

## **FLAW TOLERANCE IN LAP SHEAR BRAZED JOINTS - PART 1**

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### **ABSTRACT:**

Vacuum brazing is a viable process to achieve strong permanent and hermetic joints in space. As in any joining process, brazed joints have various imperfections and defects. It is important to understand the impact that flaws have on the load carrying capacity and performance of the brazed joints. This study focuses on the behavior of lap shear joints due to their engineering importance in brazed aerospace structures. In Part 1 an average shear strength capability and failure modes of the single lap joints are explored. Specimens comprised of 0.090 inch thick 347 stainless steel sheet brazed with pure silver are tested in accordance with the AWS C3.2 standard. Comparison of the measured loads and average shear stresses at failure with the Finite Element Analysis (FEA) of the same specimens as a function of the overlap lengths shows excellent correlation between the experimental and calculated values for the defect-free lap joints. In Part 2, various flaws will be introduced in the test specimens to simulate lack of braze coverage in the lap joints. Mechanical testing and FEA will be performed on these joints to verify if behavior of ductile lap joints containing flaws is similar to the joints with the reduced braze area. Finally, in Part 3, the results obtained in Part 1 and 2 will be applied to the brazed assembly to evaluate a load carrying capability of the structural lap joint containing defects.