

METHANOL SAFE HANDLING

ABDELLATIF MOUJAHID

RALEIGH WATER

AGENDA

- ❖ Introduction
- ❖ Who Regulates methanol in workplace?
- ❖ Types of Exposure & Poisoning symptoms
- ❖ Hazard Control of Methanol
- ❖ Spill Response & Environment Protection
- ❖ Methanol Safe Handling Video



Danger!

METHANOL

Highly Flammable liquid and vapour. Toxic if swallowed, in contact with skin or if inhaled. Causes damage to organs.

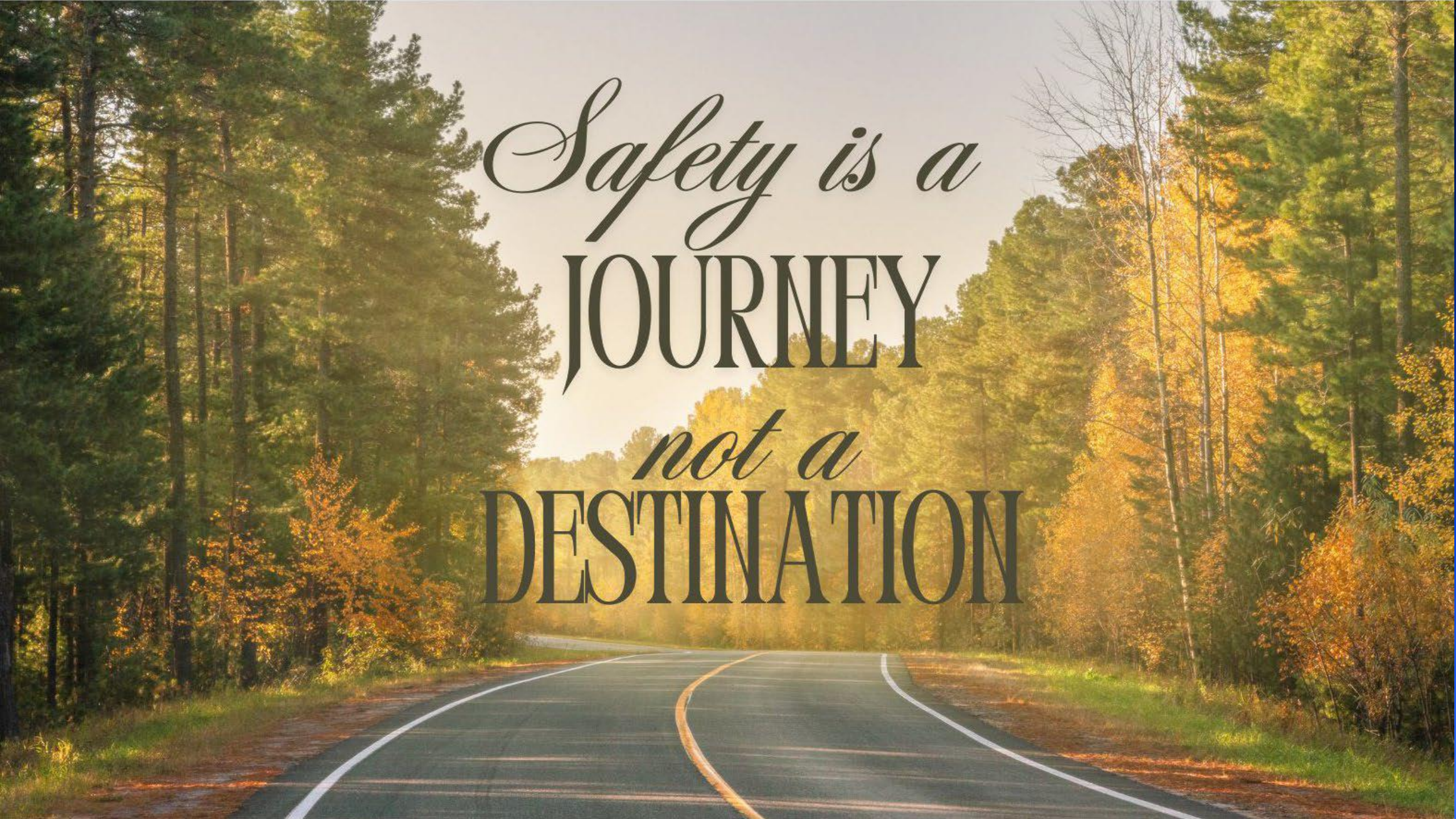
Keep away from heat/sparks/open flames/hot surfaces. No smoking. Do not breathe dust/fume/gas/mist/vapours/spray. Wear protective gloves/protective clothing.

IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.

IF exposed: Call a POISON CENTER or doctor/physician.

See Material Safety Data Sheet for further details regarding safe use of this product.

