

Appendix A
Scope of Work

(3196314G)

WGE

ORDER FOR SUPPLIES OR SERVICES

FORM Approved OMB No. 0704-0047 Expires Aug. 31, 1992

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Public Reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0497-0187), Washington, DC 20503.

1. CONTRACT/PURCH ORDER NO. DACA31-94-D-0085		2. DELIVERY ORDER NO. 0004		3. DATE OF ORDER 98 Sep 30		4. REQUISITION/PURCH REQUEST NO. CETHAM-8143-V001		5. CERTIFIED FOR NATIONAL DEFENSE UNDER DMS REG 1 DO-81	
6. ISSUED BY CENAB, CONTRACTING DIVISION ATTN: CENAB-CT-V/E.M. Rutherford 10 S. Howard St. BALTIMORE, MD 21201 (410) 962-0190				7. ADMINISTERED BY (if other than 6) DCMAO - Clearwater 9549 Koger Blvd, N. Suite 200 St. Petersburg, FL 33702		8. ADMINISTERED BY CODE S1109A		9. DELIVERY FOB () DMT (X) OTHER (See Schedule 7 if other)	
8. CONTRACTOR Environmental Science & Engineering, Inc. ATTN: Jack Burrows P.O. Box 1703 Gainesville, FL 32602-1703				9. FACILITY CODE		10. DELIVER TO FOR POINT BY (Date) 05 Feb 98		11. MARK IF BUSINESS IS () SMALL () SMALL DISAB- VANTAGED () WOMEN-OWNED	
9. CONTRACTOR CODE 1N480				10. PAYMENT WILL BE MADE BY DFAS-Columbus Center DFAS-CO/Southeast P.O. Box 1822225 Columbus, OH 43218-2225		11. DISCOUNT TERMS		12. MAIL INVOICES TO See Block 15.	
14. SHIP TO CDR, USAEC ATTN: SFIM-AEC-RM Bldg. # E4460 APG, MD 21010-5801				15. PAYMENT WILL BE MADE BY CODE SC1020		16. MARK ALL PACKAGES AND PAPERS WITH CONTRACT OR ORDER NUMBER			

14. SHIP TO CODE CETHAM		15. PAYMENT WILL BE MADE BY CODE SC1020		16. MARK ALL PACKAGES AND PAPERS WITH CONTRACT OR ORDER NUMBER	
18. DELIVERY X		This delivery order is based on another Government agency or its continuation with and subject to terms and conditions of above referenced contract.			
PURCHASE		Reference your _____ furnish the following on terms specified herein.			
ACCEPTANCE. THE CONTRACTOR HEREBY ACCEPTS THE OFFER REPRESENTED BY THE NUMBERED PURCHASE ORDER AS IT MAY PREVIOUS HAVE BEEN OR IS NOW MODIFIED, SUBJECT TO ALL OF THE TERMS AND CONDITIONS SET FORTH AND AGREES TO PERFORM THE SAME.					

ENVIRONMENTAL SCIENCE & ENGINEERING, INC. NAME OF CONTRACTOR

Signature: *[Signature]* TYPED NAME AND TITLE: BARRY W. PETERMAN, MANAGER, FLORIDA OPERATIONS

DATE SIGNED: 30 SEPT 96

X If this box is marked, supplier must sign Acceptance and return the following number of copies: ONE (1)

17. ACCOUNTING AND APPROPRIATION DATA/LOCAL USE
MIPR7808 SEE PAGE 2 \$1,828,401.00

18. ITEM NO.	19. SCHEDULE OF SUPPLIES/SERVICES	20. QUANTITY ORDERED/ACCEPTED	21. UNIT	22. UNIT PRICE	23. ESTIMATED AMOUNT
	The contractor shall provide the necessary personnel, facilities and materials (except as otherwise provided) to accomplish the effort set forth in the Enclosed Scope of Work for "Site Investigations at Ft. McClellan, AL"				
	This Delivery Order is issued on a Cost-Plus-Fixed-Fee completion basis, pursuant to FAR 18.306(d)(1).				

24. UNITED STATES OF AMERICA DATE: _____

BY: *Mark C. West* CONTRACTING OFFICER

25. TOTAL \$1,828,401.00

26. QUANTITY IN COLUMN 20 HAS BEEN () INSPECTED () RECEIVED () ACCEPTED AND TO THE CONTRACT EXCE

27. RECEIVED AT _____ SA. RECEIVED BY _____

28. QUANTITY IN COLUMN 20 HAS BEEN () INSPECTED () RECEIVED () ACCEPTED AND TO THE CONTRACT EXCE

29. I certify this account is correct and proper for payment

DATE SIGNATURE OF AUTHORIZED GOVERNMENT

DATE SIGNATURE OF CERTIFYING OFFICER

30. INITIALS

31. AMOUNT VERIFIED CORRECT FOR

32. CHECK NUMBER

33. BILL OF LADING NO.

34. INVOICE VOUCHER NO.

Post-It™ brand fax transmittal memo 7671 # of pages >

To: JACK BURROWS FROM: Edw M. RUTHERFORD

Co. ESE Co. CENAB-CT-V

Dept. CONTRACTING PR. NO. (410) 962-0190

Fax # (352) 333 6625 Fax # (410) 962-2001

COMPUTER GENERATED DD FORM 1108, SEP 88

CONTRACTOR MUST SUBMIT FOUR COPIES OF INVOICE

STANDARD FORM 36, JULY 1983		CONTINUATION SHEET		REF. NO OF DOC BEING CONT'D.	PAGE	OF
GENERAL SERVICES ADMINISTRATION FED. PROC. REG. (41CFR) 1-16.101				DACA31-94-D-0065 Delivery Order 0004	2	20
NAME OF OFFEROR OR CONTRACTOR						
Environmental Science and Engineering, Inc.						
ITEM NO.	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT	
0001	Performance of the effort as set forth in the statement of work attached hereto and made a part hereof, entitled "Site Investigations at Ft. McClellan, AL." Estimated Cost FEE @ 8.0% FCCOM Total Amount	1	LS		\$1,721,005.00 \$82,347.00 \$13,049.00 <u>\$1,826,401.00</u>	
0001AA	WBS 04.01 Mngmt Plan/Mnthly Rpts					
0001AB	WBS 04.02 Mtgs Briefings					
0001AC	WBS 04.03 Project Plans					
0001AD	WBS 04.04 Fieldwork					
0001AE	WBS 04.05 Analysis/Validation					
0001AF	WBS 04.06 Site Insp Rpt					
0001AG	WBS 04.07 Decision Docs					
0001AH	WBS 04.08 Public Reltns					
0001AJ	WBS 04.09 SI Costing					
0002	Preparation and delivery of data IAW the requirements set forth on DD Form 1423, Contract Data Requirements List, Exhibit A of the basic contract. *NSP - Not Separately Priced Contracting Officer's Representative: DEAN HUTCHINS SFIM-AEC-RPO (410) 671-1630 Appropriation: 07X0510.40B1 Suppl Actg Class 22-3400 P81546.R13 AMSCO 25CZ X ORDER 94D0065/78278BD78 JOB ORDER OBC7 ACRN: AA (\$1,435,000.00) Suppl Actg Class 22-3400 P81546.S03 AMSCO 25CZ X ORDER 94D0065/78278BE78 JOB ORDER OBC7 ACRN: AB (\$391,401) Cost Center CC789000 Element of Cost EOC484 Accounting Station S18001 MIPR: 7806 Project BC7 (BC)	1	LS	*NSP	*NSP	

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1. SCOPE.

1.1 Background:

1.1.1 Location: Fort McClellan (FTMC), comprised of three parts, the Main Post, the Choccolocco Corridor and the Pelham Range, occupies 45,679 acres adjacent to Anniston, Alabama. The Main Post encompasses 19,000 acres and contains the majority of the facilities. The Choccolocco Corridor, occupying approximately 4,500 acres, is leased from the State of Alabama and connects the Main Post with the Talladega National Forest to the east. Pelham Range, consists of approximately 22,000 acres west of the Main Post.

1.1.2 History: The area known as FTMC first attracted military interest as an area for artillery training in 1889. The land was purchased in 1917, as a troop training ground during World War I. Its primary use has been for troop training and demobilization activities. In 1951, the Chemical Corps School and replacement center for the Chemical Corps was located at FTMC to provide advanced phases of chemical, biological, and radiological warfare until 1973. Currently, the primary mission of FTMC is to provide command and support of the U.S. Army Military Police and Chemical Schools/Training Centers, the Training Brigade, and other units as specified by higher headquarters.

1.1.3 Sites: Sites Requiring Investigation: The following sites were either first identified in the 1990 Enhanced Preliminary Assessment or for the recent Environmental Baseline Survey (EBS) for further investigation under this Site Inspection.

- ✓ **1.1.3.1 Chemical School Laboratory Sump [90(7)HR]** ²⁰⁸ The Chemical School Laboratory is located in Bldg. 2218 and provided classroom and laboratory training in basic analytical and laboratory techniques until 1985. The building construction and dates are unknown. Chemical wastes generated at this building included small quantities of acids, bases, solvents, and inorganic chemicals. These wastes were drained to a sump. This sump contents were tested and found to be nonhazardous. When the laboratory was closed in 1985, all of the chemicals were discharged to the sump. This caused a chemical reaction at the site. The sump was pumped out, backfilled, and sealed. It was never determined what type of sewer drainage was located at this building (Weston, 1990). Upon examination of the FTMC sewer maps, during the EBS, sanitary and storm sewer lines are shown as being connected to the building. The exact location of the sump would determine whether it is part of the sanitary or storm sewer system. Further evaluation is required to determine whether hazardous substances were discharged to the storm sewer.
- ✓ **1.1.3.2 BUILDING 3176, BOILER PLANT #1 (RMIS # FTMC-11, 26(4)/PR)** Boiler Plant Number 1 is a steam generating facility. Wastes are generated from blowdown operation from the descaling of the boilers and are generally of a caustic nature. These wastes are then discharged to the sanitary sewer. Boiler Plant Number 1 operates under ADEM permit number 3-01-0017-Z008. A chemical storage area is located east of Boiler Plant Number One. The area is a bermed concrete pad that is used as a pickup and delivery point for sodium hydroxide and as a pickup point for used oil. An outlet drain pipe with a valve is located at one end of the pad. This pipe drains onto the hillside about 1 foot above a concrete drainage

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ditch. No spills have been reported at any of the boiler plants. However, a recent report noted that the soil located at the end of the pipe is covered with oil and soil on one side of the concrete pad is stained. This indicates that spills of unknown size may have occurred in this area.

- ✓ 1.1.3.3 **BUILDING 2278, BOILER PLANT #2 (RMIS # FTMC-12, 23(2)PS)** Boiler Plant Number 2 is a steam generating facility. Wastes are generated from blowdown operation from the descaling of the boilers and are generally of a caustic nature. These wastes are then discharged to the sanitary sewer. Boiler Plant Number 2 operates under ADEM air permit number 3-01-0017-Z002.
- ✓ 1.1.3.4 **BUILDING 1076, BOILER PLANT #3 (RMIS # FTMC-13, 14(7)PS)** Boiler Plant Number 3 is a steam generating facility. Wastes are generated from blowdown operation from the descaling of the boilers and are generally of a caustic nature. These wastes are then discharged to the sanitary sewer. Boiler Plant Number 3 operates under ADEM permit number 3-01-0017-Z001.
- ✓ 1.1.3.5 **BUILDING 1876, BOILER PLANT #4 (RMIS # FTMC-14, 101(2)PS)** Boiler Plant Number 4 is a steam generating facility. Wastes are generated from blowdown operation from the descaling of the boilers and are generally of a caustic nature. These wastes are then discharged to the sanitary sewer. Boiler Plant Number 4 does not have a specific permit number because it operates as a grand-fathered structure.
- ✓ 1.1.3.6 **Ground Scar South of Bldg. 3134 [153(7)HR(P)]** Aerial photographs taken in 1964 (frame No. 023) reveal a ground scar roughly triangular in shape at a location south of Bldg. 3134. The ground scar is located at the end of what appears to be a dirt road and measures approximately 150 ft east-west and 90 ft north-south. No other information is available regarding this feature. 
- ✓ 1.1.3.7 **Ground Scar/Trenches [154(7)HR(P)]** Aerial photographs taken in 1961 (frame No. GR-2CC-138) and 1964 (frame No. 062) reveal ground scars on both sides of Littlebrant Drive and northeast of Bldg. 3411 (Officers Quarters). Members of the EBS field team visited the area of this ground scar. The location is now heavily wooded. It is noteworthy only in that it contains 11 sets of 2 trenches. Each set of two trenches is arranged end to end with a path between them. Each trench is uniformly shaped and measures approximately 3 ft wide by 12 ft long by 1 ft deep. Two 55-gal drums, each standing upright and approximately 1/3 buried, are located within the area of the sets of trenches. The southern drum is equipped with an upright pipe which would discharge liquid into the other drum. The EBS field team speculates that this is a trench warfare training area; however, no confirmation has been obtained. No other information is available regarding operations at this site.
- ✓ 1.1.3.8 **Ground Scar with Small Pit [155(7)HR(P)]** Aerial photographs taken in 1964 (frame No. 087) reveal a ground scar roughly oval in shape (elongate north south) at a location north of Landfill No. 3. The EBS field team visited this site and observed that the area is now heavily wooded and designated "Off Limits Except for Training." A visual survey of the area revealed the presence of a single small pit measuring approximately 4 ft by 4 ft by 1 ft deep.

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This pit and the signs apparently post-date the ground scar. No other information is available regarding this feature.

- ✓ 1.1.3.9 ~~Ground Scar/Possible Dump or Landfill~~ ^{y NEAR Ammo Supply Point} [156(7)HR(P)] Aerial photographs taken in the 1957 to 1961 timeframe reveal a ground scar roughly rectangular in shape at a location east of 2nd Avenue and approximately 500 ft north of 19th Street. The photographic signature suggests that small piles of unidentified material were present at this site. No other information is available regarding this feature. It was not visited by the EBS field team due to shortage of time.
- ✓ 1.1.3.10 Ground Scar, South of Autocraft Shop [157(7)HR(P)] Aerial photographs taken in 1964 (frame No. 022) reveal a large ground scar which extends from the Autocraft Shop (Bldg. 1800) south to Area T-6 (Howitzer Hill). Photos taken in 1954 (frame No. GR-10M-58) suggest that soil was excavated from this area. No other information is available regarding this feature. It was not visited by the EBS field team due to shortage of time.
- ✓ 1.1.3.11 Ground Scar, Located Within the Southern End of the Confidence Course [158(7)HR(P)] Aerial photographs taken in 1964 (frame No. 023) reveal a ground scar roughly rectangular in shape at the south end of the Confidence Course. This feature measures approximately 180 ft north-south and 120 ft east-west. No other information is available regarding this feature. It was not visited by the EBS field team due to shortage of time.
- ✓ 1.1.3.12 Golf Course Pesticide Mixing and Storage Facilities [83(2)HS; 141(7)HS/HR(P)] Golf course pesticide storage and mixing operations were performed in Bldg. T-2249 [141(7)HS/HE(P)] from an unknown date until approximately 1985. Bldg. T-2249 was located north of Baltzell Gate Road, west of Galloway Road, and south of the railroad tracks (DEH Historical Bldg. Records, 1986; Owen, 1995). Golf course pesticide storage and mixing operations were transferred from Bldg. T-2249 to Bldg. S-2252 in 1985. Bldg. T-2249 was subsequently razed. Mixing took place outside the building on the west side (side away from the railroad tracks).

The Golf Course Pesticide Mixing and Storage Facility (Bldg. S-2252) began operations in 1985 (Weston, 1990). Golf course pesticide storage and mixing operations were transferred from Bldg. T-2249, which was located north of Baltzell Gate Rd, west of Galloway Rd, and south of the railroad tracks (Owen, 1995 and 1996). The building reportedly contains approximately 50 gal of pesticides and herbicides in containers generally 2.5 gal or less (USACE, 1993). The storage area is temperature-controlled and has an impermeable floor with a drainage sump. Mixing is conducted on a large, covered mixing pad equipped with a drain holding tank. Spills would occur during normal use and would be of minimal size.

Operations at Bldg. S-2252 were cited by USAEHA (1990) for several violations including failure to have a 4-inch continuous berm around the pesticide storage area, and lack of a paved and curved mixing area (Memorandum from Brian Higgins, March 1, 1991). Bldg. S-2252 includes a mixing pad and covered catch basin. No deficiencies were noted in March 1993

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(USACE, 1993), and the facility is reportedly in full compliance now (Owen, 1995 and 1996). No releases have been reported, and no sampling has been conducted at this site. In the past, neither the individual applying the pesticides, nor the supervisory personnel at the golf course were certified in pesticide application; however, the individual applying the chemicals is currently certified in pesticide application.

✓ 1.1.3.13 **Former Incinerators [96(7)PS(P)]** Bldgs. 4428 and 4430, located on the southeast side of Trench Hill in northern Main Post, are believed to have been constructed as coal-fired boiler plants or incinerators. Only the foundations and coal bins remain. The DEH historical building records identify similar buildings constructed in the 5000 area in 1941 and used during WWII.

Bldgs. ⁴⁴³⁰4407 and 4428 were reportedly used for storage of heavy equipment parts from 1962 through 1964, and FTMC personnel used one of the fire boxes as an incinerator in 1950s and 1960s. Wooden vehicle crates, paper boxes, fan belts, and hoses were burned at this facility. An open, vertical walled concrete sump of undetermined depth was observed during the EBS VSI adjacent to the southernmost of the two buildings. This sump was full of water and may pose an entrapment hazard.

No other information is available regarding the boiler plant/incinerator.

✓ 1.1.3.14 **Former Salvage Yard [152(7)HS/HR(P)]** The "Master Plan, Ft. McClellan, General Utilities Map, Electrical" (Office of the Post Engineer, Dec. 1946) identifies a "Salvage Yard." The location of this site is east of 11th Street, west of Cane Creek, north of 23rd Avenue, and south of Bldg. T-2116. Aerial photos taken in 1964 indicate that this area has been maintained although salvaged material is not evident in the photographs. No other information is available regarding the operation of this salvage yard.

✓ 1.1.3.15 **Former Sandel Flamethrower Range [97(7)PR]** A former flamethrower range was identified on Main Post on the north side of Howitzer Hill. Current status of the site is that portions fenced are fenced; others allow unrestricted access. Training was conducted at this site in the use of mechanized flame throwers. This site was once known as Sandel Flame Range. Personnel trained using both the portable M-27A-1 flame thrower (PFT) and the mechanized flame thrower. Trainees used both thickened and unthickened fuel. The main potential contaminant at this site is the fuel used in flamethrowers, which may have accumulated on the ground. Dates of use based on evidence from aerial photos are from 1954 to 1973. The actual period of use probably extended beyond these dates. Buildings in this area are now used as a mock confinement area. The former uses of the various buildings are described as follows:

- Bldg. 3189 - housed M131 mechanized flame thrower;
- Bldg. 3188 - housed Platoon HQ;
- Bldg. 3187 - stored PFTs;
- Bldg. 3186 - stored PFTs;
- Bldg. 3177 - stored PFTs, M-4 dispensers, and O₂/air cylinders; and

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- Bldg. 3178 - stored PFTs, M-4 dispensers, and O₂/air cylinders.

These buildings were constructed for flame operations. Sandel Flame Range had 30 firing points.

✓ 1.1.3.16 **Contractor Laydown Area [86(7)HS/HR(P)/PR(P)]** The Contractor Laydown Area is a rectangular parcel situated along a railroad siding directly west of the ASP, north of 18th street, and east of 2nd avenue. This site is open ground and asphalt and is used for storing contractor equipment and supplies. The site has been used from an unknown date until the present for a variety of storage operations. The Contractor Laydown Area has documented storage of paints, paint thinners (mineral spirits), and solvents (naptha); empty fog oil drums; waste POL in drums; five old USTs that had been excavated elsewhere; gasoline pumps; creosote- and PCP-treated telephone poles; landfarmed POL-contaminated soils; investigation derived wastes; and coal for boiler plants. Dates of use for many of these items are undocumented.

The USTs were onsite filled with rain water from about 1990 to 1993. Landfarmed fuel-contaminated soils were present during the PA (Weston, 1990).

Releases of petroleum products have been documented at this facility. Soils at the fog oil drum storage area in the southeast corner were noted to be stained with oil (Weston, 1990), as was the creosote telephone pole storage area in the northeast corner. In the central area, Weston (1990) noted that the landfarmed soils were leaking fuel out onto the asphalt and recommended soil borings and surface soil samples to evaluate the site. No report was located during the EBS indicating that this sampling had been accomplished.

