ODOROUS CHEMICALS

The following is a list of typical chemical components that have previously resulted in odor complaints. To determine if the chemical substances on your project are from one of the groups that have been an issue in the past, look in Section 3 of the Safety Data Sheet (SDS)-Composition/Information on Ingredients (see attached example.

It is critical that the Project Manager (PM) ensure that chemicals with a potentially noxious odor not be used, when possible. If possible, they should be replaced with a less odorous chemical.

The list provided below is by no means a complete list of all noxious chemicals. If you have specific concerns not addressed in this document, please contact EHS. If noxious chemicals must be used, every effort should be made to perform the work when the building is not occupied. In the event this proves to be infeasible, notify the building manager or facility representative and EHS prior to commencing work. In addition, appropriate ventilation may be considered in coordination with EHS.

Potentially Noxious Compounds

Oil-Based Paints: Containing petroleum distillates, mineral spirits, kerosene, white spirits, naphtha, Stoddard solvent, benzene, turpentine

Aerosol paints including "Krylon": Containing xylene, propane, butane, ethylbenzene, acetone, methyl ethyl ketone

Paint and Mastic Removers: Containing toluene, methanol, acetone, aromatic naphtha solvent, Nmethylpyrrolidone (NMP), Dibasic esters (DBE), including dimethyl adipate ester, dimethyl succinate ester, and dimethyl glutarate ester

Water-Proofing Products and adhesives: Containing 2-Part epoxies, perfluorinated compounds (PFCs), Naphtha, n-hexane, methyl ethyl ketone

Varnish/Lacquer: Containing butyl acetate, xylene, toluene

Caulks and Sealants: Containing silicon, polyacrylates, isocyanates

Lighter fluids and other fuels or solvents with flash points below 140^{o} F

Mercaptans: These products contain sulfur and the odor has been described as rotten eggs, garlic, rotting cabbages, or smelly socks. Olfactory fatigue may prevent adequate warning of hazardous concentrations. Synonyms - Methanethiol; Thiomethanol; Mercaptomethane; Methyl Sulfhydrate; Thimethyl Alcohol; Ethanethiol; Ethyl sulfhydrate; Mercaptoethane; Ethyl Hydrosulfide; Ethyl Thioalcohol; Thioethanol; and Thioethyl Alcohol.

Methylene chloride (Dichloromethane) should never be used in an indoor environment.

Odor Threshold

The odor threshold for a material is defined as the concentration in the air of a particular material, when the typical person should first be able to smell it. Many chemicals have good detection properties and you can detect the odor (smell) long before the concentrations become hazardous to human health. Some substances

can be detected when their concentration is only few milligrams per 1,000 tons, which is less than a drop in an Olympic swimming pool. A typical odor threshold level that is considered low is **1 ppm**. This information can be found in Section 9 of the SDS-Physical and Chemical Properties (see attached example).

Ventilation

Return air vents can draw evaporating chemicals from the project location site and distribute odors to adjacent spaces. As a chemical evaporates and becomes airborne, the material will generally move through a building along the same path as the airflow. Ventilation systems are designed to create positive air pressure in each conditioned space in order to force air out through cracks, crevices and other spaces that exist in walls, floors, and ceilings. If a ventilation system creates negative air pressure, air can be drawn into the space, resulting in the transport of dust, dirt, and odors from wall cavities, crawl spaces, and adjacent areas.

HVAC Units

One method to isolate the movement of chemical odors is to seal supply and return openings, as well as window units, with plastic. Care shall be taken to isolate or protect plenum areas above false ceilings. Operate exhaust systems, or add supplemental exhaust, where feasible, to negatively pressurize the area. If the HVAC system must remain operational, (e.g. the HVAC serves other occupied rooms), temporary activated carbon impregnated filters may be installed on the return air ductwork (i.e. on ceiling return grills, transfer ducts, or main return duct).Window convection openings should be sealed with plastic. The temporary filters must receive periodic maintenance throughout the project and be removed at the end of the project.

Surrounding Areas

All surrounding occupied areas must be protected from construction activities. Pressurize the occupied spaces to prevent entry of dust/odors during construction activities. Doors and windows should be kept closed to the space undergoing renovation. Where there are no doors, erect plastic barriers to separate the occupied areas from demolition/construction activities. Where openings must be maintained for entry of personnel or materials, a reduced pressure differential must be maintained at the work site or plastic doors constructed. When there is the potential for odorous emissions, portable local exhaust systems should be utilized. These must be self-contained systems with appropriate pollutant filtration or provisions must be made for exhausting outside the building.

