

Site Specific Health and Safety Plan


Version 7, May 13, 2011

Project Name: RACER Trust, Lansing Plants 2, 3 and 6

Project Number: B0064479.2012; B0064480.2012; B0064481.2012
Client Name: RACER Trust
Date: July 2011
Revision: April 2012

Approvals:

HASP Developer:



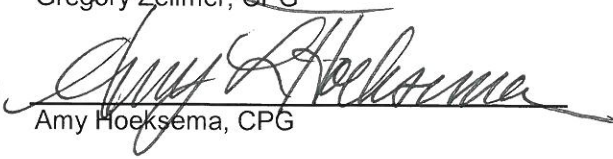
Randy Christensen

HASP Reviewer:



Gregory Zellmer, CPG

Project Manager:



Amy Hoeksema, CPG



Trip to:

1210 W Saginaw St

Lansing, MI 48915-1927

0.90 miles / 2 minutes

Notes

**Sparrow Health Systems
St. Lawrence Campus**

A 2801 W Saginaw St, Lansing, MI 48917

1. Start out going **east** on **W Saginaw St / M-43 E / I-69-BL E** toward **N Rosemary Ave.** [Map](#) **0.9 MI**
0.9 Mi Total

2. **1210 W SAGINAW ST** is on the **left.** [Map](#)

B 1210 W Saginaw St, Lansing, MI 48915-1927

Total Travel Estimate: **0.90 miles - about 2 minutes**



General Information

Site Type (select all applicable):

- | | |
|--|---|
| <input type="checkbox"/> Active | <input type="checkbox"/> Utility |
| <input checked="" type="checkbox"/> Inactive | <input type="checkbox"/> Landfill |
| <input checked="" type="checkbox"/> Secure | <input type="checkbox"/> Roadway |
| <input type="checkbox"/> Unsecured | <input type="checkbox"/> Railroad |
| <input type="checkbox"/> Residential | <input type="checkbox"/> Marine |
| <input type="checkbox"/> Retail | <input type="checkbox"/> Remote Area |
| <input type="checkbox"/> Commercial | <input type="checkbox"/> Unknown |
| <input checked="" type="checkbox"/> Industrial | <input type="checkbox"/> Other (specify): _____ |
| <input type="checkbox"/> Government | |

Surrounding Area and Topography (select one):

- Surrounding area and topography are presented in the project work plan
- Surrounding area and topography (*briefly describe*):

Local land use for the areas adjacent to the Facilities are mixed. The CSX Railroad is located in the central portion of the Facility. The Facility is bordered to the north by St. Joseph Cemetery and residential properties. Residential neighborhoods also exist east, west, and south of the Facility. The Facility is currently zoned as heavy industrial. Zoning of adjacent properties is business and residential. The Plants were demolished starting in 2007 and only the concrete slabs remain in place. Piles of demolition debris and open pits are located throughout the Facilities.

Site Background (select one):

- Site background is presented in the project work plan
- Site background (*briefly describe*):

The buildings comprising Plants 2, 3 and 6 were constructed between 1900 and 1930. Past plant 2 operations have included automobile parts manufacturing, foundry operations, and welding operations. Past operations at Plant 3 have included stamping and electroplating bumpers, general machining of crankshafts and connecting rods, and machining, welding, and stamping of automobile parts. Plant 6 previously manufactured the bodies for the Pontiac Grand Am and Chevrolet Classic. COCs included chlorinated solvents, metals and petroleum products.

Project Tasks

The following tasks are identified for this project:

Examples: "Drilling/soil sampling",
"Surveying", "Inspections"

- 1 Drilling, well install soil sampling
- 2 Groundwater monitoring and sampling
- 3 _____
- 4 _____
- 5 _____
- 6 _____

Supporting Document(s)			
JSA	Field H&S Handbook	STAR Plan or TCP	Other (specify below)
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Subcontractor supplied H&S information is attached
 Print any relevant JLAs for this scope of work and attach.
 FHSB and/or applicable STAR Plan/TCP are required to be on site even if not referenced above.
 Other (state document and if attached):

Utility clearance required?

Roles and Responsibilities

Name	Role	Additional Responsibilities (Describe)
1 <u>Sean Jeric</u>	<u>APM</u>	_____
2 <u>Randy Christensen</u>	<u>TM</u>	_____
3 <u>Meryl Hicks</u>	<u>Field Lead</u>	_____
4 <u>Meryl Hicks</u>	<u>SSO</u>	_____
5 _____	_____	_____
6 _____	_____	_____

Training

<p><i>All ARCADIS employees are required to have the following training:</i></p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> 40 hr HAZWOPER w current refresh. <input type="checkbox"/> 24 hr HAZWOPER <input type="checkbox"/> 10 hr Construction <input checked="" type="checkbox"/> HazMat #1 (Ground/Air/MOT) <input type="checkbox"/> HazMat #4 (MOT) <input checked="" type="checkbox"/> HazCom/Emergency Action Plan <input checked="" type="checkbox"/> LPS (classroom); or <input type="checkbox"/> LPS (on-line) <input checked="" type="checkbox"/> PPE <input type="checkbox"/> Respiratory protection <input type="checkbox"/> Smith System (hands on) <input checked="" type="checkbox"/> Smith System (on-line) <input type="checkbox"/> OTS/eRaisafe <input type="checkbox"/> Client specific: <input type="checkbox"/> Other: _____ 	<p><i>Selected ARCADIS employees are required to have the following additional training:</i></p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Not applicable <input type="checkbox"/> First aid/CPR/BBP <input type="checkbox"/> 30 hr Construction <input checked="" type="checkbox"/> 10 hr Construction <input type="checkbox"/> HazMat #1 (Gr./Air/MOT) <input type="checkbox"/> HazMat #4 (MOT) <input type="checkbox"/> Confined space entrant <input type="checkbox"/> Confined space rescue <input type="checkbox"/> Excavation CP <input type="checkbox"/> Electrical (NFPA 70E) <input type="checkbox"/> Lockout/Tagout <input type="checkbox"/> LPS (classroom) <input type="checkbox"/> OTS/eRaisafe <input type="checkbox"/> Smith Sys. (hands on) <input type="checkbox"/> Boating safety <input type="checkbox"/> Other: _____ 	<p>Names or Numbers from above</p> <p>_____</p> <p>_____</p> <p><u>During drilling or excavation</u></p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p>
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ARCADIS subcontractors are also required to have the above training applicable to all employees.

Hazard Analysis

Rank the hazards using HIGH (H), MEDIUM (M) or LOW (L) based on current site knowledge. For hazards that are not applicable, leave blank. Use results of this analysis to verify controls in the JLA, FHSBH or other supporting document are adequate to mitigate task hazards. When in the field, use the Tailgate Safety Meeting Form for task specific evaluation of task hazards.

Rank the hazards using the chart below:

	Consequence		Probability				
	Property Damage	Injury	Frequent	Likely	Occasional	Seldom	Unlikely
Severity	> \$100,000	Fatality	H	H	H	H	M
	> \$10,000	Injury Requiring Hospitalization	H	H	H	M	L
	> \$1000	Injury Requiring Medical Treatment Beyond First Aid	H	M	M	L	L
	< \$1000	Injury Requiring First Aid	M	L	L	L	L

Use TRACK and identify rank relevant hazards expected to be encountered on this project:

Biological

- M Biting/stinging insects
- L Biting animals
- Poisonous plants
- Phys. damaging plants

Driving

- Night driving
- M Off-road driving
- Urban driving
- All terrain vehicle
- Boat

Electrical

- Wet environments
- Electrical panels
- M Electric utilities
- Electric power tools

Environment

- H Heat
- M Cold
- M Lightning
- M Inclement weather
- M High wind

Gravity

- H Slip, trip, fall
- M Fall from height
- Ladders or scaffolds
- Struck by falling object

Mechanical

- M Cuts on equipment/tools
- L Pinch points on equipment
- L Burns from equipment
- L Struck by equipment

Motion

- M Lifting/awkward body positions
- L Struck by vehicle/traffic

Personal Safety

- Working late/night
- Working alone
- High crime area

Pressure

- M Utilities (gas, water, etc)
- Compressed gas cylinders
- Compressed air/aerosols
- Hydraulic systems

Sound

- H Equipment noise
- M Tool noise
- L Traffic noise (vehicle/train/etc)

Chemical/Radiation

- Not applicable
- M General
- L Dusts, toxic
- M Dusts, nuisance
- L Chemicals, ARCADIS use
- M Chemicals, corrosive
- Chemicals, explosive
- Chemicals, flammable
- Chemicals, oxidizing
- Chemicals, toxic
- Chemicals, reactive
- Radiation, ionizing
- Radiation, non-ionizing
- Other:

Compound Specific:

- Asbestos
- M Benzene
- Cadmium
- Hydrogen sulfide
- Lead
- Silica

Comments:

Hazard Communication (HazCom)

List the chemicals anticipated to be used by **ARCADIS** on this project subject to HazCom requirements. (Modify quantities as needed)

Acids/Bases	Qty	Decontamination	Qty	Calibration	Qty.
<input type="checkbox"/> Not applicable		<input type="checkbox"/> Not applicable		<input type="checkbox"/> Not applicable	
<input checked="" type="checkbox"/> Hydrochloric acid	<500 ml	<input type="checkbox"/> Alconox	≤ 5 lbs	<input checked="" type="checkbox"/> Isobutylene/air	1 cyl
<input checked="" type="checkbox"/> Nitric acid	<500 ml	<input checked="" type="checkbox"/> Liquinox	≤ 1 gal	<input type="checkbox"/> Methane/air	1 cyl
<input checked="" type="checkbox"/> Sulfuric acid	<500 ml	<input type="checkbox"/> Acetone	≤ 1 gal	<input type="checkbox"/> Pentane/air	1 cyl
<input checked="" type="checkbox"/> Sodium hydroxide	<500 ml	<input checked="" type="checkbox"/> Methanol	≤ 1 gal	<input type="checkbox"/> Hydrogen/air	1 cyl
<input type="checkbox"/> Zinc acetate	<500 ml	<input type="checkbox"/> Hexane	≤ 1 gal	<input type="checkbox"/> Propane/air	1 cyl
<input type="checkbox"/> Ascorbic acid	<500 ml	<input type="checkbox"/> Isopropyl alcohol	≤ 4 gal	<input type="checkbox"/> Hydrogen sulfide/air	1 cyl
<input type="checkbox"/> Acetic acid	<500 ml	<input checked="" type="checkbox"/> Nitric acid	≤ 1 L	<input type="checkbox"/> Carbon monoxide/air	1 cyl
<input type="checkbox"/> Other:		<input type="checkbox"/> Other:		<input type="checkbox"/> pH standards (4,7,10)	≤ 1 gal
_____		_____		<input type="checkbox"/> Conductivity standards	≤ 1 gal
_____		_____		<input type="checkbox"/> Other:	
_____		_____		_____	
_____		_____		_____	

Fuels	Qty.	Kits	Qty.
<input type="checkbox"/> Not applicable		<input type="checkbox"/> Not applicable	
<input checked="" type="checkbox"/> Gasoline	≤ 5 gal	<input checked="" type="checkbox"/> Hach (specify):	<u>Cr(VI) Colorimeter Kit</u> 1 kit
<input type="checkbox"/> Diesel	≤ 5 gal	<input type="checkbox"/> DTECH (specify):	_____ 1 kit
<input type="checkbox"/> Kerosene	≤ 5 gal	<input type="checkbox"/> EPA 5035 Soil (specify kit):	_____ 1 kit
<input type="checkbox"/> Propane	1 cyl	<input type="checkbox"/> Other:	_____
<input type="checkbox"/> Other:		_____	_____
_____		_____	_____

Remediation	Qty.	Other:	Qty.		Qty.
<input type="checkbox"/> Not applicable		<input type="checkbox"/> Not applicable		<input type="checkbox"/>	_____
<input type="checkbox"/>		<input checked="" type="checkbox"/> Spray paint	≤ 6 cans	<input type="checkbox"/>	_____
<input type="checkbox"/>		<input type="checkbox"/> WD-40	≤ 1 can	<input type="checkbox"/>	_____
<input type="checkbox"/>		<input type="checkbox"/> Pipe cement	≤ 1 can	<input type="checkbox"/>	_____
<input type="checkbox"/>		<input type="checkbox"/> Pipe primer	≤ 1 can	<input type="checkbox"/>	_____
<input type="checkbox"/>		<input type="checkbox"/> Mineral spirits	≤ 1 gal	<input type="checkbox"/>	_____
<input type="checkbox"/>				<input type="checkbox"/>	_____

Material safety data sheets (MSDSs) must be available to field staff. Manufacturer supplied MSDSs are preferred, however, if the manufacturer's MSDS can not be located, use the source provided below. Indicate below how MSDS information will be provided:

- Not applicable
- Printed copy in company vehicle
- Printed copy in the project trailer/office
- Printed copy attached
- Electronic copy on field computer

Bulk quantities of the following materials will be stored: _____

Contact the project H&S contact for information in determining code and regulatory requirements associated with bulk storage of materials.

Monitoring

Task: Soil Borings and Groundwater Monitoring

List the relevant constituents representing a hazard to site workers.

Constituent	Max. Conc.	Units	TWA		STEL		IDLH		LEL/UEL		VD	VP	IP
			Units	Units	Units	Units	Units	(%)	Air=1	(mm Hg)	(eV)		
Methyl isobutyl ketone	5	ppm	20	p	75	p	500	p,N	1.2/8.0	NA	16	9.3	
Acetone	20	ppm	500	p	750	p	2500	p,N	2.5/12.8	2	180	9.69	
Benzene	3.3	ppm	0.5	p	2.5	p	500	p,N	1.2/7.8	2.8	75	9.24	
Ethylbenzene	170	ppm	20	p	125	p	800	p,N	0.8/6.7	3.7	874	8.86	
Toluene	37	ppm	20	p	100	p	500	p,N	1.1/7.1	3.1	21	8.82	
1,1-DCE	0.25	ppm	5	p	NA	-	NA	-	6.5/15.5	NA	500	10	
1,1,1-Trichloroethane	12	ppm	350	p	450	p	700	p,N	7.5/12.5	4.6	100	11	
Trichloroethene	0.19	ppm	10	p	25	p	1000	p,N	8/10.5	NA	58	9.45	
Naphthalene	2	ppm	10	p,s	15	p,s	250	p,N	0.9/5.9	4.4	0.08	8.12	
Arsenic	82.8	ppm	0.01	m	NA	-	NA	-	NA/NA	NA	NA	NA	
Cadmium	10.9	ppm	0.005	m,O	NA	-	9	m,N	NA/NA	NA	0	NA	
Mercury	0.236	ppm	0.025	m,s	0.1	m,N	10	m,N	NA/NA	NA	0.0012	NA	
Chromium (VI)	28.4	ppm	0.005	m,O	NA	-	NA	-	NA/NA	NA	NA	NA	
None		ppm	9999	-	0	-	0	-	0	0	0	0	
None		ppm	9999	-	0	-	0	-	0	0	0	0	
None		ppm	9999	-	0	-	0	-	0	0	0	0	
None		ppm	9999	-	0	-	0	-	0	0	0	0	
None		ppm	9999	-	0	-	0	-	0	0	0	0	
None		ppm	9999	-	0	-	0	-	0	0	0	0	
None		ppm	9999	-	0	-	0	-	0	0	0	0	
None		ppm	9999	-	0	-	0	-	0	0	0	0	

Notes: TWAs are ACGIH 8 hr-TLVs unless noted. p-ppm m-mg/m3 c2- ceiling (2 hr) se-sensitizer "#N/A" -Constituent is not in database, manually enter information
s- skin c-ceiling "9999" - NA O-OSHA PEL
r- respirable i-inhalable N-NIOSH 10 hr REL

Monitoring Equipment and General Protocols

Air monitoring is required for any task or activity where employees have potential exposure to vapors or particulates above the TLV or PEL. Action levels below are appropriate for most situations. Contact the project H&S contact for

Monitoring Frequency:

Instrument		Actions
<input checked="" type="checkbox"/> Photoionization Detector Lamp (eV): 9.8	< 0.017 0.017 - 0.034 > 0.034	Continue work Sustained >5 min. continuous monitor, review eng. Sustained >5 min. stop work, contact SSO
<input type="checkbox"/> Flame Ionization Detector (FID)	< 0.0 0.0 - 0.0 > 0.0	Continue work Sustained >5 min. continuous monitor, review eng. Sustained >5 min. stop work, contact SSO
<input type="checkbox"/> LEL/O2 Meter	0-10% LEL >10-25% LEL >25% LEL 19.5%-23.5% O2 <19.5% O2 >23.5% O2	Continue work Continuous monitor, review eng. controls, proceed with Stop work, evacuate, contact SSO Normal, continue work O2 deficient, stop work, evacuate, cont. SSO O2 enriched, stop work, evacuate, contact SSO
<input type="checkbox"/> Colorimetric Indicator Tube (CIT) Compound(s):	≤PEL/TLV >PEL/TLV	Continue work Stop work, review eng. controls and PPE, contact SSO
<input type="checkbox"/> Sound Level Meter or Dosimeter	>80 dBA, sustained >85 dBA, sustained Result dBA-(NRR-7dBA)>90dBA	Monitor continuously, continue work Review controls, use hearing protection Stop work, contact SSO
<input type="checkbox"/> Particulate Monitor (mists, aerosols, dusts in mg/m ³)	< 2.5 2.5 - 5.00 > 5.00	Continue work Use engineering controls, monitor continuously Stop work, review controls, contact SSO
<input type="checkbox"/> Radiation Survey Meter	Specify:	Specify:
<input type="checkbox"/> Other:	Specify:	Specify:

Monitoring

Task: Groundwater Monitoring

List the relevant constituents representing a hazard to site workers.

Constituent	Max. Conc.	Units	TWA	STEL	IDLH	LEL/UEL	VD	VP	IP
			Units	Units	Units	(%)	Air=1	(mm Hg)	(eV)
Benzene	0.13	ppm	0.5	2.5	500	1.2/7.8	2.8	75	9.24
Ethylbenzene	0.6	ppm	20	125	800	0.8/6.7	3.7	874	8.86
Toluene	0.82	ppm	20	100	500	1.1/7.1	3.1	21	8.82
Naphthalene	0.021	ppm	10	15	250	0.9/5.9	4.4	0.08	8.12
None		ppm	9999	0	0	0	0	0	0
Vinyl chloride	0.013	ppm	1	5	NA	3.6/33.0	3.9	2508	9.99
Xylenes	0.032	ppm	100	150	900	1.1/7.0	3.7	9	8.44
1,1,1-Trichloroethane	476	ppm	350	450	700	7.5/12.5	4.6	100	11
1,1-Dichloroethene	7	ppm	5	NA	1000	6.5/15.5	NA	500	10
Methylcyclohexane	6	ppm	400	NA	1200	1.2/6.7	NA	37	9.85
Tetrachloroethene	8	ppm	25	100	150	NA/NA	NA	14	9.32
1,1-DCE	277	ppm	5	NA	NA	6.5/15.5	NA	500	10
PCBs	52	ppm	0.5	NA	5	NA/NA	NA	0.001	NA
Arsenic	0.037	ppm	0.01	NA	5	NA/NA	NA	NA	NA
Lead	0.024	ppm	0.05	NA	100	NA/NA	NA	0	NA
Chromium	0.058	ppm	0.5	NA	250	NA/NA	NA	NA	NA
Cadmium	0.003	ppm	0.005	NA	9	NA/NA	NA	0	NA
None		ppm	9999	0	0	0	0	0	0
None		ppm	9999	0	0	0	0	0	0
None		ppm	9999	0	0	0	0	0	0
None		ppm	9999	0	0	0	0	0	0

Notes: TWAs are ACGIH 8 hr-TLVs unless noted.

p-ppm m-mg/m³ c2- ceiling (2 hr) se-sensitizer
s- skin c-ceiling "9999" - NA O-OSHA PEL
r- respirable i-inhalable N-NIOSH 10 hr REL

"#N/A" -Constituent is not in database, manually enter information

Monitoring Equipment and General Protocols

Air monitoring is required for any task or activity where employees have potential exposure to vapors or particulates above the TLV or PEL. Action levels below are appropriate for most situations. Contact the project

Monitoring Frequency:

Instrument	Actions
<input checked="" type="checkbox"/> Photoionization Lamp (eV): 9.8	< 0.210 0.210 - 0.421 > 0.421 Continue work Sustained >5 min. continuous monitor, review eng. Sustained >5 min. stop work, contact SSO
<input type="checkbox"/> Flame Ionization Detector (FID)	< 0.0 0.0 - 0.0 > 0.0 Continue work Sustained >5 min. continuous monitor, review eng. Sustained >5 min. stop work, contact SSO
<input type="checkbox"/> LEL/O ₂ Meter	0-10% LEL >10-25% LEL >25% LEL 19.5%-23.5% O ₂ <19.5% O ₂ >23.5% O ₂ Continue work Continuous monitor, review eng. controls, proceed Stop work, evacuate, contact SSO Normal, continue work O ₂ deficient, stop work, evacuate, cont. SSO O ₂ enriched, stop work, evacuate, contact SSO
<input type="checkbox"/> Colorimetric Indicator Tube (CIT) Compound(s):	≤PEL/TLV >PEL/TLV Continue work Stop work, review eng. controls and PPE, contact SSO
<input type="checkbox"/> Sound Level Meter or Dosimeter	>80 dBA, sustained >85 dBA, sustained Result dBA-(NRR-7dBA)>90dBA Monitor continuously, continue work Review controls, use hearing protection Stop work, contact SSO
<input type="checkbox"/> Particulate Monitor (mists, aerosols, dusts in mg/m ³)	< 2.5 2.5 - 5.00 > 5.00 Continue work Use engineering controls, monitor continuously Stop work, review controls, contact SSO
<input type="checkbox"/> Radiation Survey Meter	Specify: Specify:
<input type="checkbox"/> Other:	Specify: Specify:

Personal Protective Equipment (PPE)

See JLA for the task being performed for PPE requirements . If the work is not conducted under a JLA, refer to the governing document for PPE requirements. At a minimum, the following checked PPE is required for all tasks during field work not covered by a JLA on this project:

Level D or Level D Modified:

<input checked="" type="checkbox"/> Hard hat	<input type="checkbox"/> Snake chaps/guards	<input type="checkbox"/> Coveralls:	Specify Type: _____
<input checked="" type="checkbox"/> Safety glasses	<input type="checkbox"/> Briar chaps	<input type="checkbox"/> Apron:	_____
<input type="checkbox"/> Safety goggles	<input type="checkbox"/> Chainsaw chaps	<input checked="" type="checkbox"/> Chem. resistant gloves:	nitrile
<input type="checkbox"/> Face shield	<input type="checkbox"/> Sturdy boot	<input type="checkbox"/> Gloves other:	leather
<input checked="" type="checkbox"/> Hearing protection	<input checked="" type="checkbox"/> Steel toe boot	<input type="checkbox"/> Chemical boot:	_____
<input type="checkbox"/> Rain suit	<input type="checkbox"/> Metatarsal boot	<input type="checkbox"/> Boot other:	_____
<input type="checkbox"/> Other:	_____	<input checked="" type="checkbox"/> Traffic vest:	class 2
		<input type="checkbox"/> Life vest:	_____

Task specific PPE:

Comments:

Medical Surveillance (check all that apply)

- Medical Surveillance is not required for this project.
- HAZWOPER medical surveillance applies to all ARCADIS site workers on the project.
- HAZWOPER medical surveillance applies to all subcontractors on the project.
- HAZWOPER medical surveillance applies to all site workers on the project except:

- Other medical surveillance required (describe type and who is required to participate):

- Client drug and/or alcohol testing required.

Hazardous Materials Shipping and Transportation (check all that apply)

- Not applicable, no HazMat will be transported or shipped
- A Shipping Determination has been reviewed and provided to field staff
- A Shipping Determination is attached
- All HazMat will be transported under Materials of Trade by ARCADIS
- Other (specify):

Roadway Work Zone Safety (check all that apply)

- Not applicable for this project.
- All or portions of the work conducted under a TCP
- All or portions of the work conducted under a STAR Plan
- TCP or STAR Plan provided to field staff
- TCP or STAR Plan attached
- Other (specify):

ARCADIS Commercial Motor Vehicles (CMVs)

This section is applicable to ARCADIS operated vehicles only

- This project will **not** utilize CMV drivers
- This project will utilize CMV drivers

Site Control (check all that apply)

- Not applicable for this project.
- Site control protocols are addressed in JLA or other supporting document (attach)
- Maintain an exclusion zone of 10 ft. around the active work area
- Site control is integrated into the STAR Plan or TCP for the project
- Level C site control - refer to Level C Supplement attached
- Other (specify):
Project site is inactive with no onsite traffic. All work activities will be completed inside a gated area. No work will be completed in road ROW.

Decontamination (check all that apply)

- Not applicable for this project.
- Decontamination protocols are addressed in JLA or other governing document (attach)
- Level D work- wash hands and face prior to consuming food, drink or tobacco.
- Level D Modified work- remove coveralls and contain, wash hands and face prior to consuming food, drink or tobacco. Ensure footwear is clean of site contaminants
- Level C work - refer to the Level C supplement attached.
- Other (specify):

Sanitation (check all that apply)

- Mobile operation with access to off-site restrooms and potable water
- Restroom facilities on site provided by client or other contractor
- Project to provide portable toilets (1 per 20 workers)
- Potable water available on site
- Project to provide potable water (assume 1 gal./person/day)
- Project requires running water (hot and cold, or tepid) with soap and paper towels

Safety Briefings (check all that apply)

- Safety briefing required daily
- Safety briefing required twice a day
- Safety briefings required at the following frequency: _____
- Subcontractors to participate in ARCADIS safety briefings
- ARCADIS to participate in client/contractor safety briefings
- Other (specify):

Safety Equipment and Supplies

Safety equipment/supply requirements are addressed in the JLA for the task being performed. If work is not performed under a JLA, the following safety equipment is required to be present on site in good condition (Check all that apply):

- | | |
|--|--|
| <input checked="" type="checkbox"/> First aid kit | <input checked="" type="checkbox"/> Insect repellent |
| <input type="checkbox"/> Bloodborne pathogens kit | <input checked="" type="checkbox"/> Sunscreen |
| <input type="checkbox"/> Fire extinguisher | <input type="checkbox"/> Air horn |
| <input type="checkbox"/> Eyewash (ANSI compliant) | <input checked="" type="checkbox"/> Traffic cones |
| <input checked="" type="checkbox"/> Eyewash (bottle) | <input type="checkbox"/> 2-way radios |
| <input checked="" type="checkbox"/> Drinking water | <input type="checkbox"/> Heat stress monitor |
| <input type="checkbox"/> Other:
_____ | _____ |

LPS Program (check all that apply)

- LPS metrics are provided on the account level, refer to account guidance
- LPO required at the following frequency on this project:
Select One: 400 mhrs 1 time(s) Define: _____
- LPS Field Assessment required at the following frequency on this project:
Select One: _____ mhrs _____ time(s) Define: _____
- Other (specify):
at least 1 LPO will be conducted during drilling, soil sampling, well installation and groundwater monitoring.

List tasks anticipated for LPO activity:

For successful LPOs, schedule feedback sessions with supervisor in advance!

Signatures

I have read, understand and agree to abide by the requirements presented in this health and safety plan. I understand that I have the absolute right to stop work if I recognize an unsafe condition affecting my work until corrected.

