

bioMET* 14 ANTIMICROBIAL COMPOUND

FOR CONTROL OF THE GROWTH OF FUNGI AND MANY BACTERIA

M&T CHEMICALS INC.
SUBSIDIARY OF AMERICAN CAN COMPANY

Trademark of M&T Chemicals, Inc.

GENERAL
OFFICES

RAHWAY, N. J.

ACTIVE INGREDIENTS

diphenylstibine 2-ethylhexoate 10%

INERT INGREDIENTS 90%

WARNING! Keep Out Of Reach Of Children.
May Be Fatal If Swallowed Or
Absorbed Through Skin.
Causes Severe Eye And Skin Irritation.

Do not get in eyes, on skin, or on clothing.

Do not breathe spray mist.

Wear goggles, rubber gloves and respirator when handling.

Avoid storage near food and feed products.

Wash thoroughly after handling.

In case of contact, immediately remove contaminated clothing and wash skin with soap and water. If irritation persists, get medical attention.

In case of contact with eyes, flush with plenty of water and get medical attention.

Wash contaminated clothing before re-use.

FOR INDUSTRIAL USE ONLY

Read Technical Data Bulletin About This Product
Prior to Use.

USDA Reg. No. 5204-42

No. 79

Made in U.S.A.



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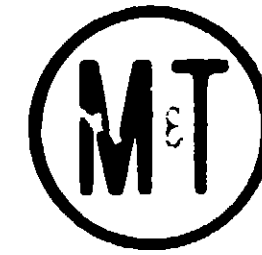
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bio-McT 14 Antimicrobial Compound

GENERAL INFORMATION

ACCEPTED
11-3-70
5204-42

For Industrial Use Only

M&T Chemicals Inc. gives no warranty, express or implied, and all products are sold upon condition that purchasers will make their own tests to determine the quality and suitability of the product. M&T Chemicals Inc. shall be in no way responsible for the proper use and service of the product. Any information or suggestions given are without warranty of any kind and purchasers are solely responsible for any loss arising from the use of such information or suggestions. No information or suggestions given by us shall be deemed to be a recommendation to use any product in conflict with any existing patent rights.

These products treated with bio-McT 14 Antimicrobial Compound will serve to control the growth of discoloring mold and mildew. It will also prevent the growth of bacteria which may cause odor or increase the environmental hazard of infection.

Wall covering See additional uses below.
Shower curtains
Rug undercoating

In addition to providing excellent compatibility with standard flexible vinyl systems, this compound protects the manufacturing area from the disagreeable odors generally associated with PVC processing. This odor protection is also afforded to the finished product. bio-McT 14 Antimicrobial Compound provides protection against discoloration in clear and white PVC films and will not alter its heat stability.

PHYSICAL AND CHEMICAL PROPERTIES (Typical)

Composition	10% solution of diphenyl-stibine 2-ethyl hexoate in dioctylphthalate
Appearance	Clear, pale yellow liquid
Corrosiveness	Non-corrosive to metal or glass
Density (calculated)	
at 25°C	1.0346
Lb. gal.	8.634
Refractive index	
at 25°C	1.4926

ANTIMICROBIAL PROPERTIES

bio-McT 14 Antimicrobial Compound is effective against a wide variety of microorganisms including bacteria and molds.

Micro-Organisms	Min. Level Required for Inhibition (PPM - of Active Ingredient)
Gram Positive Bacteria	
Staphylococcus aureus	8
Streptococcus faecalis	35
Micrococcus flavus	16
Bacterium ammoniagenes	20
Bacillus mycoides (spore former)	40
Bacillus cereus (spore former)	35
Bacillus subtilis (spore former)	30
Mycobacterium smegmatis	35
Spherothilus	25
Gram Negative Bacteria	
Aerobacter aerogenes	31
Paracolonobacterium acrogenoides	16
Salmonella typhosa	30
Shigella dysenteriae	30
Protus mirabilis	20
Pseudomonas aeruginosa	31
Alcaligenes viscolactis	30
Escherichia coli	16
Common Molds	
Aspergillus terreus	63

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1. Vinyl Upholstery (including auto seat covers), 2. Vinyl Mattress Covers, 3. Vinyl Swimming Pool Liners, 4. Vinyl Baby Pants

