

SIGMA-ALDRICH

ALDRICH CHEMICAL COMPANY, INC.
P.O. BOX 355
MILWAUKEE, WISCONSIN 53201, USA

114105

ATTN: SAFETY DIRECTOR

EMERGENCY PHONE 1-414-273-3850

WM FITZGERALD
UNIVERSITY OF WISCONSIN WHITEWATER
P O BOX 296
WHITEWATER WI 53190-0296

DATE 02/26/97
CUST#: 523216
PO#: QJ0846

M A T E R I A L S A F E T Y D A T A S H E E T PAGE 1

SECTION 1. - - - - - CHEMICAL IDENTIFICATION - - - - -

CATALOG #: 17919-1
NAME: CYCLOHEXANE, 99+%, A.C.S. REAGENT

SECTION 2. - - - - - COMPOSITION/INFORMATION ON INGREDIENTS - - - - -

CAS #: 110-82-7
MF: C6H12
EC NO: 203-806-2

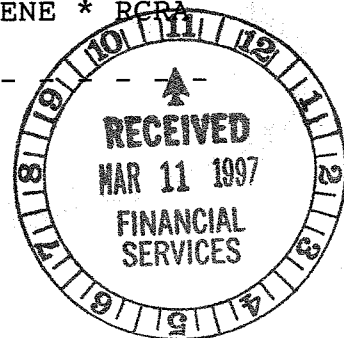
SYNONYMS

BENZENE, HEXAHYDRO- * CICLOESANO (ITALIAN) * CYCLOHEXAAN (DUTCH) *
CYCLOHEXAN (GERMAN) * CYCLOHEXANE (ACGIH:DOT:OSHA) * CYKLOHEKSAN
(POLISH) * HEXAHYDROBENZENE * HEXAMETHYLENE * HEXANAPHTHENE * BCRA
WASTE NUMBER U056 * UN1145 (DOT) *

SECTION 3. - - - - - HAZARDS IDENTIFICATION - - - - -

LABEL PRECAUTIONARY STATEMENTS

FLAMMABLE (USA)
HIGHLY FLAMMABLE (EU)
HARMFUL
HARMFUL BY INHALATION AND IF SWALLOWED.
IRRITATING TO EYES, RESPIRATORY SYSTEM AND SKIN.
TARGET ORGAN(S):
LUNGS
CENTRAL NERVOUS SYSTEM
KEEP AWAY FROM SOURCES OF IGNITION - NO SMOKING.
TAKE PRECAUTIONARY MEASURES AGAINST STATIC DISCHARGES.
KEEP CONTAINER IN A WELL-VENTILATED PLACE.
IN CASE OF CONTACT WITH EYES, RINSE IMMEDIATELY WITH PLENTY OF
WATER AND SEEK MEDICAL ADVICE.



SECTION 4. - - - - - FIRST-AID MEASURES - - - - -

IN CASE OF CONTACT, IMMEDIATELY WASH SKIN WITH SOAP AND COPIOUS AMOUNTS OF WATER.
CONTAMINATION OF THE EYES SHOULD BE TREATED BY IMMEDIATE AND PROLONGED IRRIGATION WITH COPIOUS AMOUNTS OF WATER.
ASSURE ADEQUATE FLUSHING OF THE EYES BY SEPARATING THE EYELIDS WITH FINGERS.
IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.
IF SWALLOWED, WASH OUT MOUTH WITH WATER PROVIDED PERSON IS CONSCIOUS. CALL A PHYSICIAN.
WASH CONTAMINATED CLOTHING BEFORE REUSE.

SECTION 5. - - - - - FIRE FIGHTING MEASURES - - - - -

EXTINGUISHING MEDIA

CONTINUED ON NEXT PAGE

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CARBON DIOXIDE, DRY CHEMICAL POWDER OR APPROPRIATE FOAM.
WATER MAY BE EFFECTIVE FOR COOLING, BUT MAY NOT EFFECT EXTINGUISHMENT.

SPECIAL FIREFIGHTING PROCEDURES
WEAR SELF-CONTAINED BREATHING APPARATUS AND PROTECTIVE CLOTHING TO
PREVENT CONTACT WITH SKIN AND EYES.
USE WATER SPRAY TO COOL FIRE-EXPOSED CONTAINERS.

UNUSUAL FIRE AND EXPLOSIONS HAZARDS
EXTREMELY FLAMMABLE.
VAPOR MAY TRAVEL CONSIDERABLE DISTANCE TO SOURCE OF IGNITION AND
FLASH BACK.
CONTAINER EXPLOSION MAY OCCUR UNDER FIRE CONDITIONS.

