



SIGMA-ALDRICH

Material Safety Data Sheet

Date Printed: 08/11/2005
Date Updated: 04/04/2004
Version 1.20

Section 1 - Product and Company Information

Product Name	m-Cresol Purple, indicator grade
Product Number	857890
Brand	Aldrich Chemical
Company	Sigma-Aldrich
Street Address	3050 Spruce Street
City, State, Zip, Country	SAINT LOUIS, MO 63103 US
Technical Phone:	314.771.5765
Fax:	800.325.5052
Emergency Phone:	414.273.3850 Ext. 5996

Section 2 - Composition/Information on Ingredient

Substance Name	CAS #	SARA 313	EC no	Annex I Index Number
M-CRESOL PURPLE	2303-01-7	No	218-950-6	

Formula
Synonyms
C21H18O5S

Section 3 - Hazards Identification

Emergency Overview
Caution: Avoid contact and inhalation.

For additional information on toxicity, please refer to Section 11.

Section 4 - First Aid Measures

Oral Exposure
If swallowed, wash out mouth with water provided person is conscious. Call a physician.

Inhalation Exposure
If inhaled, remove to fresh air. If not breathing give artificial respiration. If breathing is difficult, give oxygen.

Dermal Exposure
In case of contact, immediately wash skin with soap and copious amounts of water.

Eye Exposure
In case of contact, immediately flush eyes with copious amounts of water for at least 15 minutes.

Section 5 - Fire Fighting Measures

Autoignition Temp: N/A

Extinguishing Media
Suitable
Water spray, Carbon dioxide, dry chemical powder, or appropriate foam.

Firefighting
Protective Equipment
Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.
Specific Hazard(s)
Emits toxic fumes under fire conditions.

Section 6 - Accidental Release Measures

Procedure(s) of Personal Precaution(s)
Wear respirator, chemical safety goggles, rubber boots, and heavy rubber gloves.

Methods for Cleaning Up
Sweep up, place in a bag and hold for waste disposal. Avoid raising dust. Ventilate area and wash spill site after material pickup is complete.

Section 7 - Handling and Storage

Handling
User Exposure
Avoid inhalation. Avoid contact with eyes, skin, and clothing. Avoid prolonged or repeated exposure.

Storage
Suitable
Keep tightly closed. Store in a cool dry place.

Section 8 - Exposure Controls / PPE

Engineering Controls
Safety shower and eye bath. Mechanical exhaust required.

Personal Protective Equipment
Respiratory
Government approved respirator.
Hand
Compatible chemical-resistant gloves.
Eye
Chemical safety goggles.

General Hygiene Measures
Wash thoroughly after handling. Wash contaminated clothing before reuse.

Section 9 - Physical/Chemical Properties

Appearance
Form
Powder

Molecular Weight: 382.43 AMU

pH
BP/BP Range
MP/MP Range
Freezing Point
N/A
N/A
N/A
N/A

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Vapor Pressure N/A
Vapor Density N/A
Saturated Vapor Conc. N/A
SG/Density N/A
Bulk Density N/A
Odor Threshold N/A
Volatile% N/A
VOC Content N/A
Water Content N/A
Solvent Content N/A
Evaporation Rate N/A
Viscosity N/A
Partition Coefficient N/A
Decomposition Temp. N/A
Flash Point °F N/A
Flash Point °C N/A
Explosion Limits N/A
Flammability N/A
Autoignition Temp N/A
Solubility N/A
N/A = not available

Section 10 - Stability and Reactivity

Stability
Materials to Avoid
Strong oxidizing agents.

Hazardous Decomposition Products
Hazardous Decomposition Products
Carbon monoxide, Carbon dioxide, Sulfur oxides.

Section 11 - Toxicological Information

Route of Exposure
Skin Contact
May cause skin irritation.
Eye Contact
May cause eye irritation.
Multiple Routes
May be harmful by inhalation, ingestion, or skin absorption.

Signs and Symptoms of Exposure
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

RTECS Number: N/A

Section 12 - Ecological Information

No data available.

Section 13 - Disposal Considerations

Appropriate Method of Disposal or Preparation
Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.
Observe all federal, state, and local environmental regulations.

Section 14 - Transport Information

DOT
Proper Shipping Name: None
Non-Hazardous for Transport: This substance is considered to be non-hazardous for transport.
IATA
Non-Hazardous for Air Transport: Non-hazardous for air transport.

Section 15 - Regulatory Information

US Classification and Label Text
US Statements
Caution: Avoid contact and inhalation.
United States Regulatory Information
SARA Listed: No
Canada Regulatory Information
WHMIS Classification
This product has been classified in accordance with the hazard criteria of the CPR, and the MSDS contains all the information required by the CPR.
DSL: Yes
NDSL: No

Section 16 - Other Information

Disclaimer
For R&D use only. Not for drug, household or other uses.