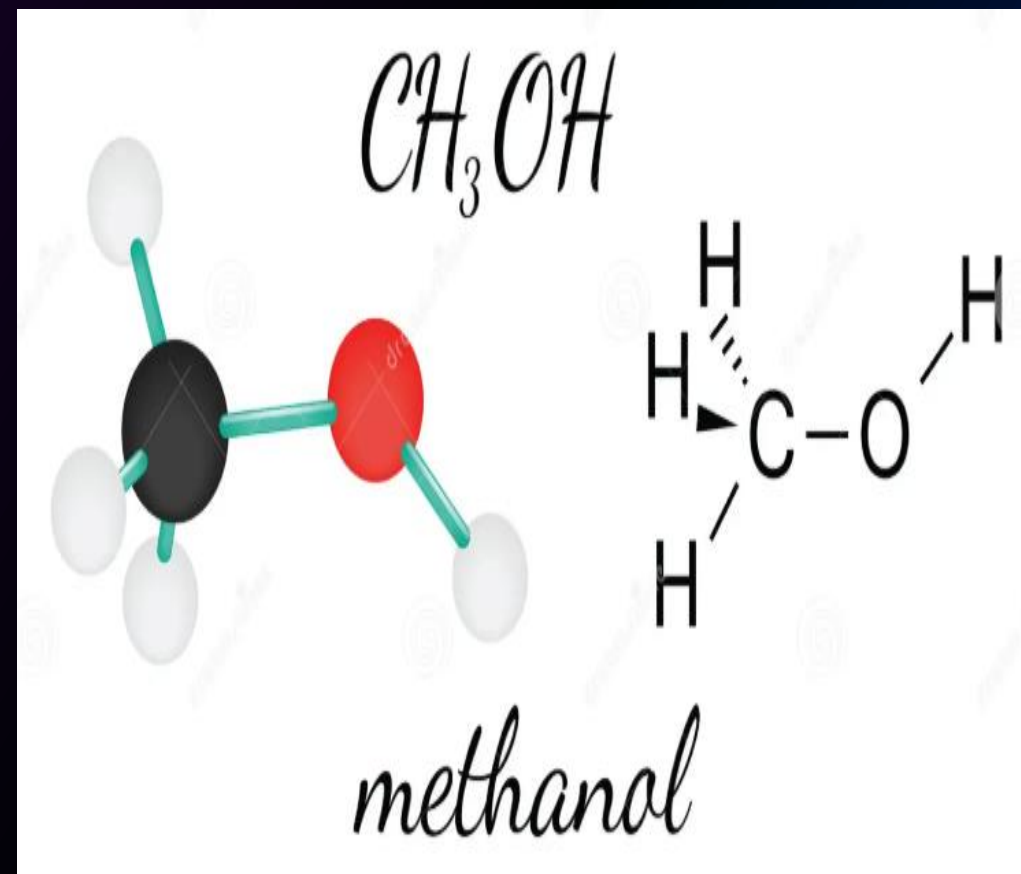
Sigma-Aldrich
3050 Spruce Street
Saint Louis, MO 63103 USA
Telephone: 1-800-325-5832

A scenic photograph of a two-lane asphalt road curving through a forest. The trees on both sides are tall and thin, with some showing vibrant autumn colors of yellow and orange, while others remain green. The road has a yellow center line and white edge lines. The sky is a pale, hazy blue.

Safety is a
JOURNEY
not a
DESTINATION

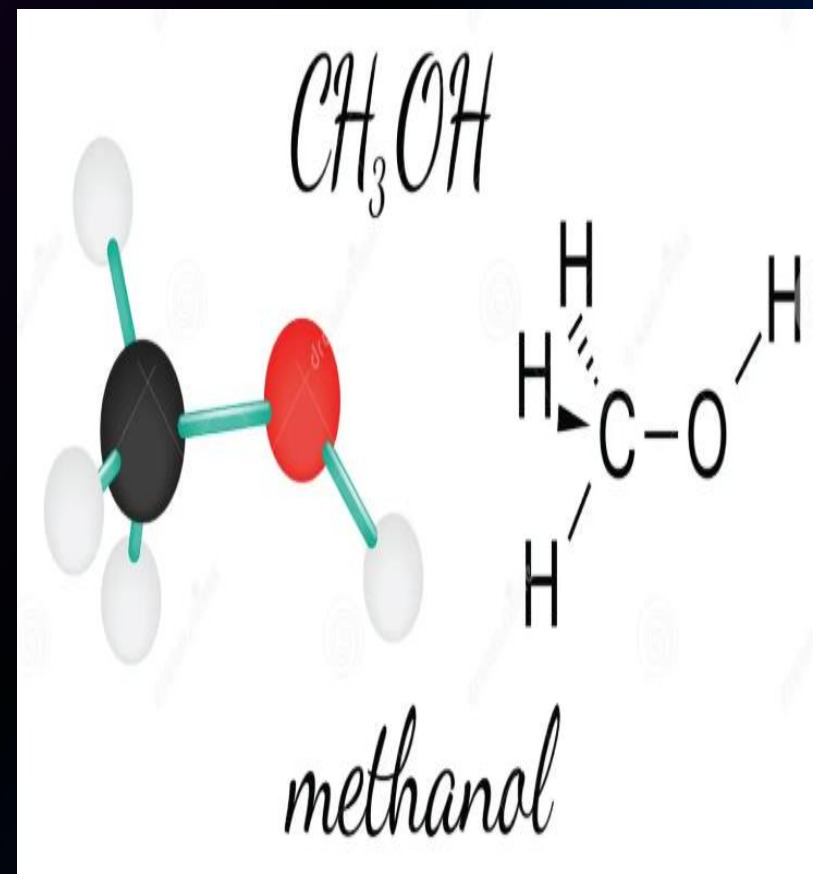
THE PHYSICAL CHEMICAL PROPERTIES OF **METHANOL**

- ❖ Chemical Formula: CH_3OH
- ❖ Name: Methyl Alcohol or Wood Spirit.
- ❖ Boiling Point: 148°F
- ❖ Freezing Point: -144°F
- ❖ Flash Point: 52°F
- ❖ pH: 7.2 SU
- ❖ Solubility(Water): 100%
- ❖ Density: 6.63 Lb./Gallon



THE PHYSICAL CHEMICAL PROPERTIES OF **METHANOL** CONT.

- ❖ Clear & Colorless liquid at room temperature
- ❖ Faintly Sweet alcohol odor
- ❖ Flammable
- ❖ Burns with a clear, low heat flame: Difficult to see during daylight
- ❖ Readily absorbs in the body



WHO REGULATES METHANOL IN WORKPLACE?



- ❖ 29 CFR 1910.106 - Flammable liquids: If methanol is handled or stored in certain quantities and processes, this standard may apply and would require related training.
- ❖ 29 CFR 1910.1200 - Hazard Communication Standard: This standard is the basis for informing employees about the hazards of chemicals in the workplace, including methanol.