During the EBS VSI, no evidence of USTs, drums, or landfarmed soils was seen. Only a few PCP-dipped telephone poles remained on the racks, and no significant visual evidence of present surface soil contamination was noted. Due to the varied and undocumented uses, documented releases, and lack of sampling performed, additional evaluation of this site is recommended.

✓ 1.1.3.17 **Battery Maintenance and Storage Areas [67(7)HS/HR(P)]**

Three buildings (Bldgs. 234, 338, and 350) were identified at FTMC where battery maintenance and storage have occurred. Bldg. 338, the Recycling Center, and Bldg. 350, the Consolidated Maintenance Facility, have been described further in other sections.

Bldg. 234 is one of the original buildings at FTMC. Built during WW I, it was part of a livery and stable operation. Battery maintenance began at an unknown date and moved to Bldg. 338 in 1981. Up to 300 batteries per year were neutralized and drained at this location. Discharged fluid went to a floor drain believed to be part of the storm sewer that drained to nearby Cane Creek. Lead-acid battery electrolyte has been found to contain extraction procedure (EP) toxic levels of cadmium and lead (USAEHA, 1986). Weston (1990) reported this finding and recommended further evaluation.

During the EBS VSI, a survey of sanitary and storm sewer maps was completed. Sewer

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drainage for Bldg. 234 could not be determined. Reportedly, storm sewer drainage was discontinued at this location, but the date could not be determined (Pence, 1995). Sediment sampling at the discharge point for EP toxicity metals was recommended by USAEHA. However, no sampling has been conducted at this site.

Currently, Bldg. 234 is used for GSA vehicle maintenance operations. Some batteries are still stored in one end of the building. No battery maintenance activities are currently conducted at this site. The impacts, if any, on Cane Creek from historical operations at Bldg. 234 have not been determined.

1.1.3.18 Background locations: The contractor shall collect appropriate background data for the surface soil, subsurface soil, the groundwater, the sediment, and the surface water. The background locations shall be proposed by the contractor in-order to gain enough background data to compare results from the sites listed above. The sites shall be proposed in the Work Plan and documented by the contractor in the final report.

1.2 Objective: The objective of this task is to perform a Site Inspection (SI) on selected areas and buildings at Fort McClellan, Alabama listed in paragraph 1.1.3 above.

2. APPLICABLE DOCUMENTS: All applicable documents not available to the contractor must be requested in writing to the Government by the contractor. The documents requested in writing by the contractor shall be provided to the contractor as Government Furnished Property (GFP) by the Government at or before the start of work meeting. All GFP shall be returned to the COR within 30 days of completion of this delivery order.

2.1 Installation Particular Documents:

2.1.1 "Installation Assessment of Fort McClellan, Alabama Records Evaluation Report 110", April 1977

2.1.2 Environmental Science and Engineering, Inc., "Reassessment of Fort McClellan, Anniston, Alabama, Report No. 110A", January 1984.

2.1.3 Roy F. Weston, Inc. "Task Order 11, Enhanced Preliminary Assessment, Contract Number DAAA15-88-D-007" December 1990.

2.1.4 Science Applications International Corporation, "Site Investigation Report, Task Order 1" Final, Fort McClellan, Alabama Contract Number DAAA15-91-D-0017, August 31, 1993.

2.1.5 Science Applications International Corporation, "Health and Safety Plan" for Task Order 1, Fort McClellan, Alabama Contract Number DAAA15-91-D-0017, 1994.

2.1.6 Science Applications International Corporation, "Quality Assurance Plan" for Task Order 1, Fort McClellan, Alabama Contract Number DAAA15-91-D-0017, 1994.

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2.1.7 Environmental Science and Engineering, Inc., "Environmental Baseline Survey of Fort McClellan, Alabama, Draft, February 1996.

2.2 Regulatory Documents:

2.2.1 Comprehensive Environmental Response and Liability Act (CERCLA) of 1980, Pub. L. 96-510, as amended by Superfund Amendments and Reauthorization Act (SARA) of 1986, Pub. L. No. 99-499.

2.2.2 National Environmental Protection Act (NEPA), Pub. L 91- 190, January 1, 1970, as amended by Pub. L. 94-52, July 3, 1975; Pub. L. 94-83, August 9 1975; Pub. L. 99-160, November 25, 1985; Pub. L. 100-200, December 22, 1987; and Pub. L. 100-404, August 19, 1988.

2.2.3 The National Oil and Hazardous Pollution Contingency Plan, 40 CFR, Part 300.

2.2.4 Information and Data Requirements for Site Investigations, Federal Agencies, the U.S. Environmental Protection Agency (EPA) Region IV, October 1990.

2.2.5 Quality Assurance Plan for Superfund, EPA, not dated (or most recent edition).

2.2.6 Data Quality Objectives For Remedial Response Activities. Development Process, EPA 540/G-87/003, March 1987.

2.2.7 Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual, Interim Final, EPA/540/1-89/002, September 29, 1989 (or most recent edition).

2.2.8 Risk Assessment Guidance for Superfund, Volume II: Environmental Evaluation Manual, Interim Final, EPA/540/1-89/001, March 1989 (or most recent edition).

2.2.9 Test Methods for Evaluating Solid Waste: Physical/ Chemical Methods, EPA/SW-846.

2.2.10 Ecological Assessment of Hazardous Waste Sites: A Field and Laboratory Reference, EPA/600/3-89/013, March 1989.

2.2.11 Guidance for Performing Site Inspections Under CERCLA, Interim Final, EPA/540-R-92-021, PB92-963375, September 1992.

2.2.12 Guidance on Preparing Superfund Decision Documents: The Proposed Plan, The Record of Decision, Explanation of Significant Differences, The Record of Decision Amendment; Interim Final, EPA/540/G-89/007, July 1989.

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2.2.13 Guide to Records of Decisions (RODs), EPA 1991, Interim Final.

2.2.14 EPA Region IV, Environmental Service Division Environmental Compliance Branch Standard Operating Procedures and Quality Assurance Manual (ECBSOPQAM), February 1991 (or most recent), (unpublished, internal)

2.2.15 Community Relations in Superfund: A Handbook, January 1992, EPA/540/R-92/009, OSWER Directive, Office of Emergency and Remedial response, United States Environmental Protection Agency, Washington D.C. 20460.

2.2.16 EPA Region IV, Supplemental Guidance to RAGS: Region 4 Bulletins, September, 1995, Interim Edition or later

2.2.17 "Safety Health Requirements Manual," Engineering Manual 385-1-1, April 1981, Revised October 1987.

2.2.18 Occupational Safety and Health Administration Standards 1910 and 1926).

2.2.19 NIOSH/OSHA/USCB/EPA "Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities", October 1985.

2.2.20 ANSI Z-358.1 "Emergency Eyewash and Shower Equipment", 1990.

2.2.21 ANSI-Z-88.2 "Practices for Respiratory Protection," 1980.

2.3 U.S. Army Documents:

2.3.1 Army Regulation AR 200-1 Environmental Protection and Enhancement.

2.3.2 Geotechnical Specifications for Drilling, Monitor Wells, Data Acquisition, and Reports; U.S. Army Toxic and Hazardous Materials Agency (USATHAMA); November 1987.

2.3.3 Quality Assurance Program, USATHAMA, January 1990.

3. **REQUIREMENTS:** The contractor, as an independent contractor and not an agent of the Government, shall, commencing on the effective date of this delivery order, supply the necessary personnel, facilities, equipment (except as furnished by the Government), to accomplish the work described below in accordance (LAW) all applicable general requirements and technical specifications identified in Section C in the basic contract.

3.1 **Monthly Cost and Performance Reports (ELIN A001, paragraph C.3.2.2.7 of basic contract).** The contractor shall prepare and submit monthly cost and performance reports LAW ELIN A001 of the basic contract. The reports shall have sufficient narrative to describe current status and projected requirements of laborhours, costs and work completed against previously approved requirements, schedules,

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and resources.

3.2 Management and Resource Plan (ELIN A003, paragraph C.3.2.1.1.3 of basic contract). The contractor shall prepare and submit a Management and Resource Plan IAW ELIN A003 of the basic contract. This plan shall detail the management approach to controlling this task order. The plan shall cover the project resources. The plan shall identify the major project tasks based upon a work breakdown structure listed in paragraph 9. below. Estimated costs shall be presented for each month of the program. Monthly costs shall be broken down, at a minimum, into the categories listed in paragraph 9.0 below. Project Management shall be discussed in this plan. An organizational chart shall be provided identifying personnel, their job title and their involvement in the task. An overall program layout shall be prepared and provided identifying major milestones and projected start and completion dates.

3.3 Work Plan. The contractor shall prepare and submit a Work Plan IAW applicable document listed in paragraph 2.2.11 above. The Work Plan shall document the decisions made by the contractor on how to approach the project and rationale for each of the decisions made during the project planning process to include both present and anticipated future field work. Information on planning work may be found in the "Superfund Federal-Lead Remedial Project Managements handbook (U.S. EPA, December 1986); and the Superfund State-Lead Remedial Project Management Handbook (U.S. EPA, December 1986). The contractor shall submit the following four iterations of the work plan IAW the schedule in paragraph 3.10 below: a preliminary draft, a draft, a draft final, and a final versions. Comments delivered after each iteration shall be incorporated into the plan and resubmitted to the government within 30 days after receipt of those comments.

3.3.1 The work plan shall present the initial evaluation of existing data and background information performed during the scoping process, including: 1) an analysis and summary of the site background and the physical setting; 2) an analysis and summary of previous responses; 3) presentation of the conceptual site model, including an analysis and summary of potential contamination; and preliminary; preliminary assessment of environmental impacts.

3.3.2 The work plan shall define the scope and objective of SI activities. The scope of the SI site characterization shall be documented in the work plan, with detailed descriptions provided in the Sampling and Analysis Plan

3.3.3 The work plan shall have at a minimum the following five elements: 1) Introduction; 2) Site Background and Physical Setting; 3) Initial Evaluation; 4) Work Plan Rationale; and 5) SI Tasks. The work plan shall include the 14 standard tasks detailed in applicable document 2.2.11.

3.4 Sampling and Analysis Plan: The contractor shall prepare and submit a Sampling and Analysis Plan (SAP) for collecting field data to support preparation of an SI for all the sites listed in paragraph 1.1.3 above in accordance with EPA and U.S. Army guidance, applicable

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documents in paragraphs 2.2 and 2.3 respectively. Specific components of the SAP are described in paragraphs 3.4.1 and 3.4.2 below. The SAP shall be composed of two separate plans, the Field Sampling Plan and the Quality Assurance Project Plan.

3.4.1 Field Sampling Plan (FSP). (Technical Plan (ELIN A004, paragraph C.3.2.1.1.1) in the basic contract): The contractor shall prepare and submit an FSP IAW applicable document 2.2.11 and IAW ELIN A009 of the basic contract. The FSP shall document all monitoring procedures, field sampling, sampling procedures, and sample analysis which would be performed during the SI in order to determine the environmental setting, potential source, and releases of hazardous constituents. The contractor shall submit the following three iterations of the FSP IAW the schedule in paragraph 3.10 below: a draft, a draft final, and a final versions. Comments delivered after each iteration shall be incorporated into the plan and resubmitted to the government within 30 days after receipt of those comments.

3.4.2 Quality Assurance Project Plan (QAPP). (Quality Control Plan, ELIN A005, paragraph C.3.2.1.1.4 in the basic contract). The contractor shall develop and submit a Quality Assurance Project Plan (QAPP) IAW guidance from the EPA, applicable document 2.2.11, and ELIN A005 of the basic contract. Reference document 2.1.6 includes a Quality Control Plan that is acceptable to the Government and covers previous fieldwork at FTMC. However, the contractor shall revise reference document 2.1.6 to produce a Quality Control Plan that is specific for the contractor and for the work proposed under this task and which incorporates the pertinent requirements most the most recent version of EPA Region IV's SOP, applicable document 2.2.14. Requirements of USATHAMA QAP, applicable document 2.3.3, shall be followed in preparation of the QAPP. All analyses performed under this task shall be conducted in accordance with the final Government approved QAPP. The contractor shall submit all data generated as a result of this task in accordance with Section C.3.3.5 of the basic contract to U.S. Army Environmental Center (USAEC) Installation Restoration Data Management System (IRDMS). The contractor shall submit the following three iterations of the QAPP IAW the schedule in paragraph 3.10 below: a draft, a draft final, and a final. Comments delivered to the contractor after each iteration shall be incorporated into the plan and then resubmitted to the government within 30 days after receipt of those comments.

3.5 Health and Safety Plan (ELIN A008, paragraph C.3.2.1.1.2 of basic contract). The contractor shall prepare and submit a Health and Safety Plan which details procedures for the safe conduct of field activities, as specified in applicable documents in paragraph 2, and IAW ELIN A008 paragraph C.3.2.1.1.2 of the basic contract. Applicable document in paragraph 2.1.5 above includes a Health and Safety Plan that is acceptable to the Government and covers previous fieldwork at FTMC. The contractor shall revise reference document 2.1.5 to produce a Health and Safety Plan that is specific for the contractor and for the work proposed under this task. The contractor shall submit the following three iterations of the Health and Safety Plan IAW the schedule in paragraph 3.10 below: a draft, a draft final, and a final. Comments delivered after each iteration shall be incorporated into the plan and resubmitted to the government within 30 days after receipt of those comments.

3.6 Field Investigation Activities: The contractor shall perform field activities IAW

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Paragraph C.3.3 of the Basic Contract, as specified in the FSP submitted to and accepted by the Government under this task, and IAW appropriate documents listed in paragraph 2. above. The final objective of the field investigations is to determine whether or not releases have been made to the environment at each site listed in paragraph 1.1.3 above such that informed decisions can be made as to the level of risk presented by the sites and whether or not a Remedial Investigation is required or perhaps whether a removal action could surface. If not, a decision document(s) will be written.

3.6.1 Although none of the sites listed above have a history of use of Chemical Warfare Agents, any field screening and sampling required at the sites suspected to be contaminated with chemical agent will be conducted by the U.S. Army Technical Escort Unit (TEU). The contractor shall collect all other samples.

3.6.2 The contractor shall collect soil, surface, and groundwater samples at the FTMC as detailed in table #1 below and IAW section C.3.3.1 of the basic contract and as detailed in the final approved Work Plans described in paragraphs 3.3 and 3.4 above. The contractor shall supply the sample bottles, preservatives, labels and coolers for all sampling conducted. Duplicate samples bottles are recommended in order to reduce holding time problems. Table #1 below does not include appropriate number of QA/QC samples.

3.6.3 Sampling and Analysis Program: The contractor shall design the sampling and analysis program to be conducted based upon the information provided in the Preliminary Assessment Report and the Site Investigation Report, applicable documents 2.1.3 and 2.1.4 respectively. The contractor shall perform the collection and transport of samples in paragraph 3.6.1 above. The contractor shall supply the decontamination equipment and supplies necessary to decontaminate the equipment between all samples. All work shall be coordinated through the COR prior to start of field work. The activities will include at a minimum the following summary of work, with the specifics to be proposed by the contractor in the work plan:

3.6.3.1 Monitor Well Installation. The contractor shall install 8 monitor wells IAW Section C.3.3.2.2 of the basic contract and applicable documents in paragraph 2. above, with special emphasis on applicable document 2.3.2. At a minimum the contractor shall assure that the specific drilling method(s), water source(s), gravel pack, bentonite seal, grout, well screen, and well casing are approved by the USAEC prior to purchase and use. The source(s) of water shall be sampled and analyzed by the contractor IAW section C.3.3.2.2.5 of the basic contract before being used in the field. The water will be approved by the USAEC before use. The contractor shall obtain all dig safe permits and any other requirements with the appropriate municipal departments for monitoring wells and soil borings installed or taken off-post. The Government shall be responsible for obtaining dig safe clearances on-post. For the purposes of cost estimates, the contractor shall assume half of the wells will go to an average depth of 40 feet each and the other half to an average depth of 80 feet. The contractor shall not install any wells in a potential contaminated chemical warfare agent area or potential unexploded ordnance (UXO) area.

3.6.3.2 Monitor Well Sampling. The contractor shall conduct the monitor well sampling IAW all paragraphs in section C.3.3.1.2 of the basic contract and

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IAW applicable documents in paragraph 2. above. The contractor shall collect water samples from all installed monitor wells, waiting a minimum of two weeks after well development for collection of samples. The contractor shall resample the newly installed wells 30 days after the first round of sampling. The contractor shall conduct one additional round of quarterly sampling.

3.6.3.3 Ground Water Screening. The contractor shall collect and analyze groundwater samples using a groundwater screening technique, similar to a Microwell, Geoprobe, Hydropunch, etc., not to exceed the number of samples listed in table #1 below. It is estimated that a total of approximately 76 locations will have to be sampled. Some of the samples may be taken from existing groundwater monitoring wells at FTMC. The total estimated number of ground water samples are listed in table #1 below.

3.6.3.4 Soil Sampling. The contractor shall collect and analyze soil samples as listed in table #1 below in accordance with Section C.3.3.1.5 of the basic contract. The contractor shall collect the soil samples with an auger or similar tool, the surface soil samples shall be taken from the zero-twelve inch level. The estimated number of soil samples are listed in table #1 below. The contractor shall also take 75 soil borings to an average depth of 8 feet at a designated locations identified in the Government approved work plan.

3.6.3.5 Surface Water and Sediment Investigation. The contractor shall determine the nature and extent of contamination in surface water bodies in the sites listed in paragraph 1.1.3 above for both sediment and surface water in the number listed in table #1 below in accordance with Sections C.3.3.1.3 and C.3.3.1.4 of the basic contract. The estimated number of surface water and sediment samples are listed in table #1 below as soil and water samples.

3.6.3.6 Soil Gas. The contractor shall conduct the passive soil gas analysis over approximately 40 acres of area with a density of approximate average of 20 foot grid IAW the requirements of Appendix C of the basic contract.

3.6.3.7 Handling of Investigation-Derived Waste. For any well located off-post of FTMC, the contractor shall containerize, mark, and then ship on-post all well cuttings and water. For wells on-post, cuttings shall initially be placed on plastic sheeting upon generation. Well cuttings shall be placed in drums if air monitoring during drilling indicates the presence of contamination. Water generated during sampling shall be containerized and taken to a location designated by FTMC. The contractor shall containerize and ship well cuttings and purge water to designated locations on post. The storage shall be coordinated by the contractor with FTMC. The contractor shall perform sampling and analysis for the waste IAW applicable laws and regulations. The soil shall be sampled for TCLP analysis and the purge water shall be held until the analysis from sampling is received. The contractor shall test and disposal of cuttings and water. For costing purposes the contractor will assume that approximately 10 drums of hazardous waste shall be disposed of by the contractor.

3.6.3.8 Surveying. The contractor shall survey all monitoring wells installed IAW section C.3.3.2.2.3 of the basic contract. The contractor shall use Global Position System (GPS) to

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survey all screening, sampling points, and cultural features; not to exceed 700 points.

3.6.3.9 Chemical Analysis. The contractor shall make a recommendation in the SAP as to which analysis listed below shall be used at which sites listed in paragraph 1.1.3. The contractor shall not exceed the total number of analysis listed below. All analysis performed shall be IAW the methods detailed in the QAPP. The contractor shall perform the number and type of chemical analysis listed in table 1 below the totals of which include all soil, ground water, sediment, and surface water samples:

Table 1

<u>ANALYSIS</u>	<u>Number of Soil Samples</u>	<u>Number of Water SAMPLES</u>
TPHC (or Similar Analysis)	110	110
Explosives	25	25
TAL Metals	175	125
TCL VOCs	175	165
TCL SVOCs	175	125
PCB/Pest	175	125
TCLP	5	
Biological oxygen Demand		20
Total Organic Carbon	90	

3.6.3.10 Background and QA/QC samples. The contractor shall collect the correct number of soil, groundwater, and surface water background samples to accurately perform the assessment required under paragraph 3.7.2 below. No QA/QC samples are included in Table 1 above, but the contractor shall assume a 20% increase in these numbers to cover the appropriate number of QA/QC samples.

3.6.4 As part of the field work the contractor shall review installation records that pertain to the sites listed in paragraph 1.1.3 above and identify work conducted at those sites and potential contaminants used. In addition, many of the sites have had wells installed as part of the installation's UST/AST programs. These wells shall be identified and pertinent ones sampled.