Warranty

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Inc. shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale. Copyright 2005 Sigma-Aldrich Co. License granted to make unlimited paper copies for internal use only.



SIGMA-ALDRICH

Material Safety Data Sheet

Date Printed: 08/11/2005
Date Updated: 03/07/2004
Version 1.90

Section 1 - Product and Company Information

Product Name Filler agent, Celite® 521
Product Number 221791
Brand Aldrich Chemical

Company Sigma-Aldrich
Street Address 3050 Spruce Street
City, State, Zip, Country SAINT LOUIS, MO 63103 US
Technical Phone: 314.771.5765
Fax: 800.325.5052

Emergency Phone: 414.273.3850 Ext. 5996

Section 2 - Composition/Information on Ingredient

Substance Name	CAS #	SARA 313	EC no	Annex I Index Number
SILICA, AMORPHOUS, DIATOMACEOUS EARTH, CONTAINING >1% CRYSTALLINE SILICA	61790-53-2	No		

Ingredient Name Information regarding the specific chemical identity of this material is being withheld as a trade secret of the manufacturer.

Formula Celite, Diatomaceous earth, natural, Kieselguhr, Silica, amorphous, diatomaceous earth, containing >1 % crystalline silica (OSHA), Silica, amorphous - diatomaceous earth (uncalcined) (ACGIH)

Section 3 - Hazards Identification

Emergency Overview

Toxic.
May cause cancer. Irritating to eyes and skin.
Calif. Prop. 65 carcinogen. Target organ(s): Lungs.

HMIS Rating Health: 2*
Flammability: 0
Reactivity: 0

NFPA Rating Health: 2
Flammability: 0
Reactivity: 0

*additional chronic hazards present.

For additional information on toxicity, please refer to Section 11.

Section 4 - First Aid Measures

Oral Exposure
If swallowed, wash out mouth with water provided person is conscious. Call a physician.

Inhalation Exposure
If inhaled, remove to fresh air. If breathing becomes difficult, call a physician.

Dermal Exposure
In case of contact, immediately wash skin with soap and copious amounts of water.

Eye Exposure
In case of contact with eyes, flush with copious amounts of water for at least 15 minutes. Assure adequate flushing by separating the eyelids with fingers. Call a physician.

Section 5 - Fire Fighting Measures

Autoignition Temp: N/A

Extinguishing Media
Suitable
Noncombustible. Use extinguishing media appropriate to surrounding fire conditions.

Firefighting
Protective Equipment
Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.
Specific Hazard(s)
Emits toxic fumes under fire conditions.

Section 6 - Accidental Release Measures

Procedure to be Followed in Case of Leak or Spill
Evacuate area.

Procedure(s) of Personal Precaution(s)
Wear self-contained breathing apparatus, rubber boots, and heavy rubber gloves. Wear disposable coveralls and discard them after use.

Methods for Cleaning Up
Sweep up, place in a bag and hold for waste disposal. Avoid raising dust. Ventilate area and wash spill site after material pickup is complete.

Section 7 - Handling and Storage

Handling
User Exposure
Do not breathe dust. Do not get in eyes, on skin, on clothing. Avoid prolonged or repeated exposure.

Storage
Suitable
Keep tightly closed.

Section 8 - Exposure Controls / PPE

Engineering Controls
Use only in a chemical fume hood. Safety shower and eye bath.

Personal Protective Equipment
Respiratory
Government approved respirator in nonventilated areas and/or for exposure above the TLV or PEL
Hand
Compatible chemical-resistant gloves.
Eye
Chemical safety goggles.

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General Hygiene Measures

Wash contaminated clothing before reuse. Wash thoroughly after handling.

Exposure Limits, RTECS

Country	Source	Type	Value
USA	ACGIH	TWA	3 MG/M3 RESPIRABLE PARTICULAT
USA	ACGIH	TWA	10 MG/M3 E
USA	MSHA Standard-dust in air	TWA	20 MCCPP
USA	OSHA	PEL	8H TWA 80 MG/M3-%SiO2
New Zealand	OEL		
Remarks: check ACGIH TLV			
USA	NIOSH	TWA	6 MG/M3

Section 9 - Physical/Chemical Properties

Appearance
Physical State
Solid

Molecular Weight: N/A

pH N/A

BP/BP Range N/A

MP/MP Range N/A

Freezing Point N/A

Vapor Pressure N/A

Vapor Density N/A

Saturated Vapor Conc. N/A

SG/Density N/A

Bulk Density N/A

Odor Threshold N/A

Volatiles% N/A

VOC Content N/A

Water Content N/A

Solvent Content N/A

Evaporation Rate N/A

Viscosity N/A

Partition Coefficient N/A

Decomposition Temp. N/A

Flash Point °F N/A

Flash Point °C N/A

Explosion Limits N/A

Flammability N/A

Autoignition Temp N/A

Solubility N/A

N/A = not available

Section 10 - Stability and Reactivity

Stability

Stable

Stable

Materials to Avoid

Strong acids, Hydrogen fluoride.