Printed Name	Signature	Date
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
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_____	_____	_____

Add additional sheets if necessary

- Subcontractor Acknowledgement Form attached

You have an absolute right to STOP WORK if unsafe conditions exist!

Attachments

JSA's

Air Knife / Hydro Knife

Drilling, Soil Sampling and well Installation

Generator JLA

Groundwater Sampling and Product Recovery

IDW Drum Handling and Sampling

Utility Clearance Using Air Knife Knife-Hydro Knife

LNAPL Sample Collection SOP

MSDS Sheets

JSA's

Air Knife Hydro Knife

drilling, sampling, well installations

driving

drum sampling and handling

generator JLA

groundwater sampling and free product recovery

sample cooler

soil sampling well installation

Job Loss Analysis

General

Client Name	BRENNTAG PACIFIC, INC.
JSA ID	5288
Job Name	Environmental-Air knife/hydro knife
Task Description	Air-Knife/Hydro-Knife
Project Number	OK0012530023
Project Name	BRENNTAG/ST. LOUIS, MO
PIC Name	STUDEBAKER, RICHARD
Project Manager	FRENCH, WARREN
Status	(3) Completed
Creation Date	6/13/2011 10:32:25 AM
Auto Closed	False

User Roles

Role	Employee	Due Date	Completed	Approve	Supervisor	Active Employee
Created By	Lloyd, Tina	7/4/2011	6/13/2011		Shonfelt, John	True

Job Steps

Job Step	Job Step Description	Potential Hazard	Critical Action	HSP Reference
1	Check and clear proposed hydro-knife locations for the presence of underground and overhead utilities	1 Staff can be hit by vehicular traffic	Wear reflective traffic vest. Establish work zone with cones.	Utility Clearance H&S Standard: ARCHSFS019
		2 Underground utilities can be encountered	Follow ARCADIS policy on utility location	Utility Clearance H&S Standard: ARCHSFS019
2	Clear hole using the hydro-knife	1 Subsurface could have material that may contain rocks/sharp objects. Flying debris could cause injury to eyes, face, arms and legs; Water spray could contain mud, sharp debris or chemicals of concern;	Stay back a minimum of five from the hydro-knife while in operation by the contractor. Wear safety glasses, leather gloves, hardhat.	
		2 operation of the hydro-knife generates excessive noise	Hearing protection is required when the equipment is in operation	
		3 vacuum unit has a large amount of suction	do not put any part of your body near the end of the hose	
3	Barricade open holes	1 Holes can be difficult to see depending on their size, and site workers could twist their ankle or fall if they step on an open hole.	Holes can be as large as 6-8 inches in diameter and as deep as 7 feet. Heavy cones, orange barrels or cones with caution tape should be used to protect the holes	
		2 Lifting hazards from carrying heavy cones or orange barrels	Minimize number of cones lifted at one time. Use team lift approach when practicable.	

Personal Protective Equipment

Type	Personal Protective Equipment	Description	Required
Eye Protection	safety glasses		Required
Foot Protection	steel-toe boots		Required
Hand Protection	work gloves (specify type)	leather	Required
Head Protection	hard hat		Required
Hearing Protection	ear plugs		Required
Miscellaneous PPE	traffic vest--Class II or III		Required

Supplies

Type	Supply	Description	Required
Miscellaneous	fire extinguisher		Required
Miscellaneous	first aid kit		Required
Personal	eye wash (specify type)		Required
Traffic Control	traffic cones		Required

Job Loss Analysis

General

Client Name	DURKIN & DURKIN, LLP
JSA ID	5458
Job Name	Environmental-Drilling, soil sampling, well installation
Task Description	Soil borings/soil sampling
Project Number	BB0182610000
Project Name	HARVEST REST./LIMO COMPANY_PH I ESA
PIC Name	
Project Manager	CARETSKY, STEVEN
Status	(3) Completed
Creation Date	7/5/2011 2:52:12 PM
Auto Closed	False

User Roles

Role	Employee	Due Date	Completed	Approve	Supervisor	Active Employee
Created By	Pringle, Casey	7/26/2011	7/5/2011		Dultz, Joseph J	True

Job Steps

Job Step	Job Step Description	Potential Hazard	Critical Action	HSP Reference
1	Set up necessary traffic and public access controls	1 Struck by vehicle due to improper traffic controls	Use a buddy system for placing site control cones and/or signage. Position vehicle so that you are protected from moving traffic. Wear Class II traffic vest	
2	Utility Clearance	1 Potential to encounter underground or aboveground utilities while drilling	Complete utility clearance in accordance with the ARCADIS H&S procedure	ARCADIS H&S Procedure ARCHSFS019
3	General drill rig operation	1 Excessive noise is generated by rig operation.	When the engine is used at high RPMs or soil samples are being collected, use hearing protection.	
		2 During drill rig operation, surfaces will become hot and cause burns if touched, and COCs in the soils more readily vaporize generating airborne contaminates.	Due to friction and lack of a drilling fluid, heat will be produced during this method. Mainly drill augers. Be careful handling split spoons. Wear proper work gloves. When soils and parts become heated, the COC could volatilize. Air monitoring should always be performed in accordance with the HASP.	
		3 Moving parts of the drilling rig can pull you in causing injury. Pinch points on the rig and auger connections can cause pinching or crushing of body parts.	Stay at least 5 feet away from moving parts of the drill rig. Know where the kill switch is, and have the drillers test it to verify that it is working. Do not wear loose clothing, and tie long hair back. Avoid wearing jewelry while drilling. Cone off the work area to keep general public away from the drilling rig	
		4 Dust and debris can cause eye injury and soil cuttings and/or water could contain COCs.	Wear safety glasses and stay as far away from actual drilling. W operation as practicable. Wear appropriate gloves to protect from COCs.	

3	General drill rig operation	5	Drilling equipment laying on the ground (i.e. augers, split spoons, decon equipment, coolers, etc), create a tripping hazard. Water from decon buckets generate mud and cause a slipping hazard.	Keep equipment and trash picked up, and store away from the primary work area.	
		6	The raised derrick can strike overhead utilities, tree limbs or other elevated items	Never move the rig with the derrick up. Ensure there is proper clearance to raise the derrick, and that you are far enough away from overhead power lines. See the Utility Location H&S policy and procedure for guidance.	
4	Mudd rotary drilling	1	The raised derrick can strike overhead utilities, tree limbs or other elevated items	Never move the rig with the derrick up. Ensure there is proper clearance to raise the derrick, and that you are far enough away from overhead power lines. See the Utility Location H&S policy and procedure for guidance.	
		2	This technology uses fluid, which collects with sediments in large basin. Fluid can splash out and cause slipping/mud hazard. Liquid mixture can splash into your eyes.	Wear rubber boots if needed, and keep clear of muddy/wet area as much as practicable. If area becomes excessively muddy, consider mud spikes or covering the area with a material that improves traction. Wear safety glasses.	
5	Hollow stem auger drilling	1	All hazards in step 3 apply. Additionally, The raised derrick can strike overhead utilities, tree limbs or other elevated items	Never move the rig with the derrick up. Ensure there is proper clearance to raise the derrick, and that you are far enough away from overhead power lines. See the Utility Location H&S policy and procedure for guidance.	
6	Air rotary drilling	1	this drilling method works with high air pressure and can generate flying debris that can strike your body or get debris in your eyes.	When the drill rig is being driven into media, it will produce flying debris. The flaps behind the drill rig should stay closed whenever possible to reduce the risk of flying debris. Safety glasses and hard hat should always be worn when the drill rig is operating. When penetrating asphalt protect surrounding cars that may be present to avoid debris damage to paint or windshields.	
		2	The raised derrick can strike overhead utilities, tree limbs or other elevated items	Never move the rig with the derrick up. Ensure there is proper clearance to raise the derrick, and that you are far enough away from overhead power lines. See the Utility Location H&S policy and procedure for guidance.	
		3	When drilling through bedrock prior to groundwater dust can be produced from pulverization. Inhalation of dusts/powder can occur	Supplemental water should be used to manage dust creation and/or dust masks if necessary.	
7	Reverse rotary drilling	1	This method will use fresh water to pump out drill cuttings through the center of the casing. Water/sediment mixture is generated and could cause contact with impacted soils or groundwater	Ensure the pit construction can hold the amount of cuttings that are anticipated. Air monitoring should also be used of pit area	

7	Reverse rotary drilling	2	Fire hydrants are often used for water source. Hydrants deliver water at high pressure. Pressurized water can cause flying parts/debris and excessive slipping hazards.	Water usage from fire hydrants should be cleared with local municipalities prior to use. Only persons that know how to use the hydrant should be performing this task. Ensure all connections are tight, and hose line is not run over to cut by traffic. Any leaks from the hydrant should be reported immediately.
		3	Settling pit construction can cause tripping hazard from excavated soils, and plastic sheeting can cause slipping.	cone off the area to keep the general public/visitors away from the settling pit. Ensure proper sloping of excavation.
		4	The raised derrick can strike overhead utilities, tree limbs or other elevated items	Never move the rig with the derrick up. Ensure there is proper clearance to raise the derrick, and that you are far enough away from overhead power lines. See the Utility Location H&S policy and procedure for guidance.
8	Rotosonic drilling	1	Fire hydrants are often used for water source. Hydrants deliver water at high pressure. Pressurized water can cause flying parts/debris and excessive slipping hazards.	Water usage from fire hydrants should be cleared with local municipalities prior to use. Only persons that know how to use the hydrant should be performing this task. Ensure all connections are tight, and hose line is not run over to cut by traffic. Any leaks from the hydrant should be reported immediately
		2	This method requires a lot of clearance. The drill head can turn 90 degrees to attach to the next drill flight or casing. This usually requires a large support truck to park directly behind the rig. As the drill head raises the new casing flight is angled down at the same time until it can be turned completely vertical.	Ensure sufficient overhead clearance.
		3	Heavy lifting of cores can cause muscle strain.	Always use 2 people to move core containers. Use caution moving core samples to layout area. Plan layout area to ensure adequate aisle space between core runs for logging. Keep back straight and use job rotation.
		4	The rotosonic drill head can move very quickly up and down while working on a borehole. Moving parts can strike someone or catch body parts	The operator and helper must communicate and stay clear of the path of the drill head. The drill utilizes two large hydraulic clamps to continuously hold casings while load/unloading previous casings. Do not wear loose clothing.
9	Direct push drilling	1	The drill rods will be handled by workers most of the time rather than the rig doing it, therefore pinch points can cause lacerations and crushing of fingers/body parts.	Keep a minimum of 5 feet away from drill rig operation and moving parts.
		2	The direct push rigs are usually meant to fit in spaces where larger rig can't. Tight spaces can pin workers.	Do not put yourself between the rig and a fixed object. Use Spotters or a tape measure to ensure clearances in tight areas. Pre-plan equipment movement from one location to the next.

9	Direct push drilling	3	some direct push equipment is controlled by wireless devices. These controls can fail and equipment can strike workers or cause damage to property.	The drill rig should be used in a large open area to test wireless controls prior to moving to boring locations. The operator of the rig will test the kill switch with wireless remote prior to use. Operator will stay in range of rig while moving so that wireless signal will not be too weak and cause errors to the controls.	
		4	Sampling sleeves must be cut to obtain access to soil. Cutting can cause lacerations.	Preferably let the driller cut the sleeves open. Many drillers have holders for the sleeve to allow for stability when cutting. If we cut the sleeves, use a hook blade, change blade regularly, and cut away from the body.	
10	Rock Coring	1	flying debris can hit workers or cause debris to get in eyes.	Rock chips or overburden may become airborne from drilling method. Wear safety glasses and hard hat and remain at a safe distance from back of drill rig.	
		2	Heavy lifting of cores can cause muscle strain.	Always use 2 people to move core containers. Use caution moving core samples to layout area. Plan layout area to ensure adequate aisle space between core runs for logging. Keep back straight and use job rotation.	
11	Sample collection and processing	1	Injuries can result from pinch points on sampling equipment, and from breakage of sample containers.	Care should be taken when opening sampling equipment. Look at empty containers before picking them up, and do not over-tighten container caps. Use dividers to store containers in the cooler so they do not break.	Sample cooler handling JLA
		2	lifting heavy coolers can cause back injuries	Use two people to move heavy coolers. Use proper lifting techniques.	Sample cooler handling JLA
12	Monitoring well installation	1	Same hazards as in Step 3 with general drill rig operation	See step 3	
		2	monitoring well construction materials can clutter the work area causing tripping hazards.	Well construction materials should be picked up during the well installation process.	
		3	Heavy lifting can cause muscle strains, and cutting open bags can cause lacerations.	Well construction materials are usually 50 lbs or greater. Team lift or use drill rig to hoist bags. Always use work gloves while cutting open bags.	
		4	Well pack material (i.e. sand, grout, bentonite) can become airborne and get in your eyes.	Wear safety glasses for protection from airborne sand and dust.	
		5	Cutting the top of the well to size can cause jagged/sharp edges on the top of the well casing.	Wear gloves when working with the top of the well casing, and file any sharp jagged edges that resulted from cutting to size.	
13	Soil cutting and purge water management	1	Moving full drums can cause back injury, or pinching/crushing injury.	Preferably have the drilling contractor move full drums with their equipment. If this is not practicable, use lift assist devices such as drum dollies, lift gates, etc. Employ proper lifting techniques, and perform TRACK to identify pinch/crush points. Wear leather work gloves, and clear all walking and work areas of debris prior to moving a drum.	Drum handling JLA

Personal Protective Equipment

Type	Personal Protective Equipment	Description	Required
Eye Protection	safety glasses		Required
Foot Protection	steel-toe boots		Required
Hand Protection	chemical resistant gloves (specify type)		Required
Hand Protection	work gloves (specify type)	leather	Required
Head Protection	hard hat		Required
Hearing Protection	ear plugs		Required
Miscellaneous PPE	traffic vest--Class II or III		Required
Respiratory Protection	dust mask		Recommended

Supplies

Type	Supply	Description	Required
Communication Devices	mobile phone		Required
Decontamination	Decon supplies (specify type)		Required
Miscellaneous	fire extinguisher		Required
Miscellaneous	first aid kit		Required
Personal	eye wash (specify type)	bottle	Required
Traffic Control	traffic cones		Required

Job Loss Analysis

General

Client Name	HOME DEPOT U.S.A., INC. - 542350758
JSA ID	5501
Job Name	General Industry-Driving - passenger vehicles
Task Description	Driving - passanger vehicle
Project Number	HT1145340000
Project Name	HOME DEPOT/GENERAL ON-CALL COMPLIANCE TA
PIC Name	ZACKEO, DOMINICK
Project Manager	STELLA, CATHERINE
Status	(3) Completed
Creation Date	7/11/2011 12:49:45 PM
Auto Closed	False

User Roles

Role	Employee	Due Date	Completed	Approve	Supervisor	Active Employee
Created By	Marnicki, Jan	8/1/2011	7/11/2011		Zackeo, Dominick	True

Job Steps

Job Step	Job Step Description	Potential Hazard	Critical Action	HSP Reference
1	Performing Pre-trip inspections and adjustments.	1 Failure to conduct pre-trip inspection of vehicle can lead to vehicle accident.	Use TRACK to conduct inspection of the vehicle. Walk around vehicle to check tire pressure, signs of leaking fluids, overall vehicle condition. Use vehicle inspection checklist.	
		2 Failure to adjust mirrors, seats, and controls prior to driving can lead to vehicle accident.	Adjust all mirrors, seats and vehicle controls prior to driving vehicle. Become familiar with electronic controls, such as turn signals, windshield wipers, air conditioning, and radio prior to vehicle operation.	
2	Vehicle loading and unloading	1 Objects placed in the vehicle can obstruct the view of the driver in rear, side or blindspot view.	Avoid placing objects in a manner that obstructs your views in windows, mirrors, or blind spots.	
		2 Unsecure objects causing pedal, steering or gear shift obstruction or injury during vehicle operation.	Secure all loads in vehicle (both in the bed of trucks and in passenger cabin) to prevent unanticipated movement or shifting that could injure driver, passenger, or affect safe operation of vehicle.	
		3 Obstruction of vehicle safety equipment caused by object placement in vehicle.	Keep emergency equipment clear and unobstructed to ensure ready availability.	
3	Vehicle operation	1 Failure to use Smith System "5-Keys" increases risk of accident and injury.	Use Smith System "5-Keys", maintain space cushion around vehicle, maintain 4 second rule and add (second for each additional hazard (wet roads, snow, etc). Brake gradual, keep eyes moving, check mirrors every 6-8 seconds, use turn signals, focus on relevant objects, use early lane positioning when approaching turns.	
		2 Injury or death from failure to wear seatbelt	Always wear seatbelts even if driving short distances off of a public roadway.	
		3 Cell phone use increases risk of accident and injury	Avoid using cell phones in any capacity when operating a vehicle, check client for cell use on project sites and follow requirements. Follow all local laws.	
		4 Use of radar detectors encourages speeding resulting in increased risk for accident or injury	Use of radar detectors and similar devices is prohibited.	
		5 Intruders attempting to enter vehicle while stopped at intersections and/or while it is vacant. Doors opening during an accident.	Lock doors before driving vehicle and always after leaving vehicle when it is stopped unless client requires vehicles to remain unlocked while onsite.	
4	Routine maintenance	1 Lack of routine vehicle maintenance can lead to engine and control failures, potential vehicle accident.	Vehicle should have routine maintenance and service to keep in good operating condition.	

Supplies

Type	Supply	Description	Required
Communication Devices	mobile phone		Required
Miscellaneous	fire extinguisher		Required
Miscellaneous	first aid kit		Required
Miscellaneous	flashlight		Recommended
Traffic Control	Other	Roadway emergency kit	Recommended

Job Loss Analysis

General

Client Name	BP AMOCO CORPORATION
JSA ID	5453
Job Name	Environmental-Drum sampling/handling
Task Description	Drum Handling/Sampling
Project Number	GP09BPNAC156
Project Name	CA-11136
PIC Name	DIAS, KEITH
Project Manager	PHILLIPS, HOLLIS
Status	(3) Completed
Creation Date	7/5/2011 9:58:37 AM
Auto Closed	False

User Roles

Role	Employee	Due Date	Completed	Approve	Supervisor	Active Employee
Created By	Frattali, John	7/26/2011	7/5/2011		Johnson, Jeffery	True
Developer (Primary Contact)	Frattali, John	7/26/2011	7/5/2011		Johnson, Jeffery	True
HASP Reviewer	Merrifield, Christopher	7/19/2011	7/11/2011	True	Frederick, Peter	True
Reviewer	Hess, Timothy	7/19/2011	7/18/2011	True	Williams, Mark	True

Reviewer Comments

Role	Employee	Approval Status	Completed Date	Comments
HASP Reviewer	Merrifield, Christopher	Approve	07/11/2011	
Reviewer	Hess, Timothy	Approve	07/18/2011	

Job Steps

Job Step	Job Step Description	Potential Hazard	Critical Action	HSP Reference
1	ins c dr s r s gns b l g n g l a n g c r s a l a n r a r and d r s	1 Chemical exposure	Read drum labels for information about contents. Review all relevant MSDSs about chemical contents. If labels are not attached, call PM or Local H&S Representative.	Employee H&S Field book, Section III Subpart II, page 102-105.
		2 Fire/explosion hazard.	Use air monitoring meters to screen drums. % LEL and VOCs (PPM). If either of the values are above the action levels described in the HASP or MSDS then Stop Work, move away from the area, and reassess the situation. Call PM and H&S staff for support.	Employee H&S Field book, Section III Subpart II, page 102-105.
2	Remove lids or bungs from drums	1 Hand Injuries can occur from sharp edges, pinch points, and from use of hand tools.	Wear appropriate work gloves. When removing ring from drum, fingers can get pinched between ring and drum. Identify all pinch points prior to lid removal. Keep fingers clear of this space. Select proper tool for task. If large amount of drums will be encountered, use a speed or drum wrench.	Employee H&S Field book, Section III Subpart II, page 102-105.

2	Remove lids or bungs from drums	2	Rapid depressurization from empty or partially full drums can cause flying parts and/or the release of volatile COCs.	Do not handle or open bulging drums (contact Corp H&S for assistance). Bleed any built up pressure by carefully loosening bung prior to removing ring. Keep face and arms away from bung opening when loosening. Slightly lift lid, insert end of air monitoring device to monitor air inside drum.	Employee H&S Field book, Section III Subpart II, page 102-105.
		3	Splashing can occur if filling drum, or collecting samples.	Wear eye and face protection. Pour liquids into drum slowly to minimize splashing.	Employee H&S Field book, Section III Subpart II, page 102-105.
		4	When working with COCs that have fire/explosive properties, sparking or heat could cause fire/explosion.	Use brass or non Spark Hand Tools if such a hazard exists or is suspected.	Employee H&S Field book, Section III Subpart II, page 102-105.
3	Sample drum contents	1	Exposure to COCs can occur by contacting impacted contents.	Select proper dermal protection for task, at a minimum nitrile gloves should be worn. Wear appropriate eye, face and body protection as outlined in the HASP.	
		2	Exposure to chemical vapors/fumes when sampling.	Conduct air monitoring as outlined in the HASP, and if required, select appropriate respiratory protection for the task.	
		3	Sharp edges and broken sample containers can cause lacerations.	Discard any broken sample ware or glass properly. Do not over tighten sample containers. Wear kevlar gloves while handling glass containers.	
		4	Chemical burns or skin irritation can occur from contact with sample preservatives.	Wear chemical protective gloves when collecting samples, or when handling damaged sample containers.	
4	Drum lid and ring installation	1	Hand Injuries can occur from sharp edges, pinch points, and from use of hand tools.	Wear appropriate work gloves. When installing lid and ring onto drum, fingers can get pinched. Identify all pinch points prior to work. Keep fingers clear of this space. Select proper tool for task. If large amount of drums will be encountered, use a speed or drum wrench.	
5	Moving/storing drums	1	Drum storage areas can be accessed by the general public, or may not be secure.	Calculate how many drums will be stored in new location. Ensure that drums are not easily accessed by the general public. Do not store such that drums impede pedestrian or vehicular traffic.	
		2	Muscle strain can occur when lifting/pulling/pushing drums.	Drums that are full can weigh as much as 800 lbs. Use a lift assist device whenever possible, and use a team lift approach. When moving soil drum generated by drilling, use a dolly to move drum. Using dolly, slightly lift drum away from dolly to install forks under drum. Slowly let drum come back down and rest on dolly. Using hook on top of dolly, ensure it latches on top of drum bung.	
		3	Body parts can be pinched between lift device, or drum and the ground.	Be aware of hand and foot placement during drum staging. Do not hurry through task. Identify all pinch point hazards.	
		4	The drum can tip or the dolly could become unstable from uneven ground surface.	Plan travel route with drum prior to moving. With drum secure on dolly, have one employee pull back on dolly, and other employee slowly push back on drum toward dolly. Have a worker act as spotter for traffic and pedestrians, if applicable, along the way.	

5	Moving/storing drums	5	Workers are subject to slips, trips and falls.	Plan travel route with drum prior to moving. Have a worker act as a spotter for any trip hazards along the way.	
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Personal Protective Equipment

Type	Personal Protective Equipment	Description	Required
Dermal Protection	long sleeve shirt/pants		Required
Eye Protection	safety glasses		Required
Foot Protection	boots	steel toe with shanks	Required
Hand Protection	chemical resistant gloves (specify type)	Nitrile	Required
Hand Protection	work gloves (specify type)	Kevlar & Leather	Required
Head Protection	hard hat		Required
Hearing Protection	ear plugs		Recommended
Miscellaneous PPE	traffic vest--Class II or III		Required

Supplies

Type	Supply	Description	Required
Communication Devices	mobile phone		Required
Miscellaneous	fire extinguisher		Required
Miscellaneous	first aid kit		Required
Miscellaneous	Other	dolly	Required
Personal	sunscreen		Required

Job Loss Analysis

General

Client Name	GE ENERGY
JSA ID	5510
Job Name	Environmental-Groundwater Sampling and free product recovery
Task Description	Groundwater sampling
Project Number	B00311810000
Project Name	GE/AUBURN ME - RFI WORKPLAN PREP
PIC Name	FARR, PATRICK
Project Manager	ADAMS, RICHARD
Status	(3) Completed
Creation Date	7/12/2011 9:37:09 AM
Auto Closed	False

User Roles

Role	Employee	Due Date	Completed	Approve	Supervisor	Active Employee
Created By	Zuranski, Laura	8/2/2011	7/12/2011		Golubski, Jason	True

Job Steps

Job Step	Job Step Description	Potential Hazard	Critical Action	HSP Reference
1	ag a r d r n d sa lng l ca n and s r n and sa lng n	1 personnel could be hit by vehiclur traffic.	Set-up cones and establish work area. Position vehicle so that field crew is protected from site traffic. Unload as close to work area as safely possible.	
		2 Sampling equipment, tools and monitoring well covers can cause tripping hazard	Keep equipment picked up and use TRACK to assess and changes	
2	Open wells to equilibrate and gauge wells	1 When squatting down, personnel can be difficult to see by vehicular traffic.	Wear Class II traffic vest if wells are located proximal to vehicular traffic. Use tall cones and the buddy system if practicable.	
		2 pinchpoints on well vault can pinch or lacerate fingers	Use correct tools to open well vault/cap. Wear leather gloves when removing well vault lids, and chemical protective gloves while guaging. Wear proper PPE including safety boots, knee pads and safety glasses.	
		3 Lifting sampling equipment can cause muscle strain	Unload as close to work area as safely possible; use proper lifting and reaching techniques and body positioning; don't carry more than you can handle, and get help moving heavy or awkward objects.	
		4 Pressure can build up inside well causing cap to release under pressure	Keep head away from well cap when removing. If pressure relief valves are on well use prior to opening well	
3	g n P rg ng ll and ll c ng Para r M as r n s	1 Electrical shock can occur when connecting/disconnecting pump from the battery.	Make sure equipment is turned off when connecting/disconnecting. Wear leather gloves. Use GFCIs when using powered tools and pumps. Do not use in the rain or run electrical cords through wet areas.	