3.7 Reports: Following completion of the fieldwork, the contractor shall prepare a Site Inspection Report and Decision Documents for the work performed under this task. Specific requirements for reports are provided in paragraphs 3.7.1 through 3.7.4 below.

3.7.1 Review of all Reports submitted: The contractor shall prepare a preliminary draft, draft, draft final, and final for each of the following documents: the SI Report and Decision Documents. The Preliminary Draft copies of each document will be reviewed by the Army only. The contractor shall incorporate Army comments into the draft of each document. The draft documents shall be submitted by the contractor to the Government for further comment. For each draft document reviewed and commented upon by the Government, the contractor shall submit a separate letter which addresses all comments made by the Government on that

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document, indicating where and how in the document each comment was incorporated or why each comment was not incorporated. The draft final and/or the letter for each document shall address all comments made to that document. The draft final of each document, along with the letter addressing comments, shall be submitted by the contractor to the Government for a second round of comments. The contractor shall incorporate all comments made on each draft final document into the final edition of each document. The contractor shall address each comment to the draft final version of each document, as described above, in a letter to be submitted with each final document.

3.7.2 Site Inspection Report (ELIN A009, Paragraph C.3.1.2.1 of the basic contract): Upon completion of and/or concurrent to the field work the contractor shall prepare and submit a Site Inspection Report IAW ELIN A009, paragraph C.3.1.2.1 of the basic contract. The report shall be prepared IAW EPA and State of Alabama guidance and shall include identification of any interim corrective measures which may be required. The contractor shall prepare and submit the following four iterations of the SI Report IAW the schedule in paragraph 3.10 below: a preliminary draft, a draft, a draft final, and a final. Comments delivered after each iteration shall be incorporated by the contractor into the report and resubmitted to the government within 30 days after receipt of those comments.

3.7.2.1 To produce the SI report, the contractor shall make extensive use of the reference documents in paragraph 2 above. Existing information shall be used wherever possible to reduce costs of report preparation. Use of applicable documents shall include, but not be limited to the following:

3.7.2.2 Reference documents in paragraph 2.1 above provides the basis for the sections on regional as well as site geology, hydrogeology, soils, climatology, demography and land use. The contractor shall modify these sections for incorporation into the SI document.

3.7.3 Decision Documents: For the required sites the contractor shall prepare, produce, and submit Decision Document(s) that meet current regulatory requirements in reference documents in paragraph 2.2 above. The Decision Document(s) shall be IAW ELIN A009 of the basic contract. The contractor shall take into consideration the review time required for the Decision Document(s) during the scheduled regulatory review in paragraph 3.10 below.

3.7.4 Public Relations: The contractor shall revise the CRP, by doing supplemental demographic studies, community interviews, logistical support for arranging and conducting public meetings. The contractor shall develop a fact sheet, and photographic and audio visual support as described in paragraph C.3.1.2.1.j of the basic contract. Additional requirements and details include the following:

3.7.4.1 Community Relations Plan (CRP): The contractor shall update the Community Relations Plan for Fort McClellan as discussed in paragraph C.3.2.1.1.5 and IAW with ELIN A012 of the basic contract. The contractor shall prepare a draft and a final CRP. The CRP shall not exceed 50 pages in length, including the appendices. The CRP shall be revised in accordance with guidance for preparation of Community Relations Plan found in Paragraph 2.2.15 above. At a minimum the contractor shall supplement revision of the plan by:

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including the LRA plans, survey local & work force population, conduct community and employee interviews, and incorporate updates/comments to the plan.

3.7.4.2 Fact Sheet: The contractor shall also be responsible for generating a fact sheet, which would be approximately four pages in length, but not to exceed six. The fact shall describe the CERCLA process, public involvement opportunities and the background on environmental conditions requiring remediation at the installation. The fact sheet shall contain a map(s) of the site study area(s) and a detachable coupon for the public to complete to be added to a informational mailing list, which the contractor shall add to the existing list.

3.8 Progress/Status Meeting Report (ELIN A002): The contractor shall prepare and submit Progress/Status Meeting Reports for each meeting attended IAW ELIN A002 in paragraph C.3.2.2.2 of the basic contract. The contractor shall assume the initial site visit shall be held at FTMC. For each meeting the contractor shall record the minutes of each meeting and submit the report to the COR within 10 days after the conclusion of each meeting. Summary of the total number of meetings are listed in table 2 below.

3.9 Briefings: The contractor shall assume two two-day meetings at EPA Region IV, Atlanta, GA, to discuss the SI and the SI Work plans. The contractor shall assume twelve meetings will be held at FTMC to brief the program, these may be incorporated as part of a public meeting(s).

Table 2

<u>Location</u>	<u># of Meetings</u>	<u>Days/mtg</u>	<u># of people</u>
FTMC	12	2	2
Atlanta	2	1	2
AEC	1	1	2

3.10 Schedule: The schedule for performance of this task is shown in Table 2 below:

Table 3

<u>Milestone</u>	<u>Days after Task Award</u>	<u>Notes</u>
Kick-off meeting	15	
Draft Management Plan	30	30 day Army review
Final Management Plan	90	
Draft Health and Safety Plan (HSP)	45	30 day review
Draft Final HSP	105	30 day review

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Final HSP	165	
Draft Work Plan	45	30 day review
Draft Final Work Plan	105	30 day review
Final Work Plan	165	
Draft Sampling and Analysis Plan (SAP)	45	30 day review
Draft Final SAP	105	30 day review
Final SAP	165	
Draft Quality Assurance Project Plan (QAPP)	45	30 day review
Draft Final QAPP	105	30 day review
Final QAPP	165	

Table 3 (Continued)

<u>Milestone</u>	<u>Days after Task Award</u>	<u>Notes</u>
Draft Community Relations Plan (CRP) (with Fact Sheet)	150	45 day review
Draft Final CRP	225	30 day review
Final CRP	285	
Preliminary Draft Site Inspection (SI) Report	330	15 day Army review
Draft SI Report	375	30 day review
Draft Final SI Report	435	15 day review
Final SI Report	490	
Draft Decision Documents (DD)	345	15 day review
Draft Final DDs	390	30 day review
Final DDs	450	

4. TESTING REQUIREMENTS: N/A.

5. ITEMS/DATA TO BE DELIVERED: The contractor shall deliver the following items as required below:

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Table 4

<u>Sequence</u>	<u>Frequency</u>	<u>1st Submission</u>	<u>Copies</u>
<u>Number (ELIN)</u>		<u>Days After Task Award</u>	
A001 Monthly C&P Report	Monthly	---	3
A002 Prog/Status Meeting Rpt	twelve	---	3
A003 Mgt & Resource Plan	two	30	3
A004 Work Plan	three	45	50
A004 FSP Plan	three	45	50
A005 QAP Plan	three	45	50
A008 Health & Safety Plan	three	45	50
A009 SI Report	four	330	50
A009 Decision Docs	three	345	50
A012 CRP (w/Fact Sheet)	three	150	50

6. GOVERNMENT-FURNISHED PROPERTY/SERVICE: The Government will provide the contractor the following property and service:

6.1 Government Furnished Property: Documents listed in section 2.0 above that are not available to the contractor shall be requested in writing by the contractor and will be delivered to the contractor within seven days upon receipt of that request. Within 30 days of completion of this delivery order contract the contractor shall return all Government-furnished property back to the COR.

6.2 Government Furnished Assistance: The following assistance will be provided to the contractor at task award:

6.2.1 Access to project files at USAEC and FTMC upon request by the contractor.

6.2.2 Access to the USAEC Installation Restoration Data Management Information System (IRDMIS).

6.2.3 Software and user's guidance for entry, verification, and output of chemical and map data on the IRDMIS.

7. HAZARDS INFORMATION: This task does not require the contractor to handle sensitive items, hazardous items (except for contaminants found in the part per billion or part per million range), chemical surety materiel or microbiological or biomedical material.

8. PERIOD OF PERFORMANCE: This task order shall be completed

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within 490 days after award, to include delivery of all final copy data.

9. **WORK BREAKDOWN STRUCTURE:**

- a. Management Plan/Monthly Reports.
- b. Site Visits/Meetings/Briefings.
- c. Project Plans.
- d. Fieldwork.
- e. Sample Analysis/Validation/Data Review/Evaluation.
- f. Site Inspection Report.
- g. Decision Documents
- h. Public Relations

Appendix B

Material Safety Data Sheets

Acetone Chemical Co. P.O. Box 14508 St. Louis, MO 63178 Phone: 314-771-5765	Aldrich Chemical Co., Inc. 1001 West St. Paul Milwaukee, WI 53233 Phone: 414-273-3850	Fluka Chemical Corp. 1001 West St. Paul Milwaukee, WI 53233 Phone: 414-273-3850
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SECTION 1. - - - - - CHEMICAL IDENTIFICATION - - - - -

CATALOG #: 00585
NAME: ACETONE

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

CAS #: 67-64-1
MF: C3H6O
EC NO: 200-662-2

SYNONYMS

ACETON (GERMAN, DUTCH, POLISH) * ACETONE (ACGIH:DOT:OSHA) * CHEVRON
ACETONE * DIMETHYLFORMALDEHYDE * DIMETHYLKETAL * DIMETHYL KETONE *
KETONE, DIMETHYL * KETONE PROPANE * BETA-KETOPROPANE * METHYL KETONE *
PROPANONE * 2-PROPANONE * PYROACETIC ACID * PYROACETIC ETHER * RCRA
WASTE NUMBER U002 * UN1090 (DOT) *

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

LABEL PRECAUTIONARY STATEMENTS

FLAMMABLE (USA)
HIGHLY FLAMMABLE (EU)
IRRITANT
IRRITATING TO RESPIRATORY SYSTEM AND SKIN.
RISK OF SERIOUS DAMAGE TO EYES.
TARGET ORGAN(S):
LIVER, KIDNEYS
KEEP AWAY FROM SOURCES OF IGNITION - NO SMOKING.
IN CASE OF CONTACT WITH EYES, RINSE IMMEDIATELY WITH PLENTY OF
WATER AND SEEK MEDICAL ADVICE.
WEAR SUITABLE PROTECTIVE CLOTHING, GLOVES AND EYE/FACE
PROTECTION.

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

IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES WITH COPIOUS AMOUNTS OF
WATER FOR AT LEAST 15 MINUTES.
ASSURE ADEQUATE FLUSHING OF THE EYES BY SEPARATING THE EYELIDS
WITH FINGERS.
FLUSH SKIN WITH WATER.
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.
REMOVE AND WASH CONTAMINATED CLOTHING PROMPTLY.

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

EXTINGUISHING MEDIA
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.

UNUSUAL FIRE AND EXPLOSIONS HAZARDS

EXTREMELY FLAMMABLE.

VAPOR MAY TRAVEL CONSIDERABLE DISTANCE TO SOURCE OF IGNITION AND FLASH BACK.

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- - - - -

CHEMICAL SAFETY GOGGLES.

MECHANICAL EXHAUST REQUIRED.

SAFETY SHOWER AND EYE BATH.

COMPATIBLE CHEMICAL-RESISTANT GLOVES.

NIOSH/MSHA-APPROVED RESPIRATOR.

FACESHIELD (8-INCH MINIMUM).

DO NOT BREATHE VAPOR.

DO NOT GET IN EYES, ON SKIN, ON CLOTHING.

AVOID PROLONGED OR REPEATED EXPOSURE.

WASH THOROUGHLY AFTER HANDLING.

SEVERE EYE IRRITANT.

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

FLASHPOINT -2.20F
-19C

EXPLOSION LIMITS IN AIR:

UPPER 13%
LOWER 2%

AUTOIGNITION TEMPERATURE: 869 F 464C

VAPOR PRESSURE: 184MM 20 C 400MM 39.5 C

SPECIFIC GRAVITY: 0.790

VAPOR DENSITY: 2

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

INCOMPATIBILITIES

BASES

OXIDIZING AGENTS

REDUCING AGENTS

HAZARDOUS COMBUSTION OR DECOMPOSITION PRODUCTS

TOXIC FUMES OF:

CARBON MONOXIDE, CARBON DIOXIDE

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

ACUTE EFFECTS

MAY BE HARMFUL BY INHALATION, INGESTION, OR SKIN ABSORPTION.

CAUSES SEVERE EYE IRRITATION.

CAUSES SKIN IRRITATION.

MATERIAL IS IRRITATING TO MUCOUS MEMBRANES AND UPPER

RESPIRATORY TRACT.

CAUSES DERMATITIS.

TARGET ORGAN(S):

LIVER, KIDNEYS

RTECS #: AL3150000

ACETONE

IRRITATION DATA

EYE-HMN 500 PPM	JHTAB 25,282,1943
SKN-RBT 395 MG OPEN MLD	UCDS** 5/7/1970
SKN-RBT 500 MG/24H MLD	85JCAE -,280,1986
EYE-RBT 20 MG SEV	AJOPAA 29,1363,1946
EYE-RBT 20 MG/24H MOD	85JCAE -,280,1986

TOXICITY DATA

UNR-MAN LDLO:1159 MG/KG	85DCAI 2,73,1970
ORL-RAT LD50:5800 MG/KG	JTEHD6 15,609,1985
IHL-RAT LC50:50100 MG/M3/8H	AIHAAP 20,364,1959
IVN-RAT LD50:5500 MG/KG	NPRI* 1,1,1974
ORL-MUS LD50:3 GM/KG	PCJOAU 14,162,1980
IHL-MUS LC50:44 GM/M3/4H	CUTOEX 1,47,1993
IPR-MUS LD50:1297 MG/KG	SCCUR* -,1,1961
ORL-RBT LD50:5340 MG/KG	FAONAU 48A,86,1970
SKN-GPG LD50:>9400 UL/KG	TXAPA9 7,559,1965

TARGET ORGAN DATA

BRAIN AND COVERINGS (RECORDINGS FROM SPECIFIC AREAS OF CNS)

SENSE ORGANS AND SPECIAL SENSES (OTHER OLFACTION EFFECTS)

SENSE ORGANS AND SPECIAL SENSES (CONJUNCTIVA IRRITATION)

BEHAVIORAL (GENERAL ANESTHETIC)

BEHAVIORAL (MUSCLE WEAKNESS)

BEHAVIORAL (MUSCLE CONTRACTION OR SPASTICITY)

LUNGS, THORAX OR RESPIRATION (RESPIRATORY DEPRESSION)

LUNGS, THORAX OR RESPIRATION (OTHER CHANGES)

KIDNEY, URETER, BLADDER (RENAL FUNCTION TESTS DEPRESSED)

EFFECTS ON FERTILITY (POST-IMPLANTATION MORTALITY)

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.

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 FLUKA CHEMICAL COMPANY FOR TRANSPORTATION INFORMATION.

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

EUROPEAN INFORMATION

EC INDEX NO: 606-001-00-8

HIGHLY FLAMMABLE

IRRITANT

R 11

HIGHLY FLAMMABLE.

S 9

KEEP CONTAINER IN A WELL-VENTILATED PLACE.

S 16

KEEP AWAY FROM SOURCES OF IGNITION - NO SMOKING.

S 23

DO NOT BREATHE VAPOR.

S 33

TAKE PRECAUTIONARY MEASURES AGAINST STATIC DISCHARGES.

REVIEWS, STANDARDS, AND REGULATIONS

OEL=MAK

ACGIH TLV-STEL 2380 MG/M3 (1000 PPM) DTLVS* TLV/BEI,1996

ACGIH TLV-TWA 1780 MG/M3 (750 PPM) DTLVS* TLV/BEI,1996

EPA FIFRA 1988 PESTICIDE SUBJECT TO REGISTRATION OR RE-REGISTRATION

FEREAC 54,7740,1989

MSHA STANDARD-AIR:TWA 1000 PPM (2400 MG/M3)

DTLVS* 3,3,1971

OSHA PEL (GEN INDU):8H TWA 1000 PPM (2400 MG/M3)

CFRGBR 29,1910.1000,1994

OSHA PEL (CONSTRUC):8H TWA 1000 PPM (2400 MG/M3)

CFRGBR 29,1926.55,1994

OSHA PEL (SHIPYARD):8H TWA 1000 PPM (2400 MG/M3)

CFRGBR 29,1915.1000,1993

OSHA PEL (FED CONT):8H TWA 1000 PPM (2400 MG/M3)

CFRGBR 41,50-204.50,1994

OEL-AUSTRALIA:TWA 500 PPM (1185 MG/M3);STEL 1000 PPM JAN 1993

OEL-AUSTRIA:TWA 750 PPM (1780 MG/M3) JAN 1993

OEL-BELGIUM:TWA 750 PPM (1780 MG/M3);STEL 1000 PPM JAN 1993

OEL-DENMARK:TWA 250 PPM (600 MG/M3) JAN 1993

OEL-FINLAND:TWA 500 PPM (1200 MG/M3);STEL 625 PPM (1500 MG/M3) JAN 1993

OEL-FRANCE:TWA 750 PPM (1800 MG/M3) JAN 1993

OEL-GERMANY:TWA 1000 PPM (2400 MG/M3) JAN 1993

OEL-HUNGARY:TWA 600 MG/M3;STEL 1200 MG/M3 JAN 1993

OEL-INDIA:TWA 750 PPM (1780 MG/M3);STEL 1000 PPM (2375 MG/M3) JAN 1993

OEL-JAPAN:TWA 200 PPM (470 MG/M3) JAN 1993

OEL-THE NETHERLANDS:TWA 750 PPM (1780 MG/M3) JAN 1993

OEL-THE PHILIPPINES:TWA 1000 PPM (2400 MG/M3) JAN 1993
OEL-POLAND:TWA 200 MG/M3 JAN 1993
OEL-RUSSIA:TWA 200 PPM;STEL 200 MG/M3 JAN 1993
OEL-SWEDEN:TWA 250 PPM (600 MG/M3);STEL 500 PPM (1200 MG/M3) JAN 1993
OEL-SWITZERLAND:TWA 750 PPM (1780 MG/M3) JAN 1993
OEL-TURKEY:TWA 1000 PPM (2400 MG/M3) JAN 1993
OEL-UNITED KINGDOM:TWA 1000 PPM (2400 MG/M3);STEL 1250 PPM JAN 1993
OEL IN BULGARIA, COLOMBIA, JORDAN, KOREA CHECK ACGIH TLV
OEL IN NEW ZEALAND, SINGAPORE, VIETNAM CHECK ACGIH TLV
NIOSH REL TO ACETONE-AIR:10H TWA 250 PPM
NIOSH* DHHS #92-100,1992
NOHS 1974: HZD 02820; NIS 350; TNF 99713; NOS 188; TNE 1287794
NOES 1983: HZD 02820; NIS 358; TNF 97342; NOS 215; TNE 1740164; TFE
540313
EPA GENETOX PROGRAM 1988, NEGATIVE: SHE-CLONAL ASSAY; CELL
TRANSFORM.-MOUSE EMBRYO
EPA GENETOX PROGRAM 1988, NEGATIVE: CELL TRANSFORM.-RLV F344 RAT EMBRYO
EPA GENETOX PROGRAM 1988, NEGATIVE: IN VITRO CYTOGENETICS-NONHUMAN
EPA GENETOX PROGRAM 1988, NEGATIVE: HISTIDINE REVERSION-AMES TEST; IN
VITRO SCE-NONHUMAN
EPA TSCA SECTION 8(B) CHEMICAL INVENTORY
EPA TSCA SECTION 8(D) UNPUBLISHED HEALTH/SAFETY STUDIES
ON EPA IRIS DATABASE
EPA TSCA TEST SUBMISSION (TSCATS) DATA BASE, APRIL 1997
NIOSH ANALYTICAL METHOD, 1994: KETONES I, 1300
NTP TOXICITY STUDIES, RPT# TOX-03, APRIL 1997
OSHA ANALYTICAL METHOD #ID-69

SECTION 16. - - - - - OTHER INFORMATION- - - - -
THE ABOVE INFORMATION IS BELIEVED TO BE CORRECT BUT DOES NOT PURPORT TO
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SECTION 1. - - - - - CHEMICAL IDENTIFICATION- - - - -

CATALOG #: BB141
NAME: BARIUM ATOMIC ABSORPTION STANDARD

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

CAS #:NONE

ADDITIONAL INFORMATION

CONTAINS NITRIC ACID, CHEMICAL ABSTRACTS REGISTRY NUMBER 7697-37-2.

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

LABEL PRECAUTIONARY STATEMENTS

TOXIC

TOXIC BY INHALATION, IN CONTACT WITH SKIN AND IF SWALLOWED.

CAUSES BURNS.

