UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

SEP 15 1994

CANCEL FILE
892B 011212

OFFICE OF
PREVENTION, PESTICIDES AND
TOXIC SUBSTANCES

MEMORANDUM

SUBJECT: EPA Reg. No. 34292-01; Dow Corning 5700 Antimicrobial Agent; 6(a)(2) Adverse Data Submission; Review of Subchronic Inhalation Toxicity Study on Impurity Found in 5 Dow Corning Antimicrobial Agents, All Containing 3-(Trimethoxysilyl)propyldimethyloctadecyl Ammonium Chloride as the Active Ingredient; Risk Assessment for Impurity

DP Barcode D183975
Case 019115
Submission S428188

Tox. Chem. No. 892B
P.C. Code No. 107401
MRID No. 425118-01

FROM: Edwin R. Budd, Toxicologist
Review Section III
Toxicology Branch I
Health Effects Division (7509C)

Budd 8/10/94

TO: Marshall Swindell/Velma Noble
Product Manager Team 31
Antimicrobial Branch
Registration Division (7505C)

THRU: Karen Hamernik, Ph.D., Section Head
Review Section III
Toxicology Branch I
Health Effects Division (7509C)

8/22/94
KB 9/14/94

IMPORTANT NOTE: This memorandum may contain Confidential Business Information (CBI) since an impurity in several Dow Corning products is identified in this action.

I. ACTION REQUESTED

A. Review and comment on 6(a)(2) submission from Dow Corning Corporation, dated September 23, 1992, containing a subchronic inhalation toxicity study on rats using [redacted] as the test material (MRID No.

1

Manufacturing process information not included.

425118-01). [redacted] is an impurity, occurring at [redacted] W/W, in 5 Dow Corning antimicrobial products, all of which contain 3-(trimethoxysilyl)propyl-dimethyloctadecyl ammonium chloride as the active ingredient.

B. Based on results from the subchronic inhalation study and available exposure data, perform a risk assessment, if appropriate, for persons exposed to [redacted]

II. CONCLUSIONS/RECOMMENDATIONS

A. The submitted subchronic inhalation study was reviewed. In addition to treatment-related organ weight changes and histopathology in the adrenals, liver and kidneys of males and in the adrenals of females, epithelial hyperplasia of the urinary bladder (a potential pre-neoplastic lesion) was consistently observed in both males and females. There was no NOEL for this effect in females. In addition, a micronucleus assay on bone marrow cells, performed at termination of the study, was positive for females at the highest exposure level tested. A DER for this study is included in this memorandum.

B. Based on epithelial hyperplasia of the urinary bladder observed in the above study, a risk assessment for persons directly exposed to [redacted] was performed. It was determined that the only persons directly exposed to this chemical per se would be certified commercial applicators (mixer/loaders) diluting the antimicrobial products with water (or other organic solvents) during manufacturing applications. Since [redacted] reacts with water to form a different chemical compound (see below), exposures of other persons to aqueous solutions of this chemical were not considered to be of concern at this time. In addition, persons exposed to bonded coatings of this antimicrobial agent on treated materials (see below) also were not considered to be of concern at this time. At the request of TB-1, OREB provided an exposure estimate for mixer/loaders (M/Ls) directly exposed to [redacted] (see memorandum by Winston Dang, dated February 9, 1994, copy attached).

C. A risk assessment for M/Ls directly exposed to [redacted] as a result of handling the Dow Corning antimicrobial products, was performed. The Margin of Exposure (MOE) for [redacted] (containing [redacted] as an impurity) was calculated to be 2.5.

D. Toxicology Branch I considers the MOE of 2.5 calculated above to be inadequate for M/L handling products containing [redacted] and recommends that the registrant (Dow Corning Corporation) be required to submit additional data/information which would permit calculation of a substantially higher MOE (equal to or above 100), and/or take appropriate steps to significantly reduce the exposure of M/L to [redacted] For further details, see "RISK MITIGATION" on pages 8 and 9 of this memorandum.

III. BACKGROUND

A. [redacted] has been identified by Dow Corning Corporation as being an impurity [redacted] occurring at concentrations of [redacted] W/W, in 5 of their antimicrobial products, all of which contain 3-(trimethoxysilyl)propyldimethyloctadecyl ammonium chloride, a silicone quaternary ammonium salt, as the active ingredient. These 5 antimicrobial products are:

1) Dow Corning 5700 Antimicrobial Agent
(EPA Reg. No. 34292-1)

2) Dow Corning 5772 Antimicrobial Agent
(EPA Reg. No. 34292-2)

3) Sylgard Antimicrobial Treatment
(EPA Reg. No. 34292-3)

4) Dow Corning 5700 Antimicrobial Agent for Manufacturing
(EPA Reg. No. 34292-5)

5) Dow Corning 5772 Antimicrobial Agent for Manufacturing
(EPA Reg. No. 34292-6)

A copy of the label and accompanying Technical Bulletin for Dow Corning 5700 Antimicrobial Agent is attached to this memorandum. As described in the Technical Bulletin, these antimicrobial products are used in numerous manufacturing applications to form durable, bonded coatings on the surfaces of a wide variety of substrates and materials, including many with considerable potential exposure to humans, (e.g. diapers, underwear, outerwear apparel, bedsheets, etc.). The bonded coatings offer broad spectrum, antimicrobial protection and are leach-resistant, nonmigrating and not consumed by microorganisms.

B. The Dow Corning antimicrobial products are incorporated during the manufacturing process directly into formulations to make end-use products (e.g. into polyurethane foam formulations) or are diluted with water (or other organic

solvents) and then applied to substrates to give a 0.1-1.0% W/W of the active ingredient. The substrates are then dried to effect condensation of silanol groups (i.e. polymerization and bonding) and to remove the water.

C. When the active ingredient in the antimicrobial products, 3-(trimethoxysilyl)propyldimethyloctadecyl ammonium chloride and the impurity, [redacted] come into contact with water, a hydrolysis reaction occurs which converts the methoxy groups in both chemicals to their "hydroxy" forms, 3-(hydroxysilyl)propyloctadecyldimethyl ammonium chloride and [redacted] respectively. Therefore, the only direct exposures to the methoxy impurity per se are to M/Ls who dilute the antimicrobial products in water (or other organic solvents) prior to or during the manufacturing process itself. Persons exposed to the bonded hydroxy form of the impurity in final end-use products would not be directly exposed to the methoxy impurity in the antimicrobial agents (verbal communication from Mike Hales, Dow Corning Corporation, on February 2, 1993).

