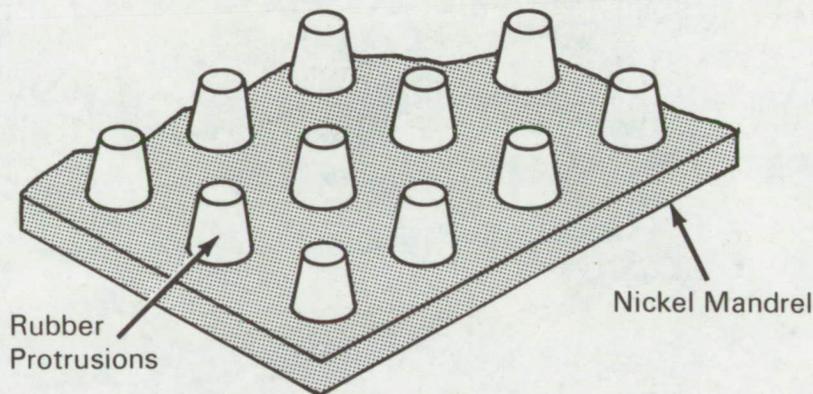


NASA TECH BRIEF



NASA Tech Briefs are issued to summarize specific innovations derived from the U.S. space program, to encourage their commercial application. Copies are available to the public at 15 cents each from the Clearinghouse for Federal Scientific and Technical Information, Springfield, Virginia 22151.

Electroformed Screens with Uniform Hole Size



An efficient method has been devised to electroform fine-mesh nickel screens, or plaques, with uniform hole size and accurate spacing between holes. Commercial electroformed screens with accurate holes are made by electroforming the metal on a mandrel with a photoresist consisting of electrically nonconductive spots as a stopoff. These mandrels are usable for only a few cycles, as the photoresist peels and requires recoating, reprinting, and redeveloping to restore the pattern. Another problem with screen mandrels which use electrically nonconductive spots flush or nearly flush with the conducting surface of the mandrel is the variation of hole size with thickness of the electroform. As a screen is electroformed and the thickness increases, the holes decrease in diameter. For example, a mandrel containing nonconductive spots 10 mils across cannot be used for electroforming screens thicker than about 5 mils, because the holes will close up.

These problems are eliminated by employing an electroformed nickel mandrel provided with non-

conducting silicone rubber projections that duplicate the desired hole size and shape in the finished nickel screen. A stainless steel sheet with holes etched through it is used as a master screen for electroforming the mandrel. The procedure then consists of the following steps:

- (1) Fill the holes in the master screen with paraffin;
- (2) Scrape the paraffin from one side of the master;
- (3) Plate approximately 5 mils of nickel on the scraped surface;
- (4) Remove the paraffin from the holes and fill them with silicone rubber resin, leaving an excess (1/8-inch thick) of resin on the nickel-plated mandrel only;
- (5) Separate the stainless steel master from the nickel mandrel after the silicone rubber has hardened in place to form projections representing the desired holes;
- (6) Electroform nickel screens using the mandrel obtained in step 5.

(continued overleaf)

Notes:

- 1: The silicone rubber projections can readily be pulled from the electroformed nickel screen, leaving the mandrel (with the projections intact) free for reuse.
2. Threaded holes can be electroformed using threaded projections of silicone rubber.
3. Details may be obtained from:
Technology Utilization Officer
Lewis Research Center
21000 Brookpark Road
Cleveland, Ohio 44135
Reference: B68-10107

Patent status:

No patent action is contemplated by NASA.

Source: G. R. Schaer
of Battelle Memorial Institute
under contract to
Lewis Research Center
(LEW-10117)