3	g n P rg ng ll and ll c ng Para r M as r n s	2	purge water can spill or leak from equipment	Stop purging activities immediately, stop leakage and block any drainage grate with sorbent pads. Call PM to notify them of any reportable spill.	
		3	Water spilling on the ground can cause muddy/slippery conditions	Be careful walking in work area when using plastic around well to protect from spillage	
		4	lacerations can occur when cutting materials such as plastic tubing	When cutting tubing, use tubing cutter. No open fixed blades should ever be used. When possible wear work gloves, leather type.	
		5	purge water can splash into eyes	Pour water slowly into buckets/drums to minimize splashing. Wear safety glasses	
4	Collect GW or Free Product Sample	1	Working with bailer rope can cause rope burns on hands.	Slowly raise and lower the rope or string for the bailer. Wear appropriate gloves for the task.	
		2	sample containers could break or leak preservative	Discard any broken sampleware or glass properly. Do not overtighten sample containers. Wear chemical protective gloves	
5	Recovery of Free Product from well	1	exposure to free product	Additional chemical protection may be necessary based on the type of product. Additionally, safety goggles, a faceshield, or respiratory protection may be required. Verify in the HASP.	
6	Staging of Well Purge water and/or Free Product	1	Muscle strains can occur when moving purge water or drums	If using buckets, do not fill buckets up to the top. Always keep lid on buckets when traveling or moving them to another location. Only half fill buckets so when dumping the buckets weigh less. See drum handling JLA for movement of drums.	Drum handling JLA

Personal Protective Equipment

Type	Personal Protective Equipment	Description	Required
Eye Protection	safety glasses		Required
Foot Protection	steel-toe boots		Required
Hand Protection	chemical resistant gloves (specify type)		Required
Hand Protection	work gloves (specify type)	leather	Required
Head Protection	hard hat		Required
Miscellaneous PPE	other	Knee pads	Required

Supplies

Type	Supply	Description	Required
Communication Devices	mobile phone		Required
Decontamination	Decon supplies (specify type)		Required
Miscellaneous	fire extinguisher		Required
Miscellaneous	first aid kit		Required
Personal	eye wash (specify type)	bottle	Required
Traffic Control	traffic cones		Required

Job Loss Analysis

General

Client Name	BP AMOCO CORPORATION
JSA ID	5463
Job Name	Environmental-Sample cooler handling
Task Description	Sample Cooler Handling
Project Number	GP09BPNAC156
Project Name	CA-11136
PIC Name	DIAS, KEITH
Project Manager	PHILLIPS, HOLLIS
Status	(3) Completed
Creation Date	7/6/2011 10:41:44 AM
Auto Closed	False

User Roles

Role	Employee	Due Date	Completed	Approve	Supervisor	Active Employee
Created By	Frattali, John	7/27/2011	7/6/2011		Johnson, Jeffery	True

Job Steps

Job Step	Job Step Description	Potential Hazard	Critical Action	HSP Reference
1	Transfer field samples to sample packing area	1 Lifting heavy coolers may result in muscle strain especially to lower back.	Use proper lifting techniques and keep back straight. Use buddy system for large coolers, Use mechanical aids like hand trucks if readily available to move coolers. Do not over fill coolers with full sample containers for temporary movement to the sample prep area. Ensure an adequate supply of sample coolers are in field	
		2 Hazards to hands from broken glass caused by over tightening lids or improper placement in cooler	Inspect all bottles and bottle caps for cracks/leaks before and after filling container. Do not over tighten sample lids. Clean up any broken bottles immediately, avoid contact with sample preservatives. Wear leather gloves when handling broken glass.	
		3 Exposure to chemicals (acid preservatives or site contaminants) on the exterior of sample bottles after filling.	Wear protective gloves for acid preservatives and safety glasses with side shields during all sample container handling activities (before and after filling), Once filled follow project specific HASP PPE requirements for skin and eye protection.	
		4 Samples containing hazardous materials may violate DOT/IATA HazMat shipping regulations	All persons filling a sample bottle or preparing a cooler for shipment must have complete ARCADIS DOT HazMat shipping training. Compare the samples collected to the materials described in the Shipping Determination for the Project and ensure consistent. Re perform all Shipping determinations if free product is collected and not anticipated during planning.	

2	Sample cooler selection	1	Sample coolers with defective handles, lid hinges, lid hasps cracked or otherwise damaged may result in injury (cuts to hands, crushing of feet if handle breaks etc)	Only use coolers that are new or in like new condition, No rope handled coolers unless part of the manufacturer's handle design.	ARCADIS Shipping Guide US-001
		2	Selection of excessively large coolers introduces lifting hazards once the cooler is filled.	Select coolers and instruct lab to only provide coolers of a size appropriate for the material being shipped. For ordinary sample shipping sample coolers should be 48 quart capacity or smaller to reduce lifting hazards.	ARCADIS Shipping Guide US-001
3	Pack Samples	1	Pinch points and abrasions to hands from cooler lid closing unexpectedly	Beware that lid could slam shut; block/brace if needed; be wary of packing in strong winds. New coolers may be more prone to self closing, tilt cooler back slightly to facilitate keeping lid open.	
		2	Awkward body positions and contact stress to legs and knees when preparing coolers on irregular or hard ground surfaces.	Plan cooler prep activities. Situate cooler where neutral body positions can be maintained if practical, like truck tailgate. Avoid cooler prep on gravel rough surfaces unless knees and legs protected during kneeling.	
		3	Frostbite or potential for oxygen deficiency when packing with dry ice. Contact cold stress to fingers handling blue ice or wet ice	Dry ice temperature is -109.30F. Wear thermal protective gloves. DO NOT TOUCH with bare skin! Dry ice sublimates at room temp and could create oxygen deficiency in closed environment. Maintain adequate ventilation! Do not keep dry ice in cab of truck. Wear gloves when handling blue ice or gaging wet ice. Dry Ice is DOT regulated for air shipping, follow procedures in Shipping Determination.	
4	Sealing, labeling and Marking Cooler	1	Cuts to hands and forearms from strapping tape placement or removing old tape and labels	Do not use a fixed, open-blade knife to remove old tags/labels, USE SCISSORS or other safety style cutting device. Only use devices designed for cutting. Do not hurry through task.	
		2	Lifting and awkward body position hazards from taping heavy coolers, dropping coolers on feet during taping.	Do not hurry through the taping tasks, ensure samples in cooler are evenly distributed in cooler to reduce potential for overhanging cooler falling off edge of tailgate/table when taping.	
		3	Improper labeling and marking may result in violation of DOT/IATA Hama shipping regulations delaying shipment or resulting in regulatory penalty	Do not deviate from ARCADIS Shipping Guide or Shipping Determination marking or labeling requirements.	
5	Offering sample cooler to a carrer or lab couriou for shipment.	1	Lifting heavy coolers may result in muscle strain especially to lower back.	See lifting hazard controls above.	
		2	Carrier refusal to accept cooler may cause shipping delay and/or result in violation of DOT HazMat shipping regulations.	Promptly report all rejected and refused shipments to the ARCADIS DOT Program Manager. Do Not re-offer shipment if carrier requires additional labels markings or paperwork inconsistent with your training or Shipping Determination without contacting the ARCADIS DOT Compliance Manager.	

Personal Protective Equipment

Type	Personal Protective Equipment	Description	Required
Eye Protection	safety glasses		Required
Hand Protection	chemical resistant gloves (specify type)	nitrile	Required
Hand Protection	work gloves (specify type)	leather	Required

Supplies

Type	Supply	Description	Required
Miscellaneous	Other	Scissors	Required

Job Loss Analysis

General

Client Name	
JSA ID	4828
Job Name	Environmental-Soil sampling/well installation - drill rig
Task Description	Soil Boring and Temp Well Installation
Project Number	
Project Name	
PIC Name	
Project Manager	
Status	(3) Completed
Creation Date	4/6/2011 12:24:23 PM
Auto Closed	False

User Roles

Role	Employee	Due Date	Completed	Approve	Supervisor	Active Employee
Created By	Lemoine, Steven	4/27/2011	4/6/2011		Dultz, Joseph J	True
Developer (Primary Contact)	Lemoine, Steven	4/27/2011	4/6/2011		Dultz, Joseph J	True
HASP Reviewer	Merkle, Kurt	4/20/2011	4/8/2011	True	Beil, Kurt	True

Reviewer Comments

Role	Employee	Approval Status	Completed Date	Comments
HASP Reviewer	Merkle, Kurt	Approve	04/08/2011	

Job Steps

Job Step	Job Step Description	Potential Hazard	Critical Action	HSP Reference
1	Set up necessary traffic and public access controls	1 Struck by vehicle due to improper traffic controls	Use a buddy system for placing site control cones and/or signage. Position vehicle so that you are protected from moving traffic. Wear Class II traffic vest	
2	Utility Clearance	1 Damage to lines (and associated physical hazards or property damage).	Use hand tools when near known underground utilities	ARCADIS Utility Clearance H&S Standard ARCHSFS019
3	General Drill rig operation	1 Excessive noise is generated by rig operation	When the engine is used at high RPMs or soil samples are being collected, use hearing protection.	ARCADIS Hearing Conservation H&S Standard ARCIH008
		2 During drill rig operation, surfaces will become hot and cause burns if touched, and COCs in the soils more readily vaporize generating airborne contaminants.	Due to friction and lack of a drilling fluid, heat will be produced during this method. Mainly drill augers. Be careful handling split spoons. Wear proper work gloves. When soils and parts become heated, the COC could volatilize. Air monitoring should always be performed in accordance with the HASP.	ARCADIS Hearing Conservation H&S Standard ARCIH008

3	General Drill rig operation	3	Moving parts of the drilling rig can pull you in causing injury. Pinch points on the rig and auger connections can cause pinching or crushing of body parts.	Stay at least 5 feet away from moving parts of the drill rig. Know where the kill switch is, and have the drillers test it to verify that it is working. Do not wear loose clothing, and tie long hair back. Avoid wearing jewelry while drilling. Cone off the work area to keep general public away from the drilling rig.	ARCADIS Hearing Conservation H&S Standard ARCIH008
		4	Dust and debris can cause eye injury and soil cuttings and/or water could contain COCs.	Wear safety glasses and stay as far away from actual drilling. W operation as practicable. Wear appropriate gloves to protect from COCs.	ARCADIS Hearing Conservation H&S Standard ARCIH008
		5	Drilling equipment laying on the ground (i.e. augers, split spoons, decon equipment, coolers, etc), create a tripping hazard. Water from decon buckets generate mud and cause a slipping hazard.	Keep equipment and trash picked up, and store away from the primary work area.	ARCADIS Hearing Conservation H&S Standard ARCIH008
		6	The raised derrick can strike overhead utilities, tree limbs or other elevated items	Never move the rig with the derrick up. Ensure there is proper clearance to raise the derrick, and that you are far enough away from overhead power lines. See the Utility Location H&S policy and procedure for guidance.	ARCADIS Hearing Conservation H&S Standard ARCIH008
4	Direct push drilling	1	The drill rods will be handled by workers most of the time rather than the rig doing it, therefore pinch points can cause lacerations and crushing of fingers/body parts.	Stay a minimum of 5 feet away from drill rig operation and moving parts.	
		2	The direct push rigs are usually meant to fit in spaces where larger rig can't. Tight spaces can pin workers.	Do not put yourself between the rig and a fixed object. Use Spotters or a tape measure to ensure clearances in tight areas. Pre-plan equipment movement from one location to the next.	
		3	Some direct push equipment is controlled by wireless devices. These controls can fail and equipment can strike workers or cause damage to property.	The drill rig should be used in a large open area to test wireless controls prior to moving to boring locations. The operator of the rig will test the kill switch with wireless remote prior to use. Operator will stay in range of rig while moving so that wireless signal will not be too weak and cause errors to the controls.	
		4	Sampling sleeves must be cut to obtain access to soil. Cutting can cause lacerations.	Preferably let the driller cut the sleeves open. Many drillers have holders for the sleeve to allow for stability when cutting. If we cut the sleeves, use a hook blade, change blade regularly, and cut away from the body.	
5	Sample collection and processing	1	Injuries can result from pinch points on sampling equipment, and from breakage of sample containers.	Care should be taken when opening sampling equipment. Look at empty containers before picking them up, and do not over-tighten container caps. Use dividers to store containers in the cooler so they do not break.	ARCADIS PPE H&S Standard ARC HSGE015
		2	Lifting heavy coolers can cause back injuries	Use two people to move heavy coolers. Use proper lifting techniques.	ARCADIS PPE H&S Standard ARC HSGE015

5	Sample collection and processing	3	Exposure to chemicals (acid preservatives or site contaminants) on the exterior of sample bottles after filling.	Wear protective gloves for acid preservatives and safety glasses with side shields during all sample container handling activities (before and after filling). Once filled follow project specific HASP PPE requirements for skin and eye protection.	ARCADIS PPE H&S Standard ARC HSGE015
		4	Samples containing hazardous materials may violate DOT/IATA HazMat shipping regulations	All persons filling a sample bottle or preparing a cooler for shipment must have complete ARCADIS DOT HazMat shipping training. Compare the samples collected to the materials described in the Shipping Determination for the Project and ensure consistent. Re perform all Shipping determinations if free product is collected and not anticipated during planning.	ARCADIS PPE H&S Standard ARC HSGE015
		5	Frostbite or potential for oxygen deficiency when packing with dry ice. Contact cold stress to fingers handling blue ice or wet ice	Dry ice temperature is -109.30F. Wear thermal protective gloves. DO NOT TOUCH with bare skin! Dry ice sublimates at room temp and could create oxygen deficiency in closed environment. Maintain adequate ventilation! Do not keep dry ice in cab of truck. Wear gloves when handling blue ice or gaging wet ice. Dry Ice is DOT regulated for air shipping, follow procedures in Shipping Determination.	ARCADIS PPE H&S Standard ARC HSGE015
6	Temp. Monitoring well installation	1	Same hazards as in Step 3 with general drill rig operation	See step 3	
		2	Monitoring well construction materials can clutter the work area causing tripping hazards.	Well construction materials should be picked up during the well installation process.	
		3	Heavy lifting can cause muscle strains, and cutting open bags can cause lacerations.	Well construction materials are usually 50 lbs or greater. Team lift or use drill rig to hoist bags. Always use work gloves while cutting open bags.	
		4	Well pack material (i.e. sand, grout, bentonite) can become airborne and get in your eyes	Wear safety glasses for protection from airborne sand and dust.	
		5	Cutting the top of the well to size can cause jagged/sharp edges on the top of the well casing.	Wear gloves when working with the top of the well casing, and file any sharp jagged edges that resulted from cutting to size.	
7	Soil cutting and purge water management	1	Moving full drums can cause back injury, or pinching/crushing injury	Preferably have the drilling contractor move full drums with their equipment. If this is not practicable, use lift assist devices such as drum dollies, lift gates, etc. Employ proper lifting techniques, and perform TRACK to identify pinch/crush points. Wear leather work gloves, and clear all walking and work areas of debris prior to moving a drum	
8	Geophysical Survey	1	Slips trips and falls on wet, uneven or steep sloped surfaces	Break loads down to manageable size that does not obstruct view of ground. Plan route and use TRACK, wear footwear with good tread and ankle support, Use buddy system for large or bulky items when carrying.	
		2	Scrapes or cuts to hands, arms or legs from equipment or vegetation in area.	Wear leather or other suitable gloves when performing survey, wear long pants, wear heavy long sleeve shirt if arm hazard exists.	
		3	Noise hazards from survey equipment using percussion devices	Wear hearing protection, keep unnecessary workers away from devices when activated.	

8	Geophysical Survey	4	Ergonomic injury from improper or prolonged use of carried devices that are long or bulky.	Use job rotation to reduce potential for injury.	
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Personal Protective Equipment

Type	Personal Protective Equipment	Description	Required
Dermal Protection	coveralls		Required
Dermal Protection	long sleeve shirt/pants		Required
Eye Protection	safety glasses		Required
Foot Protection	steel-toe boots		Required
Hand Protection	chemical resistant gloves (specify type)	Nitrile	Required
Hand Protection	work gloves (specify type)	Leather	Required
Head Protection	hard hat		Required
Hearing Protection	ear plugs		Required
Miscellaneous PPE	traffic vest--Class II or III		Required

Supplies

Type	Supply	Description	Required
Communication Devices	mobile phone		Required
Decontamination	Decon supplies (specify type)		Recommended
Miscellaneous	fire extinguisher		Required
Miscellaneous	first aid kit		Required
Miscellaneous	flashlight		Recommended
Personal	eye wash (specify type)		Required
Personal	insect repellent		Recommended
Personal	sunscreen		Recommended

MSDS Sheets

hydrochloric acid

marking paint

methonal

oil-n-soil

sulfuric acid

unleadeded gas

xylene

PCBs

Vinyl Chloride

Section 1 - Chemical Product and Company Identification

61

Material Name: Hydrochloric Acid

CAS Number: 7647-01-0

Chemical Formula: ClH

Structural Chemical Formula: HCl

EINECS Number: 231-595-7

ACX Number: X1002202-3

Synonyms: 4-D BOWL SANITIZER; ACIDE CHLORHYDRIQUE; ACIDO CLORHIDRICO; ACIDO CLORIDRICO; ANHYDROUS HYDROCHLORIC ACID; ANHYDROUS HYDROGEN CHLORIDE; AQUEOUS HYDROGEN CHLORIDE; BOWL CLEANER; CHLOORWATERSTOF; CHLOROHYDRIC ACID; CHLOROWODOR; CHLORURE D'HYDROGENE; CHLORURE D'HYDROGENE ANHYDRE; CHLORURO DE HIDROGENO; CHLORWASSERSTOFF; CLORURO DE HIDROGENO ANHIDRO; EMULSION BOWL CLEANER; EPA PESTICIDE CHEMICAL CODE 045901; HYDROCHLORIC ACID; HYDROCHLORIC ACID GAS; HYDROCHLORIDE; HYDROGEN CHLORIDE; HYDROGEN CHLORIDE (HCL); HYGEIA CREME MAGIC BOWL CLEANER; MURIATIC ACID; MURIATIC ACID); NOW SOUTH SAFTI-SOL BRAND CONCENTRATED BOWL CLEANSE WITHMAGIC ACTIO; PERCLEEN BOWL AND URINAL CLEANER; SPIRITS OF SALT; VARLEY'S OCEAN BLUE SCENTED TOILET BOWL CLEANER; VARLEY POLY-PAK BOWL CREME; WHITE EMULSION BOWL CLEANER; WUEST BOWL CLEANER SUPER CONCENTRATED

General Use: Hydrogen chloride is used to produce pharmaceutical hydrochlorides; vinyl chloride from acetylene; alkyl chlorides from olefins and arsenious chloride from arsenious oxide; electronic grade for etching semiconductor crystals. Used in the chlorination of rubber; in organic reactions involving isomerization, polymerization and alkylation; as a catalyst and condensing agent; for making chlorine where economical; in the separation of cotton from wool and cotton de-linting; as flux in the babbitt type of metal alloy; etching semi-conductor crystals. Hydrochloric acid is used for pickling and heavy duty cleaning of metal parts; rust and scale removal. The production of chlorides; neutralizing bases; a laboratory reagent. For hydrolyzing starch and proteins in preparations for food. As a catalyst and solvent in organic synthesis. As "spirits of salts" for cleaning of lime and masonry from new brickwork. As flux or flux component for soldering; manufacture of "killed spirits".

Section 2 - Composition / Information on Ingredients

Name	CAS	%
hydrogen chloride	7647-01-0	> 99.0

OSHA PEL
 Ceiling: 5 ppm, 7 mg/m³.

NIOSH REL
 Ceiling: 5 ppm (7 mg/m³).

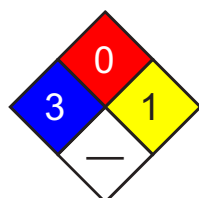
DFG (Germany) MAK
 TWA: 5 ppm; PEAK: 5 ppm.

ACGIH TLV
 Ceiling: 2 ppm.

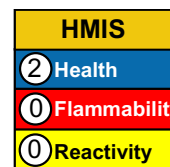
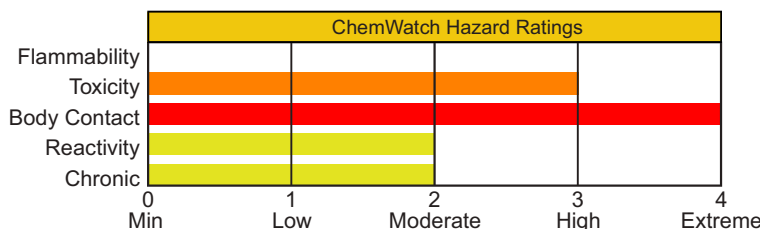
IDLH Level
 50 ppm.

EU OEL
 TWA: 5 ppm; STEL: 10 ppm.

Section 3 - Hazards Identification



Fire Diamond



ANSI Signal Word
Danger!



☆☆☆☆☆ **Emergency Overview** ☆☆☆☆☆

Colorless gas; characteristic suffocating, pungent odor. Corrosive. Stored as compressed gas which may cause frostbite. Chronic Effects: erosion of teeth.

Potential Health Effects

Target Organs: eyes, skin, respiratory system, liver (in animals)

Primary Entry Routes: inhalation, skin contact, eye contact

Acute Effects

Inhalation: The vapor is extremely discomforting to the upper respiratory tract, may cause severe mucous membrane damage and may be harmful if inhaled.

Inhalation of quantities of liquid mist may be extremely hazardous, even lethal due to spasm, extreme irritation of larynx and bronchi, chemical pneumonitis and pulmonary edema.

A single severe exposure may cause coughing and choking; bleeding of nose, inflammation and occasionally ulceration of the nose, throat and larynx. Fluid on the lungs followed by generalized lung damage may follow. Breathing of vapor may aggravate asthma and inflammatory or fibrotic pulmonary disease.

High concentrations cause necrosis of the tracheal and bronchial epithelium, pulmonary edema, atelectasis and emphysema and damage to the pulmonary blood vessels and liver.

Inhalation hazard is increased at higher temperatures.

The vapor from heated material is extremely discomforting to the upper respiratory tract and lungs if inhaled.

Continued severe exposure can result in pulmonary edema and corrosion of tissues in the nose and throat.

Eye: Hydrogen Chloride: The vapor is extremely discomforting to the eyes and is capable of causing pain and severe conjunctivitis. Corneal injury may develop, with possible permanent impairment of vision, if not promptly and adequately treated.

The material may be irritating to the eye, with prolonged contact causing inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.

Hydrochloric Acid: Eye contact is extremely painful and may cause rapid corneal damage. The liquid is extremely corrosive to the eyes and is capable of causing severe damage with loss of sight.

The vapor is highly discomforting and may be corrosive to the eyes. The vapor from heated material is extremely discomforting to the eyes.

Skin: The material is corrosive to the skin and may cause chemical burns.

Toxic effects may result from skin absorption. Bare unprotected skin should not be exposed to this material. The material may accentuate any pre-existing skin condition.

The vapor is discomforting to the skin.

Ingestion: Considered an unlikely route of entry in commercial/industrial environments.

The liquid is extremely corrosive if swallowed and is capable of causing burns to mouth, throat, esophagus, with extreme discomfort, pain and may be fatal if swallowed in quantity. Ingestion may result in nausea, abdominal irritation, pain and vomiting.

Carcinogenicity: NTP - Not listed; IARC - Group 3, Not classifiable as to carcinogenicity to humans; OSHA - Not listed; NIOSH - Not listed; ACGIH - Not listed; EPA - Not listed; MAK - Not listed.

Chronic Effects: Chronic exposure may cause discoloration or erosion of the teeth, bleeding of the nose and gums; and ulceration of the nasal mucous membranes.

Repeated exposures of animals to concentrations of about 34 ppm produced no immediate toxic effects.

Workers exposed to hydrochloric acid suffered from gastritis and a number of cases of chronic bronchitis have also been reported.

Repeated or prolonged exposure to dilute solutions may cause dermatitis. Repeated exposure to low vapor concentrations can cause skin tenderness, bleeding of the nose and gums, chronic bronchitis, gastritis.

Section 4 - First Aid Measures

Inhalation: Remove to fresh air.

Lay patient down. Keep warm and rested.

If breathing is shallow or has stopped, ensure clear airway and apply resuscitation. Transport to hospital or doctor.

Eye Contact: Immediately hold the eyes open and flush continuously for at least 15 minutes with fresh running water. Ensure irrigation under eyelids by occasionally lifting the upper and lower lids.

Transport to hospital or doctor without delay. Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

Skin Contact: Immediately flush body and clothes with large amounts of water, using safety shower if available.

Quickly remove all contaminated clothing, including footwear.

Wash affected areas with water (and soap if available) for at least 15 minutes. Transport to hospital or doctor.

Ingestion: Contact a Poison Control Center. Rinse mouth out with plenty of water. Do NOT induce vomiting. Give a glass of water.

After first aid, get appropriate in-plant, paramedic, or community medical support.

Note to Physicians: For acute or short-term repeated exposures to strong acids:

1. Airway problems may arise from laryngeal edema and inhalation exposure.

Treat with 100% oxygen initially.

2. Respiratory distress may require cricothyroidotomy if endotracheal intubation is contraindicated by excessive swelling.



See
DOT
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- Intravenous lines should be established immediately in all cases where there is evidence of circulatory compromise.
- Strong acids produce a coagulation necrosis characterized by formation of a coagulum (eschar) as a result of the desiccating action of the acid on proteins in specific tissues.

INGESTION:

- Immediate dilution (milk or water) within 30 minutes post-ingestion is recommended.
- Do not attempt to neutralize the acid since exothermic reaction may extend the corrosive injury.
- Be careful to avoid further vomiting since re-exposure of the mucosa to the acid is harmful. Limit fluids to one or two glasses in an adult.
- Charcoal has no place in acid management.
- Some authors suggest the use of lavage within 1 hour of ingestion.

SKIN:

- Skin lesions require copious saline irrigation. Treat chemical burns as thermal burns with non-adherent gauze and wrapping.
- Deep second-degree burns may benefit from topical silver sulfadiazine.

EYE:

- Eye injuries require retraction of the eyelids to ensure thorough irrigation of the conjunctival cul-de-sacs. Irrigation should last at least 20-30 minutes. Do not use neutralizing agents or any other additives. Several liters of saline are required.
- Cycloplegic drops (1% cyclopentolate for short-term use or 5% homatropine for longer term use), antibiotic drops, vasoconstrictive agents, or artificial tears may be indicated dependent on the severity of the injury.
- Steroid eye drops should only be administered with the approval of a consulting ophthalmologist.

Section 5 - Fire-Fighting Measures

Flash Point: Nonflammable

Autoignition Temperature: Not applicable

LEL: Not applicable

UEL: Not applicable

Extinguishing Media: Water spray or fog; foam;

Bromochlorodifluoromethane (BCF) (where regulations permit); Dry agent; Carbon dioxide.

General Fire Hazards/Hazardous Combustion Products: Noncombustible liquid. Will not burn, but heat produces highly toxic fumes/vapors.

Heating may cause expansion or decomposition leading to violent rupture of containers.

Decomposes on heating and produces toxic fumes of hydrogen chloride. Decomposition may produce toxic fumes of chlorine.

Reacts with metals producing flammable/explosive hydrogen gas. Contact with moisture or water may generate heat causing ignition. Reacts vigorously with alkalis. Moderate fire hazard when in contact with reducing agents.

Fire Incompatibility: Reacts with metals producing flammable/explosive hydrogen gas.

Avoid reactions with metals, metal oxides, hydroxides, amines, carbonates, alkaline materials, acetic anhydride, cyanides, sulphides, sulphites, phosphides, acetylides, borides, carbides, silicides, vinyl acetate, formaldehyde and potassium permanganate, unsaturated organics, metal acetylides, sulphuric acid.

Note: Compatibility with plastics should be confirmed prior to use.

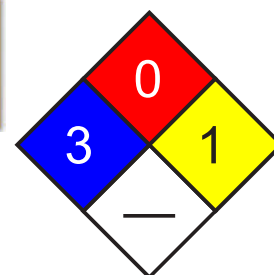
Fire-Fighting Instructions: Contact fire department and tell them location and nature of hazard.

Wear full body protective clothing with breathing apparatus. Prevent, by any means available, spillage from entering drains or waterways. Consider evacuation. Cool fire-exposed containers with water spray from a protected location.

If safe to do so, remove containers from path of fire. Equipment should be thoroughly decontaminated after use.

Water spray or fog may be used to disperse vapor. Do not approach cylinders suspected to be hot. If safe to do so, stop flow of gas.

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Fire Diamond

Section 6 - Accidental Release Measures

Small Spills: DO NOT touch the spill material. Clean up all spills immediately. Wear fully protective PVC clothing and breathing apparatus. Contain and absorb spill with sand, earth, inert material or vermiculite. Use soda ash or slaked lime to neutralize. Collect residues and place in labeled plastic containers with vented lids. Clear area of personnel and move upwind. Avoid breathing vapors and contact with skin and eyes. Do not exert excessive pressure on valve; do not attempt to operate damaged valve. Water spray or fog may be used to disperse vapor.

