

REMOTE WELDING EQUIPMENT FOR TPX*

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The Tokamak Physics Experiment (TPX) is being managed by Princeton Plasma Physics Laboratory for the Department of Energy (DOE). As a major participant in the TPX Project, General Atomics has responsibility for design of the Plasma Facing Components (PFCs) and the Remote Handling tooling necessary to perform remote maintenance of these components within the TPX vacuum vessel. Part of this remote maintenance task includes the operations of remote welding of cooling lines connecting the PFCs to the system cooling network.

This paper describes the remote welding applications and requirements necessary for maintenance of the TPX PFCs. The application identified includes inside diameter welding, outside diameter welding and edge welding of titanium and stainless steel alloys. Welding equipment developed for this application includes some unique features due to the specialized environment of the TPX vessel. Remote features of this equipment must include the ability to acquire and align the parts being welded, perform all welding operations and inspect the weld area. Designs for weld heads require the integration of industry proven hardware and the special features necessary to accomplish remote operations. Such features include compact size, remote manipulation, remote clamping and alignment, remote vision, full inert gas coverage, arc voltage control, wire feed, programmable weld schedules and failure recovery.

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