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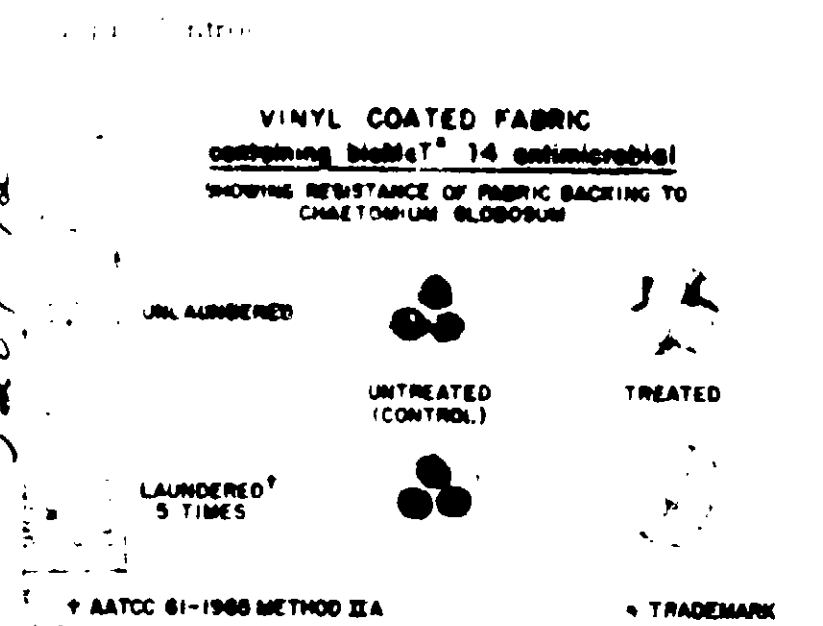
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The mildew resistance of PVC film treated with bioMeT 14 Antimicrobial Compound is demonstrated by the mixed spore agar plate method. This test is an adaptation of Mil-1-7444A (Insulation Sleeving, Electrical Flexible, dated 24 June, 1955) and Mil-1-631C (Insulation, Electrical Synthetic Resin Composition, Non-Rigid). The test organisms include *Aspergillus niger*, *Aspergillus flavus*, *Trichoderma viride* and *Penicillium piscarium* (luteum).

Sample	Additive	Mildew Rating*
Clear PVC	1.25% bioMeT 14	0
Clear PVC	none	4
Pigmented PVC	1.25% bioMeT 14	0
Pigmented PVC	none	3

*Mildew growth on the plastic film is rated as 0=no growth; 1=traces of growth; 2=light growth; 3=moderate growth; 4=heavy growth.

Soil Burial Stability

The utility of PVC film treated with bioMeT 14 Antimicrobial Compound in decorative film and vapor barriers designed for below ground installation was demonstrated by conducting soil burial tests in accordance with Federal Specification CCC W-108 (Wall Covering, Vinyl Coated). The vinyl coated fabric was obtained by blending the following ingredients and applying a 10 mil film to cotton fabric. The film was cured at 177°C (350°F) for 10 minutes.

	Clear	White
PVC resin (Geon 127EP)	100	100
DOP (dioctyl phthalate)	30	30
DOZ (dioctyl azelate)	15	15
GC2 (Epoxidized soybean oil)	5	5
Filler (TiO ₂)		15
Thermolite 187 Stabilizer	0.5	0.5
Ba Cd Zn stabilizer	2	2
bioMeT 14 Antimicrobial Compound	4.5	5

Wood Rotting Fungi	16
<i>Trichoderma reesei</i>	31
<i>Phanerochaete</i>	16
Active Cellulose Digesting Fungi	
<i>Mycelium verrucosum</i>	63
<i>Chaetomium globosum</i>	250
Pathogenic Fungi	
<i>Candida albicans</i>	31
<i>Trichophyton mentagrophytes</i>	16

DIRECTIONS FOR USE

To achieve optimum antibacterial and antifungal control, it is recommended that bioMeT 14 Antimicrobial Compound be added to PVC formulations at a concentration of 1.25% to 5% based on the weight of the film. A typical formulation is obtained by mixing the following ingredients and blending on a 2-roll differential speed mill at 163°C (325°F) for 5 minutes.

Ingredient	Parts
PVC resin	100
Plasticizer (dioctyl phthalate)	45
Butyl epoxy stearate	5
Thermolite* 187 Stabilizer	0.5
Ba Cd Zn stabilizer	2
Antioxidant (CAO-3)	0.1
Filler (TiO ₂)	0.0 to 10.0
Lubricant (Stearic acid)	0.5
bioMeT 14 Antimicrobial Compound	2.0 to 8.0