Large Spills: Contact fire department and tell them location and nature of hazard. Clear area of personnel and move upwind. Wear full body protective clothing with breathing apparatus. Prevent, by any means available, spillage from entering drains or waterways. Consider evacuation. Stop leak if safe to do so. Remove leaking cylinders to a safe place if possible. Release pressure under safe, controlled conditions by opening the valve. Do not exert excessive pressure on valve; do not attempt to operate damaged valve. Shut off all possible sources of ignition and increase ventilation. Water spray or fog may be used to disperse vapor. Use soda ash or slaked lime to neutralize. Collect and seal in labeled drums for disposal. Wash spill area with large quantities of water. If contamination of

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drains or waterways occurs, advise emergency services. After clean-up operations, decontaminate and launder all protective clothing and equipment before storing and reusing. DO NOT touch the spill material. Contain and absorb spill with sand, earth, inert material or vermiculite.

DO NOT USE WATER OR NEUTRALIZING AGENTS INDISCRIMINATELY ON LARGE SPILLS.

Regulatory Requirements: Follow applicable OSHA regulations (29 CFR 1910.120).

Section 7 - Handling and Storage

Handling Precautions: Avoid generating and breathing mist and vapor, breathing vapors and contact with skin and eyes.

Avoid physical damage to containers. Use in a well-ventilated area. Wear protective clothing and gloves when handling containers. Handle and open container with care.

WARNING: To avoid violent reaction, ALWAYS add material to water and NEVER water to material. When handling, DO NOT eat, drink or smoke. Always wash hands with soap and water after handling. Work clothes should be laundered separately. Use good occupational work practices. Observe manufacturer's storing and handling recommendations.

Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions are maintained.

Local exhaust ventilation may be required for safe working, i.e. to keep exposures below required standards; otherwise, PPE is required.

Keep dry. Reacts violently with water.

Transport containers on a trolley. Avoid sources of heat. DO NOT transfer gas from one cylinder to another.

Recommended Storage Methods: Packaging as recommended by manufacturer. Check that containers are clearly labeled.

Cylinder. Ensure the use of equipment rated for cylinder pressure. Ensure the use of compatible materials of construction. Valve protection cap to be in place until cylinder is secured, connected. Cylinder must be properly secured either in use or in storage. Cylinder valve must be closed when not in use or when empty. Segregate full from empty cylinders. WARNING: Suckback into cylinder may result in rupture. Use back-flow preventive device in piping.

Hydrochloric acid: Packs of 2.5 litres or less require a child-resistant closure. Glass container or Plastic carboy or Polylined drum.

Regulatory Requirements: Follow applicable OSHA regulations.

Section 8 - Exposure Controls / Personal Protection

Engineering Controls: If risk of overexposure exists, wear air supplied breathing apparatus. Provide adequate ventilation in warehouse or closed storage areas. Use in a well-ventilated area. Local exhaust ventilation may be required for safe working, i. e. , to keep exposures below required standards; otherwise, PPE is required.

If risk of inhalation or overexposure exists, wear NIOSH-approved respirator or work in fume hood. Hydrogen chloride vapors will not be adequately absorbed by organic vapor respirators.

Personal Protective Clothing/Equipment:

Eyes: Chemical goggles. Full face shield.

DO NOT wear contact lenses. Contact lenses pose a special hazard; soft contact lenses may absorb irritants and all lenses concentrate them.

Hands/Feet: Neoprene gloves; rubber gloves. Nitrile gloves.

Safety footwear. Rubber boots.

Hydrochloric acid: Barrier cream and Neoprene gloves or Elbow length PVC gloves. Nitrile gloves.

PVC boots or PVC safety gumboots.

Respiratory Protection:

Exposure Range >5 to <50 ppm: Air Purifying, Negative Pressure, Half Mask

Exposure Range 50 to unlimited ppm: Self-contained Breathing Apparatus, Pressure Demand, Full Face

Cartridge Color: white

Other: Ensure there is ready access to a safety shower; Eyewash unit.

Acid-resistant overalls. Full protective suit. Operators should be trained in procedures for safe use of this material.

Glove Selection Index:

BUTYL Best selection

BUTYL/NEOPRENE Best selection

HYPALON Best selection

NEOPRENE Best selection

NEOPRENE/NATURAL Best selection

NITRILE+PVC Best selection

PE/EVAL/PE Best selection

SARANEX-23 Best selection

VITON/NEOPRENE Best selection

PVC Best selection

NITRILE..... Best selection
 NATURAL RUBBER..... Satisfactory; may degrade after 4 hours continuous immersion
 NATURAL+NEOPRENE..... Satisfactory; may degrade after 4 hours continuous immersion
 NAT+NEOPR+NITRILE Poor to dangerous choice for other than short-term immersion

Section 9 - Physical and Chemical Properties

Appearance/General Info: Hydrogen chloride: Colorless, corrosive gas. Pungent suffocating odor. White fumes in moist air. Soluble in methanol, ethanol, ether and benzene.

Hydrochloric acid: Clear to light yellow (orange tint for inhibited grades) fuming corrosive liquid with sharp, suffocating odor.

Physical State: Hydrogen chloride: Compressed gas;
 Hydrochloric acid: Liquid

pH: Hydrochloric acid: < 1

Boiling Point: -85 °C (-121 °F)

Odor Threshold: 0.26 to 0.3 ppm

Freezing/Melting Point: -114.44 °C (-173.992 °F)

Vapor Pressure (kPa): < 24.8 at 25 °C

Volatile Component (% Vol): 100

Vapor Density (Air=1): 1.268 at 20 °C

Decomposition Temperature (°C): Not applicable

Formula Weight: 36.461

Water Solubility: 56.1 g/100 cc hot water at 60 °C

Specific Gravity (H₂O=1, at 4 °C): < 1.19 at 20 °C

Evaporation Rate: Slow

Section 10 - Stability and Reactivity

Stability/Polymerization/Conditions to Avoid: Decomposes in the presence of moisture to produce corrosive acid. May generate sufficient heat to ignite combustible materials. Presence of heat source and direct sunlight (ultra-violet radiation). Product is considered stable under normal handling conditions. Hazardous polymerization will not occur.

Storage Incompatibilities: Hydrogen chloride: Segregate from most common metals and their alloys, alkalis, unsaturated organics, fluorine, metal carbides, metal acetylides, potassium permanganate and sulfuric acid.

Compatibility with plastics should be confirmed prior to use.

Hydrochloric acid: Segregate from alkalis, oxidizing agents and chemicals readily decomposed by acids, i.e.

cyanides, sulfides, carbonates. Avoid storage with metals, metal oxides, hydroxides, amines, carbonates, alkaline materials, acetic anhydride, cyanides, sulphides, sulphites, phosphides, acetylides, borides, carbides, silicides, vinyl acetate, formaldehyde and potassium permanganate. Reacts with zinc, brass, galvanized iron, aluminum, copper and copper alloys.

Section 11 - Toxicological Information

Toxicity

Inhalation (human) LC_{Lo}: 1300 ppm/30 m

Inhalation (human) LC_{Lo}: 3000 ppm/5 m

Inhalation (rat) LC₅₀: 3124 ppm/60 m

Inhalation (rat) LC₅₀: 4701 ppm/30 m

Oral (rat) LD₅₀: 900 mg/kg

Irritation

Eye (rabbit): 5 mg/30 s - mild

See RTECS MW 4025000, for additional data.

Section 12 - Ecological Information

Environmental Fate: No data found.

Ecotoxicity: TL_m Gambusia affinis (mosquito fish) 282 ppm/96 hr (fresh water) /Conditions of bioassay not specified;

Lethal Lepomis macrochirus (bluegill sunfish) 3.6 mg/l/48 hr /Conditions of bioassay not specified; LC₅₀ Cockle 330

to 1,000 mg/l/48 hr /Conditions of bioassay not specified; LC₅₀ Carassius auratus (goldfish) 178 mg/l (1 to 2 hr

survival time) /Conditions of bioassay not specified; LC₅₀ Shore crab 240 mg/l/48 hr /Conditions of bioassay not

specified; LC₅₀ Shrimp 100 to 330 ppm/48 hr (salt water) /Conditions of bioassay not specified; LC₁₀₀ Trout 10 mg/l 24

hr /Conditions of bioassay not specified

Biochemical Oxygen Demand (BOD): none

Section 13 - Disposal Considerations

Disposal: Recycle wherever possible. Consult manufacturer for recycling options. Treat and neutralize at an effluent treatment plant. Bury residue in an authorized landfill. Decontaminate empty containers with a lime slurry. Return empty containers to supplier or bury empty containers at an authorized landfill.

Return empty cylinders to supplier.

Section 14 - Transport Information

DOT Hazardous Materials Table Data (49 CFR 172.101):

Note: This material has multiple possible HMT entries. Choose the appropriate one based on state and condition of specific material when shipped.

Shipping Name and Description: Hydrogen chloride, anhydrous

ID: UN1050

Hazard Class: 2.3 - Poisonous gas

Packing Group:

Symbols:

Label Codes: 2.3 - Poison Gas, 8 - Corrosive

Special Provisions: 3

Packaging: **Exceptions:** None **Non-bulk:** 304 **Bulk:** None

Quantity Limitations: **Passenger aircraft/rail:** Forbidden **Cargo aircraft only:** Forbidden

Vessel Stowage: **Location:** D **Other:** 40



Shipping Name and Description: Hydrochloric acid

ID: UN1789

Hazard Class: 8 - Corrosive material

Packing Group: II - Medium Danger

Symbols:

Label Codes: 8 - Corrosive

Special Provisions: A3, A6, B3, B15, IB2, N41, T8, TP2, TP12

Packaging: **Exceptions:** 154 **Non-bulk:** 202 **Bulk:** 242

Quantity Limitations: **Passenger aircraft/rail:** 1 L **Cargo aircraft only:** 30 L

Vessel Stowage: **Location:** C **Other:**



Shipping Name and Description: Hydrochloric acid

ID: UN1789

Hazard Class: 8 - Corrosive material

Packing Group: III - Minor Danger

Symbols:

Label Codes: 8 - Corrosive

Special Provisions: IB3, T4, TP1, TP12

Packaging: **Exceptions:** 154 **Non-bulk:** 203 **Bulk:** 241

Quantity Limitations: **Passenger aircraft/rail:** 5 L **Cargo aircraft only:** 60 L

Vessel Stowage: **Location:** C **Other:**



Section 15 - Regulatory Information

EPA Regulations:

RCRA 40 CFR: Not listed

CERCLA 40 CFR 302.4: Listed per CWA Section 311(b)(4) 5000 lb (2268 kg)

SARA 40 CFR 372.65: Listed

SARA EHS 40 CFR 355: Listed

RQ: 5000 lb

TPQ: 500 lb

TSCA: Listed

Section 16 - Other Information

Disclaimer: Judgments as to the suitability of information herein for the purchaser's purposes are necessarily the purchaser's responsibility. Although reasonable care has been taken in the preparation of such information, Genium Group, Inc. extends no warranties, makes no representations, and assumes no responsibility as to the accuracy or suitability of such information for application to the purchaser's intended purpose or for consequences of its use.

RAINBOW TECHNOLOGY CORP -- 4629 COMMUNICATIONS ORANGE MARKING PAINT -- 8010-00F027283

=====
 ===== Product Identification =====
 =====

Product ID:4629 COMMUNICATIONS ORANGE MARKING PAINT

MSDS Date:04/29/1994

FSC:8010

NIIN:00F027283

Kit Part:Y

MSDS Number: BYHXF

=== Responsible Party ===

Company Name:RAINBOW TECHNOLOGY CORP

Address:261 CAHABA VALLEY PKY

City:PELHAM

State:AL

ZIP:35124-5000

Country:US

Info Phone Num:800-637-6047

Emergency Phone Num:800-637-6047

Preparer's Name:LARRY JOE STEELEY JR

CAGE:00JL0

=== Contractor Identification ===

Company Name:RAINBOW TECHNOLOGY CORP

Address:261 CAHABA VALLEY PKY

City:PELHAM

State:AL

ZIP:35124-5000

Country:US

Phone:800-637-6047

CAGE:00JL0

=====
 ===== Composition/Information on Ingredients =====
 =====

Ingred Name:XYLENE, DIMETHYLBENZENE, XYLOL (IARC - GROUP 3) *96-1*

CAS:1330-20-7

RTECS #:ZE2100000

Fraction by Wt: 7.43%

Other REC Limits:100 PPM

OSHA PEL:100 PPM

ACGIH TLV:100 PPM, SKIN

EPA Rpt Qty:1000 LBS

DOT Rpt Qty:1000 LBS

Ingred Name:ETHYL BENZENE *96-1*

CAS:100-41-4

RTECS #:DA0700000

Fraction by Wt: 1.86%

Other REC Limits:100 PPM

OSHA PEL:435 MG/CUM

ACGIH TLV:434 MG/CUM

EPA Rpt Qty:1000 LBS

DOT Rpt Qty:1000 LBS

Ingred Name:FORMALDEHYDE, FORMALIN (SUSPECTED HUMAN CARCINOGEN BY IARC;

ACGIH; SUSPECTED CARCINOGEN BY NTP; IARC - GROUP 2A) *96-1*

CAS:50-00-0

RTECS #:LP8925000

Fraction by Wt: <0.1%

ACGIH TLV:0.37 MG/CUM IC (2A)
 EPA Rpt Qty:100 LBS
 DOT Rpt Qty:100 LBS

Ingred Name:TOLUENE (IARC CARC- GROUP 3) *96-1*
 CAS:108-88-3
 RTECS #:XS5250000
 Fraction by Wt: 9.97%
 Other REC Limits:375 MG/CUM
 OSHA PEL:100 PPM
 ACGIH TLV:100 PPM
 EPA Rpt Qty:1000 LBS
 DOT Rpt Qty:1000 LBS

Ingred Name:METHANOL (METHYL ALCOHOL), COLUMBIAN SPIRITS *96-1*
 CAS:67-56-1
 RTECS #:PC1400000
 Fraction by Wt: 0.11%
 Other REC Limits:200 PPM
 OSHA PEL:200 PPM
 ACGIH TLV:200 PPM
 EPA Rpt Qty:5000 LBS
 DOT Rpt Qty:5000 LBS

Ingred Name:V M & P NAPHTHA, LIGROINE, MINERAL SPIRITS *96-1*
 CAS:8032-32-4
 RTECS #:OI6180000
 Fraction by Wt: 5.71%
 Other REC Limits:STEL 400 PPM
 ACGIH TLV:300 PPM

Ingred Name:PROPANE (DIMETHYLMETHANE) *96-1*
 CAS:74-98-6
 RTECS #:TX2275000
 Fraction by Wt: 16.8%
 Other REC Limits:1800 MG/CUM
 OSHA PEL:1000 PPM
 ACGIH TLV:SIMPLE ASPHYXIANT

Ingred Name:ISOBUTANE, 2-METHYLPROPANE
 CAS:75-28-5
 RTECS #:TZ4300000
 Fraction by Wt: 11.2%
 Other REC Limits:1000 PPM
 OSHA PEL:1800 MG/CUM
 ACGIH TLV:1000 PPM

=====
 ===== Hazards Identification =====

Routes of Entry: Inhalation:YES Skin:NO Ingestion:NO
 Reports of Carcinogenicity:NTP:NO IARC:NO OSHA:NO
 Health Hazards Acute and Chronic:XYLENE: HIGH VAPOR CONCENTRATIONS
 >1000 PPM ARE IRRITATING TO THE EYES & RESPIRATORY TRACT,
 ASPHYXIATION. MAY CAUSE ANESTHETIC & OTHER NERVOUS SYSTEM EFFECTS
 INCLUDING DEATH. EYES: IRRITATION. SKIN: I RRRITATION, DERMATITIS.
 Explanation of Carcinogenicity:NONE
 Effects of Overexposure:IRRITATION, HEADACHES, DIZZINESS.

=====
 ===== First Aid Measures =====

First Aid:INHALATION: REMOVE TO FRESH AIR. GIVE CPR IF NEEDED. EYES:
IMMEDIATELY FLUSH W/PLENTY OF WATER FOR 15 MINS. SKIN: WASH W/SOAP
& WATER. OBTAIN MEDICAL ATTENTION IN ALL CASES.

=====
===== Fire Fighting Measures =====

Flash Point Method:TOC
Flash Point:10F AEROSOL
Extinguishing Media:CO2, DRY CHEMICAL/FOAM
Fire Fighting Procedures:WATER SPRAY MAY BE INEFFECTIVE, WATER MAY BE
USED TO COOL CONTAINERS. IF WATER IS USED, FOG NOZZLES ARE
PREFERABLE, WEAR GOGGLES & SCBA.
Unusual Fire/Explosion Hazard:EXPOSURE TO HEAT MAY CAUSE BURSTING OF
AEROSOL CANS.

=====
===== Accidental Release Measures =====

Spill Release Procedures:REMOVE IGNITION SOURCES. AVOID BREATHING
VAPORS. VENTILATE AREA. WIPE UP W/INERT MATERIALS & PLACE IN
APPROPRIATE CONTAINER.

=====
===== Handling and Storage =====

Handling and Storage Precautions:DON'T STORE >120F. EXPOSURE TO
HEAT/PROLONGED EXPOSURE TO SUN MAY CAUSE BURSTING.
Other Precautions:USE ONLY AS DIRECTED. INTENTIONAL MISUSE BY
DELIBERATELY CONCENTRATING VAPORS/INHALING CONTENTS CAN BE
HARMFUL/FATAL. PERIODICALLY USER SHOULD REQUEST NEW MSDA TO ASSURE
IT MATCHES CURRENT FORMULATION . MSDS IS BASED ON FORMULA
WB-A016-0657.

=====
===== Exposure Controls/Personal Protection =====

Respiratory Protection:AVOID CONTINUOUS BREATHING OF VAPORS & SPRAY
MIST. A SCBA IS REQUIRED FOR CONCENTRATIONS >TLV LIMITS.
Ventilation:USE W/ADEQUATE VENTILATION.
Protective Gloves:OPTIONAL
Eye Protection:REQUIRED
Supplemental Safety and Health

=====
===== Physical/Chemical Properties =====

Vapor Pres:40 PSIA
Vapor Density:>1
Evaporation Rate & Reference:FASTER THAN ETHER
Percent Volatiles by Volume:53.1

=====
===== Stability and Reactivity Data =====

Stability Indicator/Materials to Avoid:YES
STRONG OXIDIZING MATERIALS.
Stability Condition to Avoid:HEAT, TEMP >120F, SPARKS, PILOT
LIGHTS/OPEN FLAME, SUN
Hazardous Decomposition Products:HEATED: CO, CO2

=====
===== Disposal Considerations =====

Waste Disposal Methods:DON'T INCINERATE AEROSOL, DISPOSE OF
IAW/FEDERAL, STATE & LOCAL REGULATIONS. DON'T PLACE AEROSOL CANS IN
HOME COMPACTOR. DON'T PUNCTURE.

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Section 1 - Chemical Product and Company Identification

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Material Name: Methanol **CAS Number:** 67-56-1
Chemical Formula: CH₃O
Structural Chemical Formula: CH₃OH
EINECS Number: 200-659-6
ACX Number: X1001287-2

Synonyms: ALCOHOL,METHYL; ALCOOL METHYLIQUE; ALCOOL METILICO; CARBINOL; X-CIDE 402 INDUSTRIAL BACTERICIDE; COAT-B1400; COLONIAL SPIRIT; COLONIAL SPIRITS; COLUMBIAN SPIRIT; COLUMBIAN SPIRITS; EPA PESTICIDE CHEMICAL CODE 053801; EUREKA PRODUCTS CRIOSINE DISINFECTANT; EUREKA PRODUCTS,CRIOSINE; FREERS ELM ARRESTER; IDEAL CONCENTRATED WOOD PRESERVATIVE; METANOL; METANOLO; METHANOL; METHYL ALCOHOL; METHYL HYDRATE; METHYL HYDROXIDE; METHYLALKOHOL; METHYLOL; METYLOWY ALKOHOL; MONOHYDROXYMETHANE; PMC REJEX-IT F-40ME; PYROLIGNEOUS SPIRIT; PYROXYLIC SPIRIT; PYROXYLIC SPIRITS; SURFLO-B17; WILBUR-ELLIS SMUT-GUARD; WOOD ALCOHOL; WOOD NAPHTHA; WOOD SPIRIT

Derivation: Prepared by wood pyrolysis; non-catalytic oxidation of hydrocarbons; as a by-product in the fisher-tropsch synthesis; or by reduction of carbon monoxide.

General Use: Used as an industrial solvent; starting material for organic synthesis; antifreeze for windshield washer fluid; in fuel antifreezes; gasoline octane booster; fuel for stoves; extractant for oils; denaturing ethanol; softening agent; food additive; in paint, varnish removers, and embalming fluids; in the manufacture of photographic film, celluloid, textile soap, wood stains, coated fabrics, shatterproof glass, paper coating, waterproofing formulations, artificial leather, dyes.

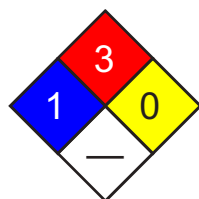
Section 2 - Composition / Information on Ingredients

Name	CAS	%
Methanol	67-56-1	ca 100% vol

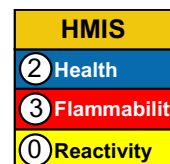
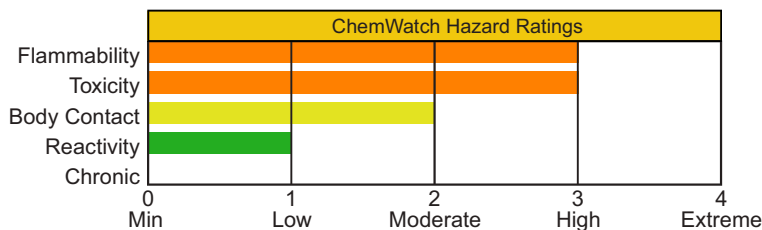
Trace Impurities: (Grade A): Acetone and aldehydes < 30 ppm, acetic acid < 30 ppm

OSHA PEL	NIOSH REL	DFG (Germany) MAK
TWA: 200 ppm; 260 mg/m ³ .	TWA: 200 ppm (260 mg/m ³); STEL: 250 ppm (325 mg/m ³); skin.	TWA: 200 ppm; PEAK: 800 ppm; skin.
ACGIH TLV TWA: 200 ppm; STEL: 250 ppm; skin.	IDLH Level 6000 ppm.	
EU OEL TWA: 260 mg/m ³ (200 ppm).		

Section 3 - Hazards Identification



Fire Diamond



ANSI Signal Word

Warning!



Flammable

☆☆☆☆☆ **Emergency Overview** ☆☆☆☆☆

Colorless liquid; slight alcohol odor when pure or disagreeably pungent odor. Irritating to eyes/skin/respiratory tract. Other Acute Effects: headache, visual disturbance, blindness, respiratory failure. Chronic Effects: reproductive effects reported in animal testing. Flammable; moderate explosion hazard.

Potential Health Effects

Target Organs: Eyes, skin, central nervous system (CNS), gastrointestinal (GI) tract, respiratory system

Primary Entry Routes: Inhalation, ingestion, skin and/or eye contact/absorption

Acute Effects

Inhalation: Irritation, breathing difficulty, headache, drowsiness, vertigo, light-headedness, nausea, vomiting, acidosis (decreased blood alkalinity), visual disturbance, and at high concentrations, CNS damage, convulsions, circulatory collapse, respiratory failure, coma and blindness can result from inhalation of methanol vapor. Concentration \geq 200 ppm may cause headache; 50,000 ppm can cause death within 1-2 hrs.

Eye: Contact with liquid may result in irritation, inflamed lids, light sensitization, and superficial lesions.

Skin: Contact may cause irritation, dermatitis, swelling, scaling, and systemic effects.

Ingestion: GI irritation and systemic effects. Symptoms may be delayed 18-48 hours. Fatal dose - 2 to 8 ounces.

Carcinogenicity: NTP - Not listed; IARC - Not listed; OSHA - Not listed; NIOSH - Not listed; ACGIH - Not listed; EPA - Not listed; MAK - Not listed.

Medical Conditions Aggravated by Long-Term Exposure: None reported.

Chronic Effects: Exposure to methanol vapors has caused conjunctivitis, headache, giddiness, insomnia, GI disturbance, impaired vision. CNS damage is also likely. Methanol is slowly eliminated from the body; exposure is considered cumulative over the short term.

Section 4 - First Aid Measures

Inhalation: Remove exposed person to fresh air and support breathing as needed.

Eye Contact: *Do not* allow victim to rub or keep eyes tightly shut. Gently lift eyelids and flush immediately and continuously with flooding amounts of water for at least 15 minutes. Consult a physician or ophthalmologist if pain or irritation develops.

Skin Contact: *Quickly* remove contaminated clothing. Rinse with flooding amounts of water for at least 15 min. Wash exposed area with soap and water. For reddened or blistered skin, consult a physician.

Ingestion: Never give anything by mouth to an unconscious or convulsing person. Contact a poison control center. Unless the poison control center advises otherwise, have the *conscious and alert* person drink 1 to 2 glasses of water, then induce vomiting.

After first aid, get appropriate in-plant, paramedic, or community medical support.

Note to Physicians: Follow emesis with rehydration, correction of acidosis, and folate to enhance formate oxidation. Consider IV administration of ethanol (if blood methanol >20 mg/dL) to show metabolic oxidation of methanol. Assay formic acid in urine, blood pH and plasma bicarbonate.

See
DOT
ERG

Section 5 - Fire-Fighting Measures

Flash Point: 54 °F (12 °C), Closed Cup

Burning Rate: 1.7 mm/min

Autoignition Temperature: 867 °F (464 °C)

LEL: 6.0% v/v

UEL: 36% v/v

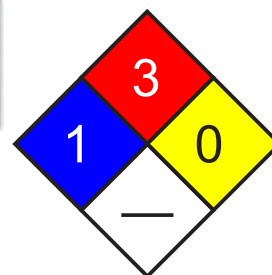
Flammability Classification: OSHA Class IB Flammable Liquid.

Extinguishing Media: Use dry chemical, carbon dioxide, water spray, fog or alcohol-resistant foam. A water spray may be used to cool fire-exposed containers, and flush spills away from ignition sources.

General Fire Hazards/Hazardous Combustion Products: Heating methanol to decomposition can produce carbon oxides (CO_x), formaldehyde, acrid smoke, and irritating fumes. Can form explosive mixtures in the air. The heavier-than-air vapors of methanol may travel along low-lying surfaces to distant sources of ignition and flash back to the material source. Containers may explode in heat of fire.

Fire-Fighting Instructions: *Do not* scatter material with any more water than needed to extinguish fire. *Do not* release runoff from fire control methods to sewers or waterways. Because fire may produce toxic thermal decomposition products, wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in pressure-demand or positive-pressure mode.

See
DOT
ERG



Fire Diamond

Section 6 - Accidental Release Measures

Spill/Leak Procedures: Isolate spill area for at least 330-660 feet (100-200 m) in all directions. Fully encapsulating, vapor protective clothing should be worn for spills and leaks with no fire. Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area). Ground all equipment used when handling this product. *Do not* touch or walk through spilled material. Stop leak if you can do it without risk. Prevent entry into waterways, sewers, basements or confined areas. A vapor suppressing foam may be used to reduce vapors.

Small Spills: Absorb with earth, sand or other non-combustible material and transfer to containers for later disposal.

