

Microfiche No.		
OTS0000469-0		
[Hatched Bar]		
New Doc I.D.	Old Doc I.D.	
	FYI-OTS-0386-0469	
[Hatched Bar]		
Date Produced	Date Received	TSCA section
7/16/62	3/07/86	
[Hatched Bar]		
Submitting Organization		
UNION CARBIDE CORP		
[Hatched Bar]		
Contractor		
MELLON INST		
[Hatched Bar]		
Document Title		
RANGE FINDING TESTS ON ALLY METHACRYLATE TRIMETHOXY SILANE ADDUCT		
[Hatched Bar]		
Chemical Category		
ORGANOSILANES		

MELLON INSTITUTE OF INDUSTRIAL RESEARCH

SPECIAL REPORT

Range Finding Tests on Allyl MethacrylateTrimethoxysilane AdductUnion Carbide Chemicals Co., U.C.C.

Industrial Fellowship 274-25

SummaryStomach Intubation, rat - LD₅₀ = 28.5 ml./kg.Skin Penetration, rabbit - LD₅₀ = 14.1 ml./kg.

Inhalation, rat -

Concentrated vapor generated at 20.5°C.

8 hours killed 0 of 6

Uncovered Skin Irritation, rabbit - trace, Grade 2.

Eye Injury, rabbit - none.

Allyl methacrylate trimethoxysilane adduct has a low order of acute toxicity by both the peroral and skin penetration routes. No hazard exists by the inhalation of concentrated vapor generated at room temperature. Rabbit eyes were unharmed by contact with the undiluted chemical while uncovered rabbit skin had reactions no greater than marked capillary injection.

The following table summarizes acute toxicity data for five trimethoxysilane compounds that have been studied earlier this year by this laboratory for the Silicones Division. Methanol is also included for comparison purposes.

<u>Material</u>	<u>Peroral LD₅₀ Ml./kg.</u>	<u>Skin Pene- tration LD₅₀ Ml./kg.</u>	<u>Inhalation of Concen- trated Vapor</u>	<u>Uncovered Skin Irritation</u>	<u>Eye Injury</u>	<u>Report Number</u>
Trimethoxysilane	9.33	6.30	15 min. killed 6/6 (62.5 ppm. for 4 hrs. killed 5/6; 31.2 ppm. for 4 hrs. killed 1/6)	Minor	Moderate	25-22

(Continued)

<u>Material</u>	<u>Peroral LD₅₀ Ml./kg.</u>	<u>Skin Penetration LD₅₀ Ml./kg.</u>	<u>Inhalation of Concentrated Vapor</u>	<u>Uncovered Skin Irritation</u>	<u>Eye Injury</u>	<u>Report Number</u>
Epoxy Cyclohexyl-ethyl Tri-methoxysilane	12.3	6.30	8 hrs. killed 0/6	Minor	None	25-51
Allyl Methacrylate Tri-methoxysilane Adduct	28.5	14.1	8 hrs. killed 0/6	Trace	None	This Report (25-63)
Methanol	15.4	20.0	8 hrs. killed 5/6; 4 hrs. killed 0/6	None	Minor	14-68 19-132

Sample

A 16-ounce sample of allyl methacrylate trimethoxysilane adduct was received on April 25, 1962, from the Silicones Division, Long Reach Plant, Sistersville, West Virginia, for toxicological evaluation as requested by Mr. R. C. Maier.

Single Peroral Doses

Allyl methacrylate trimethoxysilane adduct has an acute LD₅₀ of 28.5 (18.0 to 45.3) ml./kg. when administered undiluted by stomach tube to male albino rats.

Carworth Farms-Elias nonfasted rats, five to six weeks of age and 90-120 grams in weight were dosed at levels differing by a factor of 2.0 in a geometric series. The rats were reared in our own colony and maintained from time of weaning on Rockland rat diet (complete). The method of moving average for calculating the median-effective dose (LD₅₀) was applied to the 14-day mortality data.

The animals on the higher dosage levels were sluggish and unsteady in gait soon after dosing. All deaths had occurred by the following morning. Autopsy disclosed congestion of the lungs and the abdominal viscera plus burned areas on liver lobes that lay in apposition to stomachs that still contained part of the dose.

Skin Penetration

By rabbit skin penetration, the LD₅₀ is 14.1 (4.66 to 42.9) ml./kg. when applied undiluted. The affected skin areas were discolored and wet but no apparent irritation resulted from these covered applications.

Male albino New Zealand strain rabbits, three to five months of age and averaging 2.5 kg. in weight were immobilized during the 24-hour skin contact period. Thereafter, the polyethylene sheeting used to retain the dose in contact with the clipped skin of the trunk was removed and the animals were caged for the remainder of the 14-day observation period. The rabbits were procured locally and maintained on Rockland rabbit ration. The moving average method of calculating the LD₅₀ was used.

Deaths were delayed for two and three days after application of the chemical. During this interval, the animals were extremely sluggish with two of them lying on their side. Gross examination at autopsy revealed congested lungs, mottled livers with prominent acini, opaque injected stomach walls, and pale mottled kidneys with prominent surface markings and internal congestion. All survivors gained weight during the subsequent 14-day observation period.

Inhalation

Concentrated vapor, generated at a bubbler temperature of 20.5°C. by passing dried air at the rate of 2.5 liters/minute through a fritted glass disc immersed to a depth of at least one inch in 50 ml. of allyl methacrylate trimethoxysilane adduct, caused no mortality among a group of six CFE, female albino rats after an eight-hour inhalation period in a 9-liter chamber. The animals appeared to be normal when removed from the chamber and five of the six gained weight during the subsequent two-week observation period. The sixth rat lost 4 grams of body weight and at sacrifice on the 14th day had 35% consolidation of the lung. This pathology was probably due to a pre-existing extraneous infection and in no way related to inhalation of the chemical.

The calculated concentration of this adduct in the chamber air, based on weight loss of sample in relation to dilution air, was 0.33 mg./liter.