Child Occupied Facilities

If possible do not use any chemicals with the above listed constituents or chemicals that have low odor thresholds in child occupied facilities. If you must use these chemicals perform the work after hours or on weekends, when the facility is empty. In emergency cases where work must be performed while the building is occupied, you must contact the facility director and EHS prior to starting work.

Communication

When your renovation and repair project may use products that are potentially noxious, protective measures for building occupants and third parties are critical. Communication with all potentially affected groups is important to create a safe working environment.

EXAMPLES OF ODOR THRESHOLD VALUES

Oil-Based Paints: Containing petroleum distillates (none established), mineral spirits (none established), kerosene (**0.3-3 ppm**), white spirits (**0.5-5 ppm**), naphtha (**0.5-1.1 ppm**), Stoddard solvent (**1-30 ppm**), benzene (**1.5 ppm**), turpentine (**100 ppm**)

Aerosol paints including "Krylon": Containing xylene (**1.1 ppm**), propane (**1,800 ppm**), butane (**2,700 ppm),** ethylbenzene (**2.3 ppm**), acetone (**20 ppm**), methyl ethyl ketone (**5.4 ppm**)

Paint and Mastic Removers: Containing toluene (**0.4 ppm**), methanol (**100-1,500 ppm**), acetone (**20 ppm**), aromatic naphtha solvent (not available), N-methylpyrrolidone (NMP) (**0.17-0.36 ppm**), Dibasic esters (DBE) (**0.1 ppm**), including dimethyl adipate ester (**0.01 ppm**), dimethyl succinate ester (**0.1 ppm**), and dimethyl glutarate ester (**0.1 ppm**)

Water-Proofing Products and adhesives: Containing 2-Part epoxies (Not available), perfluorinated compounds (PFCs) (**0.04 ppm**), Naphtha (**0.5-1.1 ppm**), n-hexane (**65-248 ppm**), methyl ethyl ketone (**5.4 ppm**)
Varnish/Lacquer: Containing butyl acetate (**7-20 ppm**), xylene (**1.1 ppm**), toluene (**0.4 ppm**)

Caulks and Sealants: Containing silicon (**1-5 ppm**), polyacrylates (not available), isocyanates (**2.1 ppm**)

Mercaptans **(0.26-0.97 ppb)**

ETHYL MERCAPTAN

1. PRODUCT AND COMPANY IDENTIFICATION

Company

Odor-Tech, LLC.
7591 Esler Field Road
Pineville, LA 71360

Thio and Fine Chemicals

Customer Service Telephone Number: (800) 628-4453
(Monday through Friday, 8:30 AM to 5:30 PM EST)

Emergency Information

Transportation: CHEMTREC: (800) 424-9300
(24 hrs., 7 days a week)
Medical: Rocky Mountain Poison Center: (866) 767-5089
(24 hrs., 7 days a week)

Product Information

Product name: ETHYL MERCAPTAN
Synonyms: ETHYL MERCAPTAN, ESH
Molecular formula: C2H5SH
Chemical family: mercaptans
Molecular weight: 62.13 g/mol
Product use: Chemical intermedia

2. HAZARDS IDENTIFICATION

Emergency Overview

Color: white
Physical state: liquid
Odor: mercaptans

DANGER!
EXTREMELY FLAMMABLE LIQUID AND VAPOR.
VAPOR MAY CAUSE FLASH FIRE.
MAY BE FATAL IF SWALLOWED.
OBJECTIONABLE ODOR MAY CAUSE NAUSEA, HEADACHE OR DIZZINESS.
MAY CAUSE HEADACHE, NAUSEA, DIZZINESS, DROWSINESS, LOSS OF CONSCIOUSNESS.

Potential Health Effects

Primary routes of exposure:
Inhalation and skin contact.

Signs and symptoms of acute exposure:
Objectionable odor may cause nausea, headache or dizziness. May also cause: central nervous system effects, drowsiness, respiratory depression (severity of effects depends on extent of exposure).

Skin:
No more than slightly toxic. Slightly irritating. (based on animal studies)

EXAMPLE

Inhalation:
Practically nontoxic. (based on animal studies)

Eyes:
Slightly irritating. (based on animal studies)

Ingestion:
Slightly toxic. (based on animal studies)

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	CAS-No.	Wt/Wt	OSHA Hazardous
Ethanethiol	75-08-1	100 %	

The substance(s) marked with a "Y" in the Hazard column above, are those identified as hazardous chemicals under the criteria of the OSHA Hazard Communication Standard (29 CFR 1910.1200).

