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NASA TECH BRIEF

Manned Spacecraft Center

Polishing Is Made Cheaper By Disposable Diamond-Impregnated Abrasive Cloth

The problem:

Diamond powders are frequently used as abrasives in grinding and polishing. Normally, surfaces are polished with a suitable cloth and a set of pastes which contain diamond powders of different grades. This method has two drawbacks: first, the cloth, if reused, may become contaminated and scratch the surface, and second, diamond pastes are expensive.

The solution:

A diamond-impregnated abrasive cloth eliminates expensive diamond pastes and can be economically disposed of to avoid contamination.

How it's done:

The cloth initially used was spunbonded nylon, however, any "napless" fabric can be used. The cloth is sprayed with a specially prepared diamond abrasive gel. Prior to dilution for spray application, the gel is prepared from the following:

stearic acid (usp)	5 g
triethanolamine (usp)	25 ml
distilled water	50 ml
diamond abrasive	1 g

The consistency of this gel may be varied by using different proportions of stearic acid and water. Powder grades of the diamond abrasive are selected to suit the specific polishing application.

To produce this gel, stearic acid is placed into one beaker and a mixture of water and triethanolamine are poured into another. Both are heated to 90° C. During heating, the triethanolamine mixture is stirred moderately. Upon reaching 90° C, contents of the two beakers are combined and mixed with the selected diamond abrasive. This mixture is then stirred until it cools to room temperature.

To make it suitable for spraying, the resulting gel is diluted with distilled water (20% gel to 80% water is recommended). This diluted mixture is loaded into any suitable sprayer and is then sprayed onto spunbonded nylon cloth pieces which have been cut to the desired size. It takes 10 to 12 hours to air dry this cloth until the gel is not sticky. Before polishing, the cloth must be wetted with a suitable lubricant such as water to activate the abrasive gel.

Note:

No additional documentation is available. Specific questions, however, may be directed to:

Technology Utilization Officer
Manned Spacecraft Center
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Houston, Texas 77058
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Patent status:

NASA has decided not to apply for a patent.

Source: Fred J. Harper of
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