

NASA TECH BRIEF

Manned Spacecraft Center



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Reduction of Porosity in Aluminum Weldments

When fabricated under certain conditions, aluminum weldments are highly porous. This porosity makes the weldments unsuitable for use in fabrications requiring high quality weldments. It was initially thought that shielding gases or filler materials were responsible for this porosity, but extensive tests showed this not to be the case. The welding machines and environmental factors were checked and also found not to be at fault.

It was necessary to look elsewhere for the cause. In most cases, polyvinyl chloride hose is used to connect the welder to the gas source. At a low humidity this doesn't create a problem. However, at higher humidity the permeable plastic from which the hose is constructed allows moisture to penetrate the walls of the tube and mix with the shielding gas. Thus, water particles are injected into the weld joint resulting in porosity to a degree dependent upon the water content of the surrounding air.

Once the actual cause of the porosity was deduced, the solution to the problem turned out to be simple

and efficient. The porosity may be eliminated by replacing the polyvinyl chloride tubing with copper and by using a liquid argon gas source at the weld station. This system was found to produce weldments well within the requirements for flight grade aluminum welds.

Note:

No further documentation is available. Specific questions, however, may be directed to:

Technology Utilization Officer
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Patent status:

NASA has decided not to apply for a patent.

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