0.5 mm on the assembled wave-guide with sufficient stability. The Support Structure qualification has been done using the Design by analysis approach of the ASME code and the stresses are assessed using the ANSYS tool

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