SECTION 6. - - - - - ACCIDENTAL RELEASE MEASURES - - - - -

EVACUATE AREA.
SHUT OFF ALL SOURCES OF IGNITION.
WEAR SELF-CONTAINED BREATHING APPARATUS, RUBBER BOOTS AND HEAVY
RUBBER GLOVES.
COVER WITH AN ACTIVATED CARBON ADSORBENT, TAKE UP AND PLACE IN CLOSED
CONTAINERS. TRANSPORT OUTDOORS.
VENTILATE AREA AND WASH SPILL SITE AFTER MATERIAL PICKUP IS COMPLETE.

SECTION 7. - - - - - HANDLING AND STORAGE - - - - -

REFER TO SECTION 8.

SECTION 8. - - - - - EXPOSURE CONTROLS/PERSONAL PROTECTION - - - - -

WEAR APPROPRIATE NIOSH/MSHA-APPROVED RESPIRATOR, CHEMICAL-RESISTANT
GLOVES, SAFETY GOGGLES, OTHER PROTECTIVE CLOTHING.
MECHANICAL EXHAUST REQUIRED.
SAFETY SHOWER AND EYE BATH.
USE NONSPARKING TOOLS.
DO NOT BREATHE VAPOR.
DO NOT GET IN EYES, ON SKIN, ON CLOTHING.
WASH THOROUGHLY AFTER HANDLING.
IRRITANT.
HARMFUL LIQUID.
KEEP TIGHTLY CLOSED.
KEEP AWAY FROM HEAT, SPARKS, AND OPEN FLAME.
STORE IN A COOL DRY PLACE.

SECTION 9. - - - - - PHYSICAL AND CHEMICAL PROPERTIES - - - - -

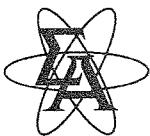
APPEARANCE AND ODOR
COLORLESS LIQUID

PHYSICAL PROPERTIES
BOILING POINT: 80.7 C
MELTING POINT: 6.5 C

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ARCH



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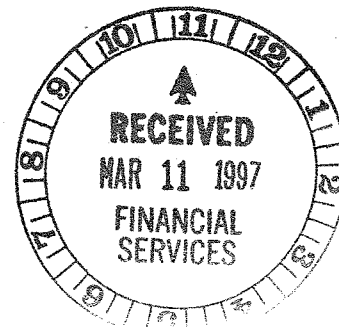
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M A T E R I A L S A F E T Y D A T A S H E E T

PAGE 3

CATALOG #: 17919-1
NAME: CYCLOHEXANE, 99+%, A.C.S. REAGENT
FLASHPOINT: -1 F / 17C
EXPLOSION LIMITS IN AIR:
UPPER: 9%
LOWER: 1%
AUTOIGNITION TEMPERATURE: 500 F / 259C
VAPOR PRESSURE: 77MM 20 C / 168.8MM 37.7 C
SPECIFIC GRAVITY: 0.779
VAPOR DENSITY: 2.9



SECTION 10. - - - - - STABILITY AND REACTIVITY - - - - -

INCOMPATIBILITIES
OXIDIZING AGENTS

HAZARDOUS COMBUSTION OR DECOMPOSITION PRODUCTS
TOXIC FUMES OF:
CARBON MONOXIDE, CARBON DIOXIDE

SECTION 11. - - - - - TOXICOLOGICAL INFORMATION - - - - -

ACUTE EFFECTS
HARMFUL IF INHALED OR SWALLOWED.
MAY BE HARMFUL IF ABSORBED THROUGH THE SKIN.
VAPOR OR MIST IS IRRITATING TO THE EYES, MUCOUS MEMBRANES AND UPPER
RESPIRATORY TRACT.
CAUSES SKIN IRRITATION.
EXPOSURE CAN CAUSE:
LUNG IRRITATION, CHEST PAIN AND EDEMA WHICH MAY BE FATAL.
GASTROINTESTINAL DISTURBANCES
TARGET ORGAN(S):
LUNGS
NERVES
TO THE BEST OF OUR KNOWLEDGE, THE CHEMICAL, PHYSICAL, AND
TOXICOLOGICAL PROPERTIES HAVE NOT BEEN THOROUGHLY INVESTIGATED.

RTECS #: GU6300000
CYCLOHEXANE

IRRITATION DATA
SKN-RBT 1548 MG/2D-I

JIHTAB 25,199,43

TOXICITY DATA
ORL-RAT LD50:12705 MG/KG
ORL-MUS LD50:813 MG/KG
IHL-MAM LC50:70 GM/M3
TXAPA9 19,699,71
NPIRI* 1,17,74
GTPZAB 32(10),25,88
ONLY SELECTED REGISTRY OF TOXIC EFFECTS OF CHEMICAL SUBSTANCES
(RTECS) DATA IS PRESENTED HERE. SEE ACTUAL ENTRY IN RTECS FOR
COMPLETE INFORMATION.

SECTION 12. - - - - - ECOLOGICAL INFORMATION - - - - -

DATA NOT YET AVAILABLE.

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SECTION 13. ----- DISPOSAL CONSIDERATIONS -----

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 -----

CONTACT ALDRICH CHEMICAL COMPANY FOR TRANSPORTATION INFORMATION.

