December 1965

## Brief 65-10398

## NASA TECH BRIEF



NASA Tech Briefs are issued by the Technology Utilization Division to summarize specific technical innovations derived from the space program. Copies are available to the public from the Clearinghouse for Federal Scientific and Technical Information, Springfield, Virginia, 22151.

## Nickel/Tin Coating Protects Threaded Fasteners in Corrosive Environment

**The problem:** To provide an adequate corrosionresistant coating for threaded fasteners used in corrosive environments. Cadmium and zinc have posed plating thickness control problems on complex surfaces such as threads and recessed socket heads.

**The solution:** A process by which parts are plated with 0.0001 to 0.0002 inch of electroless nickel and electroplating, over the nickel, 0.0001 to 0.0002 inch of tin.

**How it's done:** The electroless nickel is deposited by a conventional electroless nickel bath employing constant filtration. The tin is deposited from a bath containing 14 oz/gallon of potassium stannate and 2 oz/gallon of free potassium hydroxide. However, any electrodeposited tin such as from a fluoroborate or sulfuric acid bath, should produce an equivalent coating if thermally diffused. The use of diffusion is governed by the temperature of the corrosive environment to which the part is to be exposed. Diffusion is accomplished by heating the electroless nicke<u>l</u>coated workpiece to  $485 \pm 10^{\circ}$ F for two hours.

## Notes:

- 1. Alloy steel fasteners treated with this coating have withstood 96 hours of salt spray without corrosive damage.
- 2. Inquiries concerning this invention may be directed to:

Technology Utilization Officer Manned Spacecraft Center P.O. Box 1537 Houston, Texas, 77001 Reference: B65-10398

**Patent status:** NASA encourages the immediate commercial use of this invention. Inquiries about obtaining rights for its commercial use may be made to NASA, Code AGP, Washington, D.C., 20546.

Source: James Charles and Lloyd Veeder of North American Aviation, Inc., under contract to Manned Spacecraft Center (MSC-253)

Category 03

This document was prepared under the sponsorship of the National Aeronautics and Space Administration. Neither the United States Government nor any person acting on behalf of the United States

Government assumes any liability resulting from the use of the information contained in this document, or warrants that such use will be free from privately owned rights.