AMBUstat BY EMERGENCY Products + Research

Material Compatibility

The AMBUstat™ system is used in numerous prehospital environments as part of the cleaning and disinfection process. Any materials that are left in these spaces, including equipment, instruments, computers and work surfaces, are exposed to the vapor from a solution of Actril™ Cold Sterilant.

This document summarizes material compatibility test results for materials that may be commonly found in ambulances and other prehospital clinical spaces. The intent of the testing was to determine the effect, if any, that MINNCARE® dry fog vapor would have on various materials, including corrosion testing performed according to ASTM standards. To ensure an appreciation for these results, the MINNCARE® dry fog system employs MINNCARE® Cold Sterilant, whereas our AMBUstat™ system employs Actril™ Cold Sterilant. MINNCARE® and Actril™ are sister products that share peracetic acid and hydrogen peroxide as the active ingredient, with the difference being that MINNCARE® employs a proprietary concentrated mixture of 4.5% peracetic acid and 24.0% hydrogen peroxide and Actril™ employs a stabilized ready-to-use mixture of 0.08% peracetic acid and 1.0% hydrogen peroxide.

All materials were suspended in a small cleanroom and subjected to 30 cycles of MINNCARE® dry fog exposure. The test conditions were those that no prehospital environment should ever experience. All factors, including amount of chemical, humidity and time between cycles were set at levels above the worst-case conditions that prehospital environments will likely see in actual practice.

For the results provided on the following page, here are the codes: A = compatible, no significant effect noted; B = material exhibited some minor reaction; C = significant reaction, but not a failure of the material; and NR = not recommended for exposure due to material failure.

Although we usually recommend that sensitive instruments and electronic components be removed prior to deployment of the vapor, we recognize that users may wish to evaluate the potential effects of the vapor on electronic items. Therefore, materials representative of items commonly found in prehospital environments were tested, including a working circuit board, a personal computer, electrical outlets and the system's remote control unit. Following the 30 cycles of dry fog exposure, each device was evaluated and found to remain functional with no visual effects.

NASA SPINOFF NASA TECHNOLOGY TRANSFER PROGRAM

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METALS AND POLYMERS
Below Summmaizes the results of the tests of metal and polymer materials

METALS

Material	Code	Comments
303 Stainless Steel	A	No Significant Effect
304 Stainless Steel	A	No Significant Effect
316 Stainless Steel	A	No Significant Effect
430 Stainless Steel	B	No Significant Effect
Mild Steel	C	Significant Areas of Rust
Galvanized Steel	A*	Surface Discoloration, Oxidizing*
Type 1100 Aluminum (bare)	B	Some Surface Pitting and Roughening
Type 1100 Aluminum (anodized)	B	Some Surface Pitting and Roughening
Type 2024 Aluminum (bare)	C	Significant Dulling of Surface
Type 2024 Aluminum (anodized)	A	No Significant Effect
Type 6061 Aluminum (bare)	A	No Significant Effect
Type 6061 Aluminum (anodized)	A	No Significant Effect
Hastelloy	A	No Significant Effect
Nickel Plated Brass	B	Discoloration
Copper	NR	Surface Discoloration and Oxidizing
Naval Brass	NR	Severe Oxidizing and Discoloration

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POLYMERS

Material	Code	Comments
ABS	A	No Significant Effect
Acrylic C-PVC	A	No Significant Effect
Delrin	A	No Significant Effect
Polycarbonate	A	No Significant Effect
High Density Polyethylene	A	No Significant Effect
Polyethylene	B	No Significant Effect
Polypropylene Black	A	No Significant Effect
Polyurethane	A	No Significant Effect
Gray PVC	A	No Significant Effect
White PVC	A	No Significant Effect
Buna-N	A	Significant Swelling
EPDM	A	Some Tackiness on Surface
Latex Rubber	B	Color Fading, Loss of Form
PVDF	A	No Significant Effect
Silicone	A	No Significant Effect
Polytetrafluoroethylene (PTFE)	A	No Significant Effect

*The ASTM method used is designed to measure the amount of material oxidized through exposure to a substance. In this analysis, the ASTM procedure calls for the removal of all oxidized material before weighing the material sample and analyzing the effect of the vapor. This results in misleading data because some surfaces (i.e., the zinc on galvanized steel) are intended to oxidize and protect the substrate material.

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CONSTRUCTION MATERIALS

The materials used for the cleanroom construction that were tested include gypsum board coated with epoxy, gypsum board coated with polyurethane paint and various types of electrical outlets.

POLYMERS

Material	Code	Comments
Gypsum Board Coated with Epoxy	A	No Significant Effect
Gypsum Board Coated with	A	No Significant Effect
Aluminum/Copper Connector	A	No Significant Effect
Household Electrical Socket	A	No Significant Effect
Hospital Electrical Socket	A	No Significant Effect

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