CHEMICAL INCIDENT RESPONSE

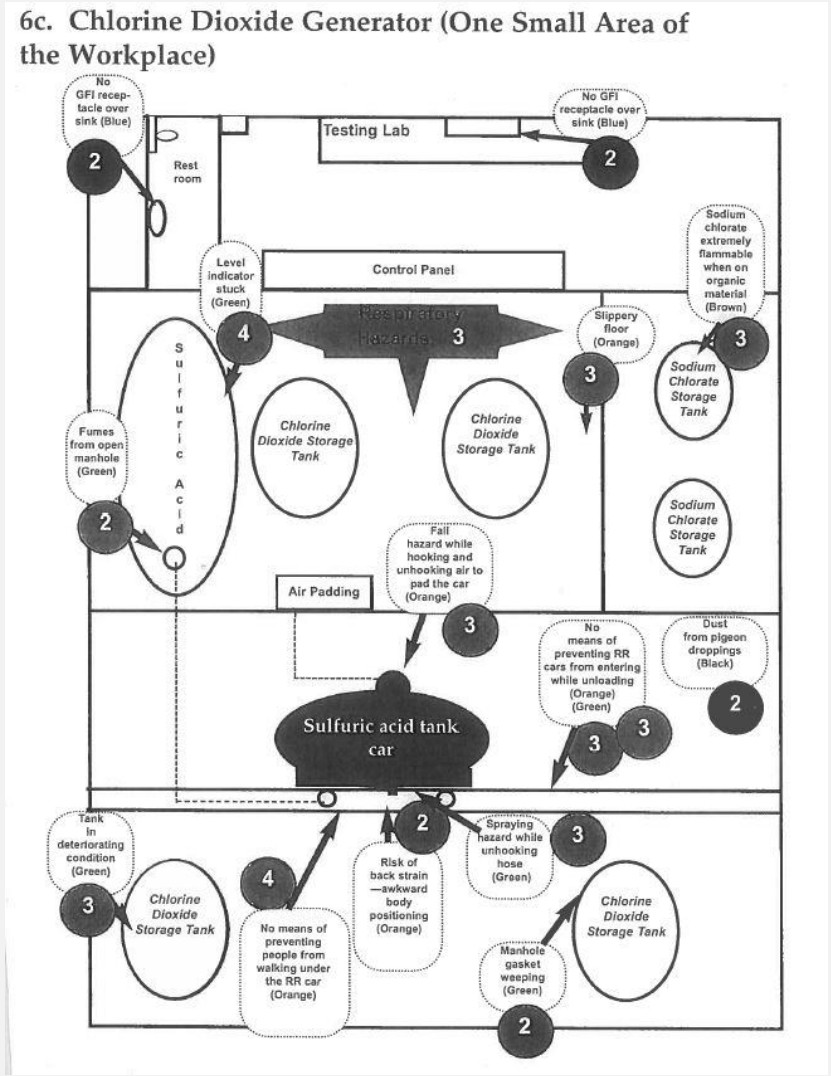
Chemical Safety & Climate Change Preparedness Training

Leominster, MA 01853

EMERGENCY RESPONSE PLAN (ERP) HAZWOPER STANDARD – 29 CFR 1910.120

- *29 CFR 1910.120(q)*
- "An ERP shall be developed and implemented prior to commencement of emergency response operations"
- "The plan shall be in writing and available for inspection and copying by employees, their representatives and OSHA inspectors"

RISK MAPPING



RESPONSE CONSIDERATIONS:

- Plan
- Training Levels Of Staff (Awareness, Operations, Technician)
- Response Equipment Available
- Personal Protective Equipment Available
- How Big Is The Incident
- Who Do I Need To Contact
- Will I Need Outside Contractors

SIZING UP THE SITUATION

(PROBLEM IDENTIFICATION & AN ASSESSMENT OF THE POSSIBLE CONSEQUENCES)

- What is the incident nature ?
- What hazards are present ?
- How large an area is affected ?
- How can the area be isolated ?
- What location would make a good staging area ?
- What are the safe routes for equipment and personnel ?

- Identify Contingencies: determine what could happen.
- Determine response objectives.
- Identify needed resources.
- Build a plan and organizational structure.
- Take action !

WISER - GENERAL GUIDELINES FOR RESPONDING TO A SPILL OR LEAK OPERATIONS LEVEL

- Know the substance
- Shut off ignition sources
- Keep material away from spilled material
- Do not touch spilled material
- Do not touch damaged containers or move anything, except to rescue people
- Detour pedestrian and vehicular traffic
- Detain anyone who has been in the area of the spill or area of suspected contamination (except for victims requiring emergency medical care)
- Delay cleanup until the authorities arrive

(WIRELESS INFORMATION SYSTEM FOR EMERGENCY RESPONDERS)
WISER

- WISER (Wireless Information System for Emergency Responders) is a system designed to assist emergency responders in hazardous material incidents.
- Developed by the National Library of Medicine, WISER provides a wide range of information on hazardous substances, including substance identification support, physical characteristics, human health information, and containment and suppression guidance.
- WISER is available as a standalone application on Microsoft Windows PCs, Apple's iOS devices (iPhone, iPad, and iPod touch), Google Android devices, and BlackBerry devices (internet connectivity required).

