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INIT 07/14/94

→ Will Perry
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FYI-0794-000996

UNION CARBIDE CORPORATION OLD RIDGEBURY ROAD, DANBURY, CT 06817
Corporate Health, Safety and Environmental Affairs Department



84940000096

A

March 2, 1984

FYI-0794-00996

Mr. Martin Greif
Executive Secretary
Interagency Testing Committee
Environmental Protection Agency (TS-792)
401 M Street, SW
Washington, D.C. 20460

100-37-8
119-64-2

RECEIVED
30 PPT
CBI
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Contains No CBI

Dear Mr. Greif:

Enclosed is some information on two of the four chemicals the ITC announced interest in in November, 1983: 2-(Diethylamino)ethanol, CAS 100-37-8; and 1,2,3,4-tetrahydronaphthalene, CAS 119-64-2. I realize this letter is past the January, 1984 time by which you requested information, but please do not interpret my tardiness as being lack of interest in supporting your program to gather available information early in the review process; on the contrary, Union Carbide strongly endorses your approach. Attribute my delay rather to the rash of other TSCA rules, proposed rules etc. which is straining our ability to reply in timely fashion. I trust you will still find the information useful. The following are enclosed.

1. Acute toxicity summary, N-Diethylethanolamine, Report No. 40-141, 1977, Bushy Run Research Laboratory of Union Carbide Corp.
2. Summary of Range Finding tests on Diethyl Aminoethanol, Mellon Institute, February 10, 1942.
3. Health Effect, MORLEX Corrosion Inhibitors DMEA and DEEA....; M. R. Huffman, B. Ballantyne, 12-23-80; (DEEA is the chemical of interest). MORLEX is a registered trademark for the product which is 99% Diethylethanolamine.
4. MSDS, N,N-Diethylethanolamine, Union Carbide Corp., Aug. 1978.
5. MSDS, MORLEX (Registered Trademark) Corrosion Inhibitor DEEA, Union Carbide Corp., December 1979.
6. Tetrahydronaphthalene, Product Information Bulletin, Union Carbide Agricultural Products Co., Inc., Dec. 1980.
7. MSDS, Tetrahydronaphthalene, Union Carbide Agricultural Products Co., Inc., March, 1980.
8. Range Finding tests on Tetrahydronaphthalene, Mellon Inst., May 4, 1949.
9. Range Finding Tests on Tetralin, Mellon Inst., May 12, 1959. "Tetralin" is a Trademark name (by another organization) used occasionally in a generic sense for "tetrahydronaphthalene".

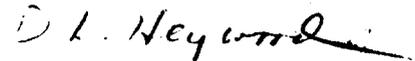
19/13/94

Mr. Martin Greif
Environmental Protection Agency
Page 2

Please be advised that the toxicity test herewith submitted were done well prior in time to when Good Laboratory Practices were in effect for TSCA or other laws; hence they were not conducted necessarily in accord with current good laboratory practice requirements.

Union Carbide is no longer a producer of ethanedial, and manufactures 4-methylpyridine only as a by-product. We have no unpublished information on those chemicals that would be of value for your review. Please do not hesitate to inquire if I can provide further information, and continue to contact my office with such requests.

Very truly yours,



D. L. Heywood

DLH/cr
Enclosures

N-Diethylethanolamine

Report 40-141; 1977
5-28; 1942

Single Oral Dose to Standard Rats (Monthly Rpt. 11-30-52)

LD50 = 2.46 (1.88 to 3.23) gm/kg as 10% in water.

Single Skin Absorption by Rabbits (Rpt. 16-102; 1953)

LD50 = 1.26 (0.85 to 1.87) ml/kg.

Single Inhalation by Rats, Vapors Saturated at Room Temperature

4 hours killed 0/6, 8 hours 1/5.

Severe liver injury (Spec. Rpt. 10-46; 1947).

Primary Irritation, Rabbit Belly Vesicant Test

Grade 3. Undiluted sample gives slight erythema

Eye Injury to Rats (Monthly Rpt. 11-30-52)

Grade 8. Severe injury from 15% glycol, minor from 5%.

Skin Irritation, Covered, Rabbit 4-Hr D.O.T. Test

2 of 2 rabbits with necrosis; therefore, a "corrosive" material.

11-2-77

8422
Replaces 4067

N-Diethylethanolamine

MELLON INSTITUTE OF INDUSTRIAL RESEARCH
UNIVERSITY OF PITTSBURGH

SPECIAL REPORT

on

SUMMARY OF RANGE FINDING TESTS ON DIETHYL AMINOETHANOL

Carbide and Carbon Chemicals Corporation Industrial Fellowship No. 274-5

Completed range finding tests are presented here on diethyl aminoethanol. The sample was received 12-4-40 from Fellowship 155.

Single Dose by Mouth

In single doses by mouth to rats as a solution in water the LD₅₀ is in the neighborhood of 1.3 gm./kg. Death from large doses came within 24 hours, but from small doses it was delayed as much as 5 days. Only slight apathy was shown by victims after dosing. There was considerable irritation in the intestinal tract, red bile, congested liver, and pale kidney with congested spleen.