Hazardous Decomposition Products

Hazardous Decomposition Products

Nature of decomposition products not known.

Hazardous Polymerization

Hazardous Polymerization

Will not occur.

Section 11 - Toxicological Information

Route of Exposure

Skin Contact

Causes skin irritation.

Skin Absorption

May be harmful if absorbed through the skin.

Eye Contact

Causes eye irritation.

Inhalation

May be harmful if inhaled. Material may be irritating to mucous membranes and upper respiratory tract.

Ingestion

May be harmful if swallowed.

Target Organ(s) or System(s)

Lungs.

Signs and Symptoms of Exposure

Prolonged inhalation of crystalline silica may result in silicosis, a disabling pulmonary fibrosis characterized by fibrotic changes and milary nodules in the lungs, a dry cough, shortness of breath, emphysema, decreased chest expansion, and increased susceptibility to tuberculosis. In advanced stages, loss of appetite, pleuritic pain, and total incapacity to work. Advanced silicosis may result in death due to cardiac failure or destruction of lung tissue. Crystalline silica is classified as group 1 "known to be carcinogenic to humans" by IARC and "sufficient evidence" of carcinogenicity by the NTP.

RTECS Number: VV7311000

Chronic Exposure - Carcinogen

Result: This is or contains a component that has been reported to be carcinogenic based on its IARC, OSHA, ACGIH, NTP, or EPA classification.

IARC Carcinogen List

Rating

Group 3

Section 12 - Ecological Information

No data available.

Section 13 - Disposal Considerations

Appropriate Method of Disposal or Preparation

Contact a licensed professional waste disposal service to dispose of this material. Observe all federal, state, and local environmental regulations.

Section 14 - Transport Information

DOT

Proper Shipping Name: None

Non-Hazardous for Transport: This substance is considered to be non-hazardous for transport.

IATA

Non-Hazardous for Air Transport: Non-hazardous for air transport.

Section 15 - Regulatory Information

EU Additional Classification

Symbol of Danger: T

Indication of Danger

Toxic

Risk Statements R: 45 36/38

May cause cancer. Irritating to eyes and skin.

Safety Statements S: 53 22 26 45

Avoid exposure - obtain special instructions before use. Do not breathe dust. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

US Classification and Label Text

Indication of Danger

Toxic.

Risk Statements

May cause cancer. Irritating to eyes and skin.

Safety Statements

Avoid exposure - obtain special instructions before use. Do not breathe dust. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

US Statements

Calif. Prop. 65 carcinogen. Target organ(s): Lungs.

United States Regulatory Information

SARA Listed: No

TSCA Inventory Item: Yes

United States - State Regulatory Information

California Prop - 65

This product is or contains chemical(s) known to the state of California to cause cancer.

Canada Regulatory Information

WHMIS Classification

This product has been classified in accordance with the hazard criteria of the CPR, and the MSDS contains all the information required by the CPR.

DSL: No

NDSL: Yes

Section 16 - Other Information

Disclaimer

For R&D use only. Not for drug, household or other uses.

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Warranty

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Inc., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale. Copyright 2005 Sigma-Aldrich Co. License granted to make unlimited paper copies for internal use only.

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SIGMA-ALDRICH

Material Safety Data Sheet

Date Printed: 08/11/2005
Date Updated: 04/05/2004
Version 1.30

Section 1 - Product and Company Information

Product Name	trans-Cinnamaldehyde, 99%
Product Number	C80687
Brand	Aldrich Chemical
Company	Sigma-Aldrich
Street Address	3050 Spruce Street
City, State, Zip, Country	SAINT LOUIS, MO 63103 US
Technical Phone:	314 771 5765
Fax:	800 325 5052
Emergency Phone:	414 273 3850 Ext. 5996

Section 2 - Composition/Information on Ingredient

<u>Substance Name</u>	<u>CAS #</u>	<u>SARA 313</u>	<u>EC no</u>	<u>Annex I Index Number</u>
CINNAMALDEHYDE, TRANS	14371-10-9	No		

Formula C₉H₈O
Synonyms (E)-Cinnamaldehyde, trans-Cinnamic aldehyde, trans-Cinnamylaldehyde, (E)-3-Phenylpropenal, (E)-3-Phenyl-2-propenal, 2-Propenal, 3-phenyl-, (E)- (9CI)

Section 3 - Hazards Identification

Emergency Overview

Irritant.
Irritating to respiratory system and skin. Risk of serious damage to eyes.
Combustible.