WISER


Known Substances
Search for a substance within WISER's database of known substances.


Help Identify Chemical
Identify an unknown chemical based on its physical properties, symptoms of exposure, the environment, and other criteria.


Tools
Explore general tools and reference material.
CHEMM

WISER – KNOWN SUBSTANCES

Key Info

- Identification
- Protective Equipment / Clothing
- Protective Distance
- Fire Fighting Procedures
- Reactivities / Incompatibilities
- Treatment Overview

- Basic
- Properties
- Hazmat
- Medical
- Environment

WISER – CHEMICAL CATEGORIES

- Basic
  - CAS Registry Number
  - EPA Hazardous Waste No.
  - Major Uses
  - Molecular Formula
  - Shipment Methods / Regulations
  - Shipping Name / Number
  - Standard Transportation No.
  - Storage Conditions
  - Substance Categories
  - Synonyms
- Properties
  - Property Summary
  - Autoignition Temperature
  - Boiling Point
  - Color / Form
  - Density / Specific Gravity
  - Flash Point
  - Ionization Potential
  - Melting Point
  - Molecular Formula
  - Molecular Weight
  - Odor
  - Odor Threshold
  - Other Properties
  - Solubilities
  - Stability / Shelf Life
  - Taste
  - Vapor Density
  - Vapor Pressure
  - Viscosity
- Hazmat
  - DOT Emergency Guidelines
  - Protective Distance
  - NFPA Hazard Classification
  - Chemical Reactivity
  - Fire Potential
  - Fire Fighting Procedures
  - Protective Equip. / Clothing
  - Flammable Limits
  - Explosive Limits / Potential
  - Reactivities / Incompatibilities
  - Other Fire Fighting Hazards
  - Cleanup Methods
  - Disposal Methods
- Medical
  - Treatment Overview
  - Health Effects
  - AEGL
  - IDLH
  - Threshold Limit Values
  - NIOSH Recommendations
  - OSHA Standards
  - Skin / Eye / Resp. Irritants
  - Other Preventive Measures
  - Toxicity Summary
  - Range of Toxicity
  - Laboratory
  - Carcinogenicity Evidence

WISER KEY INFO

- **Key Info**
- Identification
- Protective Equipment / Clothing
- Protective Distance
- Fire Fighting Procedures
- Reactivities / Incompatibilities
- Treatment Overview
- ▸ Basic
- ▸ Properties
- ▸ Hazmat
- ▸ Medical
- ▸ Environment

Acetone

CAS RN: 67-64-1

Key Info

FLAMMABLE LIQUIDS (Polar / Water-Miscible)
• HIGHLY FLAMMABLE: Easily ignited by heat, sparks or flames
• CAUTION: Very low flash point; use of water spray when fighting fire may be inefficient

Find more information on this substance at: Hazardous Substances Data Bank , TOXMAP , TOXNET

WISER – PROTECTIVE EQUIPMENT / CLOTHING

Acetone

CAS RN: 67-64-1

Protective Equipment / Clothing

Eye/face protection: Face shield and safety glasses. Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Handle with gloves.

Body Protection: Impervious clothing, flame retardant antistatic protective clothing. The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection: Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multipurpose combination (US) or type AXBEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Protective equipment made from natural rubber, viton, neoprene, polyvinyl alcohol, neoprene/natural rubber, or nitrile have breakthrough times less (usually significantly less) than one hour reported by (normally) two or more testers.

Protective clothing made from polyethylene or chlorinated polyethylene; the data suggests breakthrough times of approximately an hour or more.

No data is available regarding break-through times for clothing made from styrene-butadiene rubber, nitrile/polyvinyl chloride, or polyurethane.

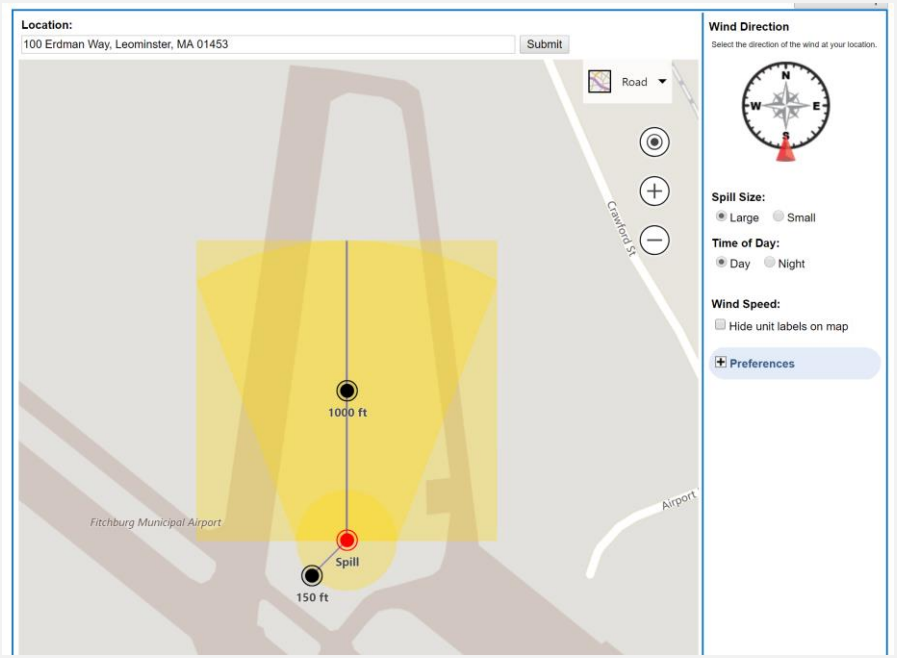
Wear appropriate eye protection to prevent eye contact.

