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NASA TECH BRIEF

NASA Pasadena Office

Effects of the Thermal Sterilization Procedure on Polymeric Products

The effects of exposing commercially available polymeric products to a dry reducing atmosphere at sterilization temperatures and times have been investigated. The term "polymeric product" as used here specifies a formulated or compounded organic polymer sold under a trade name. In its raw or basic state, an organic polymer has limited usefulness, but when cured (vulcanized) and, in most cases, when compounded with other materials, it can acquire certain desirable properties or responses.

Approximately 160 proprietary products were classified into eight categories according to their junctions: adhesives, coatings, elastomers, encapsulants, films, lubricants, reinforced plastics, and tapes. Simple, standard tests were assigned to each category, and more than 6500 specimens were prepared and tested.

Prior to the heat sterilization tests, the majority of the products were subjected to a screening program to eliminate those with poor thermal stability. The program consisted of a 40 hour exposure to dry nitrogen at a temperature of 422 K. About 20 products were thus eliminated. The remaining products were exposed to the heat sterilization test, which consisted of three 40 hour exposure cycles at 422 K in dry nitrogen.

After thermal exposure, the properties of the samples were tested, and the values were compared with those obtained for unexposed samples. Ratings of the thermal stability or thermal compatibility of the products were then made, assessing the degree of change in the measured properties. Accordingly, products were rated compatible, marginal, or not compatible.

Notes:

1. A report covering the investigations includes a tabular summary of the test results for each product, including compatibility ratings. The test data pertain to thermal exposure testing only, and are average values. Materials, procedures and tests, and compatibility criteria are included. Detailed results of the preliminary screening and the thermal exposure tests are given in tabular form. Preparatory treatment requirements for specific products, mixing ratios, pot lives, and cure conditions are included.
2. The following documentation may be obtained from:

   National Technical Information Service
   Springfield, Virginia 22151
   Single document price $6.00
   (or microfiche $0.95)

   Reference:
   NASA-CR-80434 (N67-13099), Effects of the Thermal Sterilization Procedure on Polymeric Products

Patent status:

No patent action is contemplated by NASA.

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