Single Dose by Skin Absorption

Undiluted upon the guinea pig skin, the LD₅₀ for four days contact is about 1 gm./kg. When species susceptibility is taken into account, this material is a little less toxic upon the skin than by mouth, and penetration is slow. It caused local necrosis.

Vapor Inhalation

One-fifth of the rats died as a result of 3 hours inhalation of vapors saturated at 25°C, and none died from 4 hours inhalation. Eye and nose irritation was seen, but no narcosis. Death was delayed, probably due to liver and kidney injury.

Local Action

In the rabbit eye, 0.001 ml. caused necrosis, and on the belly the undiluted material produced erythema, and a 10% solution had no action.

Summary

In single doses, diethyl aminoethanol is equivalent to ethylene diamine in toxicity. Its vapor hazard is less and it is only moderately irritating upon the skin.

Henry F. Smyth, Jr.

Henry F. Smyth, Jr.
SENIOR INDUSTRIAL FELLOW

February 11, 1942-abc

Health Effects

MORLEX Corrosion Inhibitors DMEA and DEEA are moderately toxic when swallowed.

MORLEX Corrosion Inhibitor DEEA is corrosive to the skin. While DMEA has not been tested for corrosivity, skin contact is known to cause irritation. Prolonged or extensive contact with either product could result in potentially harmful amounts of material being absorbed across the skin. There is no evidence that either product causes allergic contact dermatitis in humans.

Contamination of the eye with either MORLEX Corrosion Inhibitor DEEA or DMEA will cause moderately severe keratitis, iritis, and conjunctivitis. Immediate first aid and urgent medical attention is required for any exposure of the eye to either product.

Inhalation of MORLEX Corrosion Inhibitor DEEA may cause nausea and vomiting. High concentrations of vapors of either product may be irritating. Exposure to vapors generated at high temperatures should be avoided as they may result in the inhalation of harmful amounts of material.

There is no evidence to implicate MORLEX Corrosion Inhibitor DEEA or DMEA as a mutagen or carcinogen. However, in the presence of nitrites and under certain conditions, nitrosamines may be formed. Many nitrosamines have been shown to be carcinogenic in experimental animals.

Further information on health hazards and guidance on specific protective measures for MORLEX Corrosion Inhibitors DEEA and DMEA are provided in the respective Material Safety Data Sheets. The Material Safety Data Sheets are updated whenever new information becomes available. Contact your nearest Union Carbide Sales Office for the latest Material Safety Data Sheet.

M.R. Huffman/B. Ballantyne/nc

12-23-80



MATERIAL SAFETY DATA SHEET

(Approved by U.S. Department of Labor "Essentially Similar" to Form LSB-OOS-4)



PRODUCT NAME:	N,N-DIETHYL ETHANOLAMINE		
CHEMICAL NAME:	2-(Diethylaminol) ethanol	CHEMICAL FAMILY:	Nitrogen Compounds (Alkanolamines)
FORMULA:	(C ₂ H ₅) ₂ NC ₂ H ₄ OH	MOLECULAR WEIGHT:	117.19
SYNONYMS:	--		

I. PHYSICAL DATA

BOILING POINT, 760 mm. Hg	162.1 °C. (323.8 °F.)	FREEZING POINT	< -20 °C.
SPECIFIC GRAVITY (H ₂ O = 1)	0.8851 at 20/20 °C.	VAPOR PRESSURE AT 20°C.	1 mm. Hg
VAPOR DENSITY (air = 1)	4.0	SOLUBILITY IN WATER, % by wt.	Complete
PER CENT VOLATILES BY VOLUME	Nil	EVAPORATION RATE (Butyl Acetate = 1)	0.17
APPEARANCE AND ODOR	Water-white liquid; typical amine odor.		

II. HAZARDOUS INGREDIENTS

MATERIAL	%	TLV (Units)
Diethylaminoethanol	~ 100	10 ppm. Skin ACGIH (1977)
(See Sections III through VIII)		

III. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	120 °F., Tag closed cup ASTM D 56			
[test method(s)]	130 °F., Tag open cup ASTM D 1310			
FLAMMABLE LIMITS IN AIR, % by volume	LOWER	1.3 (calculated)	UPPER	11.7 (estimated)
EXTINGUISHING MEDIA	Use carbon dioxide or dry chemical for small fires. Use polymer type foam or water spray for large fires.			
SPECIAL FIRE FIGHTING PROCEDURES	Air-supplied respirators should be available to fire fighters; oxides of nitrogen can be evolved.			
UNUSUAL FIRE AND EXPLOSION HAZARDS	None			

EMERGENCY PHONE NUMBER

304/744-3487

This number is available days, nights, weekends, and holidays.

While Union Carbide Corporation believes that the data contained herein are factual and the opinions expressed are those of qualified experts regarding the results of the tests conducted, the data are not to be taken as a warranty or representation for which Union Carbide Corporation assumes legal responsibility. They are offered solely for your consideration, investigation, and verification. Any use of these data and information must be determined by the user to be in accordance with applicable Federal, State, and local laws and regulations.

