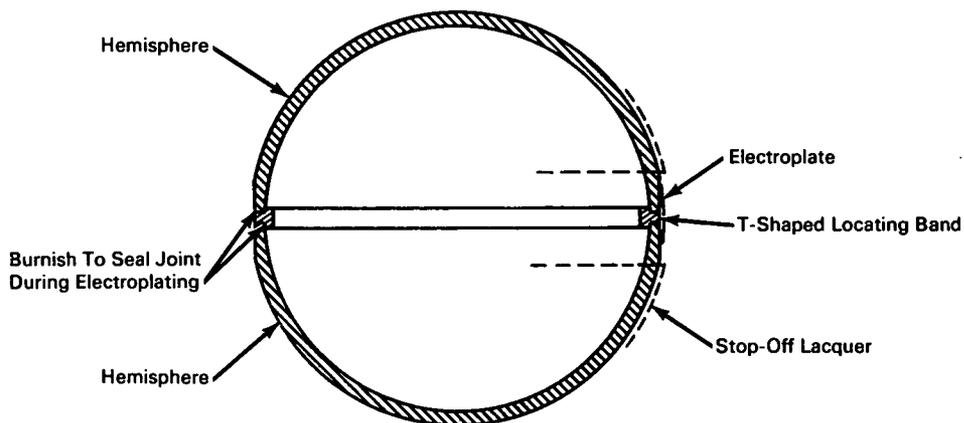


NASA TECH BRIEF



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Hollow Spherical Rotors Fabricated by Electroplating



The problem:

To fabricate a hollow spherical rotor without cracking or destroying the precise accuracy of the hemispheres. Prior art methods used fusion and diffusion welding, and furnace brazing, each of which was unsatisfactory mainly because the high temperatures involved tended to destroy the precise accuracy of the hemispheres.

The solution:

Fabricate an equatorial band to provide a locating fit for the hemispheres and join them by electroplating.

How it's done:

An equatorial band having a T-shaped cross section is machined to provide a locating fit for the two precision machined hemispheres. A shallow groove, about 15% to 20% of the width of the sphere diameter, is cut on the surface of the sphere, following the equatorial joint.

The surface of the sphere, other than the groove, is masked by a stop-off lacquer. The assembly is clamped together and the groove including the joint is electroplated. The thickness of the plate is such that the surface of the groove is above the surface of the sphere and is then machined to conform to the surface of the sphere.

Notes:

1. The electroplating method for fabricating rotors has the following advantages: (a) High clamping forces, which cause deformation, are not required. (b) Since the electroplating method is carried out at essentially room temperature, there is no possibility of temperature deformation and creep to occur. (c) Added bonding material is easily controlled because it can be removed from any area where it may penetrate.
2. Several nonmagnetic materials may be used to form the joint such as aluminum, copper, iron,

(continued overleaf)

gold, platinum, and zinc.

3. Inquiries concerning this innovation may be directed to:

Technology Utilization Officer
Jet Propulsion Laboratory
4800 Oak Grove Avenue
Pasadena, California 91103
Reference: B66-10366

Patent status:

No patent action is contemplated by NASA.

Source: H. W. Avery and T. F. Conroy
of General Electric Company
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