TARGET ORGAN(S):

HEART

NERVES

IN CASE OF ACCIDENT OR IF YOU FEEL UNWELL, SEEK MEDICAL ADVICE

IMMEDIATELY (SHOW THE LABEL WHERE POSSIBLE).

IN CASE OF CONTACT WITH EYES, RINSE IMMEDIATELY WITH PLENTY OF WATER AND SEEK MEDICAL ADVICE.

TAKE OFF IMMEDIATELY ALL CONTAMINATED CLOTHING.

WEAR SUITABLE PROTECTIVE CLOTHING, GLOVES AND EYE/FACE PROTECTION.

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

IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES OR SKIN WITH COPIOUS AMOUNTS OF WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED CLOTHING AND SHOES.

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.

DISCARD CONTAMINATED SHOES.

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

EXTINGUISHING MEDIA

DRY CHEMICAL POWDER.

SPECIAL FIREFIGHTING PROCEDURES

WEAR SELF-CONTAINED BREATHING APPARATUS AND PROTECTIVE CLOTHING TO

PREVENT CONTACT WITH SKIN AND EYES.

UNUSUAL FIRE AND EXPLOSIONS HAZARDS

EMITS TOXIC FUMES UNDER FIRE CONDITIONS.

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

EVACUATE AREA.
WEAR SELF-CONTAINED BREATHING APPARATUS, RUBBER BOOTS AND HEAVY RUBBER GLOVES.
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 - - - - -

REFER TO SECTION 8.

ADDITIONAL INFORMATION

CONTAINS 1000 UG/ML OF BA IN 2% HCL

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

WEAR APPROPRIATE NIOSH/MSHA-APPROVED RESPIRATOR, CHEMICAL-RESISTANT GLOVES, SAFETY GOGGLES, OTHER PROTECTIVE CLOTHING.
USE ONLY IN A CHEMICAL FUME HOOD.
SAFETY SHOWER AND EYE BATH.
FACESHIELD (8-INCH MINIMUM).
DO NOT GET IN EYES, ON SKIN, ON CLOTHING.
AVOID PROLONGED OR REPEATED EXPOSURE.
WASH THOROUGHLY AFTER HANDLING.

TOXIC.

CORROSIVE.

KEEP TIGHTLY CLOSED.

STORE IN A COOL DRY PLACE.

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

APPEARANCE AND ODOR

CLEAR COLORLESS LIQUID

PHYSICAL PROPERTIES

SPECIFIC GRAVITY: 1.010

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

INCOMPATIBILITIES

STRONG BASES

HAZARDOUS COMBUSTION OR DECOMPOSITION PRODUCTS

HYDROGEN CHLORIDE GAS

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

ACUTE EFFECTS

HARMFUL IF SWALLOWED, INHALED, OR ABSORBED THROUGH SKIN.
MATERIAL IS EXTREMELY DESTRUCTIVE TO TISSUE OF THE MUCOUS MEMBRANES AND UPPER RESPIRATORY TRACT, EYES AND SKIN.
INHALATION MAY RESULT IN SPASM, INFLAMMATION AND EDEMA OF THE LARYNX AND BRONCHI, CHEMICAL PNEUMONITIS AND PULMONARY EDEMA.
SYMPTOMS OF EXPOSURE MAY INCLUDE BURNING SENSATION, COUGHING, WHEEZING, LARYNGITIS, SHORTNESS OF BREATH, HEADACHE, NAUSEA AND VOMITING.

TARGET ORGAN(S):

HEART

NERVES

KIDNEYS

G.I. SYSTEM
BONE MARROW
SPLEEN
LIVER

TO THE BEST OF OUR KNOWLEDGE, THE CHEMICAL, PHYSICAL, AND
TOXICOLOGICAL PROPERTIES HAVE NOT BEEN THOROUGHLY INVESTIGATED.

SECTION 12. - - - - - ECOLOGICAL INFORMATION - - - - -
DATA NOT YET AVAILABLE.

SECTION 13. - - - - - DISPOSAL CONSIDERATIONS - - - - -
NEUTRALIZE THE SOLUTION AND ADD FILTERING AGENT (10G PER 100ML).
EVAPORATE LIQUID AND BAG RESIDUAL SOLID FOR BURIAL IN A LANDFILL SITE
APPROVED FOR HAZARDOUS-WASTE DISPOSAL.

SECTION 14. - - - - - TRANSPORT INFORMATION - - - - -
OBSERVE ALL FEDERAL, STATE AND LOCAL ENVIRONMENTAL REGULATIONS.
CONTACT SIGMA CHEMICAL COMPANY FOR TRANSPORTATION INFORMATION.

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

CAUTION: SUBSTANCE NOT YET FULLY TESTED.

TOXIC

R 23/24/25

TOXIC BY INHALATION, IN CONTACT WITH SKIN AND IF SWALLOWED.

R 34

CAUSES BURNS.

S 45

IN CASE OF ACCIDENT OR IF YOU FEEL UNWELL, SEEK MEDICAL ADVICE
IMMEDIATELY (SHOW THE LABEL WHERE POSSIBLE).

S 26

IN CASE OF CONTACT WITH EYES, RINSE IMMEDIATELY WITH PLENTY OF
WATER AND SEEK MEDICAL ADVICE.

S 27

TAKE OFF IMMEDIATELY ALL CONTAMINATED CLOTHING.

S 36/37/39

WEAR SUITABLE PROTECTIVE CLOTHING, GLOVES AND EYE/FACE
PROTECTION.

TLV AND SOURCE

FOR SOLUBLE BARIUM COMPOUNDS AS BARIUM:

ACGIH TLV-TWA: 0.5 MG/M3.

OSHA PEL: 8H TWA 0.5 MG/M3.

FOR NITRIC ACID:

ACGIH TLV-TWA: 2 PPM (5.2 MG/M3); STEL: 4 PPM (10 MG/M3).

OSHA PEL: 8H TWA 2 PPM (5 MG/M3); STEL: 4 PPM.

U.S. INFORMATION

1.0% HYDROCHLORIC ACID 7647-01-0

THIS PRODUCT IS SUBJECT TO SARA SECTION 313 REPORTING REQUIREMENTS.

0.1% BARIUM

THIS PRODUCT IS SUBJECT TO SARA SECTION 313 REPORTING REQUIREMENTS -
BARIUM COMPOUNDS.

SECTION 16. - - - - - OTHER INFORMATION - - - - -
THE ABOVE INFORMATION IS BELIEVED TO BE CORRECT BUT DOES NOT PURPORT TO

Product #: B8141 Name: BARIUM ATOMIC ABSORPTION STANDARD
Material Safety Data Sheet Valid 11/97- 1/98
Printed: 01/27/1998 15:19:17

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

CATALOG #: B6772
NAME: BENZENE 99.5 ATOM % D

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

CAS #: 1076-43-3
MF: C6H6
EC NO: 214-061-8

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

LABEL PRECAUTIONARY STATEMENTS

FLAMMABLE (USA)
HIGHLY FLAMMABLE (EU)
TOXIC
MAY CAUSE CANCER.
TOXIC: DANGER OF SERIOUS DAMAGE TO HEALTH BY PROLONGED EXPOSURE
THROUGH INHALATION, IN CONTACT WITH SKIN AND IF SWALLOWED.
DANGER: CONTAINS BENZENE, CANCER HAZARD.
MUTAGEN.
CAUSES SEVERE EYE IRRITATION.
TARGET ORGAN(S):
BLOOD
BONE MARROW
EYES
KEEP AWAY FROM SOURCES OF IGNITION - NO SMOKING.
AVOID EXPOSURE - OBTAIN SPECIAL INSTRUCTIONS BEFORE USE.
IN CASE OF ACCIDENT OR IF YOU FEEL UNWELL, SEEK MEDICAL ADVICE
IMMEDIATELY (SHOW THE LABEL WHERE POSSIBLE).

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

IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES OR SKIN WITH COPIOUS
AMOUNTS OF WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED
CLOTHING AND SHOES.
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.
REMOVE AND WASH CONTAMINATED CLOTHING PROMPTLY.

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

EXTINGUISHING MEDIA
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

DANGER:

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.
SAFETY SHOWER AND EYE BATH.
USE ONLY IN A CHEMICAL FUME HOOD.
USE NONSPARKING TOOLS.
DO NOT BREATHE VAPOR.
DO NOT GET IN EYES, ON SKIN, ON CLOTHING.
AVOID PROLONGED OR REPEATED EXPOSURE.
WASH THOROUGHLY AFTER HANDLING.

CARCINOGEN.

TOXIC.

SEVERE EYE IRRITANT.

MUTAGEN.

KEEP TIGHTLY CLOSED.

KEEP AWAY FROM HEAT, SPARKS, AND OPEN FLAME.

HYGROSCOPIC

STORE UNDER NITROGEN.

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

APPEARANCE AND ODOR

COLORLESS LIQUID

PHYSICAL PROPERTIES

BOILING POINT: 79 C
MELTING POINT: 6.8 C
FLASHPOINT 12F
-11.11C
SPECIFIC GRAVITY: 0.950

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

INCOMPATIBILITIES

OXIDIZING AGENTS

PROTECT FROM MOISTURE.

HAZARDOUS COMBUSTION OR DECOMPOSITION PRODUCTS

TOXIC FUMES OF:

CARBON MONOXIDE, CARBON DIOXIDE

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

ACUTE EFFECTS

DANGER: CONTAINS BENZENE, CANCER HAZARD.

HARMFUL IF SWALLOWED, INHALED, OR ABSORBED THROUGH SKIN.

MATERIAL IS IRRITATING TO MUCOUS MEMBRANES AND UPPER

RESPIRATORY TRACT.

CAUSES SEVERE EYE IRRITATION.

CAUSES SKIN IRRITATION.

EXPOSURE CAN CAUSE:

NAUSEA, DIZZINESS AND HEADACHE

NARCOTIC EFFECT

CHRONIC EFFECTS

CARCINOGEN.

BLOOD EFFECTS

MAY ALTER GENETIC MATERIAL.

TARGET ORGAN(S):

BLOOD

BONE MARROW

EYES

ADDITIONAL INFORMATION

INHALATION OF HIGH CONCENTRATIONS OF BENZENE MAY HAVE AN INITIAL STIMULATORY EFFECT ON THE CENTRAL NERVOUS SYSTEM CHARACTERIZED BY EXHILARATION, NERVOUS EXCITATION AND/OR GIDDINESS, DEPRESSION, DROWSINESS, OR FATIGUE. THE VICTIM MAY EXPERIENCE TIGHTNESS IN THE CHEST, BREATHLESSNESS AND LOSS OF CONSCIOUSNESS. TREMORS, CONVULSIONS AND DEATH DUE TO RESPIRATORY PARALYSIS OR CIRCULATORY COLLAPSE CAN OCCUR IN A FEW MINUTES TO SEVERAL HOURS FOLLOWING SEVERE EXPOSURES. ASPIRATION OF SMALL AMOUNTS OF LIQUID IMMEDIATELY CAUSES PULMONARY EDEMA AND HEMORRHAGE OF PULMONARY TISSUE. DIRECT SKIN CONTACT MAY CAUSE ERYTHEMA. REPEATED OR PROLONGED SKIN CONTACT MAY RESULT IN DRYING, SCALING DERMATITIS OR DEVELOPMENT OF SECONDARY SKIN INFECTIONS. THE CHIEF TARGET ORGAN IS THE HEMATOPOIETIC SYSTEM. BLEEDING FROM THE NOSE, GUMS OR MUCOUS MEMBRANES AND THE DEVELOPMENT OF PURPURIC SPOTS, PANCYTOPENIA, LEUKOPENIA, THROMBOCYTOPENIA, APLASTIC ANEMIA AND LEUKEMIA MAY OCCUR AS THE CONDITION PROGRESSES. THE BONE MARROW MAY APPEAR NORMAL, APLASTIC OR HYPERPLASTIC, AND MAY NOT CORRELATE WITH PERIPHERAL BLOOD-FORMING TISSUES. THE ONSET OF EFFECTS OF PROLONGED BENZENE EXPOSURE MAY BE DELAYED FOR MANY MONTHS OR YEARS AFTER THE ACTUAL EXPOSURE HAS CEASED.

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

DATA NOT YET AVAILABLE.

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 SIGMA CHEMICAL COMPANY FOR TRANSPORTATION INFORMATION.

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

EUROPEAN INFORMATION

HIGHLY FLAMMABLE

TOXIC

R 11

HIGHLY FLAMMABLE.

R 45

MAY CAUSE CANCER.

R 48/23/24/25

TOXIC: DANGER OF SERIOUS DAMAGE TO HEALTH BY PROLONGED EXPOSURE THROUGH INHALATION, IN CONTACT WITH SKIN AND IF SWALLOWED.

S 45

IN CASE OF ACCIDENT OR IF YOU FEEL UNWELL, SEEK MEDICAL ADVICE IMMEDIATELY (SHOW THE LABEL WHERE POSSIBLE).

S 53

AVOID EXPOSURE - OBTAIN SPECIAL INSTRUCTIONS BEFORE USE.

TLV AND SOURCE

FOR BENZENE:

ACGIH TLV-TWA: 10 PPM.

OSHA PEL: 8H TWA 1 PPM; STEL: 5 PPM (15 MIN.).

U.S. INFORMATION

OSHA-REGULATED CARCINOGEN. SEE CFR TITLE 29 PART 1910.1028

THIS PRODUCT IS OR CONTAINS CHEMICAL(S) KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER.

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

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

CATALOG #: D61555
NAME: 1,1-DICHLOROETHANE

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

CAS #: 75-34-3
MF: C2H4CL2
EC NO: 200-863-5

HAZARDOUS INGREDIENTS

CONTAINS 1,4-DIOXANE, CHEMICAL ABSTRACTS REGISTRY NUMBER 123-91-1.

SYNONYMS

AETHYLIDENCHLORID (GERMAN) * CHLORINATED HYDROCHLORIC ETHER *
CHLORURE D'ETHYLIDENE (FRENCH) * CLORURO DI ETILIDENE (ITALIAN) * 1,1-
DICHLOROETHAAN (DUTCH) * 1,1-DICHLORAETHAN (GERMAN) * 1,1-
DICHLORETHANE * 1,1-DICHLOROETHANE (ACGIH:DOT:OSHA) * 1,1-
DICLOROETANO (ITALIAN) * ETHYLIDENE CHLORIDE (OSHA) * ETHYLIDENE
DICHLORIDE * NCI-C04535 * RCRA WASTE NUMBER U076 * UN2362 (DOT) *

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

LABEL PRECAUTIONARY STATEMENTS

FLAMMABLE (USA)
HIGHLY FLAMMABLE (EU)
TOXIC

MAY CAUSE CANCER.
MAY CAUSE HERITABLE GENETIC DAMAGE.
POSSIBLE RISK OF HARM TO THE UNBORN CHILD.
HARMFUL BY INHALATION, IN CONTACT WITH SKIN AND IF SWALLOWED.
IRRITATING TO EYES, RESPIRATORY SYSTEM AND SKIN.

TARGET ORGAN(S):

LIVER, KIDNEYS

KEEP AWAY FROM SOURCES OF IGNITION - NO SMOKING.
IN CASE OF ACCIDENT OR IF YOU FEEL UNWELL, SEEK MEDICAL ADVICE
IMMEDIATELY (SHOW THE LABEL WHERE POSSIBLE).
IN CASE OF CONTACT WITH EYES, RINSE IMMEDIATELY WITH PLENTY OF
WATER AND SEEK MEDICAL ADVICE.
WEAR SUITABLE PROTECTIVE CLOTHING, GLOVES AND EYE/FACE
PROTECTION.

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

IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES OR SKIN WITH COPIOUS
AMOUNTS OF WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED
CLOTHING AND SHOES.
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

CARBON DIOXIDE, DRY CHEMICAL POWDER OR APPROPRIATE FOAM.

SPECIAL FIREFIGHTING PROCEDURES

WEAR SELF-CONTAINED BREATHING APPARATUS AND PROTECTIVE CLOTHING TO PREVENT CONTACT WITH SKIN AND EYES.

UNUSUAL FIRE AND EXPLOSIONS HAZARDS

FLAMMABLE LIQUID.

VAPOR MAY TRAVEL CONSIDERABLE DISTANCE TO SOURCE OF IGNITION AND FLASH BACK.

CONTAINER EXPLOSION MAY OCCUR UNDER FIRE CONDITIONS.

EMITS TOXIC FUMES 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.

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 - - - - -

REFER TO SECTION 8.

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

WEAR APPROPRIATE NIOSH/MSHA-APPROVED RESPIRATOR, CHEMICAL-RESISTANT GLOVES, SAFETY GOGGLES, OTHER PROTECTIVE CLOTHING.

USE ONLY IN A CHEMICAL FUME HOOD.

SAFETY SHOWER AND EYE BATH.

DO NOT BREATHE VAPOR.

DO NOT GET IN EYES, ON SKIN, ON CLOTHING.

AVOID PROLONGED OR REPEATED EXPOSURE.

WASH THOROUGHLY AFTER HANDLING.

IRRITANT.

TOXIC.

CARCINOGEN.

MUTAGEN.

POSSIBLE TERATOGEN.

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 TO FAINT YELLOW LIQUID

PHYSICAL PROPERTIES

BOILING POINT: 57 C
MELTING POINT: -97 C
SPECIFIC GRAVITY: 1.177

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

STABILITY

STABLE.

INCOMPATIBILITIES

REACTS VIOLENTLY WITH:

OXIDIZING AGENTS

CAUTION: WILL RELEASE FLAMMABLE AND TOXIC ACETALDEHYDE GAS ON CONTACT WITH STRONG CAUSTIC. ACETALDEHYDE IS A CARCINOGEN. STABILIZED WITH 3% DIOXANE, A RECOGNIZED CARCINOGEN.

HAZARDOUS COMBUSTION OR DECOMPOSITION PRODUCTS

TOXIC FUMES OF:

CARBON MONOXIDE, CARBON DIOXIDE

HYDROGEN CHLORIDE GAS

PHOSGENE GAS

HAZARDOUS POLYMERIZATION

WILL NOT OCCUR.

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

ACUTE EFFECTS

HARMFUL IF SWALLOWED, INHALED, OR ABSORBED THROUGH SKIN.

VAPOR OR MIST IS IRRITATING TO THE EYES, MUCOUS MEMBRANES AND UPPER RESPIRATORY TRACT.

CAUSES SKIN IRRITATION.

EXPOSURE CAN CAUSE:

NAUSEA, DIZZINESS AND HEADACHE

DAMAGE TO THE KIDNEYS

DAMAGE TO THE LIVER

NARCOTIC EFFECT

CAUSES DERMATITIS.

CHRONIC EFFECTS

CARCINOGEN.

MAY ALTER GENETIC MATERIAL.

OVEREXPOSURE MAY CAUSE REPRODUCTIVE DISORDER(S) BASED ON TESTS WITH LABORATORY ANIMALS.

TARGET ORGAN(S):

LIVER

KIDNEYS

CENTRAL NERVOUS SYSTEM

TO THE BEST OF OUR KNOWLEDGE, THE CHEMICAL, PHYSICAL, AND

TOXICOLOGICAL PROPERTIES HAVE NOT BEEN THOROUGHLY INVESTIGATED.

RTECS #: K10175000

ETHANE, 1,1-DICHLORO-

TOXICITY DATA

ORL-RAT LD50:725 MG/KG

HYSAAV 32(3),349,1967

IHL-RAT LC50:13000 PPM/4H

NTIS** AD-A180-198

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.

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: 602-011-00-1

HIGHLY FLAMMABLE

TOXIC

R 11

HIGHLY FLAMMABLE.

R 40

POSSIBLE RISK OF IRREVERSIBLE EFFECTS.

R 22

HARMFUL IF SWALLOWED.

R 36/37

IRRITATING TO EYES AND RESPIRATORY SYSTEM.

S 16

KEEP AWAY FROM SOURCES OF IGNITION - NO SMOKING.

S 23

DO NOT BREATHE VAPOR.

S 36/37

WEAR SUITABLE PROTECTIVE CLOTHING AND GLOVES.

TLV AND SOURCE

FOR DIOXANE:

ACGIH TLV-TWA: 25 PPM (90 MG/M3).

OSHA PEL: 8H TWA 25 PPM (90 MG/M3).