IV. HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE	10 ppm. (skin) ACGIH 1977
EFFECTS OF OVEREXPOSURE	Liquid causes severe eye injury and mild skin irritation.
EMERGENCY AND FIRST AID PROCEDURES	Immediately flush eye contact with plenty of water for at least 15 minutes and then get medical care. Flush skin contact with water.

V. REACTIVITY DATA

STABILITY		CONDITIONS TO AVOID	None
UNSTABLE	STABLE		
--	✓		
INCOMPATIBILITY (materials to avoid)		Avoid contamination with strong acids.	
HAZARDOUS DECOMPOSITION PRODUCTS		Burning can produce carbon monoxide and/or carbon dioxide, and nitrogen oxide.	
HAZARDOUS POLYMERIZATION		CONDITIONS TO AVOID	None
May Occur	Will not Occur		
--	✓		

VI. SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED	Wear suitable protective equipment. Collect for disposal. Toxic to fish; avoid discharge to natural waters.
WASTE DISPOSAL METHOD	Incinerate in a furnace where permitted under appropriate Federal, State, and local regulations.

VII. SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (specify type)		Air-supplied mask in confined areas.		
VENTILATION	LOCAL EXHAUST	Preferred	SPECIAL	--
	MECHANICAL (general)	Acceptable	OTHER	--
PROTECTIVE GLOVES		Rubber	EYE PROTECTION	Monogoggles
OTHER PROTECTIVE EQUIPMENT		Eye bath and safety shower		

VIII. SPECIAL PRECAUTIONS

PRECAUTIONARY LABELING	<p>N,N-DIETHYL ETHANOLAMINE</p> <p>DANGER!</p> <p>CAUSES EYE BURNS COMBUSTIBLE</p> <p>Do not get in eyes. Keep away from heat and open flame. Keep container closed. Use with adequate ventilation. Wash thoroughly after handling.</p> <p>FIRST AID:</p> <p>In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Call a physician.</p> <p>FOR INDUSTRY USE ONLY</p>
OTHER HANDLING AND STORAGE CONDITIONS	--



MATERIAL SAFETY DATA SHEET

EFFECTIVE DATE: December 14, 1979



IDENTIFICATION

PRODUCT NAME: MORLEX® CORROSION INHIBITOR DEEA	
CHEMICAL NAME: 2(Diethylamino) ethanol	CHEMICAL FAMILY: Nitrogen Compounds (Alkanolamines)
FORMULA: (C ₂ H ₅) ₂ NC ₂ H ₄ OH	MOLECULAR WEIGHT: 119.17 117.19
SYNONYMS: N,N-Diethylethanolamine	
DEPARTMENT OF TRANSPORTATION	HAZARD CLASSIFICATION: Corrosive Material
	SHIPPING NAME: Corrosive Liquid, NOS
CAS # 100-37-8	CAS NAME: Ethanol, 2-(diethylamino)-

PHYSICAL DATA

BOILING POINT, 760 mm. Hg	162.1 °C.(323.8 °F.)	FREEZING POINT	< -20 °C.
SPECIFIC GRAVITY (H ₂ O = 1)	0.8851 at 20/20 °C.	VAPOR PRESSURE at 20°C.	1 mm. Hg
VAPOR DENSITY (air = 1)	4.0	SOLUBILITY IN WATER, % by wt.	Complete
PER CENT VOLATILES BY VOLUME	Nil	EVAPORATION RATE (Butyl Acetate = 1)	0.17
APPEARANCE AND ODOR	Water-white liquid; typical amine odor.		

INGREDIENTS

MATERIAL	%	TLV (Units)	HAZARD
Diethylethanolamine	99 +	10 ppm.(skin)	Irritant

FLASH POINT [test method(s)]	120 °F., Tag closed cup ASTM D 56 130 °F., Tag open cup ASTM D 1310		
FLAMMABLE LIMITS IN AIR, % by volume	LOWER	1.3(calculated)	UPPER 11.7(estimated)
EXTINGUISHING MEDIA	Use water spray, carbon dioxide, dry chemical, alcohol-type or universal-type foams applied by manufacturers' recommended technique.		
SPECIAL FIRE FIGHTING PROCEDURES	Use supplied breathing air; oxides of nitrogen can be evolved.		
UNUSUAL FIRE AND EXPLOSION HAZARDS	None		

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HEALTH HAZARD DATA

TLV AND SOURCE: OSHA-CFR 29 § 1910.93 Tables ACGIH (1978)

ACUTE EFFECTS OF OVEREXPOSURE	
SWALLOWING	Expect nausea, vomiting, and abdominal pain. May go into shock.
SKIN ABSORPTION	None currently known.
INHALATION	Vapors may be irritating and cause chest discomfort and symptoms of bronchitis.
SKIN CONTACT	Contact with uncovered skin causes redness. Covered contact as from clothing wet with the chemical may cause burns.
EYE CONTACT	Causes severe irritation.
CHRONIC EFFECTS OF OVEREXPOSURE	
None currently known.	
OTHER HEALTH HAZARDS	
None currently known.	
EMERGENCY AND FIRST AID PROCEDURES:	
SWALLOWING	Give 2 glasses of water and induce vomiting by putting finger down throat. Call a physician.
SKIN	Immediately flush skin with plenty of water while removing con- taminated clothing and shoes. Wash clothing before wearing again.
INHALATION	Remove to fresh air. Call a physician if symptoms persist.
EYES	Immediately flush eyes with plenty of water for at least 15 minutes. Call a physician.