TYPES OF EXPOSURE & POISONING SYMPTOMS

- ❖ Inhalation
 - Breathing in methanol vapor or spray mist is the most common type of exposure
- ❖ Skin Contact
 - Methanol should be immediately washed from skin
- ❖ Eye Contact
 - Flush eyes with water for 15 minutes
- ❖ Swallowing
 - Swallowing as little as 50 mL or less than ¼ cup can cause a partial or complete organs damage

- ❖ WEAKNESS
- ❖ DIZZINESS
- ❖ HEADACHE
- ❖ NAUSEA
- ❖ VOMITING

NFPA 704

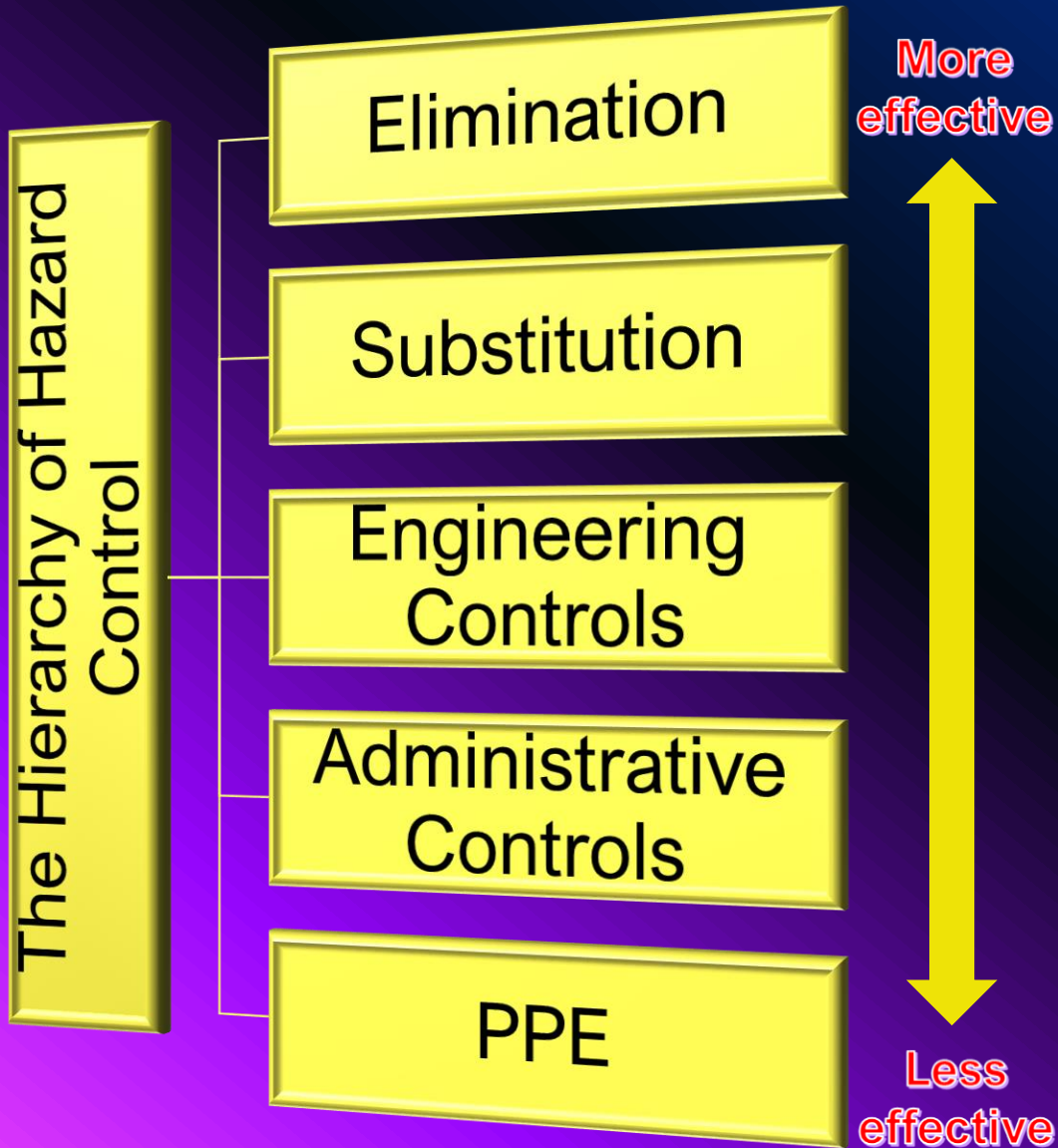
Diamond	Hazard	Value	Description
	Health	1	Can cause significant irritation.
	Flammability	3	Can be ignited under almost all ambient temperature conditions.
	Instability	0	Normally stable, even under fire conditions.
	Special		

(NFPA, 2010)

WORKPLACE EXPOSURE LIMITS

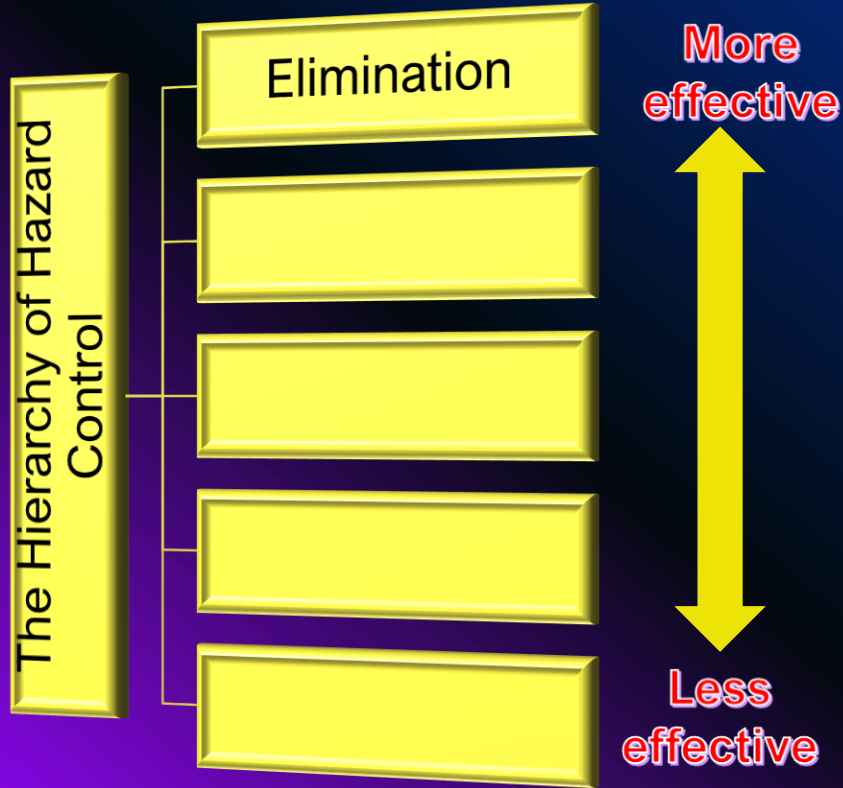
- 200 ppm for 8-Hour Work shift
- 250 ppm for 15-minutes work period