HMIS Rating
Health: 2 Flammability: 2 Reactivity: 0

NFPA Rating
Health: 2 Flammability: 2 Reactivity: 0

For additional information on toxicity, please refer to Section 11.

Section 4 - First Aid Measures

Oral Exposure

If swallowed, wash out mouth with water provided person is conscious. Call a physician.

Inhalation Exposure

If inhaled, remove to fresh air. If not breathing give artificial respiration. If breathing is difficult, give oxygen.

Dermal Exposure

In case of contact, immediately wash skin with soap and copious amounts of water.

Eye Exposure

In case of contact, immediately flush eyes with copious amounts of water for at least 15 minutes.

Section 5 - Fire Fighting Measures

Flammable Hazards: Yes

Flash Point: 160 °F 71 °C

Autoignition Temp: N/A

Extinguishing Media
Suitable
Water spray, Carbon dioxide, dry chemical powder, or appropriate foam.

Flammability: Yes

Firefighting

Protective Equipment

Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.

Specific Hazard(s)

Emits toxic fumes under fire conditions. Combustible liquid.

Section 6 - Accidental Release Measures

Procedure(s) of Personal Precaution(s)

Wear respirator, chemical safety goggles, rubber boots, and heavy rubber gloves.

Methods for Cleaning Up

Absorb on sand or vermiculite and place in closed containers for disposal. Ventilate area and wash spill site after material pickup is complete.

Section 7 - Handling and Storage

Handling

User Exposure

Do not breathe vapor. Avoid contact with eyes, skin, and clothing. Avoid prolonged or repeated exposure.

Storage

Suitable

Keep tightly closed. Keep away from heat and open flame. Store at 2-8°C

Section 8 - Exposure Controls / PPE

Engineering Controls

Mechanical exhaust required. Safety shower and eye bath.

Personal Protective Equipment

Respiratory

Government approved respirator.

Hand

Compatible chemical-resistant gloves.

Eye

Chemical safety goggles.

General Hygiene Measures
Wash thoroughly after handling.

Section 9 - Physical/Chemical Properties

Appearance Physical State	
Liquid	
Molecular Weight:	132.16 AMU
Property	Value
pH	N/A
BP/MP Range	248 °C
MP/MP Range	-7.5 °C
Freezing Point	N/A
Vapor Pressure	N/A
Vapor Density	4.6 g/l
Saturated Vapor Conc.	N/A
SG/Density	1.05 g/cm3
Bulk Density	N/A
Odor Threshold	N/A
Volatiles%	N/A
VOC Content	N/A
Water Content	N/A
Solvent Content	N/A
Evaporation Rate	N/A
Viscosity	N/A
Partition Coefficient	N/A
Decomposition Temp.	N/A
Flash Point °F	160 °F
Flash Point °C	71 °C
Explosion Limits	N/A
Flammability	N/A
Autoignition Temp	N/A
Refractive Index	1.622
Solubility	N/A
N/A = not available	

Section 10 - Stability and Reactivity

Stability	Stable
Materials to Avoid	Strong oxidizing agents, Strong bases.
Hazardous Decomposition Products	Hazardous Decomposition Products
Hazardous Decomposition Products	Carbon monoxide, Carbon dioxide.

Hazardous Polymerization
Hazardous Polymerization
Will not occur.

Section 11 - Toxicological Information

Route of Exposure	
Skin Contact	
Causes skin irritation.	
Skin Absorption	
May be harmful if absorbed through the skin.	
Eye Contact	
Causes severe eye irritation.	
Inhalation	
May be harmful if inhaled. Material is irritating to mucous membranes and upper respiratory tract.	
Ingestion	
May be harmful if swallowed.	

Signs and Symptoms of Exposure

Symptoms of exposure may include burning sensation, coughing, wheezing, laryngitis, shortness of breath, headache, nausea, and vomiting. To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

RTECS Number: GD6476000

Chronic Exposure - Mutagen	
Species	Dose
Rat	1100 MG/KG
Mouse	850 MG/KG
Hamster	10 NMOL/L
Hamster	2 NMOL/L
Hamster	340 UG/L

Mutation test

Micronucleus test	fibroblast
Morphological transformation.	fibroblast
Cytogenetic analysis	ovary
Sister chromatid exchange	

Section 12 - Ecological Information

No data available.

Section 13 - Disposal Considerations

Appropriate Method of Disposal of Substance or Preparation

Contact a licensed professional waste disposal service to dispose of this material.
This combustible material may be burned in a chemical incinerator equipped with an afterburner and scrubber.
Observe all federal, state, and local environmental regulations.

