FOREWORD INTRODUCTION

3-Chloropropyltrimethoxysilane

CAS N°: 2530-87-2

SIDS Initial Assessment Report

For

SIAM 22

Paris, France, April 18 – 21 2006

1.	**Chemical Name:**	3-chloropropyltrimethoxysilane
2.	**CAS Number:**	2530-87-2
3.	**Sponsor Country:**	United States
		Oscar Hernandez Director, Risk Assessment Division (7403M) U.S. Environmental Protection Agency 1200 Pennsylvania Ave, N.W. Washington, DC 20460 Phone: 202-564-7641
4.	**Shared Partnership with:**	**Silicones Environmental Health and Safety Council (SEHSC):** Clariant LSM (Florida), Inc. Degussa Corporation Dow Corning Corporation GE Silicones Rhodia Inc. Shin-Etsu Silicones of America Wacker Silicones, A Division of Wacker Chemical Corporation
5.	**Roles/Responsibilities of the Partners:**	
•	Name of industry sponsor /consortium	Silicones Environmental Health and Safety Council Contact point: Tracy Hill SEHSC (703) 788-6562
•	Process used	The SEHSC produced the documents; EPA reviewed the documents and provided additional information where there were data gaps.

6. Sponsorship History

- How was the chemical or category brought into the OECD HPV Chemicals Programme?

Documents were prepared and reviewed by industry prior to submission to sponsor country. Sponsor country conducted reviews of submitted data and offered comments to industry. Industry prepared and resubmitted documents for consideration at SIAM 22.

no testing	(X)
testing	( )

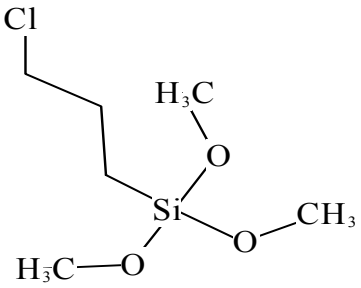
7. Review Process Prior to the SIAM: The U.S. EPA reviewed this case.

8. Quality check process: Literature searches were conducted by sponsor country to determine if all relevant data have been included in this submission.

9. Date of Submission: October 2005

10. Comments: Data from the hydrolysis product methanol were presented at SIAM 19. These documents will be available for review when published.

SIDS INITIAL ASSESSMENT PROFILE

CAS No.	2530-87-2
Chemical Name	3-Chloropropyltrimethoxysilane (CPTMO)
Structural Formula	

SUMMARY CONCLUSIONS OF THE SIAR

The chemical, 3-chloropropyltrimethoxysilane (CPTMO), undergoes rapid hydrolysis, which results in the production of 3 moles of methanol for each mole of silanetriol. Exposures to CPTMO are likely to be transient and observed toxicity is likely due primarily to the hydrolysis product methanol, with some potential exposure to trisilanols, and silanol oligomers. Methanol (CAS No 67-56-1) was assessed at SIAM 19. The SIAP for methanol is available for review. Use levels are generally less than 1 percent based upon the industrial goods formulation and less than 0.2 percent when used in composites, such that exposure to the hydrolysis products, including methanol is expected to be low.

Human Health

There were no available data on the toxicokinetic, metabolism or distribution of CPTMO. The oral (gavage) LD50 in rats of CPTMO is greater than 2000 mg/kg bw. Additional oral LD50 values in rats include 6.17 mL/kg (female) and 9.51 mL/kg to 10 g/kg (male). The dermal LD50 in rats of CPTMO is greater than 2000 mg/kg bw. Additional dermal LD50 values in rabbits include 2.83 mL/kg (male), 3.36 mL/kg (male) and 3.73 mL/kg (female). CPTMO has been shown to have none to moderate irritation to the skin and eyes. CPTMO is not a skin sensitizer when tested under the conditions of OECD guideline 406.

The no-observed-effect-level (NOEL) for male and female rats in a 90 day repeated dose inhalation toxicity study was reported to be 5 ppm (41 mg/m^3). Treatment related histopathologic changes in the urinary bladder and kidneys of rats exposed to 100 ppm (814 mg/m^3) were observed. Based on these results the lowest observed effect level (LOEL) in the rat was established at 100 ppm (814 mg/m^3). In a 28-day repeated inhalation toxicity study with CPTMO, test article-related changes were detected histopathologically in the adrenal glands, kidneys, liver and urinary bladder in some rats from one or more exposure groups at concentrations as low as 10 ppm (81 mg/m^3) (the lowest concentration). In an OECD guideline 422 repeated dose inhalation study in rats, CPTMO exposure up to and including the high concentration of 100 ppm (814 mg/m^3) did not result in any signs of general toxicity of the test article, including effects in the urinary bladder and kidney. Although the effect on the urinary bladder and kidney was not observed in all repeated inhalation exposure studies, the NOAEL for this effect across all studies is considered to be 5 ppm (41 mg/m^3). The conclusion has been reached that it is plausible that biological variation is often seen among tests and possibly, between testing laboratories; and, the 90-day study should be considered as carrying the most weight as it is the study with the longest duration and provides the most conservative NOAEL.

CPTMO was not considered to be an inducer of micronuclei *in vivo*, but is mutagenic *in vitro* (positive in

bacterial mutation assays and in the presence of metabolic activation, and in an *in vitro* mouse lymphoma mutagenesis assay). In the *in vivo* micronucleus assays clinical signs included decreases in micronucleated polychromatophilic erythrocyte (NCE) ratios at the 72 hour sampling time among male mice at 1625 mg/kg. Additional clinical observations at both 1000 and 1625 mg/kg doses are ataxia, tremors, prostration, myoclonic jerks and vocalization. There was no available carcinogenicity study for CPTMO.

In an OECD guideline 422 repeated dose inhalation study in rats, exposure to CPTMO up to and including the high concentration of 100 ppm (814 mg/m^3) did not result in any signs of reproductive or developmental toxicity. Based on these results the NOEL for general or reproductive toxicity was established at 100 ppm (814 mg/m^3).

Environment

The melting point of CPTMO is <-50°C and the boiling point is 196 °C. The vapor pressure is 0.5215 hPa at 25ºC. The estimated water solubility of CPTMO is 6.76 mg/L at 25 °C; the estimated log Kow is 0.56. The water solubility and log Kow values may not be applicable because the chemical is hydrolytically unstable. The estimated water solubility of the hydrolysis product of CPTMO, 3-chloropropylsilantriol, is 65000 mg/L; the estimated log Kow is -1.13. The overall degradation rate constant with OH radicals in the atmosphere is 4.6026 E^{-12} cm^3/molecule-sec with an estimated half-life of 3.5 days with a hydroxyl radical concentration of 5.0×10^5 molecule/cm^3. Photodegradation as a mode of removal is unlikely as CPTMO is hydrolytically unstable. CPTMO is reactive and hydrolytically unstable, such that methanol and silanetriols are rapidly generated upon contact with water or water vapor. Consequently, reaction with water vapor is likely the predominant degradation process for CPTMO in air and the overall reaction half-life in air should include both the oxidation half-life and the hydrolytic half-life. The overall reaction half-life in air is estimated to be 8 hours because of rapid hydrolysis of the material with moisture in the atmosphere. The products resulting from CPTMO hydrolysis in the atmosphere are expected to further react with hydroxyl radicals. The atmospheric oxidation was determined for the hydrolysis product, 3-chloropropylsilanetriol. The overall OH rate constant is 12.4E^{-12} cm^3/molecule-sec with an estimated half-life of 1.3 days.

CPTMO is hydrolytically unstable over a range of environmentally relevant pH and temperature conditions. At pH 7 and 25 ºC, the half-life is 53.3 minutes. Level III fugacity modeling, using loading rates for air, soil, and water of 1000 kg/h for each medium, shows the following percent distribution: air = 42.1%; soil = 52.5%; water = 5.4%; sediment = 0%. However, CPTMO is unlikely to be found in the environment, as this material is hydrolytically unstable. Level III fugacity modeling, using loading rates for air, soil, and water of 1000 kg/h for each media, shows the following percent distribution for the hydrolysis product, 3-chloropropylsilanetriol: air = 0.0%, soil = 53.5%, water = 46.4 %, and sediment = 0.1 %. CPTMO is readily biodegradable but does not meet the 10 day window. However, the biodegradation observed is likely reflective of the hydrolysis product, methanol, which is readily biodegradable and degraded 76% in 5 days and 95% in 20 days. Bioaccumulation of the parent substance is not anticipated.

CPTMO undergoes rapid hydrolysis, which occurs during testing; exposures to CPTMO are likely to be transient and observed toxicity is likely due primarily to the hydrolysis product methanol, with some potential exposure to trisilanols, and silanol oligomers. The alkyl silanols condense to siloxane oligomers; this condensation of silanols is affected by both concentration and pH, and since both change over time it is not feasible to isolate specific silanols for analysis (the structures continue to evolve until they either reach equilibrium or precipitate out of solution). Data from the hydrolysis product methanol were presented at SIAM 19. The SIAP is available for review. The 96-hour LC50 and LC0 of CPTMO in freshwater fish (*Brachydanio rerio*) are >100 mg/L. Studies have been performed with a silanol monomer, trimethylsilanol. Although this silanol is not expected to be produced following hydrolysis of CPTMO, it has been predicted (using EpiWin) to be one of the most toxic to aquatic organisms of all the silanols identified to date. A semi-static 96h study with trimethylsilanol and rainbow trout (*Oncorhynchus mykiss*) resulted in a NOEC of 128 mg/L and an LC_{50} of 271 mg/L. The 48 hour EC50 of CPTMO is 869 mg/L for the water flea (*Daphnia magna*) under static conditions. The 48 hour EC50 of trimethylsilanol is 124 mg/L for the water flea (*Daphnia magna*) under semi-static conditions. In an algae study with CPTMO, on the basis of biomass, the median effective concentration was 72 h EbC50 > 883 mg/L and 72 h EbC10 = 241 mg/L. On the basis of growth rate, a median effective concentration was achieved at (0-72 hr) ErC50 >883 mg/L; (0-72 hr) ErC10 = 514 mg/L. The NOEC was 167 mg/L. The most sensitive endpoints for *Selenastrum capricornutum* exposed to trimethylsilanol were cell density and area under the growth curve (biomass). The 72-hour EC50 value was 555 mg/L with 95% confidence limits of 141 and 612 mg/L. The 72-hour NOEC, based on cell density, area under the growth curve (biomass) and growth rate was 70 mg/L. The 96-hour EbC50 value was 625 mg/L with 95% confidence limits of 555 and 702 mg/L. The 96-hour NOEC, based on area under the growth curve (biomass), was 70 mg/L.

Exposure

In the Sponsor country, the production volume in 2001 was 10 tonnes. 250 tonnes of CPTMO were imported in the Sponsor country in 2001. Global production volumes are not available.

CPTMO is used as a coupling agent for filled composites and industrial goods (textile goods). Use levels are generally less than 1 percent based upon the industrial good formulation and less than 0.2 percent when used in composites. The substance is reacted during use and loses its chemical identity.
In order to prevent the rapid hydrolysis and subsequent loss of this material in production, it is handled in closed systems. Necessary engineering controls during production include proper ventilation, containment, safety equipment and actual hardware designed to minimize exposure through splashing, or exposure to the air. CPTMO is produced in closed systems. During sampling for analysis (quality control), local ventilation (hoods) is used to prevent worker exposure through inhalation. Dermal exposure is also a possible route of exposure during sampling. Dermal exposures are expected to be minimal as chemical protective gloves and/or clothing would be required during handling. The product is stored on site in standard warehouse conditions, with the product stored under a blanket of nitrogen in sealed containers. CPTMO is transported from the production site as the parent silane or as a blend with other silanes. The parent silane reacts during use by the industrial customer. In composites applications, the substance is added to water. The substance hydrolyzes and its chemical identity no longer exists. In industrial goods applications, the substance is mixed at low levels with polymers, fillers and other ingredients. During the mixing, molding and curing processes, the substance reacts completely and is no longer available for consumer or worker exposure. CPTMO does not volatilize during use. The substance hydrolyzes, releasing methanol.

At the industrial customer level, the material may be used in open or closed systems. Necessary engineering controls during use are likely to include local ventilation (hoods) when the substance is being transferred or used in its application. Exposure due to non-accidental releases are expected to be minimal, and may include dermal and inhalation exposure during transfer and use.

Consumer products are unlikely to contain any free (unreacted) CPTMO in any application, in that the substance has reacted with the filler and polymer in the composite or rubber.

RECOMMENDATION AND RATIONALE FOR THE RECOMMENDATION AND NATURE OF FURTHER WORK RECOMMENDED

Human Health: The chemical possesses properties indicating a hazard for human health (moderate skin and eye irritation, genotoxicity *in vitro* in bacterial and mammalian systems). Due to the rapid hydrolysis to methanol and the corresponding trisilanol and based on exposure data presented by the Sponsor country, (data on the global production volume were not available) and relating to use pattern in one country this chemical is currently of low priority for further work. Countries may desire to investigate any exposure scenarios that were not presented by the Sponsor country.

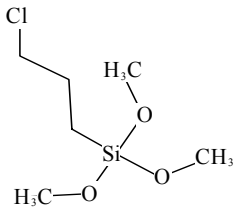
Environment: The chemical is currently of low priority for further work due to its low hazard profile.

SIDS Initial Assessment Report

1 IDENTITY

1.1 Identification of the Substance

CAS Number: 2530-87-2
IUPAC Name: (3-Chloropropyl)Trimethoxysilane
Molecular Formula: C6H15ClO3Si
Structural Formula:



Molecular Weight: 199
Synonyms: (gamma.-Chloropropyl)trimethoxysilane
3-Chloropropyltrimethyoxysilane
A-143
Dynasylan CPTMO
gamma-chloropropyltrimethoxysilane
3-(trimethoxysilyl)-propyl
Silane (3-chloropropyl)tris(methoxy)-
Silane, (3-chloropropyl)trimethoxy-
Silquest A-143
Z 6076

1.2 Purity/Impurities/Additives

Purity: 98-100%; Impurities: 0-2% (methanol, CAS number 67-56-1) (SEHSC, 2005).

1.3 Physico-Chemical properties

Table 1 Summary of Physico-Chemical Properties

Property	Value	Reference
Physical state	Liquid	
Melting point	-50 °C	AiChe, 2005; OSi Specialties, 2000 Additional values: -3.74 °C, DCC, 2005
Boiling point	196 °C at 1013 hPa	AiChe, 2005 Additional values: 100 °C at 53.3 hPa Johnson Matthey Company, 2003. 195 °C at 999.92 hPa Aldrich, 2003-2004. 201.2 °C at 1013 hPa, DCC, 2005
Relative density	1.07 g/cm3	Chemexper.com, 2005
Vapour pressure	0.5215 hPa at 25ºC	AIChE, 2005 Additional values: 1.33 hPa at 20 °C, OSi Specialties, 2000.
Water solubility	650,000 mg/L at 25 °C (estimated)	Dow Corning Corporation, 2005 [(a)] 65000 mg/l at 25 °C: 3-chloropropylsilanetriol (Dow Corning Corporation, 2005a)
Partition coefficient n-octanol/water (log value)	0.56 at 25 °C (estimated)	Dow Corning Corporation, 2005 [(a)] -1.13 at 25 °C: 3-chloropropylsilanetriol (Dow Corning Corporation, 2005a)
Henry's law constant	Data not available	

(a) Because the material is hydrolytically unstable and rapidly generates methanol when added to water, endpoints such as water solubility cannot be measured. Nonetheless, these endpoints provide valuable information on the behavior of the material and are needed to evaluate the transport and distribution (i.e., fugacity) of CPTMO between environmental matrices.

Table 2 Summary of Water Solubility and Partition Coefficient For 3-Chloropropylsilanetriol

Property	Value	Reference
Water solubility	65000 mg/l at 25 °C	Dow Corning Corporation, 2005a
Partition coefficient n-octanol/water (log value)	-1.13 at 25 °C	Dow Corning Corporation, 2005a

2 GENERAL INFORMATION ON EXPOSURE

In production, this material is handled in closed systems. Necessary engineering controls during production include proper ventilation, containment, safety equipment and actual hardware designed to minimize exposure, through splashing, or exposure to the air. Transfer of this material is in closed pipes, drums, or tanks rather than in open systems to minimize loss of this material (hydrolysis). CPTMO is a coupling agent used for filled composites and industrial goods (textile goods). Use levels are generally less than 1 percent based upon the industrial good formulation and less than 0.2 percent when used in composites. The substance is reacted during use and loses its chemical identity.

CPTMO undergoes rapid hydrolysis. The alkyl silanols condense to siloxane oligomers; this condensation of silanols is affected by both concentration and pH, and since both change over time it is not feasible to isolate specific silanols for analysis (the structures continue to evolve until they either reach equilibrium or precipitate out of solution). Data from the hydrolysis product methanol were presented at SIAM 19. The SIAP is available for review. Use levels are generally less than 1 percent based upon the industrial good formulation and less than 0.2 percent when used in composites, such that exposure to the hydrolysis products, including methanol is expected to be low.

2.1 Production Volumes and Use Pattern

In the Sponsor Country, production volume in 2001 was 10 tonnes. 250 tonnes of CPTMO were imported in the Sponsor Country in 2001. CPTMO is produced in North America, Europe and Asia. No additional global production volume data were available.

In order to prevent the rapid hydrolysis and subsequent loss of this material in production, it is handled in closed systems. The synthesis, which must take place under inert conditions, involves the hydrosilation of allyl chloride with trichlorosilane. The resultant product is reacted with methanol to replace the chlorines on the silicon atom with methoxy groups. Necessary engineering controls during production include proper ventilation, containment, safety equipment and actual hardware designed to minimize exposure through splashing, or exposure to the air. CPTMO is transported from the production site as the parent silane or as a blend with other silanes. The parent silane reacts during use by the industrial customer. In composites applications, the substance is added to water. The substance hydrolyzes and its chemical identity no longer exists. In industrial goods applications (textile goods), the substance is mixed at low levels with polymers, fillers and other ingredients. During the mixing, molding and curing processes, the substance reacts completely and is no longer available for consumer or worker exposure. CPTMO does not volatilize during use. The substance hydrolyzes, releasing methanol. Therefore, the consumer is not exposed to CPTMO from its use in consumer products.

CPTMO is a coupling agent used for filled composites and industrial goods. CPTMO is generally present in preparations for these uses at levels less than 1 percent based upon the industrial good formulation and less than 0.2 percent when used in composites. The substance is reacted during use, loses its chemical identity, and is no longer available for exposure to the environment. When CPTMO is used in filled elastomers, such as rubber shoe soles or industrial goods, it is a component in a blend with other silanes. The silane blend is added to the formulation at <=1w/w%, such that CPTMO is present at <0.1w/w%. During mixing and curing, the CPTMO reacts with inorganic fillers. The bound water on the filler hydrolyzes the silane to generate methanol, which will be evaporated from the rubber formulation. The industrial end-user uses local ventilation (hood) to remove the methanol from the workplace. Some very small percentage of methanol may continue to be slowly generated from the filled elastomer after the article is molded. When CPTMO is used as a finish for textile goods (fiberglass), it is added to a water system at low levels, generally less than 0.3 w/w%, and hydrolyzed. The silane and water mixture is coated onto glass fibers. The water and methanol is evaporated during a drying process and are removed from the workplace using local ventilation (hood). Any excess silane and water mixture is disposed of in a waste water treatment system.

2.2 Environmental Exposure and Fate

2.2.1 Sources of Environmental Exposure

The reactive nature of this material destroys the parent material in any moisture-containing environment, thus limiting environmental exposure to the silane. CPTMO hydrolyzes rapidly; at a pH of 7 and ambient temperature, the half-life is 53.3 minutes (Gorman and Powell, 1995). Hydrolysis of the parent substance results in the production of 3 moles of methanol for each mole of silanetriol. Hydrolysis of CPTMO results in the formation of silanetriols which can then condense to form highly cross-linked, high molecular weight polymers, further reducing the potential for exposure. In the environment, at lower concentrations of the parent compound (and thus lower concentrations of the hydrolysis products), exposure to unpolymerized silanetriols may occur.

2.2.2 Photodegradation

CPTMO in air is not expected to undergo direct photolysis, but may undergo indirect photolysis through hydroxyl radical oxidation. The hydroxyl radical reaction was calculated using AOPWIN® ver. 1.91 (Dow Corning Corporation, 2005). The overall OH rate constant is 4.6026E-12 cm^3/molecule-sec with an estimated half-life of 3.5 days with a hydroxyl radical concentration of 5.0×10^5 molecule/cm^3. Photodegradation as a mode of removal is unlikely as CPTMO is hydrolytically unstable. CPTMO is reactive and hydrolytically unstable, such that methanol and silanetriols are rapidly generated upon contact with water or water vapor. Consequently, reaction with water vapor is likely the predominant degradation process for CPTMO in air and the overall reaction half-life in air should include both the oxidation half-life and the hydrolytic half-life. The overall reaction half-life in air is estimated to be 8 hours because of rapid hydrolysis of the material with moisture in the atmosphere. The products resulting from CPTMO hydrolysis in the atmosphere are expected to further react with hydroxyl radicals. The atmospheric oxidation was determined for the hydrolysis product, 3-chloropropylsilanetriol (Dow Corning, 2005a). The overall OH rate constant is 12.4E-12 cm^3/molecule-sec with an estimated half-life of 1.3 days.

2.2.3 Stability in Water

CPTMO is hydrolytically unstable over a range of environmentally relevant pH and temperature conditions (Gorman and Powell, 1995):

Table 3 Summary of Stability in Water

	Half life (minutes)
pH	At 25 °C
5.0	14.6
7.0	53.3
9.0	22.4

Rapid hydrolysis of this material produces methanol and silanetriols. The Si-C bond will not undergo further hydrolysis. The Si-C bond is hydrolytically stable. Only the methoxy groups will be hydrolyzed.

2.2.4 Transport between Environmental Compartments

The EQC Level III Fugacity model (USEPA, 2003) was used to evaluate the fate, transport and distribution of CPTMO between environmental matrices. Level III Fugacity modeling, using loading rates for Air, Soil, and Water of 1000 kg/h for each media, shows the following percent distribution: Air = 42.1%; Soil = 52.5%; Water = 5.4%; Sediment = 0% (Dow Corning Corporation, 2005). However, CPTMO is unlikely to be found in the environment, as this material is hydrolytically unstable. Level III Fugacity modeling, using loading rates for Air, Soil, and Water of 1000 kg/h for each media, shows the following percent distribution for the hydrolysis product, 3-chloropropylsilanetriol: Air = 0.0%, Soil = 53.5%, Water = 46.4 %, and Sediment = 0.1 % (Dow Corning Corporation, 2005a).

2.2.5 Biodegradation

CPTMO achieved a breakdown rate of 84% in 28 days, indicating that it is readily biodegradable but does not meet the 10-day window (Degussa-Huls, 1993a). Based on the rapid hydrolysis of this material, the observed biodegradation is likely to be of the hydrolysis products. CPTMO has a hydrolytic half-life of 53.3 minutes at 25 ºC and pH 7.0. Consequently, the only biodegradable materials in the test system will be methanol, silanetriol, and condensed silanetriol materials. Total percent degradation is equal to the combined percent degradation of each material and the overall rate of degradation determined by the material that degrades most rapidly. The observation that 84% percent of the material is degraded after 28 days suggests that most of the degradation was associated with methanol. Methanol is degraded 76 percent in 5 days and 95 percent in 20 days; it is readily biodegradable.

2.2.6 Bioaccumulation

Bioaccumulation is not anticipated since this material is hydrolytically unstable. Rapid hydrolysis of this material produces methanol and trisilanols. The Si-C bond will not undergo further hydrolysis. That bond is hydrolytically stable. Only the methoxy groups will be hydrolyzed. The transient silanol groups will condense with other silanols at concentrations greater than 500 ppm to yield silanol-functional resins.

If the silane is slowly released such that the concentration of the resulting silanetriol is not high enough to result in polymerization, the trisilanol will exist largely as a monomer (Merrifield, J., 2003). The monomer is known to be water soluble by virtue of the three hydroxy groups on the silicon. It is expected that this silanetriol will have a low Kow because of these hydroxy groups and so is not expected to bioaccumulate. The water solubility of the silanetriol cannot be measured because of the tendency to condense at concentrations greater than 500 ppm. It is known however that the silanetriol and small condensation products will only precipitate out of water due to formation of larger, water insoluble polymeric resins. Methanol has a low bioaccumulation potential.

2.3 Human Exposure

2.3.1 Occupational Exposure

In order to prevent the rapid hydrolysis and subsequent loss of this material, in production, it is handled in closed systems. Necessary engineering controls during production include proper ventilation, containment, safety equipment and actual hardware designed to minimize exposure, through splashing, or exposure to the air. Transfer of this material is in closed pipes or containers

rather than in open systems to minimize loss of this material (hydrolysis) although some customers may transfer the material using open systems. Transport is a source of potential exposure through accidental releases. The material is shipped via air, road, and marine in 1 and 5 gallon pails and 55 gallon drums.