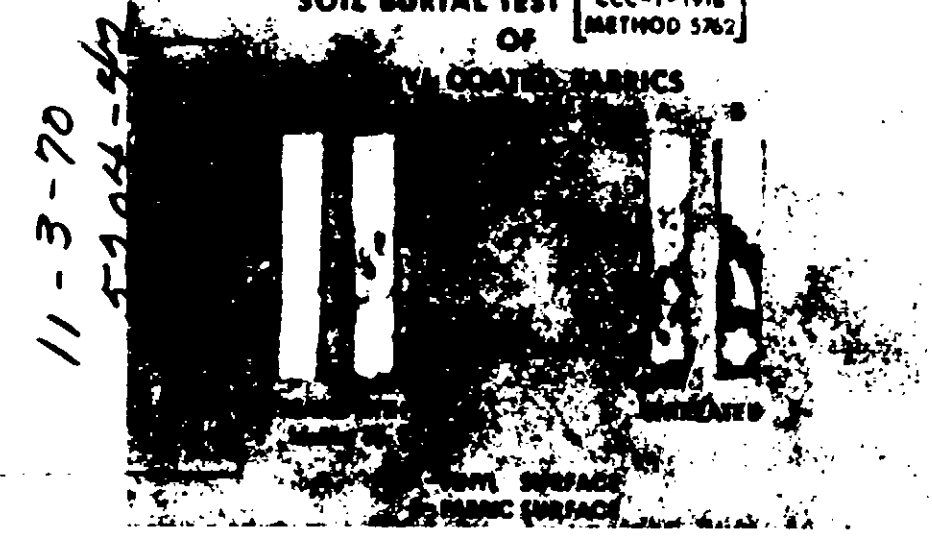
ANTIMICROBIAL PROPERTIES OF PVC TREATED WITH bioMeT 14

Bacterial Control
The antibacterial properties of PVC film treated with bioMeT 14 Antimicrobial Compound are demonstrated by the standard agar diffusion technique (AATCC Method 90-1962T) against *Staphylococcus aureus* (FDA 209).

Sample	Additive	Bacterial Control Zone of Inhibition
Clear PVC	1.25% bioMeT 14	3 mm
Clear PVC	none	0
Pigmented PVC	1.25% bioMeT 14	3 mm
Pigmented PVC	none	0

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Sample	Additive	Discoloration	Mildew
Clear	3% bioMeT 14 Compound	none	none
Clear	none	Pink and yellow staining	Severe rotting
White	3% bioMeT 14 Compound	none	none
White	none	Light and heavy staining	Severe rotting



Heat Stability

The effect of heat on the antimicrobial properties was determined by heating the bioMeT 14 Antimicrobial Compound treated PVC film for various periods of time at 177°C (350°F) and then testing the film for mildew resistance against a mixed spore inoculum. These results clearly indicate control under conditions incurred in calendaring PVC.

% bioMeT 14 Compound	Mildew Resistance vs. Time (minutes)				
	0	15	30	45	60
1.2%	-	+	+	0	-
3.0%	-	+	+	-	-
- = mildew resistant	0 = inactive				

Storage Stability

The storage stability of PVC film treated with bioMeT 14 Antimicrobial Compound was determined at temperatures alternating between 7°C (44°F) and 50°C (122°F). Mildew control is indicated under these conditions of storage stability.

% bioMeT 14 Compound	Storage Time vs. Mildew		
	0	7 weeks	11 weeks
1.2%	+	+	+
3.0%	+	-	-
- = mildew resistance	inactive		

RECOMMENDED STABILIZERS AND LUBRICANTS IN PVC SYSTEMS

It is recommended that 1.25% to 5% bioMeT 14 Antimicrobial Compound be added with the stabilizers and lubricants. The optimum concentration of bioMeT 14 Antimicrobial Compound is 1.25% to 5% based on the weight of the film. A typical formulation is obtained by mixing the following ingredients and blending on a 2-roll differential speed mill at 163°C (325°F) for 5 minutes.

TOXICOLOGY-HYGIENE OF bioMeT 14 ANTIMICROBIAL COMPOUND

This compound is very irritating to the eyes. If in contact it will cause damage. The irritativeness of such to the eyes with water is considerably less than that with most similar products. It is advisable to wear chemical goggles and or full face shield for eye protection when handling this product.

This material is very irritating to the skin and is capable of producing damage. In addition to being irritating to the skin, bioMeT 14 Antimicrobial Compound may be moderately toxic when absorbed through the skin. It is advisable to wear rubber gloves and protective clothing when using this product.

bioMeT 14 Antimicrobial Compound is toxic orally and care must be taken to avoid accidental swallowing.

SUGGESTED FIRST AID

Eye contact with bioMeT 14 Antimicrobial Compound should be treated by immediately flushing with copious amounts of water for fifteen minutes. Preferably, a gently, continuously flowing stream of water should be directed into the open eye (held open if necessary) for fifteen minutes. A physician should then be consulted.

In the event of external body contact with bioMeT 14 Antimicrobial Compound the area should be washed thoroughly with soap and water, followed by a thorough rinsing with water. The soap should contain a builder with alkaline reserve action. Contaminated clothing should be removed and washed with soap and water before reuse.

TOXICOLOGY-HYGIENE OF PVC FILM PROTECTED WITH bioMeT 14 ANTIMICROBIAL COMPOUND

Toxicological evaluations using PVC film protected with bioMeT 14 Antimicrobial Compound indicate that dermal contact will not cause irritation or sensitization. In tests performed with this vinyl film, no skin irritation was observed after repeated animal exposures of 10 and 28 days.

bioMeT 14 Antimicrobial Compound is registered with the U.S. Department of Agriculture, USDA, Reg. No. 5204-42.