HAZARD CONTROL OF METHANOL



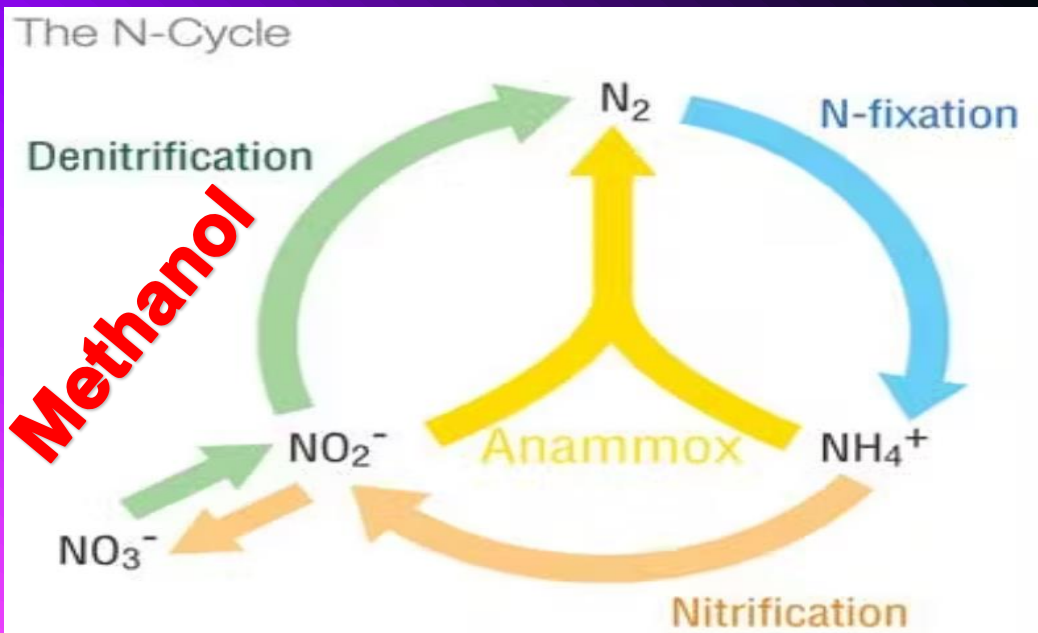
HAZARD CONTROLS

The Hierarchy of Hazard Controls provides a systematic approach to manage workplace safety by providing a structure to select the most effective control measures to eliminate or reduce the risk of certain hazards.