CPTMO is produced in closed systems. During sampling for analysis (quality control), local ventilation (hoods) is used to prevent worker exposure through inhalation. Dermal exposure is also a possible route of exposure during sampling. Dermal exposures are expected to be minimal as chemical protective gloves and/or clothing would be required during handling. The product is stored on site in standard warehouse conditions, with the product stored under a blanket of nitrogen in sealed containers.

At the industrial customer level, the material may be used in open or closed systems. Necessary engineering controls during use are likely to include local ventilation (hoods) when the substance is being transferred or used in its application. Exposure due to non-accidental releases are expected to be minimal, and may include dermal and inhalation exposure during transfer and use.

2.3.2 Consumer Exposure

Consumer products are unlikely to contain any free (unreacted) CPTMO in any application, in that the substance has reacted with the filler and polymer in the composite or rubber.

3 HUMAN HEALTH HAZARDS

3.1 Effects on Human Health

3.1.1 Toxicokinetics, Metabolism and Distribution

No data available.

3.1.2 Acute Toxicity

This material has been tested for acute toxicity by the oral and dermal routes of exposure.

Studies in Animals

Dermal

Undiluted CPTMO was applied to the clipped trunk skin of groups of 5 male and 5 female rats at a dose of 2000 mg/kg (Degussa-Huls, 1993b). This study was performed according to OECD TG 402. There was no evidence of systemic toxicity noted during the study period, all animals showed normal gains in body weight over the study period, and there were no abnormalities noted at necropsy. The combined LD50 in male and female rats of CPTMO is greater than 2000 mg/kg bw. Undiluted CPTMO was applied under an occlusive dressing to groups of 5 male and 5 female rabbits (BRRC, 1990). Dosages for each group were 8.0, 4.0, and 2.0 ml/kg (the density of CPTMO is 1.07 g/cm3). The LD50 values for undiluted CPTMO were 3.36 and 3.73 ml/kg, for male and female animals, respectively. Signs of toxicity, seen principally at dosages of 4.0 and 8.0 ml/kg, included spastic movements, prostration, salivation, and red staining perioral, perinasal, and perianal fur. Survivors of the 2.0 and 4.0 ml/kg male group and 2.0 ml/kg male group gained weight over the observation period; males of the 4.0 ml/kg group lost weight during the first post-application week, but regained weight during the second week. Gross pathological features in animals that died included red lungs, dark red kidneys and bladders filled with red fluid, and one

with enlarged thymus. Urine was positive for blood on qualitative testing. For survivors, necropsy revealed mottled dark red lungs, one with liver nodule, and trace amounts of blood in urine on qualitative testing. The dermal LD50 of CPTMO in male rabbits was determined to be 2.83 ml/kg (Carnegie-Mellon, 1974). There were no signs of toxicity or skin irritation at 1 or 2 ml/kg. At 4 and 16 ml/kg there were signs of skin irritation. Signs of toxicity included fur wet, prostration (16 ml/kg only) and cold to the touch before death and nose bleeding (4 ml/kg only).

Oral

The combined LD50 in male and female rats of CPTMO is greater than 2000 mg/kg bw (Degussa-Huls, 1993c). This study was performed according to OECD TG 401. Up to six hours after administration clinical signs of toxicity were noted including abnormal gait, squatting, staggering, unkempt fur, salivation and lacrimation, hypothermia, and uncontrolled movements. No abnormalities were noted at necropsy. All animals appeared normal beginning at the 24 hour observation point. Male rats were dosed with CPTMO at 16, 8, 4, and 1 ml/kg (the density of CPTMO is 1.07 g/cm3; Carnegie-Mellon, 1974). The oral LD50 was determined to be 9.51 ml/kg. Signs and/or symptoms of toxicity shortly after exposure to the highest dose included sluggish, unsteady gait and pilo-erection, prostrate, gasping, convulsions and death. At the two mid-doses, signs and/or symptoms included rubbing mouth on bottom of cage, sluggish and deep breathing, prostrate with, sporadic convulsions, unsteady gait and salivation. There were no signs of toxicity at the lowest dose level. Gross pathology in animals that died included livers mottled; kidneys pale, speckled and slightly congested; stomachs and intestines distended, gas and liquid filled; and bladders full. In survivors, gross pathology observations included livers mottled and surface of spleens rough. The LD50 of CPTMO in male rats was 9.51 ml/kg and in female rats was 6.17 ml/kg (BRRC, 1990). Signs of toxicity, seen at doses of 2 ml/kg and above included sluggishness, unsteady gait, prostration, and red perinasal and periocular encrustation. Survivors recovered from these effects within 1 to 7 days. Also, survivors gained weight over the first and second post-dosing weeks. Necropsy revealed the urine to be positive for blood in animals that died. Signs of gross pathology in these animals included bright red or dark red mottled lungs, dark red livers, and discolored stomachs, red and/or yellow colored intestines, and purple kidneys. Necropsy of survivors revealed mottled pink to dark red lungs and purple kidneys. CPTMO was practically non-toxic when ingested on an acute basis by rats (LD50= 10.0 g/kg; Dow Corning Corporation, 1982). Lethargy and lose of muscular coordination observed in animals at 30 minutes post dosing in the 5.0 and 10 g/kg dose groups. All animals in 0.63-2.52 g/kg dose groups appeared normal at 1 hour post-dosing. One animal in the 10.0 g/kg dose group died on day 1. Surviving animals in the 5.0 and 10.0 g/kg dose groups continued to appear weak and lethargic. All other animals appeared normal. All surviving animals appeared normal and exhibited normally anticipated body weight gains from day 8 forward.

Table 4 Summary of the Acute Toxicity of CPTMO

Species, Route	**Value (LD50)**	**Reference**
at (Wistar), oral	>2000 mg/kg bw	Degussa-Huls, 1993c
Rat (Wistar), oral	9.51 ml/kg bw (male)	Carnegie-Mellon, 1974
Rat, oral	9.51 ml/kg bw (male) 6.17 ml/kg bw (female)	BRRC, 1990
	Value (LD50)	**Reference**
Rat, oral	10 g/kg bw	Dow Corning Corporation, 1982
Rat (Wistar), dermal	>2000 mg/kg bw	Degussa-Huls, 1993b
Species, Route	**Value (LD50)**	**Reference**
Rabbit, dermal	3.36 ml/kg bw (male) 3.73 ml/kg bw (female)	BRRC, 1990
Rabbit (albino), dermal	2.83 ml/kg bw (male)	Carnegie-Mellon, 1974

The density of CPTMO is 1.07 g/cm^3

Studies in Humans

No data available.

3.1.3 Irritation

CPTMO has been tested for both skin and eye irritation.

Skin Irritation

Studies in Animals

A single, four-hour, semi-occluded application (performed according to OECD TG 404) of undiluted CPTMO resulted in erythema and edema in all six rabbits at 24 and 48 hours after application (Degussa-Huls, 1993d). At 72 hours, of the 6 animals 3 were observed to exhibit erythema. The remaining three animals exhibited edema, and dryness of the skin.. Symptoms subsided by day 17. The Primary Dermal Irritation Index (PDII) was determined to be 3.23. Undiluted (0.5 ml) CPTMO was applied to the shaven dorsal trunk of each of 6 rabbits (BRRC, 1990). The material was held in contact with the skin for 4-hr by means of an occlusive dressing. There were no local signs of injury and/or inflammation and none developed over the 7-day observation period. Undiluted CPTMO was applied to the skin of 6 rabbits under semi-occlusive cover for four hours (Dow Corning Corporation, 1981). No evidence of irritation was observed in any of the six animals.

Studies in Humans

No data available.

Eye Irritation

Studies in Animals

A single instillation of undiluted CPTMO (0.1 mL) was made to the non-irrigated eye of three rabbits (performed according to OECD TG 405) , and an assessment of damage/irritation was made 24, 48, and 72 hours following treatment (Degussa-Huls, 1993e). The treatment resulted in minimal conjunctival irritation in one of three animals. Undiluted CPTMO (0.1 mL) was placed in the inferior conjunctival sac of one eye of each of 6 rabbits (BRRC, 1990). The animals were subsequently and periodically examined for signs of ocular and periocular injury and inflammation over a 7-day period. Minimal conjunctivitis, seen as slight excess redness and swelling with discharge, was seen within an hour of exposure, but resolved within 24 hours. A minor iritis, of less than 4-hour duration, was seen in the eyes of two rabbits. Corneal injury was not seen. Two drops of test material were instilled into the left eye of one rabbit (Dow Corning Corporation, 1982). The eye was washed with water for 2 minutes within 30 seconds after the instillation. The right eye was treated similarly but left unwashed. Both eyes were observed at 1, 24, 48 hours and 6 to 8 days after treatment. In the undiluted form, CPTMO produced moderate to severe pain, slight conjunctival redness and very slight corneal opacity persisting one to two days.

Studies in Humans

No data available.

Respiratory Tract Irritation

No data available.

3.1.4 Sensitization

CPTMO has been tested in a standard Buehler assay (OECD TG 406) for skin sensitization.

Studies in Animals

Skin

A group of 20 guinea pigs was induced with 100% CPTMO on days 0, 7 and 14 and subsequently challenged with 100% CPTMO on day 28 (Degussa-Huls, 1993f). A control group of 10 animals was induced and challenged with corn oil. There was no erythema or edema observed during Induction Phases I, II or III; no skin irritation was observed in the control animals. There was no skin irritation observed in either test or control animals in the Challenge Phase. Under the conditions of this test, CPTMO is not a skin sensitizer.

Studies in Humans

No data available.

Conclusion

The oral (gavage) LD50 in rats of CPTMO is greater than 2000 mg/kg bw. Additional oral LD50 values in rats include 6.17 ml/kg (female), 9.51 mL/kg (male) to 10 g/kg. The dermal LD50 in rats of CPTMO is greater than 2000 mg/kg bw. Additional dermal LD50 values in rabbits include 2.83 ml/kg (male), 3.36 ml/kg (male) and 3.73 ml/kg (female). CPTMO has been shown to have none to moderate irritation to the skin and eyes. CPTMO is not a skin sensitizer.

3.1.5 Repeated Dose Toxicity

CPTMO has been tested for repeated dose toxicity by the inhalation route of exposure.

Studies in Animals

Inhalation

Groups of male and female rats were exposed to target concentrations of 0, 0.5, 5, 100 and 200 ppm (0, 4, 41, 814 and 1627 mg/m^3, respectively) of CPTMO vapors for 6 hours a day, 5 days a week for 90 days (Dow Corning Corporation, 1993a). After 13 weeks of exposure, rats were sacrificed and examined for changes in blood, serum chemistry, urine, organ weights and gross and histopathology. The actual overall mean exposure concentration for the test groups was 0.5, 5, 99 and 189 ppm (4, 41, 806 and 1537 mg/m^3). No mortality or apparent treatment-related signs of toxicity were observed in any of the test animals. No statistically significant differences were observed in mean body weights or food consumption between the test and control groups. There were no statistically significant differences in the haematology values of male or female rats. Sporadic increases in sodium, potassium and chloride were observed only in male rats. There were no statistically significant differences in male or female organ weights among the groups. Treatment-related histopathologic effects were seen in 100 ppm (814 mg/m^3) group animals. Increased incidence of hyperplasia of the urinary bladder epithelium was noted in both sexes of this group. In addition, an increased incidence and severity of alpha 2u-globulin inclusions (hyaline droplet nephropathy) in the kidney was observed in males. This condition is unique to male rats and

has no known implication for human risk. There were no test article-related microscopic changes in any organs or tissues of the respiratory tract. The results of this study demonstrate test article-related histopathologic changes in the urinary bladder and kidneys of animals exposed to 100 ppm (814 mg/m^3). The NOEL for male and female rats was determined to be 5 ppm (41 mg/m^3).

Groups of male and female rats were exposed by inhalation to CPTMO at concentrations of 10, 50, 100 and 200 ppm (81, 407, 814 and 1628 mg/m^3, respectively) (Dow Corning Corporation, 1992). Exposures were 6 hours/day, five days per week for 28 days. The actual overall mean exposure concentrations of the test material for the various test groups were 10, 50, 98 and 192 ppm (81, 407, 798, and 1563 mg/m^3, respectively). No mortality or apparent treatment-related clinical signs were observed in any of the test groups. No statistically significant differences were noted in either mean body weights or food consumption. No treatment-related effects were seen in the clinical pathology parameters. Statistically significant increases were noted in the absolute and relative weights of adrenal glands of male rats from the 50, 100 and 200 ppm (407, 814 and 1628 mg/m^3, respectively) exposure groups and females at 100 and 200 ppm (814 and 1628 mg/m^3, respectively). Statistically significant increases were also observed in liver and kidney weights of males at 200 ppm (1628 mg/m^3). The organ weight changes were supported by the findings of microscopic lesions in these organs. Test article-related changes were detected histopathologically in the adrenal glands, kidneys, liver and urinary bladder in some rats from one or more exposure groups. Histopathologic changes included adrenal cortical hypertrophy in males at 100 ppm (814 mg/m^3) and in both sexes at 200 ppm (1628 mg/m^3); hyaline droplet nephropathy in males at 50, 100 and 200 ppm (407, 814 and 1628 mg/m^3, respectively); hepatocellular hypertrophy in males at 200 ppm (1628 mg/m^3) and hyperplasia of urinary bladder epithelium in females at 10 ppm (81 mg/m^3) and both sexes at 50, 100 and 200 ppm (407, 814 and 1628 mg/m^3, respectively). Statistically significant increases in micronucleated cells were observed in female rats of the 200 ppm group (1628 mg/m^3). There were no test article-related microscopic changes in any of the respiratory tract organs or other tissues examined. In conclusion, test article-related changes were detected histopathologically in the adrenal glands, kidneys, liver and urinary bladder in some rats from one or more exposure groups. The no-observed-adverse-effect-level (NOAEL) was not established in this study.

In a two week study inhalation study with rats, there were eleven exposures of 6 hours per day (3 exposures during first week, 5 second week and 3 during third week) to target concentrations of 0, 50, 100 and 150 ppm (0, 407, 814 and 1221 mg/m^3, respectively) CPTMO (Dow Corning Corporation, 1990a). Gross necropsies were performed on all rats. Body weights and food consumption were measured weekly. The terminal body weights were determined on the animals at the terminal sacrifice. No mortality occurred and no treatment related toxic effects were observed in any of the test group animals. There were no statistically significant differences in group body weights or food consumption. No treatment-related effects were observed at gross necropsy.

CPTMO was administered for 6 hours daily by whole-body vapor inhalation to male rats for 28 days and to female rats throughout the 14-day pre-pairing, pairing and gestation period until the individual day 19 post coitum (RCC Ltd, 2005). The animals were exposed to the following mean test article concentrations: Group 1: 0 ppm (air control), Group 2: 5 ppm (41 mg/m^3), Group 3: 25 ppm (203 mg/m^3), and Group 4: 100 ppm (814 mg/m^3). Control animals were exposed to air only under the same conditions as animals exposed to the test article. No test article-related mortalities or clinical signs that were attributable to exposure to the test item were noted throughout the study. Neither food consumption nor body weight development was affected by exposure to the test item at any concentration. None of the parameters under investigation during the functional observational battery was considered to be affected by exposure to the test article. During necropsy of F0 parent animals, no test item-related findings were noted. Mean absolute organ weights as well as organ/body weight ratios and organ/brain weight ratios were not affected by exposure to the

test article. There were no findings which distinguished test article-treated animals from controls. Exposure to CPTMO up to and including the high concentration of 100 ppm (814 mg/m^3) did not result in any signs of general toxicity of the test article. Based on these results the NOEL was established at 100 ppm (814 mg/m^3) in the rat.

Exposure to CPTMO in the rat following a 90-day inhalation exposure resulted in histopathologic changes in the urinary bladder and kidneys of animals exposed to 100 ppm (814 mg/m^3). The NOEL for male and female rats for this effect in the 90-day study was determined to be 5 ppm (41 mg/m^3). In a 28-day repeated inhalation toxicity study with CPTMO, test article-related changes were detected histopathologically in the adrenal glands, kidneys, liver and urinary bladder in some rats from one or more exposure groups at concentrations as low as 10 ppm (81 mg/m^3) (the lowest concentration). In an OECD 422, CPTMO exposure up to and including the high concentration of 100 ppm (814 mg/m^3) did not result in any signs of general toxicity of the test article, including effects in the urinary bladder and kidney. Although the effect on the urinary bladder and kidney was not observed in all repeated inhalation exposure studies, the NOAEL for this effect across all studies is considered to be 5 ppm (41 mg/m^3). The conclusion has been reached that it is plausible that biological variation is often seen among tests and possibly, between testing laboratories; and, the 90-day study should be considered as carrying the most weight as it is the study with the longest duration and provides the most conservative NOAEL.

Studies in Humans

No data available.

Conclusion

The NOEL for male and female rats in a 90 day repeated dose inhalation toxicity study was reported to be 5 ppm (41 mg/m^3) (test article-related histopathologic changes in the urinary bladder and kidneys of animals exposed to 100 ppm (814 mg/m^3)).

3.1.6 Mutagenicity

In vivo mammalian and *in vitro* bacterial and mammalian genotoxicity studies have been conducted with CPTMO.

In vivo Studies

CPTMO was given to both male and female mice as a single dose by intraperitoneal injection in a standard micronucleus study (BRRC, 1993). There were no signs of toxicity in male or female mice in the 500 mg/kg group, except that 1 female exhibited ataxia during the first hour post-treatment. All of the males and females in the 1000 mg/kg group exhibited ataxia and 2 of the males also had tremors during the first hour after treatment. In males and females treated at 1625 mg/kg CPTMO, ataxia, tremors, and prostration were observed during the first hour after treatment. Other clinical signs in the high dose females included myoclonic jerks and vocalization. There were no significant clinical observations in male or female mice from the afternoon of Day 1 through the end of the study. There was a significant decrease in the polychromatophilic erythrocyte (PCE) to normochromatophilic erythrocyte (NCE) ratios at the 72 hr sampling time among male mice (50.6% of control) treated with 1625 mg/kg CPTMO. However, there was no evidence that CPTMO was excessively toxic to the bone marrow at the concentrations chosen for the study. No significant increases in the incidences of micronucleated PCE were observed at 500, 1000, or 1625 mg/kg CPTMO at the 30, 48 or 72 hr sampling times in mice of either sex. Groups of male and female rats were exposed to target concentrations of 0, 0.5, 5 and 100 ppm (0, 4, 41 and

814 mg/m^3, respectively) of CPTMO vapors for 6 hours a day, 5 days a week for 90 days (Dow Corning Corporation, 1990c). At 24 and 48 hours post-exposure, bone marrow was collected from the femur of 5 animals in all groups for micronucleus assay. In addition, one group of ten male and ten female rats were also exposed concurrently to a target concentration of 200 ppm (1628 mg/m^3). A micronucleus assay was performed on this group at 24 and 48 hours post-exposure. Statistically significant increases in micronucleated cells were observed in females of the 100 ppm (814 mg/m^3) group at 48 hours post-exposure. This finding was not considered treatment-related because the increase found 24 h following exposure to 100 ppm was not observed at 48h or at either time after exposure to 200 ppm.

In vitro Studies

Gene Mutations

CPTMO induced cytotoxicity and mutagenicity in several bacterial mutagenicity tests. Slight toxicity was noted for strains TA-1535 and TA-100 with activation at 2500 and 5000 ug/plate and to strain TA-1537 with activation at 5000 ug/plate (Dow Corning Corporation, 1990b). Slight toxicity was also seen to strain TA-98 at 625-5000 ug/plate (Dow Corning Corporation, 1990c). Mutagenic activity was seen in several studies as illustrated in Table 4. Appropriate concurrent negative and positive controls were included, and the expected responses were observed. CPTMO was a bacterial mutagen under the conditions of this assay.

Table 5 Summary of the Positive Responses in the Bacterial Mutagenicity Test with CPTMO

Bacterial strain/Activation	Reference
TA-1535/without metabolic activation TA-1535/ with metabolic activation	Degussa-Huls, 1993g
TA-100 and TA-1535/with metabolic activation TA-98, TA-100 and TA-1535/without metabolic activation	Dow Corning Corporation, 1993b
TA-1535, TA-1537 and TA-100/with metabolic activation TA-1535, TA-1537 and TA-100/without metabolic activation	Dow Corning Corporation. 1990d
TA-1535, TA-1537 and TA-100/ with and without activation TA-98/with activation.	Dow Corning Corporation, 1990b
TA-98/with activation.	Dow Corning Corporation, 1990c

CPTMO was tested in the L5178Y/TK+/- mouse lymphoma mutagenesis assay in the absence and presence of metabolic activation (Dow Corning Corporation, 1995). In the mutagenesis assay, no non-activated test article-treated cultures and eight S9-activated test article-treated cultures exhibited mutant frequencies that were at least twice that of the solvent control. A dose-response trend was noted in the S9-activated cultures. Toxicity in the cloned cultures, i.e., total growth of less than or equal to 50% on the solvent control, was observed at a dose of 2000 ug/ml without activation and at doses of greater than or equal to 60 ug/ml with S9 activation. The trifluorothymidine-resistant colonies for the cloned S9-activated positive control, solvent control and test article-treated cultures were sized according to diameter over a range from 0.2 to 1.1 mm. The data on colony size distributions showed an increase in the frequency of medium to large colonies when the treated cultures were compared to the solvent control cultures. Under the

conditions of this study, the test article was considered to be negative without S9 activation and positive with S9 activation in the L5178Y/TK +/- Mouse Lymphoma Mutagenesis Assay.

Conclusion

CPTMO was not considered to be an inducer of micronuclei *in vivo*, but is mutagenic *in vitro* (positive in bacterial mutation assays and in the presence of metabolic activation, and in an *in vitro* mouse lymphoma mutagenesis assay). In the *in vivo* micronucleus assays, clinical signs included decreases in micronucleated polychromatophilic erythrocyte (NCE) ratios at the 72 hour sampling time among male mice at 1625 mg/kg. Additional clinical observations at both 1000 and 1625 mg/kg doses are ataxia, tremors, prostration, myoclonic jerks and vocalization.

3.1.7 Carcinogenicity

There was no available carcinogenicity study on CPTMO.

3.1.8 Toxicity for Reproduction

CPTMO has been assessed for toxicity to reproduction following inhalation exposure.

Effects on Fertility

CPTMO was administered for 6 hours daily by whole-body vapor inhalation to male rats for 28 days and to female rats throughout the 14-day pre-pairing, pairing and gestation period until the individual day 19 post coitum (RCC Ltd, 2005). The animals were exposed to the following mean test item concentrations: Group 1: 0 ppm (air control), Group 2: 5 ppm (41 mg/m^3), Group 3: 25 ppm (204 mg/m^3), and Group 4: 100 ppm (814 mg/m^3). Control animals were exposed to air only under the same conditions as animals exposed to the test article. P generation males were sacrificed after they had been treated for 28 days, P generation females and pups were sacrificed on day 4 post partum. The fertility rate was high resulting in at least 9 litters per group for evaluation of reproduction data. At all concentrations, there were no treatment-related effects on precoital time, fertility indices, mean duration of gestation, number of implantations, post-implantation loss, pup survival or litter size from birth through to scheduled sacrifice on day 4 post partum. No abnormal findings were noted for pups at first litter check or during the first 4 days post partum. Sex ratios at first litter check and on day 4 post partum were unaffected by treatment with the test article. Mean pup weights on day 0 and day 1 post partum were unaffected by treatment with the test article. Mean pup weight development during the first 4 days post partum lactation was unaffected by treatment with the test article. The mean number of corpora lutea per dam (determined at necropsy) was similar in all groups and gave no indication of a test item-related effect. There were no findings, which distinguished test item-treated animals from controls. In particular, no treatment-related histopathological findings were observed in the reproductive organs of either sex from the parental generation. The assessment of the integrity of the spermatogenetic cycle did not provide any evidence of impaired spermatogenesis. Exposure to CPTMO up to and including the high concentration of 100 ppm (814 mg/m^3) did not result in any signs of general or reproductive toxicity of the test article. Based on these results the NOEL for general or reproductive toxicity was established at 100 ppm (814 mg/m^3) in the rat.

Developmental Toxicity

CPTMO was administered as described previously (RCC Ltd, 2005). P generation males were sacrificed after they had been treated for 28 days, P generation females and pups were sacrificed on day 4 post partum. No abnormal findings were noted for pups at first litter check or during the first 4 days post partum. Sex ratios at first litter check and on day 4 post partum were unaffected by

treatment with the test article. Mean pup weights on day 0 and day 1 post partum were unaffected by treatment with the test article. Mean pup weight development during the first 4 days post partum lactation was unaffected by treatment with the test item. No test item-related findings were noted at macroscopic examination of F1 pups. Based on these results the NOEL for general, maternal, and reproductive/developmental toxicity was established at 100 ppm (814 mg/m^3) in the rat.

Conclusion

Exposure to CPTMO up to and including the high concentration of 100 ppm (814 mg/m^3) did not result in any signs of general, reproductive or developmental toxicity of the test item in rats in a one generation study (OECD TG 422). Based on these results the NOEL was established at 100 ppm (814 mg/m^3).