4. FIRST AID MEASURES

Inhalation:
If inhaled, remove victim to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Skin:
In case of contact, immediately flush skin with plenty of water. Remove material from clothing. Wash clothing before reuse. Thoroughly clean shoes before reuse.

Eyes:
Immediately flush eye(s) with plenty of water.

Ingestion:
If swallowed, DO NOT induce vomiting. Get medical attention. Never give anything by mouth to an unconscious person.

5. FIREFIGHTING MEASURES

Flash point -49 °F (-45 °C) (Method: Standard ASTM D 3278)

Auto-ignition temperature: 572 °F (300 °C)

Lower flammable limit (LFL): 2.8

Upper flammable limit (UFL): 18 %(V)

Extinguishing media (suitable):
water spray, carbon dioxide, foam, dry chemical

Protective equipment:

EXAMPLE

Fire fighters and others who may be exposed to products of combustion should wear full fire fighting turn out gear (full Bunker Gear) and self-contained breathing apparatus (pressure demand / NIOSH approved or equivalent).

Further firefighting advice:
Cool closed containers exposed to fire with water spray.
Fire fighting equipment should be thoroughly decontaminated after use.
Do not allow run-off from fire fighting to enter drains or water courses.

Fire and explosion hazards:
When burned, the following hazardous products of combustion can occur:
Carbon oxides
sulfur oxides
hydrogen sulfide

6. ACCIDENTAL RELEASE MEASURES

In case of spill or leak:
Prevent further leakage or spillage if you can do so without risk. Evacuate area of all unnecessary personnel. Ventilate the area. Eliminate all ignition sources. Avoid generation of vapors. Contain and collect spillage with non-combustible absorbent material such as sodium bicarbonate, sodium carbonate, calcium carbonate, clean sand or non-acidic clay and then wet down (dampen) the mixture with water. Sweep up using non-sparking tools and place into suitable properly labeled containers for prompt disposal. The sweeping should be wetted down further with water. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Consult a regulatory specialist to determine appropriate state or local reporting requirements, for assistance in waste characterization and/or hazardous waste disposal and other requirements listed in pertinent environmental permits.

7. HANDLING AND STORAGE

Handling

General information on handling:
Keep away from heat, sparks and flames.
Do not taste or swallow.
Avoid breathing vapor.
Wash thoroughly after handling.
Keep container closed.
Use only with adequate ventilation.
Check that all equipment is properly grounded and installed to satisfy electrical classification requirements.
Container hazardous when empty.
Emptied container retains vapor and product residue.
Follow label warnings even after container is emptied.
RESIDUAL VAPORS MAY EXPLODE ON IGNITION.
DO NOT CUT, DRILL, GRIND, OR WELD ON OR NEAR THIS CONTAINER.
Improper disposal or reuse of this container may be dangerous and/or illegal.

Storage

General information on storage conditions:
Ensure that all storage and handling equipment is properly grounded and installed to satisfy electrical classification requirements. Static electricity may accumulate when transferring material. All storage containers, including drums,

EXAMPLE

cylinders and IBCs, must be bonded and grounded during filling and emptying operations. Store in cool, dry, well ventilated area away from sources of ignition such as flame, sparks and static electricity. Observe all federal, state and local regulations and National Fire Protection Association (NFPA) Codes which pertain to the specific local conditions of storage and use, including OSHA 29 CFR 1910.106 and NFPA 30, 70, 77, and 497.

Storage incompatibility – General:
Store away from oxidizers and reactive materials.

Store separate from: hydrogen peroxide

hypochlorites

nitric acid

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Airborne Exposure Guidelines:

Ethanethiol (75-08-1)

US. ACGIH Threshold Limit Values

Time Weighted Average (TWA): 0.5 ppm

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Ceiling Limit Value: 10 ppm (25 mg/m

Only those components with exposure limits are printed in this section. Limits with skin contact designation above have skin contact effect. Air sampling alone is insufficient to accurately quantitate exposure. Measures to prevent significant cutaneous absorption may be required. Limits with a sensitizer designation above indicate that exposure to this material may cause allergic reactions.