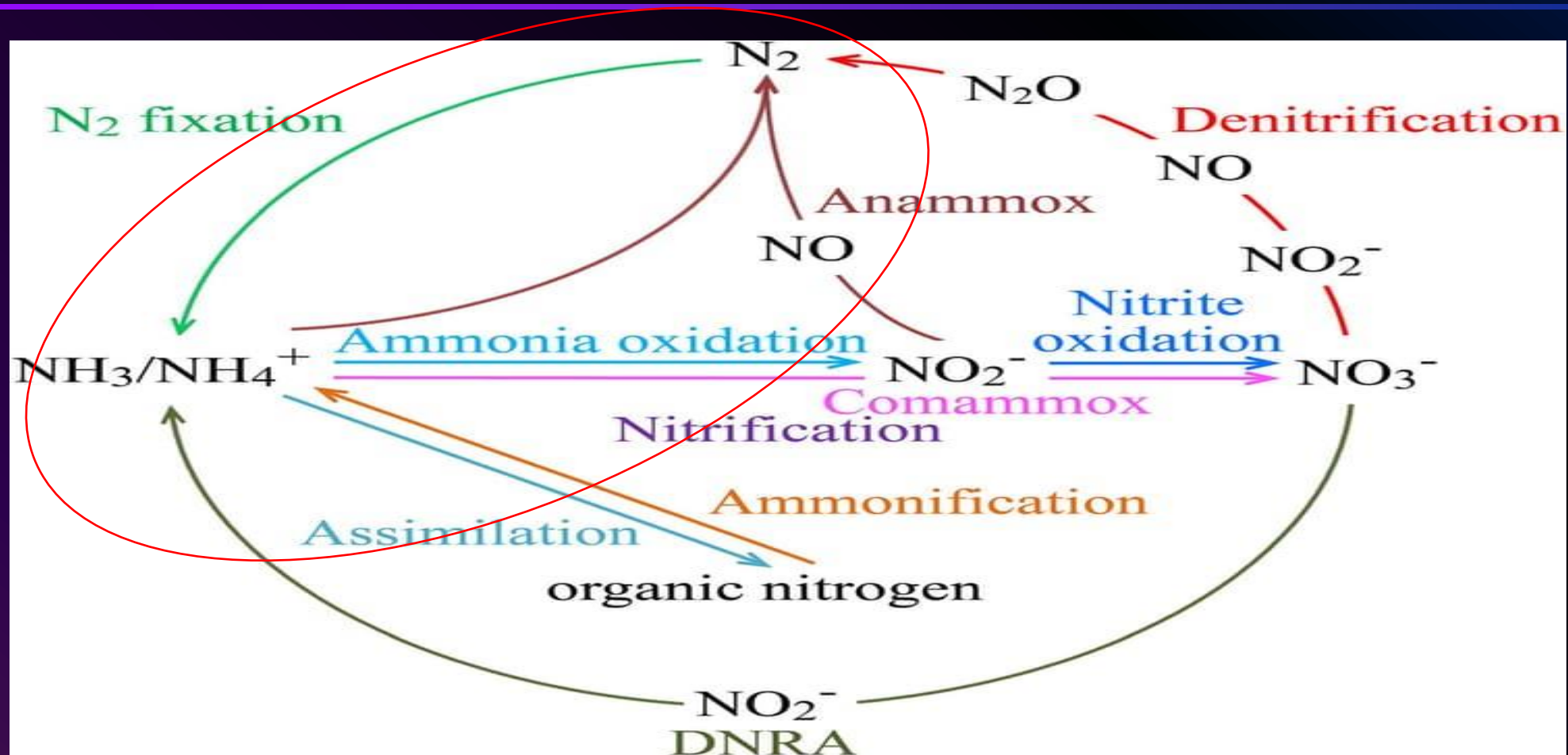


ELIMINATION OF THE HAZARD

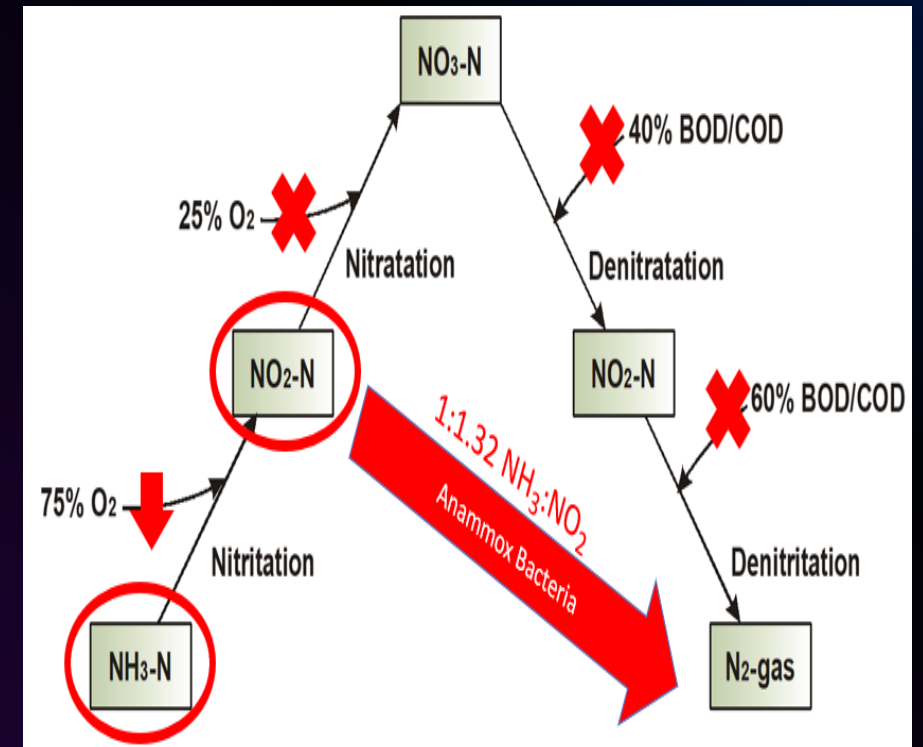
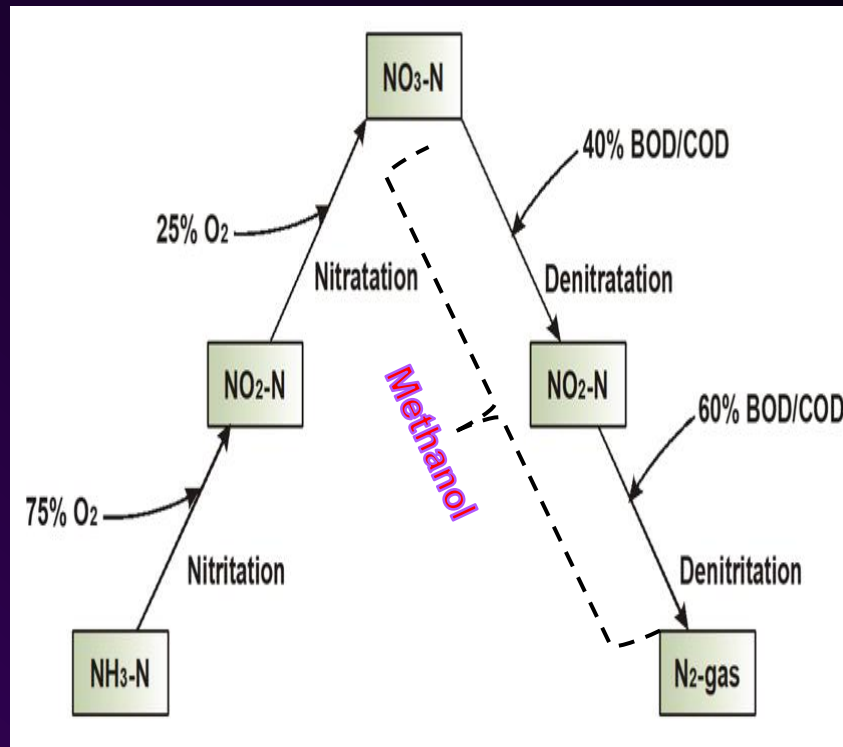
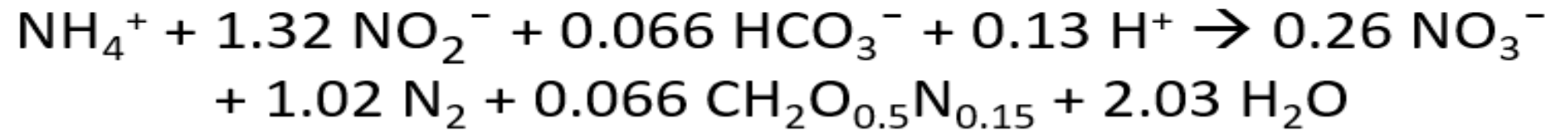
- ❖ Partial denitrification anammox (PD/Anammox) is a biological wastewater treatment process that combines partial denitrification and anammox to efficiently remove nitrogen from wastewater. It's a promising alternative to conventional nitrogen removal methods due to its potential for reduced aeration, carbon source requirements, and sludge production.