3.2 Initial Assessment for Human Health

There were no available data on the toxicokinetic, metabolism or distribution of CPTMO. The oral (gavage) LD50 in rats of CPTMO is greater than 2000 mg/kg bw. Additional oral LD50 values in rats include 6.17 mL/kg (female) and 9.51 mL/kg to 10 g/kg (male). The dermal LD50 in rats of CPTMO is greater than 2000 mg/kg bw. Additional dermal LD50 values in rabbits include 2.83 mL/kg (male), 3.36 mL/kg (male) and 3.73 mL/kg (female). CPTMO was given to both male and female mice as a single dose by ip injection at levels of 500, 1000 or 1625 mg/kg. There were no deaths. Clinical signs of toxicity were noted at doses of 500 mg/kg and higher. CPTMO has been shown to have none to moderate irritation to the skin and eyes. CPTMO is not a skin sensitizer when tested under the conditions of OECD guideline 406.

The NOEL for male and female rats in a 90 day repeated dose inhalation toxicity study was reported to be 5 ppm (41 mg/m^3). Treatment related histopathologic changes in the urinary bladder and kidneys of rats exposed to 100 ppm (814 mg/m^3) were observed. Based on these results the lowest observed effect level (LOEL) in the rat was established at 100 ppm (814 mg/m^3). In a 28-day repeated inhalation toxicity study with CPTMO, test article-related changes were detected histopathologically in the adrenal glands, kidneys, liver and urinary bladder in some rats from one or more exposure groups at concentrations as low as 10 ppm (81 mg/m^3) (the lowest concentration tested). In an OECD guideline 422 repeated dose inhalation study, CPTMO exposure up to and including the high concentration of 100 ppm (814 mg/m^3) did not result in any signs of general toxicity of the test article, including effects in the urinary bladder and kidney. Although the effect on the urinary bladder and kidney was not observed in all repeated inhalation exposure studies, the NOAEL for this effect across all studies is considered to be 5 ppm (41 mg/m^3). The conclusion has been reached in that it is plausible that biological variation is often seen among tests and possibly, between testing laboratories; and, the 90-day study should be considered as carrying the most weight as it is the study with the longest duration and provides the most conservative NOAEL.

CPTMO was not considered to be an inducer of micronuclei *in vivo*, but is mutagenic in vitro (positive in bacterial mutation assays and in the presence of metabolic activation, and in an *in vitro* mouse lymphoma mutagenesis assay). In the in vivo micronucleus assays clinical signs included decreases in micronucleated polychromatophilic erythrocyte (NCE) ratios at the 72 hour sampling time among male mice at 1625 mg/kg. Additional clinical observations at both 1000 and 1625 mg/kg doses are ataxia, tremors, prostration, myoclonic jerks and vocalization. There was no available carcinogenicity study for CPTMO. In an OECD guideline 422 repeated dose inhalation study in rats, exposure to CPTMO up to and including the high concentration of 100 ppm (814 mg/m^3) did not result in any signs of reproductive or developmental toxicity. Based on these results the NOEL for general or reproductive toxicity was established at 100 ppm (814 mg/m^3).

4 HAZARDS TO THE ENVIRONMENT

4.1 Aquatic Effects

Aquatic toxicity data are available for CPTMO.

General

CPTMO undergoes rapid hydrolysis, which occurs during testing; exposures to CPTMO are likely to be transient and observed toxicity is likely due primarily to the hydrolysis product methanol, with some potential exposure to trisilanols, and silanol oligomers. The Si-C bond will not undergo further hydrolysis. That bond is hydrolytically stable. Only the methoxy groups will be hydrolyzed. The transient silanol groups will condense with other silanols at concentrations greater than 500 ppm to yield silanol-functional resins.

If the silane is slowly released such that the concentration of the resulting silanetriol is not high enough to result in polymerization, the trisilanol will exist largely as a monomer. The monomer is known to be water soluble by virtue of the three hydroxy groups on the silicon. It is expected that this silanetriol will have a low Kow because of these hydroxy groups and so is not expected to bioaccumulate. The water solubility of the silanetriol cannot be measured because of the tendency to condense at concentrations greater than 500 ppm (Merrifield, 2003). Upon hydrolysis, CPTMO generates methanol and (3-chloropropyl)silanetriol. As concentrations approach 500 ppm, the silanetriol will condense to form highly cross-linked polymeric gels and resins that are water insoluble and will precipitate from solution.

Acute Toxicity Test Results

CPTMO undergoes rapid hydrolysis in aquatic media, and thus the exposures to CPTMO are likely to be transient. For the daphnia and algae studies, the test article was dissolved in water and stirred for an 18 hour period. Thus, for the duration of the tests, the organisms were exposed to the hydrolysis products, which include methanol and trisilanols.

Fish

Groups of ten fish were exposed for 96 hours to CPTMO concentrations of 100 mg/L (limit test). The CPTMO was dissolved in water and used without further treatment. Based on rapid hydrolysis rates, the fish were exposed to both the parent material and the hydrolysis products during the test. The measured concentration of CPTMO after 0, 24, 48, and 72 hours was 119, 103/110, 115, and 102 mg/L, respectively. The 96-hour LC50 and LC0 of CPTMO in freshwater fish (*Brachydanio rerio*) is >100 mg/L (Degussa-Huls AG, 1994). Studies have been performed with a silanol monomer, trimethylsilanol (CAS No. 1066-40-6). Although this silanol is not expected to be produced following hydrolysis of CPTMO, it has been predicted (using EpiWin) to be one of the most toxic to aquatic organisms of all the silanols identified to date. A semi-static 96h study with trimethylsilanol and rainbow trout (*Oncorhynchus mykiss*) resulted in a No Observed Effect Concentration (NOEC) of 128 mg/L and an LC_{50} of 271 mg/L (Wildlife International, Ltd., 2004a).

Aquatic invertebrates

The 48 hour EC50 of CPTMO is 869 mg/L for the water flea (*Daphnia magna*) under static conditions (Degussa-Huls AG, 1993h). The 48 hour EC50 of trimethylsilanol is 124 mg/L for the water flea (*Daphnia magna*) under semi-static conditions (Wildlife International, Ltd., 2004b).

Algae

In an algae study with CPTMO, on the basis of biomass, the median effective concentration was 72 h E_bC50 > 883 mg/L and 72 h E_bC10 = 241 mg/L. On the basis of growth rate, a median effective concentration was achieved at (0-72 hr) E_rC50 >883 mg/L; (0-72 hr) E_rC10 = 514 mg/L. The NOEC was 167 mg/L (Degussa-Huls AG, 1993i). The most sensitive endpoints for *Selenastrum capricornutum* exposed to trimethylsilanol were cell density and area under the growth curve (biomass) (Wildlife International, Ltd., 2004c). The 72-hour EC50 value was 555 mg/L with 95% confidence limits of 141 and 612 mg/L. The 72-hour NOEC, based on cell density, area under the growth curve (biomass) and growth rate was 70 mg/L. The 96-hour E_bC50 value was 625 mg/L with 95% confidence limits of 555 and 702 mg/L. The 96-hour NOEC, based on area under the growth curve (biomass), was 70 mg/L.

Chronic Toxicity Test Results

No data available.

Toxicity to Microorganisms

The toxicity of CPTMO to bacteria was determined by oxygen content where the effective concentration (EC10) is measured after 5 hours of incubation with a bacterial suspension (Degussa-Huls AG, 1993j). Bacteria were exposed to CPTMO at concentrations of 0, 500, 1000, 1500 and 2000 ul/L, sealed without air, and incubated for 5 to 6 hours. The differential between the oxygen content of the solutions stored in the individual containers at the initial time and after the incubation period reveals the bacterial oxygen consumption. Comparison of the amounts of oxygen consumed in the reference and test preparations provides information regarding the concentration-related influence on oxygen consumption by the test substance. The EC10 = 1.1 ml/L (density of the test substance = 1.07; EC10 = 1188 mg/L).

4.2 Terrestrial Effects

No data available.

4.3 Other Environmental Effects

No data available.

4.4 Initial Assessment for the Environment

The melting point of CPTMO is -50°C and the boiling point is 196 °C at 1013 hPa. The vapor pressure is 0.5215 hPa at 25ºC. The estimated water solubility of CPTMO is 650,000 mg/L; the estimated log Kow is 0.56. The water solubility and log Kow values may not be applicable because the chemical is hydrolytically unstable. The estimated water solubility of 3-chloropropylsilantriol is 65000 mg/L; the estimated log Kow is -1.13. The overall OH rate constant is 4.6026E-12 cm^3/molecule-sec with an estimated half-life of 3.5 days with a hydroxyl radical concentration of 5.0×10^5 molecule/cm^3. Photodegradation as a mode of removal is unlikely as CPTMO is hydrolytically unstable. CPTMO is reactive and hydrolytically unstable, such that methanol and silanetriols are rapidly generated upon contact with water or water vapor. Consequently, reaction with water vapor is likely the predominant degradation process for CPTMO in air and the overall reaction half-life in air should include both the oxidation half-life and the hydrolytic half-life. The overall reaction half-life in air is estimated to be 8 hours because of rapid hydrolysis of the material with moisture in the atmosphere. The products resulting from CPTMO hydrolysis in the atmosphere

are expected to further react with hydroxyl radicals. The atmospheric oxidation was determined for the hydrolysis product, 3-chloropropylsilanetriol. The overall OH rate constant is 12.4E-12 cm^3/molecule-sec with an estimated half-life of 1.3 days.

CPTMO is hydrolytically unstable over a range of environmentally relevant pH and temperature conditions. At pH 7 and 25 C, the half-life is 53.3 minutes. Level III Fugacity modeling, using loading rates for Air, Soil, and Water of 1000 kg/h for each medium, shows the following percent distribution: Air = 42.1%; Soil = 52.5%; Water = 5.4%; Sediment = 0%. However, CPTMO is unlikely to be found in the environment, as this material is hydrolytically unstable. Level III Fugacity modeling, using loading rates for Air, Soil, and Water of 1000 kg/h for each media, shows the following percent distribution for the hydrolysis product, 3-chloropropylsilanetriol: Air = 0.0%, Soil = 53.5%, Water = 46.4 %, and Sediment = 0.1 %. CPTMO is readily biodegradable but does not meet the 10 day window. However, this material rapidly hydrolyzes. Thus, the biodegradation observed is likely reflective of the hydrolysis product, methanol, which is degraded 76 percent in 5 days and 95 percent in 20 days; it is readily biodegradable. The rapid hydrolysis of CPTMO means that it is unlikely to be present in the environment. Bioaccumulation of the parent substance is not anticipated since this material is hydrolytically unstable.

The 96-hour LC50 and LC0 of CPTMO in freshwater fish (*Brachydanio rerio*) is >100 mg/L. Studies have been performed with a silanol monomer, trimethylsilanol. Although this silanol is not expected to be produced following hydrolysis of CPTMO, it has been predicted (using EpiWin) to be one of the most toxic to aquatic organisms of all the silanols identified to date. A semi-static 96h study with trimethylsilanol and rainbow trout (*Oncorhynchus mykiss*) resulted in a No Observed Effect Concentration (NOEC) of 128 mg/L and an LC_{50} of 271 mg/L. The 48 hour EC50 of CPTMO is 869 mg/L for the water flea (*Daphnia magna*) under static conditions. The 48 hour EC50 of trimethylsilanol is 124 mg/L for the water flea (*Daphnia magna*) under semi-static conditions. In an algae study with CPTMO, on the basis of biomass, the median effective concentration was 72 h EbC50 > 883 mg/L and 72 h EbC10 = 241 mg/L. On the basis of growth rate, a median effective concentration was achieved at (0-72 hr) E_rC50 >883 mg/L; (0-72 hr) E_rC10 = 514 mg/L. The NOEC was 167 mg/L. The most sensitive endpoints for *Selenastrum capricornutum* exposed to trimethylsilanol were cell density and area under the growth curve (biomass). The 72-hour EC50 value was 555 mg/L with 95% confidence limits of 141 and 612 mg/L. The 72-hour NOEC, based on cell density, area under the growth curve (biomass) and growth rate was 70 mg/L. The 96-hour E_bC50 value was 625 mg/L with 95% confidence limits of 555 and 702 mg/L. The 96-hour NOEC, based on area under the growth curve (biomass), was 70 mg/L.

5 RECOMMENDATIONS

Human Health:

The chemical is currently of low priority for further work. The chemical possesses properties indicating a hazard for human health (moderate skin and eye irritation, genotoxicity *in vitro* in bacterial and mammalian systems). Due to the rapid hydrolysis to methanol and the corresponding trisilanol and based on exposure data presented by the Sponsor country, (data on the global production volume are not available) and relating to use pattern in one country this chemical is currently of low priority for further work. These properties should nevertheless be noted by chemical safety professionals and users. Countries may desire to investigate any exposure scenarios that were not presented by the Sponsor country.

Environment:

The chemical is currently of low priority for further work due to its low hazard profile.

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I U C L I D

Data Set

Existing Chemical	:	ID: 2530-87-2
CAS No.	:	2530-87-2
EINECS Name	:	3-chloropropyltrimethoxysilane
EC No.	:	219-787-9
Molecular Formula	:	C6H15ClO3Si

Producer related part

Company	:	Epona Associates, LLC
Creation date	:	09.05.2003

Substance related part

Company	:	Epona Associates, LLC
Creation date	:	09.05.2003
Status	:	
Memo	:	SEHSC
Printing date	:	12.06.2006
Revision date	:	
Date of last update	:	01.06.2006
Number of pages	:	99
Chapter (profile)	:	Chapter: 1, 2, 3, 4, 5, 6, 7, 8, 10
Reliability (profile)	:	Reliability: without reliability, 1, 2, 3, 4
Flags (profile)	:	Flags: without flag, confidential, non confidential, WGK (DE), TA-Luft (DE), Material Safety Dataset, Risk Assessment, Directive 67/548/EEC, SIDS

1.0.1 APPLICANT AND COMPANY INFORMATION

1.0.2 LOCATION OF PRODUCTION SITE, IMPORTER OR FORMULATOR

1.0.3 IDENTITY OF RECIPIENTS

1.0.4 DETAILS ON CATEGORY/TEMPLATE

1.1.0 SUBSTANCE IDENTIFICATION

IUPAC Name : 3-(Chloropropyl) Trimethoxysilane
Smiles Code : CO[Si](CCCCl)(OC)OC
Molecular formula : C6H15ClO3Si
Molecular weight : 199
Petrol class :

01.06.2006 (39)

1.1.1 GENERAL SUBSTANCE INFORMATION

Purity type : typical for marketed substance
Substance type : organic
Physical status : liquid
Purity : 98 - 100 % w/w
Colour :
Odour :

01.06.2006 (39)

1.1.2 SPECTRA

1.2 SYNONYMS AND TRADENAMES

(.gamma.-Chloropropyl)trimethoxysilane

25.08.2005

(3-Chloropropyl)trimethoxysilane

25.08.2005

3-Chloropropyltrimethyoxysilane

25.08.2005

A 143

25.08.2005

CPTMO

17.10.2005

Dynasylan CPTMO

25.08.2005

gamma-chloropropyltrimethoxysilane
3-(trimethoxysilyl)-propyl

07.11.1996

Silane (3-chloropropyl)tris(methoxy)-

25.08.2005

Silane, (3-chloropropyl)trimethoxy-

25.08.2005

Silquest A-143

25.08.2005

Z 6076

25.08.2005

1.3 IMPURITIES

Purity	:	typical for marketed substance
CAS-No	:	67-56-1
EC-No	:	200-659-6
EINECS-Name	:	methanol
Molecular formula	:	CH4O
Value	:	0 - 2 % w/w

01.06.2006 (39)

1.4 ADDITIVES

1.5 TOTAL QUANTITY

Quantity	:	9.6 - tonnes produced in 2001
Remark	:	In the sponsor country

27.10.2005

Quantity	:	250 - tonnes imported in 2001

Remark : In the Sponsor Country
01.06.2006 (39)

1.6.1 LABELLING

1.6.2 CLASSIFICATION

1.6.3 PACKAGING

1.7 USE PATTERN

Type of use : industrial
Category :

Result : Main Category: 24% - closed system
76% - use is non-dispersive - not sold into the consumer market directly

Industrial Categories: 24% chemical industry
76% used in synthesis

Use Categories: 100% intermediate
01.06.2006 (39)

1.7.1 DETAILED USE PATTERN

1.7.2 METHODS OF MANUFACTURE

1.8 REGULATORY MEASURES

1.8.1 OCCUPATIONAL EXPOSURE LIMIT VALUES

1.8.2 ACCEPTABLE RESIDUES LEVELS

1.8.3 WATER POLLUTION

1.8.4 MAJOR ACCIDENT HAZARDS

1.8.5 AIR POLLUTION

1.8.6 LISTINGS E.G. CHEMICAL INVENTORIES

1.9.1 DEGRADATION/TRANSFORMATION PRODUCTS

1.9.2 COMPONENTS

1.10 SOURCE OF EXPOSURE

Source of exposure : other: Environment
Exposure to the : Substance

Remark : The reactive nature of this material destroys the parent material in any moisture-containing environment, thus limiting environmental exposure to the silane. CPTMO hydrolyzes rapidly; at a pH of 7 and ambient temperature, the half life is 53.3 minutes (Gorman, and Powell, 1995). Hydrolysis of CPTMO results in the formation of silanetriols which can then condense to form highly cross-linked, high molecular weight polymers, further reducing the potential for exposure. In the environment, at lower concentrations of the parent compound (and thus lower concentrations of the hydrolysis products), exposure to unpolymerized silanetriols may occur.

18.10.2005

Source of exposure : Human: exposure by production
Exposure to the : Substance

Remark :

CPTMO is produced in closed systems. During sampling for analysis (quality control), local ventilation (hoods) is used to prevent worker exposure through inhalation. Dermal exposure is also a possible route of exposure during sampling. Dermal exposures are expected to be minimal as chemical protective gloves and/or clothing would be required during handling. The product is stored on site in standard warehouse conditions, with the product stored under a blanket of nitrogen in sealed containers

In order to prevent the rapid hydrolysis and subsequent loss of this material, in production, it is handled in closed systems. Necessary engineering controls during production include proper ventilation, containment, safety equipment and actual hardware designed to minimize exposure, through splashing, or exposure to the air. Transfer of this material is in closed pipes or containers rather than in open systems to minimize loss of this material (hydrolysis) although some customers may transfer the material using open systems. Transport is a source of potential exposure through accidental releases. The material is shipped via air, road, and marine in 1 and 5 gallon pails and 55 gallon drums.

18.10.2005

Source of exposure : other: Human: Exposure to the industrial customer
Exposure to the : Substance

Remark : At the industrial customer level, the material may be used in open or closed systems. Necessary engineering controls during use are likely to include local ventilation (hoods) when the substance is being transferred or used in its application. Exposure due to non-accidental releases are expected to be minimal, and may include dermal and inhalation exposure during

transfer and use.
CPTMO is a coupling agent used for filled composites and industrial goods. Use levels are generally less than 1 percent based upon the industrial good formulation and less than 0.2 percent when used in composites. The substance is reacted during use, loses its chemical identity, and is no longer available for exposure to the environment. When CPTMO is used in filled elastomers, such as rubber shoe soles or industrial goods, it is a component in a blend with other silanes. The silane blend is added to the formulation at <=1w/w%, such that CPTMO is present at <0.1w/w%. During mixing and curing, the CPTMO reacts with inorganic fillers. The bound water on the filler hydrolyzes the silane to generate methanol, which will be evaporated from the rubber formulation. The industrial end-user uses local ventilation (hood) to remove the methanol from the workplace. Some very small percentage of methanol may continue to be slowly generated from the filled elastomer after the article is molded. When CPTMO is used as a finish for textile goods (fiberglass), it is added to a water system at low levels, generally less than 0.3 w/w%, and hydrolyzed. The silane and water mixture is coated onto glass fibers. The water and methanol is evaporated during a drying process and are removed from the workplace using local ventilation (hood). Any excess silane and water mixture is disposed of in a waste water treatment system.

01.06.2006

Source of exposure : Human: exposure of the consumer/bystander
Exposure to the : Substance

Remark : Consumer products are unlikely to contain any free (unreacted) CPTMO in any application, in that the substance has reacted with the filler and polymer in the composite or rubber.

01.06.2006

1.11 ADDITIONAL REMARKS

1.12 LAST LITERATURE SEARCH

1.13 REVIEWS

2.1 MELTING POINT

Value	:	-50 °C
Sublimation	:	
Method	:	other
Year	:	2005
GLP	:	no
Test substance	:	as prescribed by 1.1 - 1.4
Reliability	:	(2) valid with restrictions The 801 dataset identifies the uncertainty associated with this value as <10%. A reliability code of 2 (valid with restriction) will be assigned to this melting value because the physical property data for CPTMO remain under review by AIChE DIPPR for targeted release to the public version of the database in 2007.
Flag	:	Critical study for SIDS endpoint

01.06.2006 (2) (37)

Value	:	-3.7 °C
Sublimation	:	
Method	:	other: estimated
Year	:	2005
GLP	:	no
Test substance	:	as prescribed by 1.1 - 1.4
Method	:	Epiwin
Reliability	:	(2) valid with restrictions Modeled data

01.06.2006 (20)

2.2 BOILING POINT

Value	:	= 196 °C at 1013 hPa
Decomposition	:	
Method	:	other
Year	:	2005
GLP	:	no
Test substance	:	as prescribed by 1.1 - 1.4
Reliability	:	(2) valid with restrictions The 801 dataset identifies the uncertainty associated with this value as <1%. A reliability code of 2 (valid with restriction) will be assigned to this boiling point value because the physical property data for CPTMO remain under review by AIChE DIPPR for targeted release to the public version of the database in 2007.
Flag	:	Critical study for SIDS endpoint

01.06.2006 (2)

Value	:	201.2 °C at 1013 hPa
Decomposition	:	
Method	:	other: estimated
Year	:	2005
GLP	:	no
Test substance	:	as prescribed by 1.1 - 1.4

Method : Epiwin
Reliability : (2) valid with restrictions
Modeled data
01.06.2006 (20)

Value : 100 °C at 53.3 hPa
Decomposition :
Method :
Year : 2003
GLP : no data
Test substance : as prescribed by 1.1 - 1.4

Source : US EPA
Reliability : (4) not assignable
Reliability of 4 assigned because data are taken from a secondary literature source (i.e. MSDS).
01.06.2006 (35)

Value : 195 °C at 999.92 hPa
Decomposition :
Method :
Year : 2003
GLP : no data
Test substance : as prescribed by 1.1 - 1.4

Source : US EPA
Reliability : (4) not assignable
Reliability of 4 assigned because data are taken from a secondary literature source.
01.06.2006 (1)

Value : 91 °C at
Decomposition :
Method :
Year :
GLP : no data
Test substance : as prescribed by 1.1 - 1.4

Remark : A value of 91 C appears to have been measured at a reduced pressure, but data is not available to confirm this.
Reliability : (4) not assignable
01.06.2006 (7)

2.3 DENSITY

Type : density
Value : 1.077 g/cm³ at °C
Method : other
Year : 2005
GLP : no
Test substance : as prescribed by 1.1 - 1.4

Reliability : (2) valid with restrictions
The DIPPR 801 dataset identifies the error associated with this value as <10%. A reliability code of 2 (valid with restriction) will be assigned to this density value because the physical property data for CPTMO remain under review by AIChE DIPPR for targeted release to the public version of the database in 2007

01.06.2006 (2) (7)

2.3.1 GRANULOMETRY

2.4 VAPOUR PRESSURE

Value : .5215 hPa at 25 °C
Decomposition :
Method : other (calculated)
Year : 2005
GLP : no
Test substance : as prescribed by 1.1 - 1.4

Remark : The value of 0.5215 hPa at 25ºC, which was interpolated from a temperature-vapor pressure regression fitted to data measured over a temperature range of -50.0 to 370 ºC. The vapor pressure value at 25 ºC was obtained from a regression fitted to data by the American Institute of Chemical Engineers (AIChE), Design Institute for Physical Property Data (DIPPR). The DIPPR 801 dataset identifies the error associated with this value as <25%.
Reliability : (2) valid with restrictions
A reliability code of 2 (valid with restriction) will be assigned to this vapor pressure value because the physical property data for (3-chloropropyl)trimethoxy-silane remain under review by AIChE DIPPR for targeted release to the public version of the database in 2007.
Flag : Critical study for SIDS endpoint
01.06.2006 (2)

Value : = 1.33 hPa at 20 °C
Decomposition :
Method :
Year : 2000
GLP : no data
Test substance : as prescribed by 1.1 - 1.4

Result : Vapor pressure approximately 1.33 hPa (1.00 mmHg) at 20 deg C.
Test substance : Silquest A-143 silane; > 95% 3-chloropropyltrimethoxysilane
Reliability : (4) not assignable
Reliability of 4 assigned because data are taken from a secondary literature source (i.e. MSDS).
01.06.2006 (37)

Value : 24 hPa at 20 °C
Decomposition :
Method : other (measured)
Year : 2005
GLP : no
Test substance : as prescribed by 1.1 - 1.4

Method : The isoteniscope is based on the principle of the static method. The method involves placing a sample in a bulb maintained at constant temperature and connected to a manometer and a vacuum pump. The isoteniscope was developed to measure the vapour pressure of certain liquid hydrocarbons, but it is appropriate for the investigation of

solids as well. The method is usually not suitable for multicomponent systems. Results are subject to errors for sample containing non-volatile impurities. The recommended range is 102 to 105 Pa.
Procedure : Add to the isoteniscope a quantity of sample sufficient to fill the sample bulb and the short leg of the manometer section. Attach the isoteniscope to the vacuum system and evacuate both the system and the filled isoteniscope to a pressure of 13.3 Pa (0.1 torr). Break the vacuum with nitrogen. Repeat the evacuation and purge of the system twice to remove residual oxygen.
Place the filled isoteniscope in a horizontal position so that the sample spreads out into a thin layer in the sample bulb and manometer section. Reduce the system pressure to 133 Pa (1 torr). Remove dissolved fixed gases by gently warming the sample with an alcohol lamp until it just boils. Continue for 1 minute.
After the sample has been degassed, close the vacuum line valve and turn the isoteniscope to return the sample to the bulb and short leg of the manometer so that both are entirely filled with the liquid. Create a vapour-filled, nitrogen free space between the bulb and the manometer by heating the tip of the bulb so that the sample just starts to emit vapour. Place the filled isoteniscope in a vertical position in the constant temperature bath. As the isoteniscope approaches temperature equilibrium in the bath, add nitrogen to the gas-sampling system until its pressure equals that of the sample. Periodically adjust the pressure of the nitrogen in the gas-handling system to equal that of the sample.
When the isoteniscope reaches temperature equilibrium, make a final adjustment of the nitrogen pressure to equal the vapour indicated by the manometer section of the isoteniscope.

