Development of the Low Return Loss 340-Size Ceramic Window for the APS Linac *

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Abstract

The Advanced Photon Source (APS) linac high-power switching system makes use of 340-size waveguide components. These components include vacuum-grade furnace-brazed transitions, pressurized-grade aluminum 340-size switches, and more recently 340-size ceramic windows. The fabrication of these 340-size windows proceeded with brazing of ceramic membrane to thin walled copper sleeves and real-time network analyzer testing performed by the ASD (Accelerator Systems Division) RF (Radio Frequency) Group. Initially it was thought that this real-time testing of prototype hardware would be necessary in the investigative stage to establish required dimensions and physical geometry satisfying the 40-dB return loss criteria. However, producing four windows now installed involved real-time network analyzer testing during production of each window conducted in parallel with adjustments of tuners designed into each 340-size ceramic window.

Keywords: radio-frequency, vacuum, brazing

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