See
DOT
ERG

Use clean non-sparking tools to collect absorbed material.

Large Spills: Dike far ahead of liquid spill for later disposal. *Do not* release into sewers or waterways. Ground all equipment. Use non-sparking tools.

Regulatory Requirements: Follow applicable OSHA regulations (29 CFR 1910.120).

Section 7 - Handling and Storage

Handling Precautions: Avoid vapor inhalation, and skin and eye contact. Use only with ventilation sufficient to reduce airborne concentrations to non-hazardous levels (see Sec. 2). Wear protective gloves, goggles, and clothing (see Sec. 8). Keep away from heat and ignition sources. Ground and bond all containers during transfers to prevent static sparks. Use non-sparking tools to open and close containers.

Never eat, drink, or smoke in work areas. Practice good personal hygiene after using this material, especially before eating, drinking, smoking, using the toilet, or applying cosmetics.

Recommended Storage Methods: Store in tightly closed container in cool, well-ventilated area, away from heat, ignition sources and incompatibles (see Sec. 10). Equip drums with self-closing valves, pressure vacuum bungs, and flame arrestors.

Regulatory Requirements: Follow applicable OSHA regulations. Also 29 CFR 1910.106 for Class 1B Flammable Liquids.

Section 8 - Exposure Controls / Personal Protection

Engineering Controls: To prevent static sparks, electrically ground and bond all containers and equipment used in shipping, receiving, or transferring operations. Provide general or local exhaust ventilation systems to maintain airborne concentrations as low as possible. Local exhaust ventilation is preferred because it prevents contaminant dispersion into the work area by controlling it at its source.

Administrative Controls: Enclose operations and/or provide local explosion-proof exhaust ventilation at the site of chemical release. Where possible, transfer methanol from drums or other storage containers to process containers. Minimize sources of ignition in surrounding areas.

Personal Protective Clothing/Equipment: Wear chemically protective gloves, boots, aprons, and gauntlets of butyl rubber, Teflon, Viton, Saranex, 4H, Responder, Trelchem HPS, or Tychem 10000 (Breakthrough Time (BT) >8 hr) to prevent skin contact. Natural rubber, neoprene, nitrile rubber, polyethylene, polyvinyl alcohol and CPF 3 may degrade after contact and are not recommended. Wear splash-proof chemical safety goggles, and face shield, per OSHA eye- and face-protection regulations (29 CFR 1910.133). Contact lenses are not eye protective devices. Appropriate eye protection must be worn instead of, or in conjunction with contact lenses.

Respiratory Protection: Seek professional advice prior to respirator selection and use. Follow OSHA respirator regulations (29 CFR 1910.134) and, if necessary, wear a MSHA/NIOSH-approved respirator. For concentrations \leq 2000 ppm, use a supplied air respirator; \leq 5000 ppm, supplied air (SA) respirator in continuous flow mode; \leq 6000 ppm, SA respirator with tight-fitting face mask operated in continuous flow mode, or SCBA with full facepiece, or SA respirator with full facepiece; $>$ IDLH/unknown/emergency, SCBA with full facepiece operated in pressure-demand or other positive-pressure mode, or SA respirator with full facepiece operated in pressure-demand or other positive-pressure mode in combination with auxiliary SCBA operated in pressure-demand or other positive-pressure mode. For escape, use an appropriate escape-type SCBA. *Warning! Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.* If respirators are used, OSHA requires a written respiratory protection program that includes at least: medical certification, training, fit-testing, periodic environmental monitoring, maintenance, inspection, cleaning, and convenient, sanitary storage areas.

Other: Separate contaminated work clothes from street clothes. Launder before reuse. Remove this material from your shoes and clean personal protective equipment. Make emergency eyewash stations, safety/quick-drench showers, and washing facilities available in work area.

Section 9 - Physical and Chemical Properties

Appearance/General Info: Colorless; slight alcohol odor when pure, disagreeably pungent odor when crude.

Physical State: Liquid

Odor Threshold: 13.1150 to 26840 mg/m³

Vapor Pressure (kPa): 127 mm Hg at 77 °F (25 °C)

Vapor Density (Air=1): 1.11

Bulk Density: 6.59 lbs/gal at 68 F (20 °C)

Formula Weight: 32.04

Density: 0.796 g/mL at 59 °F (15 °C)

Specific Gravity (H₂O=1, at 4 °C): 0.81 at 0 °C/4 °C

Refractive Index: 1.3292 at 68 °F (20 °C)

pH: Slightly acidic

Boiling Point: 148 °F (64.7 °C) at 760 mm Hg

Freezing/Melting Point: -144.04 °F (-97.8 °C)

Viscosity: 0.614 mPa sec

Surface Tension: 22.61 dynes/cm

Ionization Potential (eV): 10.84 eV

Water Solubility: Miscible

Other Solubilities: Ethanol, acetone, benzene, chloroform, DMSO, ether, ketones, most organic solvents.

Section 10 - Stability and Reactivity

Stability/Polymerization/Conditions to Avoid: Methanol is stable at room temperature in closed containers under normal storage and handling conditions. Hazardous polymerization cannot occur. Vapor inhalation, oxidizers.

Storage Incompatibilities: Include beryllium dihydride, metals (potassium, magnesium), oxidants (barium perchlorate, bromine, chlorine, hydrogen peroxide, sodium hypochlorite, phosphorus trioxide), potassium tertbutoxide, carbon tetrachloride and metals, chloroform and heat, diethyl zinc, alkyl aluminum salts, acetyl bromide, chloroform and sodium hydroxide, cyanuric chloride, nitric acid, chromic anhydride, lead perchlorate.

Hazardous Decomposition Products: Thermal oxidative decomposition of methanol can produce carbon oxides (CO_x), formaldehyde, acrid smoke, and irritating fumes.

Section 11 - Toxicological Information

Acute Oral Effects:

Rat, oral, LD₅₀: 5628 mg/kg.

Human, oral, LD_{Lo}: 428 mg/kg produced toxic effects: behavioral - headache; lungs, thorax, or respiration - other changes.

Human, oral, LD_{Lo}: 143 mg/kg produced optic nerve neuropathy, dyspnea, nausea or vomiting.

Acute Inhalation Effects:

Rat, inhalation, LC₅₀: 64000 ppm/4 hr.

Human, inhalation, TC_{Lo}: 300 ppm produced visual field changes, headache; lungs, thorax, or respiration - other changes.

Acute Skin Effects:

Rabbit, skin, LD₅₀: 15800 mg/kg.

Monkey, skin, LD_{Lo}: 393 mg/kg.

Irritation Effects:

Rabbit, standard Draize test: 100 mg/24 hr resulted in moderate irritation.

Rabbit, standard Draize test: 20 mg/24 hr resulted in moderate irritation.

Other Effects:

Rat, oral: 10 μmol/kg resulted in DNA damage.

Rat, inhalation: 50 mg/m³/12 hr/13 weeks intermittently produced degenerative changes to brain and coverings; muscle contraction or spasticity.

Rat, inhalation: 2610 ppm/6 hr/4 weeks intermittently produced toxic effects: endocrine - changes in spleen weight.

Multiple Dose Toxicity Effects - Rat, oral: 12 g/kg/8 weeks intermittently produced toxic effects: behavioral - ataxia; behavioral - alteration of operant conditioning.

Human, lymphocyte: 300 mmol/L resulted in DNA inhibition.

Rat (female), oral: 7500 mg/kg, administered during gestational days 17-19 produced effects on newborn - behavioral.

Rat (female), oral: 35295 mg/kg administered during gestational days 1-15 produced effects on the fertility index; pre implantation mortality; and post-implantation mortality.

Rat (female), inhalation: 20000 ppm/7 hr, administered during gestational days 1-22 produced specific developmental abnormalities - musculoskeletal system; cardiovascular (circulatory) system; urogenital system.

Rat (male), oral: 200 ppm/20 hr, 78 weeks prior to mating produced paternal effects - testes, epididymis, sperm duct.

See RTECS PC1400000, for additional data.

Section 12 - Ecological Information

Environmental Fate: Bioconcentration (BCF, estimated at 0.2) is not expected to be significant. Physical removal from air can occur via rainfall. Relatively rapid evaporation from dry surfaces is likely to occur. If released to the atmosphere, it degrades via reaction with photochemically produced hydroxyl radicals with an approximate half-life of 17.8 days. If released to water or soil, biodegradation is expected to occur. A low K_{oc} indicates little sorption and high mobility in the soil column.

Ecotoxicity: Trout, LC₅₀: 8,000 mg/L/48 hr; *Pimephales promelas* (fathead minnow) LC₅₀: 29.4 g/L/96 hr.

Henry's Law Constant: 4.55 x 10⁻⁶ atm-m³/mole at 77 °F (25 °C)

Octanol/Water Partition Coefficient: log K_{ow} = -0.77

Soil Sorption Partition Coefficient: K_{oc} = 0.44

Section 13 - Disposal Considerations

Disposal: Contact your supplier or a licensed contractor for detailed recommendations. Follow applicable Federal, state, and local regulations.

Section 14 - Transport Information

DOT Hazardous Materials Table Data (49 CFR 172.101):

Note: This material has multiple possible HMT entries. Choose the appropriate one based on state and condition of specific material when shipped.

Shipping Name and Description: Methanol

ID: UN1230

Hazard Class: 3 - Flammable and combustible liquid

Packing Group: II - Medium Danger

Symbols: + I

Label Codes: 3 - Flammable Liquid, 6.1 - Poison *or* Poison Inhalation Hazard *if inhalation hazard, Zone A or B*

Special Provisions: IB2, T7, TP2

Packaging: **Exceptions:** 150 **Non-bulk:** 202 **Bulk:** 242

Quantity Limitations: **Passenger aircraft/rail:** 1 L **Cargo aircraft only:** 60 L

Vessel Stowage: **Location:** B **Other:** 40



Shipping Name and Description: Methanol

ID: UN1230

Hazard Class: 3 - Flammable and combustible liquid

Packing Group: II - Medium Danger

Symbols: D - Domestic transportation

Label Codes: 3 - Flammable Liquid

Special Provisions: IB2, T7, TP2

Packaging: **Exceptions:** 150 **Non-bulk:** 202 **Bulk:** 242

Quantity Limitations: **Passenger aircraft/rail:** 1 L **Cargo aircraft only:** 60 L

Vessel Stowage: **Location:** B **Other:**



Section 15 - Regulatory Information

EPA Regulations:

RCRA 40 CFR: Listed U154 Ignitable Waste

CERCLA 40 CFR 302.4: Listed per RCRA Section 3001 5000 lb (2268 kg)

SARA 40 CFR 372.65: Listed

SARA EHS 40 CFR 355: Not listed

TSCA: Listed

Section 16 - Other Information

Disclaimer: Judgments as to the suitability of information herein for the purchaser's purposes are necessarily the purchaser's responsibility. Although reasonable care has been taken in the preparation of such information, Genium Group, Inc. extends no warranties, makes no representations, and assumes no responsibility as to the accuracy or suitability of such information for application to the purchaser's intended purpose or for consequences of its use.

Section 1 - Chemical Product and Company Identification

61

Material Name: Vinyl Chloride

CAS Number: 75-01-4

Chemical Formula: C₂H₃Cl

Structural Chemical Formula: CH₂=CHCl

EINECS Number: 200-831-0

ACX Number: X1003494-5

Synonyms: CHLORETHENE; CHLORETHYLENE; CHLOROETHENE; CHLOROETHYLENE; CHLORURE DE VINYLE; CLORURO DI VINILE; ETHENE,CHLORO-; ETHYLENE MONOCHLORIDE; ETHYLENE,CHLORO-; MONOCHLOROETHENE; MONOCHLOROETHYLENE; MONOCHOROETHENE; MONOVINYL CHLORIDE (MVC); TROVIDUR; VC; VCM; VINILE (CLORURO DI); VINYL C MONOMER; VINYL CHLORIDE; VINYL CHLORIDE MONOMER; VINYL CHLORIDE MONOMER (VCM); VINYL CHLORIDE,INHIBITED; VINYLCHLORID; VINYLE(CHLORURE DE); WINYLU CHLOREK

General Use: Used in the plastics industry; as a refrigerant; in organic syntheses

Section 2 - Composition / Information on Ingredients

Name	CAS	%
vinyl chloride	75-01-4	>98

OSHA PEL

TWA: 1 ppm; Ceiling: 5 ppm, 15-minute; 1910.1017.

NIOSH REL

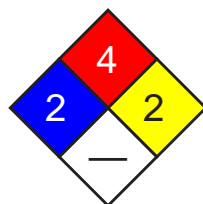
ACGIH TLV

TWA: 1 ppm.

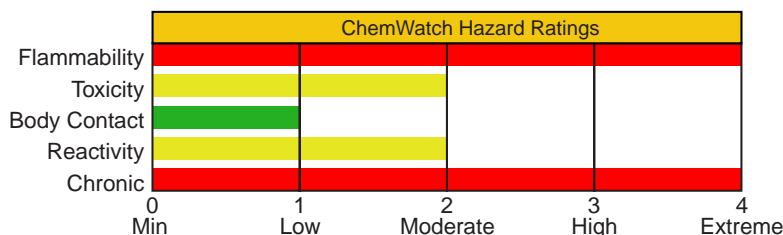
EU OEL

TWA: 7.77 mg/m³.

Section 3 - Hazards Identification



Fire Diamond



HMIS	
3	Health
4	Flammability
2	Reactivity

ANSI Signal Word

Danger!



☆☆☆☆☆ Emergency Overview ☆☆☆☆☆

Colorless gas; pleasant ethereal odor. Compressed gas can cause frostbite. Toxic. Other Acute Effects: CNS depression. Chronic Effects: reproductive effects, skin/blood changes, arthralgias, bone effects (hand), vascular disorder (fingers/toes). Cancer hazard. Flammable

Potential Health Effects

Target Organs: liver, central nervous system (CNS), respiratory system, lymphatic system, bone, connective tissue of the skin

Primary Entry Routes: inhalation, skin contact, eye contact

Acute Effects

Inhalation: The gas is highly discomforting and may be fatal if inhaled.

Acute intoxication by halogenated aliphatic hydrocarbons appears to take place over two stages. Signs of a reversible narcosis are evident in the first stage and in the second stage signs of injury to organs may become evident. A single organ alone is (almost) never involved.

Depression of the central nervous system is the most outstanding effect of most halogenated aliphatic hydrocarbons. Inebriation and excitation, passing into narcosis, is a typical reaction. In severe acute exposures there is always a danger of death from respiratory failure or cardiac arrest due to a tendency to make the heart more susceptible to catecholamines (adrenalin).

A single 5 minute inhalation exposure of 8000-25000 ppm caused nausea, headache and dizziness among volunteers. After cessation of exposure only 3-5% of the parent compound was exhaled unchanged. Metabolism by microsomal cytochrome P-450 results in the production of chloroethylene oxide and 2-chloroacetaldehyde and subsequent urinary elimination as thiodiglycolic acid. Half-life is 4-5 hours.

Vinyl chloride and related vinyl monomers possess narcotic action and produce depending upon concentration, characteristic neurological effects, a state of euphoria, followed by a state of inebriation, similar to ethanol intoxication.

Exposure of mice, rats and guinea pigs at 100,000-300,000 ppm caused concentration-dependent mortality. Pulmonary edema, inflammation, hyperemia, congestion and engorgement were recorded - liver and kidney involvement was surprisingly low. Deaths were due to central arrest in narcosis.

Eye: The vapor is discomforting to the eyes and is capable of causing a mild, temporary redness of the conjunctiva (similar to wind-burn), temporary impairment of vision and/or other transient eye damage/ulceration.

Skin: The vapor is mildly discomforting to the skin.

Toxic effects may result from skin absorption.

Vinyl chloride acts upon the skin and produces a sensation of heat.

Vaporizing liquid causes rapid cooling and contact may cause cold burns, frostbite.

Ingestion: Not normally a hazard due to physical form of product.

Carcinogenicity: NTP - Class 1, Known to be a carcinogen; IARC - Group 1, Carcinogenic to humans; OSHA - Listed as a carcinogen; NIOSH - Listed as carcinogen; ACGIH - Class A3, Animal carcinogen; EPA - Listed; MAK - Class A1, Capable of inducing malignant tumors as shown by experience with humans.

Chronic Effects: Repeated exposure of laboratory animals to vinyl chloride produced little liver or kidney damage. Repeated exposures produce neurological effects in man with somnolence prominent. Dyspeptic disturbances include epigastric pain, swelling, discomfort, heaviness in the right hypochondrium and anorexia. Congestive hepatomegaly may mimic toxic hepatitis without jaundice. Some cases become chronic. Allergic dermatitis and scleroderma and Raynaud's syndrome have been observed. Repeated exposure of workers has caused increased liver enzyme concentrations, restricted blood flow, bone degeneration in the fingers, liver and spleen enlargement, nervous system disturbance, CNS depression, decreased respiratory function and emphysema.

A dose-dependent relationship between exposure and the incidence of several tumor types has been established.

Exposures to high concentrations have little additional effect because the action of metabolites is responsible for the carcinogenicity rather than the action of the parent molecule. Formation rates of the metabolites are limited and dose-dependent and once the enzyme systems responsible for vinyl chloride activation are saturated, greater doses do not produce a corresponding increase in tumor incidence. Reports of hepatic angiosarcoma and respiratory cancers in vinyl chloride workers have appeared over many years. Cancers of the respiratory system (primarily angiosarcoma), brain as well as lymphomas occur more often than might be expected among men occupationally exposed to vinyl chloride for at least one year.

Section 4 - First Aid Measures

Inhalation: Remove to fresh air.

Lay patient down. Keep warm and rested.

If breathing is shallow or has stopped, ensure clear airway and apply resuscitation. Transport to hospital or doctor.

Eye Contact: Immediately hold the eyes open and flush continuously for at least 15 minutes with fresh running water. Ensure irrigation under eyelids by occasionally lifting the upper and lower lids.

Transport to hospital or doctor without delay. Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

Skin Contact: Immediately flush body and clothes with large amounts of water, using safety shower if available.

Quickly remove all contaminated clothing, including footwear.

Wash affected areas with water (and soap if available) for at least 15 minutes. Transport to hospital or doctor.

In case of cold burns (frostbite): Bathe the affected area immediately in cold water for 10 to 15 minutes, immersing if possible and without rubbing.

Do not apply hot water or radiant heat. Apply a clean, dry dressing.

Transport to hospital or doctor.

Ingestion: Not normally a hazard due to physical form of product. DO NOT delay. Immediately transport to hospital or doctor.

After first aid, get appropriate in-plant, paramedic, or community medical support.

Note to Physicians: Treat symptomatically. Do not give adrenalin (epinephrine) or related drugs.

See
DOT
ERG

Section 5 - Fire-Fighting Measures

Flash Point: -78 °C Open Cup

Autoignition Temperature: 472 °C

LEL: 3.6% v/v

UEL: 33% v/v

Extinguishing Media: Dry chemical powder. DANGER: Deliver media remotely.

For minor fires: Flooding quantities only.

For large fires: Do not attempt to extinguish.

General Fire Hazards/Hazardous Combustion Products: WARNING: Long standing in contact with air and light may result in the formation of potentially explosive peroxides.

Liquid and vapor are highly flammable.

Dangerous hazard when exposed to heat or flame.

Severe vapor explosion hazard, when exposed to flame or spark.

Heating may cause expansion or decomposition leading to violent rupture of containers.

Decomposition may produce toxic fumes of hydrogen chloride.

Fire Incompatibility: Avoid reaction with copper, aluminum, oxidizing agents and certain catalytic impurities.

Explosion hazard may follow contact with incompatible materials. Avoid contamination with oxidizing agents i.e. nitrates, oxidizing acids, chlorine bleaches, pool chlorine etc. as ignition may result.

Fire-Fighting Instructions: Contact fire department and tell them location and nature of hazard.

Fight fire from a safe distance, with adequate cover.

May be violently or explosively reactive. Wear full body protective clothing with breathing apparatus. Consider evacuation.

If safe to do so, switch off electrical equipment until vapor fire hazard is removed.

If safe to do so, stop flow of gas.

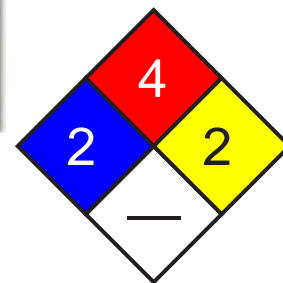
Do not approach cylinders suspected to be hot.

Cool fire-exposed containers with water spray from a protected location.

Use water delivered as a fine spray to control the fire and cool adjacent area.

Given its high vapor density spilled vinyl chloride is slow to disperse and will collect in low lying areas.

See
DOT
ERG



Fire Diamond

Section 6 - Accidental Release Measures

Small Spills: Erect warning notices and seal off area.

1. Avoid breathing vapor and any contact with liquid or gas. Protective equipment including respirator should be used.

2. Do NOT enter confined spaces where gas may have accumulated.

3. Shut off all sources of possible ignition and increase ventilation.

4. Clear area of personnel.

5. Stop leak only if safe to do so.

6. Remove leaking cylinders to safe place. Release pressure under safe controlled conditions by opening valve.

7. Keep area clear of personnel until gas has dispersed.

Large Spills: Supply maximum air ventilation (explosion proof equipment) to keep concentration well below lower flammability limit.

1. Clear area of all unprotected personnel and move upwind.

2. Contact fire department and advise them of the location and nature of hazard.

3. May be violently or explosively reactive.

4. Wear full body clothing with breathing apparatus.

5. Consider evacuation.

6. Shut off all possible sources of ignition and increase ventilation.

7. No smoking or bare lights within area.

8. Use extreme caution to prevent violent reaction.

9. Stop leak only if safe to do so.

10. Water spray or fog may be used to disperse vapor.

11. Do NOT enter confined space where gas may have collected.

12. Keep area clear until gas has dispersed.

When leaking containers have been removed or leak has been stopped, hose spill area down with copious quantities of water. Allow any liquid to evaporate prior to wash down.

Regulatory Requirements: Follow applicable OSHA regulations (29 CFR 1910.120).

See
DOT
ERG

Section 7 - Handling and Storage

Handling Precautions: Used in closed pressurized systems, fitted with safety relief valve.

Vented gas is flammable, denser than air and will spread. Vent path must not contain ignition sources, pilot lights, bare flames.

Atmospheres must be tested and O.K. before work resumes after leakage.
 Obtain a work permit before attempting any repairs.
 Do not attempt repair work on lines, vessels under pressure.
 Handle and open container with care.
 Avoid all personal contact, including inhalation.
 Wear protective clothing when risk of exposure occurs.
 Use in a well-ventilated area. Prevent concentration in hollows and sumps.
 DO NOT enter confined spaces until atmosphere has been checked.
 Avoid smoking, bare lights, heat or ignition sources.
 When handling, DO NOT eat, drink or smoke.
 Vapor may ignite on pumping or pouring due to static electricity.
 DO NOT use plastic buckets. Ground and secure metal containers when dispensing or pouring product. Use spark-free tools when handling.
 Avoid contact with incompatible materials.
 Keep containers securely sealed. Avoid physical damage to containers.
 Always wash hands with soap and water after handling.
 Work clothes should be laundered separately.
 Use good occupational work practices. Observe manufacturer's storing and handling recommendations. Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions.
 DO NOT transfer gas from one cylinder to another.

Recommended Storage Methods: Check that containers are clearly labeled.
 Cylinder fitted with valve protector cap.
 Ensure the use of equipment rated for cylinder pressure.
 Ensure the use of compatible materials of construction.
 Cylinder valve must be closed when not in use or when empty.
 Cylinder must be properly secured either in use or in storage.
 WARNING: Suckback into cylinder may result in rupture.
 Use back-flow preventive device in piping.
 Aerosol pack.
 Vacuum insulated container.

Regulatory Requirements: Follow applicable OSHA regulations.

Section 8 - Exposure Controls / Personal Protection

Engineering Controls: Fans and electrical equipment must be explosion-proof to meet TLV requirements. Approved respirators must be available for non-routine and emergency situations.
 Areas where gas cylinders are stored/used require discrete, controlled exhaust ventilation.
 Local exhaust ventilation usually required.
 If risk of overexposure exists, wear NIOSH-approved respirator.
 Correct fit is essential to obtain adequate protection. NIOSH-approved self contained breathing apparatus (SCBA) may be required in some situations.
 Provide adequate ventilation in warehouse or closed storage area.

Personal Protective Clothing/Equipment:

Eyes: Close fitting gas tight goggles and DO NOT wear contact lenses.
 Contact lenses pose a special hazard; soft lenses may absorb irritants and all lenses concentrate them.

Hands/Feet: Neoprene rubber gloves.

Respiratory Protection:

Exposure Range >1 to 50 ppm: Supplied Air, Constant Flow/Pressure Demand, Half Mask
 Exposure Range >50 to 1000 ppm: Supplied Air, Constant Flow/Pressure Demand, Full Face
 Exposure Range >1000 to unlimited ppm: Self-contained Breathing Apparatus, Pressure Demand, Full Face
 Note: poor warning properties

Other: Protective overalls, closely fitted at neck and wrist. Eye-wash unit.

IN CONFINED SPACES:

1. Non-sparking protective boots
2. Static-free clothing.

Glove Selection Index:

VITON Best selection
 NITRILE Satisfactory; may degrade after 4 hours continuous immersion

Section 9 - Physical and Chemical Properties

Appearance/General Info: A colorless poisonous gas at ambient temperature, with a mild sweet odor in high concentrations. It liquefies readily under increased pressure or at reduced temperatures. Soluble in alcohol, ether, carbon tetrachloride and benzene.

Physical State: Liquefied gas

Vapor Pressure (kPa): 343.5 at 20 °C

Vapor Density (Air=1): 2.2	pH (1% Solution): Not applicable.
Formula Weight: 62.5	Boiling Point: -13.37 °C (8 °F)
Specific Gravity (H₂O=1, at 4 °C): 0.912 at 20 °C	Freezing/Melting Point: -153.8 °C (-244.84 °F)
Evaporation Rate: Not applicable	Volatile Component (% Vol): 100
pH: Not applicable	Water Solubility: Slightly soluble

Section 10 - Stability and Reactivity

Stability/Polymerization/Conditions to Avoid: Presence of heat source and direct sunlight (ultra-violet radiation).
Presence of elevated temperatures.

Presence of an ignition source.

Storage in unsealed containers.

Stable under normal storage conditions. Polymerization may occur at elevated temperatures and in the presence of ignition sources.

Storage Incompatibilities: Avoid contamination with oxidizing agents i.e. nitrates, oxidizing acids, chlorine bleaches, pool chlorine etc. as ignition may result.

Avoid peroxides, copper and copper alloys and plastics.

Haloalkenes are highly reactive. Some of the more lightly substituted lower members are highly flammable; many members of the group are peroxidizable and polymerizable.

If peroxidation occurs, vinyl chloride tends to self-polymerize violently and this has resulted in several industrial accidents.

Accidental exposure of the recovered monomer to atmospheric oxygen for a long period resulted in the formation of an unstable polyperoxide which initiated explosion. A 20-30% aqueous solution has been used to destroy the peroxide.

An explosion in a valve in a liquid monomer line appears to have been caused by traces of nitrogen oxides remaining after passivation of the line by nitric acid.

Section 11 - Toxicological Information

Toxicity

Oral (rat) LD₅₀: 500mg/kg

Oral (rat) TD_{Lo}: 3463mg/kg/52w

Inhalation (rat) TC_{Lo}: 1ppm/4h/52w

Inhalation (man) TC_{Lo}: 200ppm/14y

Tumors of the sense organs, vascular system, respiratory system, gastrointestinal system, skin and liver, lymphoma, paternal effects, effects on fertility, fetotoxicity, specific developmental abnormalities involving the musculoskeletal system recorded.