Wear appropriate personal protective clothing to prevent skin contact.

Respirator Recommendations: Up to 2500 ppm:

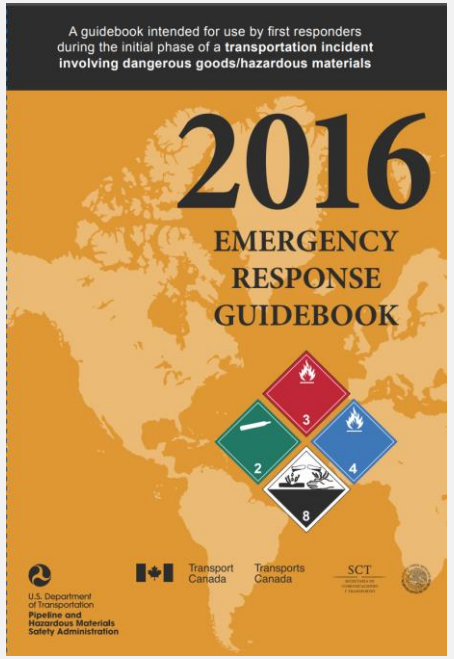
WISER – PROTECTIVE DISTANCES

…Immediately ISOLATE 150 ft in all directions, then consider initial EVACUATION 1000 ft downwind



PHMSA - U.S. DEPARTMENT OF TRANSPORTATION, PIPELINE AND HAZARDOUS MATERIALS SAFETY ADMINISTRATION

- Emergency Response Guidebook
- Commonly Called DOT ERG or ERG
- Provides first responders with a go-to manual to help deal with hazmat transportation accidents during the critical first 30 minutes.
- Contains an indexed list of dangerous goods and the associated ID number, the general hazards they pose and recommended safety precautions.



WHITE & YELLOW BORDER PAGES

White (Front) Section:

- Information regarding shipping documents
- Instructions on how to use the guidebook
- General guidance for responding to any hazardous material incident
- Basic information on the hazard classification system and the associated placards/labels
- Recommendations the proper guides based transporting vehicle type when the material in question cannot be further identified otherwise)
- General safety precautions
- Specific guidance for incidents involving pipelines

Yellow Page Borders:

- References the material in order of its assigned 4-digit ID number/UN/NA number (which is often placarded with the other hazardous materials placards)
- Identifies the appropriate guide number to reference in the Orange Section).
- Items highlighted in green in this section will have evacuation distances included in the Green Section.

BLUE & ORANGE BORDER PAGES

Blue Page Borders:

- References the material in alphabetical order of its name and identifies the appropriate guide number to reference in the Orange Section.
- Items highlighted in green in this section will also have evacuation distances included in the Green Section.

Orange Page Borders:

- Includes the actual response guides.
- Each of the 62 guides provides safety recommendations and directions on how to proceed during the initial response phase (first thirty minutes) of the incident.
- In the event of an unknown material, Guide #111 should be followed until more information becomes available.

GREEN & WHITE BORDER PAGES

Green Page Borders:

- suggests initial evacuation or shelter in place distances (protective action distances) for spills of materials that are Toxic-by-Inhalation (TIH).
- These distances vary based on the size of the spill (small or large) and whether the incident occurs during the day or at night.
- Only materials that were highlighted in green in the Yellow and Blue Sections are included in the Green Section.

- White (Rear) Section:
- Additional instructions on how to use the guidebook
- Information regarding protective clothing and equipment
- Instructions on fire and spill control
- Beginning with the 2004 edition, information specifically for hazardous materials being used for terrorism

(COMPUTER-AIDED MANAGEMENT OF EMERGENCY OPERATIONS)
CAMEO

- CAMEO is a system of software applications used to plan for and respond to chemical emergencies.
- Developed by EPA and NOAA to assist front-line chemical emergency planners and responders.
- CAMEO can access, store, and evaluate information critical for developing emergency plans.
- CAMEO supports regulatory compliance by helping users meet the chemical inventory reporting requirements of the Emergency Planning and Community Right-to-Know Act (EPCRA, also known as SARA Title III).