When the liquid levels in the manometer arms are equal in height, balance is indicated. Read and record the nitrogen pressure in the system at the balance point.

Increase the temperature of the constant-temperature bath by an appropriate amount. As the temperature rises, maintain pressure balance in the system. When temperature equilibrium is reached, make a final adjustment of pressure to establish balance. Read and record the system pressure. Repeat at regular intervals until an adequate range of pressures has been obtained.

In the case of liquids, the substance itself serves as the fluid in the differential manometer and for solids, depending on the pressure and temperature ranges, manometer liquids such as silicon fluids or phthalates are used.

Result : Result : 30 mbar at 25°C (mean of runs 1 to 2)

24 mbar at 20°C (mean of runs 1 to 2)

Table of Full test results

Temperature (°C)	Pressure (mbar)
Run one	
20*	25
25*	30

48.5 67
61.8 104
70.1 133
80.1 178
90.0 229
100.0 286
110.0 357
Run two
20* 24
25* 29
50.0 68
59.3 87
68.8 117
80.0 158
90.0 202

Reliability : (3) invalid
Review of the report indicates that the data is not reliable and suggests that the sample was not completely degassed in the isoteniscope.

01.06.2006 (6)

2.5 PARTITION COEFFICIENT

Partition coefficient : octanol-water
Log pow : .56 at 25 °C
pH value :
Method : other (calculated)
Year : 2005
GLP : no
Test substance : as prescribed by 1.1 - 1.4

Remark : Because the material is hydrolytically unstable and rapidly generates methanol when added to water, endpoints such as octanol/water partition coefficient cannot be measured. Nonetheless, these endpoints provide valuable information on the behavior of the material and are needed to evaluate the transport and distribution (i.e., fugacity) of CPTMO between environmental matrices. Therefore, octanol/water partition coefficient was estimated using KOWWIN® (version 1.67).
Reliability : (2) valid with restrictions
Flag : Critical study for SIDS endpoint
27.12.2005 (20)

Partition coefficient : octanol-water
Log pow : -1.13 at 25 °C
pH value :
Method : other (calculated)
Year : 2005
GLP : no
Test substance : other TS: hydrolysis product

Method : KOWWIN (v1.67); USEPA 2003
Remark : All simulations were conducted at a data temperature of 25*C using default values of the model for compartment dimensions and properties. Chemical-specific data required for the simulations were estimated using structure activity relationships (SAR) developed by the United States Environmental Protection Agency (USEPA) Office of Pollution Prevention and Toxics (OPPT) and Syracuse Research Corporation. The SAR models

were used as provided in the Estimations Programs Interface (EPI) Suite®, which was obtained from the USEPA (2003). SAR estimations were based on the SMILES (Simplified Molecular Input Line Entry System) notation for the chemical structure(s) of interest.
Upon contact with water or water vapor chloropropyltrimethoxysilane will rapidly hydrolyze, generating methanol (CAS 67-56-1) and chloropropylsilanetriol (CAS 64426-41-

Test substance : 3-Chloropropylsilanetriol; CAS Number 64426-41-1; hydrolysis product
Reliability : (2) valid with restrictions
Results were obtained using the EQC Model, as recommneded by the U.S. Environmental Protection Agency. Estimated data was used for chemical-specific data required by the model.
Flag : Critical study for SIDS endpoint
01.06.2006 (19)

2.6.1 SOLUBILITY IN DIFFERENT MEDIA

Solubility in : Water
Value : 6.76 mg/l at 25 °C
pH value :
concentration : at °C
Temperature effects :
Examine different pol. :
pKa : at 25 °C
Description :
Stable :
Deg. product :
Method : other: calculated
Year : 2005
GLP : no
Test substance : as prescribed by 1.1 - 1.4

Remark : Because the material is hydrolytically unstable and rapidly generates methanol when added to water, endpoints such as water solubility cannot be measured.
Nonetheless, these endpoints provide valuable information on the behavior of the material and are needed to evaluate the transport and distribution (i.e., fugacity) of CPTMO between environmental matrices. Therefore, water solubility was estimated using WSKOW (version 1.41).
Reliability : (2) valid with restrictions
Flag : Critical study for SIDS endpoint
27.12.2005 (20)

Solubility in : Water
Value : 650000 mg/l at 25 °C
pH value :
concentration : at °C
Temperature effects :
Examine different pol. :
pKa : at 25 °C
Description :
Stable :
Deg. product :
Method : other: (calculated)
Year : 2005

GLP : no
Test substance : other TS: hydrolysis product

Method : WSKOW (v1.41; Log Kow = -1.13); USEPA 2003
Result : 6.50x10 5 g/m3
Test substance : 3-Chloropropylsilanetriol; CAS Number 64426-41-1; hydrolysis product
Reliability : (2) valid with restrictions
Flag : Critical study for SIDS endpoint
01.06.2006 (19)

2.6.2 SURFACE TENSION

2.7 FLASH POINT

Value : = 45 °C
Type : closed cup
Method : other: Tag Closed Cup
Year : 2000
GLP : no data
Test substance : as prescribed by 1.1 - 1.4

Test substance : Silquest A-143 silane; > 95% 3-chloropropyltrimethoxysilane
Reliability : (4) not assignable
Reliability of 4 assigned because data are taken from a secondary literature source (i.e. MSDS).
01.06.2006 (37)

Value : 84 °C
Type :
Method :
Year : 2003
GLP : no data
Test substance : as prescribed by 1.1 - 1.4

Source : US EPA
Reliability : (4) not assignable
Reliability of 4 assigned because data are taken from a secondary literature source (i.e. MSDS).
01.06.2006 (35)

Value : 57 °C
Type :
Method :
Year : 2003
GLP : no data
Test substance : as prescribed by 1.1 - 1.4

Source : US EPA
Reliability : (2) valid with restrictions
Handbook
14.02.2005 (1)

2.8 AUTO FLAMMABILITY

2.9 FLAMMABILITY

2.10 EXPLOSIVE PROPERTIES

2.11 OXIDIZING PROPERTIES

2.12 DISSOCIATION CONSTANT

2.13 VISCOSITY

2.14 ADDITIONAL REMARKS

Memo : Refractive Index

Result : 1.4183 at 20C
Reliability : (2) valid with restrictions
The DIPPR 801 dataset identifies the error associated with this value as <1%. A reliability code of 2 (valid with restriction) will be assigned to this refractive index value because the physical property data for CPTMO remain under review by AIChE DIPPR for targeted release to the public version of the database in 2007.

01.06.2006 (2) (7)

Memo : Refractive Index

Result : 1.4190 at 20 deg C
Source : US EPA
Reliability : (4) not assignable
Reliability of 4 assigned because data are taken from a secondary literature source.

01.06.2006 (1)

3.1.1 PHOTODEGRADATION

Type	:	other
Light source	:	
Light spectrum	:	nm
Relative intensity	:	based on intensity of sunlight
INDIRECT PHOTOLYSIS		
Sensitizer	:	OH
Conc. of sensitizer	:	500000 molecule/cm³
Rate constant	:	.0000000000046026 cm³/(molecule*sec)
Degradation	:	50 % after 3.5 day(s)
Deg. product	:	
Method	:	other (calculated)
Year	:	2005
GLP	:	no
Test substance	:	as prescribed by 1.1 - 1.4

Method :

Atkinson, R. 1988. Estimation of gas phase hydroxyl radical rate constants for organic chemicals. Environmental Toxicology and Chemistry 7:435 442.

Prinn, R., Cunnold, P., Simmonds, R., Alyea, R., Boldi, A., Crawford, P., Fraser, D., Gutzler, D., Hartley, R., Rosen, R., and Rasmussen R. 1992. Global average concentration and trend for hydroxyl radicals deduced from ALE/GAGE trichloroethane (methyl chloroform) data for 1978 1990. Journal of Geophysical Research 97:2445 2461.

Meylan, W.M. and P.H. Howard. 1993. Computer estimation of the atmospheric gas phase reaction rate of organic compounds with hydroxyl radicals and ozone. Chemosphere 26:2293 2299.

EUTGD. 2001. Technical guidance document for new and existing chemicals. Commission of the European Communities, European Chemicals Bureau, Ispra, Italy. Draft, August 2001.

USEPA. 2003. Estimations Programs Interface (EPI) Suite®. The EPI Suite® and the individual models included within the software are owned by the U.S. Environmental Protection Agency and are protected by copyright throughout the world.

Gorman, M. and D.E. Powell. 1995. Hydrolysis of DC-5772 as a function of pH. Dow Corning Technical Report 1995-I0000-40961.

Atmospheric Oxidation (25 deg C) [AOPWIN® ver. 1.91]

The dominant degradation process for most chemicals in the troposphere is the daylight reaction with OH radicals (Atkinson 1988). The reaction half life was calculated directly from the reaction rate constant for the hydroxyl radical and the average atmospheric concentrations of hydroxyl radical based on a 24 hour day (Prinn et al. 1992). The hydroxyl radical reaction rate constant was calculated based on SAR methods and reaction values for structural fragments (Meylan and Howard 1993) using the model AOPWIN® (ver. 1.91), as received with EPI Suite® (USEPA 2003). The estimated OH degradation rate constant was converted to an overall atmospheric oxidation half life using a 24 hour average atmospheric OH radical concentration of 5.0 105 molecules/cm3 (EUTGD 2001).

Remark : Level-II fugacity modeling indicates that about 7.5% of the steady-state mass of 3-Chloropropyl-trimethoxysilane in the environment will exist in the air compartment and may undergo photolytic degradation. The parent silane contains no chromaphors that would absorb visible or UV radiation so direct photolysis is not likely to be significant. Indirect photolysis resulting from gas-phase reaction with photochemically produced hydroxlyl radicals is expected to occur. Because the material is highly reactive and hydrolytically unstable, photolysis itself is not expected to be the primary degradation process. Reaction with water vapor is likely to be a predominant degradation process and the overall reaction half life in air should include both the oxidation half life and the hydrolytic half life.

Because of the decreased activity of water, the rate of hydrolysis in air was assumed to be one tenth (1/10) of the rate in water or 10 times (10x) the measured half life in water.

Result : Atmospheric Oxidation (25 deg C) [AOPWIN® ver. 1.91]:
" Hydroxyl Radical Reaction:
o Reaction Rate Constant = 4.6026E-12 cm3/(mol*sec)
o OH radical conc (24 h ave) = 5.0E+05 mol/cm3 (EUTGD 2001)
o Half-Life = 3.5 Days
o Half-Life = 84 Hrs
" Overall Reaction Rate:
o Hydrolysis half-life = 0.89 Hrs (Gorman and Powell 1995)
o OH degradation half-life = 84 Hrs
o Overall reaction half-life = 8.0 Hrs

Reliability : (2) valid with restrictions
Results based on QSAR modeling rather than measured data.

Flag : Critical study for SIDS endpoint

27.12.2005 (20)

Type : other
Light source :
Light spectrum : nm
Relative intensity : based on intensity of sunlight
INDIRECT PHOTOLYSIS
Sensitizer : OH
Conc. of sensitizer : 500000 molecule/cm³
Rate constant : .0000000000124 cm³/(molecule*sec)
Degradation : 50 % after 1.3 day(s)
Deg. product :
Method : other (calculated)
Year : 2005
GLP : no
Test substance : other TS

Method : Atkinson, R. 1988. Estimation of gas phase hydroxyl radical rate constants for organic chemicals. Environmental Toxicology and Chemistry 7:435 442.

Prinn, R., Cunnold, P., Simmonds, R., Alyea, R., Boldi, A., Crawford, P., Fraser, D., Gutzler, D., Hartley, R., Rosen, R., and Rasmussen R. 1992. Global average concentration and trend for hydroxyl radicals deduced from ALE/GAGE trichloroethane (methyl chloroform) data for 1978 1990. Journal of Geophysical Research 97:2445 2461.

Meylan, W.M. and P.H. Howard. 1993. Computer estimation of the atmospheric gas phase reaction rate of organic compounds with hydroxyl radicals and ozone. Chemosphere 26:2293 2299.

EUTGD. 2001. Technical guidance document for new and existing

chemicals. Commission of the European Communities, European Chemicals Bureau, Ispra, Italy. Draft, August 2001.

USEPA. 2003. Estimations Programs Interface (EPI) Suite®. The EPI Suite® and the individual models included within the software are owned by the U.S. Environmental Protection Agency and are protected by copyright throughout the world.

Atmospheric Oxidation (25 deg C) [AOPWIN® ver. 1.91]

The dominant degradation process for most chemicals in the troposphere is the daylight reaction with OH radicals (Atkinson 1988). The reaction half life was calculated directly from the reaction rate constant for the hydroxyl radical and the average atmospheric concentrations of hydroxyl radical based on a 24 hour day (Prinn et al. 1992). The hydroxyl radical reaction rate constant was calculated based on SAR methods and reaction values for structural fragments (Meylan and Howard 1993) using the model AOPWIN® (ver. 1.91), as received with EPI Suite® (USEPA 2003). The estimated OH degradation rate constant was converted to an overall atmospheric oxidation half life using a 24 hour average atmospheric OH radical concentration of 5.0 105 molecules/cm3 (EUTGD 2001).

Remark : Level-III fugacity modeling indicates that <0.1% of the steady-state mass of 3-Chloropropylsilanetriol in the environment will exist in the air compartment, even if released directly into air. 3-Chloropropylsilanetriol in air is expected to undergo indirect photolysis resulting from gas-phase reaction with photochemically produced hydroxlyl radicals.
Upon contact with water or water vapor chloropropyltrimethoxysilane will rapidly hydrolyze, generating methanol (CAS 67-56-1) and chloropropylsilanetriol (CAS 64426-41-

Result : Atmospheric Oxidation (25 deg C) [AOPWIN® ver. 1.91]:
" Hydroxyl Radical Reaction:
o Reaction Rate Constant = 12.4E-12 cm3/(mol*sec)
o OH radical conc (24 h ave) = 5.0E+05 mol/cm3 (EUTGD 2001)
o Half-Life = 1.3 Days
o Half-Life = 31 Hrs

Test substance : 3-Chloropropylsilanetriol; CAS Number 64426-41-1

Reliability : (2) valid with restrictions
Results based on QSAR modeling rather than measured data.

Flag : Critical study for SIDS endpoint

27.12.2005 (19)

3.1.2 STABILITY IN WATER

Type : abiotic
t1/2 pH4 : = at 25 °C
t1/2 pH7 : = 53.3 minute(s) at 25 °C
t1/2 pH9 : = 22.4 minute(s) at 25 °C
t1/2 pH 5 : = 14.6 minute(s) at °C
Deg. product : yes
Method : other: US EPA Guideline 40 CFR 158.130, Subdivision N, Series 161-1, Hydrolysis
Year : 1995
GLP : yes
Test substance : as prescribed by 1.1 - 1.4

Method : 1H-NMR and 29Si-NMR

US EPA Guideline 40 CFR 158.130, Subdivision N, Series 161-1, Hydrolysis.

The hydrolysis rate was determined by monitoring disappearance of the three methoxy groups bonded to silicon by 1H-NMR. Phosphate salts were used to prepare buffered aqueous test solutions having pH's of 5, 7, and 9. Characterization of the hydrolysis products was conducted by 29Si-NMR.

Remark : The hydrolysis rate constants and half-lives were determined for chloropropyltrimethoxysilane (CAS 2530-87-2) at pH 5, 7, and 9 at 25 +/- 1 oC and the hydrolysis degradation products characterized. The hydrolysis data for chloropropyltrimethoxysilane was generated on the neat material. Morever, at elevated concentrations chloropropylsilanetriol will condense to form insoluble siloxane resins that precipitate from solution.

Result : Nominal initial concentration = 1.5x10-2 M (~3000 mg/L) Concentration not directly measured.

Table I. Kinetic Constants for Hydrolysis Reactions of Chloropropyltrimethoxysilane at 25 +/- 1 deg C.

Constant	
kH+ (M-1 sec-1)	78.3
kOH- (M-1 sec-1)	51.7

Degradation Products: Upon contact with water or water vapor chloropropyltrimethoxysilane will rapidly hydrolyze, generating methanol (CAS 67-56-1) and chloropropylsilanetriol (CAS 64426-41-1). At elevated concentrations chloropropylsilanetriol will condense to form high molecular weight insoluble siloxane resins. Analysis indicated the hydrolysis products consisted of <1% free chloropropylsilanetriol hydrolyzed material [(HO)3Si(CH2)3Cl] and 5.5, 40, and 54%, respectively, of singly condensed [(HO)2SiO1/2(CH2)3Cl], doubly condensed [HOSiO2/2(CH2)3Cl], and triply condensed [SiO3/2(CH2)3Cl] forms of chloropropylsilanetriol.

Test substance : Chloropropyltrimethoxysilane (CAS Number 2530-87-2) with a stated purity of 100%.

Conclusion : According to the definition put forth in the test guidelines, the test material was found to be hydrolytically unstable (t1/2<1 year) over a range of environmentally relevant pH conditions at 25 +/- 1 deg C.

Reliability : (1) valid without restriction

Flag : Critical study for SIDS endpoint

17.02.2005 (34)

3.1.3 STABILITY IN SOIL

3.2.1 MONITORING DATA

3.2.2 FIELD STUDIES

3.3.1 TRANSPORT BETWEEN ENVIRONMENTAL COMPARTMENTS

Type : fugacity model level III
Media :
Air : % (Fugacity Model Level I)
Water : % (Fugacity Model Level I)
Soil : % (Fugacity Model Level I)
Biota : % (Fugacity Model Level II/III)
Soil : % (Fugacity Model Level II/III)
Method : other: modeling
Year : 2005

Method : USEPA. 2003. Estimations Programs Interface (EPI) Suite®. The EPI Suite® and the individual models included within the software are owned by the U.S. Environmental Protection Agency and are protected by copyright throughout the world.

Result : Emission Rates (kg/h): Air = 1000; Soil = 1000; Water = 1000

	Air	Water	Soil	Sediment	Total
"Distribution(%)	42.1	5.4	52.5	0.0	
"Reaction losses(%)	29.6	33.8	33.2	0.0	96.5
"Advective losses(%)	3.4	0.0	0.0	3.4	

"Overall persistence (h)8.11
-reaction persistence (h)8.40
-advective persistence (h)234

Reliability : (2) valid with restrictions
Flag : Critical study for SIDS endpoint
27.12.2005 (33)

Type : fugacity model level III
Media :
Air : % (Fugacity Model Level I)
Water : % (Fugacity Model Level I)
Soil : % (Fugacity Model Level I)
Biota : % (Fugacity Model Level II/III)
Soil : % (Fugacity Model Level II/III)
Method : other
Year : 2005

Method : Equilibrium Criterion (EQC) multimedia fugacity model (Mackay et. al. 1996).
Mackay, D., A. Di Guardo, S. Paterson, C.E. Cowan. 1996. Evaluating the environmental fate of a variety of types of chemicals using the EQC model. Environmental Toxicology and Chemistry 15:1627-1637.

USEPA. 2003. Estimations Programs Interface (EPI) Suite®. The EPI Suite® and the individual models included within the software are owned and copyright protected by the U.S. Environmental Protection Agency.

Atkinson, R. 1988. Estimation of gas phase hydroxyl radical rate constants for organic chemicals. Environmental Toxicology and Chemistry 7:435 442.

Prinn, R., Cunnold, P., Simmonds, R., Alyea, R., Boldi, A., Crawford, P., Fraser, D., Gutzler, D., Hartley, R., Rosen, R., and Rasmussen R. 1992.

Global average concentration and trend for hydroxyl radicals deduced from ALE/GAGE trichloroethane (methyl chloroform) data for 1978 1990. Journal of Geophysical Research 97:2445 2461.

Meylan, W.M. and P.H. Howard. 1993. Computer estimation of the atmospheric gas phase reaction rate of organic compounds with hydroxyl radicals and ozone. Chemosphere 26:2293 2299.

EUTGD. 2001. Technical guidance document for new and existing chemicals. Commission of the European Communities, European Chemicals Bureau, Ispra, Italy. Draft, August 2001.

Boethling, R.S., Howard, P.H., Meylan, W.M., Stiteler, W., Beauman, J., and Tirado, N. 1994. Group contribution method for predicting probability and rate of aerobic biodegradation. Environmental Science and Technology 28:459 465.

SMILES notation: ClCCC[Si](O)(O)O
Molecular weight (g/mol): 157
Data temperature (ºC): 25.0
Water solubility (mg/L): 6.50 105 WSKOW (v1.41); USEPA 2003
Vapor pressure (Pa): 3.99 10-4 MPBPWIN (v1.41); USEPA 2003
Melting point (ºC): 72.6 MPBPWIN (v1.41); USEPA 2003
Boiling point (ºC) 322 MPBPWIN (v1.41); USEPA 2003
Log Kow (no units): -1.13 KOWWIN (v1.67); USEPA 2003
Biodegradation half-life (h) 900 BIOWIN (v4.02); USEPA 2003
OH degradation (cm3 mol-1 sec-1) 12.4 10-12 AOPWIN (v1.91); USEPA 2003
Overall half-life (h):
" Air: 31.0 Calculated (see note 1)
" Water: 900 Calculated (see note 2)
" Soil: 1800 Calculated (see note 2)
" Sediment: 8100 Calculated (see note 2)

Note 1: The overall reaction half life in air was calculated from the OH degradation rate constant and the 24 hour average atmospheric OH radical concentration of 5.0 105 molecules/cm3 (EUTGD 2001).

Note 2: The half life in water was estimated from BIOWIN using conversion factors derived by the USEPA (Boethling et al. 1994). The rate of degradation in sediment was calculated as one ninth (1/9) of that in the water column, or nine times (9x) the estimated half life in water. Similarly, the rate of degradation in soil was calculated as one half (1/2) that in water, or twice (2x) the estimated half life in water.

Remark : All simulations were conducted at a data temperature of 25*C using default values of the model for compartment dimensions and properties. Chemical-specific data required for the simulations were estimated using structure activity relationships (SAR) developed by the United States Environmental Protection Agency (USEPA) Office of Pollution Prevention and Toxics (OPPT) and Syracuse Research Corporation. The SAR models were used as provided in the Estimations Programs Interface (EPI) Suite®, which was obtained from the USEPA (2003). SAR estimations were based on the SMILES (Simplified Molecular Input Line Entry System) notation for the chemical structure(s) of interest.
Upon contact with water or water vapor chloropropyltrimethoxysilane will rapidly hydrolyze, generating methanol (CAS 67-56-1) and chloropropylsilanetriol (CAS 64426-41-

Result : Level III Fugacity modeling, using loading rates for Air, Soil, and Water of

1000 kg/h for each media, shows the following percent distribution:
" Air = 0.0%
" Soil = 53.5%
" Water = 46.4 %
" Sediment = 0.1 %

Test substance : 3-Chloropropylsilanetriol; CAS Number 64426-41-1
Reliability : (2) valid with restrictions
Results were obtained using the EQC Model, as recommneded by the U.S. Environmental Protection Agency. Estimated data was used for chemical-specific data required by the model.
Flag : Critical study for SIDS endpoint
27.12.2005 (19)

3.3.2 DISTRIBUTION

3.4 MODE OF DEGRADATION IN ACTUAL USE

3.5 BIODEGRADATION

Type : aerobic
Inoculum : activated sludge, domestic
Concentration : 20 mg/l related to Test substance
related to
Contact time : 28 day(s)
Degradation : = 84 (±) % after 28 day(s)
Result : readily biodegradable
Kinetic of testsubst. : 6 day(s) = 40 %
11 day(s) = 49 %
17 day(s) = 70 %
20 day(s) = 70 %
26 day(s) = 90 %
Control substance : Benzoic acid, sodium salt
Kinetic : 0 day(s) = 1 %
28 day(s) = 74 %
Deg. product :
Method : Directive 84/449/EEC, C.5 "Biotic degradation - modified Sturm test"
Year : 1993
GLP : yes
Test substance : as prescribed by 1.1 - 1.4

Method : The biodegradation of the test substance (10 and 20 mg/l)and a control substance (sodium benzoate; 20 mg/l) was determined in a modified Sturm Test in duplicate samples. Mineral medium and inoculum were placed into the test containers and the test substance or positive control was introduced. The test containers were sealed and incubated at 21.2 - 24.21 deg C and shaken at approximately 180 RPM. An hour before analysis sodium hydroxide in added, respectively, to each bottle. The sodium hydroxide is sufficient to absorb the CO2 that is evolved when the test substance is completely degraded. The degree of biodegradation was recorded on day 0, 3, 6, 11, 17, 20, 26, and 28.
Remark : The report does not provide an explanation of the rise and fall of the % biodegradation on days 26 and 28. It is likely this is simply the variation on

the analytical results, and is not expected to invalidate the study.