D. Dow Corning Corporation, on its own initiative, performed a 28-day subchronic inhalation toxicity study on rats using the impurity, [redacted] as the test material. Based on preliminary results in this study, Dow Corning submitted two earlier 6(a)(2) notifications to EPA as follows:

1) notification dated February 13, 1992 in which preliminary data obtained in the bone marrow micronucleus assay portion of the study was presented (MRID No. 422042-01), and

2) notification dated May 15, 1992, in which preliminary data from the histopathologic examination conducted as part of the same study was presented (MRID No. 423341-01).

The present submission, dated September 23, 1992, is a 6(a)(2) follow-up submission to the earlier notifications which presents the final full report of the subchronic inhalation toxicity study (MRID No. 425118-01).

IV. REVIEW OF THE SUBCHRONIC INHALATION TOXICITY STUDY

The Executive Summary for the subchronic inhalation toxicity study is presented below. The DER for this study is included in this memorandum.

EXECUTIVE SUMMARY: In a subchronic inhalation toxicity study (MRID No. 425118-01), groups of 10 male and 10 female CD rats were exposed to vapors of [redacted]

Manufacturing process information not included.

[redacted] for 6 hours/day, 5 days/week for 28 days. Exposure levels were 0, 10, 50, 100 or 200 ppm (equivalent to 0, 0.08, 0.41, 0.81 or 1.62 mg/L).

No treatment-related effects were observed on mortality, clinical signs, body weights, food consumption, ophthalmoscopic examinations, hematology, clinical chemistries or gross necropsies. Treatment-related increases in organ weights, however, were observed in males for the adrenals at ≥ 50 ppm (up to 25% increase in absolute weight), for the liver at 200 ppm (16% increase in absolute weight) and for the kidneys at 200 ppm (15% increase in absolute weight). In females, treatment-related increased organ weights were observed for the adrenals at ≥ 100 ppm (up to 25% increase in absolute weight). For both males and females, these organ weight increases were associated with histopathologic effects. Treatment-related histopathological effects were observed in males for the adrenals (minimal to mild adrenal cortical hypertrophy) at ≥ 100 ppm, for the liver (minimal hepatocyte hypertrophy) at 200 ppm, for the kidneys (minimal to moderate hyaline droplets in the convoluted tubular epithelium) at ≥ 50 ppm and for the urinary bladder (simple diffuse epithelial hyperplasia) at ≥ 50 ppm. The incidence and severity of epithelial hyperplasia in the urinary bladders of males was 0/10, 0/10, 1/10 (1 moderate), 5/10 (5 minimal) and 10/10 (1 minimal, 8 mild, and 1 moderate) for the 0, 10, 50, 100 and 200 ppm groups respectively. In females, treatment-related histopathological effects were observed for the adrenals (mild adrenal cortical hypertrophy) at 200 ppm and for the urinary bladder (simple diffuse epithelial hyperplasia) at ≥ 10 ppm. The incidence and severity of epithelial hyperplasia in the urinary bladder of females was 0/10, 2/10 (minimal), 2/10 (minimal), 2/10 (minimal) and 9/10 (7 mild and 2 moderate) for the 0, 10, 50, 100 and 200 ppm groups respectively. In addition, a micronucleus assay was performed on bone marrow cells at the terminal sacrifice. A statistically significant increase ($p < 0.05$) in mean % micronucleated polychromatic erythrocytes was observed in the females at 200 ppm (0.11 ± 0.07%) when compared to the female control group (0.07 ± 0.14%). This increase at 200 ppm is also considered to be related to treatment with the test material. **No NOEL was established in this study. The NOEL is < 10 ppm, the lowest exposure level tested. The LEL is 10 ppm (based on simple epithelial hyperplasia in the urinary bladder of females).**

This study is classified as <u>Core Supplementary</u> because the 28-day duration of this study is less than the 90-day duration required in the Subdivision F Guidelines for a subchronic inhalation study (82-4). This study, therefore,

can not be upgraded. In addition, no NOEL was established in this study.

Although this study is not acceptable as a Subdivision F Guidelines study, it nevertheless does contain valid information that indicates a toxicological effect of concern in the urinary bladder of female rats at 10 ppm and in both male and female rats at higher exposure levels (simple epithelial hyperplasia).

V. RISK ASSESSMENT (MOE) FOR [redacted]

A. NOEL for Toxicological End-Point of Concern

In the 28-day subchronic inhalation toxicity study on rats using [redacted] as the test material (MRID No. 425118-01), treatment-related epithelial hyperplasia of the urinary bladder (a potential pre-neoplastic lesion) was observed in male rats at ≥ 50 ppm and in female rats at ≥ 10 ppm. The incidence of this lesion was 0/10, 0/10, 1/10, 5/10 and 10/10 for males and 0/10, 2/10, 2/10, 2/10 and 9/10 for females at exposure levels of 0 (control), 10, 50, 100 and 200 ppm, respectively. Although a NOEL of 10 ppm was established for this effect in males, no NOEL was established in females since the lesion was observed in 2/10 females at 10 ppm, the lowest exposure level tested. The flat dose-response curve for females from 10 to 100 ppm (2/10 responses at each of 3 exposure levels tested) and the rather steep dose-response curve for males, however, suggest that the true NOEL for this effect in females may be only slightly less than 10 ppm. Therefore, an additional uncertainty factor of 10 was used to approximate the NOEL for females in this study. For the purposes of this risk assessment, it will be assumed that the NOEL for females is 10 ppm / 10 = 1 ppm.

The actual daily exposure of female rats to 1 ppm [redacted] in units of ug/kg/day, was calculated as follows.