CAMEO SUITE PROGRAMS

CAMEO is actually a suite of four core programs that can be used together or separately:

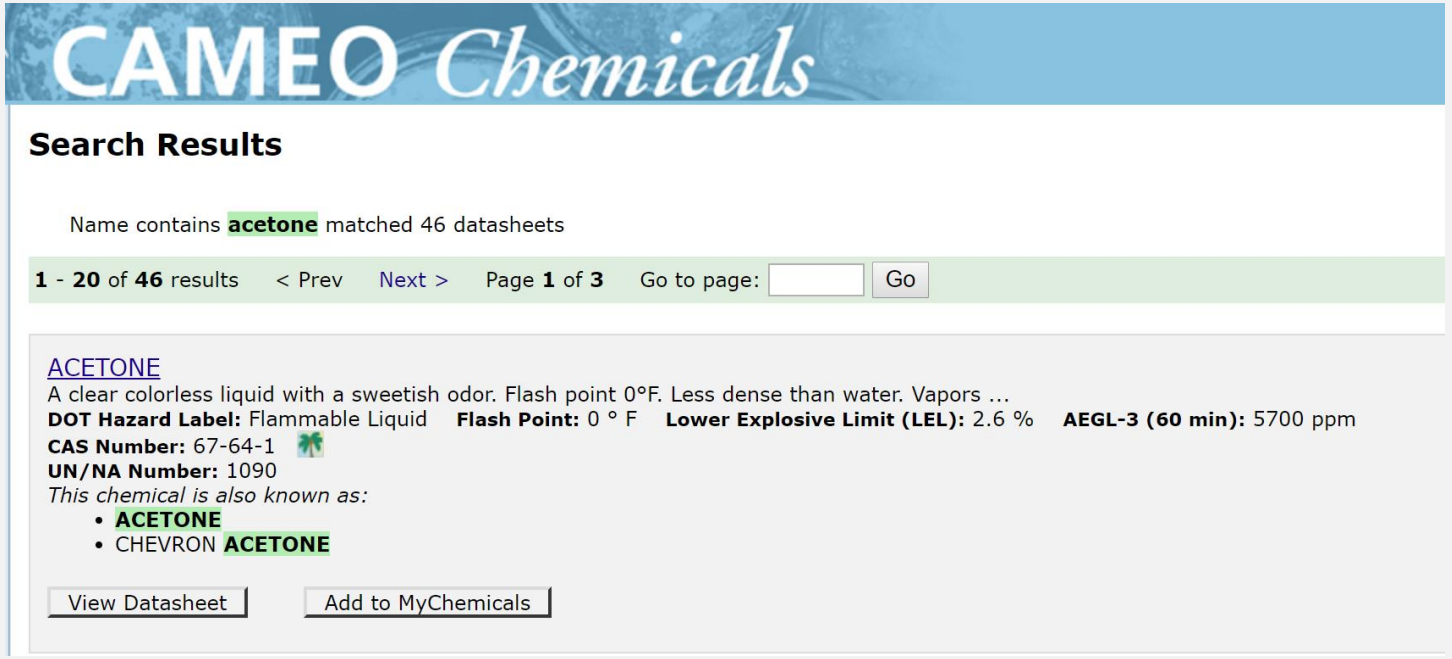
The CAMEO System Integrates:

- Chemical database
- Method to manage the data
- Air dispersion model
- Mapping capability.

SUITE OF FOUR CORE PROGRAMS

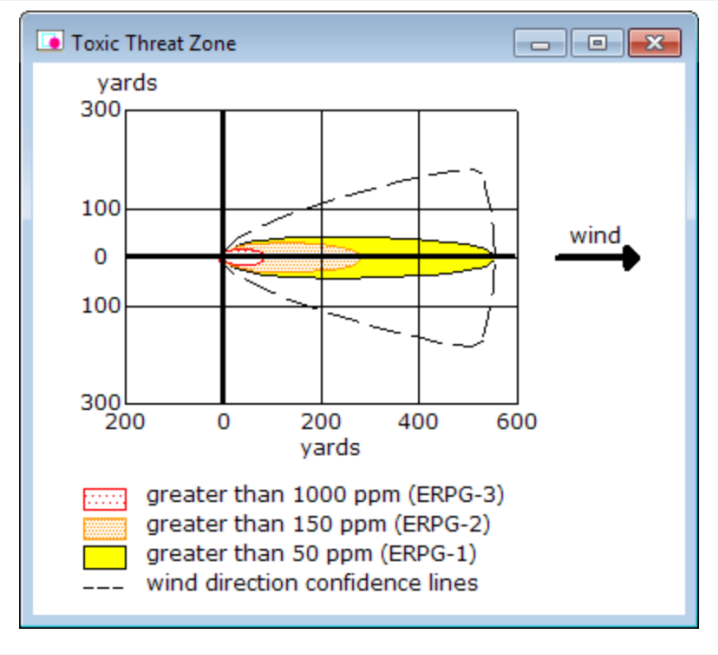
- **CAMEO*fm*** - Database and Information Management Tool
- **CAMEO Chemicals** - Chemical Response Datasheets and Reactivity Prediction Tool
- **MARPLOT** - Mapping Application for Response, Planning, and Local Operational Tasks
- **ALOHA** - Areal Locations of Hazardous Atmospheres