Result : DYNASYLAN CPTMO achieved a breakdown rate of 84% in 28 days, indicating that it is readily biodegradable, but does not meet the 10-day window. The control substance achieved a breakdown rate of 74% confirming the sludge specimen used possessed sufficient biological activity.

Test substance : DYNASYLAN CPTMO: 98.9% 3-chloropropyltrimethoxysilane

Reliability : (1) valid without restriction
Guideline study

Flag : Critical study for SIDS endpoint

01.06.2006 (16)

3.6 BOD5, COD OR BOD5/COD RATIO

3.7 BIOACCUMULATION

Remark : Bioaccumulation is not anticipated since this material is hydrolytically unstable. Rapid hydrolysis of this material produces methanol and trisilanols. The Si-C bond will not undergo further hydrolysis. That bond is hydrolytically stable. Only the methoxy groups will be hydrolyzed. The transient silanol groups will condense with other silanols to yield silanol-functional resins.

If the silane is slowly released such that the concentration of the resulting silanetriol is not high enough to result in polymerization, the trisilanol will exist largely as a monomer (Merrifield, J., 2003). The monomer is known to be water soluble by virtue of the three hydroxy groups on the silicon. It is expected that this silanetriol will have a low Kow because of these hydroxy groups and so is not expected to bioaccumulate. The water solubility of the silanetriol cannot be measured because of the tendency to condense at concentrations greater than 500 ppm. It is known however that the silanetriol and small condensation products will only precipitate out of water due to formation of larger, water insoluble polymeric resins.

Reliability : (2) valid with restrictions

18.10.2005 (36)

3.8 ADDITIONAL REMARKS

4.1 ACUTE/PROLONGED TOXICITY TO FISH

Type	:	semistatic
Species	:	Brachydanio rerio (Fish, fresh water)
Exposure period	:	96 hour(s)
Unit	:	mg/l
LC0	:	> 100
LC50	:	> 100
Limit test	:	yes
Analytical monitoring	:	yes
Method	:	Directive 92/69/EEC, C.1
Year	:	1994
GLP	:	yes
Test substance	:	as prescribed by 1.1 - 1.4

Method : Analytical evaluation of the test substance concentration was performed by TOC determination.

Groups of ten fish per 20 l aquarium were exposed for 96 hours to test substance target concentrations of 0 or 100 mg/l.

The test substance was dissolved in water (10.11 grams/liter water) and used without further treatment.

Remark : All reported values were nominal, following analytical confirmation of the stock solutions
The test substance was dissolved in water and used without further treatment. Based on the rapid rate of hydrolysis, the fish were exposed to both parent material and hydrolysis products during the test. When the results are interpreted, the hydrolysis of the test substance during the preparation of the initial solution or during the test should be considered.

Result : The measured concentration of the test substance after 0, 24, 48, and 72 hours was determined to be 119, 103/110 (indicating stability within 24 hours), 105, and 102 mg/l, respectively.

The deviation of the analytical results were within 20%, such that the concentrations were reported as nominal.

Concentration (mg/l)

0 hr	24 hr	48 hr	72 hr
119	103*/110	105	102

*= 24 hour stability control

Water characteristics:
Hardness = 10.7 deg dH
Temperature = 20 +/- 1 deg C

pH

	0 hr	24 hr	48 hr	72 hr	96 hr
Control	7.8	7.8	7.8	7.8	8.4
100 mg/l	7.8	7.7	7.8	7.8	8.3

Oxygen content (mg/l)

	0 hr	24 hr	48 hr	72 hr	96 hr
Control	8.0	7.9	8.4	7.4	8.9

100 mg/l 8.1 7.7 8.2 7.5 8.7
10 fish per 20 l aquarium.

Test substance : DYNASYLAN CPTMO: 98.9% 3-chloropropyltrimethoxysilane
Reliability : (1) valid without restriction
Guideline study
Flag : Critical study for SIDS endpoint
03.01.2006 (18)

Type : semistatic
Species : Oncorhynchus mykiss (Fish, fresh water)
Exposure period : 96 hour(s)
Unit : mg/l
NOEC : 128
LC0 : 128
LC50 : 271
Limit test : no
Analytical monitoring : yes
Method : OECD Guide-line 203 "Fish, Acute Toxicity Test"
Year : 2004
GLP : yes
Test substance : other TS

Method : OECD. 1993. OECD Guidelines for Testing of Chemicals. Guideline 203: Fish, Acute Toxicity Test. Updated Guideline adopted on 17 July 1992.

USEPA. 1996. Fish Acute Toxicity Test, Freshwater and Marine. Series 850 - Ecological Effects Test Guidelines (draft), OPPTS Number 850.1075.

Statistical methods: Binomial Probability, Probit Met
96-Hour Static-Renewal Acute (Daily Renewals)
Test fish: Age 77 Days/Mean Total Length 5.9 cm (Range 5.5 to 6.3 cm)/Wet Weight 1.7 g (Range 1.4 to 2.3 g), Loading 0.58 g/L, Fish were acclimated to laboratory conditions for a minimum of 2 weeks prior to the test.
Test Conditions:
oSemi-Static
oDilution water source: Well Water
oDilution water chemistry: Hardness 122 mg/L as CaCO3, Alkalinity 180 mg/L as CaCO3, Conductivity 270 mhos/cm, pH 8.6
oStock and test solution and how they were prepared: Direct addition of test article to dilution water
oConcentrations dosing rate: Negative Control, 63, 125, 250, 500 and 1000 mg/L in dilution water
oVehicle/solvent and concentrations: No organic solvent
oStability of the test chemical solutions: Not Stable
oExposure vessel type: 38-L or 54-L stainless steel aquaria containing 30-L of test solution
oNumber of replicates, fish per replicate: Two replicates per treatment, 10 Fish per replicate
oWater chemistry in test: DO, pH and temperature measured in each test chamber daily (old and new solutions as appropriate)
Test Temperature Range: 11.3 - 12.2 C
Method of Calculating Mean Arithmetic mean.
Measured Concentrations: Negative Control, 63, 125, 250, 500 and 1000 mg/l.
Measurement of test concentrations in each test chamber at

test initiation, on Day 1 (old solutions) and at test termination by GC/FID.

Remark : CPTMO rapidly hydrolyzes to form silanols and methanol. The toxicity of trimethylsilanol was determined in this study, as a means to further characterize the toxicity of the parent material, CPTMO.

Result : Measured concentrations (as mg/L):<LOQ, 65, 128, 250, 481 and 949

Statistical results (95% confidence interval), as appropriate:
24-Hour LC50: >949 mg/L (not calculable)
48-Hour LC50: 523 mg/L (250 - 949)
72-Hour LC50: 476 mg/L (402 - 565)
96-Hour LC50: 271 mg/L (128 - 481 mg/L)
No Mortality Concentration - 128 mg/L
NOEC - 128 mg/L

Biological observations: After 96 hours of exposure, all surviving fish appeared normal.
Table showing cumulative mortality:

Mean Measured Concentration (mg/L)	Number Dead/Number Exposed (hours) 0	24	48	72	96
0	0/20	0/20	0/20	0/20	1/20
65	0/20	0/20	0/20	0/20	0/20
128	0/20	0/20	0/20	0/20	0/20
250	0/20	0/20	0/20	1/20	8/20
481	0/20	0/20	8/20	9/20	20/20
949	0/20	6/20	20/20	20/20	20/20

Lowest test substance concentration causing 100% mortality: 481 mg/L
"Mortality of controls: 5%
"Abnormal responses: Surfacing, loss of equilibrium, erratic swimming and lying on bottom
"Any observations, such as precipitation that might cause a difference between measured and nominal values: All test solutions appeared clear and colorless.

Test substance : Trimethylsilanol (CAS Number 1066-40-6)

Conclusion : The 96-hour LC50 for rainbow trout (Oncorhynchus mykiss) exposed to trimethylsilanol under static-renewal test conditions was 271 mg/L with 95% confidence limits of 128 and 481 mg/L. The no mortality concentration and NOEC were 128 mg/L.

Reliability : (1) valid without restriction
This was a GLP compliant study with measured test concentrations. The study is scientifically defensible because a concentration-effect relationship was demonstrated

Flag : Critical study for SIDS endpoint
17.10.2005

4.2 ACUTE TOXICITY TO AQUATIC INVERTEBRATES

Type : static
Species : Daphnia magna (Crustacea)
Exposure period : 48 hour(s)
Unit : mg/l

NOEC : = 669
EC50 : = 869
EC100 : > 941
24 hr EC50 : > 941
Analytical monitoring : yes
Method : OECD Guide-line 202
Year : 1993
GLP : yes
Test substance : as prescribed by 1.1 - 1.4

Method : The test substance was dissolved at 1 g/l in VE water and stirred for 18 h. The solution was filtered and served as the initial solution for testing. The test included seven test substance concentrations (target values of 115, 167, 230, 335, 471, 669 and 941 mg/l) and a control. Daphnia (20 organisms in 4 groups of five each for each test concentration and control) were observed for immobilization at 24 and 48 hours.

Analytical method: DOC determination

Potassium dichromate was used as a reference substance in order to determine the test specimen's sensitivity.

The synthetic water used for the study had the following components:
$CaCl_2 \times 2 H_2O$ = 294 mg/l
$MgSO_4 \times 7 H_2O$ = 123 mg/l
$NaHCO_3$ = 63 mg/l
KCl = 5.5 mg/l

Remark : When the results are interpreted, the hydrolysis of the test substance during the preparation of the initial solution or during the test should be considered.

Result : The reported values were nominal, following analytical confirmation of the stock solutions. The DOC content was determined to be 378.5 mg/l, that corresponds to a test material concentration of 1046 mg/l (stock solution).

Immobile organisms were observed only at the test substance concentration of 941 mg/l:

24 hr			48 hr		
mobile	immobile	%	mobile	immobile	%
19	1	5	7	13	65

For the positive control (calcium dichromate) the following results were obtained:

Conc (mg/l)	% Immobile
0.9	30
1.9	100

Oxygen content and pH at the end of the test:

conc (mg/l)	O2 (mg/L)	pH
Control (0)	8.2	7.5
115	7.3	7.5
167	7.2	7.4
230	7.1	7.4
335	6.9	7.4
471	7.2	7.4
669	7.4	7.4
941	6.9	7.4

Test substance	:	DYNASYLAN CPTMO: 98.9% 3-chloropropyltrimethoxysilane. The test substance is susceptible to hydrolysis. As the test substance has low water solubility, it was dissolved at 1 g/l in VE water and stirred for 18 h. The solution was filtered and served as the initial solution for testing.
Reliability	:	(1) valid without restriction Guideline study
Flag	:	Critical study for SIDS endpoint

17.10.2005 (15)

Type	:	semistatic
Species	:	Daphnia magna (Crustacea)
Exposure period	:	48 hour(s)
Unit	:	mg/l
NOEC	:	< 60
EC50	:	= 124
Limit Test	:	no
Analytical monitoring	:	yes
Method	:	OECD Guide-line 202
Year	:	2004
GLP	:	yes
Test substance	:	other TS

Method :

OECD. 1984. OECD Guidelines for Testing of Chemicals. Guideline 202: Daphnia sp. Acute Immobilization Test and Reproduction Test. Updated Guideline adopted on 4 April 1984.

USEPA. 1996. Acute Invertebrate Acute Toxicity Test, Freshwater Daphnids. Series 850 - Ecological Effects Test Guidelines (draft), OPPTS Number 850.1010.

Statistical methods: Probit Analysis
Test Details: 48-hour Semi-Static (Test solutions were renewed at 24 hours)
Nominal concentrations: Negative Control, 63, 125, 250, 500 and 1000 mg/l

Test organisms:
- Source: Wildlife International, Ltd. cultures
- Age at study initiation: <24 hours old
- Control group: Negative control

Test conditions:
- Stock solutions preparation (vehicle, solvent, concentrations) and stability: Direct addition of test article to dilution water. The test article was not stable.
- Test temperature range: 19.2 to 20.5 C
- Exposure vessel type: 250-mL glass beakers containing 200 mL of test solution.
- Dilution water source: Well water
- Dilution water chemistry (hardness, alkalinity, pH, TOC, TSS, salinity, Ca/Mg ration, Na/K ratio): Hardness 126 mg/L as CaCO3, Alkalinity 179 mg/L as CaCO3, pH 8.6, Conductivity 290 mhos/cm and TOC <1 mg/L
- Lighting (quality, intensity, and periodicity): Wavelength similar to natural sunlight, 131 lux, 16 hours light: 8 hours dark
- Water chemistry in test: DO, pH and temperature measured in each test chamber daily (old and new solutions, where

appropriate)
"Element (unit) basis (i.e., immobilization): Mortality and immobilization

Test design (number of replicates, individuals per replicate, concentrations): Two replicates/treatment, 10 individuals/replicate, Negative Control, 63, 125, 250, 500 and 1000 mg/L

Method of calculating mean measured concentrations: Arithmetic mean

Analytical monitoring: Measurement of test concentrations in each test chamber at test initiation, on Day 1 (old solution) and test termination. Test concentrations were measured by GC\FID.

Remark : CPTMO rapidly hydrolyzes to form silanols and methanol. The toxicity of trimethylsilanol was determined in this study, as a means to further characterize the toxicity of the parent material, CPTMO.

Result : Measured concentrations in mg/L: <LOQ, 60, 116, 207, 447 and 905

EC50, EL50, LC0, LL0, at 24, 48 hours: EC50 at 24 and 48 hours and NOEC

Statistical results (95% confidence interval), as appropriate:
24-Hour EC50: >905 mg/L (not calculable)
48-Hour EC50: 124 mg/L (51 - 203 mg/L)
NOEC: <60 mg/L

Biological observations:
- Number immobilized as compared to the number exposed: After 48 hours of exposure, mortality/immobility in the 60, 116, 207, 447 and 905 mg/L treatment groups was 30, 65, 45, 80 and 85%, respectively.
- Concentration response with 95% confidence limits: Yes

- Cumulative immobilization:

Mean Measured Concentration (mg/L)	Number Dead/Number Immobile/Number Exposed (hours) 0	24	48
Negative control	0/0/20	0/0/20	0/1/20
60	0/0/20	0/0/20	0/6/20
116	0/0/20	0/0/20	7/6/20
207	0/0/20	0/0/20	8/1/20
447	0/0/20	0/2/20	10/6/20
905	0/0/20	0/4/20	8/9/20

Note: At 48 hours, daphnia trapped on the water surface were observed in every group except the negative control and the 60 mg/L treatment group, with more daphnia being trapped at the higher concentrations.

oWas control response satisfactory: Yes

Test substance : Trimethylsilanol (CAS Number 1066-40-6)

Conclusion : The 48-hour EC50 for Daphnia magna exposed to trimethylsilanol under static-renewal test conditions was

124 mg/L with 95% confidence limits of 51 and 203 mg/L. The NOEC was <60 mg/L, the lowest concentration tested.

Reliability : (1) valid without restriction
This was a GLP compliant study with measured test concentrations. The study is scientifically defensible because a concentration-effect relationship was demonstrated

Flag : Critical study for SIDS endpoint
17.10.2005

4.3 TOXICITY TO AQUATIC PLANTS E.G. ALGAE

Species	:	Scenedesmus subspicatus (Algae)
Endpoint	:	biomass
Exposure period	:	72 hour(s)
Unit	:	mg/l
NOEC	:	= 167
EC10	:	= 241
EC50	:	> 833
Limit test	:	
Analytical monitoring	:	yes
Method	:	other: Directive 88/69/EEC, C.3
Year	:	1993
GLP	:	yes
Test substance	:	as prescribed by 1.1 - 1.4

Method : The test substance was dissolved at 1 g/l in VE water and stirred for 18 h. The solution was filtered and served as the initial solution for testing. Test concentrations were calculated from the relationship of the master solution and corresponding test substance concentration.

Analytical method: DOC determination

Algae cell counts were made photometrically at 0, 24, 48 and 72 hrs.

Target test substance concentrations were 0, 59, 98, 167, 294, 491, and 883 mg/l.

Temperature = 24 +/- 2 deg C

Remark : When the results are interpreted, the hydrolysis of the test substance during the preparation of the initial solution or during the test should be considered.

Result : The reported values were nominal, following analytical confirmation of the stock solutions. The DOC determination showed a concentration of 356 mg/l, which corresponds to a test substance concentration of 981 mg/l.

On the basis of biomass, the 72 h EbC90 was determined to be > 883 mg/l.
On the basis of growth rate, a median effective concentration was determined to be (0-72 hr) ErC50 > 883 mg/l; (0-72 hr) ErC10 = 514 mg/l; (0-72 hr) ErC90 > 883 mg/l.

pH (begining of the test) = 7.6 - 7.8
(end of the test) = 7.6 - 8.5

Test substance : DYNASYLAN CPTMO: 98.9% 3-chloropropyltrimethoxysilane

The test substance is susceptible to hydrolysis. As the test substance has low water solubility, it was dissolved at 1 g/l in VE water and stirred for 18 h. The solution was filtered and served as the initial solution for testing.

Reliability : (1) valid without restriction
Guideline study

Flag : Critical study for SIDS endpoint

17.02.2005 (14)

Species	:	Selenastrum capricornutum (Algae)
Endpoint	:	other: cell density and biomass
Exposure period	:	72 hour(s)
Unit	:	mg/l
NOEC	:	70
EC50	:	555
96 ECb50	:	625
Limit test	:	no
Analytical monitoring	:	yes
Method	:	OECD Guide-line 201 "Algae, Growth Inhibition Test"
Year	:	2004
GLP	:	yes
Test substance	:	other TS

Method : OECD. 1984. OECD Guidelines for Testing of Chemicals. Guideline 201: Alga, Growth Inhibition Test. Adopted 7 June 1984.

Official Journal of the European Communities. 1992. No. L383. Method C.3.: Algal Inhibition Test.

USEPA. 1996. Algal Toxicity, Tiers I and II. Series 850 - Ecological Effects Test Guidelines (draft), OPPTS number 850.5400.

Statistical methods: Non-linear regression, linear interpolation and Dunnett's test

Test type (static/other): Static

Nominal concentrations in mg/L: Negative Control, 31, 63, 125, 250, 500 and 1000

Test Organisms: Initial Density 10,000 cells/mL
Element basis (i.e. number of cells/ml, area under the curve, growth rate, etc.): Cell Density, Area Under the Growth Curve (Biomass) and Growth Rate

Test Conditions:
- Test temperature range: 23.6 to 24.6 C
- Growth/test medium chemistry: Freshwater Algal Medium (OECD 201), pH 7.9
- Dilution water source: NANOpure water
- Exposure vessel type: 250-mL Erlenmeyer flasks plugged with cotton stoppers containing 100 mL of test solution.
- Water chemistry in test: Temperature was measured in the environmental chamber twice daily. Measurements of pH were made in each treatment group at test initiation and test termination.
- Stock solutions preparation: Direct addition of test article to freshwater algal medium

- Light levels and quality during exposure: 3900 to 4700 lux, continuous cool-white fluorescent lighting

Test Design: Six replicates for the control and three replicates for each treatment group. Six test concentrations and a negative control.

Method of calculating mean measured concentrations (i.e. arithmetic mean, geometric mean, etc.): Test concentrations declined to less than 70% of nominal at test termination. Consequently, the results of the study were based on Day 0 measured concentrations.

Analytical monitoring: Test Concentrations were measured in each treatment at test initiation and at test termination by GC/FID.

Remark : CPTMO rapidly hydrolyzes to form silanols and methanol. The toxicity of trimethylsilanol was determined in this study, as a means to further characterize the toxicity of the parent material, CPTMO.

Result : Measured concentrations in mg/L:<LOQ, 33, 70, 135, 257, 522, 1053 (Day 0); <LOQ, 12, 28, 35, 95, 220 and 444 (Day 4)

Element value (e.g. ErC50, ErL50, EbC50, EbL50, EC10-CD, EL10-CD, EC50-CD, EL50-CD, EL90-CD, EC90-CD, EC0, or EL0 at 24, 48, 72 or 96 hours)

Note whether cells removed prior to measurement: EC50 values for cell density, area under the growth curve and growth rate based on Day 0 measured concentrations. Cells were removed prior to measurement.

NOEC, LOEC, or NOEL, LOEL: NOEC

Was control response satisfactory: Yes

Statistical results (95% confidence limits), as appropriate Cell Density
72-Hour EC50: 555 mg/L (141 - 612 mg/L)
72-Hour NOEC: 70 mg/L
96-Hour EC50: 683 mg/L (641 - 727 mg/L)
96-Hour NOEC: 135 mg/L

Area Under the Growth Curve (Biomass)
72-Hour EbC50: 566 mg/L (409 - 618 mg/L)
72-Hour NOEC: 70 mg/L
96-Hour EbC50: 625 mg/L (555 - 702 mg/L)
96-Hour NOEC: 70 mg/L

Growth Rate
72-Hour ErC50: >1053 mg/L (not calculable)
72-Hour NOEC: 70 mg/L
96-Hour ErC50: >1053 mg/L (not calculable)
96-Hour NOEC: 522 mg/L

Biological observations:
- Cell density at each flask at each measuring point: Yes
- Growth curves: Yes

- Percent biomass/growth rate inhibition per concentration:

Day 0 Measured Concentration (mg/L)	33	70	135	257	522	1053
72-Hour Cell Density	4.6	5.8	39	51	44	90
96-Hour Cell Density	0.74	-0.70	-1.8	18	25	88
72-Hour Biomass	3.4	8.0	32	45	46	90
96-Hour Biomass	2.3	3.1	16	32	35	89
72-Hour Growth Rate	0.94	1.2	9.5	14	11	45
96-Hour Growth Rate	0.12	-0.11	-0.30	3.3	4.6	34

- Observations: There were no noticeable changes in cell morphology in any of the tested concentrations in comparison to the control.

Test substance : Trimethylsilanol (CAS Number 1066-40-6)

Conclusion : The most sensitive endpoints for Selenastrum capricornutum exposed to trimethylsilanol were cell density and area under the growth curve (biomass). The 72-hour EC50 value was 555 mg/L with 95% confidence limits of 141 and 612 mg/L. The 72-hour NOEC, based on cell density, area under the growth curve (biomass) and growth rate was 70 mg/L. The 96-hour EbC50 value was 625 mg/L with 95% confidence limits of 555 and 702 mg/L. The 96-hour NOEC, based on area under the growth curve (biomass), was 70 mg/L.

Reliability : (1) valid without restriction
This was a GLP compliant study with measured test concentrations. The study is scientifically defensible because a concentration-effect relationship was demonstrated

17.10.2005

4.4 TOXICITY TO MICROORGANISMS E.G. BACTERIA

Type : other
Species : Pseudomonas putida (Bacteria)
Exposure period : 5 hour(s)
Unit :
Analytical monitoring : no
Method : other: Oxygen consumption test (Huels method)
Year : 1993
GLP : yes
Test substance : as prescribed by 1.1 - 1.4

Method : Four 100-ml von Loh bottles with ground glass stoppers were filled with the culture solution, the bacterial suspension, and the test substance in staged concentrations (0, 500,1000, 1500 and 2000 ul/l), and were sealed without air, and were incubated for 5 to 6 hours at approximately 25 deg C (24.2 - 26.2 deg C). Two were treated with HgCl2 solution to kill the
bacteria, and serve to determine auto-oxidation grades of the test substance. Nine control bottles without the test substance were used as reference; four of these contained HgCl2 to determine the final oxygen content. At the end of testing HCl was added to stop biochemical processes.

The differential between the oxygen content of the solutions stored in the individual containers at the initial time (0) and after the incubation period reveals the bacterial oxygen

consumption. Comparison of the amounts of oxygen consumed in the reference and test preparations provides information regarding the concentration-related influence on oxygen consumption by the test substance.