24-Hour Irritation Tests

Uncovered application of 0.01 ml. amounts of allyl methacrylate trimethoxysilane adduct to the clipped skin of the rabbit belly caused no irritation on one animal and from moderate to marked capillary injection on four others. Grade 2 in our ten-grade rating system.

Five rabbit eyes were unharmed by the instillation of an excess (0.5 ml.) of the undiluted material. Grade 1 in our ten-grade rating system.


Jean A. Striegel, B.S.
Junior Fellow


Charles P. Carpenter, Ph.D.
Assistant Administrative Fellow

Approved:

Acknowledgments

Skin Penetration, Irritation Tests

Inhalation Studies

Neomi I. Condra, E.S.
Junior Fellow
Charles C. Haun, B.S.
Research Associate

Typed: July 16, 1962 - md

Table 25-252

Allyl Methacrylate Trimethoxysilane Adduct (25-97)

Single Doses to Male Albino Rats Fed Undiluted by Stomach Tube

<u>Rat Number</u>	<u>1962 Date Dosed</u>	<u>Grams Weight</u>	<u>Weight Change in 14 Days</u>	<u>Dosage; Ml. Per Kilo</u>	<u>Dose in Ml.</u>	<u>Days to Death</u>
55524	5-15	106	-	32.0	3.4	1
55527	5-15	107	-	32.0	3.4	1
55528	5-15	101	-	32.0	3.2	1
55522	5-15	107	+65	32.0	3.4	-
55525	5-15	120	+76	32.0	3.8	-
54891	5-8	90	+47	16.0	1.4	-
54913	5-8	116	+ 5	16.0	1.9	-
54910	5-8	114	+66	16.0	1.8	-
54949	5-8	110	+46	16.0	1.8	-
54970	5-8	120	+81	16.0	1.9	-

 $LD_{50} = 28.5 (18.0 \text{ to } 45.3) \text{ ml./kg.}$

Table 25-253

Allyl Methacrylate Trimethoxysilane Adduct (25-97)Single Doses to Male Albino Rabbits by Skin Penetration
Administered Undiluted Under Polyethylene Dam for 24 Hours

Rabbit Number	Date Clipped	Date Applied	Grams Weight	Weight Change in 14 Days	Dosage; ML. Per Kilo	Dose in ML.	Days to Death
	1962						
52088	5-22	5-23	2240	-	20.0	44.8	2
52089	5-22	5-23	2222	-	20.0	44.4	2
52035	5-9	5-10	2120	+116	20.0	42.4	-
52036	5-9	5-10	2450	+400	20.0	49.0	-
54285	5-28	5-29	2336	-	10.0	23.4	3
54286	5-28	5-29	2154	-	10.0	21.5	3
52033	5-7	5-8	2196	+150	10.0	22.0	-
52019	5-7	5-8	2450	+178	10.0	24.5	-
51914	5-2	5-3	2640	+96	5.0	13.2	-
51965	5-2	5-3	2438	+186	5.0	12.2	-
54320	6-5	6-6	2710	+282	5.0	13.6	-
54322	6-5	6-6	2824	+228	5.0	14.1	-

LD₅₀ = 14.1 (4.66 to 42.9) ml./kg.

Table 25-254

Allyl Methacrylate Trimethoxysilane Adduct (25-97)Single Inhalation by a Group of Female Albino Rats
of Concentrated Vapor Generated at 20.5°C.

Rat Number	Date and Duration of Inhalation	Conc. Mg./L.	Initial Weight Grams	Weight Change in 14 Days
54240			134	+28
54243	5-4-62		148	-4
54245	8 Hours in	0.3332	160	+24
54258	9-Liter		168	+38
54261	Chamber		186	+33
54272			146	+27

00006

Microfiche No.			OTS0000469-0		
New Doc I.D.			Old Doc I.D.		
			FYI-OTS-0386-0469		
Date Produced		Date Received		TSCA section	
5/12/64		3/07/86			
Submitting Organization					
UNION CARBIDE CORP					
Contractor					
MELLON INST					
Document Title					
RANGE FINDING TESTS ON SILICONE A-174 (GAMMA METHACRYLOXY-PROPLY TRIMETHOXYSILANE)					
Chemical Category					
ORGANOSILANES					

R: 5-12-64.

Confidential

Report 27-67

22

MELLON INSTITUTE

Special Report

Range Finding Tests on Silicone A-174
(gamma Methacryloxypropyl Trimethoxysilane)

Chemicals Division, Union Carbide Corporation Industrial Fellowship 274-27

Summary

- Stomach Intubation, rat - LD₅₀ = 22.6 ml./kg.
- Skin Penetration, rabbit - 20 ml./kg. killed 0 of 4.
- Inhalation, rat -
 - Concentrated vapor generated at 22°C.
 - 8 hours killed 0 of 6 (0.25 mg./liter)
- Uncovered Skin Irritation, rabbit - minor, Grade 4.
- Eye Injury, rabbit - trace, Grade 2.

Silicone A-174 has an extremely low order of acute toxicity by both the peroral and skin penetration routes and presents no hazard by inhalation under normal handling conditions. The undiluted chemical caused only minor irritation to rabbit skin and eyes.

In 1962 a sample of this silicone was studied under the name allyl methacrylate trimethoxysilane adduct (Rpt. 25-63) and was made by a different process than the current sample. A summary of acute toxicity data obtained with the earlier material follows:

- Stomach Intubation, rat - LD₅₀ = 28.5 (18.0 to 45.3) ml./kg.
- Skin Penetration, rabbit - LD₅₀ = 14.1 (4.66 to 42.9) ml./kg.
- Inhalation, rat
 - Concentrated vapor generated at room temperature
 - 8 hours killed 0 of 6
- Uncovered Skin Irritation, rabbit - trace, Grade 2.
- Eye Injury, rabbit - none.