[redacted]

[redacted]

= 2,160 ug/kg/day

NOEL (female rats) = 2,160 ug/kg/day (assuming 100% absorption via inhalation route of exposure)

B. Exposure Estimate for Mixer/Loaders

The direct exposure of mixer/loaders (M/L) to chloropropyl-trimethoxysilane was estimated in a memorandum, dated February 9 1994, from Winston Dang (OREB) to Karen Hamernik (TB-I) (copy attached). [redacted]

Actual Daily Exposure (M/L) = 857.06 ug/kg/day

Absorbed Dose (M/L) = 857.06 ug/kg/day (assuming 100% absorption via dermal* and inhalation routes of exposure)

* Since no dermal absorption study is available for [redacted] 100% absorption was assumed.

Manufacturing process information not included.

C. Calculation of Margin of Exposure (MOE)

The Margin of Exposure (MOE) was calculated as follows.

MOE = NOEL (female rats) / Absorbed Dose (M/L)

= 2,160 ug/kg/day / 857.06 ug/kg/day = 2.5

The MOE for [redacted] (containing [redacted] as an impurity) was calculated to be 2.5.

VI. RISK MITIGATION

A. Toxicology Branch I considers the MOE of 2.5 calculated above to be inadequate for M/L handling products containing [redacted] and recommends that the registrant (Dow Corning Corporation) be required to submit additional data/information which would permit calculation of a substantially higher MOE (equal to or above 100), and/or take appropriate steps to significantly reduce the exposure of M/L to [redacted]

B. Regarding the submission of additional data/information, consideration should be given to performing a new exposure study for [redacted] in which dermal and inhalation components would be separately determined. The test material for this study should be the registered product per se (e.g. Dow Corning DC 5700 Antimicrobial Agent, EPA Reg. No. 34292-1) which contains the "methoxy" form of the impurity. It is recommended that OREB be consulted prior to conducting such a study. Accompanying this exposure study should be either a 90-day subchronic dermal toxicity study (Guideline 82-3) or a dermal penetration study (Guideline 85-3) in order that the dermal component of the exposure might also be considered and related to a relevant toxicological endpoint. The test material in these latter studies should be [redacted] [It should be noted that the previously submitted 90-day subchronic dermal toxicity study on rats using DC 5700 hydrolysate as the test material (Dow Corning Corp., study 3933-19, 12/18/89) would not be satisfactory for this purpose.]

C. Regarding steps to reduce the exposure of M/L to [redacted], the following should be considered.

1) With respect to the use of personal protective equipment, it should be noted that the label requirement to wear gloves, which is already on the

label for DC5700 Antimicrobial Agent (EPA Reg. No. 34292-1) and presumably on the labels for the other Dow Corning antimicrobial products as well, would not alter the MOE calculated above because the M/L in the "CMA Study" also wore gloves in 14 of the 16 studies considered. Further, since the inhalation component of the exposure to M/L in the "CMA Study" was relatively small (verbal communication with Winston Dang of OREB), a new requirement on the labels to use respirators probably would not reduce the exposure appreciably.

2) Use of engineering controls, particularly a closed system for diluting the products, would reduce the exposure to M/L.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

FEB 9 1994

MEMORANDUM

OFFICE OF
PREVENTION, PESTICIDES AND
TOXIC SUBSTANCES

SUBJECT: OCCUPATIONAL AND RESIDENTIAL EXPOSURE ASSESSMENT FOR 3-(Trimethoxysilyl)propyl dimethyl octadecyl ammnium chloride AND THE IMPURITIES

FROM: Winston Dang, Chemist
Reregistration Section
Occupational and Residential Exposure Branch
Health Effects Division (7509C)

TO: Karen Hamernik, Section Chief
Section III
Toxicology Branch I
Health Effects Division (7509C)

THRU: Alan P. Nielsen, Chief
Reregistration Section
Occupational and Residential Exposure Branch
Health Effects Division (7509C)

Larry C. Dorsey, Chief 2/9/94
Occupational and Residential Exposure Branch
Health Effects Division (7509C)

Please find the OREB review of ....

DP Barcode: D198719

Pesticide Chemical Codes:107401

Case No.:3148

EPA Reg. No.:34292-1, 34292-2

EPA MRID No.: N/A

Review Time: 3 days

PHED: N/A

Introduction and Background

OREB has been requested by TB I/HED (K. Hamernik) to do a worker exposure assessment to an impurity in 3-(Trimethoxysilyl)propyl dimethyl octadecyl ammnium chloride.

3-(Trimethoxysilyl)propyl dimethyl octadecyl ammonium chloride is an antimicrobial agent (broad spectrum bacteriostat, algicide and fungicide) used on textiles (i.e., human clothing), special industrial products, carpets or upholstery to control the growth of odor causing bacteria, to reduce deterioration and discoloration caused by fungus in the presence of moisture, to control the growth of mold, mildew, etc. This antimicrobial agent can be applied to surfaces as an aqueous solution at a rate of 0.1% to 1.0% by weight of active ingredient by dipping, foam application, preservative treatment, sponging or spraying until uniformly wet.[1]

