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Vacuum Compatibility of Flux-Core Arc Welding (FCAW) DANA AROSE, MARTIN DENAULT, STEPHAN JURCZNSKI, PPPL — Typically, vacuum chambers are welded together using gas tungsten arc welding (GTAW) or gas metal arc welding (GMAW). This is demonstrated in the vacuum chamber of Princeton Plasma Physics Lab's (PPPL) National Spherical Torus Experiment (NSTX). These processes are slow and apply excess heat to the base metal, which may cause the vacuum chamber to deform beyond designed tolerance. Flux cored arc welding (FCAW) avoids these problems, but may produce an unacceptable amount of outgasing due to the flux shielding. We believe impurities due to outgasing from FCAW will not greatly exceed those found in GTAW and GMAW welding. To test this theory, samples welded together using all three welding processes will be made and baked in a residual gas analyzer (RGA). The GTAW and GMAW welds will be tested to establish a metric for permissible outgasing. By testing samples from all three processes we hope to demonstrate that FCAW does not significantly outgas, and is therefore a viable alternative to GTAW and GMAW. Results from observations will be presented.

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