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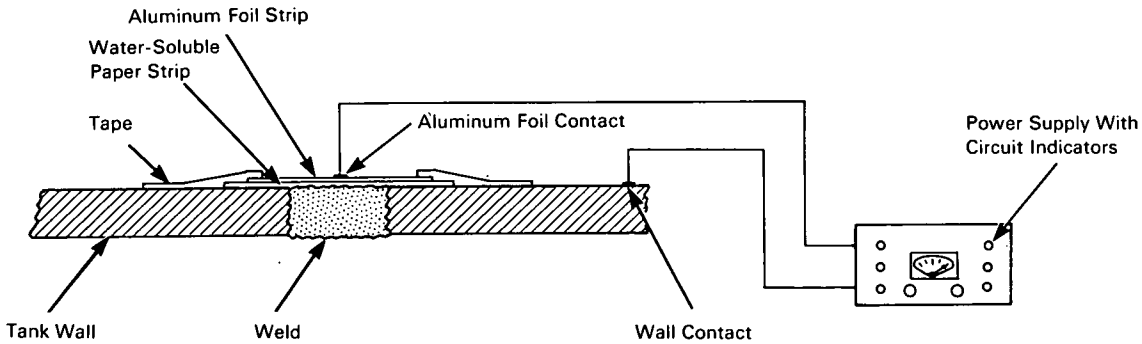
NASA TECH BRIEF

Weld Leaks Rapidly and Safely Detected



The problem: To detect leaks that occur during hydrostatic pressure testing of welded joints in metal tanks.

The solution: A strip of aluminum foil electrically insulated from the tank by a strip of water-soluble paper is placed over the weld on the outside surface of the tank. A voltage applied between the tank wall and the foil strip is monitored to detect a decrease in ohmic resistance caused by water leakage into the paper layer.

How it's done: Adhesive tape placed along the edges of the aluminum foil and water-soluble paper holds them in proper position over the welded joint. An ohmmeter circuit (with an audible or a visual alarm system) indicates the large decrease in resistance that occurs when the hydrostatic pressure in the tank forces water through a leaky weld into the paper. Separate strip assemblies can be placed over each of the welded joints and connected to the monitoring circuit during one test. When an indication of a leak is recorded for a particular welded joint, the exact area where the leak has occurred can be determined after shutdown of the hydrostatic pressure and removal of the tape and aluminum strip. A clear area due to solution of the paper identifies the site of the leak.

Notes:

1. This test method has the following advantages:
   a. Safety to personnel is assured since no one need be in the test area until the hydrostatic pressure is removed.
   b. No paints or dyes that can contaminate the tank are used.
   c. Black light or TV cameras are not required.
   d. The tape, foil, and paper are commercially available materials which can be prepackaged into suitable rolls. The power supply and indicator circuits can easily be constructed from standard electrical components.

(continued overleaf)

2. Inquiries concerning this innovation may be directed to:

   Technology Utilization Officer
   Marshall Space Flight Center
   Huntsville, Alabama, 35812
   Reference: B65-10265

Patent status: NASA encourages commercial use of this innovation. No patent action is contemplated by NASA.

Source: The Boeing Company
under contract to
Marshall Space Flight Center
(M-FS-362)