Engineering controls:
Investigate engineering techniques to reduce exposures below airborne exposure limits or to otherwise reduce exposures. Provide ventilation if necessary to minimize exposures or to control exposure levels to below airborne exposure limits (if applicable see above). Provide ventilation if necessary to control exposure levels below airborne exposure limits (see above). Consult ventilation manual or NFPA Standard 91 for design of exhaust systems.

Respiratory protection:
When airborne exposure limits are exceeded, use NIOSH approved respiratory protection equipment appropriate to the material and/or its component. Consult respirator manufacturer to determine appropriate type equipment for a given application. Observe respirator use limitations specified by NIOSH or the manufacturer. For emergency and other conditions where there may be a potential for significant exposure or where exposure limit may be significantly exceeded, use an approved full face positive-pressure, self-contained breathing apparatus or positive-pressure airline with auxiliary self-contained air supply. Respiratory protection programs must comply with 29 CFR § 1910.134.

Skin protection:
Minimize skin contamination by following good industrial hygiene practice. Wearing protective gloves is recommended. Wash thoroughly after handling.

EXAMPLE

Eye protection:
Use good industrial practice to avoid eye contact.

9. PHYSICAL AND CHEMICAL PROPERTIES

Color:	white
Physical state:	liquid
Odor:	mercaptans
Odor threshold:	0.4 ppb
pH:	not determined
Density:	not determined
Specific Gravity (Relative density):	0.839 (68 °F(20 °C))
Vapor pressure:	401 mmHg (68 °F (20 °C))calculated
Relative vapor density:	2.1
Vapor density:	2.1 kg/m3
Boiling point/boiling range:	95 °F (35 °C)
Freezing point:	-234 °F (-148 °C)
Melting point/range:	-234 °F (-148 °C)
Evaporation rate:	not determined
Solubility in water:	6.8 g/l 68 °F (20 °C)
Refractive index:	1.431 68 °F (20 °C)
Viscosity, dynamic:	0.29 mPa.s 68 °F (20 °C)
% Volatiles:	100 %
Molecular weight:	g/mol
Oil/water partition coefficient:	1.5
Critical point:	Critical pressure: 40,653 mmHg Critical temperature: 437.9 °F (225.5 °C)
Henry's constant:	455.8E+00 Pa.m^3/mol

EXAMPLE

10. STABILITY AND REACTIVITY

Stability:
This material is chemically stable under normal and anticipated storage, handling and processing conditions.

Materials to avoid:
Strong oxidizing agents
Hydrogen peroxide
Nitric acid
Reactive materials
Hypochlorites
Risk of violent reaction.

Conditions / hazards to avoid:
Sparks, flames, ignition points and static electricity.

Hazardous decomposition products:

Thermal decomposition giving flammable and toxic products
Carbon oxides
sulfur oxides
hydrogen sulfide

11. TOXICOLOGICAL INFORMATION

Data on this material and/or a similar material are summarized be

Data for ETHYL MERCAPTAN

Acute toxicity

Oral:
Slightly toxic. (rat) LD50 = 682 mg/kg.

Dermal:
No more than slightly toxic. (rabbit) LD > 2,0 /kg.

Inhalation:
Practically nontoxic. (rat) 4 LC50 11.2 m 4420 ppm). (vapor)

(laboratory animal) signs: c nosis, centra rvous system depression, respiratory irritation, breathing difficulties, resp ion, death (At h concentrations)

Skin Irrita a:
Slightly i ting. (rabbit) (4 h

Ey itation:
S tly irritatin rabbit) (data r a similar material)

Repe se toxicity
Subchro oral admi ation to rat / affected organ(s): blood, liver / signs: changes in blood cell counts, ch s in n structure or function / (data for a similar material)

EXAMPLE

Subchronic inhalation administration to rat / affected organ(s): blood, liver, kidney / signs: changes in blood cell counts, changes in organ structure or function / (data for a similar material)

Subchronic inhalation administration to rat / affected organ(s): lung, kidney / signs: inflammation, changes in organ structure or function, changes in organ weights / (data for a similar material)

Genotoxicity

Assessment in Vitro:
No genetic changes were observed in laboratory tests using: bacteria

Both positive and equivocal responses have been reported in tests using: animal cells

Assessment in Vivo:
No genetic changes were observed in laboratory tests using: mice, (data for similar material)

Developmental toxicity
Exposure during pregnancy. inhalation (mouse) / No birth defects were observed.