Action and Exposure Assessment Of Impurity

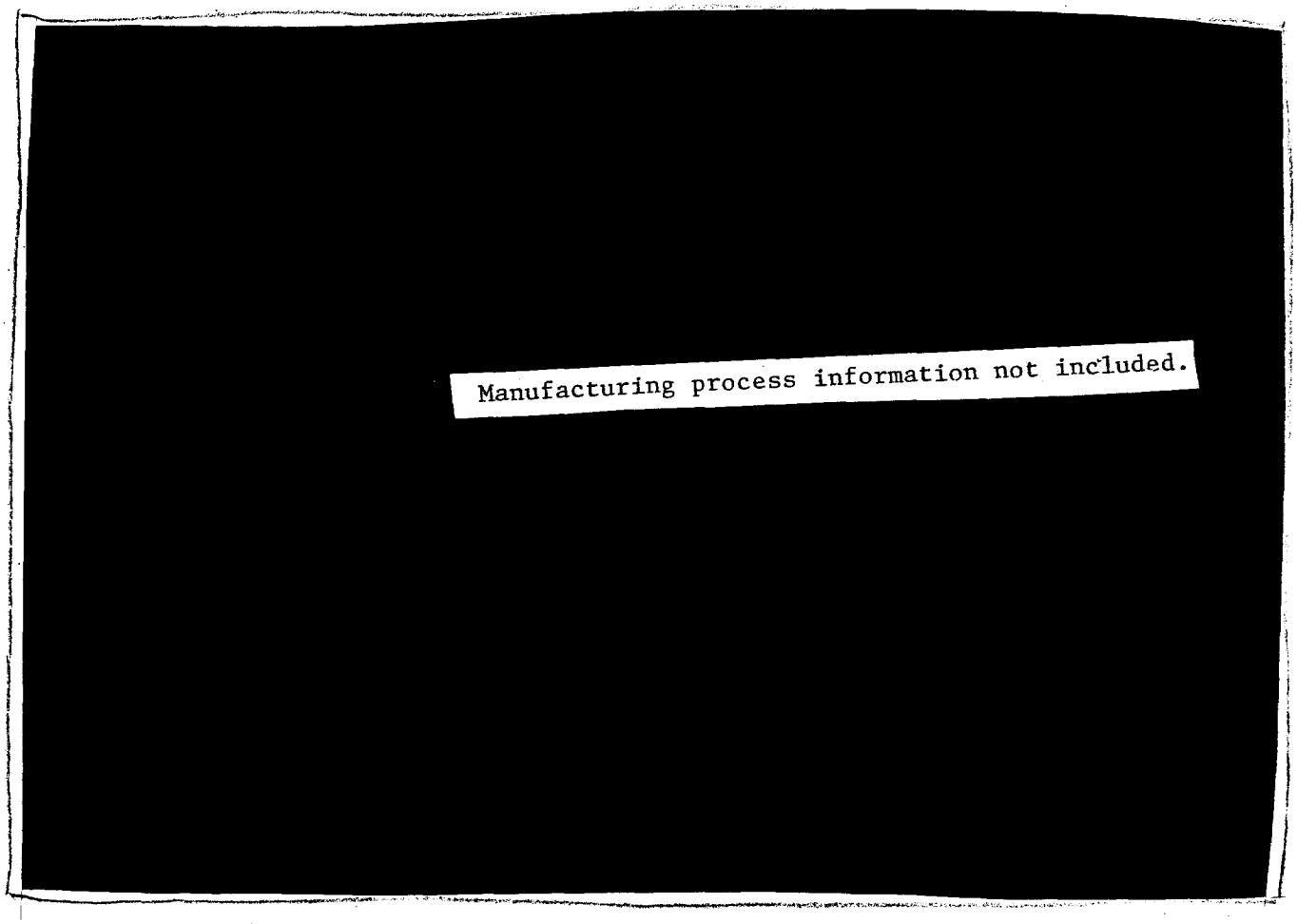
Based on the information provided by Mike Hales of Dow Corning Midland Michigan (one of the registrants), in Dow Corning 5700 the "impurity" is about [redacted] In Dow Corning 5772 Antimicrobial Agent the "impurity" is about [redacted] Mixing the antimicrobial with water" induces a hydrolysis reaction which converts the methoxy function groups on the active ingredient, and on some of the impurities, to hydroxy groups." Toxicity studies revealed that the impurities may have a potential chronic tox-concern[2]. OREB conducted an exposure estimate of those impurities in the concentrated product (e.g., DC5700 in 49% Methanol) to the mixer/loader, and an exposure estimate to the applicator by the end-use product[3] [redacted]

Manufacturing process information not included.

1. Use information is based on the Luis report dated 6/25/91 from Phyllis Johnson of BEAD, and the product labels, EPA Reg. 34292-1 and 34292-2.
2. Tox information was retrieved from the tox one liners dated 12/10/92 and discussion with Karen Hamennik of Toxicology Branch I.
3. The impurity, based on the information from Mike Hales of Dow Corning Midland Michigan (the registrant) [redacted]

11

The exposure of impurity to mixer/loader



Conclusions

The exposure estimate for mixers/loaders who are exposed to the impurity during open pouring is 587.9 ug/kg/day.

cc: Winston Dang/OREB
Chemical File
Circulation
Correspondence

[redacted]

DOW CORNING® 5700

Antimicrobial Agent

A SILICONE QUATERNARY AMMONIUM SALT

EPA Reg. No. 34292-1 EPA Est. 34292-MI-01
ACTIVE INGREDIENT: 3-(trimethoxysilyl) propyldimethyloctadecyl ammonium chloride 42%
INERT INGREDIENTS: 58%

CONTAINS OVER 49% METHANOL

KEEP OUT OF REACH OF CHILDREN

DANGER! ☠ POISON ☠

CAUSES EYE DAMAGE • METHANOL MAY CAUSE BLINDNESS • HARMFUL OR FATAL IF SWALLOWED • VAPOR HARMFUL • AVOID BREATHING SPRAY MIST OR VAPORS • AVOID CONTACT WITH SKIN • FLAMMABLE

STATEMENT OF PRACTICAL TREATMENT

IF SWALLOWED: Drink large quantity of water. Have patient lie down and keep warm. Cover eyes to exclude light, call a physician and/or poison control center. IF INHALED: Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. IF ON SKIN: Flush with copious amounts of water for at least 15 minutes. IF IN EYES: Flush with copious amounts of water for at least 15 minutes and get immediate medical attention.

PRECAUTIONARY STATEMENTS

HAZARD TO HUMANS (& DOMESTIC ANIMALS)

DANGER! CORROSIVE. CAUSES EYE DAMAGE AND SKIN IRRITATION.

Keep out of reach of children. Do not get in eyes, on skin, or on clothing. Wear goggles or face shield and rubber gloves when handling. Use with adequate ventilation. Vapor harmful. Avoid breathing of vapor.

Harmful or fatal if swallowed. Avoid contamination of food. Methanol may cause blindness.

ENVIRONMENTAL HAZARDS:

This pesticide is toxic to fish. Do not discharge into lakes, streams, ponds, or public waters unless in accordance with NPDES permit. For guidance, contact your regional office of the EPA.

PHYSICAL OR CHEMICAL HAZARDS

Flammable. Keep away from heat and open flame.