NITROGEN CYCLE



Anammox



The Hierarchy of Hazard Control

Substitution

More effective

Less effective

SUBSTITUTION OF THE HAZARD

- Replace the hazard with an alternative chemical that is safer.
- MicroC® 2000: Safer and Non-flammable

SAFETY DATA SHEET

MicroC® 2000



1. PRODUCT AND COMPANY IDENTIFICATION

Product Name: MicroC® 2000 **Publication Date:** February 26, 2024
Product Code: NA **Replaces:** October 17, 2023
Product Use: A reducing agent for biological processes

Supplier Information:
Environmental Operating Solutions, Inc
53 Portside Drive
Pocasset, MA 02559
Phone: 508-743-8440
Fax: 844-308-5537
Website: www.microc.com

EMERGENCY TELEPHONE NUMBER: CHEMTREC 800-424-9300

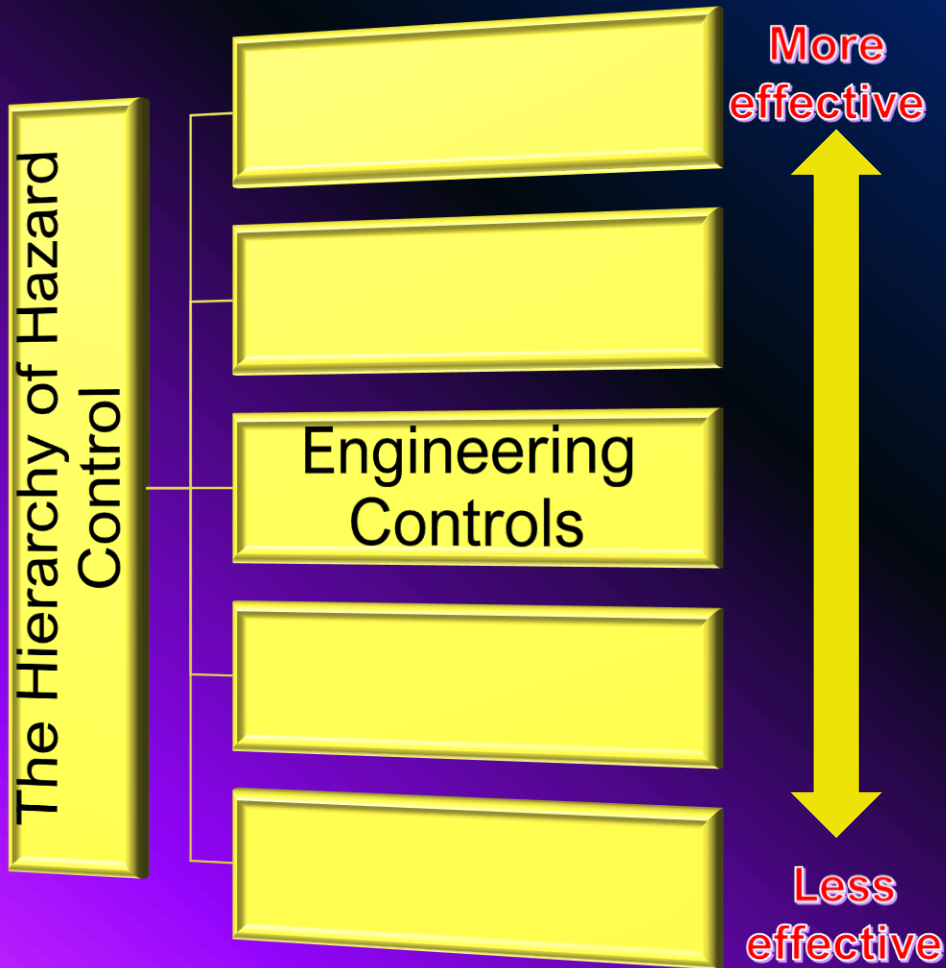
2. HAZARDS IDENTIFICATION

OSHA Regulatory Status:
This product when used as intended is not hazardous according to 29 CFR 1910.1200
This product when used as intended is not hazardous according to GHS categories

GHS Pictograms: None Applicable
Signal Word: None Applicable
GHS Hazard Classification: None Applicable
Hazard Statements: None Applicable

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State	Liquid	Flash Point	None to Boil (ASTM D93)
Color	Light brown	Boiling Point	Not determined
Odor	Musty – Sweet Odor	Evaporation Rate	Not determined
Odor Threshold	Not determined	UEL/LEL	Not determined
		Flammability (solid, gas)	Not determined
pH	4.00-11.00	Vapor Pressure	Not determined
Solubility in Water	Highly soluble in water	Vapor Density	Not determined
		Relative Density	Not Determined
Bulk Density	10.2 lbs/gal	Partition Coefficient	Not determined
Specific gravity	1.22 @ 20°C	Autoignition Temperatures	
		Decomposition	
Viscosity	45 cPs @ 20C	Temperature	Not determined



ENGINEERING CONTROLS OF THE HAZARD

- ❖ Isolate workers from the hazard
- ❖ Minimize exposure by automated dosing pumps
- ❖ Use Closed system
- ❖ Install and maintain Class B fire extinguishers (foam, CO₂, dry chemical)
- ❖ Install fire suppression system if large volumes are stored

STORAGE TANKS



STORAGE GUIDELINES

- Above ground storage tanks.
- Store in approved & properly labeled tanks (stainless steel).
- (MeOH)
- Well-ventilated area.
- Use explosion proof electrical equipment.
- Secondary containment.
- Level indicators & alarms
- Flame arrestors and pressure relief valves.
- Eliminate any source of ignition.



GAS DETECTORS

- Installed at the secondary containment area & pumps room



METHANOL RECEIVING STATION



METHANOL RECEIVING STATION CONT.