Section 14 - Transport Information

DOT	Proper Shipping Name: Combustible liquid, n.o.s.
UN#:	1993
Class:	COMBUSTIBLE LIQUID
Packing Group:	Packing Group III
Hazard Label:	None
PIH:	Not PIH

IATA

Non-Hazardous for Air Transport: Non-hazardous for air transport.

Section 15 - Regulatory Information

EU Additional Classification

Symbol of Danger: Xi

Indication of Danger

Irritant

Risk Statements R: 37/38 41

Irritating to respiratory system and skin. Risk of serious damage to eyes.

Safety Statements S: 26 39

In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Wear eye/face protection.

US Classification and Label Text

Indication of Danger

Irritant

Risk Statements

Irritating to respiratory system and skin. Risk of serious damage to eyes.

Safety Statements

In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Wear eye/face protection.

US Statements

Combustible.

United States Regulatory Information

SARA Listed: No

Canada Regulatory Information

WHMIS Classification

This product has been classified in accordance with the hazard criteria of the CPR, and the MSDS contains all the information required by the CPR.

DSL: No

NDSL: No

Section 16 - Other Information

Disclaimer

For R&D use only. Not for drug, household or other uses.

Warranty

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Inc., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale. Copyright 2005 Sigma-Aldrich Co. License granted to make unlimited paper copies for internal use only.



SIGMA-ALDRICH

Material Safety Data Sheet

Date Printed: 08/11/2005
Date Updated: 04/04/2004
Version 1.30

Section 1 - Product and Company Information

Product Name 4-Methylcyclohexanone, 99%
Product Number 173614
Brand Aldrich Chemical
Company Sigma-Aldrich
Street Address 3050 Spruce Street
City, State, Zip, Country SAINT LOUIS, MO 63103 US
Technical Phone: 314.771.5765
Fax: 800.325.5052
Emergency Phone: 414.273.3850 Ext. 5996

Section 2 - Composition/Information on Ingredient

Substance Name	CAS #	SARA 313	EC no	Annex I Index Number
4-METHYLCYCLOHEXANONE	589-92-4	No	209-665-3	
Formula	C7H12O			
Synonyms	4-Methylcyclohexanone, Methyl-4 cyclohexanone-1 (French)			

Section 3 - Hazards Identification

Emergency Overview
Combustible (USA) Flammable (EU). Harmful.
Harmful if swallowed.

HMIS Rating Health: 1	Flammability: 2	Reactivity: 0
NFPA Rating Health: 1	Flammability: 2	Reactivity: 0

For additional information on toxicity, please refer to Section 11.

Section 4 - First Aid Measures

Oral Exposure
If swallowed, wash out mouth with water provided person is conscious. Call a physician.

Inhalation Exposure
If inhaled, remove to fresh air. If not breathing give artificial respiration. If breathing is difficult, give oxygen.

Dermal Exposure
In case of contact, immediately wash skin with soap and copious amounts of water.

Eye Exposure
In case of contact, immediately flush eyes with copious amounts of water for at least 15 minutes.

Section 5 - Fire Fighting Measures

Flash Point: 118.4 °F 48 °C
Autoignition Temp: N/A
Extinguishing Media
Suitable
Water spray, Carbon dioxide, dry chemical powder, or appropriate foam.

Firefighting

Protective Equipment

Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.
Specific Hazard(s)
Combustible liquid. Emits toxic fumes under fire conditions.

Section 6 - Accidental Release Measures

Procedure to be Followed in Case of Leak or Spill
Evacuate area.

Procedure(s) of Personal Precaution(s)

Wear respirator, chemical safety goggles, rubber boots, and heavy rubber gloves.

Methods for Cleaning Up

Cover with dry-lime, sand, or soda ash. Place in covered containers using non-sparking tools and transport outdoors. Ventilate area and wash spill site after material pickup is complete.

Section 7 - Handling and Storage

Handling

User Exposure

Avoid breathing vapor. Avoid contact with eyes, skin, and clothing. Avoid prolonged or repeated exposure.

Storage

Suitable

Keep tightly closed. Keep away from heat and open flame.

Section 8 - Exposure Controls / PPE

Engineering Controls

Safety shower and eye bath. Mechanical exhaust required.

Personal Protective Equipment

Respiratory

Government approved respirator.

Hand

Compatible chemical-resistant gloves.

Eye

Chemical safety goggles.

General Hygiene Measures
Wash contaminated clothing before reuse. Wash thoroughly after handling.