CAMEO CHEMICALS



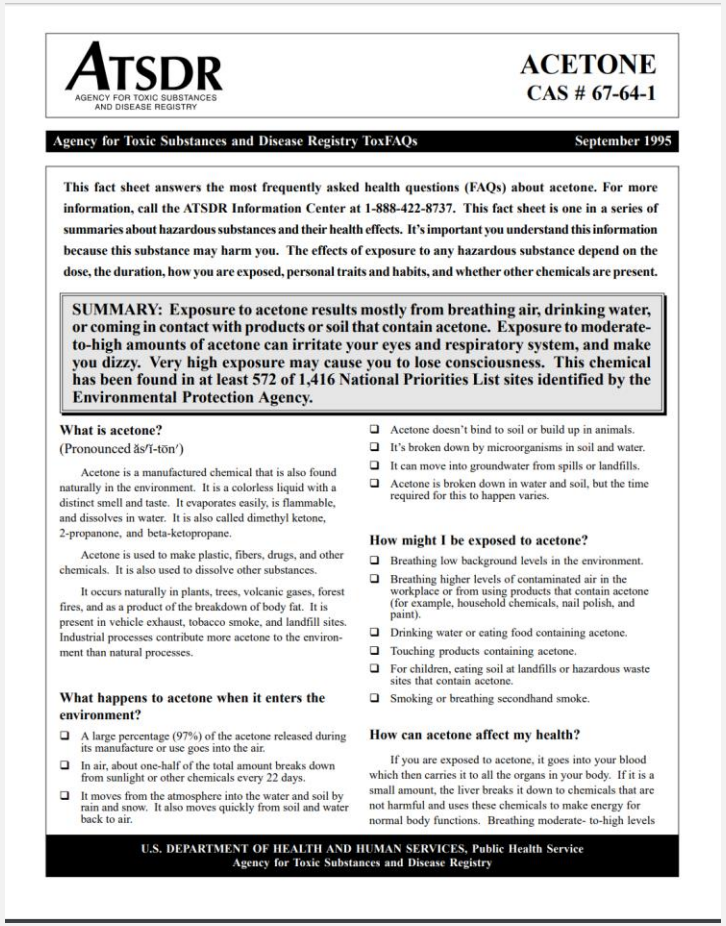
ALOHA

- Allows you to enter details about a real or potential chemical release, and then it will generate threat zone estimates for various types of hazards.
- ALOHA can model toxic gas clouds, flammable gas clouds, BLEVEs (Boiling Liquid Expanding Vapor Explosions), jet fires, pool fires, and vapor cloud explosions.
- The threat zone estimates are shown on a grid in ALOHA, and they can also be plotted on maps in MARPLOT®, Esri's ArcMap, Google Earth, and Google Maps.
- The red threat zone represents the worst hazard level, and the orange and yellow threat zones represent areas of decreasing hazard.



AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY (ATSDR) TOXFAQS

- **Agency for Toxic Substances and Disease Registry (ATSDR)** is a federal public health agency of HHS.
- The ATSDR ToxFAQs™ is a series of summaries about hazardous substances
- Each fact sheet serves as a quick and easy to understand guide.
- Answers are provided to the most (FAQs) about exposure to hazardous substances found around hazardous waste sites and the effects of exposure on human health.
- Each ToxFAQs™ is available in both the standard HTML format or in the PDF format which provides the familiar two page print version widely used at community meetings.



ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

ACETONE
CAS # 67-64-1

Agency for Toxic Substances and Disease Registry ToxFAQs **September 1995**

This fact sheet answers the most frequently asked health questions (FAQs) about acetone. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

SUMMARY: Exposure to acetone results mostly from breathing air, drinking water, or coming in contact with products or soil that contain acetone. Exposure to moderate-to-high amounts of acetone can irritate your eyes and respiratory system, and make you dizzy. Very high exposure may cause you to lose consciousness. This chemical has been found in at least 572 of 1,416 National Priorities List sites identified by the Environmental Protection Agency.

What is acetone?
(Pronounced ăs′ĭ-tōn′)

Acetone is a manufactured chemical that is also found naturally in the environment. It is a colorless liquid with a distinct smell and taste. It evaporates easily, is flammable, and dissolves in water. It is also called dimethyl ketone, 2-propanone, and beta-ketopropane.

Acetone is used to make plastic, fibers, drugs, and other chemicals. It is also used to dissolve other substances.

It occurs naturally in plants, trees, volcanic gases, forest fires, and as a product of the breakdown of body fat. It is present in vehicle exhaust, tobacco smoke, and landfill sites. Industrial processes contribute more acetone to the environment than natural processes.

What happens to acetone when it enters the environment?