Sample

On March 10, 1964, 1 pint of Silicone A-174, gamma methacryloxypropyl trimethoxysilane (Lot 118022564) was received from Sistersville, W. Va. for toxicity assay as requested by S. Sterman of the Silicones Division. This material is of recent production and is made by a different process than the previously evaluated sample.

Single Peroral Doses

Silicone A-174 has an acute LD₅₀ of 22.6 ml./kg. when administered undiluted by stomach intubation to male albino rats.

00002

Carworth Farms-Elias nonfasted rats, 5 to 6 weeks of age and 90-120 grams in weight, were dosed at levels differing by a factor of 2.0 in a geometric series. The rats were reared in our own colony and maintained from time of weaning on Rockland rat diet (complete). The method of moving average for calculating the median-effective dose (JD₅₀) was applied to the 14-day mortality data.

Most of the deaths occurred within 24 hours after dosing. Gross examination at autopsy disclosed congestion throughout the lungs and the abdominal viscera plus some evidence of gastrointestinal irritation. The survivors gained weight well during the subsequent 2-week observation period.

Skin Penetration

In the skin penetration test, a group of 4 rabbits survived a dosage level of 20 ml./kg. applied undiluted. This dosage represents the maximum amount of fluid that can be retained in contact with the skin of the trunk beneath the impervious plastic covering. No skin injury was apparent from these covered applications. The animals all gained weight during the subsequent 2-week observation period.

Male albino New Zealand strain rabbits, 3 to 5 months of age and averaging 2.5 kg. in weight, were immobilized during the 24-hour skin contact period. Thereafter, the VINYLITE sheeting used to retain the dose in contact with the clipped skin of the trunk was removed and the animals were caged for the remainder of the 14-day observation period. The rabbits were procured locally and maintained on Rockland rabbit ration.

Inhalation

Concentrated vapor, generated at a bubbler temperature of 22°C. by passing dried air at the rate of 2.5 liters/minute through a fritted glass disc immersed to a depth of at least one inch in 50 ml. of Silicone A-174, caused no mortality among a group of 6 CFE, female albino rats after an 8-hour inhalation period in a 9-liter chamber. The animals appeared to be normal when removed from the inhalation chamber. All gained weight during the subsequent 2-week observation period and 5 of the 6 had no remarkable pathology evident upon gross examination at sacrifice on the 14th day.

The calculated concentration, based upon the weight loss of sample in relation to dilution air, was 0.25 mg./liter.

24-Hour Irritation Tests

Uncovered application of 0.01 ml. amounts of Silicone A-174 to the clipped skin of the rabbit belly caused moderate edema on one animal and marked capillary injection on 4 others. Grade 4 in our ten-grade rating system.

Three rabbit eyes were unharmed and 2 others had only traces of diffuse corneal necrosis following the instillation of an excess (0.5 ml.) of the undiluted chemical. Grade 2 in our ten-grade rating system.

Approved:

Jean A. Striegel
Jean A. Striegel, B.S.
Junior Fellow
Charles P. Carpenter
Charles P. Carpenter, Ph.D.
Assistant Administrative Fellow

Acknowledgments

Skin Penetration, Irritation Tests - Naomi I. Condra, B.S., Junior Fellow
Inhalation Studies - Charles C. Haun, B.S., Research Associate

Typed: May 12, 1964 - md

00003

Table 27-269

Silicone A-174 (27-73)

Single Doses to Male Albino Rats Fed Undiluted by Stomach Tube

<u>Rat Number</u>	<u>1964 Date Dosed</u>	<u>Grams Weight</u>	<u>Weight Change in 14 Days</u>	<u>Dosage; Ml. Per Kilo</u>	<u>Dose in Ml.</u>	<u>Days to Death</u>
98542	3-17	117	-	32.0	3.7	1
98543	3-17	110	-	32.0	3.5	1
98545	3-17	101	-	32.0	3.2	1
98549	3-17	91	-	32.0	2.9	1
98548	3-17	99	-	32.0	3.2	2
98553	3-17	118	+73	16.0	1.9	-
98551	3-17	115	+45	16.0	1.8	-
98554	3-17	99	+59	16.0	1.6	-
98550	3-17	110	+46	16.0	1.8	-
98560	3-17	111	+90	16.0	1.8	-
98559	3-17	120	+98	8.0	0.96	-
98562	3-17	110	+89	8.0	0.88	-
98556	3-17	120	+80	8.0	0.96	-
98558	3-17	105	+82	8.0	0.84	-
98557	3-17	110	+84	8.0	0.88	-

LD₅₀ = 22.6 ml./kg.

Table 27-270

Silicone A-174 (27-73)

Single Inhalation by a Group of Female Albino Rats of Concentrated Vapor Generated at 22°C.

<u>Rat Number</u>	<u>Date and Duration of Inhalation</u>	<u>Conc. Mg./L.</u>	<u>Initial Weight Grams</u>	<u>Weight Change in 14 Days</u>
98634			162	+32
98636	4-1-64		146	+34
98684	8 Hours in	0.25	138	+27
98687	9-Liter		154	+26
98688	Chamber		168	+12
98689			156	+15

Microfiche No.		
OTS0000469-0		
[Hatched separator]		
New Doc I.D.	Old Doc I.D.	
	FYI-OTS-0386-0469	
[Hatched separator]		
Date Produced	Date Received	TSCA section
8/20/85	3/07/86	
[Hatched separator]		
Submitting Organization		
UNION CARBIDE CORP		
[Hatched separator]		
Contractor		
BUSHY RUN RES CTR		
[Hatched separator]		
Document Title		
VARIOUS SILANE AND SILICONE SAMPLES: PRIMARY SKIN IRRITANCY STUDIES		
[Hatched separator]		
Chemical Category		
ORGANOSILANES		



BUSHY RUN RESEARCH CENTER

R. D. 4, Mellon Road, Export, Pennsylvania 15632

Telephone (412) 733-5200

PROJECT REPORT 48-110

29

TITLE: Various Silane and Silicone Samples
Primary Skin Irritancy Studies
(IATA Classification)

AUTHOR: R. C. Myers

SPONSOR: D. Liebeskind
Silicones and Urethane Intermediates Division
Union Carbide Corporation

DATE: August 20, 1985



BUSHY RUN RESEARCH CENTER

R. D. 4, Mellon Road, Export, Pennsylvania 15632

Telephone (412) 733-5200

UCC BUSINESS CONFIDENTIAL: Not to be released outside UCC without the written consent of the UCC-sponsoring Division HS&EA Manager.