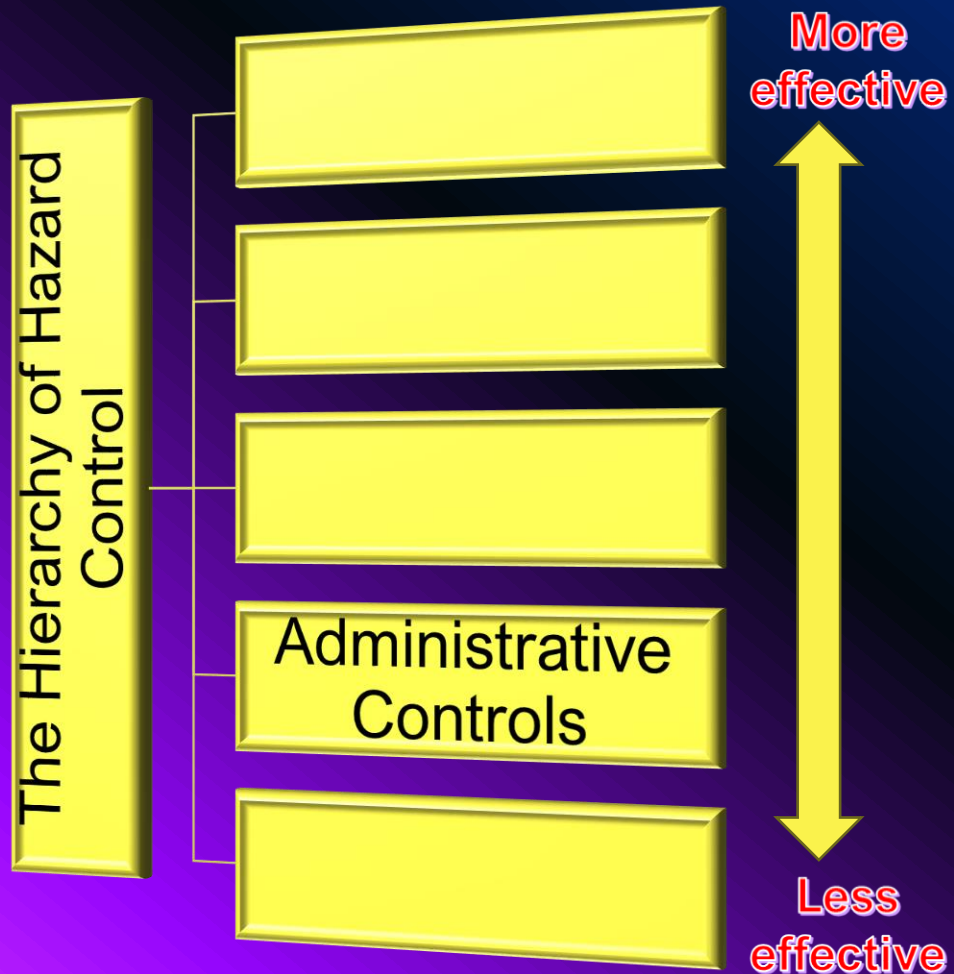


FIRE SUPPRESSION SYSTEM



FIRE SUPPRESSION SYSTEM





ADMINISTRATIVE CONTROLS OF THE HAZARD

- ❖ Maintain regulatory compliance by adhering to OSHA, EPA, and Local authority regulations for chemical handling
- ❖ Maintain up-To-date SDS and make sure it is accessible to all employees
- ❖ Provide annual training on methanol hazards, Emergency response
- ❖ Implement a Hazard Communication Program (HazCom)
- ❖ Maintain a good training & Documentation record for monthly inspection of fire extinguishers, weekly inspection of Eye wash and shower stations, annual training on fire extinguishers use and evacuation routes drills.

SAFETY DATA SHEET(SDS)



Hazard Communication Safety Data Sheets

The Hazard Communication Standard (HCS) requires chemical manufacturers, distributors, or importers to provide Safety Data Sheets (SDSs) for each hazardous chemical. The HCS requires SDSs to be in a uniform format and include the section numbers, the headings, and associated information under the headings below:

Section 1, Identification includes product identifier used on the label; manufacturer or distributor name, U.S. address and phone number; emergency phone number; recommended use; restrictions on use.

Section 2, Hazard(s) identification includes all hazards regarding the chemical's intrinsic properties including a change in the chemical's physical form and chemical reaction products associated with known or reasonably anticipated uses or applications; required label elements.

Section 3, Composition/information on ingredients includes information on chemical ingredients such as names; Chemical Abstracts Service (CAS) numbers or other unique identifiers; prescribed concentration ranges for trade secret claims.

Section 4, First-aid measures includes important symptoms/effects, acute, delayed; required treatment.

Section 5, Fire-fighting measures lists suitable extinguishing techniques, equipment; chemical hazards from fire.

Section 6, Accidental release measures lists emergency procedures; protective equipment; proper methods of containment and cleanup.

Section 7, Handling and storage lists precautions for safe handling and storage, including incompatibilities.

(Continued on other side)

For more information:



Occupational
Safety and Health
Administration

www.osha.gov (800) 321-OSHA (6742)

OSHA 3493-08R 2024



Hazard Communication Safety Data Sheets

Section 8, Exposure controls/personal protection for chemicals listed in Section 3, lists OSHA's Permissible Exposure Limits (PELs); ACGIH Threshold Limit Values (TLVs); and any other exposure limit or range used or recommended by the chemical manufacturer, importer, or employer preparing the SDS, where available; appropriate engineering controls; personal protective equipment (PPE).

Section 9, Physical and chemical properties lists the chemical's characteristics, including particle size.

Section 10, Stability and reactivity lists chemical stability and possibility of hazardous reactions, including associated with any foreseeable emergencies.

Section 11, Toxicological information includes routes of exposure; related symptoms, acute and chronic effects; numerical measures of toxicity; interactive effects.

Section 12, Ecological information*

Section 13, Disposal considerations*

Section 14, Transport information*

Section 15, Regulatory information*

Section 16, Other information, includes the date of preparation or last revision.

*Note: Since other Agencies regulate this information, OSHA will not be enforcing Sections 12 through 15 (29 CFR 1910.1200(g)(2)).

Employers must ensure that SDSs are readily accessible to employees.