Human experience

Inhalation:
Central nervous system: headache, nausea, respiratory depression.
Nose: The gas deadens the sense of smell. Do not depend on odor t etect pres ce of ga

12. ECOLOGICAL INFORMATION

Chemical Fate and Pathway
Data on this material and/or a similar material are summarized bel

Data for ETHYL MERCAPTAN

Biodegradation:
Not readily biodegradable. (28 d) biodegradation 27. / Clos le test

Octanol Water Partition Coefficie
log Pow = 1.5

Photodegradation:
air Half-life direct photolys = 0.2 d

Mobility and Distribution he Environm t:
Slight adsorption /
Evaporation / Half-life 2.5 h (
Evaporati Half-life 29 h (p d)

Ecotoxi ogy
Data o is materia d/or a simi material are summarized below.

Data fo HY MERCAPT

EXAMPLE

Aquatic toxicity data:
Moderately toxic. Oncorhynchus mykiss (rainbow trout) 96 h LC50 = 2.4 mg/l

Aquatic invertebrates:
Highly toxic. Daphnia magna (Water flea) 24 h EC50 = 0.38 mg/l

Microorganisms:
Activated sludge 3 h EC50 880.5 mg/l (similar material)

13. DISPOSAL CONSIDERATIONS

Waste disposal:
Disposal via incineration is recommended. Dispose of in accordance with federal, state and local regulations. Consult a regulatory specialist to determine appropriate state or local reporting requirements, for assistance in waste characterization and/or hazardous waste disposal and other requirements listed in pertinent environmental permits. Note: Chemical additions to, processing of, or otherwise altering this material may make this waste management information incomplete, inaccurate, or otherwise inappropriate. Furthermore, state and local waste disposal requirements may be more restrictive or otherwise different from federal laws and regulations.

14. TRANSPORT INFORMATION

US Department of Transportation (DOT)

UN Number	:	2363
Proper shipping name	:	Ethyl mercaptan
Class	:	3
Packaging group	:	I
Marine pollutant	:	yes

International Maritime Dangerous Goods Code (IMDG)

UN Number	:	2363
Proper shipping name	:	ETHYL MERCAPTAN
Class	:	3
Packaging group	:	I
Marine pollutant	:	[illegible]
Flash point	:	[illegible] °F ([illegible] °C)

15. REGULATORY INFORMATION

Chemical Inventory Status

EU. EINECS	EINECS	Conforms to
US. Toxic Substances Control Act	TSCA	The components of this product are all on the TSCA Inventory.
Australian Industrial Chemical (Notification and Assessment) Act	AICS	Conforms to

EXAMPLE

Canada. Canadian Environmental Protection Act (CEPA). Domestic Substances List (DSL)	DSL	All components of this product are on the Canadian DSL.
Japan. Kashin-Hou Law List	ENCS (JP)	Conforms to
Korea. Existing Chemicals Inventory (KECI)	KECI (KR)	Conforms to
Philippines. The Toxic Substances and Hazardous and Nuclear Waste Control Act	PICCS (PH)	Conforms to
China. Inventory of Existing Chemical Substances	IECSC (CN)	Conforms to

United States – Federal Regulations

SARA Title III – Section 302 Extremely Hazardous Chemicals:

The components in this product are either not SARA Section 302 regulated or regulated but present in negligible concentrations.

SARA Title III - Section 311/312 Hazard Categories:
Acute Health Hazard, Fire Hazard

SARA Title III – Section 313 Toxic Chemicals:
SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) - Reportable Quantity (RQ):

The components in this product are either not CERCLA regulated, regulated but present in negligible concentrations, or regulated with no assigned reportable quantity.

OSHA Regulated Carcinogens (NTP, IARC, OSHA):

NTP:
No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

IARC:
No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

OSHA:
No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

United States – State Regulations

New Jersey Right to Know

Chemical Name	CAS-No.
Ethanethiol	75-08-1

EXAMPLE

New Jersey Right to Know – Special Health Hazard Substance(s)

Chemical Name	CAS-No.
Ethanethiol	75-08-1

Pennsylvania Right to Know

Chemical Name	CAS-No.
Ethanethiol	75-08-1

California Prop. 65
This product does not contain any chemicals known to the State of California to cause cancer, birth defects, or any other reproductive defects.

16. OTHER INFORMATION

Miscellaneous:

Other information: This MSDS covers the following grades: Odora[illegible]rade

Latest Revision(s):

Revised Section(s): Name changed, section 16 changed
Reference number: 000000068369
Date of Revision: 12/18/2013
Date Printed: 12/19/2013

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EXAMPLE