ACCEPTED
SEP 11 1992
Under the Federal Insecticide, Fungicide, and Rodenticide Act, as amended, for the pesticide registered under EPA Reg. No. 34292-1

DOW CORNING® 5700

13

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

FOR INDUSTRIAL USE ONLY, AS A FINAL BACTERIOSTATIC, FUNGISTATIC, PRESERVATIVE FINISH IN THE PRESENCE OF MOISTURE.

DOW CORNING® 5700 Antimicrobial Agent is to be used as directed in Dow Corning's Technical Bulletins.

STORAGE AND DISPOSAL

STORAGE: Moisture sensitive. Keep tightly closed until ready to use. Reclose tightly after each use.

DISPOSAL: Do not contaminate water, food, or feed by storage or disposal. Pesticide wastes are toxic. Improper disposal of excess pesticide, spray mixture, or rinsate is a violation of Federal Law. If these wastes cannot be disposed of by use according to label instructions, contact your State Pesticide or Environmental Control Agency, or the Hazardous Waste representative at the nearest EPA Regional Office for guidance.

Do not reuse containers. Do not cut or weld containers. Triple rinse (or equivalent) empty containers. Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or by other procedures approved by state and local authorities.

NOTICE:

Seller warrants that the product conforms to its chemical description and is reasonably fit for the purposes stated on the bulletin when used in accordance with directions under normal conditions of use; but neither this warranty of MERCHANTABILITY nor FITNESS FOR A PARTICULAR PURPOSE, expressed or implied, extends to the use of this product contrary to bulletin instructions, or under abnormal conditions, or under conditions not reasonably foreseeable to seller, and buyer assumes the risk of any such use.

ATTENTION! This container will have vapor and/or product residues when emptied. All hazard precautions on label must be observed when handling emptied container.

1582976-0592

FLAMMABLE LIQUID, N.O.S. (METHANOL) UN1993

DOW CORNING

DOW CORNING CORPORATION
MIDLAND, MI 48686-0994, U.S.A.

MADE IN U.S.A.
(517) 496-6000

PRINTED IN U.S.A.

THIS IS AN INITIAL PRINTING
SPECIMEN LABEL 1582976 DATE CODE 0592

52636 8/13/92

Information About Antimicrobial Agents

DOW CORNING

DESCRIPTION

DOW CORNING® 5700 Antimicrobial Agent is Dow Corning's designation for 3-(trimethoxysilyl) propyloctadecyldimethyl ammonium chloride containing 42 percent active ingredient by weight in methanol. Alkoxysilanes of this nature have been shown to form durable bonded coatings to a number of materials (see "References" section).

DOW CORNING 5700 Antimicrobial Agent offers users the following features:

- Good durability – DOW CORNING 5700 Antimicrobial Agent imparts durable, broad spectrum, biostatic activity to the surface of a wide variety of substrates; it is leach-resistant and nonmigrating and is not consumed by microorganisms
- Broad-spectrum activity – effective against gram positive and gram negative bacteria, fungi, algae and yeasts; antimicrobial action is exhibited on contact in the presence of moisture
- Increased efficiency – through proper application, durable bacteriostatic, fungistatic and algistatic surfaces can be attained with a minimum amount of DOW CORNING 5700 Antimicrobial Agent

BENEFITS

DOW CORNING 5700 Antimicrobial Agent offers users the following benefits:

- Prevents deterioration and discoloration caused by bacteria, fungi, algae and yeasts
- Retains the "freshness" of an article by inhibiting or resisting the growth of odor-causing bacteria and mildew (fungus)

DOW CORNING® 5700 ANTIMICROBIAL AGENT

U.S. Environmental Protection Agency Registration Number	34292-1 (EPA Est. 34292-MI-01)
Type	Silicone quaternary ammonium salt
Physical Form	Low-viscosity liquid
Special Properties	Surface bondability
Primary Uses	As a durable antimicrobial agent that is active against a wide variety of bacteria, fungi, algae and yeasts

- Prolongs the life of an article by inhibiting the growth of bacteria and mildew
- Provides hygienic freshness
- Provides a treatment that is not destroyed by repeated cleaning/washing
- Resists odors through chemical protection
- Compatible with substrates and processes listed under approved uses

TYPICAL PROPERTIES

These values are not intended for use in preparing specifications.

	Structure	$[(CH_3O)_3Si(CH_2)_3\text{-}N^+(CH_3)_2\text{-}C_{18}H_{37}]Cl^-$
CTM[1] 0208	Concentration	42 percent active ingredient in methanol
CTM 0176	Appearance	Light to dark amber liquid
CTM 0002	Refractive Index, at 26 C (78.8 F)	1.390
CTM 0090A	Flash Point, °C (°F)	11 (52)
	Cloud Point, °C (°F)	-3 (26)
	Solubility	Miscible in all proportions with water, alcohols, ketones, esters, hydrocarbons and chlorinated hydrocarbons
	Thermal Stability, °C (°F)	Stable to 125 (257)
	Specific Gravity, at 25 C (77 F)	0.87
	Freeze-Thaw Stability[2]	Stable through 10 cycles

[1]In most cases, Corporate Test Methods (CTMs) correspond to ASTM standard tests. Copies of CTM procedures are available upon request.

[2]Cycles from -17.7 to 50 C (0 to 122 F).

Specification Writers: Please obtain a copy of the Dow Corning Sales Specification for this product, and use it as a basis for your specifications. It may be obtained from any Dow Corning Sales Office, or from Dow Corning Product Information in Midland, MI. Call (517) 496-6000.