- A large percentage (97%) of the acetone released during its manufacture or use goes into the air.
- In air, about one-half of the total amount breaks down from sunlight or other chemicals every 22 days.
- It moves from the atmosphere into the water and soil by rain and snow. It also moves quickly from soil and water back to air.
- Acetone doesn't bind to soil or build up in animals.
- It's broken down by microorganisms in soil and water.
- It can move into groundwater from spills or landfills.
- Acetone is broken down in water and soil, but the time required for this to happen varies.

How might I be exposed to acetone?

- Breathing low background levels in the environment.
- Breathing higher levels of contaminated air in the workplace or from using products that contain acetone (for example, household chemicals, nail polish, and paint).
- Drinking water or eating food containing acetone.
- Touching products containing acetone.
- For children, eating soil at landfills or hazardous waste sites that contain acetone.
- Smoking or breathing secondhand smoke.

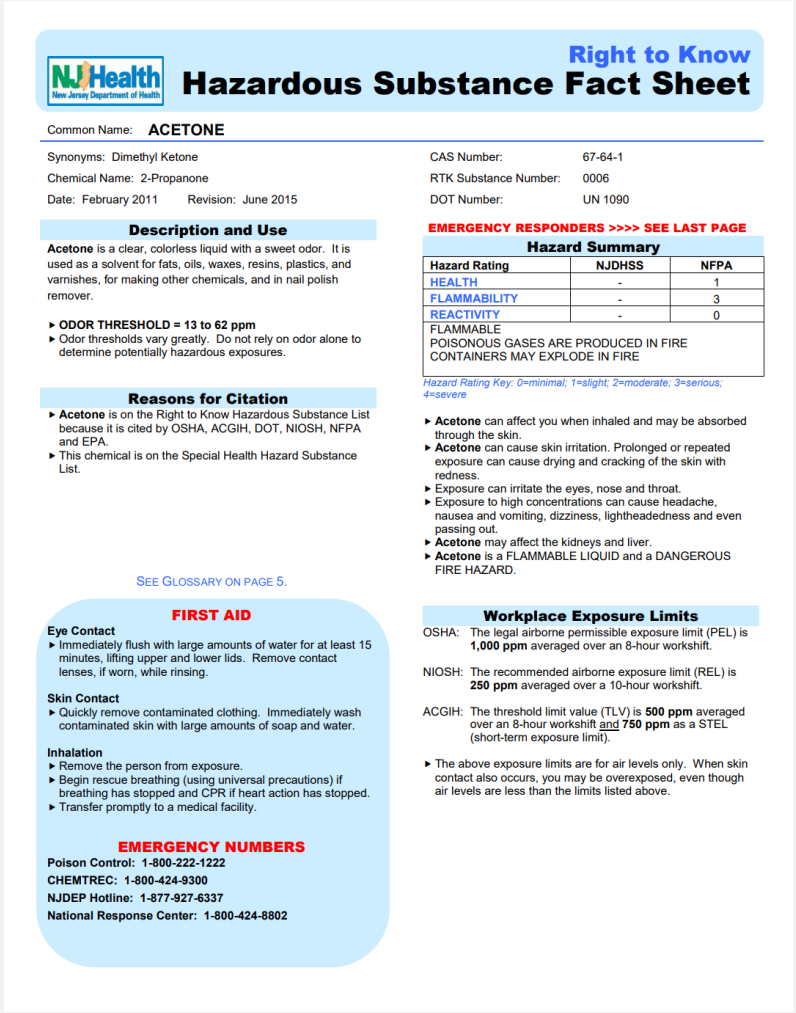
How can acetone affect my health?

If you are exposed to acetone, it goes into your blood which then carries it to all the organs in your body. If it is a small amount, the liver breaks it down to chemicals that are not harmful and uses these chemicals to make energy for normal body functions. Breathing moderate- to-high levels

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES, Public Health Service
Agency for Toxic Substances and Disease Registry

NJ DEPARTMENT OF PUBLIC HEALTH RIGHT TO KNOW HAZARDOUS SUBSTANCE FACT SHEETS

- The Fact Sheets are prepared for substances on the *New Jersey Right to Know Hazardous Substance List.*
- More than 1,600 Fact Sheets have been completed and more than 900 have been translated into Spanish.
- The Fact Sheets are prepared on pure substances and contain information on health hazards, exposure limits, personal protective equipment, proper handling, first aid, and emergency procedures for fires and spills.



NJ Health New Jersey Department of Health

Right to Know

Hazardous Substance Fact Sheet

Common Name: **ACETONE**

Synonyms: Dimethyl Ketone
Chemical Name: 2-Propanone
Date: February 2011 Revision: June 2015

CAS Number: 67-64-1
RTK Substance Number: 0006
DOT Number: UN 1090

Description and Use

Acetone is a clear, colorless liquid with a sweet odor. It is used as a solvent for fats, oils, waxes, resins, plastics, and varnishes, for making other chemicals, and in nail polish remover.

- **ODOR THRESHOLD = 13 to 62 ppm**
- Odor thresholds vary greatly. Do not rely on odor alone to determine potentially hazardous exposures.