NOTES TO PHYSICIAN

Any treatment which might be required for overexposure
would be directed at control of symptoms and establishment
of a normal physiologic state. No specific antidotes are known.

VI. REACTIVITY DATA

STABILITY		CONDITIONS TO AVOID	None
UNSTABLE	STABLE		
--	✓		
INCOMPATIBILITY (materials to avoid)		Avoid contamination with strong acids.	
HAZARDOUS COMBUSTION OR DECOMPOSITION PRODUCTS		Burning can produce carbon monoxide and/or carbon dioxide, and nitrogen oxides.	
HAZARDOUS POLYMERIZATION		CONDITIONS TO AVOID	None
May Occur	Will not Occur		
--	✓		

VII. SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED	Wear suitable protective equipment. Collect for disposal. Toxic to fish; avoid discharge to natural waters.
WASTE DISPOSAL METHOD	Incinerate in a furnace where permitted under appropriate Federal, State, and local regulations.

VIII. SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (specify type)	Air-supplied mask in high concentrations.		
VENTILATION	General (mechanical) room ventilation is expected to be satisfactory if this product is stored and handled at normal room temperature.		
PROTECTIVE GLOVES	Rubber	EYE PROTECTION	Monogoggles
OTHER PROTECTIVE EQUIPMENT	Eye bath and safety shower		

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

Do not get in eyes, on skin, on clothing.
Keep away from heat and open flame.
Avoid breathing vapor.
Keep container closed.
Use with adequate ventilation.
Wash thoroughly after handling.

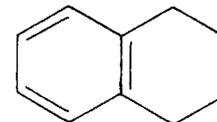
FOR INDUSTRY USE ONLY

OTHER PRECAUTIONS

None required

TETRAHYDRONAPHTHALENE

Chemical Abstracts Registry No. 119-64-2



Tetrahydronaphthalene is a high boiling, water insoluble, yellow liquid having a mild odor similar to naphthalene. It is supplied in 90 per cent and 98 per cent concentrations, the balance being essentially naphthalene.

Tetrahydronaphthalene is a specialty solvent used for chlorinated rubber, in alkali resistant lacquers, for cleaning printing ink from rollers and type, in shoe cream and floor waxes, as a heat transfer fluid, and as a solvent for mineral, animal, vegetable oils and waxes. It is used in the textile industry as a dye solvent carrier and has been suggested for use as a pesticide solvent.

TENTATIVE SPECIFICATIONS

Subject to change without notice

Specific Gravity at 20/20°C.	0.9725
Distillation at 760 mm.	207.6°C Dp 215°C., maximum
Acidity	0.005 per cent by weight, maximum, calculated as acetic acid
Tetrahydronaphthalene	98.0 per cent by weight, minimum
Tetralin Hydroperoxide	0.05 per cent by weight, maximum
Dihydronaphthalene	0.5 per cent by weight, maximum
Naphthalene	2.0 per cent by weight, maximum
Color	2 Gardner units, maximum
Suspended Matter	Substantially free

F-41843

This information is not to be taken as a warranty or representation for which we assume legal responsibility nor as permission or recommendation to practice any patented invention without a license. It is offered solely for your consideration, investigation and verification.

TETRAHYDRONAPHTHALENE

PHYSICAL PROPERTIES

Determined on purified samples (99% +)

Molecular Weight	132.21
Apparent Specific Gravity at 20/20°C.	0.9717
Δ Sp. Gr./ Δ t. at 10 to 40°C.	0.00076 per °C.
Boiling Point	
at 760 mm. Hg	207.6°C.
at 300 mm. Hg	171°C.
at 10 mm. Hg	80°C.
Vapor Pressure at 20°C.	<1 mm. Hg
Δ t./ Δ p. at 740 to 760 mm. Hg	0.057°C. per mm. Hg
Antoine Constants	
A	6.97036
B	1658.6
C	198.0
Absolute Viscosity	
at 0°C.	3.4 cps.
at 25°C.	1.99 cps.
at 50°C.	1.27 cps.
Surface Tension at 30°C.	34.3 dynes per cm.
Freezing Point	-35.8°C.
Constants for Specific Heat Equation: $C_p = A + Bt + Ct^2$	
A=0.3716 B=0.0007834 C=6.7549 x 10.7	t = Temperature, °C.
Temperature	443°C. (est.)
Pressure	33.4 atm. (est.)
Volume	0.438 liters per mole (est.)
Compressibility	0.249
Heat of Vaporization	
at 1 atm.	137.8 Btu per lb. (est.)
at 300 mm.	145.9 Btu per lb. (est.)
Heat of Combustion at 20°C.	18,163 Btu per lb.
Refractive Index, n_D^{25}	1.5392
Solubility In Water at 60°C.	<0.01
Flash Point, Cleveland open cup (ASTM Method D92)	190°F.*