REVIEWS, STANDARDS, AND REGULATIONS

OEL=MAK

ACGIH TLV-NOT CLASSIFIABLE AS A HUMAN CARCINOGEN DTLVS* TLV/BEI,1996

ACGIH TLV-TWA 405 MG/M3 (100 PPM) DTLVS* TLV/BEI,1996

MSHA STANDARD-AIR:TWA 200 PPM (320 MG/M3)

DTLWS* 3,15,1973

OSHA PEL (GEN INDU):8H TWA 100 PPM (400 MG/M3)

CFRGBR 29,1910.1000,1994

OSHA PEL (CONSTRUC):8H TWA 100 PPM (400 MG/M3)

CFRGBR 29,1926.55,1994

OSHA PEL (SHIPYARD):8H TWA 100 PPM (400 MG/M3)

CFRGBR 29,1915.1000,1993

OSHA PEL (FED CONT):8H TWA 100 PPM (400 MG/M3)

CFRGBR 41,50-204.50,1994

OEL-ARAB REPUBLIC OF EGYPT JAN 1993

OEL-AUSTRALIA:TWA 200 PPM (810 MG/M3);STEL 250 PPM (1010 MG/M3) JAN

1993

OEL-AUSTRIA:TWA 100 PPM (400 MG/M3) JAN 1993

OEL-BELGIUM:TWA 200 PPM (810 MG/M3);STEL 250 PPM (1010 MG/M3) JAN 1993

OEL-DENMARK:TWA 100 PPM (400 MG/M3) JAN 1993
OEL-FINLAND:TWA 100 PPM (400 MG/M3);STEL 250 PPM (1000 MG/M3) JAN 1993
OEL-FRANCE:TWA 200 PPM (810 MG/M3) JAN 1993
OEL-GERMANY:TWA 100 PPM (400 MG/M3) JAN 1993
OEL-JAPAN:TWA 100 PPM (400 MG/M3) JAN 1993
OEL-THE NETHERLANDS:TWA 200 PPM (820 MG/M3) JAN 1993
OEL-THE PHILIPPINES:TWA 100 PPM (400 MG/M3) JAN 1993
OEL-RUSSIA:TWA 100 PPM JAN 1993
OEL-SWITZERLAND:TWA 100 PPM (400 MG/M3);STEL 200 PPM (800 MG/M3) JAN 1993
OEL-THAILAND:TWA 50 PPM;STEL 100 PPM JAN 1993
OEL-TURKEY:TWA 100 PPM (400 MG/M3) JAN 1993
OEL-UNITED KINGDOM:TWA 200 PPM (810 MG/M3);STEL 400 PPM JAN 1993
OEL IN BULGARIA, COLOMBIA, JORDAN, KOREA CHECK ACGIH TLV
OEL IN NEW ZEALAND, SINGAPORE, VIETNAM CHECK ACGIH TLV
NIOSH REL TO 1,1-DICHLOROETHANE-AIR:10H TWA 100 PPM
NIOSH* DHHS #92-100,1992
NOHS 1974: HZD 24120; NIS 7; TNF 143; NOS 9; TNE 715
NOES 1983: HZD 24120; NIS 2; TNF 10; NOS 7; TNE 1957; TFE 272
EPA TSCA SECTION 8(B) CHEMICAL INVENTORY
EPA TSCA SECTION 8(D) UNPUBLISHED HEALTH/SAFETY STUDIES
ON EPA IRIS DATABASE
EPA TSCA TEST SUBMISSION (TSCATS) DATA BASE, APRIL 1997
NIOSH CURRENT INTELLIGENCE BULLETIN 27, 1978
NIOSH ANALYTICAL METHOD, 1994: HYDROCARBONS, HALOGENATED, 1003
NCI CARCINOGENESIS BIOASSAY (GAVAGE);EQUIVOCAL EVIDENCE:MOUSE,RAT
NCITR* NCI-TR-66,78

U.S. INFORMATION

THIS PRODUCT IS SUBJECT TO SARA SECTION 313 REPORTING REQUIREMENTS.
CALIFORNIA PROPOSITION 65:
THIS PRODUCT IS OR CONTAINS CHEMICAL(S) KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER.

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. SIGMA, ALDRICH, FLUKA 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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SECTION 1. - - - - - CHEMICAL IDENTIFICATION- - - - -

CATALOG #: 396095
NAME: TRANS-1,2-DICHLOROETHENE NEAT STANDARD
FOR EPA
METHODS

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

CAS #: 156-60-5
MF: C2H2CL2
EC NO: 205-860-2

SYNONYMS

TRANS-ACETYLENE DICHLORIDE * TRANS-DICHLOROETHYLENE * TRANS-1,2-
DICHLOROETHYLENE * RCRA WASTE NUMBER U079 *

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

LABEL PRECAUTIONARY STATEMENTS

FLAMMABLE (USA)
HIGHLY FLAMMABLE (EU)
HARMFUL
HARMFUL BY INHALATION, IN CONTACT WITH SKIN AND IF SWALLOWED.
IRRITATING TO EYES, RESPIRATORY SYSTEM AND SKIN.
TARGET ORGAN(S):
CENTRAL NERVOUS SYSTEM
LIVER
KEEP AWAY FROM SOURCES OF IGNITION - NO SMOKING.
IN CASE OF CONTACT WITH EYES, RINSE IMMEDIATELY WITH PLENTY OF
WATER AND SEEK MEDICAL ADVICE.
WEAR SUITABLE PROTECTIVE CLOTHING.

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

IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES OR SKIN WITH COPIOUS
AMOUNTS OF WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED
CLOTHING AND SHOES.
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

WATER SPRAY.
CARBON DIOXIDE, DRY CHEMICAL POWDER OR APPROPRIATE FOAM.
SPECIAL FIREFIGHTING PROCEDURES
FLAMMABLE LIQUID.

VAPOR MAY TRAVEL CONSIDERABLE DISTANCE TO SOURCE OF IGNITION AND
FLASH BACK.

UNUSUAL FIRE AND EXPLOSIONS HAZARDS

EMITS TOXIC FUMES 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.

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- - - - -
REFER TO SECTION 8.

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

WEAR APPROPRIATE NIOSH/MSHA-APPROVED RESPIRATOR, CHEMICAL-RESISTANT
GLOVES, SAFETY GOGGLES, OTHER PROTECTIVE CLOTHING.

USE ONLY IN A CHEMICAL FUME HOOD.

SAFETY SHOWER AND EYE BATH.

DO NOT BREATHE VAPOR.

DO NOT GET IN EYES, ON SKIN, ON CLOTHING.

AVOID PROLONGED OR REPEATED EXPOSURE.

WASH THOROUGHLY AFTER HANDLING.

IRRITANT.

HARMFUL LIQUID AND FUMES.

KEEP TIGHTLY CLOSED.

KEEP AWAY FROM HEAT, SPARKS, AND OPEN FLAME.

LIGHT SENSITIVE

AIR AND MOISTURE SENSITIVE

STORE IN A COOL DRY PLACE.

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

PHYSICAL PROPERTIES

BOILING POINT: 48 C

MELTING POINT: -49 C

FLASHPOINT 43F
6.11C

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

INCOMPATIBILITIES

OXIDIZING AGENTS

BASES

MAY DECOMPOSE ON EXPOSURE TO AIR AND MOISTURE.

MAY DECOMPOSE ON EXPOSURE TO LIGHT.

HAZARDOUS COMBUSTION OR DECOMPOSITION PRODUCTS

TOXIC FUMES OF:

HYDROGEN CHLORIDE GAS

CARBON MONOXIDE, CARBON DIOXIDE

PHOSGENE GAS

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

ACUTE EFFECTS

HARMFUL IF SWALLOWED, INHALED, OR ABSORBED THROUGH SKIN.
VAPOR OR MIST IS IRRITATING TO THE EYES, MUCOUS MEMBRANES AND UPPER
RESPIRATORY TRACT.

CAUSES SKIN IRRITATION.
PROLONGED CONTACT CAN CAUSE:

NARCOTIC EFFECT
TARGET ORGAN(S):
CENTRAL NERVOUS SYSTEM
LIVER
KIDNEYS

TO THE BEST OF OUR KNOWLEDGE, THE CHEMICAL, PHYSICAL, AND
TOXICOLOGICAL PROPERTIES HAVE NOT BEEN THOROUGHLY INVESTIGATED.

RTECS #: KV9400000

ETHYLENE, 1,2-DICHLORO-, (E)-

IRRITATION DATA

SKN-RBT 500 MG/24H MOD ATDAEI 1,11,1990
EYE-RBT 10 MG MOD ATDAEI 1,11,1990

TOXICITY DATA

ORL-RAT LD50:1235 MG/KG TXCYAC 7,141,1977
IPR-RAT LD50:7411 MG/KG TXCYAC 7,141,1977
ORL-MUS LD50:2122 MG/KG DCTODJ 8,373,1985
IPR-MUS LD50:3952 MG/KG TXCYAC 7,141,1977
SKN-RBT LD50:>5 GM/KG ATDAEI 1,10,1990

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.

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 SIGMA CHEMICAL COMPANY FOR TRANSPORTATION INFORMATION.

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

EUROPEAN INFORMATION

HIGHLY FLAMMABLE
HARMFUL
R 20/21/22
HARMFUL BY INHALATION, IN CONTACT WITH SKIN AND IF SWALLOWED.
R 36/37/38
IRRITATING TO EYES, RESPIRATORY SYSTEM AND SKIN.
HIGHLY FLAMMABLE
S 16
KEEP AWAY FROM SOURCES OF IGNITION - NO SMOKING.
S 26
IN CASE OF CONTACT WITH EYES, RINSE IMMEDIATELY WITH PLENTY OF
WATER AND SEEK MEDICAL ADVICE.

S 36

WEAR SUITABLE PROTECTIVE CLOTHING.

REVIEWS, STANDARDS, AND REGULATIONS

OEL=MAK

EPA TSCA SECTION 8(B) CHEMICAL INVENTORY

EPA TSCA SECTION 8(D) UNPUBLISHED HEALTH/SAFETY STUDIES

ON EPA IRIS DATABASE

EPA TSCA TEST SUBMISSION (TSCATS) DATA BASE, APRIL 1997

NTP CARCINOGENESIS STUDIES; TEST COMPLETED (PEER REVIEW), APRIL 1997

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. SIGMA, ALDRICH, FLUKA 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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CATALOG #: 47592
NAME: GASOLINE REFINERY GRADE COMPONENTS

HAZARDS IDENTIFIED WITH THIS PRODUCT ARE THOSE ASSOCIATED WITH THE FOLLOWING COMPONENT(S). REFER TO THE MATERIAL SAFETY DATA SHEET(S) FOR THE LISTED ITEM(S).

CATALOG NUMBER	NAME	PERCENT
	GASOLINE, REFINERY GRADE COMPONENTS	2.15
	METHANOL ACS	97.85

- - - - MULTIPLE COMPONENT SPILL OR LEAK PROCEDURES - - - -
STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED
EVACUATE AREA.

SHUT OFF ALL SOURCES OF IGNITION.

WEAR SELF-CONTAINED BREATHING APPARATUS, RUBBER BOOTS AND HEAVY RUBBER GLOVES.

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.

WASTE DISPOSAL METHOD

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.

LABEL PRECAUTIONARY STATEMENTS

FLAMMABLE (USA)

HIGHLY FLAMMABLE (EU)

TOXIC

TOXIC BY INHALATION AND IF SWALLOWED.

IRRITATING TO EYES AND SKIN.

TARGET ORGAN(S):

EYES

HEART

KEEP CONTAINER TIGHTLY CLOSED.

KEEP AWAY FROM SOURCES OF IGNITION - NO SMOKING.

AVOID CONTACT WITH SKIN.

IN CASE OF ACCIDENT OR IF YOU FEEL UNWELL, SEEK MEDICAL ADVICE

IMMEDIATELY (SHOW THE LABEL WHERE POSSIBLE).

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

CATALOG #: 47592

NAME: GASOLINE REFINERY GRADE COMPONENTS

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

CAS #: 86290-81-5

EC NO: 289-220-8

SYNONYMS

BENZYNA (POLISH) * BENZINE BR-1 * BENZINE BR-2 * GASOLINE BR-1 *
HERBICIDE ES * NEFRAS 150/200 *

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

LABEL PRECAUTIONARY STATEMENTS

FLAMMABLE (USA)
HIGHLY FLAMMABLE (EU)
TOXIC
TOXIC BY INHALATION AND IF SWALLOWED.
IRRITATING TO EYES AND SKIN.
TARGET ORGAN(S):

EYES
HEART

KEEP CONTAINER TIGHTLY CLOSED.
KEEP AWAY FROM SOURCES OF IGNITION - NO SMOKING.
AVOID CONTACT WITH SKIN.

IN CASE OF ACCIDENT OR IF YOU FEEL UNWELL, SEEK MEDICAL ADVICE
IMMEDIATELY (SHOW THE LABEL WHERE POSSIBLE).

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

IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES OR SKIN WITH COPIOUS
AMOUNTS OF WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED
CLOTHING AND SHOES.

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

WATER SPRAY.
CARBON DIOXIDE, DRY CHEMICAL POWDER OR APPROPRIATE FOAM.

SPECIAL FIREFIGHTING PROCEDURES

WEAR SELF-CONTAINED BREATHING APPARATUS AND PROTECTIVE CLOTHING TO
PREVENT CONTACT WITH SKIN AND EYES.

FLAMMABLE LIQUID.

UNUSUAL FIRE AND EXPLOSIONS HAZARDS

EMITS TOXIC FUMES UNDER FIRE CONDITIONS.
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 DRY-LIME, SAND, OR SODA ASH. PLACE IN COVERED CONTAINERS
USING NON-SPARKING TOOLS AND TRANSPORT OUTDOORS.

PLACE IN APPROPRIATE CONTAINER.

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.
SAFETY SHOWER AND EYE BATH.
USE ONLY IN A CHEMICAL FUME HOOD.
DO NOT BREATHE VAPOR.
DO NOT GET IN EYES, ON SKIN, ON CLOTHING.
AVOID PROLONGED OR REPEATED EXPOSURE.
WASH THOROUGHLY AFTER HANDLING.
TOXIC.
IRRITANT.
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
LIQUID.

SECTION 10. - - - - - STABILITY AND REACTIVITY - - - - -
INCOMPATIBILITIES
STRONG OXIDIZING AGENTS
HAZARDOUS COMBUSTION OR DECOMPOSITION PRODUCTS
TOXIC FUMES OF:
CARBON MONOXIDE, CARBON DIOXIDE

SECTION 11. - - - - - TOXICOLOGICAL INFORMATION - - - - -
ACUTE EFFECTS
HARMFUL IF SWALLOWED, INHALED, OR ABSORBED THROUGH SKIN.
CAUSES SKIN IRRITATION.
VAPOR OR MIST IS IRRITATING TO THE EYES, MUCOUS MEMBRANES AND UPPER
RESPIRATORY TRACT.
CAN CAUSE CNS DEPRESSION.
EXPOSURE CAN CAUSE:
DERMATITIS
CHRONIC EFFECTS
MAY CAUSE NERVOUS SYSTEM DISTURBANCES.
INHALATION STUDIES ON TOLUENE HAVE DEMONSTRATED THE DEVELOPMENT OF
INFLAMMATORY AND ULCEROUS LESIONS OF THE PENIS, PREPUCE AND SCROTUM IN
ANIMALS.
TARGET ORGAN(S):
HEART
BRAIN
LIVER
KIDNEYS
BLADDER
TO THE BEST OF OUR KNOWLEDGE, THE CHEMICAL, PHYSICAL, AND
TOXICOLOGICAL PROPERTIES HAVE NOT BEEN THOROUGHLY INVESTIGATED.
RTECS #: DE3550000

BENZINE (MOTOR FUEL)

TOXICITY DATA

ORL-RAT LD50:92 GM/KG GISAAA 32(3),31,1967
ORL-MUS LD50:60 ML/KG GTPZAB 25(11),52,1981
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.

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 SIGMA CHEMICAL COMPANY FOR TRANSPORTATION INFORMATION.

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

EUROPEAN INFORMATION

HIGHLY FLAMMABLE

TOXIC

R 45

MAY CAUSE CANCER.

R 11

HIGHLY FLAMMABLE.

R 23/25

TOXIC BY INHALATION AND IF SWALLOWED.

S 7

KEEP CONTAINER TIGHTLY CLOSED.

S 16

KEEP AWAY FROM SOURCES OF IGNITION - NO SMOKING.

S 24

AVOID CONTACT WITH SKIN.

S 45

IN CASE OF ACCIDENT OR IF YOU FEEL UNWELL, SEEK MEDICAL ADVICE

IMMEDIATELY (SHOW THE LABEL WHERE POSSIBLE).

REVIEWS, STANDARDS, AND REGULATIONS

OEL=MAK

EPA TSCA SECTION 8(D) UNPUBLISHED HEALTH/SAFETY STUDIES

EPA TSCA TEST SUBMISSION (TSCATS) DATA BASE, APRIL 1997

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. SIGMA, ALDRICH,
FLUKA SHALL NOT BE HELD LIABLE FOR ANY DAMAGE RESULTING FROM HANDLING
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St. Louis, MO 63178	Milwaukee, WI 53233	Milwaukee, WI 53233
Phone: 314-771-5765	Phone: 414-273-3850	Phone: 414-273-3850

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

CATALOG #: 59310
NAME: ISOPROPANOL

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

CAS #: 67-63-0
MF: C3H8O
EC NO: 200-661-7

SYNONYMS

ALCOOL ISOPROPILICO (ITALIAN) * ALCOOL ISOPROPYLIQUE (FRENCH) *
ALCOJEL * ALCOSOLVE * AVANTIN * AVANTINE * COMBI-SCHUTZ *
DIMETHYLCARBINOL * HARTOSOL * 2-HYDROXYPROPANE * IMSOL A * ISOHOL *
ISOPROPANOL (DOT) * ISOPROPYL ALCOHOL (ACGIH:DOT:OSHA) * ISO-
PROPYLALKOHOL (GERMAN) * LUTOSOL * 1-METHYLETHANOL * 1-METHYLETHYL
ALCOHOL * PETROHOL * PRO * 2-PROPANOL * I-PROPANOL (GERMAN) * N-
PROPAN-2-OL * SEC-PROPYL ALCOHOL * 2-PROPYL ALCOHOL * I-PROPYLALKOHOL
(GERMAN) * SPECTRAR * STERISOL HAND DISINFECTANT * TAKINEOCOL *
UN1219 (DOT) *

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

LABEL PRECAUTIONARY STATEMENTS

FLAMMABLE (USA)
HIGHLY FLAMMABLE (EU)
IRRITANT
IRRITATING TO EYES, RESPIRATORY SYSTEM AND SKIN.
RISK OF SERIOUS DAMAGE TO EYES.
TARGET ORGAN(S):
NERVES
KIDNEYS

KEEP AWAY FROM SOURCES OF IGNITION - NO SMOKING.
IN CASE OF CONTACT WITH EYES, RINSE IMMEDIATELY WITH PLENTY OF
WATER AND SEEK MEDICAL ADVICE.
WEAR SUITABLE PROTECTIVE CLOTHING.

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

IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES WITH COPIOUS AMOUNTS OF
WATER FOR AT LEAST 15 MINUTES.
ASSURE ADEQUATE FLUSHING OF THE EYES BY SEPARATING THE EYELIDS
WITH FINGERS.
IN CASE OF CONTACT, IMMEDIATELY WASH SKIN WITH SOAP AND COPIOUS
AMOUNTS OF WATER.
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.
REMOVE AND WASH CONTAMINATED CLOTHING PROMPTLY.

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

EXTINGUISHING MEDIA
CARBON DIOXIDE, DRY CHEMICAL POWDER OR APPROPRIATE FOAM.
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.
FLAMMABLE LIQUID.
UNUSUAL FIRE AND EXPLOSIONS HAZARDS
VAPOR MAY TRAVEL CONSIDERABLE DISTANCE TO SOURCE OF IGNITION AND
FLASH BACK.
CONTAINER EXPLOSION MAY OCCUR UNDER FIRE CONDITIONS.

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

SHUT OFF ALL SOURCES OF IGNITION.
EVACUATE AREA.
WEAR SELF-CONTAINED BREATHING APPARATUS, RUBBER BOOTS AND HEAVY
RUBBER GLOVES.
ABSORB ON SAND OR VERMICULITE AND PLACE IN CLOSED CONTAINERS FOR
DISPOSAL.
USE NONSPARKING TOOLS.
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 - - - - -
CHEMICAL SAFETY GOGGLES.
SAFETY SHOWER AND EYE BATH.
RUBBER GLOVES.
MECHANICAL EXHAUST REQUIRED.
NIOSH/MSHA-APPROVED RESPIRATOR.
DO NOT GET IN EYES, ON SKIN, ON CLOTHING.
DO NOT BREATHE VAPOR.
WASH THOROUGHLY AFTER HANDLING.
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 TO 83C
FLASHPOINT 53.60F
12C
EXPLOSION LIMITS IN AIR:
UPPER 12%
LOWER 2.5%
AUTOIGNITION TEMPERATURE: 860 F 459C
VAPOR PRESSURE: 33MM 20 C

SOLUBILITY:

WATER -SOLUBLE ETHANOL -SOLUBLE
ETHER -SOLUBLE
SPECIFIC GRAVITY: 0.785
VAPOR DENSITY: 2.1

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

STABILITY
STABLE.

