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NASA TECH BRIEF

Marshall Space Flight Center

Investigation to Identify Paint Coatings Resistive to Microorganism Growth

An investigation was conducted to identify microbial-resistive paints or varnishes among the formulations used or evaluated for use as coatings on external surfaces of spacecraft. Spacecraft coatings are applied for various purposes, including passive thermal control, ionizing and optical radiation protection, radar reflectance, and protection of underlying metal surfaces from oxidation and corrosion. In addition to meeting the special property requirements of these particular purposes, the coatings must have excellent adhesion, stability to thermal fluxes, and resistance to erosion from rain droplets and atmospheric particles.

Previously (NASA Tech Brief 69-10181), 166 coating formulations (most commonly, silicones and silicates) had been identified and characterized with respect to chemical and physical properties. Of the 166 formulations, 17 were subsequently selected as being representative of the coatings applied externally on spacecraft. The selected coatings were applied to carefully prepared aluminum alloy rods and evaluated in the laboratory to determine whether they were resistant to microbial attack and whether nutrients from the coatings were available for the growth of microorganisms. It was found that all of the coatings contained nutrients that would support microbial growth or would allow survival of two or more species studied. Some of the coatings, e.g., fungicide-containing varnishes, a phenolic butyrate, and a polyimide, appeared to be somewhat resistant to microbial attack, while epoxy, acrylic, silicone, silicate and polyurethane formulations, respectively, in decreasing order of resistance, appear to be more susceptible to attack.

The incorporation of suitable microbiocidal agents into selected coatings from the latter group is recommended for improved inhibition of microorganism growth and for increased protection against deterioration of the coatings by microorganisms. Research based on this recommendation could lead to the formulation of antimicrobial coatings for walls and equipment in hospitals and food processing plants, and the development of reusable, sterile polymer containers.

Note:

The following documentation may be obtained from:

National Technical Information Service
Springfield, Virginia 22151
Single document price $3.00
(or microfiche $0.95)

Reference:
NASA-CR-111524 (N71-13017), Investigation of Spacecraft Materials that Support Microorganism Growth

Patent status:

No patent action is contemplated by NASA.

Source: H. T. Kemp and C. W. Cooper of
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