*Commercial material

Thermal Conductivity at 35°C. 0.125 $\frac{\text{Watt}}{\text{meter} \cdot \text{deg Kelvin}}$

TETRAHYDRONAPHTHALENE

TOXICOLOGICAL PROPERTIES

Tetrahydronaphthalene has a moderate degree of toxicity. When fed to rats, it has a toxicity comparable to an equal amount of 10 per cent acetic acid. It is not expected to penetrate the skin in harmful amounts, but skin contact will be irritating. If skin contact is prolonged and repeated, moderate burns may result. No significant hazard exists from breathing vapors since animals survived an eight-hour exposure to concentrated vapors formed at 170°C. Rabbit eyes were not harmed by contact with the liquid.

The major hazard is associated with skin contact. Skin contact should be avoided. Accidental contact should be flushed at once with water followed by washing with soap and water. Contaminated clothing should be removed and laundered before wearing again. Any eye contact should be thoroughly flushed with plenty of clean running water. A physician should see any cases in which discomfort persists.

STORAGE AND HANDLING

Tetrahydronaphthalene is not corrosive to commonly used metals. It is usually shipped and stored in steel containers. Elastomers, tank linings, and plastics may not be compatible with tetrahydronaphthalene and should not be used, unless they are known to be suitable.

Tetrahydronaphthalene has a low freezing point and a low viscosity. Heated storage is not normally required. A centrifugal pump is suitable for transfer service. Piping can be of steel; asbestos can be used for gaskets and packing.

PRECAUTIONARY LABELING

CAUTION: CAUSES SKIN IRRITATION. CAUSES EYE IRRITATION ON CONTACT.

Avoid contact with skin.

In case of skin contact, immediately flush with plenty of water followed by washing with soap and water.

FOR INDUSTRY USE ONLY

SHIPPING DATA

Subject to change without notice

Weight per Gallon	
at 20°C.	8.10 lb.
at 15.56°C.	8.13 lb.
Δ lb. per Gallon/Δt	0.00666 per °C.
Coefficient of Expansion	
at 20°C.	0.00082 per °C.
at 55°C.	0.00085 per °C.
Flash Point, Cleveland open cup (ASTM Method D92)	190°F.
Containers and Net Contents*	
1-Gallon Tin Can	8 lb.
5-Gallon DOT 17E Steel Drum with Flex Spout	40 lb.
55-Gallon DOT 17E Steel Drum	449 lb.
Freight Description	Chemicals, Noibn
Dangerous Article description on containers	None
DOT Warning Label Required	None

*Available in tank trucks and tank cars.



IDENTIFICATION

PRODUCT NAME: Tetrahydronaphthalene

CHEMICAL NAME: Tetrahydronaphthalene

CHEMICAL FAMILY: Aryls

FORMULA: C₁₀H₁₂

MOLECULAR WEIGHT: 132.21

SYNONYMS:

DEPARTMENT OF TRANSPORTATION HAZARD CLASSIFICATION Combustible liquid
SHIPPING NAME Combustible liquid, NOS

CAS # 119-64-2 CAS NAME Tetrahydronaphthalene

BOILING POINT, 760 mm. Hg	207.6°C (405.7°F)	FREEZING POINT	-35.8C
SPECIFIC GRAVITY (H ₂ O = 1)	0.9725 at 20/20°C	VAPOR PRESSURE at 20°C.	<1mm Hg
VAPOR DENSITY (air = 1)	4.6	SOLUBILITY IN WATER, % by wt.	Insoluble
PER CENT VOLATILES BY VOLUME	Nil	EVAPORATION RATE (Butyl Acetate = 1)	0.03
APPEARANCE AND ODOR			

MATERIAL	%	TLV (Units)	HAZARD
Tetrahydronaphthalene	100%	NONE	Skin and respiratory irritant. Narcotic in high concentrations

FLASH POINT [test method(s)]	190°F., Cleveland open cup		
FLAMMABLE LIMITS IN AIR, % by volume	LOWER	0.8	UPPER 5.0
EXTINGUISHING MEDIA	Carbon dioxide or dry chemical for small fires Ordinary foam for large fires		
SPECIAL FIRE FIGHTING PROCEDURES	NONE		
UNUSUAL FIRE AND EXPLOSION HAZARDS	NONE		

304/744-3487

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UNION CARBIDE AGRICULTURAL PRODUCTS COMPANY, INC. • P.O. Box 17610
7825 Baymeadows Way, Jacksonville, Florida 32216

HEALTH HAZARD DATA

TLV AND SOURCE:

ACUTE EFFECTS OF OVEREXPOSURE

No information available.
LD50 in rats = 2.9 Gram/Kg.