Project Report 48-110
Amendment 1
22 Pages
September 4, 1985

Various Silane and Silicone Samples Primary Skin Irritancy Studies (IATA Classification)

Sponsor: Silicones and Urethane Intermediates Division
Union Carbide Corporation

* * * * *

SUMMARY

Each of 10 silane or silicone samples was applied to the covered skin of 6 albino rabbits according to the standard 4-hour irritancy test. A volume of 0.5 ml was dosed and skin reactions were evaluated through 7 or 14 days. Whenever necrosis was observed on any rabbit, shorter tests of one hour and of 3 minutes were performed to permit classification under International Air Transport Association (IATA) Regulations. Rabbits tested for these shorter time periods were observed through 3 days and sacrificed.

Five of the silane/silicone samples were slightly irritating (and A-174) to moderately irritating () to rabbit skin in the 4-hour test. No necrosis (or other corrosive reaction) was apparent. Silicones did not produce any dermal irritation in the 4-hour application. These last 7 materials were less irritating than IATA Classification III (less than minor danger). They were not D.C.T. "corrosive" materials.

PROCEDURE

The standard test procedure for primary skin irritation, shown in Appendix 1, was completed on each of the 10 samples. A volume of 0.5 ml was applied. To permit classification by International Air Transport Association (IATA) Regulations (Appendix II), additional tests were included. When the 4-hour test produced necrosis, a one-hour and a 3-minute test was performed. The same dosing technique as for the 4-hour test was used for these shorter contact periods, except that animals were not placed into the restraining apparatus for the 3-minute test. Rabbits dosed for one hour or 3 minutes were observed through 72 hours and then sacrificed.

RESULTS

Skin irritation test results from the individual samples are presented in Tables 1 through 16. Irritation from the adhesive tape, residue from the tape and sample residue were apparent on or around the dose sites of many animals. These findings were not considered to be directly related to the test materials and, therefore, are not discussed further.

Silane A-174

Five of 6 rabbits receiving 0.5 ml of sample for a 4-hour period developed minor erythema. There was no edema, necrosis or other irritation. After 2 days, no dermal reaction was present on any rabbit.

Table 5

Primary Skin Irritation - Rabbit

Material: Silane A-174 Sample No.: 48-104 Conditions: 0.5 ml dosed; 4-hr Contact

Date: 05-14-85	Date: 05-14-85	Date: 05-14-85	Date: 05-14-85
Rabbit No: 85-2393	Rabbit No: 85-2395	Rabbit No: 85-2440	Rabbit No: 85-2442
Sex: Male	Sex: Male	Sex: Female	Sex: Female

Erythema & Eschar Formation

Time (After Initiation of Contact):	Score	Score	Score	Score	Score	Ave. Score
5 hours	1	0	1	0	1	0.7
1 day	1	0	1	1	1	0.8
2 days	0	0	0	0	0	0.0
3 days	0	0	0	0	0	0.0
7 days	0	0	0	0	0	0.0

Edema Formation

Time:	Score	Score	Score	Score	Score	Ave. Score
5 hours	0	0	0	0	0	0.0
1 day	0	0	0	0	0	0.0
2 days	0	0	0	0	0	0.0
3 days	0	0	0	0	0	0.0
7 days	0	0	0	0	0	0.0

Other Irritation or Effects

Time:	Effect	Effect	Effect	Effect	Effect
5 hours	None	None	None	None	None
1 day	None	None	None	None	None
2 days	None	None	None	None	D
3 days	None	None	None	None	D
7 days	None	None	None	None	None

Specific Effects/Remarks: D = Desquamation; Tape Irritation and/or residue present on the dose site of most rabbits at 5 hr through 7 days.

APPENDIX II

IATA Dangerous Goods Regulations

Class 8 - Corrosives

Packing Group I (very dangerous substances)

Substances that cause visible necrosis of the skin tissue at the site of contact when tested on the intact skin of an animal for a period of not more than three minutes; and

Packing Group II (substances presenting medium danger)

Substances that cause visible necrosis of the skin tissue at the site of contact when tested on the intact skin of an animal for a period of more than 3 but not more than 60 minutes; and

Packing Group III (substances presenting minor danger)

Substances that cause visible necrosis of the skin tissue at the site of contact when tested on the intact skin of an animal for a period of not more than four hours.

WPC/rkk/0845B-1
07-29-85

00006

APPENDIX 1Skin Irritation

Male or female New Zealand White rabbits are dosed with 0.5 ml (or 0.5 g for solids, moistened with water). The dose is applied to the clipped, intact skin under a gauze patch and is loosely covered with impervious sheeting. Smaller amounts are given if 0.5 ml (or 0.5 g) is lethal. The test material is applied to each of 6 rabbits, which are restrained for the 4-hr contact period. Excess sample is removed after contact. Skin reaction is scored, by the method of Draize (given below), at one hour, one day, 2 days, 3 days, 7 days, and, depending on the local skin reaction, possibly 10 and 14 days after dosing.