15

APPROVED USES

DOW CORNING 5700 Antimicrobial Agent can be used to impart durable, broad-spectrum, antimicrobial protection to substrates for the following applications:

- Air filters for furnaces, air-conditioners, air purification devices, automobiles, recirculating air handling systems
- Air filters/materials
- Aquarium filter material
- Bed sheets, blankets and bedspreads
- Buffer pads (abrasive and polishing)
- Carpet and draperies
- Fiberfill for upholstery, sleeping bags, apparel, etc., where the fiber is cotton, natural down, nylon, polyester, rayon or wool
- Fiberglass ductboard
- Fire hose fabric
- Humidifier belts
- Mattress pads and ticking
- Men's underwear and outerwear
- Nonwoven disposable diapers
- Nonwoven polyester
- Outerwear apparel
- Disposable polyurethane foam cushions for Lapidus Airfloat Systems
- Polyurethane foam for household, industrial and institutional sponges and mops
- Polyurethane and polyethylene foam, when covered
- Polyurethane foam for packaging and cushioning in non-food contact applications
- Polyurethane foam used as a growth medium for non-food crops and plants
- Premoistened towelettes and tissue wipes (these do not impart pesticidal properties)
- Roofing materials – defined as shingles, roofing granules, wood shakes, felt, stone and synthetic overcoats
- Sand bags, tents, tarpaulins, sails and ropes
- Athletic and casual shoes
- Shoe insoles
- Shower curtains
- Socks composed of nylon, nylon/orlon, cotton/nylon, linen/Lycra®1, acrylic/polypropylene/nylon/Lycra, wool/silk/nylon/Lycra and wool/acrylic/nylon/Lycra; provides residual self-sanitizing activity against athlete's foot fungus (*trichophyton mentagrophytes*) on the sock, durable for up to 10 repeated washings; prevents 99.9 percent of the growth of athlete's foot fungus on the sock
- Throw rugs
- Toweling made of 100 percent cotton, 100 percent polyester, and blends of the two fibers
- Toilet tank and seat covers
- Umbrellas
- Upholstery made of acetates, acrylics, cotton, fiberglass, nylon, polyester, polyethylene, polyolefins, polypropylene, rayon, spandex, vinyl and wool
- Vacuum cleaner bags and filters
- Vinyl paper-wallpaper for non-food contact surfaces
- Disposal wiping cloths that can be used for multiple purposes such as dusting or washing furniture, cars, walls, windows, floors, appliances, dishes, counter tops, etc.; the wiping cloths do not impart pesticide properties
- Women's hosiery
- Women's intimate apparel

HOW TO USE

DOW CORNING 5700 Antimicrobial Agent can be incorporated directly into formulations used to make the end-use products listed in this bulletin. For example, it can be incorporated into a polyurethane foam formulation during the manufacturing process. Protection is attained because the active ingredient orients on the surface of the cured foam.

DOW CORNING 5700 Antimicrobial Agent can also be diluted with water or with organic solvents such as alcohols, ketones, esters, hydrocarbons and chlorinated hydrocarbons and then applied to organic and inorganic surfaces to give 0.1 to 1.0 percent by weight of active ingredient. Solutions can be prepared by simply adding the antimicrobial agent to solvent with stirring.

CAUTION: Poor agitation when adding this silane to water can result in locally high concentrations, which may form gel particles.

Substrates can be treated by brushing, dipping, padding, soaking, spraying, fogging or by using foam finishing techniques.

After applying the antimicrobial agent, the substrate can then be dried at temperatures from ambient to a maximum of 160 C (320 F) to effect complete condensation of silanol groups and to remove water, solvents and/or traces of methanol from hydrolysis. Optimum application and drying conditions, such as time and temperature, should be determined for each application before use in a commercial process.

STORAGE, HANDLING AND PRECAUTIONARY INFORMATION

This product is "flammable" and "poisonous." Keep away from heat and open flame.

Storage and Shelf Life

When stored in original, unopened containers at or below 25 C (77 F), DOW CORNING 5700 Antimicrobial Agent has a minimum shelf life of 12 months from date of shipment from Dow Corning. Since this material is moisture-sensitive, keep containers tightly closed after each use.

FISH TOXICITY

The results of a 4-day static fish toxicity study (using rainbow trout and bluegills) are summarized below.

	4-Day TL_{50} Values	
Species	DOW CORNING 5700 Antimicrobial Agent	Toxaphene
Rainbow trout	0.56 ppm	~0.036 ppm
Bluegills	0.51 ppm	0.024 ppm

1"Lycra" is a registered trademark of E.I. du Pont de Nemours & Company.

Handling (Danger)

Wear goggles or face shield and rubber gloves when handling.

DOW CORNING 5700 Antimicrobial Agent, if ingested in amounts incidental to industrial handling, should pose no significant adverse health hazard. Direct contact of the undiluted material with eyes may cause serious injury or blindness. Particular care must be taken to prevent eye contact. In case of contact with eyes, immediately flush eyes with large amounts of water for at least 15 minutes and get prompt medical attention.

Single, short-term skin exposure may cause slight irritation. Contact over several days may cause blistering and a superficial burn. Precautions should be taken to avoid prolonged or repeated skin contact.

DOW CORNING 5700 Antimicrobial Agent contains 50 percent methanol. Keep away from heat and open flame. Appropriate measures should be taken to prevent the accumulation of hazardous concentrations of methanol vapors in the work area. Avoid breathing vapors.

Neutralization and Environmental Protection

DOW CORNING 5700 Antimicrobial Agent is toxic to fish (see "Fish Toxicity" table). This antimicrobial agent, by standard BOD (biological oxygen demand) and TOD (total oxygen demand) determination, does not appear to be biodegradable. Potential harm to the environment is minimized, however, because of the minimal amount of chemical applied and its durable coupling to surfaces.

Inactivation of solutions containing DOW CORNING 5700 Antimicrobial Agent may be accomplished by one of the following methods:

- Addition of an anionic surfactant or detergent in quantity equivalent to that of DOW CORNING 5700 Antimicrobial Agent in solution
- Addition of Triton X-100 nonionic detergent at a final concentration of 10,000 ppm (1.0 percent volume/volume) or greater to bath solutions up to 1.0 percent volume/volume of DOW CORNING 5700 Antimicrobial Agent

Every effort should be made to contain accidental spills of DOW CORNING 5700 Antimicrobial Agent to the immediate area. This may be accomplished by the use of sandbags to confine the spill to facilitate cleanup and disposal. Contaminated sand may then be disposed of by burial in an approved landfill. Many spills may be cleaned up with rags by wiping and/or mopping and allowing the liquid to absorb onto the fabric. The rags may then be disposed of by incineration.

Floor drains in areas of material use should be protected with sandbags to contain accidental spills.

Acute Oral Toxicity

DOW CORNING 5700 Antimicrobial Agent has an extremely low acute oral toxicity of LD_{50} = 12.27 ± 0.16 g/kg body weight in albino rats.