INCOMPATIBILITIES

OXIDIZING AGENTS
ACIDS
ACID ANHYDRIDES
HALOGENS
ALUMINUM
HAZARDOUS COMBUSTION OR DECOMPOSITION PRODUCTS
TOXIC FUMES OF:
CARBON MONOXIDE, CARBON DIOXIDE
HAZARDOUS POLYMERIZATION
WILL NOT OCCUR.

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

ACUTE EFFECTS

MAY BE HARMFUL BY INHALATION, INGESTION, OR SKIN ABSORPTION.
CAUSES SEVERE EYE IRRITATION.
CAUSES SKIN IRRITATION.
MATERIAL IS IRRITATING TO MUCOUS MEMBRANES AND UPPER
RESPIRATORY TRACT.
CAN CAUSE CNS DEPRESSION.
PROLONGED EXPOSURE CAN CAUSE:
NAUSEA, HEADACHE AND VOMITING
NARCOTIC EFFECT
PROLONGED OR REPEATED EXPOSURE TO SKIN CAUSES DEFATTING AND
DERMATITIS.

CHRONIC EFFECTS

TARGET ORGAN(S):
LIVER

KIDNEYS

CARDIOVASCULAR SYSTEM
G.I. SYSTEM

TO THE BEST OF OUR KNOWLEDGE, THE CHEMICAL, PHYSICAL, AND
TOXICOLOGICAL PROPERTIES HAVE NOT BEEN THOROUGHLY INVESTIGATED.

RTECS #: NT8050000

ISOPROPYL ALCOHOL

IRRITATION DATA

SKN-RBT 500 MG MLD	NTIS** AD-A106-944
EYE-RBT 100 MG SEV	AJOPAA 29,1363,1946
EYE-RBT 10 MG MOD	TXAPA9 55,501,1980
EYE-RBT 100 MG/24H MOD	85JCAE -,191,1986

TOXICITY DATA

ORL-MAN LDLO:5272 MG/KG	AJCPAI 38,144,1962
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ORL-HMN LDLO:3570 MG/KG	34ZIAG -,339,1969
UNR-MAN LDLO:2770 MG/KG	85DCAI 2,73,1970
ORL-RAT LD50:5045 MG/KG	GISAAA 43(1),8,1978
IHL-RAT LC50:16000 PPM/8H	NPIRI* 1,100,1974
IPR-RAT LD50:2735 MG/KG	EVHPAZ 61,321,1985
IVN-RAT LD50:1088 MG/KG	EVHPAZ 61,321,1985
ORL-MUS LD50:3600 MG/KG	GISAAA 43(1),8,1978
IPR-MUS LD50:4477 MG/KG	EVHPAZ 61,321,1985
IVN-MUS LD50:1509 MG/KG	EVHPAZ 61,321,1985
ORL-RBT LD50:6410 MG/KG	FAONAU 48A,114,1970
SKN-RBT LD50:12800 MG/KG	NPIRI* 1,100,1974
IPR-RBT LD50:667 MG/KG	EVHPAZ 61,321,1985
IVN-RBT LD50:1184 MG/KG	EVHPAZ 61,321,1985
IPR-GPG LD50:2560 MG/KG	EVHPAZ 61,321,1985
IPR-HAM LD50:3444 MG/KG	EVHPAZ 61,321,1985

TARGET ORGAN DATA

SENSE ORGANS AND SPECIAL SENSES (OTHER EYE EFFECTS)
BEHAVIORAL (SOMNOLENCE)
BEHAVIORAL (HALLUCINATIONS, DISTORTED PERCEPTIONS)
CARDIAC (PULSE RATE DECREASED WITH FALL IN BP)
VASCULAR (BP LOWERING NOT CHARACTERIZED IN AUTONOMIC SECTION)
GASTROINTESTINAL (NAUSEA OR VOMITING)
EFFECTS ON EMBRYO OR FETUS (FETAL DEATH)
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.

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 FLUKA CHEMICAL COMPANY FOR TRANSPORTATION INFORMATION.

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

EUROPEAN INFORMATION

EC INDEX NO: 603-003-00-0

HIGHLY FLAMMABLE

IRRITANT

R 11

HIGHLY FLAMMABLE.

S 7

KEEP CONTAINER TIGHTLY CLOSED.

S 16

KEEP AWAY FROM SOURCES OF IGNITION - NO SMOKING.

REVIEWS, STANDARDS, AND REGULATIONS

OEL=MAK

ACGIH TLV-STEL 1230 MG/M3 (500 PPM)

DTLVS* TLV/BEI,1996

ACGIH TLV-TWA 983 MG/M3 (400 PPM) DTLVS* TLV/BEI,1996
IARC CANCER REVIEW:ANIMAL INADEQUATE EVIDENCE IMEMDT 15,223,1977
IARC CANCER REVIEW:HUMAN INADEQUATE EVIDENCE IMSUDL 7,229,1987
IARC CANCER REVIEW:GROUP 3 IMSUDL 7,229,1987
EPA FIFRA 1988 PESTICIDE SUBJECT TO REGISTRATION OR RE-REGISTRATION
FEREAC 54,7740,1989
MSHA STANDARD-AIR:TWA 400 PPM (980 MG/M3)
DTLVS* 3,141,1971
OSHA PEL (GEN INDU):8H TWA 400 PPM (980 MG/M3)
CFRGBR 29,1910.1000,1994
OSHA PEL (CONSTRUC):8H TWA 400 PPM (980 MG/M3)
CFRGBR 29,1926.55,1994
OSHA PEL (SHIPYARD):8H TWA 400 PPM (980 MG/M3)
CFRGBR 29,1915.1000,1993
OSHA PEL (FED CONT):8H TWA 400 PPM (980 MG/M3)
CFRGBR 41,50-204.50,1994
OEL-AUSTRALIA:TWA 400 PPM (980 MG/M3);STEL 500 PPM (1225 MG/M3) JAN
1993
OEL-BELGIUM:TWA 400 PPM (985 MG/M3);STEL 500 PPM (1230 MG/M3) JAN 1993
OEL-DENMARK:TWA 200 PPM (490 MG/M3);SKIN JAN 1993
OEL-FRANCE:STEL 400 PPM (980 MG/M3) JAN 1993
OEL-GERMANY:TWA 400 PPM (980 MG/M3) JAN 1993
OEL-JAPAN:STEL 400 PPM (980 MG/M3) JAN 1993
OEL-THE NETHERLANDS:TWA 400 PPM (980 MG/M3);SKIN JAN 1993
OEL-THE PHILIPPINES:TWA 400 PPM (980 MG/M3) JAN 1993
OEL-RUSSIA:STEL 400 PPM (10 MG/M3) JAN 1993
OEL-SWEDEN:TWA 150 PPM (350 MG/M3);STEL 250 PPM (600 MG/M3) JAN 1993
OEL-SWITZERLAND:TWA 400 PPM (980 MG/M3);STEL 800 PPM JAN 1993
OEL-TURKEY:TWA 200 PPM (500 MG/M3) JAN 1993
OEL-UNITED KINGDOM:TWA 400 PPM (980 MG/M3);STEL 500 PPM;SKIN JAN 1993
OEL IN BULGARIA, COLOMBIA, JORDAN, KOREA CHECK ACGIH TLV
OEL IN NEW ZEALAND, SINGAPORE, VIETNAM CHECK ACGIH TLV
NIOSH REL TO ISOPROPYL ALCOHOL-AIR:10H TWA 400 PPM;STEL 500 PPM
NIOSH* DHHS #92-100,1992
VOHS 1974: HZD 40987; NIS 465; TNF 213605; NOS 252; TNE 3183554
NOES 1983: HZD 40987; NIS 449; TNF 183402; NOS 278; TNE 4665524; TFE
2058264
EPA GENETOX PROGRAM 1988, NEGATIVE: CELL TRANSFORM.-SA7/SHE; N
CRASSA-ANEUPLOIDY
EPA TSCA SECTION 8(B) CHEMICAL INVENTORY
EPA TSCA SECTION 8(D) UNPUBLISHED HEALTH/SAFETY STUDIES
EPA TSCA SECTION 8(E) RISK NOTIFICATION, 8EHQ-0293-8734;8EHQ-0892-8787
EPA TSCA TEST SUBMISSION (TSCATS) DATA BASE, APRIL 1997
NIOSH ANALYTICAL METHOD, 1994: ALCOHOLS I, 1400
SECTION 16. - - - - - OTHER INFORMATION - - - - -
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Material Safety Data Sheet Valid 11/97- 1/98
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SECTION 1. - - - - - CHEMICAL IDENTIFICATION- - - - -

CATALOG #: L8898
NAME: LEAD ACS REAGENT GRANULAR, APPROX. 30
MESH

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

CAS #: 7439-92-1
MF: PB
EC NO: 231-100-4

SYNONYMS

C.I. PIGMENT METAL 4 * C.I. 77575 * GLOVER * KS-4 * LEAD (ACGIH) *
LEAD FLAKE * LEAD INORGANIC (OSHA) * LEAD S2 * OLOW (POLISH) * OMAHA
& GRANT *

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

LABEL PRECAUTIONARY STATEMENTS

HARMFUL
HARMFUL BY INHALATION AND IF SWALLOWED.
DANGER OF CUMULATIVE EFFECTS.
REPRODUCTIVE HAZARD.
TARGET ORGAN(S):
NERVES
BLOOD
IN CASE OF CONTACT WITH EYES, RINSE IMMEDIATELY WITH PLENTY OF
WATER AND SEEK MEDICAL ADVICE.
WEAR SUITABLE PROTECTIVE CLOTHING.

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

IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES WITH COPIOUS AMOUNTS OF
WATER FOR AT LEAST 15 MINUTES.
FLUSH SKIN WITH WATER.
IF INHALED, REMOVE TO FRESH AIR.

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

EXTINGUISHING MEDIA

USE EXTINGUISHING MEDIA APPROPRIATE TO SURROUNDING FIRE CONDITIONS.
SPECIAL FIREFIGHTING PROCEDURES
WEAR SELF-CONTAINED BREATHING APPARATUS AND PROTECTIVE CLOTHING TO
PREVENT CONTACT WITH SKIN AND EYES.
UNUSUAL FIRE AND EXPLOSIONS HAZARDS
EMITS TOXIC FUMES UNDER FIRE CONDITIONS.

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

CHEMICAL SAFETY GOGGLES.
USE PROTECTIVE CLOTHING, GLOVES AND MASK.
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 - - - - -

REFER TO SECTION 8.

ADDITIONAL INFORMATION

VIOLENT REACTION OF LEAD WITH AMMONIUM NITRATE, HYDROGEN PEROXIDE,
SODIUM AZIDE, ZIRCONIUM, SODIUM ACETYLIDE AND CHLORINE TRIFLUORIDE
HAVE BEEN REPORTED.

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

CHEMICAL SAFETY GOGGLES.

NIOSH/MSHA-APPROVED RESPIRATOR IN NONVENTILATED AREAS AND/OR FOR
EXPOSURE ABOVE THE ACGIH TLV.

COMPATIBLE CHEMICAL-RESISTANT GLOVES.

SAFETY SHOWER AND EYE BATH.

MECHANICAL EXHAUST REQUIRED.

AVOID CONTACT AND INHALATION.

AVOID PROLONGED OR REPEATED EXPOSURE.

WASH THOROUGHLY AFTER HANDLING.

REPRODUCTIVE HAZARD.

HARMFUL DUST.

IRRITANT.

KEEP CONTAINER CLOSED.

STORE IN A COOL DRY PLACE.

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

APPEARANCE AND ODOR

DARK-GREY FILINGS

PHYSICAL PROPERTIES

MELTING POINT: 327.5 C

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

INCOMPATIBILITIES

STRONG ACIDS

HAZARDOUS COMBUSTION OR DECOMPOSITION PRODUCTS

NATURE OF DECOMPOSITION PRODUCTS NOT KNOWN.

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

ACUTE EFFECTS

HARMFUL IF INHALED OR SWALLOWED.

CAUSES EYE IRRITATION.

MAY CAUSE SKIN IRRITATION.

MATERIAL IS IRRITATING TO MUCOUS MEMBRANES AND UPPER

RESPIRATORY TRACT.

MAY CAUSE NERVOUS SYSTEM DISTURBANCES.

CHRONIC EFFECTS

MAY CAUSE REPRODUCTIVE DISORDERS.

ANEMIA

TARGET ORGAN(S):

NERVES

BLOOD, KIDNEYS

FEMALE REPRODUCTIVE SYSTEM

MALE REPRODUCTIVE SYSTEM

ECS #: OF7525000

LEAD

TARGET ORGAN DATA

PERIPHERAL NERVE AND SENSATION (FLACCID PARALYSIS WITHOUT ANESTHESIA)
BEHAVIORAL (HALLUCINATIONS, DISTORTED PERCEPTIONS)
BEHAVIORAL (MUSCLE WEAKNESS)
GASTROINTESTINAL (GASTRITIS)
LIVER (OTHER CHANGES)
EFFECTS ON FERTILITY (OTHER MEASURES OF FERTILITY)
EFFECTS ON EMBRYO OR FETUS (FETOTOXICITY)
EFFECTS ON EMBRYO OR FETUS (FETAL DEATH)
SPECIFIC DEVELOPMENTAL ABNORMALITIES (BLOOD AND LYMPHATIC SYSTEMS)
EFFECTS ON NEWBORN (GROWTH STATISTICS)
EFFECTS ON NEWBORN (BIOCHEMICAL AND METABOLIC)
EFFECTS ON NEWBORN (BEHAVIORAL)
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.

SECTION 13. - - - - - DISPOSAL CONSIDERATIONS - - - - -
MATERIAL IN THE ELEMENTAL STATE SHOULD BE RECOVERED FOR REUSE OR
RECYCLING.
OBSERVE ALL FEDERAL, STATE AND LOCAL ENVIRONMENTAL REGULATIONS.

SECTION 14. - - - - - TRANSPORT INFORMATION - - - - -
CONTACT SIGMA CHEMICAL COMPANY FOR TRANSPORTATION INFORMATION.

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

EUROPEAN INFORMATION

EC INDEX NO: 082-001-00-6

HARMFUL

R 20/22

HARMFUL BY INHALATION AND IF SWALLOWED.

R 33

DANGER OF CUMULATIVE EFFECTS.

R 61

MAY CAUSE HARM TO THE UNBORN CHILD.

S 45

IN CASE OF ACCIDENT OR IF YOU FEEL UNWELL, SEEK MEDICAL ADVICE
IMMEDIATELY (SHOW THE LABEL WHERE POSSIBLE).

S 53

AVOID EXPOSURE - OBTAIN SPECIAL INSTRUCTIONS BEFORE USE.

REVIEWS, STANDARDS, AND REGULATIONS

OEL=MAK

ACGIH TLV-ANIMAL CARCINOGEN

DTLVS* TLV/BEI,1996

ACGIH TLV-TWA 0.05(PB)/M3

DTLVS* TLV/BEI,1996

IARC CANCER REVIEW:ANIMAL INADEQUATE EVIDENCE IMEMDT 23,325,1980

IARC CANCER REVIEW:HUMAN INADEQUATE EVIDENCE IMEMDT 23,325,1980

IARC CANCER REVIEW:GROUP 2B

IMSUDL 7,230,1987

MSHA STANDARD-AIR:TWA 0.15 MG/M3

DTLVS* 3,143,1971

OSHA PEL (GEN INDU):SEE CFR 29,1910.1025
CFRGBR 29,1910.1000,1994

OSHA PEL (CONSTRUC):8H TWA 0.2 MG(PB)/M3
CFRGBR 29,1926.55,1994

OSHA PEL (FED CONT):8H TWA 0.2 MG(PB)/M3
CFRGBR 41,50-204.50,1994

OEL-FRANCE:TWA 150 MG/M3 JAN 1993

OEL-GERMANY:TWA 0.1 MG/M3 JAN 1993

OEL-POLAND:TWA 0.05 MG/M3 JAN 1993

NIOSH REL TO LEAD, INORGANIC-AIR:10H TWA <0.1 MG(PB)/M3

NIOSH* DHHS #92-100,1992

NOHS 1974: HZD 42490; NIS 107; TNF 8256; NOS 81; TNE 103308

NOES 1983: HZD X3272; NIS 5; TNF 149; NOS 15; TNE 4226; TFE 777

NOES 1983: HZD X5909; NIS 4; TNF 53; NOS 7; TNE 857; TFE 437

NOES 1983: HZD X8307; NIS 2; TNF 13; NOS 2; TNE 616

NOES 1983: HZD 42490; NIS 235; TNF 43061; NOS 146; TNE 767619; TFE
236378

EPA GENETOX PROGRAM 1988, POSITIVE: SPERM MORPHOLOGY-HUMAN

EPA GENETOX PROGRAM 1988, NEGATIVE: IN VIVO CYTOGENETICS-NONHUMAN BONE
MARROW

EPA GENETOX PROGRAM 1988, NEGATIVE: IN VITRO CYTOGENETICS-HUMAN
LYMPHOCYTE

EPA GENETOX PROGRAM 1988, INCONCLUSIVE: CARCINOGENICITY-MOUSE/RAT

EPA GENETOX PROGRAM 1988, INCONCLUSIVE: IN VIVO CYTOGENETICS-HUMAN
LYMPHOCYTE

EPA TSCA SECTION 8(B) CHEMICAL INVENTORY

EPA TSCA SECTION 8(D) UNPUBLISHED HEALTH/SAFETY STUDIES

ON EPA IRIS DATABASE

EPA TSCA TEST SUBMISSION (TSCATS) DATA BASE, APRIL 1997

NIOSH ANALYTICAL METHOD, 1994: ELEMENTS BY ICP, 7300

NIOSH ANALYTICAL METHOD, 1994: LEAD, BY FLAME AAS, 7082; OR BY HGAAS,
7105

NIOSH ANALYTICAL METHOD, 1994: ELEMENTS IN BLOOD OR TISSUE, 8005

NIOSH ANALYTICAL METHOD, 1994: LEAD IN BLOOD AND URINE, 8003; IN
SURFACE WIPE SAMPLES, 9100

NIOSH ANALYTICAL METHOD, 1994: METALS IN URINE, 8310

OSHA ANALYTICAL METHOD #ID-125G

U.S. INFORMATION

THIS PRODUCT IS SUBJECT TO SARA SECTION 313 REPORTING REQUIREMENTS -
LEAD COMPOUNDS.