Draize Scoring System for Skin IrritationEvaluation of skin reactionsValue

Erythema and eschar formation:

No erythema-----	0
Very slight erythema (barely perceptible) -----	1
Well-defined erythema -----	2
Moderate to severe erythema -----	3
Severe erythema (beet redness) to slight eschar formation (injury in depth) -----	4

Edema formation:

No edema -----	0
Very slight edema (barely perceptible) -----	1
Slight edema (edges of area well defined by definite raising) -----	2
Moderate edema (raised approximately 1 millimeter) -----	3
Severe edema (raised more than 1-millimeter and extending beyond the area of exposure) -----	4

WPC/vlt/2256

12/04/84

00007

Microfiche No.		
OTS0000469-0		
[Hatched Bar]		
New Doc I.D.	Old Doc I.D.	
	FYI-OTS-0286-0469	
[Hatched Bar]		
Date Produced	Date Recieved	TSCA section
4/27/61	2/14/86	
[Hatched Bar]		
Submitting Organization		
DOW CORNING CORP		
[Hatched Bar]		
Contractor		
DOW BIOCHEM RES LAB		
[Hatched Bar]		
Document Title		
RESULTS OF RANGE FINDING TOXICOLOGICAL TESTS ON DOW CORNING A1096-121-6 (Z-6030) (METHACRYLOXYPROPYLTRIMETHOXYSILANE)		
[Hatched Bar]		
Chemical Category		
ORGANOSILANES		

Biochemical Research Laboratory

The Dow Chemical Company

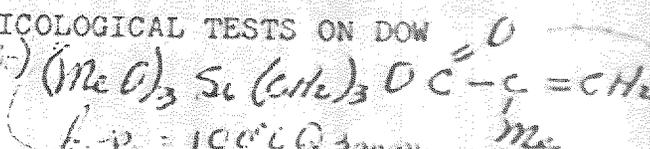
April 27, 1961

J. McHard
Dow Corning Corporation
Midland, Michigan

*Sign. = Z-8-0930
& methacryloyloxyethylmethacrylate*

SUBJECT: RESULTS OF RANGE FINDING TOXICOLOGICAL TESTS ON DOW
CORNING A1096-121-6 (Z-603)

PROBLEM



The subject material was submitted to the Biochemical Research Laboratory February 20, 1961 for toxicological investigation and definition of industrial handling hazards.

CONCLUSIONS

The subject material has a low acute oral toxicity. There should be no problem from ingestion incidental to industrial handling.

The subject material is only slightly irritating to the eye. Minimal eye protection should be sufficient for industrial handling.

The undiluted material is only slightly irritating to intact and abraded skin. Reasonable care and cleanliness should be sufficient for safe industrial handling.

Results of acute inhalation tests conducted in the laboratory indicate that there should be no problem from single exposure to the vapor of the material under conditions of room temperature.

These conclusions are based upon range finding toxicological tests and are limited to precautions for industrial handling of the material. Development of specific uses will require consideration of the health problems presented and of the need for further toxicological studies.

A summary of data and an Industrial Hygiene Data Sheet accompanying this letter. If we can be of further assistance regarding this problem, we are at your service.

Sincerely yours,

K. J. Olson

K. J. Olson
Biochemical Research Laboratory
1701 Building

KJO/nad

SUMMARY OF RANGE FINDING TOXICOLOGICAL DATAAcute Oral Toxicity

<u>Animal</u>	<u>Preparation Fed</u>	<u>Dose (g/kg)</u>	<u>No. Died No. Fed</u>	<u>Response-Remarks</u>
Rat	10% sol. in corn oil	0.50	1/2	Animal died 3 days after feeding. Sl. liver and kidney injury observed at autopsy.
Rat	10% sol. in corn oil	1.0	0/2	Sl. liver and kidney injury observed at autopsy.
Rat	10% sol. in corn oil	2.0	0/2	Animals had sl. diarrhea the day of feeding. Sl. liver and kidney injury observed at autopsy.

Eye Contact - Rabbit

<u>Material</u>	<u>Treatment</u>	<u>Response-Remarks</u>
Undiluted	Unwashed	Sl. pain on direct contact. Ess. no irritation observed.
Undiluted	Washed with water	Ess. no irritation observed.

Skin Contact - Rabbit

<u>Material</u>	<u>Condition of Skin</u>	<u>No. of Appl.</u>	<u>Site</u>	<u>Response-Remarks</u>
Undiluted	Intact	10	Ear	Sl. exfoliation from the 4th to 21st day of exposure.
Undiluted	Intact	10	Belly	Sl. hyperemia from the 7th to the 18th day of exposure. Mod. sheet-like exfoliation from the 7th to the 21st day of exposure.
Undiluted	Abraded	3	Belly	Sl. hyperemia through 4 days of exposure. Mod. sheet-like exfoliation from the 7th to the 18th day of exposure.

Skin Absorption

There is no indication, from the skin irritation tests conducted, that this material is absorbed through the skin in toxic amounts.

Inhalation (Saturated Atmosphere)

<u>Animal</u>	<u>Bath Temp.</u>	<u>Hours Exposed</u>	<u>No. Died No. Treated</u>	<u>Response-Remarks</u>
Rat	Room	7	0/5	Animals appeared normal during and after exposure. Sl. kidney injury observed at autopsy.