Section 9 - Physical/Chemical Properties

Appearance	Color	Form
	Faintly yellow	Clear liquid
Molecular Weight:	112.17 AMU	
<u>Property</u>	<u>Value</u>	<u>At Temperature or Pressure</u>
pH	N/A	
BP/BP Range	60 - 62 °C	10 mmHg
MP/MP Range	N/A	
Freezing Point	N/A	
Vapor Pressure	N/A	
Vapor Density	N/A	
Saturated Vapor Conc.	N/A	
SG/Density	0.914 g/cm3	
Bulk Density	N/A	
Odor Threshold	N/A	
Volatile%	N/A	
VOC Content	N/A	
Water Content	N/A	
Solvent Content	N/A	
Evaporation Rate	N/A	
Viscosity	N/A	
Partition Coefficient	N/A	
Decomposition Temp.	N/A	
Flash Point °F	118.4 °F	
Flash Point °C	48 °C	
Explosion Limits	N/A	
Flammability	N/A	
Autoignition Temp	N/A	
Refractive Index	1.445	
Solubility	N/A	
N/A = not available		

Method: closed cup
Method: closed cup

Section 10 - Stability and Reactivity

Stability	Stable
Materials to Avoid	Strong oxidizing agents, Strong reducing agents, Strong bases.
Hazardous Decomposition Products	
Hazardous Decomposition Products	Carbon monoxide, Carbon dioxide.

Hazardous Polymerization
Hazardous Polymerization
Will not occur.

Section 11 - Toxicological Information

Route of Exposure	
Skin Contact	May cause skin irritation.
Skin Absorption	May be harmful if absorbed through the skin.
Eye Contact	May cause eye irritation.
Inhalation	May be harmful if inhaled.
Ingestion	Harmful if swallowed.

Signs and Symptoms of Exposure

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

RTECS Number: GW1750200

Toxicity Data

Oral - Rat: 800 mg/kg (LD50)
Oral - Mouse: 1600 mg/kg (LD50)

Section 12 - Ecological Information

No data available.

Section 13 - Disposal Considerations

Appropriate Method of Disposal or Substance or Preparation
Contact a licensed professional waste disposal service to dispose of this material.
This combustible material may be burned in a chemical incinerator equipped with an afterburner and scrubber.
Observe all federal, state, and local environmental regulations.

Section 14 - Transport Information

DOT	Proper Shipping Name: Methylcyclohexanone
UN#:	2297
Class:	3
Packing Group:	Packing Group III
Hazard Label:	Flammable liquid
PH:	Not PIH
IATA	
Proper Shipping Name:	Methylcyclohexanone
IATA UN Number:	2297
Hazard Class:	3
Packing Group:	III

Section 15 - Regulatory Information

EU Additional Classification

Symbol of Danger: Xn

Indication of Danger

Harmful

Risk Statements R: 10 22

Flammable, Harmful if swallowed.

Safety Statements S: 16 36

Keep away from sources of ignition - no smoking. Wear suitable protective clothing.

US Classification and Label Text

Indication of Danger

Combustible (USA) Flammable (EU). Harmful.

Risk Statements

Harmful if swallowed.

Safety Statements

Keep away from sources of ignition - no smoking. Wear suitable protective clothing.

United States Regulatory Information

SARA Listed: No

TSCA Inventory Item: Yes

Canada Regulatory Information

WHMIS Classification

This product has been classified in accordance with the hazard criteria of the CPR, and the MSDS contains all the information required by the CPR.

DSL: Yes

NDSL: No

Section 16 - Other Information

Disclaimer

For R&D use only. Not for drug, household or other uses.

Warranty

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Inc., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale. Copyright 2005 Sigma-Aldrich Co. License granted to make unlimited paper copies for internal use only.



SIGMA-ALDRICH

Material Safety Data Sheet

Date Printed: 08/11/2005
Date Updated: 03/06/2004
Version 1.40

Section 1 - Product and Company Information

Product Name	Pentane, anhydrous, 99+%
Product Number	236705
Brand	Aldrich Chemical
Company	Sigma-Aldrich
Street Address	3050 Spruce Street
City, State, Zip, Country	SAINT LOUIS, MO 63103 US
Technical Phone:	314 771 5766
Fax:	800 325 5052
Emergency Phone:	414 273 3850 Ext. 5996

Section 2 - Composition/Information on Ingredient

Substance Name	CAS #	SARA 313	EC no	Annex I Index Number
N-PENTANE	109-66-0	No	203-682-4	601-006-00-1

Formula C5H12
Synonyms Amyl hydride, Pentan (Polish), Pentane (ACGIH/OSHA), Pentanen (Dutch), Pentant (Italian), Skellysolve A

Section 3 - Hazards Identification

Emergency Overview

Flammable (USA) Extremely Flammable (EU). Harmful. Dangerous for the environment. Extremely flammable. Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. Irritating to eyes, respiratory system and skin. Harmful: may cause lung damage if swallowed. Repeated exposure may cause skin dryness or cracking. Vapors may cause drowsiness and dizziness.