Result : EC10 = 1.1 ml/L (density of the test substance = 1.08; EC10 = 1188 mg/L)
Test substance : DYNASYLAN CPTMO: 98.9% 3-chloropropyltrimethoxysilane
Reliability : (1) valid without restriction
Study according to standard method

25.08.2005 (12)

4.5.1 CHRONIC TOXICITY TO FISH

4.5.2 CHRONIC TOXICITY TO AQUATIC INVERTEBRATES

4.6.1 TOXICITY TO SEDIMENT DWELLING ORGANISMS

4.6.2 TOXICITY TO TERRESTRIAL PLANTS

4.6.3 TOXICITY TO SOIL DWELLING ORGANISMS

4.6.4 TOX. TO OTHER NON MAMM. TERR. SPECIES

4.7 BIOLOGICAL EFFECTS MONITORING

4.8 BIOTRANSFORMATION AND KINETICS

4.9 ADDITIONAL REMARKS

5.0 TOXICOKINETICS, METABOLISM AND DISTRIBUTION

5.1.1 ACUTE ORAL TOXICITY

Type	:	LD50
Value	:	> 2000 mg/kg bw
Species	:	rat
Strain	:	other: BOR:WISW (SPF Cpb)
Sex	:	male/female
Number of animals	:	10
Vehicle	:	other: none
Doses	:	2000 mg/kg bw
Method	:	OECD Guide-line 401 "Acute Oral Toxicity"
Year	:	1993
GLP	:	yes
Test substance	:	as prescribed by 1.1 - 1.4
Method	:	A group of ten (5 male and 5 female) rats was given a single oral dose of undiluted test substance at a dose level of 2000 mg/kg bw. Animals were observed 1 and 4 hours after dosing and then once a day for 14 days. Bodyweights were recorded on the day of treatment and on days 7 and 14. All animals were subject to gross necropsy examination for any macroscopic abnormalities.
Result	:	Up to six hours after administration clinical signs of toxicity were noted including abnormal gait, squatting, staggering, unkempt fur, salivation and lacrimation, hypothermia, and uncontrolled movements. No abnormalities were noted at necropsy. All animals appeared normal begining at the 24 hour observation point.
Test substance	:	DYNASYLAN CPTMO: 98.9% 3-chloropropyltrimethoxysilane
Reliability	:	(1) valid without restriction Guideline study
Flag	:	Critical study for SIDS endpoint

11.02.2005 (11)

Type	:	LD50
Value	:	= 9.51 ml/kg bw
Species	:	rat
Strain	:	Wistar
Sex	:	male
Number of animals	:	17
Vehicle	:	other: none
Doses	:	1, 4, 8, and 16 ml/kg
Method	:	other: comparable to OECD 401
Year	:	1974
GLP	:	no
Test substance	:	as prescribed by 1.1 - 1.4
Method	:	Male Wistar, non-fasted rats, 3 to 4 weeks of age and 90-120 grams in weight were dosed at levels differing by a factor of 2 in a geometric series (16, 8, 4, and 1 ml/kg). Each rat received a single undiluted dose by stomach intubation. Animals were observed for 14 days following dosing. The LD50 was calculated by the moving average method based on the 14-day mortality data.

Result : Dosage: 16.0 ml/kg
Dead/Dosed: 5/5
Days to Death: 0,0,0,1,1
Signs and/or Symptoms: Sluggish, unsteady gait and pilo-erection 5 min., prostrate 8 min., gasping 23 min., convulsions 25 min., death of three 1 to 3.5 hr.

Dosage: 8.0 ml/kg
Dead/Dosed: 1/5
Days to Death: 1
Weight Change: 58 to 126
Signs and/or Symptoms: Rubbing mouth on bottom of cage 1 min., sluggish and deep breathing 2 min., prostrate with sporadic convulsions 7 min.

Dosage: 4.0 ml/kg
Dead/Dosed: 1/5
Days to Death: 2
Weight Change: 88 to 104
Signs and/or Symptoms: Sluggish and deep breathing 7 min., unsteady gait 18 min., salivation within 40 min.

Dosage: 1.0 ml/kg
Dead/Dosed: 0/2
Weight Change: 108 and 110
Signs and/or Symptoms: -

Gross Pathology: In animals that died, livers mottled; kidneys pale, speckled and slightly congested; stomachs distended, gas and liquid filled; intestines distended, liquid filled and yellow; bladders full. In survivors, livers mottled and surface of spleens rough.

Test substance : Silicone A-143; 3-chloropropyltrimethoxysilane. Purity not stated.

Conclusion : The oral LD50 was determined to be 9.51 (6.30 to 14.4) ml/kg, undiluted.

Reliability : (2) valid with restrictions
Reliability of 2 assigned because basic data are given and study is comparable to guidelines.

01.06.2006 (5)

Type : LD50
Value : 6.17 - 9.51 ml/kg bw
Species : rat
Strain :
Sex : male/female
Number of animals : 35
Vehicle : other: none
Doses : 2, 4, 8, or 16 ml/kg
Method : other: in general conformance with OECD 401
Year : 1990
GLP : no data
Test substance : as prescribed by 1.1 - 1.4

Method : Undiluted A-1430 was given by gavage to groups of 5 male and 5 female rats at dosages of 16.0 (males only), 8.0, 4.0, and 2.0 ml/kg. Animals were subsequently, and periodically, examined for signs of toxic and/or pharmacologic effects over a 14-day postdosing period. Animals were weighed before dosing, and at 7 and 14 days postdosing. Animals that died, and survivors sacrificed at the end of the

observation period, were subjected to necropsy examination. Kidneys and urinary bladders from 2 males and 2 females of each dosage group were processed for examination by light microscopy.

Remark : Although the GLP page was not available, studies of this type conducted at Bushy Run Research Corporation were generally conducted under GLP.

Result : Mortalities over the 14-day postdosing observation period were as follows:

Dosage (ml/kg)	Mortality Male	Female	Time to death
16.0	5/5	not dosed	3 hr - 1 day
8.0	1/5	4/5	1-2 days
4.0	1/5	0/5	2 days
2.0	0/5	0/5	---

The above dosage-mortality data allowed the calculation of the following acute peroral LD50 values (with 95% confidence limits) for undiluted A-1430:
Male rat = 9.51 (6.30-14.40) ml/kg
Female rat = 6.17 (4.57-8.33) ml/kg

Signs of toxicity, seen at doses of 2 ml/kg and above, included sluggishness, unsteady gait, prostration, and red perinasal and periocular encrustation. Survivors recovered from these effects within 1 to 7 days. Also, survivors gained weight over the first and second postdosing weeks.

Necropsy revealed the urine to be positive for blood (on qualitative reagent strip testing) in animals that died. Signs of gross pathology in these animals included bright red or dark red mottled lungs, dark red livers, discolored stomachs, red and/or yellow colored intestines, and purple kidneys. Necropsy of survivors revealed mottled pink to dark red lungs and purple kidneys.

Major histological findings were as follows for the kidneys (2 males and 2 females per dosage level):

16 ml/kg (males only):
Both had tubular proteinosis and one had tubular epithelial cell degeneration.

8 ml/kg:
Males - No significant findings.
Females - One with congestion, and tubular proteinosis and epithelial cell degeneration.

4 ml/kg:
Males - One with tubular proteinosis, dilation and basophilia.
Females - One with tubular basophilia and mineralization.

2 ml/kg:
Males - One with tubular proteinosis.
Females - No significant findings.

Only one animal (a female of the 8.0 ml/kg group) had any

urinary bladder lesions (cystitis).

Test substance : Organofunctional silane A-1430; 99.72% 3-chloropropyltrimethoxysilan

Reliability : (2) valid with restrictions
Reliability of 2 assigned because basic data are given and study is comparable to guidelines.

01.06.2006 (3)

Type : other: ALD50
Value : = 10000 mg/kg bw
Species : rat
Strain : no data
Sex : male
Number of animals :
Vehicle : other: none
Doses : 0.63, 1.26, 2.52, 5.0, 10.0 g/kg
Method : other
Year : 1981
GLP : no
Test substance : as prescribed by 1.1 - 1.4

Method : Animals were fasted overnight prior to dosing. There were two animals per dose level. The material was administered by gavage, undiluted. All animals were weighed and observed at intervals over a two-week post-administration period. Acute oral toxicity testing for Federal Hazardous Substance Act (FHSA) purposes requires albino rats weighing between 200 and 300 g.

Remark : After reviewing the body weight data associated with this study, (Dow Corning Corporation report number 1982-I0005-943, study number 1369-6), there does not appear to be any indication that the body weight of the surviving animals was affected by test article treatment at any body weight collection.

Result : One animal died in the 10 g/kg dose group. The ALD50 = 10 g/kg.

Number of deaths at each dose level:
Sex: Males

Dose Level (g/kg)	No. Deaths	Days to Death
0.63	0	
1.26	0	
2.52	0	
5.0	0	
10.0	1	1

Time of death (provide individual animal time if less than 24 hours after dosing): one day after dosing.

Description, severity, time of onset and duration of clinical signs at each dose level: Lethargy and lose of muscular coordination observed in animals at 30 minutes post dosing in the 5.0 and 10 g/kg dose groups). All animals in 0.63-2.52 g/kg dose groups appear normal at 1 hour post-dosing. One animal in the 10.0 g/kg dose group died on day 1. Surviving animals in the 5.0 and 10.0 g/kg dose groups continue to appear weak and lethargic. All other animals appear normal. All surviving animals appeared normal and exhibited normally anticipated weight gain from day 8 forward.

Test substance : Purity of the test material was not reported.

Conclusion : Chloropropyltrimethoxysilane was practically non-toxic when ingested on an acute basis by laboratory rats (ALD50= 10.0 g/kg body weight).
Reliability : (2) valid with restrictions
01.06.2006 (23)

5.1.2 ACUTE INHALATION TOXICITY

Type :
Value :
Species : rat
Strain :
Sex : male/female
Number of animals : 10
Vehicle : other: none
Doses :
Exposure time : 6 hour(s)
Method : other: substantially saturated vapor
Year : 1990
GLP : no data
Test substance : as prescribed by 1.1 - 1.4

Method : To determine the potential for adverse effects by acute exposure to vapor generated at ambient temperature from A-1430, 5 male and 5 female rats were exposed for 6 hours to a substantially saturated vapor atmosphere from the material. The atmosphere was generated statically by placing a sample of A-1430 into an exposure chamber and allowing the atmosphere to equilibrate overnight (c. 18 hr). Animals were then placed in the chamber, maintained at an air temperature of 26 deg C. Animals were observed for signs of toxic and/or pharmacologic effects during exposure and over a 14-day postexposure period. Survivors were sacrificed at the end of the observation period for necropsy examination.
Remark : Although the GLP page was not available, studies of this type conducted at Bushy Run Research Corporation were generally conducted under GLP.
Result : No animals died during exposure or in the postexposure observation period. Hyperactivity was seen during exposure and disappeared the day following exposure. Animals gained weight over the two-week observation period. Necropsy revealed no gross pathological features.
Test substance : Organofunctional silane A-1430; 99.72% 3-chloropropyltrimethoxysil
Conclusion : "The above findings indicate a low potential for toxicity by acute exposure to a vapor saturated atmosphere, presumably in part reflecting the low vapor pressure of the material."
Reliability : (3) invalid
Reliability of 3 assigned because the study does not meet important criteria of today/s standard methods.
11.02.2005 (3)

Type :
Value :
Species : rat
Strain : no data
Sex : no data

Number of animals	:	6
Vehicle	:	other: none
Doses	:	
Exposure time	:	8 hour(s)
Method	:	other: substantially saturated vapor
Year	:	1974
GLP	:	no
Test substance	:	as prescribed by 1.1 - 1.4
Method	:	Substantially saturated vapor was prepared by spreading 50 grams of chemical over 200 cm(2) area on shallow tray placed near the top of a 120-liter glass chamber which was then sealed for at least 16 hours while an intermittently operated fan agitated the internal chamber atmosphere. Rats were then introduced in a gasketed drawer-type cage designed and operated to minimize vapor loss. The study was conducted at 20 deg. C. The animals were observed for 14 days postexposure for signs of toxicity.
Result	:	Exposure to substantially saturated vapor for 8 hours caused no mortality. Weight change over the 14-day postexposure period ranged from 51 to 71 grams. No signs and/or symptoms were reported.
Test substance	:	Silicone A-143; 3-chloropropyltrimethoxysilane. Purity not stated.
Conclusion	:	Based on the results, no hazard is anticipated from the infrequent inhalation of substantially saturated vapor evolved at room temperature under normal handling conditions.
Reliability	:	(3) invalid Reliability of 3 assigned because the study does not meet important criteria of today/s standard methods (i.e. substantially, saturated vapor procedure was used).

01.06.2006 (5)

5.1.3 ACUTE DERMAL TOXICITY

Type	:	LD50
Value	:	> 2000 mg/kg bw
Species	:	rat
Strain	:	other: Bor:WISW (SPF Cpb)
Sex	:	male/female
Number of animals	:	10
Vehicle	:	other: none
Doses	:	2000 mg/kg bw
Method	:	OECD Guide-line 402 "Acute dermal Toxicity"
Year	:	1993
GLP	:	yes
Test substance	:	as prescribed by 1.1 - 1.4
Method	:	In order to determine the potential for local and systemic toxicity by single sustained contact with the skin, the undiluted material was applied to the clipped trunk skin of groups of 5 male and 5 female rats at a dose of 2000 mg/kg. Animals were observed ½, 1, 2, 3, 4, 5 and 6 hours after dosing and then once a day for 14 days. Body weights were recorded on the day of treatment and on days 7 and 14. All animals were subject to gross necropsy examination for any macroscopic abnormalities.
Result	:	There was no evidence of systemic toxicity noted during the

study period, all animals showed normal gains in body weight over the study period, and there were no abnormalities noted at necropsy.

Test substance : DYNASYLAN CPTMO: 98.9% 3-chloropropyltrimethoxysilane
Reliability : (1) valid without restriction
Guideline study
Flag : Critical study for SIDS endpoint
11.02.2005 (9)

Type : LD50
Value :
Species : rabbit
Strain :
Sex : male/female
Number of animals : 30
Vehicle : other: none
Doses : 2, 4, or 8 ml/kg
Method : other: in general conformance with OECD 402
Year : 1990
GLP : no data
Test substance : as prescribed by 1.1 - 1.4

Method : In order to determine the potential for local and systemic toxicity of A-1430 by single sustained contact with the skin, the undiluted material was applied to the clipped tunk skin of groups of 5 male and 5 female rabbits. Dosages for each group were 8.0, 4.0, and 2.0 ml/kg. The material was maintained in contact with the skin for 24 hr by means of an occlusive dressing. Animals were inspected for signs of toxic and/or pharmacologic effects during the period of occlusive contact with A-1430, and periodically thereafter for a 2-week period. Animals were weighed before application of the test material, and at one and two weeks after dosing. On removal of the occlusive dressing, and at one and two weeks, the skin was inspected for signs of local injury and inflammation. Animals that died, and survivors sacrificed at the end of the postapplication observation period, were subjected to necropsy examination. Kidneys and bladders were removed from two males and two females of each dosage group and processed for examination by light microscopy.

Remark : Although the GLP page was not available, studies of this type conducted at Bushy Run Research Corporation were generally conducted under GLP.

Result : Mortalities over the two week postapplication observation period were as follows:

Applied Dosage (ml/kg)	Mortality (# dying/# dosed) Male	Female	Time to death
8.0	5/5	5/5	1-2 days
4.0	3/5	3/5	1 day
2.0	1/5	0/5	2 days

The above dosage-mortality data allowed the calculation of the following acute percutaneous LD50 values (with 95% confidence limits) for undiluted A-1430:
Male rabbit = 3.36 (1.89 - 5.97) ml/kg
Female rabbit = 3.73 (2.52 - 5.52) ml/kg

On removal of the occlusive dressing there was erythema and

edema. At 7 days there was desquamation, and at 14 days alopecia.

Signs of toxicity, seen principally at dosages of 4.0 and 8.0 ml/kg, included spastic movements, prostration, salivation, and red staining perioral, perinasal, and perianal fur. Survivors of the 2.0 and 4.0 ml/kg male group and 2.0 ml/kg male group gained weight over the observation period; males of the 4.0 ml/kg group lost weight during the first postapplication week, but regained weight during the second week.

Gross pathological features in animals that died included red lungs, dark red kidneys, bladders filled with red fluid, and one with enlarged thymus. Urine was positive for blood on qualitative testing. For survivors, necropsy revealed mottled dark red lungs, one with liver nodule, and trace amounts of blood in urine on qualitative testing.

Results of light microscopy were as follows for kidneys:
8.0 ml/kg:
Males - One with tubular epithelial cell degeneration, tubular proteinosis and transitional cell vacuolation.
Females - Two with tubular proteinosis, and one with tubular epithelial cell degeneration, granulomatous nephritis, pelvic cell necrosis, and pyelonephritis.

4.0 ml/kg:
Males - Two with tubular proteinosis.
Females - One with tubular epithelial cell degeneration, granulomatous nephritis, and pyelonephritis.

2.0 ml/kg:
Males - One with tubular proteinosis and pyelonephritis
Females - No lesions.

The urinary bladder of one male and one female (4.0 ml/kg group) had cystitis and hemorrhage.

Test substance : Organofunctional silane A-1430; 99.72% 3-chloropropyltrimethoxysilane

Reliability : (2) valid with restrictions
Reliability of 2 assigned because basic data are given and study is comparable to guidelines.

11.02.2005 (3)

Type : LD50
Value : = 2.83 ml/kg bw
Species : rabbit
Strain : other: albino
Sex : male
Number of animals : 12
Vehicle : other: none
Doses : 1, 2, 4, or 16 ml/kg
Method : other: comparable to OECD 402
Year : 1974
GLP : no
Test substance : as prescribed by 1.1 - 1.4

Method : Male albino rabbits, 3 to 5 months of age, were immobilized during the 24-hour contact period with the compound retained

under impervious sheeting on the clipped intact skin of the trunk. Thereafter, excess fluid was removed to prevent ingestion. The nonfasted animals were maintained on appropriate Rockland diet and water ad lib except during period of manipulation or confinement. Dosage levels differed by a factor of 2 in a geometric series (16, 4, 2, and 1 ml/kg). The LD50 was calculated by the moving average method based on a 14-day observation period.

Result : Dosage: 16.0 ml/kg
Dead/Dosed: 2/2
Days to Death: 1,1
Skin Irritation: erythema, ecchymosis
Signs and/or Symptoms: Fur wet, prostration and cold to the touch before death.

Dosage: 4.0 ml/kg
Dead/Dosed: 4/4
Days to Death: 1,1,1,2
Skin Irritation: erythema
Signs and/or Symptoms: Nose bleeding, fur wet and cold to the touch on 1 rabbit before death.

Dosage: 2.0 ml/kg
Dead/Dosed: 0/4
Weight Change: 205, 340, 358, 565
Skin Irritation: -
Signs and/or Symptoms: -

Dosage: 1.0 ml/kg
Dead/Dosed: 0/2
Weight Change: 133, 418
Skin Irritation: -
Signs and/or Symptoms: -

Gross Pathology: lungs and kidneys congested.

Test substance : Silicone A-143; 3-chloropropyltrimethoxysilane. Purity not stated.

Conclusion : The dermal LD50 was determined to be 2.83 (1.73 to 4.62) ml/kg, undiluted.

Reliability : (2) valid with restrictions
Reliability of 2 assigned because basic data are given and study is comparable to guidelines.

01.06.2006 (5)

5.1.4 ACUTE TOXICITY, OTHER ROUTES

Type : other: micronucleus test
Value : 2031 mg/kg bw
Species : mouse
Strain : Swiss Webster
Sex : male/female
Number of animals :
Vehicle : other: corn oil
Doses : 0 (corn oil), 500, 1000 or 1625 mg/kg
Route of admin. : i.p.
Exposure time :
Method : other: micronucleus test
Year : 1993
GLP : yes

Test substance	:	as prescribed by 1.1 - 1.4
Method	:	Chloropropyltrimethoxysilane (CAS No. 2530-87-2) was given to both male and female Swiss-Webster mice as a single dose by intraperitoneal injection. Based upon mortality data obtained in a range-finding study, the acute intraperitoneal LD50 for the combined sexes was calculated to be 2031 mg/kg chloropropyltrimethoxysilane (95% confidence interval, 1672 to 2456 mg/kg). Exposure time = 30, 48 and 72 hours
Result	:	There were no signs of toxicity in male or female mice in the 500 mg/kg group, except that 1 female exhibited ataxia during the first hour post-treatment. All of the males and females in the 1000 mg/kg group exhibited ataxia and 2 of the males also had tremors during the first hour after treatment. In males and females treated at 1625 mg/kg CPTMO, ataxia, tremors, and prostration were observed during the first hour after treatment. Other clinical signs in the high dose females included myoclonic jerks and vocalization. There were no significant clinical observations in male or female mice from the afternoon of Day 1 through the end of the study.
Test substance	:	Purity not stated.
Reliability	:	(1) valid without restriction

01.06.2006 (4)

5.2.1 SKIN IRRITATION

Species	:	rabbit
Concentration	:	undiluted
Exposure	:	Semiocclusive
Exposure time	:	4 hour(s)
Number of animals	:	6
Vehicle	:	other: none
PDII	:	3.23
Result	:	moderately irritating
Classification	:	irritating
Method	:	OECD Guide-line 404 "Acute Dermal Irritation/Corrosion"
Year	:	1981
GLP	:	yes
Test substance	:	as prescribed by 1.1 - 1.4
Method	:	A single, four-hour, semi-occluded application of the test material (.5 cm3) was made to the clipped skin of six rabbits (small white russian). After four hours the patches were removed, and the skin wiped gently with water. The test sites were examined for evidence of irritation one, 24, 48, and 72 hours and 6, 8, 10, 14 and 17 days after patch removal, and scored according to Draize, 1959.
Result	:	Erythema and edema were noted in all six animals at 24 and 48 hours after application. At 72 hours, three animals still exhibited erythema and three animals exhibited edema, and dryness of the skin was observed. Symptoms subsided by day 17.
Test substance	:	DYNASYLAN CPTMO: 98.9% 3-chloropropyltrimethoxysilane
Reliability	:	(1) valid without restriction Guideline study

01.06.2006 (8)

Species : rabbit
Concentration : undiluted
Exposure : Occlusive
Exposure time : 4 hour(s)
Number of animals : 6
Vehicle : other: none
PDII :
Result : not irritating
Classification : not irritating
Method : other: in general conformance with OECD 404
Year : 1990
GLP : no data
Test substance : as prescribed by 1.1 - 1.4

Method : 0.5 ml of the undiluted liquid was applied to the shaven dorsal trunk skin of each of 6 albino rabbits. The material was held in contact with the skin for 4-hr by means of an occlusive dressing. The contact site was examined for signs of local injury and/or inflammation on removal of the occlusive dressing and periodically thereafter for up to 7 days.
Remark : Although the GLP page was not available, studies of this type conducted at Bushy Run Research Corporation were generally conducted under GLP.
Result : On removal of the occlusive dressing there were no local signs of injury and/or inflammation and none developed over the 7-day observation period.
Test substance : Organofunctional silane A-1430; 99.72% 3-chloropropyltrimethoxysil
Reliability : (2) valid with restrictions
Reliability of 2 assigned because basic data are given.

01.06.2006 (3)

Species : rabbit
Concentration : undiluted
Exposure : Semiocclusive
Exposure time : 4 hour(s)
Number of animals : 6
Vehicle : other: none
PDII :
Result : not irritating
Classification : not irritating
Method : other: Department of Transportation Hazardous Materials Regulations, Part 173.240, Appendix A, published in September, 1976
Year : 1981
GLP : no
Test substance : as prescribed by 1.1 - 1.4

Method : New Zealand White rabbits were used in the study. The test material (0.5 ml) was applied under a gauze pad held in place with adhesive tape. The rabbits were then loosely covered with a heavy gauze plastic. After 4 hours, the gauze patches were removed and the application sites graded for erythema, edema and necrosis. The application sites were then washed with soap and water and held for additional readings at 24 and 48 hours.
Result : No evidence of irritation was observed in any of the six test animals.
Test substance : Purity of the test material was not reported.
Conclusion : This material was not corrosive to the skin of rabbits when

tested and classified according to the Department of Transportation Hazardous Materials Regulations.

Reliability : (2) valid with restrictions
01.06.2006 (22)

Species : rabbit
Concentration : undiluted
Exposure : Semiocclusive
Exposure time : 24 hour(s)
Number of animals : 1
Vehicle :
PDII :
Result :
Classification :
Method :
Year : 1981
GLP : no
Test substance : as prescribed by 1.1 - 1.4

Method : The test material was applied to the ear or to intact or abraded skin under a 1" by 1" cotton pad held in place by a cloth bandage taped to the hair. Ten applications were made over a period of 14 days.

* Age: Not reported
* Doses per time period: 1/24 hours
* Volume administered or concentration: Not reported
* Post dose observation period: Not reported
* Exposure duration (for inhalation studies): 24 hours
* Purity of the test material was not reported.