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

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Product #: L8898 Name: LEAD ACS REAGENT GRANULAR, APPROX. 30
Material Safety Data Sheet Valid 11/97- 1/98
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SECTION 1. - - - - - CHEMICAL IDENTIFICATION - - - - -

CATALOG #: 233390
NAME: 1,2,3,4,5,6-HEXACHLOROCYCLOHEXANE,
GAMMA-ISOMER, 97% (GAMMA-BHC)

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

CAS #: 58-89-9
MF: C6H6CL6
EC NO: 200-401-2

SYNONYMS

AALINDAN * AFICIDE * AGROCIDE * AGROCIDE 2 * AGROCIDE 7 * AGROCIDE 6G
* AGROCIDE III * AGROCIDE WP * AGRONEXIT * AMEISENMITTEL MERCK *
AMEISENTOD * APARASIN * APHTIRIA * APLIDAL * ARBITEX * BBH * BENHEXOL
* BEN-HEX * BENTOX 10 * BENZENE HEXACHLORIDE * GAMMA-BENZENE
HEXACHLORIDE * GAMMA-BENZOHEXACHLORIDE * BEXOL * BHC * GAMMA-BHC *
CELANEX * CHLORESENE * CODECHINE * DETMOL-EXTRAKT * DETOX 25 *
DEVORAN * DOL GRANULE * DRILLTOX-SPEZIAL AGLUKON * ENT 7,796 *
ENTOMOXAN * FENOFORM FORTE * FORST-NEXEN * GALLOGAMA * GAMACARBATOX *
GAMACID * GAMAPHEX * GAMENE * GAMISO * GAMMALIN * GAMMALIN 20 * GAMMA-
MEAN 400 * GAMMATERR * GEOBILAN * GEOLIN G 3 * GEXANE * HCC * HCCH *
HCH * GAMMA-HCH * HECLTOX * HEXA * HEXACHLORAN * GAMMA-HEXACHLORAN *
HEXACHLORANE * GAMMA-HEXACHLORANE * GAMMA-HEXACHLOROBENZENE *
HEXACHLOROCYCLOHEXANE * 1-ALPHA,2-ALPHA,3-BETA,4-ALPHA,5-ALPHA,6-BETA-
HEXACHLOROCYCLOHEXANE * GAMMA-HEXACHLOROCYCLOHEXANE * 1,2,3,4,5,6-
HEXACHLOROCYCLOHEXANE * GAMMA-1,2,3,4,5,6-HEXACHLOROCYCLOHEXANE * 1,2,
3,4,5,6-HEXACHLOROCYCLOHEXANE, ALPHA ISOMER * HEXACHLOROCYCLOHEXANE,
GAMMA-ISOMER * 1,2,3,4,5,6-HEXACHLOROCYCLOHEXANE, GAMMA-ISOMER *
HEXAVERM * HEXICIDE * HEXYCLAN * HGI * HILBEECH * HORTEX * HUNGARIA
L7 * INEXIT * ISOTOX * JACUTIN * KOKOTINE * KWELL * LACCO HI LIN *
LASOCHRON * LENDINE * LENTOX * LIDENAL * LINDAFOR * LINDAGAM *
LINDAGRAN * LINDAGRANOX * LINDANE * GAMMA-LINDANE * LINDANE (ACGIH:
DOT:OSHA) * LINDAPOUDRE * LINDATOX * LINDEX * LINDOSEP * LINTOX *
LINVUR * LOREXANE * MGLAWIK L * MILBOL 49 * MSZYCOL * NCI-C00204 *
NEO-SCABICIDOL * NEXEN FB * NEXIT * NEXIT-STARK * NEXOL-E *
NICOCHLORAN * NOVIGAM * OMNITOX * OVADZIAK * OWADZIAK * PEDRACZAK *
PFLANZOL * PLK * QUELLADA * RCRA WASTE NUMBER U129 * SANG GAMMA *
SILVANOL * SPRITZLINDANE * SPRITZ-RAPIDIN * SPRUEHPFLANZOL * STREUNEX
* TAP 85 * TRI-6 * VERINDAL ULTRA * VITON *

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

LABEL PRECAUTIONARY STATEMENTS

HIGHLY TOXIC (USA)
VERY TOXIC (EU)

MAY CAUSE CANCER.
MAY CAUSE HERITABLE GENETIC DAMAGE.
VERY TOXIC BY INHALATION, IN CONTACT WITH SKIN AND IF SWALLOWED.
DANGER OF CUMULATIVE EFFECTS.
CAUSES IRRITATION.
NEUROLOGICAL HAZARD.
TARGET ORGAN(S):
BLOOD
IN CASE OF ACCIDENT OR IF YOU FEEL UNWELL, SEEK MEDICAL ADVICE IMMEDIATELY (SHOW THE LABEL WHERE POSSIBLE).
IN CASE OF CONTACT WITH EYES, RINSE IMMEDIATELY WITH PLENTY OF WATER AND SEEK MEDICAL ADVICE.
WEAR SUITABLE PROTECTIVE CLOTHING, GLOVES AND EYE/FACE PROTECTION.
KEEP CONTAINER TIGHTLY CLOSED IN A COOL WELL-VENTILATED PLACE.

SECTION 4. - - - - - FIRST-AID MEASURES- - - - -
IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES OR SKIN WITH COPIOUS AMOUNTS OF WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED CLOTHING AND SHOES.
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
WATER SPRAY.
CARBON DIOXIDE, DRY CHEMICAL POWDER OR APPROPRIATE FOAM.
SPECIAL FIREFIGHTING PROCEDURES
WEAR SELF-CONTAINED BREATHING APPARATUS AND PROTECTIVE CLOTHING TO PREVENT CONTACT WITH SKIN AND EYES.
UNUSUAL FIRE AND EXPLOSIONS HAZARDS
EMITS TOXIC FUMES UNDER FIRE CONDITIONS.

SECTION 6. - - - - - ACCIDENTAL RELEASE MEASURES- - - - -
EVACUATE AREA.
WEAR SELF-CONTAINED BREATHING APPARATUS, RUBBER BOOTS AND HEAVY RUBBER GLOVES.
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- - - - -
REFER TO SECTION 8.
SECTION 8. - - - - - EXPOSURE CONTROLS/PERSONAL PROTECTION- - - - -
WEAR APPROPRIATE NIOSH/MSHA-APPROVED RESPIRATOR, CHEMICAL-RESISTANT GLOVES, SAFETY GOGGLES, OTHER PROTECTIVE CLOTHING.
SAFETY SHOWER AND EYE BATH.
USE ONLY IN A CHEMICAL FUME HOOD.
DO NOT BREATHE DUST.
DO NOT GET IN EYES, ON SKIN, ON CLOTHING.

AVOID PROLONGED OR REPEATED EXPOSURE.
READILY ABSORBED THROUGH SKIN.
WASH THOROUGHLY AFTER HANDLING.
HIGHLY TOXIC.
IRRITANT.
CARCINOGEN.
MUTAGEN.
NEUROLOGICAL HAZARD.
KEEP TIGHTLY CLOSED.
STORE IN A COOL DRY PLACE.

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

APPEARANCE AND ODOR

WHITE POWDER

PHYSICAL PROPERTIES

MELTING POINT: 113 C TO 115 C

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

INCOMPATIBILITIES

STRONG OXIDIZING AGENTS

HAZARDOUS COMBUSTION OR DECOMPOSITION PRODUCTS

TOXIC FUMES OF:

CARBON MONOXIDE, CARBON DIOXIDE

HYDROGEN CHLORIDE GAS

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

ACUTE EFFECTS

MAY BE FATAL IF INHALED, SWALLOWED, OR ABSORBED THROUGH SKIN.

VAPOR OR MIST IS IRRITATING TO THE EYES, MUCOUS MEMBRANES AND UPPER RESPIRATORY TRACT.

CAUSES SKIN IRRITATION.

MAY CAUSE NERVOUS SYSTEM DISTURBANCES.

MAY CAUSE CONVULSIONS.

MAY CAUSE CYANOSIS (BLUE-GRAY COLORING OF SKIN AND LIPS CAUSED BY LACK OF OXYGEN).

EXPOSURE CAN CAUSE:

NAUSEA, DIZZINESS AND HEADACHE

CHRONIC EFFECTS

BLOOD EFFECTS

CARCINOGEN.

MAY ALTER GENETIC MATERIAL.

RTECS #: GV4900000

CYCLOHEXANE, 1,2,3,4,5,6-HEXACHLORO-, GAMMA-ISOMER

TOXICITY DATA

ORL-RAT LD50:76 MG/KG

SPEADM 78-1,11,1978

SKN-RAT LD50:414 MG/KG

GISAAA 55(7),87,1990

IPR-RAT LD50:35 MG/KG

AEPPAE 212,463,1951

UNR-RAT LD50:125 MG/KG

GISAAA 28(8),29,1963

ORL-MUS LD50:44 MG/KG

JEENAI 65,632,1972

IPR-MUS LD50:125 MG/KG

SOGEBZ 2,80,1966

ICE-MUS LD50:60 MG/KG

TOLED5 60,289,1992

ORL-DOG LD50:40 MG/KG

SPEADM 78-1,11,1978

ORL-CAT LD50:25 MG/KG	85GMAT - ,72,1982
ORL-RBT LD50:60 MG/KG	JHEMA2 22,115,1978
SKN-RBT LD50:50 MG/KG	AFDOAQ 16,3,1952
ORL-GPG LD50:127 MG/KG	FEPRA7 6,386,1947
ORL-HAM LD50:360 MG/KG	EJTXAZ 7,159,1974
IPR-HAM LD50:640 MG/KG	ARTODN 58,152,1986
UNR-MAM LD50:300 MG/KG	GTPZAB 17(3),32,1973

TARGET ORGAN DATA

SENSE ORGANS AND SPECIAL SENSES (VISUAL FIELD CHANGES)
BEHAVIORAL (HALLUCINATIONS, DISTORTED PERCEPTIONS)
BEHAVIORAL (TREMOR)
BEHAVIORAL (CONVULSIONS OR EFFECT ON SEIZURE THRESHOLD)
BEHAVIORAL (EXCITEMENT)
CARDIAC (OTHER CHANGES)
LUNGS, THORAX OR RESPIRATION (DYSPPNAE)
LUNGS, THORAX OR RESPIRATION (CYANOSIS)
LUNGS, THORAX OR RESPIRATION (RESPIRATORY STIMULATION)
GASTROINTESTINAL (CHANGES IN STRUCTURE OR FUNCTION OF SALIVARY GLANDS)
SKIN AND APPENDAGES (AFTER SYSTEMIC EXPOSURE: DERMATITIS, OTHER)
PATERNAL EFFECTS (TESTES, EPIDIDYMIS, SPERM DUCT)
MATERNAL EFFECTS (MENSTRUAL CYLCE CHANGES OR DISORDERS)
MATERNAL EFFECTS (OTHER EFFECTS ON FEMALE)
EFFECTS ON FERTILITY (PRE-IMPLANTATION MORTALITY)
EFFECTS ON FERTILITY (POST-IMPLANTATION MORTALITY)
EFFECTS ON EMBRYO OR FETUS (MATERNAL-FETAL EXCHANGE)
EFFECTS ON EMBRYO OR FETUS (FETOTOXICITY)
SPECIFIC DEVELOPMENTAL ABNORMALITIES (MUSCULOSKELETAL SYSTEM)
EFFECTS ON NEWBORN (STILLBIRTH)
EFFECTS ON NEWBORN (PHYSICAL)
NUTRITIONAL AND GROSS METABOLIC (WEIGHT LOSS OR DECREASED WEIGHT GAIN)
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.

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

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 - - - - -

CONTACT ALDRICH CHEMICAL COMPANY FOR TRANSPORTATION INFORMATION.

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

EUROPEAN INFORMATION

EC INDEX NO: 602-043-00-6

VERY TOXIC

R 23/24/25

TOXIC BY INHALATION, IN CONTACT WITH SKIN AND IF SWALLOWED.

R 36/38

IRRITATING TO EYES AND SKIN.

R 50/53

VERY TOXIC TO AQUATIC ORGANISMS, MAY CAUSE LONG-TERM ADVERSE EFFECTS IN THE AQUATIC ENVIRONMENT.

S 13

KEEP AWAY FROM FOOD, DRINK AND ANIMAL FEEDINGSTUFFS.

S 45

IN CASE OF ACCIDENT OR IF YOU FEEL UNWELL, SEEK MEDICAL ADVICE IMMEDIATELY (SHOW THE LABEL WHERE POSSIBLE).

S 60

THIS MATERIAL AND ITS CONTAINER MUST BE DISPOSED OF AS HAZARDOUS WASTE.

S 61

AVOID RELEASE TO THE ENVIRONMENT. REFER TO SPECIAL INSTRUCTIONS/SAFETY DATA SHEETS.

REVIEWS, STANDARDS, AND REGULATIONS

OEL=MAK

ACGIH TLV-ANIMAL CARCINOGEN

DTLVS* TLV/BEI,1996

ACGIH TLV-TWA 0.5 MG/M3 (SKIN)

DTLVS* TLV/BEI,1996

IARC CANCER REVIEW:ANIMAL LIMITED EVIDENCE

IMSUDL 7,220,1987

EPA FIFRA 1988 PESTICIDE SUBJECT TO REGISTRATION OR RE-REGISTRATION

FEREAC 54,7740,1989

MSHA STANDARD-AIR:TWA 0.5 MG/M3 (SKIN)

DTLVS* 3,146,1971

OSHA PEL (GEN INDU):8H TWA 0.5 MG/M3 (SKIN)

CFRGBR 29,1910.1000,1994

OSHA PEL (CONSTRUC):8H TWA 0.5 MG/M3 (SKIN)

CFRGBR 29,1926.55,1994

OSHA PEL (SHIPYARD):8H TWA 0.5 MG/M3 (SKIN)

CFRGBR 29,1915.1000,1993

OSHA PEL (FED CONT):8H TWA 0.5 MG/M3 (SKIN)

CFRGBR 41,50-204.50,1994

OEL-DENMARK:TWA 0.5 MG/M3;SKIN JAN 1993

OEL-FINLAND:TWA 0.5 MG/M3;SKIN JAN 1993

OEL-THE NETHERLANDS:TWA 0.5 MG/M3;SKIN JAN 1993

OEL-THE PHILIPPINES:TWA 0.5 MG/M3;SKIN JAN 1993

OEL-SWITZERLAND:TWA 0.5 MG/M3;SKIN JAN 1993

OEL-THAILAND:TWA 0.5 MG/M3 JAN 1993

OEL-TURKEY:TWA 0.5 MG/M3;SKIN JAN 1993

OEL-UNITED KINGDOM:TWA 0.5 MG/M3;STEL 1.5 MG/M3;SKIN JAN 1993

OEL IN BULGARIA, COLOMBIA, JORDAN, KOREA CHECK ACGIH TLV

OEL IN NEW ZEALAND, SINGAPORE, VIETNAM CHECK ACGIH TLV

NIOSH REL TO LINDANE-AIR:8H TWA 0.5 MG/M3 (SK)

NIOSH* DHHS #92-100,1992

NOHS 1974: H2D 09318; NIS 5; TNF 424; NOS 6; TNE 689

NOES 1983: H2D 09318; NIS 6; TNF 2617; NOS 11; TNE 15036; TFE 5153

ATSDR TOXICOLOGY PROFILE (NTIS** PB/90/171406/AS)

EPA GENETOX PROGRAM 1988, POSITIVE: S CEREVISIAE GENE CONVERSION

EPA GENETOX PROGRAM 1988, POSITIVE/LIMITED: CARCINOGENICITY-MOUSE/RAT

EPA GENETOX PROGRAM 1988, INCONCLUSIVE: HOST-MEDIATED ASSAY; D

MELANOGASTER SEX-LINKED LETHAL

— EPA TSCA SECTION 8(B) CHEMICAL INVENTORY
EPA TSCA SECTION 8(D) UNPUBLISHED HEALTH/SAFETY STUDIES
ON EPA IRIS DATABASE
EPA TSCA TEST SUBMISSION (TSCATS) DATA BASE, APRIL 1997
NIOSH ANALYTICAL METHOD, 1994: LINDANE, 5502
NCI CARCINOGENESIS BIOASSAY (FEED);NO EVIDENCE:MOUSE,RAT
NCITR* NCI-TR-14,77
NTP 7TH ANNUAL REPORT ON CARCINOGENS, 1992 : ANTICIPATED TO BE
CARCINOGEN

U.S. INFORMATION

THIS PRODUCT IS SUBJECT TO SARA SECTION 313 REPORTING REQUIREMENTS.

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

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

CATALOG #: 173
NAME: METHYLENE CHLORIDE

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

CAS #: 75-09-2
MF: CH2CL2
EC NO: 200-838-9

SYNONYMS

AEROTHENE MM * CHLORURE DE METHYLENE (FRENCH) * DICHLOROMETHANE (DOT: OSHA) * METHANE DICHLORIDE * METHYLENE BICHLORIDE * METHYLENE CHLORIDE (ACGIH:DOT:OSHA) * METHYLENE DICHLORIDE * METYLENU CHLOREK (POLISH) * NARKOTIL * NCI-C50102 * R 30 * R30 (REFRIGERANT) * RCRA WASTE NUMBER U080 * SOLAESTHIN * SOLMETHINE * UN1593 (DOT) *

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

LABEL PRECAUTIONARY STATEMENTS

TOXIC

MAY CAUSE CANCER.
POSSIBLE RISK OF HARM TO THE UNBORN CHILD.
HARMFUL IF SWALLOWED.
IRRITATING TO EYES, RESPIRATORY SYSTEM AND SKIN.
READILY ABSORBED THROUGH SKIN.
TARGET ORGAN: HEART BECAUSE METHYLENE CHLORIDE IS CONVERTED TO CARBON MONOXIDE IN THE BODY.
TARGET ORGAN: CENTRAL NERVOUS SYSTEM BECAUSE OF POSSIBLE DIZZINESS, HEADACHE, LOSS OF CONSCIOUSNESS AND DEATH AT HIGH CONCENTRATIONS.
AVOID EXPOSURE - OBTAIN SPECIAL INSTRUCTIONS BEFORE USE.
IN CASE OF ACCIDENT OR IF YOU FEEL UNWELL, SEEK MEDICAL ADVICE IMMEDIATELY (SHOW THE LABEL WHERE POSSIBLE).
WEAR SUITABLE PROTECTIVE CLOTHING, GLOVES AND EYE/FACE PROTECTION.
DO NOT BREATHE VAPOR.

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

IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES OR SKIN WITH COPIOUS AMOUNTS OF WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED CLOTHING AND SHOES.
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
CARBON DIOXIDE, DRY CHEMICAL POWDER OR APPROPRIATE FOAM.
WATER SPRAY.

SPECIAL FIREFIGHTING PROCEDURES
WEAR SELF-CONTAINED BREATHING APPARATUS AND PROTECTIVE CLOTHING TO
PREVENT CONTACT WITH SKIN AND EYES.

UNUSUAL FIRE AND EXPLOSIONS HAZARDS
EMITS TOXIC FUMES UNDER FIRE CONDITIONS.

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

EVACUATE AREA.
WEAR SELF-CONTAINED BREATHING APPARATUS, RUBBER BOOTS AND HEAVY
RUBBER GLOVES.
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- - - - -

REFER TO SECTION 8.
ADDITIONAL INFORMATION
FOR PROTECTION AND HANDLING REQUIREMENTS CONSULT CFR TITLE 29
PART 1910.1052.

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

POSITIVE PRESSURE RESPIRATOR SHOULD BE WORN.
MECHANICAL EXHAUST REQUIRED.
COMPATIBLE CHEMICAL-RESISTANT GLOVES.
IMPERVIOUS PROTECTIVE CLOTHING.
STORE AND USE WITH ADEQUATE VENTILATION.
DO NOT BREATHE VAPOR.
DO NOT GET IN EYES, ON SKIN, ON CLOTHING.
AVOID PROLONGED OR REPEATED EXPOSURE.
WASH THOROUGHLY AFTER HANDLING.
KEEP TIGHTLY CLOSED.
STORE IN A COOL DRY PLACE.

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

APPEARANCE AND ODOR
COLORLESS LIQUID

PHYSICAL PROPERTIES

BOILING POINT:	39.8 C TO 40 C
MELTING POINT:	-97 C
EXPLOSION LIMITS IN AIR:	
UPPER	22%
LOWER	14%
AUTOIGNITION TEMPERATURE:	1223 F 661C
VAPOR PRESSURE:	6.83PSI 20 C 24.48PSI 55 C
SPECIFIC GRAVITY:	1.325
VAPOR DENSITY:	2.9

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

STABILITY

STABLE.

INCOMPATIBILITIES

ALKALI METALS
ALUMINUM
HEAT

HAZARDOUS COMBUSTION OR DECOMPOSITION PRODUCTS

TOXIC FUMES OF:
CARBON MONOXIDE, CARBON DIOXIDE
HYDROGEN CHLORIDE GAS
PHOSGENE GAS

HAZARDOUS POLYMERIZATION

WILL NOT OCCUR.