FIRST AID MEASURES

EYE CONTACT	<input checked="" type="checkbox"/> If the eyes are contaminated, they should be flushed immediately with copious amounts of flowing water for at least 15 minutes. <input checked="" type="checkbox"/> Medical attention should be obtained if irritation persists or develops after washing of the eyes. <input type="checkbox"/> Medical attention should be obtained. <input type="checkbox"/> MEDICAL ATTENTION SHOULD THEN BE OBTAINED WITHOUT DELAY.
SKIN CONTACT	<input checked="" type="checkbox"/> Any injuries or irritations which may develop should receive medical attention. <input checked="" type="checkbox"/> Contaminated clothing and shoes should be removed and not re-used until thoroughly cleaned. <input checked="" type="checkbox"/> Wash contaminated skin with soap and plenty of water. <input type="checkbox"/> Contaminated clothing, including shoes, should be removed and the affected skin area should be washed thoroughly with soap and plenty of water. <input type="checkbox"/> Medical attention should then be obtained. <input type="checkbox"/> Contaminated clothing and shoes should not be re-used until thoroughly cleaned. <input type="checkbox"/> All contaminated clothing, including shoes, <u>must</u> be removed immediately and the affected skin area flushed thoroughly with water from a safety shower, or other suitable device and cleansed with soap and plenty of water. <input type="checkbox"/> MEDICAL ATTENTION MUST THEN BE OBTAINED AS RAPIDLY AS POSSIBLE. <input type="checkbox"/> Contaminated clothing including shoes, must not be re-used until thoroughly cleaned or <u>must</u> be discarded.
INHALATION	<input type="checkbox"/> If a person should experience any noticeable ill effects from breathing the vapor or fumes of this material, medical attention should be obtained promptly. <input type="checkbox"/> If a person should be overcome from breathing this material, he should be removed to fresh air at once, be made to vomit, kept warm, and MEDICAL ATTENTION SHOULD BE OBTAINED IMMEDIATELY. If breathing stops, artificial respiration should be administered.
INGESTION	<input type="checkbox"/> If appreciable amounts of material are swallowed, vomiting should be induced by tickling the back of the tongue with the finger or by giving an emetic such as 2 tablespoonfuls of table salt in a glass of warm water. Medical attention should then be obtained. <input type="checkbox"/> If the material is swallowed, vomiting must be induced by tickling the back of the tongue with the finger or by giving an emetic such as 2 tablespoonfuls of table salt in a glass of warm water. MEDICAL ATTENTION SHOULD THEN BE OBTAINED WITHOUT DELAY

COMMENTS:

nad

Microfiche No.

OTS0000469-0

New Doc I.D.

Old Doc I.D.

FYI-OTS-0286-0469

Date Produced

8/31/76

Date Received

2/14/86

TSCA section

Submitting Organization

DOW CORNING CORP

Contractor

DOW HEALTH & ENVIR SERVS DEPT

Document Title

SUMMARY OF TOXICOLOGIC PROPERTIES AND INDUSTRIAL HANDLING
HAZARDS OF DOW CORNING Z-6030 SILANE

Chemical Category

ORGANOSILANES

DOW CORNING HEALTH AND ENVIRONMENTAL SERVICES DEPARTMENT
DOW CORNING CORPORATION

File No.:

TOXICOLOGIC PROPERTIES AND INDUSTRIAL HANDLING HAZARDS OF:

Reference No.:

DOW CORNING® Z-6030 SILANE

Series No.:

Lot/Reference No.: E2620-62C

Author: Benjamin H. Franklin

Reported By: B. Franklin *BH* Checked By: E. Hobbs *EH*

Submitted By: J. Klueck

Date: August 31, 1976

This summary of data and conclusions is based upon the sample received. Additional information including the effects of repeated exposure may be required as specific uses and formulations are developed or if process changes occur.

A sample of Dow Corning Z-6030 silane was received by the Health & Environmental Services Department for evaluation of oral toxicity, eye and skin irritation potential, and assessment of handling hazards associated with acute industrial exposure. This translucent, yellow liquid is intended for use as a coupling agent.

Dow Corning Z-6030 silane is slightly toxic when ingested on an acute basis (ALD₅₀ = 3.0 ± 0.6 gm/kg of body weight); however, internal injury probably will not occur following the ingestion of amounts normally encountered incidental to industrial use. If large amounts should be accidentally or willfully swallowed, internal injury may occur.

Direct eye contact with undiluted Dow Corning Z-6030 silane may produce, at most, a very slight transient reddening of the conjunctiva. Precautions should be taken to avoid eye contact with this liquid. If contamination should occur, the eyes should be promptly flushed with copious amounts of water.

Skin contact with Dow Corning Z-6030 silane should not cause a significant amount of irritation. Normal personal hygiene practices appear sufficient in order to safely handle Dow Corning Z-6030 silane. This liquid does not appear to be absorbed through the skin in acutely toxic amounts.

Upon hydrolysis, sufficient amounts of methanol vapors may be generated to present an inhalation hazard to personnel. Atmospheric concentrations of methanol in the work area must be monitored when the possibility exists that these vapors may exceed the Occupational Safety & Health Administration (OSHA) standard of 200 ppm.

00002

Microfiche No.		
OTS0000469-0		
[Hatched]		
New Doc I.D.	Old Doc I.D.	
	FYI-OTS-0286-0469	
[Hatched]		
Date Produced	Date Recieved	TSCA section
2/29/60	2/14/86	
[Hatched]		
Submitting Organization		
DOW CORNING CORP		
[Hatched]		
Contractor		
DOW BIOCHEM RES LAB		
[Hatched]		
Document Title		
RESULTS OF RANGE FINDING TOXICOLOGICAL TESTS ON TRIMETHOXY-SILANE		
[Hatched]		
Chemical Category		
ORGANOSILANES		

Biochemical Research Laboratory

The Dow Chemical Company

February 29, 1960

Dr. R. R. McGregor
Dow Corning Corporation
Midland, Michigan

THIS REPORT IS THE PROPERTY
OF
THE DOW CHEMICAL COMPANY

Dear Dr. McGregor:

RESULTS OF RANGE FINDING TOXICOLOGICAL TESTS ON TRIMETHOXY SILANE
(A-907-58F, CUT 2)

Recently you submitted a sample of the subject material to the Biochemical Research Laboratory for toxicological investigation and definition of industrial handling hazards. You indicated that some time ago, General Electric reported that one of their men was hospitalized presumably as a result of being exposed to fumes of triethoxy silane. ←

CONCLUSIONS

Trimethoxy silane is particularly hazardous from the standpoint of vapor inhalation. Laboratory rats failed to survive a 30 minute exposure to the saturated vapors at room temperature. The animals were particularly irritated during the first 15 minutes of exposure but died quietly, manifesting labored breathing. Due to the high vapor pressure of the material, it is possible that the element of asphyxiation was involved. It is important to note, however, that the eyes were coated with a white substance and the animals themselves assumed a pale appearance. Exposure to the vapors of the subject material must be avoided. Vapor concentrations which might well be dangerous to life in a few minutes are readily attainable at room conditions. The vapors, in a concentration sufficient to cause death are probably appreciably irritating and painful to the eyes and nose. The material must be handled in a hood. For cleaning up accidental spills, it is recommended that a full face gas mask equipped with a suitable canister be used in well ventilated areas or a self contained breathing apparatus be used in a poorly ventilated area.