Irritation

Nil reported

See RTECS YZ 3200000, for additional data.

Section 12 - Ecological Information

Environmental Fate: If released to soil, it will be subject to rapid volatilization with reported half-lives of 0.2 and 0.5 days for evaporation from soil at 1 and 10 cm incorporation, respectively. Any which does not evaporate will be expected to be highly to very highly mobile in soil and it may leach to the groundwater. It may be subject to biodegradation under anaerobic conditions such as exists in flooded soil and groundwater. If released to water, it will not be expected to hydrolyze, to bioconcentrate in aquatic organisms or to adsorb to sediments. It will be subject to rapid volatilization with an estimated half-life of 0.805 hr for evaporation from a river 1 m deep with a current of 3 m/sec and a wind velocity of 3 m/sec. In waters containing photosensitizers such as humic acid, photodegradation will occur fairly rapidly. Limited existing data indicate that it is resistant to biodegradation in aerobic systems and therefore, it may not be subject to biodegradation in aerobic soils and natural waters. It will not be expected to hydrolyze in soils or natural waters under normal environmental conditions. If released to the atmosphere, it can be expected to exist mainly in the vapor-phase in the ambient atmosphere and to degrade rapidly in air by gas-phase reaction with photochemically produced hydroxyl radicals with an estimated half-life of 1.5 days.

Ecotoxicity: No data found.

Henry's Law Constant: 0.0560

BCF: estimated at 7

Biochemical Oxygen Demand (BOD): none

Octanol/Water Partition Coefficient: log K_{ow} = calculated at 0.6

Soil Sorption Partition Coefficient: K_{oc} = estimated at 56

Section 13 - Disposal Considerations

Disposal: The gas should be burned in a high temperature furnace equipped with an afterburner and scrubber to remove HCl formed.

Follow applicable federal, state, and local regulations.

Return all damaged and empty cylinders and containers to the supplier.

Section 14 - Transport Information

DOT Hazardous Materials Table Data (49 CFR 172.101):

Shipping Name and Description: Vinyl chloride, stabilized

ID: UN1086

Hazard Class: 2.1 - Flammable gas

Packing Group:

Symbols:

Label Codes: 2.1 - Flammable Gas

Special Provisions: 21, B44, T50

Packaging: **Exceptions:** 306 **Non-bulk:** 304 **Bulk:** 314, 315

Quantity Limitations: **Passenger aircraft/rail:** Forbidden **Cargo aircraft only:** 150 kg

Vessel Stowage: **Location:** B **Other:** 40



Section 15 - Regulatory Information

EPA Regulations:

RCRA 40 CFR: Listed U043 Toxic Waste

CERCLA 40 CFR 302.4: Listed per RCRA Section 3001, per CWA Section 307(a), per CAA Section 112 1 lb (0.454 kg)

SARA 40 CFR 372.65: Listed

SARA EHS 40 CFR 355: Not listed

TSCA: Listed

Section 16 - Other Information

Disclaimer: Judgments as to the suitability of information herein for the purchaser's purposes are necessarily the purchaser's responsibility. Although reasonable care has been taken in the preparation of such information, Genium Group, Inc. extends no warranties, makes no representations, and assumes no responsibility as to the accuracy or suitability of such information for application to the purchaser's intended purpose or for consequences of its use.

Material Safety Data Sheet
To comply with OSHA's Hazard Communication Standard, 29 CFR 1910.120

OIL-IN-SOIL Test Kit
CAS 3 85-83-6 (SUDAN IV; OIL REB"B")

SECTION I – Manufacturer and International Distributors

Manufacturer:
OIL IN SOIL, LLC
6 Queen Anne Road
Levittown, PA USA 19057
1 (215) 687-0355
info@oil-in-soil.com

All Products are produced in and shipped from Pennsylvania USA
Date of MSDS Preparation 6/7/96

SECTION II --Composition Information on Ingredients

Dyes are dispersed in a sugar cube that has an approximate weight of 2.4 g. The red dye, is a standard dye used throughout the oil industry to color the oil red, is a possible mutagen but its weight is less than 0.1 percent. The fluorescent green dye comprises less than 1 percent of the weight of the dye cube and is not hazardous.

SECTION III -- Physical Characteristics

Property

Melting point - 186 °C
Specific gravity - 1.58

Solubility in water -sugar cube - very soluble
(water soluble dye - very soluble)
(red oil dye - insoluble in water soluble in oil or other hydrocarbons)

Flammability limit - Unknown
Extinguishing media - Water or foam
Special Fire Fighting Procedures - None

SECTION IV -- Reactivity Data

Stability - All Components are STABLE.
Incompatibility - None
Hazardous decomposition production - Stable compounds
Hazardous Polymerization - Will not occur
Conditions to Avoid - Fire

SECTION V -- Health Hazard Information

First Aid

If swallowed wash out mouth. If dye comes in contact with skin thoroughly wash area with soap and water.

Eye Contact

Flush eyes with large amounts of water for 15 minutes. Seek medical attention.

Skin Contact

Wash hands thoroughly with soap and water.

SECTION VI -- Spill, Leak and disposal Procedure

Spills and Leaks: Dig up the soil that kit material has spilled on. If spilled on hard surface soak up spill and wash with detergent and water.

Disposal: Dispose of soil with oily soil. Dispose of cleanup absorbent with other absorbent material.

SECTION VII -- Special Precautions

Respiratory Protection:

None required if dye cube not crushed to powder. If crushed use dust mask.

Ventilation:

Use in open air.

Protective Gloves:

Always use protective vinyl or polyethylene gloves.

Eye Protection:

Always wear safety glasses

SECTION VIII --Special Precautions**Storage Information:**

Keep away from temperatures greater than 140°F (Adhesive for dye cube may melt). Dye cube may crack with sudden

shock at temperatures less than 32 °F. **Avoid inhaling any dust from dye cube!**

DOT Class - Non flammable

Section 1 - Chemical Product and Company Identification

61

Material Name: Polychlorinated Biphenyls (PCBs) **CAS Number:** 1336-36-3
Chemical Formula: Unspecified or Variable
Structural Chemical Formula: $(C_{12}H_{10-x})Cl_x$
EINECS Number: 215-648-1
ACX Number: X1004032-9

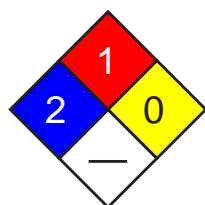
Synonyms: AROCLOR; AROCLOR 1221; AROCLOR 1232; AROCLOR 1242; AROCLOR 1248; AROCLOR 1254; AROCLOR 1260; AROCLOR 1262; AROCLOR 1268; AROCLOR 2565; AROCLOR 4465; AROCLOR 5442; 1,1'-BIPHENYL,CHLORO DERIVS; BIPHENYL,POLYCHLORO-; CHLOPHEN; CHLOREXTOL; CHLORINATED BIPHENYL; CHLORINATED DIPHENYL; CHLORINATED DIPHENYLENE; CHLORO 1,1-BIPHENYL; CHLORO 1,1-BIPHENYL-; CHLORO BIPHENYL; CLOPHEN; CLOPHEN A 60; DYKANOL; EPA PESTICIDE CHEMICAL CODE 017801; FENCLOR; FENCLOR 42; INERTEEN; KANECHLOR; KANECHLOR 300; KANECHLOR 400; MONTAR; MONTER; NOFLAMOL; PCB; PCBS; PHENOCHLOR; PHENOCLOR; POLYCHLORINATED BIPHENYL; POLYCHLORINATED BIPHENYLS; POLYCHLORINATED BIPHENYLS (PCBS); POLYCHLOROBIPHENYL; PYRALENE; PYRANOL; SANTOTHERM; SANTOTHERM FR; SOVOL; THERMINOL; THERMINOL FR-1

General Use: Used as dielectric fluids in transformers and capacitors. Prior to 1972, were used as hydraulic and other industrial fluids (e.g., in vacuum pumps, as lubricants and cutting oils), in paints, inks and fire retardants. Also used in heat transfer systems; gas-transmission turbines; carbonless reproducing paper; adhesives; as plasticizer in epoxy paints; fluorescent light ballasts; wax extenders; coolants; dedusting agents; pesticide extenders; surface treatment and coatings; sealants; caulking material. This is one of a group of once widely used industrial chemicals whose high stability contributed both to their commercial usefulness and the long term deleterious environmental health effects. Consequently their use has been phased out. Their manufacture in the U.S.A. was discontinued in 1977.

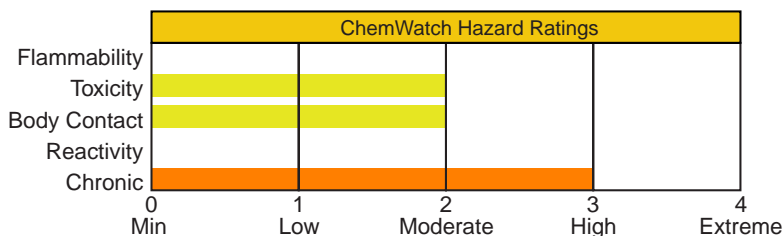
Section 2 - Composition / Information on Ingredients

Name	CAS	%
polychlorinated biphenyls (PCB's)	1336-36-3	100
OSHA PEL	NIOSH REL	
ACGIH TLV		

Section 3 - Hazards Identification



Fire Diamond



HMIS	
2	Health
1	Flammability
0	Reactivity

ANSI Signal Word

Warning!

☆☆☆☆☆ **Emergency Overview** ☆☆☆☆☆

Oily liquid, white crystalline solid, or hard resin. Severely irritating. Suspect cancer hazard. Chronic Effects: chloracne, GI disturbances, neurological symptoms, liver enlargement, menstrual changes, bronchitis, possible reproductive/teratogenic effects.

Potential Health Effects

Target Organs: skin, liver, eyes, mucous membranes, respiratory system

Primary Entry Routes: inhalation, skin contact, ingestion

Acute Effects

Inhalation: Not normally a hazard due to nonvolatile nature of product. Inhalation of vapor is more likely at higher than normal temperatures.

The vapor/mist is discomforting and may be extremely toxic if inhaled.

Eye: The vapor/liquid is moderately discomforting and may be harmful to the eyes.

Skin: The liquid is harmful to the skin, it is rapidly absorbed and is capable of causing skin reactions.

Exposure to material may result in a dermatitis, described as chloracne, a persistent acneiform characterized by comedones (white-, and black- heads), keratin cysts, and inflamed papules with hyperpigmentation and an anatomical distribution frequently involving the skin under the eyes and behind the ears. It occurs after acute or chronic exposure to a variety of chlorinated aromatic compounds by skin contact, ingestion or inhalation and may appear within days and months following the first exposure. Other dermatological alterations including hypertrichosis (the growth of excess hair), an increased incidence of actinic or solar elastosis (the degeneration of elastic tissue within muscles or loss of dermal elasticity produced by the effects of sunlight), and Peyrone's disease (a rare progressive scarring of the penile membrane).

Ingestion: Considered an unlikely route of entry in commercial/industrial environments.

The material is moderately discomforting to the gastrointestinal tract and may be harmful if swallowed in large quantity.

Ingestion may result in nausea, pain, vomiting. Vomit entering the lungs by aspiration may cause potentially lethal chemical pneumonitis.

Digestion may lead to nausea, vomiting, abdominal pain, anorexia, jaundice and liver damage, coma and death.

Headache, dizziness, lethargy, depression, nervousness, loss of libido, muscle, joint pains may be found.

Symptoms appear after a latent period of 5 to 6 months.

PCB's may appear in breast milk of exposed mothers and in newborn infants.

Carcinogenicity: NTP - Class 2B, Reasonably anticipated to be a carcinogen, sufficient evidence of carcinogenicity from studies in experimental animals; IARC - Group 2A, Probably carcinogenic to humans; OSHA - Not listed; NIOSH - Not listed; ACGIH - Not listed; EPA - Class B2, Probable human carcinogen based on animal studies; MAK - Not listed.

Chronic Effects: People occupationally exposed to PCB's have relatively high PCB residue levels in blood plasma.

Symptoms include chloracne dermatitis and degreasing the skin, pigmentation of skin and nails, excessive eye discharge, swelling of eyelids, transient visual disturbances, distinctive hair follicles, edema of the face and hands.

In common with other polyhalogenated aromatic hydrocarbons, the chlorinated biphenyls exhibit dioxin-like behavior.

Polyhalogenated aromatic hydrocarbons (PHAHs) comprise two major groups.

The first group represented by the halogenated derivatives of dibenzodioxins (the chlorinated form is PCDD), dibenzofurans (PCDF) and biphenyls (PCB) exert their toxic effect (as hepatotoxicants, reproductive toxicants, immunotoxicants and procarcinogens) by interaction with a cytosolic protein known as the Ah receptor. In guinea pigs the Ah receptor is active in a mechanism which "pumps" PHAH into the cell whilst in humans the reverse appears to be true. This, in part, may account for species differences often cited in the literature. This receptor exhibits an affinity for the planar members of this group and carries these to the cellular nucleus where they bind, reversibly, to specific genomes on DNA.

This results in the regulation of the production of certain proteins which elicit the toxic response. The potency of the effect is dependent on the strength of the original interaction with the Ah receptor and is influenced by the degree of substitution by the halogen and the position of such substitutions on the parent compound.

The most potent molecule is 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) while the coplanar PCBs (including mono-ortho coplanars) possess approximately 1% of this potency. Nevertheless, all are said to exhibit "dioxin-like" behavior and in environmental and health assessments it has been the practice to assign each a TCDD-equivalence value.

The most subtle and important biological effects of the PHAHs are the effects on endocrine hormones and vitamin homeostasis. TCDD mimics the effect of thyroxin (a key metamorphosis signal during maturation) and may disrupt patterns of embryonic development at critical stages. Individuals from exposed wildlife populations have been observed to have altered sexual development, sexual dysfunction as adults and immune system suppression.

Immunotoxic effects of the PHAHs (including the brominated congener, PBB) have been the subject of several studies. No clear pattern emerges in human studies however with T-cell numbers and function (a blood marker for immunological response) increasing in some and decreasing in others.

Three incidences have occurred which have introduced abnormally high levels of dioxin or dioxin-like congeners to humans. The explosion at a trichlorophenol-manufacturing plant in Seveso, Italy distributed TCDD across a large area of the country-side, whilst rice-oil contaminated with heat-transfer PCBs (and dioxin-like contaminants) has been consumed by two groups, on separate occasions (one in Yusho, Japan and another in Yu-cheng, Taiwan). The only symptom which can unequivocally be related to all these exposures is the development of chloracne, a disfiguring skin condition, following each incident. Contaminated oil poisonings also produced eye-discharge, swelling of eyelids and visual disturbances. The Babies born up to 3 years after maternal exposure (so-called "Yusho-babies") were characteristically brown skinned, colored gums and nails and (frequently) produced eye-discharges. Delays in

intellectual development have been noted. It has been estimated that Yu-cheng patients consumed an average level of 0.06 mg/kg body weight/day total PCB and 0.0002 mg/kg/day of PCDF before the onset of symptoms after 3 months. When the oil was withdrawn after 6 months they had consumed 1 gm total PCB containing 3.8 mg PCDF.

Preliminary data from the Yusho cohort suggests a six-fold excess of liver cancer mortality in males and a three-fold excess in women.

Recent findings from Seveso indicate that the biological effects of low level exposure (BELLEs), experienced by a cohort located at a great distance from the plant, may be hormetic, i.e. may be protective AGAINST the development of cancer.

TCDD induces carcinogenic effects in the laboratory in all species, strains and sexes tested. These effects are dose-related and occur in many organs.

Exposures as low as 0.001 ug/kg body weight/day produce carcinoma.

Several studies implicate PCBs in the development of liver cancer in workers as well as multi-site cancers in animals.

The second major group of PHAH consists of the non-planar PCB congeners which possess two or more ortho-substituted halogens. These have been shown to produce neurotoxic effects which are thought to reduce the concentration of the brain neurotransmitter, dopamine, by inhibiting certain enzyme-mediated processes.

The specific effect elicited by both classes of PHAH seems to depend on the as much on the developmental status of the organism at the time of the exposure as on the level of exposure over a lifetime.

Section 4 - First Aid Measures

Inhalation: Remove to fresh air.

Lay patient down. Keep warm and rested.

If breathing is shallow or has stopped, ensure clear airway and apply resuscitation. Transport to hospital or doctor.

Eye Contact: Immediately hold the eyes open and flush continuously for at least 15 minutes with fresh running water. Ensure irrigation under eyelids by occasionally lifting the upper and lower lids.

Transport to hospital or doctor without delay. Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

Skin Contact: Immediately remove all contaminated clothing, including footwear (after rinsing with water).

Wash affected areas thoroughly with water (and soap if available).

Seek medical attention in event of irritation.

Ingestion: Contact a Poison Control Center. DO NOT induce vomiting. Observe the patient carefully. Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious. Give water (or milk) to rinse out mouth. Then provide liquid slowly and as much as casualty can comfortably drink. Transport to hospital or doctor without delay.

After first aid, get appropriate in-plant, paramedic, or community medical support.

Note to Physicians: Treat symptomatically. If large amounts are ingested, gastric lavage is suggested. For splash in the eyes, a petrolatum-based ophthalmic ointment may be applied to the eye to relieve the irritating effects of PCBs. If electrical equipment arcs over, PCB dielectric fluids may decompose to produce hydrogen chloride (HCl), a respiratory irritant. [Monsanto] Preplacement and annual medical examinations of workers, with emphasis on liver function, skin condition, reproductive history, is recommended.

See
DOT
ERG

Section 5 - Fire-Fighting Measures

Flash Point: > 141 °C

Autoignition Temperature: 240 °C

LEL: Not applicable

UEL: Not applicable

Extinguishing Media: Foam. Alcohol stable foam.

Dry chemical powder.

General Fire Hazards/Hazardous Combustion Products: Noncombustible liquid.

POLLUTANT -contain spillage.

Decomposes on heating and produces acrid black soot and toxic fumes of aldehydes, hydrogen chloride (HCl), chlorides and extremely toxic polychlorinated dibenzofuran (PCDF), polychlorinated dibenzodioxin (PCDD).

Fire Incompatibility: Reacts vigorously with chlorine (Cl₂).

Fire-Fighting Instructions: POLLUTANT -contain spillage. Noncombustible.

Clear area of personnel and move upwind.

Contact fire department and tell them location and nature of hazard.

Wear full body protective clothing with breathing apparatus. Prevent, by any means available, spillage from entering drains or waterways.

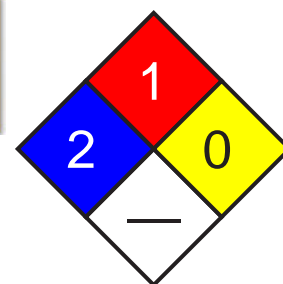
Use fire fighting procedures suitable for surrounding area.

Cool fire-exposed containers with water spray from a protected location.

Avoid spraying water onto liquid pools.

If safe to do so, remove containers from path of fire.

See
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ERG



Fire Diamond

Equipment should be thoroughly decontaminated after use.

Section 6 - Accidental Release Measures

Small Spills: POLLUTANT -contain spillage. Clean up all spills immediately.

Environmental hazard - contain spillage.

Avoid breathing vapors and contact with skin and eyes.

Wear protective clothing, impervious gloves and safety glasses.

Contain spill with sand, earth or vermiculite.

Wipe up and absorb small quantities with vermiculite or other absorbent material.

Place spilled material in clean, dry, sealable, labeled container.

Large Spills: POLLUTANT -contain spillage. Clear area of personnel.

Contact fire department and tell them location and nature of hazard.

Wear full body protective clothing with breathing apparatus. Prevent, by any means available, spillage from entering drains or waterways.

Stop leak if safe to do so.

Contain spill with sand, earth or vermiculite.

Collect recoverable product into labeled containers for recycling.

Absorb remaining product with sand, earth or vermiculite.

Collect residues and seal in labeled drums for disposal.

After clean-up operations, decontaminate and launder all protective clothing and equipment before storing and reusing.

If equipment is grossly contaminated, decontaminate and destroy.

If contamination of drains or waterways occurs, advise emergency services.

Regulatory Requirements: Follow applicable OSHA regulations (29 CFR 1910.120).



See
DOT
ERG

Section 7 - Handling and Storage

Handling Precautions: Do not allow clothing wet with material to stay in contact with skin Use good occupational work practices. Observe manufacturer's storing and handling recommendations.

Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions are maintained.

Avoid all personal contact, including inhalation.

Wear protective clothing and gloves when handling containers.

Avoid physical damage to containers.

Use in a well-ventilated area and Use only in completely enclosed system.

Avoid contact with incompatible materials.

When handling, DO NOT eat, drink or smoke.

Wash hands with soap and water after handling.

Work clothes should be laundered separately: NOT at home.

Recommended Storage Methods: Packaging as recommended by manufacturer.

Check that containers are clearly labeled.

Metal can or metal drum or Steel drum with plastic liner.

Regulatory Requirements: Follow applicable OSHA regulations.

Section 8 - Exposure Controls / Personal Protection

Engineering Controls: Provide adequate ventilation in warehouse or closed storage areas.

If inhalation risk of overexposure exists, wear NIOSH-approved organic-vapor respirator.

In confined spaces where there is inadequate ventilation, wear full-face air supplied breathing apparatus.

Personal Protective Clothing/Equipment:

Eyes: Safety glasses with side shields; chemical goggles.

Full face shield.

Contact lenses pose a special hazard; soft lenses may absorb irritants and all lenses concentrate them.

Hands/Feet: Impervious gloves or Viton gloves or Polyethylene gloves or PVC gloves.

Protective footwear.

Other: Impervious protective clothing. Overalls. Impervious apron.

Eyewash unit.

Ensure there is ready access to a safety shower.

Section 9 - Physical and Chemical Properties

Appearance/General Info: Clear, colorless to yellow-green, mobile oily to viscous liquid, or sticky to hard resin, or white crystalline solid, depending on degree of chlorination. Slightly soluble in glycerol and glycols. Soluble in organic solvents and lipids. Viscosity range: 71 - 2500 Saybolt unit sec. at 38 °C. PCBs are resistant to chemical and biological degradation and because of their solubility in fats and oils they tend to be concentrated in living organisms. The highly chlorinated PCBs are retained in animal's bodies longer and seems to delay the excretion of the lower chlorinated PCB's. They have become widely dispersed in the world-wide environment and in the food-chain since their introduction in 1929. They are now recognized internationally to be a major environmental pollutant, their persistence causing ecological damage via water pollution. Consequently loss of PCBs to the environment is to be avoided at all costs.

Physical State: Liquid

Vapor Pressure (kPa): Negligible

Formula Weight: 188.66 - 395

Specific Gravity (H₂O=1, at 4 °C): 1.18 - 1.8

Evaporation Rate: Non Vol. at 38 °C

pH: Not applicable

pH (1% Solution): Not applicable.

Boiling Point: 340 °C (644 °F) to 375 °C (707 °F)

Decomposition Temperature (°C): 375-550

Water Solubility: Solubility in water extremely low

Section 10 - Stability and Reactivity

Stability/Polymerization/Conditions to Avoid: Product is considered stable. Hazardous polymerization will not occur.

Storage Incompatibilities: Avoid storage with oxidizers. Segregate from chlorine.

Avoid contamination of water, foodstuffs, feed or seed.

Section 11 - Toxicological Information

Toxicity

Oral (human) LD₅₀: 500 mg/kg

Oral (rat) LD₅₀: 3980 mg/kg

Irritation

Nil reported

See RTECS TQ1350000, for additional data.

Section 12 - Ecological Information

Environmental Fate: PCBs are mixtures of different congeners of chlorobiphenyl and the relative importance of the environmental fate mechanisms generally depends on the degree of chlorination. In general, the persistence of PCBs increases with an increase in the degree of chlorination. Mono-, di- and trichlorinated biphenyls (Aroclor 1221 and 1232) biodegrade relatively rapidly, tetrachlorinated biphenyls (Aroclors 1016 and 1242) biodegrade slowly, and higher chlorinated biphenyls (Aroclors 1248, 1254, and 1260) are resistant to biodegradation. Although biodegradation of higher chlorinated congeners may occur very slowly on an environmental basis, no other degradation mechanisms have been shown to be important in natural water and soil systems; therefore, biodegradation may be the ultimate degradation process in water and soil.

If released to soil, PCBs experience tight adsorption with adsorption generally increasing with the degree of chlorination. PCBs will generally not leach significantly in aqueous soil systems; the higher chlorinated congeners will have a lower tendency to leach than the lower chlorinated congeners. In the presence of organic solvents PCBs may leach quite rapidly through soil. Vapor loss from soil surfaces appears to be an important fate mechanism with the rate of volatilization decreasing with increasing chlorination. Although the volatilization rate may be low, the total loss by volatilization over time may be significant because of persistence and stability. Enrichment of the low Cl PCBs occurs in the vapor phase relative to the original Aroclor; the residue will be enriched in the PCBs containing high Cl content.

If released to water, adsorption to sediment and suspended matter will be an important fate process; PCB concentrations in sediment and suspended matter have been shown to be greater than in the associated water column. Although adsorption can immobilize PCBs (especially the higher chlorinated congeners) for relatively long periods of time, eventual resolution into the water column has been shown to occur. The PCB composition in the water will be enriched in the lower chlorinated PCBs because of their greater water solubility, and the least water soluble PCBs (highest Cl content) will remain adsorbed. In the absence of adsorption, PCBs volatilize relatively rapidly from water. However, strong PCB adsorption to sediment significantly competes with volatilization, with the higher chlorinated PCBs having longer half-lives than the lower chlorinated PCBs. Although the resulting volatilization rate may be low, the total loss by volatilization over time may be significant because of persistence and stability. PCBs have been shown to bioconcentrate significantly in aquatic organisms. If released to the atmosphere, PCBs will primarily exist in the vapor-phase; the tendency to become associated with the particulate-phase will increase as the degree of chlorination of the PCB increases. The dominant atmospheric transformation process is probably the vapor-phase reaction with hydroxyl radicals which has estimated half-lives ranging from 12.9 days for monochlorobiphenyl to 1.31 years for heptachlorobiphenyl. Physical removal from the atmosphere, which is very important environmentally, is accomplished by wet and dry deposition.

Ecotoxicity: Aquatic toxicity: 0.278 ppm/96 hr/bluegill/TL_m/fresh water 0.005 ppm/336-1080 hr/pinfish/TL_m/salt water; Waterfowl toxicity: LD₅₀ 2000 ppm (mallard duck); Food chain concentration potential: High

Henry's Law Constant: 5×10^{-5}

BCF: bioconcentrate in tissue

Biochemical Oxygen Demand (BOD): very low

Soil Sorption Partition Coefficient: $K_{oc} = 510$ to 1.33×10^4

Section 13 - Disposal Considerations

Disposal: Recycle wherever possible. Consult manufacturer for recycling options.

Follow applicable federal, state, and local regulations.

Due to their environmental persistence and potential health hazards, PCBs cannot be disposed of in landfills or dumped at sea. The only environmentally acceptable method for the disposal of PCBs is by high temperature incineration.

All wastes and residues containing PCB's (e. g. , wiping cloths, absorbent material, used disposable protective gloves, contaminated clothing, etc.) should be collected, placed in proper containers, labelled and disposed of in accordance with applicable regulations.