Acute Skin Contact

Based on studies conducted on albino rabbits, undiluted DOW CORNING 5700 Antimicrobial Agent has a slight to moderate effect upon intact and abraded skin. A single exposure for several hours may cause slight erythema and edema. Prolonged or repeated contact over a period of several days may cause blistering and a superficial burn.

Repeated Skin Contact

A human repeated insult patch test has been conducted with a 0.84 percent aqueous solution of active ingredient on nonwoven polyester. The results of this study showed an overall incidence of skin irritation reactions to be 2/450 or 0.4 percent. Two subjects each reacted once to the applications of the test material: one with a very slight erythema and the other with very slight erythema and edema. There was no evidence of skin sensitization noted with any of the subjects.

Acute Dermal Absorption

DOW CORNING 5700 Antimicrobial Agent has an extremely low acute dermal toxicity of LD_{50} >7.95 g/kg body weight in albino rabbits.

Therefore, this material does not appear to present a hazard from skin absorption under ordinary industrial handling conditions when good care and cleanliness are practiced.

Percutaneous Absorption

DOW CORNING 5700 Antimicrobial Agent is not absorbed through the skin of rabbits. Any potential hazard from contact with the skin by this product during use is therefore considered to be insignificant.

MSDS INFORMATION

BEFORE HANDLING, READ PRODUCT AND MATERIAL SAFETY DATA SHEETS AND CONTAINER LABELS FOR SAFE USE, PHYSICAL AND HEALTH HAZARD INFORMATION. THE MATERIAL SAFETY DATA SHEET CAN BE OBTAINED BY WRITING TO DOW CORNING CUSTOMER SERVICE, OR BY CALLING (517) 496-6000.

Shipping Limitations

DOT Classification: Flammable.

Packaging

DOW CORNING 5700 Antimicrobial Agent is supplied in 1-, 35- and 400-lb (0.454-, 15.9- and 181.4-kg) containers, net weight.

IMPORTANT: WARRANTY AND DISCLAIMER INFORMATION

Dow Corning warrants that the product conforms to its chemical description and is reasonably fit for the purposes stated in this bulletin when used in accordance with directions under normal conditions of use; but this warranty of fitness for a particular purpose does not extend to the use of this product contrary to bulletin instructions, or under abnormal conditions, or under conditions not reasonably foreseeable to seller, and buyer assumes the risk of any such use.

DOW CORNING SPECIFICALLY DISCLAIMS ANY OTHER EXPRESS OR IMPLIED WARRANTY, INCLUDING THE WARRANTY OF MERCHANTABILITY.

PATENT INFRINGEMENT NOT INTENDED

Recommendations or suggestions for use should not be interpreted as inducements to infringe any patents.

REFERENCES

1. Hough, J.S. and T.P. Lyons. "Coupling of Enzymes Onto Microorganisms." *Nature*, London, 1972, 235-389.
2. Johannsen, O.K., F.O. Stark, G.E. Vogel and R.M. Fleishmann. "Evidence for Chemical Bond Formation at Silane Coupling Agent Interfaces." *J. Compos. Mater.*, 1967, 1:278-292.
3. Plueddemann, E.P. "Adhesion Through Silane Coupling Agents." *J. Adhesion*, 1970, 2:184-201.
4. Venter, J.E., J.E. Dixon, P.R. Maroko and N.O. Kaplan. "Biologically Active Catecholamine Covalently Bound to Glass Bead." *Proc. Nat. Acad. Sci.* (U.S.A.), 1972, 69:1141-1145.
5. Weetall, H.H. "Trypsin and Papain Covalently Coupling to Porous Glass." *Science*, 1969, 166:615-617.
6. Isquith, A.J., E.A. Abbott and P.A. Walters. "Surface-Bonded Antimicrobial Activity of an Organosilicon Ammonium Chloride." *Appl. Microbiol.*, 1972, 24:859-863.
7. Gettings, R.L. and B.L. Triplett. "New Durable Antimicrobial Finish for Textiles." *AATCC Book of Papers – 1978 Nat. Tech. Conf.*, 1978, 259-261.
8. Isquith, A.J. and C.J. McCallum. "Surface Kinetic Test Method for Determining Rate of Kill by an Antimicrobial Solid." *Appl. & Environ. Microbiol.*, 1978, 36:700-704.
9. Malek, J.R. and J.L. Speier. "Development of an Organosilicone Antimicrobial Agent for the Treatment of Surfaces." *J. Coated Fabrics*, 1982, 12:38-45.
10. Speier, J.L. and J.R. Malek. "Destruction of Microorganisms by Contact With Solid Surfaces." *J. Colloid Interface Science*, 1982, 89:68-76.
11. Siddiqui, W.H., J.R. Malek, E. Stanton and E.J. Hobbs. "Percutaneous Absorption of an Antimicrobial Organosilicon Quaternary Ammonium Chloride in Rabbits." *J. Appl. Toxicol.*, 1983, 3.3:146-149.
12. McGee, J.B., J.R. Malek and W.C. White. "New Antimicrobial Treatment for Carpet Applications." *Am. Dyestuff Rep.*, 1983, 6:56-59.
13. Hales, M.G., M.E. Sorkin and W.C. White. "Antimicrobial Treatments, Part I: What They Are and Why They Are Used." *Cleaning and Restoration*, 1986, March, 14-15.
14. Hales, M.G., M.E. Sorkin and W.C. White. "Antimicrobial Treatments, Part II: Types and Considerations for Use." *Cleaning and Restoration*, 1986, Vol. 24, Num. 4, 13-15.
15. Hales, M.G., and W.C. White. "Antimicrobial Treatments, Part III: Methods for Determining Their Effectiveness." *Cleaning and Restoration*, 1986, May, 18-20.
16. Battice, D.R. and M.G. Hales. "A New Technology for Producing Stabilized Foams Having Antimicrobial Activity." *Journal of Cellular Plastics*, 1985, Vol. 21, Num. 5, 332-337.