The subject material has a low acute oral toxicity. It should present no problem from ingestion incidental to industrial use or general handling.

Continued

00002

Conclusions (Continued)

The undiluted material is moderately irritating to the eye. Direct contact would likely be quite painful and result in moderate conjunctival swelling and corneal damage which might persist for a week or more. It is important to note that immediate and thorough washing of contaminated eyes should decrease injury to an appreciable extent. Safety glasses with side shields are recommended for industrial handling whenever the likelihood of eye contact exists.

The undiluted material is only slightly irritating to intact and abraded skin. Direct contact for an hour or so would probably produce no injury. Contact in excess of this time, particularly if confined under clothing, or to abraded skin might produce appreciable irritation and swelling. Prolonged repeated contact with the material should be avoided. Protective clothing would be advisable while cleaning up spills or while handling under conditions where gross, excessive contact is likely.

Results of skin irritation tests indicate that the material may be absorbed through the skin in amounts sufficient to result in some internal injury.

Sincerely,



K. J. Olson
Biochemical Research Laboratory
12-634 Building
Phone - ME 6-1527

KJO/vmv

cc: R. R. McGregor (5) ✓
J. H. McHard
H. H. Gay, M.D.

SUMMARY OF RANGE FINDING TOXICOLOGICAL DATAAcute Oral Toxicity

<u>Animal</u>	<u>Preparation Fed</u>	<u>Dose (g/kg)</u>	<u>No. Died No. Fed</u>	<u>Response-Remarks</u>
Rat	10% solution in corn oil	2.0	0/2	Animals manifested diarrhea and diuresis. Extensive liver and kidney damage with some lung injury observed at autopsy.

Eye Contact - Rabbit

<u>Material</u>	<u>Treatment</u>	<u>Response-Remarks</u>
Undiluted	Unwashed	Extensive pain with mod. conjunctivitis and sl. to mod. corneal damage - not subsided in one week.
Undiluted	Washed with water	Sl. conjunctivitis - not subsided in one week.

Skin Contact - Rabbit

<u>Material</u>	<u>Condition of Skin</u>	<u>No. of Appl.</u>	<u>Site</u>	<u>Response-Remarks</u>
Undiluted	Intact	8	Ear	Sl. hyperemia and exfoliation followed 2nd appl. - ear normal in 21 days. *
Undiluted	Intact	8	Belly	Sl. hyperemia and exfoliation persisted after 2nd application - skin became dry and stiff - skin essentially normal in 21 days. *
Undiluted	Abraded	3	Belly	Sl. hyperemia and edema followed 1st appl. - sl. to mod. exfoliation thereafter - area essentially normal in 21 days.*

* The animal lost weight during the course of the experiment.

Skin Absorption

There is some indication, from the skin irritation tests conducted, that this material is absorbed through the skin in toxic amounts.

Inhalation (Saturated Atmosphere)

<u>Animal</u>	<u>Bath Temp.</u>	<u>Hours Exposed</u>	<u>No. Died No. Treated</u>	<u>Response-Remarks</u>
Rat	Room	0.5	4/4	Rats showed irritation during 1st 15 minutes - eyes were coated with white material - animals appeared pale, gasped before death.

FIRST AID MEASURES

If the eyes are contaminated, they should be flushed immediately with copious amounts of flowing water for at least 15 minutes.

Medical attention should be obtained.

Any skin injuries or irritations which may develop should receive medical attention.

Contaminated clothing, including shoes, should be removed and the affected skin area should be washed thoroughly with soap and plenty of water.

Contaminated clothing and shoes should not be re-used until thoroughly cleaned.

If a person should experience any noticeable ill effects from breathing the vapor or fumes of this material, medical attention should be obtained promptly.

If a person should be overcome from breathing this material, he should be removed to fresh air at once, be made to rest, kept warm, and **MEDICAL ATTENTION SHOULD BE OBTAINED IMMEDIATELY.** If breathing stops, artificial respiration should be administered.

Microfiche No.		
OTS0000469-0		
[Hatched separator]		
New Doc I.D.	Old Doc I.D.	
	FYI-OTS-0286-0469	
[Hatched separator]		
Date Produced	Date Received	TSCA section
4/05/78	2/14/86	
[Hatched separator]		
Submitting Organization		
DOW CORNING CORP		
[Hatched separator]		
Contractor		
DOW TOX DEPT		
[Hatched separator]		
Document Title		
COMPARISON OF THE PRIMARY SKIN IRRITATION POTENTIAL AND THE EFFECTS OF REPEATED PROLONGED SKIN EXPOSURES TO VARIOUS VOLATILE EXPERIMENTAL COSMETICS FLUIDS WITH SD ALCOHOL 40		
[Hatched separator]		
Chemical Category		
ORGANOSILANES		

COMPARISON OF THE PRIMARY SKIN IRRITATION POTENTIAL AND THE EFFECTS OF REPEATED PROLONGED SKIN EXPOSURES TO VARIOUS VOLATILE EXPERIMENTAL COSMETIC FLUIDS WITH SD ALCOHOL 40 WHEN TESTED ACCORDING TO FEDERAL HAZARDOUS SUBSTANCES ACT (FHSA) PROCEDURES

Author: Benjamin H. Franklin

Submitted By: James R. Hefield

Reported By: B. H. Franklin *BH* C. L. Groh

Checked By: E. J. Hobbs *EJ*

Date: April 5, 1978

This summary of data and conclusions is based upon the sample received. Additional studies may be required as specific uses and formulations are developed or if process changes occur.