Target organ(s): Nerves, Heart.

HMIS Rating
Health: 1*
Flammability: 4
Reactivity: 0

NFPA Rating
Health: 1
Flammability: 4
Reactivity: 0

*additional chronic hazards present.

For additional information on toxicity, please refer to Section 11.

Section 4 - First Aid Measures

Oral Exposure

If swallowed, wash out mouth with water provided person is conscious. Call a physician.

Inhalation Exposure

If inhaled, remove to fresh air. If not breathing give artificial respiration. If breathing is difficult, give oxygen.

Dermal Exposure

In case of skin contact, flush with copious amounts of water for at least 15 minutes. Remove contaminated clothing and shoes. Call a physician.

Eye Exposure

In case of contact with eyes, flush with copious amounts of water for at least 15 minutes. Assure adequate flushing by separating the eyelids with fingers. Call a physician.

Section 5 - Fire Fighting Measures

Flammable Hazards: Yes

Explosion Hazards

Vapor may travel considerable distance to source of ignition and flash back. Container explosion can occur under fire conditions. In advanced or massive fires the area should be evacuated and the fire should be fought from a remote explosion-resistant location.

Flash Point: -57 °F -49 °C

Explosion Limits: Lower: 1.4 % Upper: 8.3 %

Autoignition Temp: 260 °C **Flammability:** Yes

Extinguishing Media

Suitable
Water spray, Carbon dioxide, dry chemical powder, or appropriate foam.

Firefighting

Protective Equipment

Vapor self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.

Specific Hazard(s)

Flammable liquid. Emits toxic fumes under fire conditions.

Section 6 - Accidental Release Measures

Procedure to be Followed in Case of Leak or Spill

Evacuate area. Shut off all sources of ignition.

Procedure(s) of Personal Precaution(s)

Wear self-contained breathing apparatus, rubber boots, and heavy rubber gloves.

Methods for Cleaning Up

Cover with dry-lime, sand, or soda ash. Place in covered containers using non-sparking tools and transport outdoors. Ventilate area and wash spill site after material pickup is complete.

Section 7 - Handling and Storage

Handling

User Exposure

Do not breathe vapor. Avoid contact with eyes, skin, and clothing. Avoid prolonged or repeated exposure. Open carefully.

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Storage

Suitable
Keep container closed. Keep away from heat, sparks, and open flame. Store in a cool dry place. Store under nitrogen.

Special Requirements

May develop pressure. Refrigerate before opening.

Section 8 - Exposure Controls / PPE

Engineering Controls

Safety shower and eye bath. Use nonsparking tools. Mechanical exhaust required.

Personal Protective Equipment

Respiratory
Government approved respirator.

Hand

Compatible chemical-resistant gloves.

Eye

Chemical safety goggles.

General Hygiene Measures

Wash thoroughly after handling. Wash contaminated clothing before reuse.

Exposure Limits

Country	Type	Value
Poland	NDS	1800 MG/M3
Poland	NDSch	2300 MG/M3
Poland	NDSF	

Exposure Limits, RTECS

Country	Source	Value
USA	ACGIH	600 PPM
USA	MSHA Standard-air	500 PPM (1475 MG/M3)
USA	OSHA	8H TWA 1000 PPM (2950 MG/M3)
New Zealand	OEL	120 PPM 610 PPM/15M
Remarks: check ACGIH TLV	NIOSH	
USA		TWACelling concentration

Section 9 - Physical/Chemical Properties

Appearance
Physical State
Clear liquid

Color
Colorless

Molecular Weight: 72.15 AMU

pH
N/A
BP/BP Range
35 - 36 °C
MP/MP Range
-130 °C
Freezing Point
N/A
Vapor Pressure
434.28 mmHg
Vapor Density
2.48 g/l
Saturated Vapor Conc.
N/A
SG/Density
0.626 g/cm3
Bulk Density
N/A
Odor Threshold
N/A
Volatiles%
N/A

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VOC Content
N/A
Water Content
< 0.01 %
Solvent Content
N/A
Evaporation Rate
N/A
Viscosity
N/A
Partition Coefficient
Log Kow: 3.39
Decomposition Temp.
N/A
Flash Point °F
-57 °F
Flash Point °C
-49 °C
Explosion Limits
Lower: 1.4 %
Upper: 8.3 %
Flammability
N/A
Autoignition Temp
260 °C
Refractive Index
1.358
Solubility
N/A

Method: closed cup
Method: closed cup

N/A = not available

Section 10 - Stability and Reactivity

Stability

Stable.

Materials to Avoid

Strong oxidizing agents.