Reasons for Citation

- **Acetone** is on the Right to Know Hazardous Substance List because it is cited by OSHA, ACGIH, DOT, NIOSH, NFPA and EPA.
- This chemical is on the Special Health Hazard Substance List.

SEE GLOSSARY ON PAGE 5.

FIRST AID

Eye Contact
- Immediately flush with large amounts of water for at least 15 minutes, lifting upper and lower lids. Remove contact lenses, if worn, while rinsing.

Skin Contact
- Quickly remove contaminated clothing. Immediately wash contaminated skin with large amounts of soap and water.

Inhalation
- Remove the person from exposure.
- Begin rescue breathing (using universal precautions) if breathing has stopped and CPR if heart action has stopped.
- Transfer promptly to a medical facility.

EMERGENCY NUMBERS

Poison Control: 1-800-222-1222
CHEMTREC: 1-800-424-9300
NJDEP Hotline: 1-877-927-6337
National Response Center: 1-800-424-8802

EMERGENCY RESPONDERS >>>> SEE LAST PAGE

Hazard Summary

Hazard Rating	NJDHSS	NFPA
HEALTH	-	1
FLAMMABILITY	-	3
REACTIVITY	-	0

FLAMMABLE
POISONOUS GASES ARE PRODUCED IN FIRE
CONTAINERS MAY EXPLODE IN FIRE

Hazard Rating Key: 0=minimal; 1=slight; 2=moderate; 3=serious; 4=severe

- **Acetone** can affect you when inhaled and may be absorbed through the skin.
- **Acetone** can cause skin irritation. Prolonged or repeated exposure can cause drying and cracking of the skin with redness.
- Exposure can irritate the eyes, nose and throat.
- Exposure to high concentrations can cause headache, nausea and vomiting, dizziness, lightheadedness and even passing out.
- **Acetone** may affect the kidneys and liver.
- **Acetone** is a FLAMMABLE LIQUID and a DANGEROUS FIRE HAZARD.

Workplace Exposure Limits

OSHA: The legal airborne permissible exposure limit (PEL) is **1,000 ppm** averaged over an 8-hour workshift.

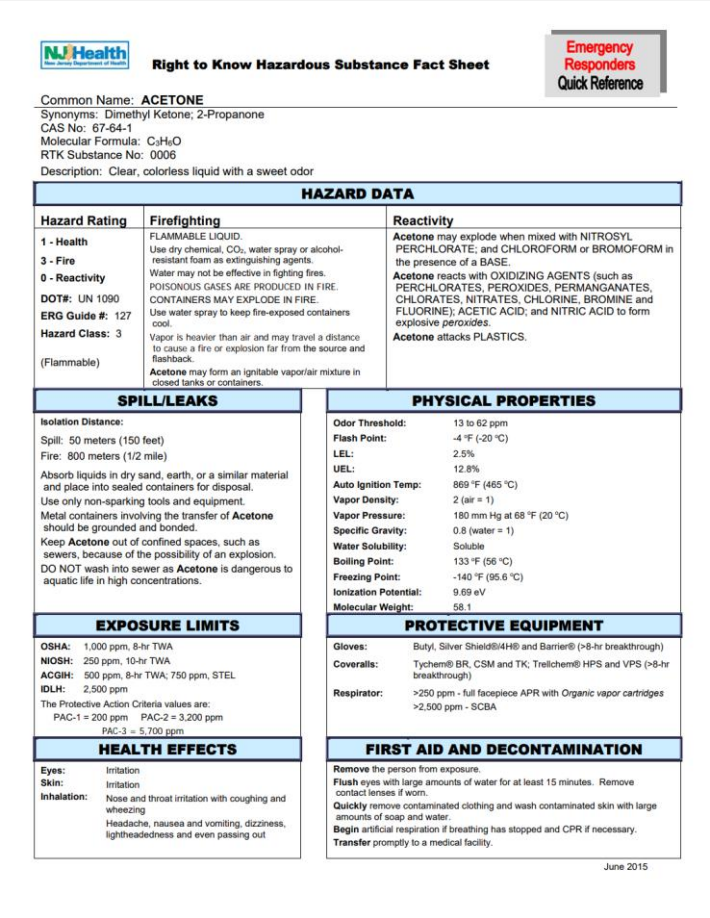
NIOSH: The recommended airborne exposure limit (REL) is **250 ppm** averaged over a 10-hour workshift.

ACGIH: The threshold limit value (TLV) is **500 ppm** averaged over an 8-hour workshift and **750 ppm** as a STEL (short-term exposure limit).

- The above exposure limits are for air levels only. When skin contact also occurs, you may be overexposed, even though air levels are less than the limits listed above.

NJ DEPARTMENT OF PUBLIC HEALTH EMERGENCY RESPONDERS QUICK REFERENCE (QR)

- **The Emergency Responders Quick Reference (QR)** provides comprehensive safety and health information on a hazardous substance when responding to a chemical emergency.