Samples of various volatile experimental cosmetic fluids were submitted to the Biological Services Department for determination of primary skin irritation potential and the effects of repeated prolonged skin contact when evaluated according to procedures promulgated by the Consumer Product Safety Commission in compliance with Federal Hazardous Substances Act (FHSA) Regulations. The test samples were identified as follows:

<u>TX Number</u>	<u>Material</u>	<u>Lot/Reference No.</u>
1445	SD Alcohol-40	E-3089-8A
1446	DOW CORNING® 200 Fluid, 0.65 cs.	AAX-002
1447	DOW CORNING® 344 Fluid	LL-07050
1448	Blend Consisting of: 80% Dow Corning 200 fluid, 0.65 cs. 20% Dow Corning 344 fluid	AAX-002 LL-07052

The FHSA method of evaluating primary skin irritation potential requires exposing laboratory animals to a single application of a test substance. The Dow Corning volatile experimental cosmetic fluids which were employed in this study are intended for use as diluents in cosmetic and personal care products which will likely be applied to the skin in a repeated manner; therefore, in addition to the FHSA test, another study was conducted to permit an assessment of the effect of repeated, prolonged skin exposures to these materials. SD Alcohol-40 is a commonly used, widely accepted diluent for cosmetic formulations and was employed in this series of evaluations as a control.

Procedure

The primary skin irritation potential of the above test materials was evaluated according to FHSA protocol with one exception: In this study each animal received a single skin application (at a different site) of

3431-1, 1010-3, 2061-3
I-0005-0565
Benjamin H. Franklin
April 5, 1978

each of the fluids being evaluated; a procedure which compensated for individual variation among the test animals. Afterwards, the entire abdomen was covered with an impervious material to retard the evaporation of volatile substances. To study the effects of repeated prolonged skin exposures to the test materials, each laboratory rabbit received ten applications of each material over a 16 day period in a manner similar to the above FHSA study. In this phase, the abdomen was covered with a cloth bandage taped in place to the surrounding hair. In this situation, volatile components were allowed to evaporate from the skin surface through the bandage to simulate the type of skin exposure beneath an article of clothing.

Results

TX-1445 (SD Alcohol-40)

The FHSA test with SD Alcohol-40 produced a slight amount of redness. According to current FHSA definition, SD Alcohol-40 is not a primary skin irritant. Repeated, prolonged skin exposures to this liquid resulted in slight redness and swelling.

TX-1446 (Dow Corning 200 fluid, 0.65 cs.)

The FHSA test with Dow Corning 200 fluid, 0.65 cs. produced a slight amount of redness. According to current FHSA definition, Dow Corning 200 fluid, 0.65 cs. is not a primary skin irritant. Repeated, prolonged skin exposures to this liquid resulted in slight redness and a very slight amount of swelling.

TX-1447 (Dow Corning 344 fluid)

The FHSA test with Dow Corning 344 fluid produced a slight amount of redness. According to current FHSA definition, Dow Corning 344 fluid is not a primary skin irritant. Repeated, prolonged skin exposures to this liquid produced a slight amount of redness and swelling.

TX-1448 (an 80/20% blend of Dow Corning 200, 0.65 cs. and 344 fluids)

The FHSA test with this fluid blend produced a slight amount of redness and swelling. According to current FHSA definition, this material is not a primary skin irritant. Repeated, prolonged skin exposures to this liquid caused a slight amount of redness.

3431-1, 1010-3, 2061-3
I-0005-0565 -
Benjamin H. Franklin
April 5, 1978

SUMMARY

Primary Skin Irritation Potential of Various Volatile Experimental
Cosmetic Fluids When Tested According to FHSA Regulations

<u>Material</u>	<u>FHSA Primary Irritation Score</u>	<u>Classification</u>
TX-1445 (SD Alcohol-40)	0.5/8.0	Not a skin irritant
TX-1446 (DC® 200 fluid/0.65 cs)	0.7/8.0	Not a skin irritant
TX-1447 (DC® 344 fluid)	2.5/8.0	Not a skin irritant
TX-1448 (80%/20% blend DC® 200/344)	2.2/8.0	Not a skin irritant

Comments

The following conclusions can be drawn from the data generated in this series of experiments.

- (A) Under the conditions of these tests, no significant differences in either the FHSA or repeated, prolonged skin exposure test response exist between Dow Corning 200 fluid, 0.65 cs. and SD Alcohol-40.
- (B) Although Dow Corning 344 fluid and the blend of Dow Corning 200, 0.65 cs. fluids are not primary skin irritants as defined by FHSA regulations, the degree of irritation produced by these materials is higher than that produced by Dow Corning 200 fluid 0.65 cs. alone or by SD Alcohol-40 in both types of exposure. This is probably attributable to the lower volatility of Dow Corning 344 fluid, which permitted a longer period of contact with the skin.

Recommendations

Based upon the relative skin irritation potential of the various volatile experimental cosmetic fluids which were evaluated in this study, it would appear that (provided other criteria, e.g., physical properties, compatibility with other components of the formulation, etc., were met) Dow Corning 200 fluid, 0.65 cs. is a suitable replacement candidate for SD Alcohol-40 in cosmetic and personal care formulations.

3431-1, 1010-3, 2061-3

I-0005-0565

Benjamin H. Franklin

April 5, 1978

Dow Corning 344 fluid and the blend of Dow Corning 344/200 (0.65 cs.) fluids, while not (by definition) irritating to skin, did elicit sufficient response to require consideration as to the type and nature of cosmetic preparations into which these materials are formulated; because the skin responses of these fluids are probably directly related to the degree and length of confinement to the skin and the volatility of the respective silicone.

The rabbit in most instances is more sensitive than the human to skin irritation. If the potential cosmetic use of Dow Corning 344 and/or Dow Corning 200 fluid, 0.65 cs/Dow Corning 344 is of continued significant interest, it would be appropriate to conduct a similar type evaluation on human subjects for a more definitive answer to the question.

BHF/kld