Hazardous Decomposition Products

Hazardous Decomposition Products
Carbon monoxide, Carbon dioxide.

Hazardous Polymerization

Hazardous Polymerization
Will not occur.

Section 11 - Toxicological Information

Route of Exposure

Skin Contact

May cause skin irritation.

Skin Absorption

May be harmful if absorbed through the skin.

Eye Contact

May cause eye irritation.

Inhalation

Material may be irritating to mucous membranes and upper respiratory tract. May be harmful if inhaled.

Ingestion

May be harmful if swallowed.

Target Organ(s) or System(s)

Central nervous system. Heart. Lungs.

Signs and Symptoms of Exposure

Contact with eyes can cause redness, tearing, and blurred vision. Prolonged or repeated contact with skin can cause defatting and dermatitis. CNS depression. Damage to the lungs.

RTECS Number: RZ9450000

Toxicity Data

Inhalation - Rat: 364,000 mg/m3 (LC50)
Intravenous - Mouse: 446 MG/KG (LD50)

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Section 12 - Ecological Information

Accumulation
Bioaccumulation Potential
Indication of bioaccumulation.

Acute Ecotoxicity Tests

Test Type
EC50 Daphnia
Species
Daphnia magna
Time: 48.0 h
Value: 9.74 mg/l

Additional Results/Data from Relevant Scientific Experiments

Avoid contamination of the environment. Because of harmful effects on water organisms, this material should not be introduced into drains.

Section 13 - Disposal Considerations

Appropriate Method of Disposal of Substance or Preparation

Contact a licensed professional waste disposal service to dispose of this material.
Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable.
Observe all federal, state, and local environmental regulations.

Section 14 - Transport Information

DOT

Proper Shipping Name: Pentanes
UN#: 1265
Class: 3
Packing Group: Packing Group II
Hazard Label: Flammable liquid
PIH: Not PIH

IATA

Proper Shipping Name: Pentanes
IATA UN Number: 1265
Hazard Class: 3
Packing Group: II

Section 15 - Regulatory Information

EU Directives Classification

Symbol of Danger: F+ Xn N

Indication of Danger

Extremely Flammable. Harmful. Dangerous for the environment.

Risk Statements
R: 12 51/53 65 66 67

Extremely flammable. Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. Harmful; may cause lung damage if swallowed. Repeated exposure may cause skin dryness or cracking. Vapors may cause drowsiness and dizziness.

Safety Statements

S: 9 16 29 33 61 62

Keep container in a well-ventilated place. Keep away from sources of ignition - no smoking. Do not empty into drains. Take precautionary measures against static discharges. Avoid release to the environment. Refer to special instructions/safety data sheets. If swallowed, do not induce vomiting; seek medical advice immediately and show this container or label.

US Classification and Label Text

Indication of Danger

Flammable (USA) Extremely Flammable (EU). Harmful. Dangerous for the environment.

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Risk Statements

Extremely flammable. Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. Irritating to eyes, respiratory system and skin. Harmful; may cause lung damage if swallowed. Repeated exposure may cause skin dryness or cracking. Vapors may cause drowsiness and dizziness.

Safety Statements

Keep container in a well-ventilated place. Keep away from sources of ignition - no smoking. Do not empty into drains. Take precautionary measures against static discharges. Avoid release to the environment. Refer to special instructions/safety data sheets. If swallowed, do not induce vomiting; seek medical advice immediately and show this container or label.

US Statements

Target organ(s): Nerves. Heart.

United States Regulatory Information

SARA Listed: No

TSCA Inventory Item: Yes

Canada Regulatory Information

WHMIS Classification

This product has been classified in accordance with the hazard criteria of the CPR, and the MSDS contains all the information required by the CPR.

DSL: Yes

NDSL: No

Section 16 - Other Information

Disclaimer

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8/11/05

MSDS Address Confirmation

Our records indicate your MSDS address as:

Sold-To Acct. # 0049487708
MSDS Recipient Acct. # 0049487708
SCHOOLCRAFT COLLEGE
18600 HAGGERTY RD
LIVONIA, MI 48152-3932
US

Address Correction:

Authorized by: _____

Telephone: _____

Comments(if necessary): _____

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*I hereby certify that my organization meets all 29 CFR 1910.1200 OSHA HAZCOMM requirements by alternative means, electronic or otherwise, and do not require Sigma-Aldrich to send me a paper copy of MSDS' for any and all products ordered from Sigma-Aldrich Corporation.

Signature of Corporate Product Safety Director _____

Date: _____

Print Safety Director Name: _____

Telephone : _____

Ref. PackageID #00000000000012848257

Please fax completed confirmation to our CMMG department at 877-380-2660 or 314-286-8083 or e-mail address changes to cmmg@sial.com.