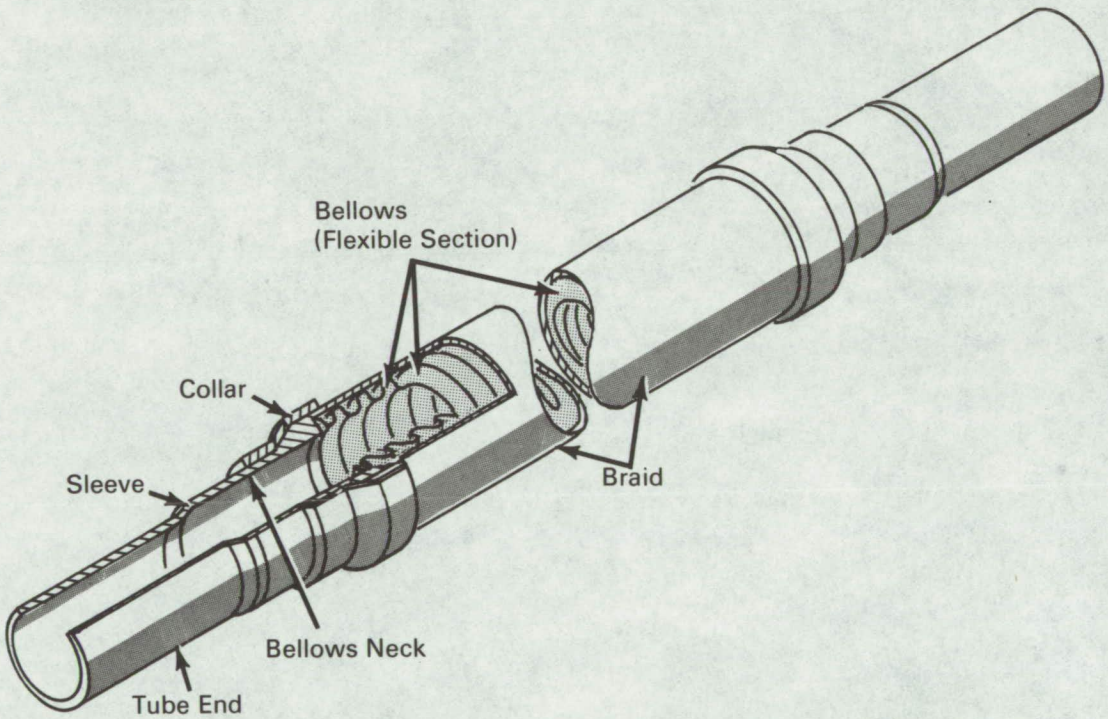
December 1966

Brief 66-10635

NASA TECH BRIEF

Lightweight, All-Metal Hose Assembly Has High Flexibility and Strength Over Wide Range of Temperature and Pressure



The problem:

To develop a lightweight flexible, metal braid reinforced hose assembly to be used in high and low pressure oxygen, helium, and hydrogen systems. The hose assembly must be capable of withstanding pressures from 100 to 3200 psi, at temperatures from 70° to −423°F. Existing hose assemblies were heavy, had little flexibility, and short life.

The solution:

A hose design which incorporates a new method of fastening flexible sections and reinforcement braid.

How it's done:

The all-metal hose assembly consists of a flexible section, sleeves, reinforcement braid, collars, and tube ends. The flexible section is an annular, continuous convoluted bellows. The end sleeves are joined to the bellows neck which fits snugly within the inside diameter of the sleeve, by an overlapping, double-row resistance weldment. This weldment is trimmed, still leaving a pressuretight joint, with the resulting end subsequently butt welded to the tube ends. The stainless steel braid is then assembled over the flexible section (bellows) which is compressed in a fixture to

(continued overleaf)

its required length. The braid is then formed over the sleeve conical shoulder and a collar is positioned over and against the braid at the sleeve cone area. This provides a clamping action which is maintained by swaging and heliarc welding the collar and the braid to the sleeve.

Notes:

1. These hose assemblies have been successfully used on the Saturn-II stage to provide joints of sufficient flexibility to absorb movement resulting from structural and load induced excursions and temperature variations.
2. These assemblies have been made in sizes varying from 1/4 to 1 inch.
3. Inquiries concerning this invention may be directed to:

   Technology Utilization Officer
   Marshall Space Flight Center
   Huntsville, Alabama 35812
   Reference: B66-10635

Patent status:

Inquiries about obtaining rights for the commercial use of this invention may be made to NASA, Code GP, Washington, D.C. 20546.

Source: L. L. Bessing
of North American Aviation, Inc.
under contract to
Marshall Space Flight Center
(M-FS-1831)