Result : A single 24-hour contact with undiluted test material produced slight redness. Repeated or prolonged exposures skin contact produced moderate redness, slight edema and moderate flaking of the skin.
Test substance : Purity not stated.
Conclusion : Single and prolonged exposure to the test material produced slight irritation. However, repeated prolonged contacts caused appreciable skin irritation.
Reliability : (3) invalid
Reliability of 3 assigned because the study does not meet important criteria of today's standard methods
01.06.2006 (23)

Species : rabbit
Concentration : undiluted
Exposure : Open
Exposure time :
Number of animals : 5
Vehicle : other: none
PDII :
Result : not irritating
Classification :
Method : other
Year : 1974
GLP : no data
Test substance : as prescribed by 1.1 - 1.4

Method : Chemical was applied in 0.01 ml amounts to clipped, uncovered intact skin of 5 rabbit bellies undiluted. Ten grades are recognized based on appearance of moderate or

marked capillary injection, erythema, edema or necrosis within 24 hours. No injury from undiluted = Grade 1.

Result : Moderate capillary injection on 2, no irritation on 3 rabbits. Grade 2.
Test substance : Silicone A-143; 3-chloropropyltrimethoxysilane. Purity not stated.
Reliability : (3) invalid
Reliability of 3 assigned because the study does not meet important criteria of today's standard methods (only 0.01 ml applied).

01.06.2006 (5)

5.2.2 EYE IRRITATION

Species : rabbit
Concentration : undiluted
Dose : .1 ml
Exposure time : 72 hour(s)
Comment : not rinsed
Number of animals : 3
Vehicle : other: none
Result : not irritating
Classification : not irritating
Method : OECD Guide-line 405 "Acute Eye Irritation/Corrosion"
Year : 1993
GLP : yes
Test substance : as prescribed by 1.1 - 1.4

Method : A single instillation of the test material was made to the non-irrigated eye of three rabbits, and an assessment of damage/irritation was made 24, 48, and 72 hours following treatment. Scoring of damage/irritation was made according to Draize, 1959.
Result : A single installation to the rabbit eye produced minimal conjunctival irritation in one of three animals.
Test substance : DYNASYLAN CPTMO: 98.9% 3-chloropropyltrimethoxysilane. Purity not stated.
Reliability : (1) valid without restriction
Guideline study

01.06.2006 (10)

Species : rabbit
Concentration : undiluted
Dose : .1 ml
Exposure time :
Comment :
Number of animals : 6
Vehicle : other: none
Result : slightly irritating
Classification : not irritating
Method : other: in general conformance with OECD 405
Year : 1990
GLP : no data
Test substance : as prescribed by 1.1 - 1.4

Method : 0.1 ml of the undiluted liquid was placed in the inferior conjunctival sac of one eye of each of 6 rabbits. The animals were subsequently and periodically examined for signs of ocular and periocular injury and inflammation over

a 7-day period.

Remark : Although the GLP page was not available, studies of this type conducted at Bushy Run Research Corporation were generally conducted under GLP.

Result : Minimal conjunctivitis, seen as slight excess redness and swelling with discharge, was seen within an hour of exposure, but resolved within 24 hours. A minor iritis, of less than 4-hour duration, was seen in the eyes of two rabbits. Corneal injury was not seen.

Test substance : Organofunctional silane A-1430; 99.72% 3-chloropropyltrimethoxysilane

Reliability : (2) valid with restrictions
Reliability of 2 assigned because basic data are given and study is comparable to guidelines.

11.02.2005 (3)

Species : rabbit
Concentration : no data
Dose : 2 other: drops
Exposure time : .5 minute(s)
Comment :
Number of animals : 1
Vehicle : other: none
Result : moderately irritating
Classification : irritating
Method : other: none
Year : 1981
GLP : no
Test substance : as prescribed by 1.1 - 1.4

Method : The test material was instilled into the left eye of one male rabbit (strain not specified). The eye was washed with water for 2 minutes within 30 seconds after the instillation. The right eye was treated similarly but left unwashed. Both eyes were observed for pain and examined at 1, 24, 48 hours and 6 to 8 days after treatment for irritation.
* Age: Not reported

Result : In the undiluted form, the material produced moderate to severe pain, slight conjunctival redness and very slight corneal opacity persisting one to two days.

Test substance : Purity of the test material was not reported.

Conclusion : The test material was moderately irritating to the eyes of the rabbit

Reliability : (2) valid with restrictions

01.06.2006 (23)

Species : rabbit
Concentration : undiluted
Dose : .5 ml
Exposure time : 24 hour(s)
Comment :
Number of animals : 5
Vehicle : other: none
Result :
Classification :
Method : other
Year : 1974
GLP : no
Test substance : as prescribed by 1.1 - 1.4

Method	:	"Eyes not staining with 5% fluorescein in 20 seconds contact were accepted. Single instillation of 0.5 ml undiluted were made into the conjunctival sac of 5 rabbits. Read immediately unstained and after fluorescein at 24 hours, with ten grades recognized. Trace or no injury from 0.5 ml undiluted = Grade 1."
Result	:	No corneal injury on 5 eyes from an excess, 0.5 ml per eye. Grade 1.
Test substance	:	Silicone A143; 3-chloropropyltrimethoxysilane. Purity not stated.
Reliability	:	(3) invalid Reliability of 3 assigned because the study does not meet important criteria of today/s standard methods (only corneal eye injury was assessed).

01.06.2006 (5)

5.3 SENSITIZATION

Type	:	Buehler Test
Species	:	guinea pig
Concentration	:	1st: Induction 100 % occlusive epicutaneous 2nd: Challenge 100 % occlusive epicutaneous 3rd:
Number of animals	:	30
Vehicle	:	other: none
Result	:	not sensitizing
Classification	:	not sensitizing
Method	:	OECD Guide-line 406 "Skin Sensitization"
Year	:	1993
GLP	:	yes
Test substance	:	as prescribed by 1.1 - 1.4
Method	:	In the definitive test, a test group of 20 animals was induced with 100% test substance on days 0, 7 and 14 and subsequently challenged with 100% test substance on day 28. A control group of 10 animals was induced and challenged with MEH 56 corn oil.
Result	:	There were no substance related effects or influence on body weight in either test or control animals. There was no erythema or edema observed during Induction Phases I, II or III; no skin irritation was observed in the control animals. There was no skin irritation observed in either test or control animals in the Challenge Phase.
Test substance	:	DYNASYLAN CPTMO: 98.9% 3-chloropropyltrimethoxysilane
Reliability	:	(1) valid without restriction Guideline study

15.02.2005 (17)

5.4 REPEATED DOSE TOXICITY

Type	:	Sub-chronic
Species	:	rat
Sex	:	male/female
Strain	:	Sprague-Dawley
Route of admin.	:	inhalation
Exposure period	:	90 day(s)
Frequency of treatm.	:	6 hours/day, 5 days/week

Post exposure period	:	none
Doses	:	0.5, 5, 100 and 200 ppm
Control group	:	yes, concurrent no treatment
NOAEL	:	= 5 ppm
Method	:	OECD Guide-line 413 "Subchronic Inhalation Toxicity: 90-day Study"
Year	:	1993
GLP	:	yes
Test substance	:	as prescribed by 1.1 - 1.4

Method : Groups of male and female rats were exposed to target concentrations of 0, 0.5, 5, 100 and 200 ppm of chloropropyltrimethoxysilane vapors for 6 hours a day, 5 days a week for 90 days. After 13 weeks of exposure, rats were sacrificed and examined for changes in blood, serum chemistry, urine, organ weights and gross and histopathology. At 24 and 48 hours post-exposure, bone marrow was collected from the femur of 5 animals in all groups for micronucleus assay. The group of ten male and ten female rats also exposed to a target concentration of 200 ppm were used for a micronucleus assay, performed on this group at 24 and 48 hours post-exposure.

Test Subjects
* Age at study initiation: 7-9 weeks
* No. of Animals per sex per dose: 10/group, In addition, 5 animals/ sex were utilized for micronucleus assay following termination of the study.

Study Design
* Satellite groups and reasons they were added: None
* Clinical observations performed and frequency: All animals were observed daily following exposure for treatment-related signs of toxicity, mortality, general appearance and any evidence of respiratory, dermal, behavioral, nasal or ocular changes. Eyes of all rats were examined prior to initiation of the study and eyes of rats in the control and 100 ppm groups were also examined at the termination of the study. Body weights and food consumption of all rats were measured weekly. Clinical pathology parameters were also assessed for all rats.
* Organs examined at necropsy (macroscopic and microscopic: The lungs, liver, heart, kidneys, brain, spleen, adrenals, testes and ovaries were examined and weighed. A complete set of tissues/organs were collected and retained in 10% neutral buffered formalin. All tissues from the control and 100 ppm groups were processed histologically and examined microscopically. In addition, tissues from the lower exposure groups were examined if treatment related-effects were seen in the 100 ppm group.
Statistical Methods: Two-sided Welch Trend Test was used to analyze the data. Micronucleus assay data was analyzed by Wilcoxon Rank Sum Test. One-way analysis of Variance (ANOVA), Dunnett's multiple t-test was also used. The 95% (P= 0.05) confidence level was chosen as the criteria of significance.

Remark : Target concentrations of 0, 0.5, 5, and 100 ppm and 200 ppm = 0, 4, 41, and 814 and 1627 mg/m3, respectively. The actual overall mean exposure concentrations of 0.5, 5, and 99 and 189 ppm = 4, 41, and 806 and 1537 mg/m3, repsectively.

Result : The actual overall mean exposure concentration for the test

groups were 0.5, 5, 99 and 189 ppm. No mortality or apparent treatment-related signs of toxicity were observed in any of the test animals. No statistically significant differences were observed in mean body weights or food consumption between the test and control groups. There were no statistically significant differences in the hematology values of male or female rats. Sporadic increases in sodium, potassium and chloride were observed only in male rats. There were no statistically significant differences in male or female organ weights among the gruops. Microscopic histopathological data was collected for both the 0.5 and 5 ppm exposures groups respectively. There were no reported finding for the female animals of either group, N = 10 per exposure concentration. Eight of 10 male animals in the 0.5 ppm exposure group were reported as normal. The two remaining male animals exhibited minimal chronic cystitis of the urinary bladder. Nine of 10 male animals were reported as normal in the 5.0 ppm exposure group. The remaining male animal exhibited minimal chronic cystitis of the urinary bladder. Treatment-related histopathologic effects were seen in 100 ppm group animals. Increased incidence of hyperplasia of the urinary bladder epithelium was noted in both sexes of this group. In addition, an increased incidence and severity of alpha 2u-globulin inclusions (hyaline droplet nephropathy) in the kidney was observed in males. This condition is unique to male rats and has no known implication for human risk. Statistically significant increases in micronucleated cells was observed in females of the 100 ppm group at 48 hours post-exposure. This finding was not considered treatment-related because it lacked a dose-response and there was no increase in micronucleated cells at 24 hours. There were no test article-related microscopic changes in any organs or tissues of the respiratory tract. The results of this study demonstrate test article-related histopathologic changes in the urinary bladder and kidneys of animals exposed to 100 ppm. The no-observed-effect-level (NOEL) for male and female rats was reported to be 5 ppm.

NOAEL (NOEL): 5 ppm in both male and female rats

Test substance : Test material of 96% purity was used
Conclusion : The results of this study indicate test article-related histopathologic changes in the urinary bladder and kidneys of animals exposed to 100 ppm. The NOEL for male and female rats was reported to be 5 ppm.
Reliability : (1) valid without restriction
Flag : Critical study for SIDS endpoint
01.06.2006 (29)

Type : Sub-acute
Species : rat
Sex : male/female
Strain : Sprague-Dawley
Route of admin. : inhalation
Exposure period : 28 day(s)
Frequency of treatm. : 6 hours/day, 5 days/week
Post exposure period : none
Doses : 10, 50, 100 and 200 ppm
Control group : yes, concurrent no treatment
Method : OECD Guide-line 412 "Repeated Dose Inhalation Toxicity: 28-day or 14-day Study"
Year : 1992

GLP : yes
Test substance : as prescribed by 1.1 - 1.4

Method : Test Subjects
* Age at study initiation: 8-9 weeks

Study Design
* Satellite groups and reasons they were added: None
* Clinical observations performed and frequency: Animals were observed daily following exposure for treatment-related signs of toxicity, mortality, general appearance and any evidence of respiratory, dermal, behavioral, nasal or ocular changes. Eyes of all rats were examined prior to initiation of the study and eyes of rats in the control and high exposure groups were also examined at the terminal sacrifice. Body weights and food consumption were measured weekly.
* Organs examined at necropsy (macroscopic and microscopic: The liver, brain, heart, kidneys, adrenals, testes, ovaries, lungs and spleen were weighed and examined. A complete set of tissues/organs were selected and retained in 10% neutral buffered formalin. All tissues from the control and high exposure groups were processed histologically and examined microscopically. In addition, the lungs, nasal passages, larynx and trachea of all animals in the lower and intermediate exposure groups were examined microscopically.

Statistical Methods: Trend test (two sided Welch trend test), One-way analysis of Variance (ANOVA) and Dunnett's test were used to analyze the data. The $P<0.05$ was chosen as the criteria of significance.

Remark : Concentrations of 10, 50, 100 and 200 ppm = 81, 407, 814 and 1628 mg/m3, respectively. Actual overall mean exposure concentrations oof 10, 50, 98 and 192 ppm = 81, 407, 798, and 1563 mg/m3, respectively,

Result : The actual overall mean exposure concentrations of the test material for the various test groups were 10, 50, 98 and 192 ppm. No mortality or apparent treatment-related clinical signs were observed in any of the test groups. No statistically significant differences were noted in either mean body weights or food consumption. No treatment-related effects were seen in the clinical pathology parameters. Statistically significant increases were noted in the absolute and relative weights of adrenal glands of male rats from the 50, 100 and 200 ppm exposure groups and females at 100 and 200 ppm. Statistically significant increases were also observed in liver and kidney weights of males at 200 ppm. The organ weight changes were supported by the findings of microscopic lesions in these organs. Test article-related changes were detected histopathologically in the adrenal glands, kidneys, liver and urinary bladder in some rats from one or more exposure groups. Histopathologic changes included adrenal cortical hypertrophy in males at 100 ppm and in both sexes at 200 ppm; hyaline droplet nephropathy in males at 50, 100 and 200 ppm; hepatocellular hypertrophy in males at 200 ppm and hyperplasia of urinary bladder epithelium in females at 10 ppm and both sexes at 50, 100 and 200 ppm. Statistically significant increases in micronucleated cells were observed in female rats of the 200 ppm group. There were no test article-related microscopic changes in any of the respiratory tract organs or other

tissues examined. In conclusion, test article-related changes were detected histopathologically in the adrenal glands, kidneys, liver and urinary bladder in some rats from one or more exposure groups.

NOAEL (NOEL): Not established in this study.

Test substance : Test material of > 97% purity was used
Conclusion : Test article-related changes were detected histopathologically in the adrenal glands, kidneys, liver and urinary bladder in some rats from one or more exposure groups. Based on these results, a no-observed-effect level (NOEL) was not established in this study for chloropropyltrimethoxysilane.
Reliability : (1) valid without restriction
01.06.2006 (28)

Type : Sub-acute
Species : rat
Sex : male/female
Strain : Sprague-Dawley
Route of admin. : inhalation
Exposure period : Three weeks
Frequency of treatm. : Eleven exposures of 6 hours per day (3 exposures during first week, 5 second week and 3 during third week)
Post exposure period : None
Doses : Target concentrations were 0, 50, 100 and 150 ppm
Control group : other: Control group was exposed to chamber air
Method : other: none
Year : 1990
GLP : yes
Test substance : as prescribed by 1.1 - 1.4

Method : Test Subjects
* Age at study initiation: ~ 8 weeks
* No. of Animals per sex per dose: 10

Study Design
* Vehicle: N/A
* Satellite groups and reasons they were added: None
* Clinical observations performed and frequency: Daily (excluding weekends). The animals were observed for general appearance, mortality and any evidence of respiratory, dermal, behavioral or ocular changes.
* Organs examined at necropsy (macroscopic and microscopic): Gross necropsies were performed on all rats. Body weights and food consumption were measured weekly. The terminal body weights were determined on the animals at the terminal sacrifice.

Statistical Methods: Dunnett's Multiple T-test. The 95% confidence level ($P<0.05$) was chosen as the criteria of significance.

Result : No mortality occurred and no treatment related toxic effects were observed in any of the test group animals. There were no statistically significant differences in group body weights or food consumption. No treatment-related effects were observed at gross necropsy.

NOAEL (NOEL): Not reported
LOAEL (LOEL): Not reported

Actual Dose Recevied by Dose Level by Sex, If Known: 50,101 and 148 ppm (overall mean concentration)
Toxic Response/Effects by Dose Level: None

Test substance : Gas chromatographic analysis of this material showed the purity greater than 95%.

Conclusion : No treatment-related effects were observed in any of the parameters examined in this study. Based on the study results, the authors selected target exposure concentrations of 50, 100 and 150 ppm for conducting the 28-day vapor inhalation toxicity study.

Reliability : (2) valid with restrictions
The study does not follow recognised guidelines.

01.06.2006 (24)

Type	:	Sub-acute
Species	:	rat
Sex	:	male/female
Strain	:	Sprague-Dawley
Route of admin.	:	inhalation
Exposure period	:	28 days
Frequency of treatm.	:	daily
Post exposure period	:	
Doses	:	0, 5, 25, 100 ppm
Control group	:	yes, concurrent vehicle
NOAEL	:	100 ppm
Method	:	other: OECD Guideline 422
Year	:	2005
GLP	:	yes
Test substance	:	as prescribed by 1.1 - 1.4

Method : (3-Chloropropyl)trimethoxysilane was administered for 6 hours daily by whole-body vapour inhalation to male rats for 28 days and to female rats throughout the 14-day pre-pairing, pairing and gestation period until the individual day 19 post coitum.
The animals were exposed to the following mean test item concentrations:
Group 1: 0 ppm (air control)
Group 2: 5 ppm
Group 3: 25 ppm
Group 4: 100 ppm
Control animals were exposed to air only under the same conditions as animals exposed to the test item.
P generation males were sacrificed after they had been treated for 28 days, P generation females and pups were sacrificed on day 4 post partum.

ORGAN WEIGHTS
From all adult males and females the following organs were taken, trimmed and weighed:
liver
heart
adrenals*
overies*
thymus
uterus
kidneys*
testes*
spleen
epididymides*
seminal vesicles, with coagulating glands and their fluids(as one unit)

lungs
prostate
brain
* = paired weights

TISSUE PRESERVATION
The following tissues were collected from all adult males and females and preserved in neutral phosphate buffered 4% formaldehyde solution (except for testes and epididymides,
which were fixed in Bouin's fixative):
gross lesions
uterus
heart
brain
thymus
spinal cord
thyroid
small and large intestines (incl. Peyers Patches)
trachea and lungs (preserved by inflation with fixative
and then immersion)
stomach
urinary bladder
liver
lymph nodes (mediastinal and mesenteric)
kidneys
sciatic nerve
adrenals
bone marrow
spleen
testes
ovaries
epididymides
uterus
prostate
seminal vesicles with coagulation glands

The vapor generation system consisted of a round bottomed flask that was placed in a heating device set at 30 oC. Compressed air was supplied into the glass flasks and allowed the liquid test item to equilibrate with the temperature of the walls of the container. The vapor produced passed through a pipe and was then mixed and diluted with filtered air and conveyed to the inlet of the whole-body exposure chamber. After set-up of the definitive generation system the chamber concentration and stability of CPTMO over the duration of 6 hours was determined on two occasions prior to the start of the animal exposures.
The nominal atmosphere concentration was determined once daily by weighing the test item container before and after each exposure. The weight of the test item used was divided by the total air flow volume to give the nominal concentration.
The test atmosphere concentration in each chamber was determined daily, 5 times per hour per chamber during each hour of exposure.

Remark : The selection of dose levels (0, 5, 25 and 100 ppm) was based on the 90 day study with CPTMO, in which groups of male and female rats were exposed to target concentrations of 0, 0.5, 5 and 100 ppm of CPTMO vapors for 6 hours a day, 5 days a week for 90 days. The results of this 90 day study demonstrate test article-related histopathologic changes in the urinary bladder and kidneys of animals exposed to 100 ppm. The no-observed-effect-level (NOEL) for male and female rats was reported to be 5 ppm. While there were no effects at any dose in the OECD 422 study, based on the findings reported in the 90-day study, it was expected that

effects would be observed at the concentrations selected.

Result : PARENT ANIMALS
GENERAL TOLERABILITY
No test item-related mortalities or clinical signs that were attributable to exposure to the test item were noted throughout the study. Neither food consumption nor body weight development were affected by exposure to the test item at any concentration.
FUNCTIONAL OBSERVATIONAL BATTERY
None of the parameters under investigation during the functional observational battery was considered to be affected by exposure to the test item.
TERMINAL EXAMINATIONS
During necropsy of parent animals no test item-related findings were noted. Mean absolute organ weights as well as organ/body weight ratios and organ/brain weight ratios were not affected by exposure to the test item.
HISTOPATHOLOGICAL EXAMINATION
There were no findings, which distinguished test item-treated animals from controls.

The chamber concentrations (ppm) over the treatment period were as follows:

Group	Mean nominal concentration	Mean analytical concentration
2	4.93	5.02
3	24.00	25.44
4	101.3	99.7

Test substance : Purity not stated.
Conclusion : Exposure to (3-Chloropropyl)trimethoxysilane up to and including the high concentration of 100 ppm did not result in any signs of general toxicity of the test item.
Based on these results the NOEL (no observed effect level) was established at 100 ppm.
Reliability : (1) valid without restriction
Guideline study
Flag : Critical study for SIDS endpoint
01.06.2006 (38)

5.5 GENETIC TOXICITY 'IN VITRO'

Type : Ames test
System of testing : Preincubation test with TA 98, TA 100, TA 1535, TA 1537, and TA 1538
Test concentration : 8, 40, 200, 1000 and 5000 ug/plate
Cycotoxic concentr. : >5000 ug/plate
Metabolic activation : with and without
Result : positive
Method : Directive 84/449/EEC, B.14
Year : 1993
GLP : yes
Test substance : as prescribed by 1.1 - 1.4

Method : Two tests were conducted:
1. A main test with and without a metabolic activation system
2. A pre-incubation test (30 minutes) with and without a metabolic activation system

The test substance was dissolved in DMSO at 10 g/l.

Positive control substances used during this test included:
Nitro-fluorine - TA 98 and TA 1538
Sodium azide - TA 100 and TA 1535
Aminoacridine - TA 1537

Result : Precipitation occurred at 5000 ug/plate.
TA 1535 without metabolic activation: mutagenic activity at 250 ug/plate; TA 1535 with metabolic activation: mutagenic activity at 200 ug/plate. There was no positive mutagenic effect with any of the other bacterial strains either with or without metabolic activation.

Test substance : DYNASYLAN CPTMO: 98.9% 3-chloropropyltrimethoxysilane

Conclusion : Although only one the test organism showed an increase in mutations, compared with the spontaneous arising mutations (factor the of 2) the test substance was concluded to be mutagenic.

Reliability : (1) valid without restriction
Guideline study

15.02.2005 (13)

Type : Bacterial reverse mutation assay
System of testing : Bacterial
Test concentration : 100, 333, 1000, 3333 and 5000 ug/plate
Cycotoxic concentr. : none
Metabolic activation : with and without
Result : positive
Method : other: Ames, et. al., Mutation Research, 31: 347-364, 1975, Moron, D.M. and Ames, B.N., 1983, Mutation Research 113:173-215
Year : 1993
GLP : yes
Test substance : as prescribed by 1.1 - 1.4

Method : Salmonella typhimurium/TA-98,TA-100,TA-1535,TA-1537,TA-1538, TA-102;
Escherichia coli/WP2uvrA

Metabolic activation:
* Species and cell type: Rat liver
* Quantity: 0.5 ml S9 mix
* Induced or not induced: Yes, Aroclor 1254

Statistical methods: None
The assay was performed in two phases using the plate incorporation method. The first phase, the dose range-finding study, was used to establish the dose range for the mutagenicity assay. The second phase, the mutagenicity assay, was used to evaluate mutagenicity of the test article.

Test Design:
* Number of replicates: 3
* Positive and negative control groups and treatment:
2-aminoanthracene was the positive control agent for activation assay (for all strains except TA-102 which utilized sterigmatocystin as a positive control agent). In the non-activation assay, the positive control substances were 2-nitrofluorene (TA-98 and TA-1537), sodium azide (TA-100 and TA-1535), cumene hydroperoxide (TA-102), 9-aminoacridine (TA-1537) and methyl methanesulfonate (WP2uvrA). All positive control treatment were 1 ug/plate except 9-aminoacridine (75 ug/plate), steirgmatocystin (10

ug/plate), cumene hydroperoxide (100 ug/plate) and methyl methanesulfonate (1000 ug/plate). 2-aminoanthracene was used at 10 ug/plate for WP2uvrA strain in the activation assay.
* Solvent: DMSO at 50 ul
* Criteria for evaluating results (e.g. cell evaluated per dose group): All cultures must demonstrate the characteristic mean number of spontaneous revertants in the vehicle control as shown below:

TA98	10 - 50
TA100	80 - 240
TA1535	5 - 45
TA1537	3 - 21
TA1538	5 - 35
TA102	200- 380
WP2uvrA	10 - 60

To ensure that appropriate numbers of bacteria are plated, tester strain culture titers must be greater than or equal to 0.3 x 109 cells/ml. The mean of each positive control must exhibit at least a three-fold increase in the number of revertants over the mean value of the respective vehicle control. A minimum of three non-toxic dose levels were required to evaluate assay data.