SECTION 15. ----- REGULATORY INFORMATION -----

EUROPEAN INFORMATION

EC INDEX NO: 601-017-00-1

HIGHLY FLAMMABLE

HARMFUL

R 11

HIGHLY FLAMMABLE.

S 9

KEEP CONTAINER IN A WELL-VENTILATED PLACE.

S 16

KEEP AWAY FROM SOURCES OF IGNITION - NO SMOKING.

S 33

TAKE PRECAUTIONARY MEASURES AGAINST STATIC DISCHARGES.

REVIEWS, STANDARDS, AND REGULATIONS

OEL=MAK

ACGIH TLV-TWA 300 PPM

85INA8 6,355,91

MSHA STANDARD-AIR:TWA 300 PPM (1050 MG/M3)

DTLVS* 3,65,71

OSHA PEL (GEN INDU):8H TWA 300 PPM (1050 MG/M3)

CFRGBR 29,1910.1000,94

OSHA PEL (CONSTRUC):8H TWA 300 PPM (1050 MG/M3)

CFRGBR 29,1926.55,94

OSHA PEL (SHIPYARD):8H TWA 300 PPM (1050 MG/M3)

CFRGBR 29,1915.1000,93

OSHA PEL (FED CONT):8H TWA 300 PPM (1050 MG/M3)

CFRGBR 41,50-204.50,94

OEL-AUSTRALIA:TWA 300 PPM (1050 MG/M3) JAN93

OEL-AUSTRIA:TWA 300 PPM (1050 MG/M3) JAN93

OEL-BELGIUM:TWA 300 PPM (1030 MG/M3) JAN93

OEL-DENMARK:TWA 300 PPM (1050 MG/M3) JAN93

OEL-FINLAND:TWA 300 PPM (1050 MG/M3):STEL 375 PPM (1315 MG/M3) JAN93

OEL-FRANCE:TWA 300 PPM (1050 MG/M3):STEL 375 PPM (1300 MG/M3) JAN93

OEL-GERMANY:TWA 300 PPM (1050 MG/M3) JAN93

OEL-HUNGARY:TWA 500 MG/M3:STEL 1000 MG/M3 JAN93

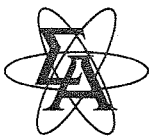
OEL-JAPAN:TWA 150 PPM (520 MG/M3) JAN93

OEL-THE NETHERLANDS:TWA 300 PPM (1050 MG/M3) JAN93

OEL-THE PHILIPPINES:TWA 300 PPM (1050 MG/M3) JAN93

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CATALOG #: 17919-1
NAME: CYCLOHEXANE, 99+%, A.C.S. REAGENT

OEL-POLAND:TWA 80 MG/M3 JAN93
OEL-RUSSIA:TWA 150 PPM;STEL 80 MG/M3 JAN93
OEL-SWEDEN:TWA 300 PPM (1000 MG/M3);STEL 370 PPM (1300 MG/M3) JAN93
OEL-SWITZERLAND:TWA 300 PPM (1050 MG/M3);STEL 600 PPM JAN93
OEL-TURKEY:TWA 300 PPM (1050 MG/M3) JAN93
OEL-UNITED KINGDOM:TWA 300 PPM (1050 MG/M3);STEL 375 PPM JAN93
OEL IN BULGARIA, COLOMBIA, JORDAN, KOREA CHECK ACGIH TLV
OEL IN NEW ZEALAND, SINGAPORE, VIETNAM CHECK ACGIH TLV
NIOSH REL TO CYCLOHEXANE-AIR:10H TWA 300 PPM
NIOSH* DHHS #92-100,92
NOHS 1974: HZD 21190; NIS 117; TNF 14841; NOS 74; TNE 125761
NOES 1983: HZD 21190; NIS 37; TNF 2260; NOS 54; TNE 55077; TFE 14873
EPA GENETOX PROGRAM 1988, NEGATIVE: CELL TRANSFORM.-SA7/SHE; HISTIDINE
REVERSION-AMES TEST
EPA TSCA SECTION 8(B) CHEMICAL INVENTORY
EPA TSCA SECTION 8(D) UNPUBLISHED HEALTH/SAFETY STUDIES
EPA TSCA TEST SUBMISSION (TSCATS) DATA BASE, OCTOBER 1996
NIOSH ANALYTICAL METHOD, 1994: HYDROCARBONS, BP 36-126 DEGREE C, 1500

U.S. INFORMATION
THIS PRODUCT IS SUBJECT TO SARA SECTION 313 REPORTING REQUIREMENTS.

SECTION 16. - - - - - OTHER INFORMATION - - - - -

THE ABOVE INFORMATION IS BELIEVED TO BE CORRECT BUT DOES NOT PURPORT TO BE ALL INCLUSIVE AND SHALL BE USED ONLY AS A GUIDE. ALDRICH 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.

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RESEARCH