NJ Health — New Jersey Department of Health

Right to Know Hazardous Substance Fact Sheet

Emergency Responders Quick Reference

Common Name: **ACETONE**
Synonyms: Dimethyl Ketone; 2-Propanone
CAS No: 67-64-1
Molecular Formula: C_3H_6O
RTK Substance No: 0006
Description: Clear, colorless liquid with a sweet odor

HAZARD DATA

Hazard Rating	Firefighting	Reactivity
1 - Health **3 - Fire** **0 - Reactivity** **DOT#:** UN 1090 **ERG Guide #:** 127 **Hazard Class:** 3 (Flammable)	FLAMMABLE LIQUID. Use dry chemical, CO_2, water spray or alcohol-resistant foam as extinguishing agents. Water may not be effective in fighting fires. POISONOUS GASES ARE PRODUCED IN FIRE. CONTAINERS MAY EXPLODE IN FIRE. Use water spray to keep fire-exposed containers cool. Vapor is heavier than air and may travel a distance to cause a fire or explosion far from the source and flashback. **Acetone** may form an ignitable vapor/air mixture in closed tanks or containers.	**Acetone** may explode when mixed with NITROSYL PERCHLORATE; and CHLOROFORM or BROMOFORM in the presence of a BASE. **Acetone** reacts with OXIDIZING AGENTS (such as PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLUORINE); ACETIC ACID; and NITRIC ACID to form explosive *peroxides*. **Acetone** attacks PLASTICS.

SPILL/LEAKS

Isolation Distance:
Spill: 50 meters (150 feet)
Fire: 800 meters (1/2 mile)

Absorb liquids in dry sand, earth, or a similar material and place into sealed containers for disposal.
Use only non-sparking tools and equipment.
Metal containers involving the transfer of **Acetone** should be grounded and bonded.
Keep **Acetone** out of confined spaces, such as sewers, because of the possibility of an explosion.
DO NOT wash into sewer as **Acetone** is dangerous to aquatic life in high concentrations.

PHYSICAL PROPERTIES

Odor Threshold:	13 to 62 ppm
Flash Point:	-4 °F (-20 °C)
LEL:	2.5%
UEL:	12.8%
Auto Ignition Temp:	869 °F (465 °C)
Vapor Density:	2 (air = 1)
Vapor Pressure:	180 mm Hg at 68 °F (20 °C)
Specific Gravity:	0.8 (water = 1)
Water Solubility:	Soluble
Boiling Point:	133 °F (56 °C)
Freezing Point:	-140 °F (95.6 °C)
Ionization Potential:	9.69 eV
Molecular Weight:	58.1

EXPOSURE LIMITS

OSHA:	1,000 ppm, 8-hr TWA
NIOSH:	250 ppm, 10-hr TWA
ACGIH:	500 ppm, 8-hr TWA; 750 ppm, STEL
IDLH:	2,500 ppm

The Protective Action Criteria values are:
PAC-1 = 200 ppm PAC-2 = 3,200 ppm
PAC-3 = 5,700 ppm

PROTECTIVE EQUIPMENT

Gloves:	Butyl, Silver Shield®/4H® and Barrier® (>8-hr breakthrough)
Coveralls:	Tychem® BR, CSM and TK; Trellchem® HPS and VPS (>8-hr breakthrough)
Respirator:	>250 ppm - full facepiece APR with *Organic vapor cartridges* >2,500 ppm - SCBA

HEALTH EFFECTS

Eyes:	Irritation
Skin:	Irritation
Inhalation:	Nose and throat irritation with coughing and wheezing Headache, nausea and vomiting, dizziness, lightheadedness and even passing out

FIRST AID AND DECONTAMINATION

Remove the person from exposure.
Flush eyes with large amounts of water for at least 15 minutes. Remove contact lenses if worn.
Quickly remove contaminated clothing and wash contaminated skin with large amounts of soap and water.
Begin artificial respiration if breathing has stopped and CPR if necessary.
Transfer promptly to a medical facility.

June 2015

WEB LINKS

CAMEO:

- https://www.epa.gov/cameo

DOT ERG 2016:

- https://www.phmsa.dot.gov/hazmat/erg/emergency-response-guidebook-erg

WISER:

- https://webwiser.nlm.nih.gov/getHomeData.do

ToxFAQ:

- https://www.atsdr.cdc.gov/toxfaqs/index.asp

NJ Hazardous Substance Fact Sheets

- http://web.doh.state.nj.us/rtkhsfs/indexfs.aspx

TRAINING WITH THE NEW ENGLAND CONSORTIUM

- 40-hour HAZWOPER
- 24-hour emergency responder
- Safety planning for supervisors and managers
- Disaster preparedness
- OSHA 10-hour construction safety
- Confined Space Entry, Rescue, Awareness
- Work Zone Safety
- Hazard Assessment, Mapping and Incident Investigation
- 8-hour HAZWOPER/ER Refresher
- Incident Command
- Infectious Disease Preparedness

QUESTIONS ?

DAVID COFFEY
DAVID_COFFEY@UML.EDU
WWW.UML.EDU/TNEC
978-934-3296