Section 14 - Transport Information

DOT Hazardous Materials Table Data (49 CFR 172.101):

Note: This material has multiple possible HMT entries. Choose the appropriate one based on state and condition of specific material when shipped.

Shipping Name and Description: Polychlorinated biphenyls, liquid

ID: UN2315

Hazard Class: 9 - Miscellaneous hazardous material

Packing Group: II - Medium Danger

Symbols:

Label Codes: 9 - Class 9

Special Provisions: 9, 81, 140, IB3, T4, TP1

Packaging: **Exceptions:** 155 **Non-bulk:** 202 **Bulk:** 241

Quantity Limitations: **Passenger aircraft/rail:** 100 L **Cargo aircraft only:** 220 L

Vessel Stowage: **Location:** A **Other:** 95



Shipping Name and Description: Polychlorinated biphenyls, solid

ID: UN2315

Hazard Class: 9 - Miscellaneous hazardous material

Packing Group: II - Medium Danger

Symbols:

Label Codes: 9 - Class 9

Special Provisions: 9, 81, 140, IB7

Packaging: **Exceptions:** 155 **Non-bulk:** 212 **Bulk:** 240

Quantity Limitations: **Passenger aircraft/rail:** 100 kg **Cargo aircraft only:** 200 kg

Vessel Stowage: **Location:** A **Other:**



Section 15 - Regulatory Information

EPA Regulations:

RCRA 40 CFR: Not listed

CERCLA 40 CFR 302.4: Listed per CWA Section 311(b)(4), per CWA Section 307(a) 1 lb (0.454 kg)

SARA 40 CFR 372.65: Listed

SARA EHS 40 CFR 355: Not listed

TSCA: Listed

Section 16 - Other Information

Disclaimer: Judgments as to the suitability of information herein for the purchaser's purposes are necessarily the purchaser's responsibility. Although reasonable care has been taken in the preparation of such information, Genium Group, Inc. extends no warranties, makes no representations, and assumes no responsibility as to the accuracy or suitability of such information for application to the purchaser's intended purpose or for consequences of its use.

Section 1 - Chemical Product and Company Identification

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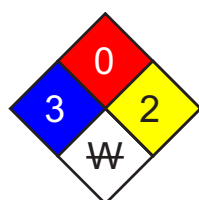
Material Name: Sulfuric Acid **CAS Number:** 7664-93-9
Chemical Formula: H₂O₄S
Structural Chemical Formula: H₂SO₄
EINECS Number: 231-639-5
ACX Number: X1002217-4
Synonyms: ACIDE SULFURIQUE; ACIDO SOLFORICO; ACIDO SULFURICO; BATTERY ACID; BOV; DIHYDROGEN SULFATE; DIPPING ACID; ELECTROLYTE ACID; EPA PESTICIDE CHEMICAL CODE 078001; HYDROGEN SULFATE; MATTLING ACID; OIL OF VITRIOL; SCHWEFELSAEURELOESUNGEN; SULFURIC ACID; SULFURIC ACID (AQUEOUS); SULFURIC ACID,SPENT; SULPHURIC ACID; VITRIOL BROWN OIL; ZWAVELZUUROPLOSSINGEN
General Use: The manufacture of superphosphate fertilizer, inorganic and petro-chemicals, explosives and pigments. Component of heavy duty metal cleaners, pickles. In manufacture of rayon, cellulose film. As battery electrolyte and also in electroplating processes.

Section 2 - Composition / Information on Ingredients

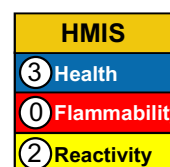
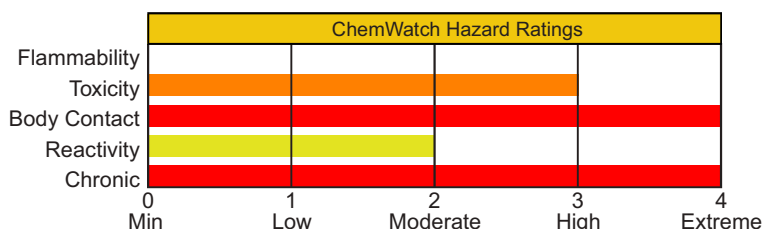
Name	CAS	%
sulfuric acid	7664-93-9	>51
water	7732-18-5	remainder

OSHA PEL TWA: 1 mg/m ³ .	NIOSH REL TWA: 1 mg/m ³ .	DFG (Germany) MAK TWA: 0.1 mg/m ³ ; PEAK: 0.1 mg/m ³ ; Ceiling: 0.2 mg/m ³ ; measured as inhalable fraction of the aerosol.
ACGIH TLV TWA: 1 mg/m ³ ; STEL: 3 mg/m ³ ; A2 = as contained in strong inorganic acid mists.	IDLH Level 15 mg/m ³ .	

Section 3 - Hazards Identification



Fire Diamond



ANSI Signal Word

Danger!



Corrosive

☆☆☆☆☆ **Emergency Overview** ☆☆☆☆☆

Colorless to dark-brown, oily, odorless liquid. Corrosive. Other Acute Effects: blindness. Chronic Effects: tooth erosion, GI disturbances, dermatitis. Reaction with water produces excessive heat.

Potential Health Effects

Target Organs: respiratory system, eyes, skin, teeth

Primary Entry Routes: inhalation, skin contact, eye contact

Acute Effects

Inhalation: The vapor is extremely discomforting to the upper respiratory tract and is capable of causing severe mucous membrane irritation, upper respiratory tract inflammation.

Exposure to high concentrations causes bronchitis and is characterized by the onset of hemorrhagic pulmonary edema.

Mists are highly irritating to eyes, mucous membranes and respiratory tract and high mist concentrations may lead to pulmonary edema.

Eye: HIGHLY CORROSIVE The liquid is extremely corrosive to the eyes and any contact may cause rapid tissue destruction and is capable of causing severe damage with loss of sight.

The mist is highly corrosive and contact may cause rapid tissue destruction.

The vapor is extremely discomforting to the eyes.

The material may produce severe irritation to the eye causing pronounced inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.

Skin: HIGHLY CORROSIVE. The liquid is extremely corrosive to the skin and any contact may cause rapid tissue destruction with severe burns.

The mist is highly discomforting to the skin and may cause deep ulceration to body tissue.

Topical application of a 10% solution to skin on the scapula or waist produces only negligible evidence of irritation.

Ingestion: HIGHLY CORROSIVE and Considered toxic by all exposure routes.

The liquid is extremely corrosive and may rapidly cause severe burns to the gastrointestinal tract and may be fatal if swallowed in quantity.

Considered an unlikely route of entry in commercial/industrial environments.

Carcinogenicity: NTP - Not listed; IARC - Group 1, Carcinogenic to humans; OSHA - Not listed; NIOSH - Not listed; ACGIH - Class A2, Suspected human carcinogen; EPA - Not listed; MAK - Not listed.

Chronic Effects: Repeated minor exposure to mists can cause erosion of teeth and inflammation of the upper respiratory tract leading to chronic bronchitis.

Repeated skin contact with dilute solutions may cause dermatitis.

Lungs of sulfuric acid plant workers appear to be less affected than the lungs of workers exposed to "dust".

There is evidence that the corrosion of tooth enamel occurs at 1 mg/m³ but that acclimatized workers could tolerate three to four times that level. Forming room workers in a battery factory exposed to 3 to 16 mg/m³ sulfuric acid mist concentrations exhibited the most serious signs of erosion whilst charging room workers exposed to 0.08 to 2.5 mg/m³ were affected to a lesser degree.

Workers chronically exposed to sulfuric acid mists may show various skin lesions, tracheobronchitis, stomatitis, conjunctivitis and gastritis.

Increased risk of laryngeal cancer is associated with chronic exposures.

Section 4 - First Aid Measures

Inhalation: Remove to fresh air.

Lay patient down. Keep warm and rested.

If available, administer medical oxygen by trained personnel.

If breathing is shallow or has stopped, ensure clear airway and apply resuscitation. Transport to hospital or doctor, without delay.

See
DOT
ERG

Eye Contact: Immediately hold the eyes open and flush continuously for at least 15 minutes with fresh running water. Ensure irrigation under eyelids by occasionally lifting the upper and lower lids.

Transport to hospital or doctor without delay. Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

Skin Contact: Immediately flush body and clothes with large amounts of water, using safety shower if available.

Quickly remove all contaminated clothing, including footwear.

Wash affected areas with water (and soap if available) for at least 15 minutes. Transport to hospital or doctor.

DO NOT attempt to neutralize burns with alkaline solutions.

Ingestion: Rinse mouth out with plenty of water.

Contact a Poison Control Center.

Do NOT induce vomiting. Give a glass of water.

After first aid, get appropriate in-plant, paramedic, or community medical support.

Note to Physicians: For acute or short-term repeated exposures to strong acids:

1. Airway problems may arise from laryngeal edema and inhalation exposure.

Treat with 100% oxygen initially.

2. Respiratory distress may require cricothyroidotomy if endotracheal intubation is contraindicated by excessive swelling.

3. Intravenous lines should be established immediately in all cases where there is evidence of circulatory compromise.

4. Strong acids produce a coagulation necrosis characterized by formation of a coagulum (eschar) as a result of the desiccating action of the acid on proteins in specific tissues.

INGESTION:

1. Immediate dilution (milk or water) within 30 minutes post-ingestion is recommended.

2. Do not attempt to neutralize the acid since exothermic reaction may extend the corrosive injury.

3. Be careful to avoid further vomiting since re-exposure of the mucosa to the acid is harmful. Limit fluids to one or two glasses in an adult.

4. Charcoal has no place in acid management.

5. Some authors suggest the use of lavage within 1 hour of ingestion.

SKIN:

1.Skin lesions require copious saline irrigation. Treat chemical burns as thermal burns with non-adherent gauze and wrapping.

2.Deep second-degree burns may benefit from topical silver sulfadiazine.

EYE:

1.Eye injuries require retraction of the eyelids to ensure thorough irrigation of the conjunctival cul-de-sacs. Irrigation should last at least 20-30 minutes. Do not use neutralizing agents or any other additives. Several liters of saline are required.

2.Cycloplegic drops (1% cyclopentolate for short-term use or 5% homatropine for longer term use), antibiotic drops, vasoconstrictive agents, or artificial tears may be indicated dependent on the severity of the injury.

3.Steroid eye drops should only be administered with the approval of a consulting ophthalmologist.

Section 5 - Fire-Fighting Measures

Flash Point: Nonflammable

Autoignition Temperature: Not applicable

LEL: Not applicable

UEL: Not applicable

Extinguishing Media: Use extinguishing media suitable for surrounding area. Water spray or fog, from a safe distance only.

General Fire Hazards/Hazardous Combustion Products: HIGHLY CORROSIVE.

Noncombustible liquid. Reacts vigorously with water.

Heating may cause expansion or decomposition leading to violent rupture of containers.

Contact with readily oxidizable organic material may cause ignition /fire.

Reacts with metals producing flammable/explosive hydrogen gas.

Decomposes on heating and produces acrid and toxic fumes of sulfur oxides (SO_x).

Fire Incompatibility: Reacts with mild steel, galvanized steel/zinc producing hydrogen gas which may form an explosive mixture with air.

Contact with readily oxidizable organic material may cause ignition /fire.

Avoid any contamination of this material as it is very reactive and any contamination is potentially hazardous.

Fire-Fighting Instructions: Contact fire department and tell them location and nature of hazard.

May be violently or explosively reactive. Wear full body protective clothing with breathing apparatus. Prevent, by any means available, spillage from entering drains or waterways. Consider evacuation.

Use water delivered as a fine spray to control fire and cool adjacent area.

Avoid spraying water onto liquid pools.

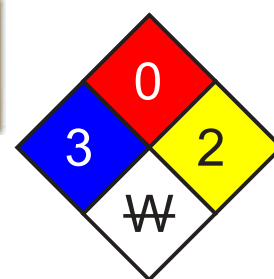
Do not approach containers suspected to be hot.

Cool fire-exposed containers with water spray from a protected location.

If safe to do so, remove containers from path of fire.

Equipment should be thoroughly decontaminated after use.

See
DOT
ERG



Fire Diamond

Section 6 - Accidental Release Measures

Small Spills: Clean up all spills immediately.

Avoid breathing vapors and contact with skin and eyes.

Control personal contact by using protective equipment.

Contain and absorb spill with sand, earth, inert material or vermiculite.

Wipe up. Place in a suitable labeled container for waste disposal.

Use soda ash or slaked lime to neutralize.

Large Spills: DO NOT touch the spill material. Clear area of personnel and move upwind.

Contact fire department and tell them location and nature of hazard.

May be violently or explosively reactive. Wear full body protective clothing with breathing apparatus. Prevent, by any means available, spillage from entering drains or waterways. Consider evacuation.

Stop leak if safe to do so.

Contain spill with sand, earth or vermiculite.

Collect recoverable product into labeled containers for recycling.

Neutralize/decontaminate residue.

Collect solid residues and seal in labeled drums for disposal.

Wash area and prevent runoff into drains.

After clean-up operations, decontaminate and launder all protective clothing and equipment before storing and reusing.

If contamination of drains or waterways occurs, advise emergency services.

DO NOT USE WATER OR NEUTRALIZING AGENTS INDISCRIMINATELY ON LARGE SPILLS.

Regulatory Requirements: Follow applicable OSHA regulations (29 CFR 1910.120).

See
DOT
ERG

Section 7 - Handling and Storage

Handling Precautions: Avoid generating and breathing mist. Avoid all personal contact, including inhalation.

Wear protective clothing when risk of exposure occurs.

Use in a well-ventilated area.

WARNING: To avoid violent reaction, ALWAYS add material to water and NEVER water to material.

Avoid smoking, bare lights or ignition sources.

Avoid contact with incompatible materials.

When handling, DO NOT eat, drink or smoke.

Keep containers securely sealed when not in use. Avoid physical damage to containers. Always wash hands with soap and water after handling. Work clothes should be laundered separately.

Launder contaminated clothing before reuse.

Use good occupational work practices. Observe manufacturer's storing and handling recommendations. Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions are maintained.

Recommended Storage Methods: Glass carboy. Glass container is suitable for laboratory quantities.

Plastic carboy. Polylined drum.

Check that containers are clearly labeled.

Packaging as recommended by manufacturer.

DO NOT use mild steel or galvanized containers.

Regulatory Requirements: Follow applicable OSHA regulations.

Section 8 - Exposure Controls / Personal Protection

Engineering Controls: Use in a well-ventilated area.

General exhaust is adequate under normal operating conditions.

Local exhaust ventilation may be required in special circumstances.

If risk of overexposure exists, wear NIOSH-approved respirator. Correct fit is essential to ensure adequate protection.

Provide adequate ventilation in warehouses and enclosed storage areas.

Personal Protective Clothing/Equipment:

Eyes: Chemical goggles. Full face shield.

Contact lenses pose a special hazard; soft lenses may absorb irritants and all lenses concentrate them.

Hands/Feet: Wear chemical protective gloves, eg. PVC.

Wear safety footwear or safety gumboots, eg. Rubber.

Respiratory Protection:

Exposure Range >1 to 10 mg/m³: Air Purifying, Negative Pressure, Half Mask

Exposure Range >10 to <15 mg/m³: Air Purifying, Negative Pressure, Full Face

Exposure Range 15 to unlimited mg/m³: Self-contained Breathing Apparatus, Pressure Demand, Full Face

Cartridge Color: white with dust/mist prefilter (use P100 or consult supervisor for appropriate dust/mist prefilter)

Other: Overalls. PVC apron. PVC protective suit may be required if exposure severe.

Eyewash unit. Ensure there is ready access to a safety shower.

Glove Selection Index:

NATURAL RUBBER..... Best selection

NATURAL+NEOPRENE..... Best selection

NEOPRENE..... Best selection

NEOPRENE/NATURAL..... Best selection

NITRILE..... Best selection

PE..... Best selection

PVC..... Best selection

SARANEX-23 Best selection

Section 9 - Physical and Chemical Properties

Appearance/General Info: Colorless, oily, dense, HIGHLY CORROSIVE liquid. Faint acid odor.

Material is a powerful oxidizing and dehydrating agent causing rapid human tissue destruction on contact.

Concentrated acid is very exothermic (generates heat) when mixed with water.

DANGER: Adding water to acid will cause violent steam explosion, scattering corrosive acid. Always add acid slowly to water.

Mixes with alcohol in all proportions. Available in technical, pure and analytical grades

Physical State: Liquid

Evaporation Rate: Non Vol. at 38 °C

Odor Threshold: 1.0 mg/m³

pH: < 1

Vapor Pressure (kPa): 0.133 at 146 °C

pH (1% Solution): 1

Vapor Density (Air=1): 3.40

Boiling Point: About 290 °C (554 °F)

Formula Weight: 98.07

Freezing/Melting Point: 10.36 °C (50.648 °F)

Specific Gravity (H₂O=1, at 4 °C): 1.6-1.84 at 15 °C

Decomposition Temperature (°C): 340

Water Solubility: Soluble in water

Section 10 - Stability and Reactivity

Stability/Polymerization/Conditions to Avoid: Product is considered stable. Hazardous polymerization will not occur.

Storage Incompatibilities: Segregate from alkalies, oxidizing agents and chemicals readily decomposed by acids, i.e. cyanides, sulfides, carbonates.

Reacts vigorously with water and alkali.

Contact with readily oxidizable organic material may cause ignition /fire.

Avoid contamination of water, foodstuffs, feed or seed.

Section 11 - Toxicological Information

Toxicity

Oral (rat) LD₅₀: 2140 mg/kg

Inhalation (rat) LC₅₀: 510 mg/m³/2h

Inhalation (human) TC_{L0}: 3 mg/m³/24w

Irritation

Eye (rabbit): 1.38 mg SEVERE

Eye (rabbit): 5 mg/30sec SEVERE

See RTECS WS 5600000, for additional data.

Section 12 - Ecological Information

Environmental Fate: No data found.

Ecotoxicity: TL_m Lepomis macrochirus (bluegill) 24.5 ppm/24 hr fresh water /Conditions of bioassay not specified; LC₅₀ Flounder 100 to 330 mg/l/48 hr aerated water /Conditions of bioassay not specified; LC₅₀ Shrimp 80 to 90 mg/l/48 hr aerated water /Conditions of bioassay not specified; LC₅₀ Prawn 42.5 ppm/48 hr salt water /Conditions of bioassay not specified

BCF: no food chain concentration potential

Biochemical Oxygen Demand (BOD): none

Section 13 - Disposal Considerations

Disposal: Recycle wherever possible or consult manufacturer for recycling options.

Follow applicable federal, state, and local regulations.

Treat and neutralize at an effluent treatment plant.

Use soda ash or slaked lime to neutralize.

Recycle containers, otherwise dispose of in an authorized landfill.

Bury residue in an authorized landfill.

Section 14 - Transport Information

DOT Hazardous Materials Table Data (49 CFR 172.101):

Shipping Name and Description: Sulfuric acid *with more than 51 percent acid*

ID: UN1830

Hazard Class: 8 - Corrosive material

Packing Group: II - Medium Danger

Symbols:

Label Codes: 8 - Corrosive

Special Provisions: A3, A7, B3, B83, B84, IB2, N34, T8, TP2, TP12

Packaging: Exceptions: 154 **Non-bulk:** 202 **Bulk:** 242

Quantity Limitations: **Passenger aircraft/rail:** 1 L **Cargo aircraft only:** 30 L

Vessel Stowage: **Location:** C **Other:** 14



Section 15 - Regulatory Information

EPA Regulations:

RCRA 40 CFR: Not listed

CERCLA 40 CFR 302.4: Listed per CWA Section 311(b)(4) 1000 lb (453.5 kg)

SARA 40 CFR 372.65: Listed

SARA EHS 40 CFR 355: Listed

RQ: 1000 lb

TPQ: 1000 lb

TSCA: Listed

Section 16 - Other Information

Disclaimer: Judgments as to the suitability of information herein for the purchaser's purposes are necessarily the purchaser's responsibility. Although reasonable care has been taken in the preparation of such information, Genium Group, Inc. extends no warranties, makes no representations, and assumes no responsibility as to the accuracy or suitability of such information for application to the purchaser's intended purpose or for consequences of its use.

CHEVRON -- UNLEADED GASOLINE, CPS201110 -- 9130-00N018990

===== Product Identification =====

Product ID:UNLEADED GASOLINE, CPS201110

MSDS Date:03/06/1991

FSC:9130

NIIN:00N018990

MSDS Number: CFZGX

=== Responsible Party ===

Company Name:CHEVRON

Box:4054

City:RICHMOND

State:CA

ZIP:94804

Country:US

Info Phone Num:800-582-3835

Emergency Phone Num:800-582-3835

CAGE:0AHD1

=== Contractor Identification ===

Company Name:CHEVRON ENVIRONMENTAL HEALTH CENTER INC

Address:15299 SAN PABLO AVE

Box:4054

City:RICHMOND

State:CA

ZIP:94804

Country:US

Phone:800-582-3835

CAGE:0AHD1

===== Composition/Information on Ingredients =====

Ingred Name:ING 12:BE EPIGENETIC PROCESS UNIQUE TO FEMALE MOUSE. INHAL
EXPOS TO WHOLE GAS VAP ALSO CAUSED KIDNEY DMG & (ING 14)
RTECS #:9999999ZZ

Ingred Name:ING 13:EVENTUALLY KIDNEY CANCER IN MALE RATS. NOTE:TOLUENE
APPEARS ON NAVY LIST OF OCCUP CHEM REPRO HAZS. SEEK (ING 15)
RTECS #:9999999ZZ

Ingred Name:ING 14:CONSULTATION FROM APPROP HLTH PROFESSIONALS
CONCERNING LATEST HAZ LIST INFO & SAFE HNDLG & EXPOS INFO (ING 16)
RTECS #:9999999ZZ

Ingred Name:ING 15:. FOR MORE COMPLETE INFORMATION, CONTACT NEHC .
RTECS #:9999999ZZ

Ingred Name:FIRST AID PROC:OBTAINED, THEN TAKE PERS & PROD CNTNR TO
NEAREST MED EMER TREATMENT CENTER/HOSPITAL. NOTE TO MD: (ING 18)
RTECS #:9999999ZZ

Ingred Name:ING 17:INGESTION OF THIS PRODUCT OR SUBSEQUENT VOMITING CAN
RESULT IN ASPIRATION WHICH CAN CAUSE PNEUMONITIS.
RTECS #:9999999ZZ

Ingred Name:SPILL PROC:REPORTING SPILLS OF THIS MATL THAT COULD REACH
ANY SURF WATERS. TOLL FREE NUMBER FOR U.S. COAST GUARD(ING 20)
RTECS #:9999999ZZ

Ingred Name:ING 19:NATIONAL RESPONSE CENTER IS (800) 424-8802.
RTECS #:9999999ZZ

Ingred Name:WASTE DISP METH:CONTAM MATLS IN DISPOSABLE CNTNRS & DISPOSE
OF IN A MANNER CONSISTENT W/APPLIC REGS. CONT LOC (ING 22)
RTECS #:9999999ZZ

Ingred Name:ING 21:ENVIRONMENTAL OR HEALTH AUTHORITIES FOR APPROVED
DISPOSAL OF THIS MATERIAL.
RTECS #:9999999ZZ

Ingred Name:ING 11:LIVER TUMORS IN FEMALE MICE. MECHANISM OF THIS
RESPONSE IS STILL BEING INVESTIGATED BUT IT IS THOUGHT TO (ING 13)
RTECS #:9999999ZZ

Ingred Name:GASOLINE
CAS:8006-61-9
RTECS #:LX3300000
Fraction by Wt: 100%
OSHA PEL:300 PPM
ACGIH TLV:300 PPM;500 STEL

Ingred Name:BENZENE, ETHYL-; (ETHYLBENZENE) (SARA 313)
CAS:100-41-4
RTECS #:DA0700000
Fraction by Wt: <1.4%
OSHA PEL:100 PPM
ACGIH TLV:100 PPM;125 STEL
EPA Rpt Qty:1000 LBS
DOT Rpt Qty:1000 LBS

Ingred Name:P-XYLENE; (P-DIMETHYLBENZENE) (SARA 313) (CERCLA)
CAS:106-42-3
RTECS #:ZE2625000
Fraction by Wt: <0.9%
OSHA PEL:100 PPM
ACGIH TLV:100 PPM;150 STEL
EPA Rpt Qty:1000 LBS
DOT Rpt Qty:1000 LBS

Ingred Name:M-XYLENE; (M-DIMETHYLBENZENE) (SARA 313) (CERCLA)
CAS:108-38-3
RTECS #:ZE2275000
Fraction by Wt: <4.6%
OSHA PEL:100 PPM
ACGIH TLV:100 PPM;150 STEL
EPA Rpt Qty:1000 LBS
DOT Rpt Qty:1000 LBS

Ingred Name:O-XYLENE; (O-DIMETHYLBENZENE) (SARA 313) (CERCLA)
CAS:95-47-6
RTECS #:ZE2450000
Fraction by Wt: <2.2%
OSHA PEL:100 PPM
ACGIH TLV:100 PPM;150 STEL
EPA Rpt Qty:1000 LBS
DOT Rpt Qty:1000 LBS

Ingred Name:TOLUENE (SARA 313) (CERCLA)
CAS:108-88-3

RTECS #:XS5250000
 Fraction by Wt: <6.5%
 OSHA PEL:200 PPM
 ACGIH TLV:50 PPM, S
 EPA Rpt Qty:1000 LBS
 DOT Rpt Qty:1000 LBS

Ingred Name:HEXANE; (N-HEXANE) (CERCLA)
 CAS:110-54-3
 RTECS #:MN9275000
 Fraction by Wt: <3%
 OSHA PEL:500 PPM
 ACGIH TLV:50 PPM
 EPA Rpt Qty:1 LB
 DOT Rpt Qty:1 LB

Ingred Name:CYCLOHEXANE (SARA 313) (CERCLA)
 CAS:110-82-7
 RTECS #:GU6300000
 Fraction by Wt: <2.4%
 OSHA PEL:300 PPM
 ACGIH TLV:300 PPM
 EPA Rpt Qty:1000 LBS
 DOT Rpt Qty:1000 LBS

Ingred Name:METHYL TERT-BUTYL ETHER (SARA 313) (CERCLA)
 CAS:1634-04-4
 RTECS #:KN5250000
 Fraction by Wt: <15%
 OSHA PEL:N/K
 ACGIH TLV:N/K
 EPA Rpt Qty:1 LB
 DOT Rpt Qty:1 LB

Ingred Name:BENZENE (SARA 313) (CERCLA). OSHA PEL:1 PPM TWA; 5 PPM STEL
 (MFR).
 CAS:71-43-2
 RTECS #:CY1400000
 Fraction by Wt: <4.9%
 OSHA PEL:SEE INGREDIENT
 ACGIH TLV:10 PPM
 EPA Rpt Qty:10 LBS
 DOT Rpt Qty:10 LBS

Ingred Name:SUPDAT:(CALLED ASPIR). CAN CAUSE SEV INJURY TO LUNGS &
 DEATH. LIFETIME INHAL OF WHOLE GAS VAP HAS CAUSED INCR (ING 12)
 RTECS #:9999999ZZ

===== Hazards Identification =====

LD50 LC50 Mixture:LD50:(ORAL,RAT) >5 ML/KG.
 Routes of Entry: Inhalation:YES Skin:YES Ingestion:YES
 Reports of Carcinogenicity:NTP:YES IARC:YES OSHA:YES
 Health Hazards Acute and Chronic:EYE CONT:SLIGHTLY IRRIT & COULD CAUSE
 PRLNG (DAYS) IMPAIRMENT OF VISION. SIGNS & SYMPS MAY INCL PAIN,
 TEARS, SWELL, REDNESS & BLURRED VISION. VAPS, FUMES/SPRAY MIST
 COULD ALSO CAUSE SIMILAR SIGNS & SY MPS. SKIN IRRIT:RPTD CONT MAY
 CAUSE SKIN TO CRACK/DRY FROM DEFAT ACTION. INHAL:SLIGHTLY TOX.
 TARGET (EFTS OF OVEREXP)
 Explanation of Carcinogenicity:BENZENE:IARC MONOGRAPHS, SUPP, VOL 7, PG

120, 1987:GRP 1. NTP 7TH ANNUAL RPT ON CARCINS, 1994:KNOWN TO BE
(SUPP DATA)

Effects of Overexposure:HLTH HAZ:ORGAN:NERV SYS. CONCS >1000 PPM MAY
CAUSE CNS EFTS SUCH AS HDCH, DIZZ, LOSS OF APPETITE, WEAK & LOSS OF
COORD. CONCS >5000 PPM MAY CAUSE LOSS OF CONSCIOUSNESS, COMA &
DEATH. INGEST:SLIGHTLY TOX IF SWALLOWED. TARGET ORGAN:NERV
SYS.SIGNS & SYMPS OF CNS EFTS MAY INCL HDCH, DIZZ, LOSS OF
APPETITE, WEAK & (SUPDAT)

Medical Cond Aggravated by Exposure:NONE SPECIFIED BY MANUFACTURER.