SWALLOWING

SKIN ABSORPTION

Causes skin irritation

INHALATION

Causes irritation of respiratory tract, nausea, vomiting, headache and stupor in high concentration

SKIN CONTACT

Causes skin irritation

EYE CONTACT

Causes eye irritation

CHRONIC EFFECTS OF OVEREXPOSURE

Dermatitis

OTHER HEALTH HAZARDS

EMERGENCY AND FIRST AID PROCEDURES:

SWALLOWING

Seek medical attention

SKIN

Wash thoroughly with soap and water

INHALATION

Remove to fresh air

EYES

Flush thoroughly with water

NOTES TO PHYSICIAN

REACTIVITY DATA

STABILITY		CONDITIONS TO AVOID	NONE
UNSTABLE	STABLE		
	X		

INCOMPATIBILITY (materials to avoid) NONE

HAZARDOUS COMBUSTION OR DECOMPOSITION PRODUCTS Thermal decomposition may produce carbon monoxide and/or carbon dioxide

HAZARDOUS POLYMERIZATION		CONDITIONS TO AVOID	NONE
May Occur	Will not Occur		
	X		

SPILL/RELEASE PROCEDURES

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED Recover liquid. Use absorbent for small quantities. Keep out of streams and waterways.

WASTE DISPOSAL METHOD Incineration

PERSONAL PROTECTIVE INFORMATION

RESPIRATORY PROTECTION (specify type)

VENTILATION Local exhaust preferable; mechanical exhaust acceptable

PROTECTIVE GLOVES	Rubber	EYE PROTECTION	Safety goggles
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OTHER PROTECTIVE EQUIPMENT	Eye bath and safety shower
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PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

CAUTION! Causes skin irritation
 Avoid contact with skin or clothing
 In case of contact, flush skin with plenty of water while removing contaminated clothing. Then wash with soap and water

FOR INDUSTRY USE ONLY

OTHER PRECAUTIONS

Confidential

Report 12-40

R: 5-4-49

L/H 5/6/49

MELLON INSTITUTE OF INDUSTRIAL RESEARCH

UNIVERSITY OF PITTSBURGH

SPECIAL REPORT

on

Range Finding Tests on Tetrahydronaphthalene

Tables of Protocols Attached

Carbide and Carbon Chemicals Corporation Industrial Fellowship 274-12

Summary

Tetrahydronaphthalene is a compound of moderate acute oral toxicity for rats with an R.F. LD₅₀ value of 2.86 (2.58 to 3.18) gm./kg.

Skin penetration is slow and constitutes a relatively minor hazard as judged by the R.F. LD₅₀ of 17.3 (14.5 to 20.6) ml./kg. for the undiluted material applied under an impervious sheeting to rabbits.

Inhalation of saturated vapor evolved at room temperature or a mist generated at 170° C. was not lethal to rats in an 8 hour exposure.

Other workers have advocated careful ocular examination of workmen exposed to tetrahydronaphthalene to detect incipient cataract.

Skin irritation, as judged by application of the undiluted chemical to rabbit skin, is comparable to that produced by 2-ethyl hexyl acetate.

Tetrahydronaphthalene caused no damage to rabbit eyes.

Sample

Tetrahydronaphthalene (tetralin) was procured from Eastman Kodak Co. under their number P550 on 1-10-49. This work was undertaken for the HN project.

Single Oral Doses

The feeding of tetrahydronaphthalene to male albino Sherman strain rats, without previous withdrawal of food, as a 20% dispersion in 1% "Tergitol" 7 resulted in a R.F. LD₅₀ 2.86 (2.58 to 3.18) gm./kg. based upon a 14 day observation period. Following the doses, the rats exhibited symptoms of sluggishness, prostration, and narcosis with deaths often delayed 3 to 4 days. A dosage of 7.95 gm./kg. produced severe lung hemorrhage, congestion of the liver, paleness of the kidney with edema in some instances, opacity and adhesions of the intestines and urine with a brownish coloration. Several of the livers were jaundiced after the administration of a dosage of 3.98 gm./kg. This effect was not found at the higher level because of rapid death. Lower dosage levels produced similar symptoms of lesser intensity.

Skin Penetration

The R. F. LD₅₀ for tetrahydronaphthalene applied undiluted to the clipped skin of the rabbit trunk under "Vinylite" sheeting for 24 hours is 17.3 (14.5 to 20.6) ml./kg. Upon removal of the covering the skin was erythematous, on subsequent examination it was necrosed and ultimately became leathery and dry. Autopsy of victims revealed pale livers, and kidneys and congestion of the pancreas and intestines. The disparity between oral and percutaneous toxicity indicates that tetrahydronaphthalene penetrates quite slowly through the skin.

Inhalation

Groups of 6 rats each tolerated 8 hour exposures to substantially saturated vapor produced at room temperature, and to mist generated by aerating the compound while it was heated to 170° C.

