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Subject Evaluation Test of a
Braze Bimetallic Joint

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An evaluation test of a brazed bimetallic joint of 6061-T6 aluminum and T-304 stainless steel has been conducted. This type joint is being considered for a bimetallic transition sleeve required in the pressure vessel seal block design. The test specimen and joint geometry are shown in Figure 1. The brazing was performed by Bi-BRAZE Corp., N. J.

The test results indicate the mechanical strength of this joint to be satisfactory for operating pressures of 750 psig.

Pressure tests, temperature cycling tests, impact tests and leak tests were included in this evaluation. The sequence of tests and results obtained are summarized below:

1. Hydrostatic test at 1600 psig for 10 minutes. No pressure loss or visual cracks of joint.
2. Pressure test with Helium gas at 750 psig and ambient temperature for 10 minutes. No evidence of failure.
3. Test of assembly covered with liquid nitrogen (-320°F) while pressurized with 750 psig Helium for 10 minutes. No evidence of failure. Pressure was released at this temperature.

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INFORMATION CATEGORY

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4. Subjected test assembly at ambient pressure from R.T. to -320°F for four cycles. Specimen held 10 minutes at -320°F for each cycle. No visual evidence of cracks.
5. Pressurized test assembly to 750 psig (Helium gas) after 4th cycle above at -320°F . No pressure loss was observed.
6. Pressurized to 750 psig (Helium gas) at room temperature and immersed specimen in water. No gas bubbles or evidence of leakage were observed.
7. Dropped a one pound weight from a height of 5 feet striking the stainless steel member. The aluminum section was clamped to a semi-rigid support. The assembly was then pressurized to 175 psig with Helium gas at room temperature. A CEC leak detector was used to check for leaks. No indication of leaks greater than 10^{-8} CC/sec were observed.
8. Repeated drop test with 5 pound weight from 5 feet. Checked at 200 and 750 psig (helium gas, Room Temperature) with no indication of leaks.
9. Hydrostatic test at 3000 psig for 8 minutes. No visible damage of joint.
10. Ultimate pressure test at room temperature. Hydrostatic pressure applied to 5500 psig at which time a shear failure of the joint occurred.

Photos of failed specimens are available but are not included in this report.

G. M. Bove
Reactor Assembly &
Dynamics Experiments

Approved by:

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Attachment

MATERIAL

ITEM 2 - 6061-T6 AL

ITEM 1 - T 304 CRES

PART OF L/O 937J740

FIGURE 1 - BIMETALLIC JOINT TEST SPECIMEN