=====
===== First Aid Measures =====

First Aid:EYES:FLUSH IMMED W/FRESH WATER FOR AT LST 15 MINS WHILE
HOLDING LIDS OPEN. REMOVE CONT LENSES IF WORN. IF IRRIT PERSISTS,
SEE MD. SKIN:WASH THORO W/SOAP & WATER. REMOVE & WASH CONTAM CLTHG.
INHAL:MOVE TO FRESH AIR. IF ANY EFTS CONTINUE, SEE MD. INGEST:GIVE
WATER/MILK TO DRINK & TELEPHONE FOR MED ADVICE. DO NOT MAKE PERS
VOMIT UNLESS DIRECTED TO DO SO BY MED PERS. IF MED ADVICE CANNOT BE
(ING 17)

=====
===== Fire Fighting Measures =====

Flash Point Method:PMCC
Flash Point:<-49F,<-45C
Lower Limits:1.4%
Upper Limits:7.6%
Extinguishing Media:FIRE FIGHTING FOAM:ALCOHOL RESISTANT TYPE (AR).
AFFF, CO*2, DRY CHEMICAL.
Fire Fighting Procedures:USE NIOSH APPROVED SCBA & FULL PROTECTIVE
EQUIPMENT .
Unusual Fire/Explosion Hazard:EXTREME FIRE HAZ. LIQ VERY QUICKLY EVAPS,
EVEN AT LOW TEMPS & FORMS VAP (FUMES) WHICH CAN CATCH FIRE & BURN
W/EXPLO VIOLENCE. INVISIBLE VAP SPREADS (SUPP DATA)

=====
===== Accidental Release Measures =====

Spill Release Procedures:ELIM ALL SOURCES OF IGNIT. CLEAN UP SPILLS
IMMED, OBSERVING PRECS IN PROT EQUIP SECTION. MATL IS CONSIDERED TO
BE WATER POLLUTANT & RELS SHOULD BE PREVENTED FROM CONTAM SOIL &
WATER & FROM ENTERING DR AINAGE & SEWER SYS. U.S.A. REGS REQ (ING
19)
Neutralizing Agent:NONE SPECIFIED BY MANUFACTURER.

=====
===== Handling and Storage =====

Handling and Storage Precautions:USE ONLY AS MOTOR FUEL. DO NOT USE FOR
CLEANING, PRESS APPLIANCE FUEL/ANY OTHER SUCH USE. USE ONLY IN WELL
VENTED AREA. KEEP OUT OF REACH OF CHILDREN.
Other Precautions:DO NOT USE/STORE NEAR FLAME, SPKS/HOT SURFS. KEEP
CNTNR CLSD. DO NOT TRANSFER LIQ TO UNLABELED CNTNR. DO NOT WELD,
HEAT/DRILL CNTNR. REPLACE CAP/BUNG. EMPTIED CNTNR STILL CNTNS
HAZ/EXPLO VAP/LIQ. READ & OBSERVE ALL PRECS ON PROD LABEL.

=====
===== Exposure Controls/Personal Protection =====

Respiratory Protection:NO SPECIAL PROTECTION IS NORMALLY REQUIRED.
HOWEVER, IF OPERATING CONDITIONS CREATE AIRBORNE CONCENTRATIONS
WHICH EXCEED RECOMMENDED EXPOSURE STANDARDS, USE OF A NIOSH
APPROVED RESPIRATOR IS REQUIRED.
Ventilation:USE ONLY IN WELL VENTILATED AREAS.

Protective Gloves:IMPERVIOUS GLOVES .
 Eye Protection:ANSI APPROVED CHEM WORKERS GOGGS .
 Other Protective Equipment:ANSI APPROVED EYE WASH FOUNTAIN & DELUGE
 SHOWER . CONTACT CAN BE MINIMIZED BY WEARING PROTECTIVE CLOTHING.
 Work Hygienic Practices:NONE SPECIFIED BY MANUFACTURER.
 Supplemental Safety and Health
 EXPLO HAZ:EASILY & CAN BE SET ON FIRE BY MANY SOURCES SUCH AS PILOT
 LIGHTS, WELDING EQUIP & ELEC MOTORS & SWITCHES. EXPLAN OF
 CARCIN:CARCIN. OSHA REGULATED:29 CFR 1910.1028. HUMAN:MYELOID
 LEUKEMIA, HO DGKINS DISEASE, LYMPHOMA. EFTS OF OVEREXP:LOSS OF
 COORD. SUBSTANCE CAN DIRECTLY ENTER LUNGS IF IT IS SWALLOWED (ING
 11)

===== Physical/Chemical Properties =====

Boiling Pt:B.P. Text:>77F,>25C
 Vapor Pres:5-15 @100F
 Vapor Density:3-4
 Spec Gravity:0.7-0.8
 Solubility in Water:INSOLUBLE
 Appearance and Odor:ORANGE TO BRONZE LIQUID.
 Percent Volatiles by Volume:>99

===== Stability and Reactivity Data =====

Stability Indicator/Materials to Avoid:YES
 MAY REACT W/STRONG OXIDIZING AGENTS, SUCH AS CHLORATES, NITRATES,
 PEROXIDES, ETC.
 Stability Condition to Avoid:NEVER SIPHON GASOLINE BY MOUTH.
 Hazardous Decomposition Products:NORMAL COMBUSTION FORMS CARBON DIOXIDE
 & WATER VAPOR; INCOMPLETE COMBUSTION CAN PRODUCE CARBON MONOXIDE.

===== Disposal Considerations =====

Waste Disposal Methods:DISP MUST BE I/A/W FED, STATE & LOC REGS . CLEAN
 UP SM SPILLS USING APPROP TECHNIQUES SUCH AS SORBENT MATLS/PUMPING.
 WHERE FEASIBLE & APPROP, REMOVE CONTAM SOIL. FOLLOW PRESCRIBED
 PROCS FOR REPO RTING & RESPONDING TO LGR RELS. PLACE (ING 21)

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 document should seek competent professional advice to verify and
 assume responsibility for the suitability of this information to their
 particular situation.

Section 1 - Chemical Product and Company Identification

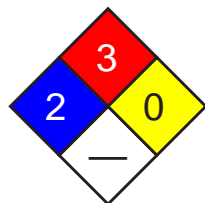
61

Material Name: Xylene **CAS Number:** 1330-20-7
Chemical Formula: C₈H₁₀
Structural Chemical Formula: C₆H₄(CH₃)₂
EINECS Number: 215-535-7
ACX Number: X1001166-8
Synonyms: BENZENE,DIMETHYL-; COMPONENT 1 (83%): XYLENES; COMPONENT 2 (17%): ETHYL BENZENE; DIMETHYLBENZENE; DIMETHYLBENZENES; EPA PESTICIDE CHEMICAL CODE 086802; KSYLEN; METHYL TOLUENE; METHYLTOLUENE; VIOLET 3; XILOLI; XYLENE; XYLENEN; XYLOL; XYLOLE
General Use: A strong solvent for general use in the manufacture of paints, varnishes, lacquers, thinners, inks, rubber, pesticides, herbicides and paint strippers.

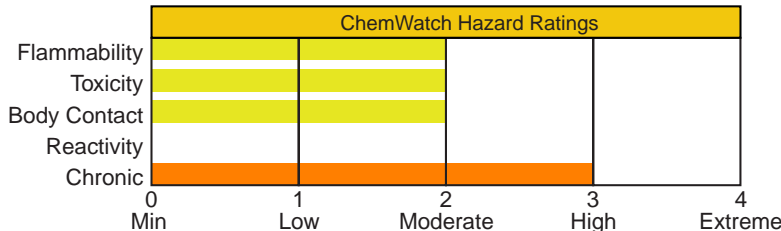
Section 2 - Composition / Information on Ingredients

Name	CAS	%
xylene	1330-20-7	> 95
OSHA PEL TWA: 100 ppm; 435 mg/m ³ .	NIOSH REL TWA: 100 ppm, 435 mg/m ³ ; STEL: 150 ppm, 655 mg/m ³ .	DFG (Germany) MAK TWA: 100 ppm; PEAK: 200 ppm; skin.
ACGIH TLV TWA: 100 ppm; STEL: 150 ppm.		
EU OEL TWA: 50 ppm; STEL: 100 ppm.		

Section 3 - Hazards Identification



Fire Diamond



HMIS	
2	Health
3	Flammability
0	Reactivity

ANSI Signal Word

Warning!



Flammable

☆☆☆☆☆ **Emergency Overview** ☆☆☆☆☆

Clear, sweet smelling liquid. Irritating to eyes/skin/respiratory tract. Other Acute Effects: dizziness, nausea, drowsiness. Chronic Effects: dermatitis, kidney/liver/peripheral nerve damage. May cause birth defects (animal data). Flammable.

Potential Health Effects

Target Organs: central nervous system (CNS), eyes, gastrointestinal (GI) tract, liver, kidneys, skin

Primary Entry Routes: inhalation, skin absorption (slight), eye contact, ingestion

Acute Effects

Inhalation: Xylene is a central nervous system depressant. The vapor is discomforting to the upper respiratory tract and may be harmful if inhaled.

Inhalation hazard is increased at higher temperatures.

Toxic effects are increased by consumption of alcohol.

Acute effects from inhalation of high concentrations of vapor are pulmonary irritation, including coughing, with nausea; central nervous system depression - characterized by headache and dizziness, increased reaction time, fatigue and loss of coordination.

If exposure to highly concentrated solvent atmosphere is prolonged this may lead to narcosis, unconsciousness, even coma and possible death.

Headache, fatigue, lassitude, irritability and gastrointestinal disturbances (e.g., nausea, anorexia and flatulence) are the most common symptoms of xylene overexposure. Injury to the heart, liver, kidneys and nervous system has also been noted among workers. Transient memory loss, renal impairment, temporary confusion and some evidence of disturbance of liver function was reported in three workers overcome by gross exposure to xylene (10000 ppm). One worker died and autopsy revealed pulmonary congestion, edema, and focal alveolar hemorrhage.

Volunteers inhaling xylene at 100 ppm for 5 to 6 hours showed changes in manual coordination, reaction time and slight ataxia. Tolerance developed during the workweek but was lost over the weekend. Physical exercise may antagonize this effect. Xylene body burden in humans exposed to 100 or 200 ppm xylene in air depends on the amount of body fat with 4% to 8% of total absorbed xylene accumulating in human adipose tissues.

Eye: The liquid is highly discomforting to the eyes and is capable of causing a mild, temporary redness of the conjunctiva (similar to wind-burn), temporary impairment of vision and/or other transient eye damage/ulceration.

The vapor is highly discomforting to the eyes.

The material may produce severe irritation to the eye causing pronounced inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.

Corneal changes have been reported in furniture polishers exposed to xylene.

Skin: The liquid is highly discomforting to the skin and may cause drying of the skin, which may lead to dermatitis and it is absorbed by the skin.

Toxic effects may result from skin absorption.

Open cuts, abraded or irritated skin should not be exposed to this material.

The material may accentuate any pre-existing skin condition.

The material may cause skin irritation after prolonged or repeated exposure and may produce a contact dermatitis (nonallergic). This form of dermatitis is often characterized by skin redness (erythema) and swelling (edema) which may progress to vesiculation, scaling and thickening of the epidermis. Histologically there may be intercellular edema of the spongy layer (spongiosis) and intracellular edema of the epidermis.

Ingestion: Considered an unlikely route of entry in commercial/industrial environments.

The liquid may produce gastrointestinal discomfort and may be harmful if swallowed. Ingestion may result in nausea, pain and vomiting. Vomit entering the lungs by aspiration may cause potentially lethal chemical pneumonitis.

Carcinogenicity: NTP - Not listed; IARC - Group 3, Not classifiable as to carcinogenicity to humans; OSHA - Not listed; NIOSH - Not listed; ACGIH - Not listed; EPA - Class D, Not classifiable as to human carcinogenicity; MAK - Not listed.

Chronic Effects: Chronic solvent inhalation exposures may result in nervous system impairment and liver and blood changes.

Prolonged or continuous skin contact with the liquid may cause defatting with drying, cracking, irritation and dermatitis following.

Small excess risks of spontaneous abortion and congenital malformation was reported amongst women exposed to xylene in the first trimester of pregnancy. In all cases however the women had also been exposed to other substances. Evaluation of workers chronically exposed to xylene has demonstrated a lack of genotoxicity. Exposure to xylene has been associated with increased risks of hemopoietic malignancies but, again simultaneous exposure to other substances (including benzene) complicate the picture. A long-term gavage study of mixed xylenes (containing 17% ethyl benzene) found no evidence of carcinogenic activity in rats and mice of either sex.

Exposure to the material for prolonged periods may cause physical defects in the developing embryo (teratogenesis).

Section 4 - First Aid Measures

Inhalation: Remove to fresh air.

Lay patient down. Keep warm and rested.

If available, administer medical oxygen by trained personnel.

If breathing is shallow or has stopped, ensure clear airway and apply resuscitation. Transport to hospital or doctor, without delay.

Eye Contact: Immediately hold the eyes open and flush continuously for at least 15 minutes with fresh running water. Ensure irrigation under eyelids by occasionally lifting the upper and lower lids.

Transport to hospital or doctor without delay. Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

Skin Contact: Immediately remove all contaminated clothing, including footwear (after rinsing with water).

Wash affected areas thoroughly with water (and soap if available).

Seek medical attention in event of irritation.

Ingestion: Contact a Poison Control Center.

Do NOT induce vomiting. Give a glass of water.

After first aid, get appropriate in-plant, paramedic, or community medical support.

Note to Physicians: For acute or short-term repeated exposures to xylene:

1. Gastrointestinal absorption is significant with ingestions.

See
DOT
ERG

For ingestions exceeding 1-2 mL (xylene)/kg, intubation and lavage with cuffed endotracheal tube is recommended.

The use of charcoal and cathartics is equivocal.

2. Pulmonary absorption is rapid with about 60-65% retained at rest.

3. Primary threat to life from ingestion and/or inhalation is respiratory failure.

4. Patients should be quickly evaluated for signs of respiratory distress (e.g. cyanosis, tachypnea, intercostal retraction, obtundation) and given oxygen. Patients with inadequate tidal volumes or poor arterial blood gases ($pO_2 < 50$ mm Hg or $pCO_2 > 50$ mm Hg) should be intubated.

5. Arrhythmias complicate some hydrocarbon ingestion and/or inhalation and electrocardiographic evidence of myocardial injury has been reported; intravenous lines and cardiac monitors should be established in obviously symptomatic patients. The lungs excrete inhaled solvents, so that hyperventilation improves clearance.

6. A chest x-ray should be taken immediately after stabilization of breathing and circulation to document aspiration and detect the presence of pneumothorax.

7. Epinephrine (adrenalin) is not recommended for treatment of bronchospasm because of potential myocardial sensitization to catecholamines.

Inhaled cardioselective bronchodilators (e.g. Alupent, Salbutamol) are the preferred agents, with aminophylline a second choice.

BIOLOGICAL EXPOSURE INDEX - BEI

These represent the determinants observed in specimens collected from a healthy worker exposed at the Exposure Standard (ES or TLV):

<u>Determinant</u>	<u>Index</u>	<u>Sampling Time</u>	<u>Comments</u>
Methylhippuric acids in urine	1.5 gm/gm creatinine 2 mg/min	End of shift Last 4 hrs of shift.	

Section 5 - Fire-Fighting Measures

Flash Point: 25.6 °C

Autoignition Temperature: 241 °C

LEL: 1.0% v/v

UEL: 7.0% v/v

Extinguishing Media: Alcohol stable foam; dry chemical powder; carbon dioxide.

Water spray or fog - Large fires only.

General Fire Hazards/Hazardous Combustion Products: Liquid and vapor are flammable.

Moderate fire hazard when exposed to heat or flame.

Vapor forms an explosive mixture with air.

Moderate explosion hazard when exposed to heat or flame.

Vapor may travel a considerable distance to source of ignition.

Heating may cause expansion or decomposition leading to violent rupture of containers.

On combustion, may emit toxic fumes of carbon monoxide (CO).

Other combustion products include carbon dioxide (CO₂).

Fire Incompatibility: Avoid contamination with strong oxidizing agents as ignition may result.

Fire-Fighting Instructions: Contact fire department and tell them location and nature of hazard.

May be violently or explosively reactive. Wear breathing apparatus plus protective gloves. Prevent, by any means available, spillage from entering drains or waterways.

If safe, switch off electrical equipment until vapor fire hazard removed.

Use water delivered as a fine spray to control fire and cool adjacent area.

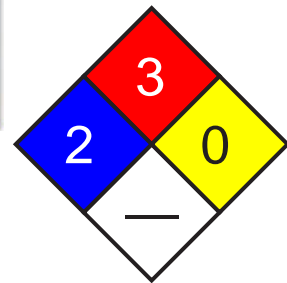
Avoid spraying water onto liquid pools.

Do not approach containers suspected to be hot.

Cool fire-exposed containers with water spray from a protected location.

If safe to do so, remove containers from path of fire.

See
DOT
ERG



Fire Diamond

Section 6 - Accidental Release Measures

Small Spills: Remove all ignition sources. Clean up all spills immediately.

Avoid breathing vapors and contact with skin and eyes.

Control personal contact by using protective equipment.

Contain and absorb small quantities with vermiculite or other absorbent material. Wipe up. Collect residues in a flammable waste container.

Large Spills: Clear area of personnel and move upwind.

Contact fire department and tell them location and nature of hazard.

May be violently or explosively reactive. Wear breathing apparatus plus protective gloves. Prevent, by any means available, spillage from entering drains or waterways.

No smoking, bare lights or ignition sources. Increase ventilation.

See
DOT
ERG

Stop leak if safe to do so. Water spray or fog may be used to disperse/absorb vapor. Contain spill with sand, earth or vermiculite.

Use only spark-free shovels and explosion proof equipment.

Collect recoverable product into labeled containers for recycling.

Absorb remaining product with sand, earth or vermiculite.

Collect solid residues and seal in labeled drums for disposal.

Wash area and prevent runoff into drains.

If contamination of drains or waterways occurs, advise emergency services.

Regulatory Requirements: Follow applicable OSHA regulations (29 CFR 1910.120).

Section 7 - Handling and Storage

Handling Precautions: Avoid all personal contact, including inhalation.

Wear protective clothing when risk of overexposure occurs.

Use in a well-ventilated area. Prevent concentration in hollows and sumps.

DO NOT enter confined spaces until atmosphere has been checked.

Avoid smoking, bare lights or ignition sources.

Avoid generation of static electricity. DO NOT use plastic buckets.

Ground all lines and equipment. Use spark-free tools when handling.

Avoid contact with incompatible materials.

When handling, DO NOT eat, drink or smoke.

Keep containers securely sealed when not in use. Avoid physical damage to containers. Always wash hands with soap and water after handling.

Work clothes should be laundered separately.

Observe manufacturer's storing and handling recommendations. Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions.

Recommended Storage Methods: Metal can; metal drum. Packing as recommended by manufacturer.

Check all containers are clearly labeled and free from leaks.

Plastic containers may only be used if approved for flammable liquids.

Regulatory Requirements: Follow applicable OSHA regulations.

Section 8 - Exposure Controls / Personal Protection

Engineering Controls: Use in a well-ventilated area. Local exhaust ventilation may be required for safe working, i. e. , to keep exposures below required standards; otherwise, PPE is required.

CARE: Use of a quantity of this material in confined space or poorly ventilated area, where rapid build-up of concentrated atmosphere may occur, could require increased ventilation and/or protective gear.

General exhaust is adequate under normal operating conditions.

Local exhaust ventilation may be required in specific circumstances.

If risk of overexposure exists, wear NIOSH-approved respirator.

Correct fit is essential to obtain adequate protection.

Provide adequate ventilation in warehouse or closed storage areas.

In confined spaces where there is inadequate ventilation, wear full-face air supplied breathing apparatus.

Personal Protective Clothing/Equipment:

Eyes: Safety glasses with side shields; or as required, chemical goggles.

Contact lenses pose a special hazard; soft lenses may absorb irritants and all lenses concentrate them.

Hands/Feet: Barrier cream with polyethylene gloves; Butyl rubber gloves or Neoprene gloves or PVC gloves.

Safety footwear.

Do NOT use this product to clean the skin.

Other: Overalls. Impervious protective clothing.

Eyewash unit.

Ensure there is ready access to an emergency shower.

Glove Selection Index:

PE/EVAL/PE Best selection

PVA Best selection

VITON Best selection

TEFLON Best selection

PVDC/PE/PVDC Poor to dangerous choice for other than short-term immersion

NATURAL+NEOPRENE..... Poor to dangerous choice for other than short-term immersion

NEOPRENE/NATURAL..... Poor to dangerous choice for other than short-term immersion

NITRILE+PVC Poor to dangerous choice for other than short-term immersion

HYPALON Poor to dangerous choice for other than short-term immersion

NAT+NEOPR+NITRILE Poor to dangerous choice for other than short-term immersion

BUTYL Poor to dangerous choice for other than short-term immersion

BUTYL/NEOPRENE Poor to dangerous choice for other than short-term immersion

NITRILE	Poor to dangerous choice for other than short-term immersion
NEOPRENE.....	Poor to dangerous choice for other than short-term immersion
PVC.....	Poor to dangerous choice for other than short-term immersion

Section 9 - Physical and Chemical Properties

Appearance/General Info: Clear colorless flammable liquid with a strong aromatic odor; floats on water. Mixes with most organic solvents.

Physical State: Liquid

pH: Not applicable

Odor Threshold: 5.00 x10⁻⁵ ppm

pH (1% Solution): Not applicable.

Vapor Pressure (kPa): 0.5 at 15 °C

Boiling Point: 137 °C (279 °F) to 140 °C (284 °F)

Vapor Density (Air=1): 3.66 at 15 °C

Freezing/Melting Point: -47 °C (-53 °F)

Formula Weight: 106.18

Volatile Component (% Vol): 100

Specific Gravity (H₂O=1, at 4 °C): 0.87 at 15 °C

Water Solubility: Practically insoluble in water

Evaporation Rate: 0.7 Bu Ac=1

Section 10 - Stability and Reactivity

Stability/Polymerization/Conditions to Avoid: Product is considered stable. Hazardous polymerization will not occur.

Storage Incompatibilities: Avoid storage with oxidizers.

Section 11 - Toxicological Information

Toxicity

Oral (human) LD₅₀: 50 mg/kg

Oral (rat) LD₅₀: 4300 mg/kg

Inhalation (human) TC_{Lo}: 200 ppm

Inhalation (man) LC_{Lo}: 10000 ppm/6h

Inhalation (rat) LC₅₀: 5000 ppm/4h

Reproductive effector in rats

Irritation

Skin (rabbit):500 mg/24h moderate

Eye (human): 200 ppm irritant

Eye (rabbit): 87 mg mild

Eye (rabbit): 5 mg/24h SEVERE

See RTECS ZE 2100000, for additional data.

Section 12 - Ecological Information

Environmental Fate: Most of the xylenes are released into the atmosphere where they may photochemically degrade by reaction with hydroxyl radicals (half-life 1-18 hr). The dominant removal process in water is volatilization. Xylenes are moderately mobile in soil and may leach into groundwater where they are known to persist for several years, despite some evidence that they biodegrade in both soil and groundwater. Bioconcentration is not expected to be significant.

Ecotoxicity: LC₅₀ Rainbow trout 13.5 mg/l/96 hr /Conditions of bioassay not specified; LD₅₀ Goldfish 13 mg/l/24 hr /Conditions of bioassay not specified

Henry's Law Constant: 0.22

BCF: estimated at 2.14 to 2.20

Octanol/Water Partition Coefficient: log K_{ow} = 3.12 to 3.20

Soil Sorption Partition Coefficient: K_{oc} = 48 to 68

Section 13 - Disposal Considerations

Disposal: Consult manufacturer for recycling options and recycle where possible.

Follow applicable federal, state, and local regulations.

Incinerate residue at an approved site.

Recycle containers where possible, or dispose of in an authorized landfill.

Section 14 - Transport Information

DOT Hazardous Materials Table Data (49 CFR 172.101):

Note: This material has multiple possible HMT entries. Choose the appropriate one based on state and condition of specific material when shipped.

Shipping Name and Description: Xylenes

ID: UN1307

Hazard Class: 3 - Flammable and combustible liquid

Packing Group: II - Medium Danger

Symbols:

Label Codes: 3 - Flammable Liquid

Special Provisions: IB2, T4, TP1

Packaging: **Exceptions:** 150 **Non-bulk:** 202 **Bulk:** 242

Quantity Limitations: **Passenger aircraft/rail:** 5 L **Cargo aircraft only:** 60 L

Vessel Stowage: **Location:** B **Other:**



Shipping Name and Description: Xylenes

ID: UN1307

Hazard Class: 3 - Flammable and combustible liquid

Packing Group: III - Minor Danger

Symbols:

Label Codes: 3 - Flammable Liquid

Special Provisions: B1, IB3, T2, TP1

Packaging: **Exceptions:** 150 **Non-bulk:** 203 **Bulk:** 242

Quantity Limitations: **Passenger aircraft/rail:** 60 L **Cargo aircraft only:** 220 L

Vessel Stowage: **Location:** A **Other:**



Section 15 - Regulatory Information

EPA Regulations:

RCRA 40 CFR: Listed U239 Ignitable Waste

CERCLA 40 CFR 302.4: Listed per CWA Section 311(b)(4), per RCRA Section 3001 100 lb (45.35 kg)

SARA 40 CFR 372.65: Listed

SARA EHS 40 CFR 355: Not listed

TSCA: Listed

Section 16 - Other Information

Disclaimer: Judgments as to the suitability of information herein for the purchaser's purposes are necessarily the purchaser's responsibility. Although reasonable care has been taken in the preparation of such information, Genium Group, Inc. extends no warranties, makes no representations, and assumes no responsibility as to the accuracy or suitability of such information for application to the purchaser's intended purpose or for consequences of its use.