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

ACUTE EFFECTS

HARMFUL IF SWALLOWED.
MAY BE HARMFUL IF INHALED.
MAY BE HARMFUL IF ABSORBED THROUGH THE SKIN.
CAUSES EYE AND SKIN IRRITATION.
MATERIAL IS IRRITATING TO MUCOUS MEMBRANES AND UPPER
RESPIRATORY TRACT.
HEAVY OR PROLONGED SKIN EXPOSURE MAY RESULT IN THE ABSORPTION OF
HARMFUL AMOUNTS OF MATERIAL.
DICHLOROMETHANE IS METABOLIZED IN THE BODY PRODUCING CARBON MONOXIDE
WHICH INCREASES AND SUSTAINS CARBOXYHEMOGLOBIN LEVELS IN THE BLOOD,
REDUCING THE OXYGEN-CARRYING CAPACITY OF THE BLOOD.
PROLONGED OR REPEATED EXPOSURE TO SKIN CAUSES DEFATTING AND
DERMATITIS.
A SIMPLE ASPHYXIAN. EXPOSURE CAN CAUSE ANESTHETIC ACTION, DIFFICULTY IN
BREATHING, HEADACHE, AND DIZZINESS.
EXPOSURE CAN CAUSE:
CNS DEPRESSION
PARESTHESIA
SOMNOLENCE
CONVULSIONS
CONJUNCTIVITIS
PULMONARY EDEMA. EFFECTS MAY BE DELAYED.
IRREGULAR BREATHING
INGESTION CAN CAUSE GASTROINTESTINAL DISORDERS, NAUSEA AND VOMITING.
DROWSINESS
INCREASED LIVER ENZYMES
WEAKNESS

CHRONIC EFFECTS

THIS IS OR CONTAINS A COMPONENT THAT HAS BEEN REPORTED TO BE
CARCINOGENIC BASED ON ITS IARC, OSHA, ACGIH, NTP OR EPA CLASSIFICATION.
EXISTING DATA SUGGESTS THAT METHYLENE CHLORIDE MAY BE A WEAK
MUTAGEN IN MAMMALIAN SYSTEMS.
POSSIBLE RISK OF CONGENITAL MALFORMATION IN THE FETUS.
TARGET ORGAN: HEART BECAUSE METHYLENE CHLORIDE IS CONVERTED

TO CARBON MONOXIDE IN THE BODY.

TARGET ORGAN: CENTRAL NERVOUS SYSTEM BECAUSE OF POSSIBLE
DIZZINESS, HEADACHE, LOSS OF CONSCIOUSNESS AND DEATH AT HIGH
CONCENTRATIONS.

TARGET ORGAN(S):

LIVER

PANCREAS

TO THE BEST OF OUR KNOWLEDGE, THE CHEMICAL, PHYSICAL, AND
TOXICOLOGICAL PROPERTIES HAVE NOT BEEN THOROUGHLY INVESTIGATED.

RTECS #: PA8050000

METHANE, DICHLORO-

IRRITATION DATA

SKN-RBT 810 MG/24H SEV	EJTXAZ 9,171,1976
SKN-RBT 100 MG/24H MOD	85JCAE -,88,1986
EYE-RBT 162 MG MOD	EJTXAZ 9,171,1976
EYE-RBT 10 MG MLD	TXCYAC 6,173,1976
EYE-RBT 500 MG/24H MLD	85JCAE -,88,1986

TOXICITY DATA

ORL-HMN LDLO:357 MG/KG	342IAG -,390,1969
ORL-RAT LD50:1600 MG/KG	FAONAU 48A,94,1970
IHL-RAT LC50:52 GM/M3	TPKVAL 15,64,1979
IPR-RAT LD50:916 MG/KG	ENVRAL 40,411,1986
UNR-RAT LD50:5350 MG/KG	GISAAA 53(6),78,1988
IHL-MUS LC50:14400 PPM/7H	NIHBAZ 191,1,1949
IPR-MUS LD50:437 MG/KG	AGGHAR 18,109,1960
SCU-MUS LD50:6460 MG/KG	TXAPA9 4,354,1962
UNR-MUS LD50:4770 MG/KG	ESKGA2 28,P31,1982
UNR-RBT LD50:1225 MG/KG	GISAAA 53(6),78,1988

TARGET ORGAN DATA

PERIPHERAL NERVE AND SENSATION (PARESTHESIA)

BEHAVIORAL (ALTERED SLEEP TIME)

BEHAVIORAL (EUPHORIA)

BEHAVIORAL (SOMNOLENCE)

BEHAVIORAL (CONVULSIONS OR EFFECT ON SEIZURE THRESHOLD)

BEHAVIORAL (ATAXIA)

CARDIAC (CHANGE IN RATE)

LUNGS, THORAX OR RESPIRATION (CHANGE IN TRACHEA OR BRONCHI)

LUNGS, THORAX OR RESPIRATION (ACUTE PULMONARY EDEMA)

LUNGS, THORAX OR RESPIRATION (TUMORS)

LIVER (LIVER FUNCTION TESTS IMPAIRED)

SPECIFIC DEVELOPMENTAL ABNORMALITIES (MUSCULOSKELETAL SYSTEM)

SPECIFIC DEVELOPMENTAL ABNORMALITIES (UROGENITAL SYSTEM)

TUMORIGENIC (CARCINOGENIC BY RTECS CRITERIA)

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.

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

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 - - - - -

CONTACT SIGMA CHEMICAL COMPANY FOR TRANSPORTATION INFORMATION.

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

EUROPEAN INFORMATION

EC INDEX NO: 602-004-00-3

TOXIC

R 40

POSSIBLE RISK OF IRREVERSIBLE EFFECTS.

S 23

DO NOT BREATHE VAPOR.

S 24/25

AVOID CONTACT WITH SKIN AND EYES.

S 36/37

WEAR SUITABLE PROTECTIVE CLOTHING AND GLOVES.

TLV AND SOURCE

FOR DICHLOROMETHANE(METHYLENE CHLORIDE):

ACGIH TLV-TWA: 50 PPM (175 MG/M3).

OSHA PEL: 8H TWA 25 PPM; STEL 125 PPM

REVIEWS, STANDARDS, AND REGULATIONS

OEL=MAK

ACGIH TLV-ANIMAL CARCINOGEN DTLVS* TLV/BEI,1996

ACGIH TLV-TWA 174 MG/M3 (50 PPM) DTLVS* TLV/BEI,1996

IARC CANCER REVIEW:ANIMAL SUFFICIENT EVIDENCE IMEMDT 41,43,1986

IARC CANCER REVIEW:HUMAN INADEQUATE EVIDENCE IMEMDT 41,43,1986

IARC CANCER REVIEW:GROUP 2B IMSUDL 7,194,1987

EPA FIFRA 1988 PESTICIDE SUBJECT TO REGISTRATION OR RE-REGISTRATION

FEREAC 54,7740,1989

MSHA STANDARD-AIR:TWA 500 PPM (1750 MG/M3)

DTLVS* 3,171,1971

OSHA PEL (GEN INDU):8H TWA 500 PPM;CL 1000 PPM;PK 2000 PPM/5M/2H

CFRGBR 29,1910.1000,1994

OSHA PEL (CONSTRUC):SEE 56 FR 57036

CFRGBR 29,1926.55,1994

OSHA PEL (SHIPYARD):8H TWA 500 PPM (1740 MG/M3)

CFRGBR 29,1915.1000,1993

OSHA PEL (FED CONT):8H TWA 500 PPM (1740 MG/M3)

CFRGBR 41,50-204.50,1994

OEL-AUSTRALIA:TWA 100 PPM (350 MG/M3);CARCINOGEN JAN 1993

OEL-AUSTRIA:TWA 100 PPM (360 MG/M3) JAN 1993

OEL-BELGIUM:TWA 50 PPM (174 MG/M3);CARCINOGEN JAN 1993

OEL-DENMARK:TWA 50 PPM (175 MG/M3);SKIN;CARCINOGEN JAN 1993

OEL-FINLAND:TWA 100 PPM (350 MG/M3);STEL 250 PPM (870 MG/M3) JAN 1993

OEL-FRANCE:TWA 100 PPM (360 MG/M3);STEL 500 PPM (1800 MG/M3) JAN 1993

OEL-GERMANY:TWA 100 PPM (360 MG/M3);CARCINOGEN JAN 1993

OEL-HUNGARY:STEL 10 MG/M3;CARCINOGEN JAN 1993

OEL-JAPAN:TWA 100 PPM (350 MG/M3) JAN 1993

OEL-THE NETHERLANDS:TWA 100 PPM (350 MG/M3);STEL 500 PPM JAN 1993
OEL-THE PHILIPINES:TWA 500 PPM (1740 MG/M3) JAN 1993
OEL-POLAND:TWA 50 MG/M3 JAN 1993
OEL-RUSSIA:TWA 100 PPM;STEL 50 MG/M3 JAN 1993
OEL-SWEDEN:TWA 35 PPM (120 MG/M3);STEL 70 PPM (250 MG/M3);SKIN JAN 1993
OEL-SWITZERLAND:TWA 100 PPM (360 MG/M3);STEL 500 PPM JAN 1993
OEL-THAILAND:TWA 500 MG/M3;STEL 1000 MG/M3 JAN 1993
OEL-TURKEY:TWA 500 PPM (1740 MG/M3) JAN 1993
OEL-UNITED KINGDOM:TWA 100 PPM (350 MG/M3);STEL 250 PPM JAN 1993
OEL IN BULGARIA, COLOMBIA, JORDAN, KOREA CHECK ACGIH TLV
OEL IN NEW ZEALAND, SINGAPORE, VIETNAM CHECK ACGIH TLV
NIOSH REL TO METHYLENE CHLORIDE-AIR:CA LOWEST FEASIBLE CONCENTRATION
NIOSH* DHHS #92-100,1992
NOHS 1974: HZD 47270; NIS 374; TNF 89025; NOS 192; TNE 975696
NOES 1983: HZD 47270; NIS 363; TNF 87086; NOS 212; TNE 1438196; TFE
352536
ATSDR TOXICOLOGY PROFILE (NTIS** PB/89/194468/AS)
EPA GENETOX PROGRAM 1988, POSITIVE: CELL TRANSFORM.-RLV F344 RAT EMBRYO
EPA GENETOX PROGRAM 1988, POSITIVE: HISTIDINE REVERSION-AMES TEST
EPA GENETOX PROGRAM 1988, POSITIVE: S CEREVISIAE GENE CONVERSION; S
CEREVISIAE-HOMOZYGOSIS
EPA GENETOX PROGRAM 1988, POSITIVE: S CEREVISIAE-REVERSION
EPA GENETOX PROGRAM 1988, NEGATIVE: D MELANOGASTER SEX-LINKED LETHAL
EPA TSCA SECTION 8(B) CHEMICAL INVENTORY
EPA TSCA 8(A) PRELIMINARY ASSESSMENT INFORMATION, FINAL RULE
FEREAC 47,26992,82
EPA TSCA SECTION 8(D) UNPUBLISHED HEALTH/SAFETY STUDIES
ON EPA IRIS DATABASE
EPA TSCA TEST SUBMISSION (TSCATS) DATA BASE, APRIL 1997
NIOSH CURRENT INTELLIGENCE BULLETIN 46, 1986
NIOSH ANALYTICAL METHOD, 1994: METHYLENE CHLORIDE, 1005
NTP CARCINOGENESIS STUDIES (INHALATION);CLEAR EVIDENCE:MOUSE,RAT
NTPTR* NTP-TR-306,86
NTP 7TH ANNUAL REPORT ON CARCINOGENS, 1992 : ANTICIPATED TO BE
CARCINOGEN

OSHA ANALYTICAL METHOD #ID-59
U.S. INFORMATION

THIS PRODUCT IS SUBJECT TO SARA SECTION 313 REPORTING REQUIREMENTS.
CALIFORNIA PROPOSITION 65:
THIS PRODUCT IS OR CONTAINS CHEMICAL(S) KNOWN TO THE STATE OF
CALIFORNIA TO CAUSE CANCER.
OSHA REGULATED - SEE CFR TITLE 29 PART 1910.1052.

SECTION 16. - - - - - OTHER INFORMATION - - - - -
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Product #: 173 Name: METHYLENE CHLORIDE
Material Safety Data Sheet Valid 11/97- 1/98
Printed: 01/27/1998 15:23:09

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Phone: 314-771-5765	Phone: 414-273-3850	Phone: 414-273-3850

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

CATALOG #: 86955
NAME: 1,1,1,2-TETRACHLOROETHANE

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

CAS #: 630-20-6
MF: C2H2CL4
EC NO: 211-135-1

SYNONYMS

NCI-C52459 * RCRA WASTE NUMBER U208 * 1,1,1,2-TETRACHLOROETHANE *

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

LABEL PRECAUTIONARY STATEMENTS

HARMFUL
HARMFUL BY INHALATION, IN CONTACT WITH SKIN AND IF SWALLOWED.
IRRITATING TO EYES, RESPIRATORY SYSTEM AND SKIN.
RISK OF SERIOUS DAMAGE TO EYES.
POSSIBLE RISK OF IRREVERSIBLE EFFECTS.
POSSIBLE CARCINOGEN.
TARGET ORGAN(S):
NERVES
LIVER
IN CASE OF CONTACT WITH EYES, RINSE IMMEDIATELY WITH PLENTY OF
WATER AND SEEK MEDICAL ADVICE.
WEAR SUITABLE PROTECTIVE CLOTHING, GLOVES AND EYE/FACE
PROTECTION.

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

IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES OR SKIN WITH COPIOUS
AMOUNTS OF WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED
CLOTHING AND SHOES.
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 IMMEDIATELY.
WASH CONTAMINATED CLOTHING BEFORE REUSE.

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

EXTINGUISHING MEDIA

WATER SPRAY.
CARBON DIOXIDE, DRY CHEMICAL POWDER OR APPROPRIATE FOAM.
SPECIAL FIREFIGHTING PROCEDURES
WEAR SELF-CONTAINED BREATHING APPARATUS AND PROTECTIVE CLOTHING TO
PREVENT CONTACT WITH SKIN AND EYES.
UNUSUAL FIRE AND EXPLOSIONS HAZARDS

EMITS TOXIC FUMES UNDER FIRE CONDITIONS.

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

EVACUATE AREA.
WEAR SELF-CONTAINED BREATHING APPARATUS, RUBBER BOOTS AND HEAVY RUBBER GLOVES.
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- - - - -

REFER TO SECTION 8.

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

WEAR APPROPRIATE NIOSH/MSHA-APPROVED RESPIRATOR, CHEMICAL-RESISTANT GLOVES, SAFETY GOGGLES, OTHER PROTECTIVE CLOTHING.
SAFETY SHOWER AND EYE BATH.
USE ONLY IN A CHEMICAL FUME HOOD.
DO NOT BREATHE VAPOR.
DO NOT GET IN EYES, ON SKIN, ON CLOTHING.
AVOID PROLONGED OR REPEATED EXPOSURE.
WASH THOROUGHLY AFTER HANDLING.
POSSIBLE CARCINOGEN.
HARMFUL LIQUID.
SEVERE EYE IRRITANT.
KEEP TIGHTLY CLOSED.
STORE IN A COOL DRY PLACE.

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

APPEARANCE AND ODOR
COLORLESS LIQUID
PHYSICAL PROPERTIES
SPECIFIC GRAVITY: 1.553

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

STABILITY
STABLE.
INCOMPATIBILITIES
STRONG OXIDIZING AGENTS
STRONG BASES
HAZARDOUS COMBUSTION OR DECOMPOSITION PRODUCTS
TOXIC FUMES OF:
CARBON MONOXIDE, CARBON DIOXIDE
HYDROGEN CHLORIDE GAS
HAZARDOUS POLYMERIZATION
WILL NOT OCCUR.

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

ACUTE EFFECTS
HARMFUL IF SWALLOWED, INHALED, OR ABSORBED THROUGH SKIN.
CAUSES SEVERE EYE IRRITATION.
CAUSES SKIN IRRITATION.
MATERIAL IS IRRITATING TO MUCOUS MEMBRANES AND UPPER RESPIRATORY TRACT.
CAN CAUSE CNS DEPRESSION.

IONIC EFFECTS

POSSIBLE CARCINOGEN.

TARGET ORGAN(S):

NERVES
LIVER

TO THE BEST OF OUR KNOWLEDGE, THE CHEMICAL, PHYSICAL, AND TOXICOLOGICAL PROPERTIES HAVE NOT BEEN THOROUGHLY INVESTIGATED.

RTECS #: K18450000

ETHANE, 1,1,1,2-TETRACHLORO-

IRRITATION DATA

SKN-RBT 500 MG/24H AMPMAR 35,593,1974

EYE-RBT 100 MG SEV AMPMAR 35,593,1974

TOXICITY DATA

ORL-RAT LD50:670 MG/KG AMPMAR 35,593,1974

IHL-RAT LC50:2100 PPM/4H AMPMAR 35,593,1974

ORL-MUS LD50:1500 MG/KG AMPMAR 35,593,1974

IPR-MUS LD50:1275 MG/KG SAIGBL 8,371,1966

IHL-RBT LC50:2800 PPM/4H AMPMAR 35,593,1974

SKN-RBT LD50:20 GM/KG AMPMAR 35,593,1974

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.

SECTION 13. - - - - - DISPOSAL CONSIDERATIONS - - - - -
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 - - - - -
CONTACT FLUKA CHEMICAL COMPANY FOR TRANSPORTATION INFORMATION.

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

EUROPEAN INFORMATION

HARMFUL

R 20/21/22

HARMFUL BY INHALATION, IN CONTACT WITH SKIN AND IF SWALLOWED.

R 36/37/38

IRRITATING TO EYES, RESPIRATORY SYSTEM AND SKIN.

R 41

RISK OF SERIOUS DAMAGE TO EYES.

R 40

POSSIBLE RISK OF IRREVERSIBLE EFFECTS.

S 26

IN CASE OF CONTACT WITH EYES, RINSE IMMEDIATELY WITH PLENTY OF WATER AND SEEK MEDICAL ADVICE.

S 36/37/39

WEAR SUITABLE PROTECTIVE CLOTHING, GLOVES AND EYE/FACE PROTECTION.

REVIEWS, STANDARDS, AND REGULATIONS

OEL=MAK

IARC CANCER REVIEW:ANIMAL LIMITED EVIDENCE IMEMDT 41,87,1986
IARC CANCER REVIEW:HUMAN NO ADEQUATE DATA IMEMDT 41,87,1986
IARC CANCER REVIEW:GROUP 3 IMSUDL 7,56,1987
NIOSH REL TO 1,1,1,2-TETRACHLOROETHANE-AIR:HANDLE WITH CAUTION
NIOSH* DHHS #92-100,1992
EPA TSCA SECTION 8(B) CHEMICAL INVENTORY
EPA TSCA SECTION 8(D) UNPUBLISHED HEALTH/SAFETY STUDIES
ON EPA IRIS DATABASE
EPA TSCA TEST SUBMISSION (TSCATS) DATA BASE, APRIL 1997
NIOSH CURRENT INTELLIGENCE BULLETIN 27, 1978
NTP TOXICITY STUDIES, RPT# TOX-45, APRIL 1997

U.S. INFORMATION

THIS PRODUCT IS SUBJECT TO SARA SECTION 313 REPORTING REQUIREMENTS.

SECTION 16. - - - - - OTHER INFORMATION- - - - -
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P.O. Box 14508 1001 West St. Paul 1001 West St. Paul
St. Louis, MO 63178 Milwaukee, WI 53233 Milwaukee, WI 53233
Phone: 314-771-5765 Phone: 414-273-3850 Phone: 414-273-3850

CATALOG #: 40083
NAME: TETRACHLOROETHENE (PCE) SINGLE
COMPONENT STANDARD
FOR EPA METHODS

HAZARDS IDENTIFIED WITH THIS PRODUCT ARE THOSE ASSOCIATED WITH THE
FOLLOWING COMPONENT(S). REFER TO THE MATERIAL SAFETY DATA SHEET(S) FOR
THE LISTED ITEM(S).

CATALOG NUMBER	NAME	PERCENT
395951	TETRACHLOROETHENE NEAT STANDARD FOR EPA METHODS	.50
	METHANOL ACS	99.50

- - - - MULTIPLE COMPONENT SPILL OR LEAK PROCEDURES - - - -

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED
EVACUATE AREA.

SHUT OFF ALL SOURCES OF IGNITION.

WEAR SELF-CONTAINED BREATHING APPARATUS, RUBBER BOOTS AND HEAVY
RUBBER GLOVES.

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.

WASTE DISPOSAL METHOD

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.

HAZARD PRECAUTIONARY STATEMENTS

FLAMMABLE (USA)

HIGHLY FLAMMABLE (EU)

TOXIC

MAY CAUSE CANCER.

MAY CAUSE HERITABLE GENETIC DAMAGE.

TOXIC BY INHALATION AND IF SWALLOWED.

IRRITATING TO EYES AND SKIN.

TARGET ORGAN(S):

EYES

LIVER

KEEP CONTAINER TIGHTLY CLOSED.

KEEP AWAY FROM SOURCES OF IGNITION - NO SMOKING.

AVOID CONTACT WITH SKIN.

IN CASE OF ACCIDENT OR IF YOU FEEL UNWELL, SEEK MEDICAL ADVICE

IMMEDIATELY (SHOW THE LABEL WHERE POSSIBLE).

Product #: 40083 Name: TETRACHLOROETHENE (PCE) SINGLE
Material Safety Data Sheet Valid 11/97- 1/98
Printed: 01/27/1998 15:24:16

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