For the test article to be evaluated positive, it must cause a dose-related increase in the mean revertants per plate of at least one tester strain with a minimum of two increasing concentrations of test article. Data sets for strains TA1535, TA1537 and TA1538 will be judged positive if the increase in mean revertants at the peak of the dose response is equal to greater than three times the mean vehicle control value. Data sets for strains TA98, TA100, and WP2uvrA will be judged positive if the increase in mean revertants at the peak of the dose-response is equal to or greater than two times the mean vehicle control value.

Result : No precipitate or bacterial toxicity was observed in this assay. A positive response was observed with bacterial tester strain TA-98 in the absence of metabolic activation and tester strains TA-100 and TA-1535 with and without metabolic activation. The authors concluded that under these experimental conditions, the test material caused mutagenicity in three bacterial tester strains.
Cytotoxic concentration:
* With metabolic activation: No toxicity observed at the maximum dose of 5000 ug/plate
* Without metabolic activation: No toxicity observed at the maximum dose of 5000 ug/plate
Genotoxic effects (e.g. positive, negative, unconfirmed, dose-response, equivocal):
* With metabolic activation: Positive in TA-100 and TA-1535
* Without metabolic activation: Positive in TA-98, TA-100 and TA-1535

Test substance : Test item purity = 97%

Conclusion : The test material exhibited genetic activity in Salmonella strain TA-98 in the absence of metabolic activation and tester strains TA-100 and TA-1535 with and without metabolic activation.

Reliability : (1) valid without restriction

01.06.2006 (30)

Type	:	Bacterial reverse mutation assay
System of testing	:	Bacterial
Test concentration	:	312.5, 625, 1250, 2500 and 5000 ug/plate
Cycotoxic concentr.	:	
Metabolic activation	:	with and without
Result	:	positive
Method	:	other: EEC Directive No. L251, Vol 27 pp 137-139
Year	:	1990
GLP	:	yes
Test substance	:	as prescribed by 1.1 - 1.4

Method : Five concentrations of the test material, separated by half-log intervals, were evaluated with and without metabolic activation. Positive and negative controls were employed with each experiment and consisted of direct-acting mutagens for non-activation assays and mutagens that require metabolic biotransformation in activation assays. Plates were incubated for 72 hours and then counted. All testing was done in triplicate.

Test Design:
* Number of replicates: 3
* Positive and negative control groups and treatment:
2-anthramine was the positive control for the activation assay (all strains). In the non-activation assay, the positive substances were sodium azide (TA-1535 and TA-100), 9-amino acridine (TA-1537), 2-ntofluorene (TA-98) and N-methyl-N-nitri-N-nitrosoguanidine (WP2 uvr A). All positive controls were administered at10 ug/plate except 9-amino acridine which was used at 50 ug/plate.
* Solvent: ETOH
* Criteria for evaluating results (e.g. cell evaluated per dose group): Not reported
* No purity of the test material reported
Salmonella tphimurium/TA-1535, TA-1537, TA-98 and TA-100; Escherichia coli/ WP2uvrA
Metabolic activation: Both with and without
* Species and cell type: Rat liver
* Quantity: 0.5 ml S9 mix
* Induced or not induced: Yes, Aroclor 1254-induced
Statistical methods: None

Result : No toxicity or precipitate was noted. The test material produced a dose related increase in revertant colonies in strains TA-1535 and TA-1537 and TA-100 both with and without activation. The increases in revertant colonies was significant at the higher dose levels and ranged from a 2-fold to a 20-fold increase. No dose related increase in revertant colonies was noted in strain TA-98 or WP2 with or without activation. These results were confirmed in an independent repeat test. The test material is considered mutagenic under the conditions of this assay.
Cytotoxic concentration:
* With metabolic activation: None
* Without metabolic activation: None
Genotoxic effects (e.g. positive, negative, unconfirmed, dose-response, equivocal):
* With metabolic activation: TA-1535, TA-1537 and TA-100
* Without metabolic activation: TA-1535, TA-1537 and TA-100

Test substance : Purity not stated.
Conclusion : Under the conditions of this assay, the test material exhibited genetic activity in Salmonella typhimurium strains TA-1535, TA-1537 and TA-100 with and without activation.
Reliability : (1) valid without restriction
01.06.2006 (27)

Type : Bacterial reverse mutation assay
System of testing : bacterial
Test concentration : 312.5, 625, 1250, 2500 and 5000 ug/plate
Cycotoxic concentr. :
Metabolic activation : with and without
Result : positive
Method : other: EEC Directive No. L251, Vol. 27, pp. 137-139, Sept. 1984
Year : 1990
GLP : yes
Test substance : as prescribed by 1.1 - 1.4

Method : Species/Strain or cell type and or cell line, bacterial or non-bacterial: Salmonella typhmurium/TA-98, TA-100,TA-1535 and TA-1537; Escherichia coli/WP2 uvrA

Metabolic activation:
* Species and cell type: Rat liver
* Quantity: 0.5 ml S9 mix
* Induced or not induced: Yes, Arocolor 1254-induced

Test Design:
* Number of replicates: 3
* Positive and negative control groups and treatment: 2-Anthramine was the positive control agent for the activation assay (all strains). In the non-activation assay, the positive control substances were sodium azide (TA-100 and TA-1535), 9-Amino Acridine (TA-1537), Nitrofluorene (TA-98) and Methyl-nitro-nitrosoguanidine (WP2 uvrA). All positive control treatments were administered at 10 ug/plate except 9-Amino Acridine which was used at 50 ug/plate.
* Solvent: Ethanol
* Criteria for evaluating results (e.g. cell evaluated per dose group): Not reported
* Test material purity was not reported

Result : No precipitate was noted. Slight toxicity was noted to strains TA-1535 and TA-100 with activation at 2500 and 5000 ug/plate and to strain TA-1537 with activation at 5000 ug/plate. The test material produced a dose-related increase in revertant colonies in strains TA-1535, TA-1537 and TA-100 both with and without activation. The increase in revertant colonies was significant at the higher dose levels and ranged from a 2-fold to a 15-fold increase. In addition, a dose-related increase in revertant colonies was observed in strain TA-98 with activation. This was also significant at the higher dose levels. No dose-related increase in revertant colonies was noted in strain TA-98 without activation or WP2 with or without activation. The authors considered the test material to be mutagenic under the conditions of this assay.
Cytotoxic concentration:
* With metabolic activation: Slight toxicity was observed at 2500 and 5000 ug/plate in TA-1535, TA-100 and 5000 ug/plate in TA-1537 strain.
* Without metabolic activation: None

Genotoxic effects (e.g. positive, negative, unconfirmed, dose-response, equivocal):
* With metabolic activation: Positive in TA-1535, TA-1537, TA-100 and TA-98 strains.
* Without metabolic activation: Positive in TA-1535, TA-1537 and TA-100 strains.

Test substance : Purity not stated.
Conclusion : The test material exhibited genetic activity in Salmonella strains TA-1535, TA-1537 and TA-100 with and without activation and test strain TA-98 with activation.
Reliability : (1) valid without restriction
01.06.2006 (26)

Type : Bacterial reverse mutation assay
System of testing : bacterial
Test concentration : 312.5, 625, 1250, 2500, 5000 ug/plate
Cycotoxic concentr. : With metabolic activation: None* Without metabolic activation: Slight toxicity to strain
TA-98 at 625-5000 ug/plate
Metabolic activation : with and without
Result : positive
Method : other: EEC Directive, No. L251, Vol. 27 pp. 137-139, Sept. 1984
Year : 1990
GLP : yes
Test substance : as prescribed by 1.1 - 1.4

Method : Five concentrations of the test material, separated by half-log intervals, were evaluated with and without metabolic activation. Positive and negative controls were employed with each experiment and consisted of direct-acting mutagens for nonactivation assays and mutagens that require metabolic biotransformation in activation assays. Plates were incubated for 72 hours and counted. All testing was done in triplicate.

Species/Strain or cell type and or cell line, bacterial or non-bacterial: Salmonella typhimurium/TA-1535, TA-1537, TA-98, TA-100; Escherichia coli/WP2uvr A

Metabolic activation: Both with and without
* Species and cell type: Rat liver
* Quantity: 0.5 ml S9 mix
* Induced or not induced: Yes, Aroclor 1254-induced

Test Design:
* Number of replicates: 3
* Positive and negative control groups and treatment: 2-Anthramine was the positive control substance for the activation assay (all strains). In the non-activation assay, the positive control substances were sodium azide (TA-1535 and TA-100), 9-amino acridine (TA-1537), 2-nitrofluorene (TA-98) and N-methyl-N-nitro-N-nitrosoguanidine (WP2 uvr A). All positive control treatments were administered at10 ug/plate except 9-amino acridine which was used at 50 ug/plate.
* Solvent: ETOH
* Criteria for evaluating results (e.g. cell evaluated per dose group): Not reported
* Purity of the test material was

Result : No precipitate was noted. Slight toxicity was noted in strain TA-98 without activation at 625-5,000 ug/plate. The

test material produced a dose-related increase in revertant colonies in strains TA-1535, TA-1537 and TA-100 both with and without activation. In addition, a dose-related increase in revertant colonies was observed in strain TA-98 with activation. No dose-related increase in revertant colonies was noted in strains TA-98 without activation and WP2 with or without activation. The increase in revertant colonies was significant at the higher dose levels and ranged from a 2 fold to a 25-fold increase. These results were confirmed in an independent repeat test. The test material was considered mutagenic under the conditions of this assay.

Cytotoxic concentration:
* With metabolic activation: None
* Without metabolic activation: Slight toxicity to strain TA-98 at 625-5000 ug/plate

Genotoxic effects (e.g. positive, negative, unconfirmed, dose-response, equivocal):
* With metabolic activation: TA-1535, TA-1537, TA-100 and TA-98
* Without metabolic activation: TA-1535, TA-1537 and TA-100

Test substance : Purity not stated.
Conclusion : Under the conditions of this assay, the test material exhibited genetic activity in Salmonella strains TA-1535, TA-1537 and TA-100 with and without activation and stain TA-98 with activation.
Reliability : (1) valid without restriction
01.06.2006 (25)

Type : Mouse lymphoma assay
System of testing : Non-bacterial
Test concentration : 25, 50, 60, 70 and 80 ug/ml in the presence of S9. 500, 1000, 1500, 2000 and 2500 ug/ml in the absence of S9
Cycotoxic concentr. :
Metabolic activation :
Result : positive
Method : OECD Guide-line 476
Year : 1995
GLP : yes
Test substance :

Method : The material was tested in the L5178Y/TK+/- mouse lymphoma mutagenesis assay in the absence and presence of Aroclor-induced rat liver S9. The assay was performed in two phases. The first phase, the preliminary toxicity assay was used to establish the dose range for the mutagenesis assay. The second phase, the mutagenesis assay was used to evaluate the mutagenic potential of the test article. A confirmatory assay which is required by full compliance of OECD and EPA guidelines was not performed. Selection of dose levels for the mutation assay was based on reduction of suspension growth relative to the solvent control. Substantial toxicity, i.e., suspension growth of less than equal to 50% of the solvent control, was observed at 5000 ug/ml without activation and greater than or equal to 50% at 50 ug/ml with S9 activation. Based on these findings, the dose chosen for the mutagenesis assay ranged from 500 to 5000 ug/ml for the non-activated cultures and 10 to 100 ug/ml for the S9 activated cultures. Acetone was determined to be the solvent

of choice based on solubility of the test article and compatibility with the target cells.

Test Design:
* Number of replicates: 2
* Positive and negative control groups and treatment: Two positive control agents were used. 1) Ethyl methanesulfonate in the absence of metabolic activation at 0.25 and 0.50 ul/ml and 2) 7, 12-Dimethylbenz(a)anthracene was used in the presence of metabolic activation at 2.5 and 5.0 ug/ml.
* Solvent: Acetone
* Description of follow up repeat study: None
* Criteria for evaluating results (e.g. cell evaluated per dose group): In evaluation of the data, increases in the mutant frequencies which occurred only at highly toxic concentrations (i.e., less than 10% total growth) were not considered biologically relevant. All conclusions were based on sound scientific judgment; however, as a guide to interpretation of the data, the test article was considered to induce a positive response if a concentration-related increase in mutant frequency was observed and more than one dose level with 10% or greater total growth exhibited a mutant frequency two-fold greater than the solvent control. A doubling above background at one or more dose levels with 10% or greater total growth with no evidence of a dose-response was considered equivocal. Test articles not producing a doubling above background at one or more dose levels with 10% or greater total growth were concluded to be negative.

The following criteria must be met for the mutagenesis assay to be considered valid. The mutant frequency of the positive controls must be at least twice that of the appropriate solvent control cultures. The spontaneous mutant frequency of the solvent controls must be between 20 and 100 TFT-resistant mutants per 106 surviving cells. The cloning efficiency of the solvent controls must be greater than 50%.

The purity of the test material was not reported.
Type: L5178Y/TK+/- Mouse Lymphoma Mutgenesis Assay
Species/Strain or cell type and or cell line, bacterial or non-bacterial: L5178Y/TK+/- Mouse lymphoma cells
Metabolic activation:
* Species and cell type: Rat Liver
* Quantity: 250 ul S9
* Induced or not induced: Aroclor 1254-induced

Result : In the mutagenesis assay, no non-activated test article-treated cultures and eight S9-activated test article-treated cultures exhibited mutant frequencies that were at least twice that of the solvent control. A dose-response trend was noted in the S9-activated cultures. Toxicity in the cloned cultures, i.e., total growth of less than or equal to 50% on the solvent control, was observed at a dose of 2000 ug/ml without activation and at doses of greater than or equal to 60 ug/ml with S9 activation. The trifluorothymidine-resistant colonies for the cloned S9-activated positive control, solvent control and test article-treated cultures were sized according to diameter over a range from 0.2 to 1.1 mm. The data on colony size

distributions showed an increase in the frequency of medium to large colonies when the treated cultures were compared to the solvent control cultures. Under the conditions of this study, the test article was considered to be negative without S9 activation and positive with S9 activation in the L5178Y/TK +/- Mouse Lymphoma Mutagenesis Assay.

Cytotoxic concentration:
* With metabolic activation: 80 and 90 ug/ml
* Without metabolic activation: 2000 and 2500 ug/ml

Genotoxic effects (e.g. positive, negative, unconfirmed, dose-response, equivocal):
* With metabolic activation: Positive
* Without metabolic activation: Negative

Test substance : Purity not stated.

Conclusion : Under the conditions of this study, the test material was considered to be negative without S9 activation and positive with S9 activation in the L5178Y/TK+/- Mouse Lymphoma Mutagenesis Assay.

Reliability : (2) valid with restrictions
A confirmatory assay which is required by full compliance of OECD and EPA guidelines was not performed

01.06.2006 (32)

5.6 GENETIC TOXICITY 'IN VIVO'

Type : Micronucleus assay
Species : mouse
Sex : male/female
Strain : Swiss Webster
Route of admin. : i.p.
Exposure period : 30, 48 and 72 hours
Doses : 0 (corn oil), 500, 1000 or 1625 mg/kg
Result : negative
Method : other: in conformance with OECD 474
Year : 1993
GLP : yes
Test substance : as prescribed by 1.1 - 1.4

Method : Chloropropyltrimethoxysilane (CAS No. 2530-87-2) was given to both male and female Swiss-Webster mice as a single dose by intraperitoneal injection. Based upon mortality data obtained in a range-finding study, the acute intraperitoneal LD50 for the combined sexes was calculated to be 2031 mg/kg chloropropyltrimethoxysilane (95% confidence interval, 1672 to 2456 mg/kg). The doses for the definitive micronucleus assay were selected by the study director as approximately 25%, 50%, and 90% of the LD50 or 500, 1000, and 1625 mg/kg chloropropyltrimethoxysilane.

Result : There were no signs of toxicity in male or female mice in the 500 mg/kg group, except that 1 female exhibited ataxia during the first hour post-treatment. All of the males and females in the 1000 mg/kg group exhibited ataxia and 2 of the males also had tremors during the first hour after treatment. In males and females treated at 1625 mg/kg chloropropyltrimethoxysilane, ataxia, tremors, and prostration were observed during the first hour after treatment. Other clinical signs in the high dose females

included myoclonic jerks and vocalization. There were no significant clinical observations in male or female mice from the afternoon of Day 1 through the end of the study.

There was a significant decrease in the polychromatophilic erythrocyte (PCE) to normochromatophilic erythrocyte (NCE) ratios at the 72 hr sampling time among male mice (50.6% of control) treated with 1625 mg/kg cloropropyltrimethoxysilane. However, there was no evidence that chloropropyltrimethoxysilane was excessively toxic to the bone marrow at the concentrations chosen for the study. No significant increases in the incidences of micronucleated PCE were observed at 500, 1000, or 1625 mg/kg chloropropyltrimethoxysilane at the 30, 48 or 72 hr sampling times in mice of either sex.

Test substance : Purity: 96% chloropropyltrimethoxysilane
Conclusion : Chloropropyltrimethoxysilane did not produce significant, treatment-related increases in the incidence of micronucleated polychromatophilic erythrocytes among male or female Swiss-Webster mice assessed at 30, 48 or 72 hours after treatment with a single dose by intraperitoneal injection. Therefore, chloropropyltrimethoxysilane was not considered to be an inducer of micronuclei in male or female Swiss-Webster mice under the conditions of the in vivo assay.
Reliability : (1) valid without restriction
Flag : Critical study for SIDS endpoint
01.06.2006 (4)

Type : Micronucleus assay
Species : rat
Sex : male/female
Strain : Sprague-Dawley
Route of admin. : inhalation
Exposure period : 90 days
Doses : 0.5, 5, 100 and 200 ppm
Result : negative
Method : other: OECD 413
Year : 1993
GLP : yes
Test substance : as prescribed by 1.1 - 1.4

Method : Micronucleus assay data was analyzed by Wilcoxon Rank Sum Test.
Groups of male and female rats were exposed to target concentrations of 0, 0.5, 5 and 100 ppm of chloropropyltrimethoxysilane vapors for 6 hours a day, 5 days a week for 90 days. After 13 weeks of exposure, rats were sacrificed and examined for changes in blood, serum chemistry, urine, organ weights and gross and histopathology. At 24 and 48 hours post-exposure, bone marrow was collected from the femur of 5 animals in all groups for micronucleus assay. In addition, one group of ten male and ten female rats were also exposed concurrently to a target concentration of 200 ppm. A micronucleus assay was performed on this group at 24 and 48 hours post-exposure.
Result : Statistically significant increases in micronucleated cells was observed in females of the 100 ppm group at 48 hours post-exposure. This finding was not considered treatment-related because it lacked a dose-response and

there was no increase in micronucleated cells at 24 hours.

Test substance : Test material of 96% purity was used
Reliability : (1) valid without restriction
15.02.2005 (31)

5.7 CARCINOGENICITY

5.8.1 TOXICITY TO FERTILITY

Type	:	One generation study
Species	:	rat
Sex	:	male/female
Strain	:	Sprague-Dawley
Route of admin.	:	inhalation
Exposure period	:	28 days
Frequency of treatm.	:	daily
Premating exposure period		
Male	:	14 days
Female	:	14 days
Duration of test	:	until the individual day 19 post coitum
No. of generation studies	:	
Doses	:	0, 5, 25 and 100 ppm
Control group	:	yes, concurrent vehicle
NOAEL parental	:	100 ppm
NOAEL F1 offspring	:	100 ppm
Result	:	No effects up to 100 ppm
Method	:	OECD Guide-line 422
Year	:	2005
GLP	:	yes
Test substance	:	as prescribed by 1.1 - 1.4

Method : (3-Chloropropyl)trimethoxysilane was administered for 6 hours daily by whole-body vapour inhalation to male rats for 28 days and to female rats throughout the 14-day pre-pairing, pairing and gestation period until the individual day 19 post coitum.
The animals were exposed to the following mean test item concentrations:
Group 1: 0 ppm (air control)
Group 2: 5 ppm
Group 3: 25 ppm
Group 4: 100 ppm
Control animals were exposed to air only under the same conditions as animals exposed to the test item.
parental generation males were sacrificed after they had been treated for 28 days, Parental generation females and pups were sacrificed on day 4 post partum.

Result : REPRODUCTION DATA
The fertility rate was high resulting in at least 9 litters per group for evaluation of reproduction data. At all concentrations, there were no treatment-related effects on precoital time, fertility indices, mean duration of gestation, number of implantations, post-implantation loss, pup survival or litter size from birth through to scheduled sacrifice on day 4 post partum.

LITTER DATA
No abnormal findings were noted for pups at first litter check or during the first 4 days post partum. Sex ratios at first litter check and on day 4 post partum were unaffected by treatment with the test item.

Mean pup weights on day 0 and day 1 post partum were unaffected by treatment with the test item. Mean pup weight development during the first 4 days post partum lactation was unaffected by treatment with the test item.
TERMINAL EXAMINATIONS
The mean number of corpora lutea per dam (determined at necropsy) was similar in all groups and gave no indication of a test item-related effect.
HISTOPATHOLOGICAL EXAMINATION
There were no findings, which distinguished test item-treated animals from controls. In particular, no treatment-related histopathological findings were observed in the reproductive organs of either sex from the parental generation. The assessment of the integrity of the spermatogenetic cycle did not provide any evidence of impaired spermatogenesis.

Test substance : Purity not stated.

Conclusion : Exposure to (3-Chloropropyl)trimethoxysilane up to and including the high concentration of 100 ppm did not result in any signs of general or reproductive toxicity of the test item.
Based on these results the NOEL (no observed effect level) was established at 100 ppm.

Reliability : (1) valid without restriction
Guideline study

Flag : Critical study for SIDS endpoint

01.06.2006 (38)

5.8.2 DEVELOPMENTAL TOXICITY/TERATOGENICITY

Species	:	rat
Sex	:	male/female
Strain	:	Sprague-Dawley
Route of admin.	:	inhalation
Exposure period	:	28 days
Frequency of treatm.	:	daily
Duration of test	:	until the individual day 19 post coitum.
Doses	:	0, 5, 25 and 100 ppm
Control group	:	yes, concurrent vehicle
NOAEL maternal tox.	:	100 ppm
NOAEL teratogen.	:	100 - ppm
Result	:	No effects up to 100 ppm
Method	:	other: OECD Guideline 422
Year	:	2005
GLP	:	yes
Test substance	:	as prescribed by 1.1 - 1.4

Method : (3-Chloropropyl)trimethoxysilane was administered for 6 hours daily by whole-body vapour inhalation to male rats for 28 days and to female rats throughout the 14-day pre-pairing, pairing and gestation period until the individual day 19 post coitum.
The animals were exposed to the following mean test item concentrations:
Group 1: 0 ppm (air control)
Group 2: 5 ppm
Group 3: 25 ppm
Group 4: 100 ppm
Control animals were exposed to air only under the same conditions as animals exposed to the test item.
Parental generation males were sacrificed after they had been treated for 28 days, Parental generation females and pups were sacrificed on day 4 post partum.

Result : LITTER DATA

No abnormal findings were noted for pups at first litter check or during the first 4 days post partum. Sex ratios at first litter check and on day 4 post partum were unaffected by treatment with the test item.
Mean pup weights on day 0 and day 1 post partum were unaffected by treatment with the test item. Mean pup weight development during the first 4 days post partum lactation was unaffected by treatment with the test item.
TERMINAL EXAMINATIONS
No test item-related findings were noted at macroscopical examination of pups.

Test substance : Purity not stated.

Conclusion : Exposure to (3-Chloropropyl)trimethoxysilane up to and including the high concentration of 100 ppm did not result in any signs of general or reproductive toxicity of the test item.
Based on these results the NOEL (no observed effect level) was established at 100 ppm.

Reliability : (1) valid without restriction
Guideline study

Flag : Critical study for SIDS endpoint

01.06.2006 (38)

5.8.3 TOXICITY TO REPRODUCTION, OTHER STUDIES

5.9 SPECIFIC INVESTIGATIONS

5.10 EXPOSURE EXPERIENCE

Type of experience : Human - Epidemiology

Method : Chemical Name: Chloropropyltrimethoxysilane
Number of Years Exposed: 17
Average Time Exposed: 6

The investigation was instituted as a means of determining whether or not personnel exposed to this material, who had periodic medical surveillance studies done, were in any way affected by their work with this chemical.

Studies Performed

1. Chest X-Ray
2. EKG
3. Audiometer
4. Tonometer
5. Pulmonary Function
6. Urinalysis
7. CBC
8. Differential Blood Count
9. Channel 12
10. GGTP, SGPT, T-4 and triglycerides

Purity of test material not reported

Result : The results of these studies revealed no major abnormalities. Occasional minimal variations from "normal" were noted but these variations were at random intervals and were not consistent nor persistent.

Source : Dow Corning Corporation Midland, MI

Conclusion : The study did not reveal any harmful effects in the

parameters studied in the individuals who were involved in the study.

Reliability : (3) invalid
This is a medical surveillance study not an epidemiological study with limited number of subjects.

04.03.2005 (21)

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