Symptoms of cataract were not seen in any of these rats but experiments on guinea pigs exposed to tetrahydronaphthalene resulted in signs of cataract in 6 days according to Badinand, Paufique and Rodier. Arch. d. Mal. Prof. 8, 124, 1947. They maintain that it would be prudent to make systematic ocular examination of workers exposed to tetrahydronaphthalene in industry.

Irritation

The application of 0.01 ml. amounts of the undiluted compound to the clipped skin of the rabbit belly produced moderate to marked erythema of an intensity comparable to that induced by 2-ethyl hexyl acetate which is representative of Grade 4 compounds.

The undiluted compound caused no damage to rabbit eyes when applied in 0.5 ml. amounts.

Charles P. Carpenter

Charles P. Carpenter

SENIOR INDUSTRIAL FELLOW

Typed: May 4, 1949 - mrc

Table 12-77

TETRAHYDRONAPHTHALENE

Single Doses to Male Albino Rats by MouthFed by Stomach Tube as a Dispersion in 1% "Tg" 7, 1 ml. = 0.20 gm.

Rat No.	Date Dosed	Grams Wt.	Weight Change in 14 Days	Dosage; Grams per Kilo	Dose in Grams	Dose in ml. of Dispersion	Days to Death
86465	1-27-49	106	-	3.98	0.422	2.1	4
86467	"	98	-	3.98	0.390	2.0	2
86468	"	98	-	3.98	0.390	2.0	2
86469	"	99	-	3.98	0.394	2.0	1
86470	"	90	-	3.98	0.358	1.8	4
85946	1-31-49	96	-	3.98	0.382	1.9	1
85950	"	90	-	3.98	0.358	1.8	3
85972	"	98	-	3.98	0.390	2.0	1
85970	"	94	-	3.98	0.394	1.9	3
85945	"	108	-	3.98	0.430	2.2	3
85966	1-31-49	106	-	3.16	0.335	1.7	3
85965	"	100	-	3.16	0.316	1.6	1
85968	"	104	-	3.16	0.329	1.6	1
85837	"	100	-	3.16	0.316	1.6	1
86709	"	98	-	3.16	0.310	1.6	3
85878	"	114	-	3.16	0.360	1.8	4
85876	"	98	-	3.16	0.310	1.6	4
85967	"	96	+ 44	3.16	0.303	1.5	-
85838	"	100	+ 60	3.16	0.316	1.6	-
85865	"	102	+ 90	3.16	0.322	1.6	-
85875	1-31-49	102	-	2.52	0.257	1.3	4
85880	"	96	-	2.52	0.242	1.2	4
85874	"	94	+ 14	2.52	0.237	1.2	-
85867	"	96	+ 36	2.52	0.242	1.2	-
85871	"	120	+ 48	2.52	0.302	1.5	-
85870	"	96	+ 40	2.52	0.242	1.2	-
85860	"	114	+ 50	2.52	0.287	1.4	-
85863	"	100	+ 68	2.52	0.252	1.3	-
85864	"	98	+ 56	2.52	0.247	1.2	-
85775	"	108	+ 50	2.52	0.272	1.4	-
86687	1-27-49	100	-	2.00	0.200	1.00	5
86471	"	120	+ 28	2.00	0.184	0.92	-
86471	"	101	+ 43	2.00	0.202	1.00	-
86459	"	97	+ 35	2.00	0.194	0.97	-
86460	"	95	+ 9	2.00	0.190	0.95	-
86461	"	116	+ 52	2.00	0.232	1.20	-
85797	"	104	+ 42	2.00	0.208	1.00	-
85803	"	100	+ 28	2.00	0.200	1.00	-
86688	"	110	+ 35	2.00	0.220	1.10	-
86689	"	106	+ 52	2.00	0.212	1.10	-

Table 12-78

TETRAHYDRONAPHTHALENE

Single Doses to Male Albino Rabbits by Skin AbsorptionAdministered undiluted under "Vinylite" dam for 24 hrs.

Rabbit No.	Date Clipped	Date Applied	Gm. Wt.	Weight Change in 14 Days	Dosage; Ml. per Kilo	Dose in ml.	Days to Death
82373	3-28-49	3-28-49	2482	-	20.0	49.6	11
82375	"	"	2480	-	20.0	49.6	14
82380	3-30-49	3-30-49	2238	-	20.0	44.8	12
82383	"	"	2718	-	20.0	54.4	12
82374	3-28-49	3-28-49	2434	- 461	20.0	48.7	-
88374	4-13-49	4-13-49	2228	-	15.8	35.2	13
88363	"	"	2574	- 494	15.8	40.7	-
88366	"	"	2314	- 190	15.8	36.6	-
88573	"	"	2638	- 274	15.8	41.7	-
88375	"	"	2224	- 168	15.8	35.1	-
82199	3-22-49	3-22-49	2202	-	12.6	27.7	4
82302	"	"	2646	- 273	12.6	33.3	-
82303	"	"	2698	- 394	12.6	34.0	-
82304	"	"	2414	- 179	12.6	30.4	-
88361	4-13-49	4-13-49	2592	- 405	12.6	32.7	-

100% mortality was assumed at a dosage level of 25.2 ml./kg. for calculating the R. F. LD₅₀ by the Thompson method.