ACCEPTED

SEP 11 1992

Under the Federal Insecticide, Fungicide, and Rodenticide Act, as amended, for the pesticide registered under EPA Reg. No. 34292-1

DOW CORNING CORPORATION
MIDLAND, MICHIGAN 48686-0994

Printed in U.S.A. Form No. 25-187A-92

DOW CORNING

Budd 8/17/94

Reviewed by: Edwin R. Budd, M.A.
Review Section III, Toxicology Branch I (7509C)
Secondary Reviewer: Karen Hamernik, Ph.D., Section Head
Review Section III, Toxicology Branch I (7509C)

DATA EVALUATION REPORT

Study Type: Subchronic Inhalation Toxicity Study, Rats
EPA Subdivision F Guideline 82-4

Test Material: [redacted]
(Dow Corning 1-2366)

Tox. Chem. No.: none

P.C. Code No.: none

MRID No.: 425118-01

Study Title: A 28-Day Subchronic Inhalation Toxicity Study of [redacted] in the Rat

Testing Laboratory: Toxicology Department
Dow Corning Corporation
Midland, Michigan

Study No.: 7374

Report No.: 1992-I0000-37310

Author: Gary B. Kolesar et al.

Report Date: July 28, 1992

Sponsor: Dow Corning Corporation
(Midland, Michigan)

Manufacturing process information not included.

EXECUTIVE SUMMARY: In a subchronic inhalation toxicity study (MRID No. 425118-01), groups of 10 male and 10 female CD rats were exposed to vapors of [redacted] for 6 hours/day, 5 days/week for 28 days. Exposure levels were 0, 10, 50, 100 or 200 ppm (equivalent to 0, 0.08, 0.41, 0.81 or 1.62 mg/L).

No treatment-related effects were observed on mortality, clinical signs, body weights, food consumption, ophthalmoscopic examinations, hematology, clinical chemistries or gross necropsies. Treatment-related increases in organ weights, however, were observed in males for the adrenals at ≥ 50 ppm (up to 25% increase in absolute weight), for the liver at 200 ppm

(16% increase in absolute weight) and for the kidneys at 200 ppm (15% increase in absolute weight). In females, treatment-related increased organ weights were observed for the adrenals at ≥ 100 ppm (up to 25% increase in absolute weight). For both males and females, these organ weight increases were associated with histopathologic effects. Treatment-related histopathological effects were observed in males for the adrenals (minimal to mild adrenal cortical hypertrophy) at ≥ 100 ppm, for the liver (minimal hepatocyte hypertrophy) at 200 ppm, for the kidneys (minimal to moderate hyaline droplets in the convoluted tubular epithelium) at ≥ 50 ppm and for the urinary bladder (simple diffuse epithelial hyperplasia) at ≥ 50 ppm. The incidence and severity of epithelial hyperplasia in the urinary bladders of males was 0/10, 0/10, 1/10 (1 moderate), 5/10 (5 minimal) and 10/10 (1 minimal, 8 mild, and 1 moderate) for the 0, 10, 50, 100 and 200 ppm groups respectively. In females, treatment-related histopathological effects were observed for the adrenals (mild adrenal cortical hypertrophy) at 200 ppm and for the urinary bladder (simple diffuse epithelial hyperplasia) at ≥ 10 ppm. The incidence and severity of epithelial hyperplasia in the urinary bladder of females was 0/10, 2/10 (minimal), 2/10 (minimal), 2/10 (minimal) and 9/10 (7 mild and 2 moderate) for the 0, 10, 50, 100 and 200 ppm groups respectively. In addition, a micronucleus assay was performed on bone marrow cells at the terminal sacrifice. A statistically significant increase ($p < 0.05$) in mean % micronucleated polychromatic erythrocytes was observed in the females at 200 ppm (0.11 ± 0.07%) when compared to the female control group (0.07 ± 0.14%). This increase at 200 ppm is also considered to be related to treatment with the test material. **No NOEL was established in this study. The NOEL is < 10 ppm, the lowest exposure level tested. The LEL is 10 ppm (based on simple epithelial hyperplasia in the urinary bladder of females).**

This study is classified as **Core Supplementary** because the 28-day duration of this study is less than the 90-day duration required in the Subdivision F Guidelines for a subchronic inhalation study (82-4). This study, therefore, **can not be upgraded**. In addition, no NOEL was established in this study.

Although this study is not acceptable as a Subdivision F Guidelines study, it nevertheless does contain valid information that indicates a toxicological effect of concern in the urinary bladder of female rats at 10 ppm and in both male and female rats at higher exposure levels (simple epithelial hyperplasia).

20

TRI QUATS PC 107401 TXR 011212

Page _____ is not included in this copy.

Pages 21 through 28 are not included in this copy.

The material not included contains the following type of information:

_____ Identity of product inert ingredients.

_____ Identity of product impurities.

_____ Description of the product manufacturing process.

_____ Description of quality control procedures.

_____ Identity of the source of product ingredients.

_____ Sales or other commercial/financial information.

_____ A draft product label.

_____ The product confidential statement of formula.

_____ Information about a pending registration action.

_____ FIFRA registration data.

_____ The document is a duplicate of page(s) _____.

_____ The document is not responsive to the request.

X DETAILED REVIEW OF DATA CLAIMED CONFIDENTIAL

The information not included is generally considered confidential by product registrants. If you have any questions, please contact the individual who prepared the response to your request.

TRI QUATS PC 107401 TXR 011212

Page _____ is not included in this copy.

Pages 29 through 40 are not included in this copy.

The material not included contains the following type of information:

_____ Identity of product inert ingredients.

_____ Identity of product impurities.

_____ Description of the product manufacturing process.

_____ Description of quality control procedures.

_____ Identity of the source of product ingredients.

_____ Sales or other commercial/financial information.

_____ A draft product label.

_____ The product confidential statement of formula.

_____ Information about a pending registration action.

X FIFRA registration data.

_____ The document is a duplicate of page(s) _____.

_____ The document is not responsive to the request.

The information not included is generally considered confidential by product registrants. If you have any questions, please contact the individual who prepared the response to your request.

13544

035222

Chemical:	**1-Octadecanaminium, N,N-dimethyl-N-(3-(t**
PC Code:	**107401**
HED File Code	**14000 Risk Reviews**
Memo Date:	**09/15/94**
File ID:	**TX011212**
Accession Number:	**412-02-0280**

HED Records Reference Center
04/10/2002