Confidential

Report 22-28

R: 5-12-59

WFS

5-14-59

MELLON INSTITUTE OF INDUSTRIAL RESEARCH

UNIVERSITY OF PITTSBURGH

SPECIAL REPORT

on

Range Finding Tests on Tetralin

Union Carbide Chemicals Co., U.C.C.

Industrial Fellowship 274-22

Summary

Tetralin is a moderately toxic compound for rats by stomach intubation with an LD₅₀ of 1.6 (1.3 to 2.0) ml./kg. undiluted. A 1943 sample fed as a 20% dispersion in 1% aqueous TERGITOL 7 had an LD₅₀ of 2.8 gm./kg. For comparison 1-tetralone has a comparable LD₅₀ of 0.812 (0.619 to 1.07).

By skin penetration on rabbits tetralin allowed survival of 4 animals at 10.0 ml./kg. in the 24-hour test under impervious sheeting. Erythema and necrosis of the skin resulted. The 1943 sample had an LD₅₀ of 17.3 ml./kg. in this test.

Concentrated vapor at room temperature was not lethal to 6 rats that inhaled the vapor-air mixture for 8 hours. The concentration achieved is estimated to be less than 500 p.p.m.

Uncovered applications produced marked erythema of the skin of the rabbit belly with the undiluted material. Grade 5.

An excess of undiluted tetralin caused no corneal damage on 2 rabbit eyes and trace injuries on three.

Sample

On 2-18-59 an 8 oz. quantity of tetralin (1,2,3,4-tetrahydronaphthalene), identified by Code HN 2266-97A, was received from South Charleston. Sample furnished by W. T. Pace. This compound is one of several encountered in the synthesis of 1-naphthol.

Single Oral Dose

The LD₅₀ for male albino rats fed the undiluted tetralin by stomach intubation is 1.62 (1.31 to 2.00) ml./kg.

Carworth Farms-Nelson, non-fasted 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 (LD₅₀) was applied to the 14-day mortality data.

Following a dosage of 5.0 ml./kg. the rats were quite excitable. There was lung hemorrhage, congestion of the liver and kidney and blood pigment in the urine at autopsy of victims.

Skin Penetration

Four rabbits survived a dosage of 10 ml./kg. of undiluted tetralin. The covered applications caused marked erythema and necrosis but apparently did not penetrate skin rapidly or completely.

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 room temperature by passing air at 2.5 liters/minute through a fritted glass disc immersed in 50 ml. of tetralin caused no mortality among 6 female rats exposed for 8 hours and observed subsequently for a total of 14 days.

Based upon dilution airflow and the amount of tetralin evaporated, the concentration was on the order of 500 p.p.m. Condensation on the exposure chamber walls within one hour leads us to believe that a considerable lower concentration was obtained in the air.

Irritation

The uncovered application of 0.01 ml. amounts undiluted to the clipped skin of the rabbit belly resulted in marked erythema when read 24-hours later. Grade 5.

An excess (0.5 ml.) instilled in rabbit eyes resulted in 3 trace reactions and 2 negative as regards corneal necrosis. Grade 1.


ASSISTANT ADMINISTRATIVE FELLOW

Charles P. Carpenter

Typed: May 12, 1959 - jlp

Table 22-77

Tetralin (22-25)Single Doses to Male Albino Rats by MouthFed Undiluted by Stomach Tube

Rat Number	1959 Date Dosed	Grams Wt.	Weight Change in 14 Days	Dosage; ml. per Kilo	Dose in Ml.	Days to Death
73898	2-25	95	-	2.5	0.24	1
73897	2-25	106	-	2.5	0.27	1
73904	2-25	102	-	2.5	0.26	1
73903	2-25	92	-	2.5	0.23	2
73902	2-25	98	-	2.5	0.24	2
73900	2-25	101	-	1.25	0.13	1
73901	2-25	99	+30	1.25	0.12	-
73933	2-25	101	+55	1.25	0.13	-
73939	2-25	90	+42	1.25	0.11	-
73937	2-25	106	+53	1.25	0.13	-

LD₅₀ = 1.62 (1.31 to 2.00) ml./kg.

Table 22-78

Single Inhalation by Female CFN Ratsof Concentrated Vapors Generated at 24°C.in 9 Liter Desiccator

Rat Number	Date Inhaled	Initial Wt., gms.	Weight Change in 14 Days	(Calc.) Conc., p.p.m.	Dura-tion	Days to Death
73003	3-5-59	104	+22	527	8 Hrs.	-
73011	3-5-59	112	+22	527	8 Hrs.	-
73012	3-5-59	98	- 8	527	8 Hrs.	-
73014	3-5-59	94	+ 8	527	8 Hrs.	-
73016	3-5-59	99	+25	527	8 Hrs.	-
73026	3-5-59	104	+44	527	8 Hrs.	-