See Appendix D of 29 CFR 1910.1200 for a detailed description of SDS contents.

For more information:



Occupational
Safety and Health
Administration

www.osha.gov (800) 321-OSHA (6742)

SAFETY DATA SHEET(SDS) CONT.

Methanol

Safety Data Sheet

according to 29 CFR 1910.1200 and Schedule 1 of Hazardous Products Regulations (HPR) (SOR/2015-17)

Date of issue: 09/22/2005 Revision date: 03/30/2017 Supersedes: 06/27/2016 Version: 5.2



SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Product form : Substance
Trade name : Methanol
Chemical name : methanol
CAS No : 67-56-1
Formula : CH₃OH

1.2. Relevant identified uses of the substance or mixture and uses advised against

Use of the substance/mixture : Solvent, Fuel, Feedstock

1.3. Details of the supplier of the safety data sheet

Methanex Methanol Company
5850 Granite Parkway Suite 400
Plano, TX 75024 - USA
T +1 972 702 0909 - F +1 972 233 1266

Methanex Corporation
1800 Waterfront Centre,
200 Burrard Street, V6C 3M1 - Canada
T (604) 661.2600

1.4. Emergency telephone number

Emergency number : CHEMTREC Emergency Tel. #: 1-800-424-9300 (Canada and USA)
CANUTEC Emergency Tel. # (613)-996-6666 (Canada) *666 (cellular)

SECTION 2: Hazards Identification

2.1. Classification of the substance or mixture

Classification in accordance with the Hazardous Products (HPR) Regulations (SOR /2015-17).

Flammable Liquids - Category 2
Acute Toxicity - Oral - Category 3
Acute Toxicity - Dermal - Category 3
Acute Toxicity - Inhalation - Vapor - Category 3
Serious Eye Damage/Eye Irritation - Category 2A
Reproductive Toxicity - Category 1A
Specific Target Organ Toxicity - Single Exposure - Category 1 (optic nerve , central nervous system , retina)
Specific Target Organ Toxicity - Single Exposure - Category 3

2.2. Label elements

GHS Labeling Elements

Hazard pictograms



Signal word : Danger

Hazard statements : H225 - Highly flammable liquid and vapor.
H301+H311+H331 - Toxic if swallowed, in contact with skin or if inhaled.
H319 - Causes serious eye irritation.
H360 - May damage fertility or the unborn child.
H370 - Causes damage to organs.
H336 - May cause drowsiness or dizziness.

Precautionary statements

Prevention
P201 - Obtain special instructions before use.
P202 - Do not handle until all safety precautions have been read and understood.
P210 - Keep away from heat, sparks, open flames, hot surfaces. - No smoking.
P233 - Keep container tightly closed.
P240 - Ground/bond container and receiving equipment.
P241 - Use explosion-proof electrical, ventilating, lighting equipment.
P242 - Use only non-sparking tools.
P243 - Take precautionary measures against static discharge.

Methanol

Safety Data Sheet

according to 29 CFR 1910.1200 and Schedule 1 of Hazardous Products Regulations (HPR) (SOR/2015-17)



P260 - Do not breathe dust/fume/gas/mist/vapours/spray.
P264 - Wash hands thoroughly after handling.
P270 - Do not eat, drink or smoke when using this product.
P271 - Use only outdoors or in a well-ventilated area.
P280 - Wear protective gloves, protective clothing, eye protection, face protection.

Response

P370+P378 - In case of fire: Use Water spray to extinguish.
P307+P311 - If exposed: Call a poison center/doctor.
P301+P310 - If swallowed: Immediately call a doctor.
P303+P361+P353 - If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P304+P340 - IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P305+P351+P338 - If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P330 - Rinse mouth.
P363 - Wash contaminated clothing before reuse.

Storage

P403+P233 + P235 - Store in a well-ventilated place. Keep container tightly closed. Keep cool.
P405 - Store locked up.

Disposal

P501 - Dispose of contents/container to licensed waste management site

2.3. Other hazards (HNOC)

Health Hazard Not Otherwise Classified - Category 1: If swallowed there is a risk of blindness.

2.4. Unknown acute toxicity

0% of the mixture consists of ingredient(s) of unknown acute toxicity. (Oral, Dermal, Inhalation)

SECTION 3: Composition/information on ingredients

3.1. Substance

Name	Product identifier	%
Methanol	(CAS No) 67-56-1	100

3.2. Mixture

Not applicable

SECTION 4: First aid measures

4.1. Description of first aid measures

First-aid measures general : Never give anything by mouth to an unconscious person. If you feel unwell, seek medical advice (show the label where possible). Call a POISON CENTER or doctor/physician. Methanol is toxic and flammable. Take proper precautions to ensure your own safety before attempting rescue (e.g. wear appropriate protective equipment and remove any sources of ignition).

First-aid measures after inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If breathing is difficult, give oxygen. Obtain medical attention.

First-aid measures after skin contact : Rinse skin with water/shower. Remove/Take off immediately all contaminated clothing. Immediately call a poison center or doctor/physician. Wash contaminated clothing before reuse.

First-aid measures after eye contact : Rinse immediately and thoroughly, pulling the eyelids well away from the eye (15 minutes minimum). Remove contact lenses, if present and easy to do. Continue rinsing. Ensure that folded skin of eyelids is thoroughly washed with water. Obtain medical attention if pain, blinking or redness persist.

First-aid measures after ingestion : Rinse mouth. Do NOT induce vomiting. Obtain emergency medical attention. Never give anything by mouth to an unconscious person.

4.2. Most important symptoms and effects, both acute and delayed

Symptoms/injuries after inhalation : Symptoms may include dizziness, headache, nausea and loss of coordination. CNS depression. Metabolic acidosis and severe visual effects can occur following an 8-24 hour latent period. Coma and death, usually due to respiratory failure, may occur if medical treatment is not received. Visual effects may include reduced reactivity and/or increased sensitivity to light, blurred, double and/or snowy vision, and blindness.

Symptoms/injuries after skin contact : Repeated exposure to this material can result in absorption through skin causing significant health hazard. Repeated and/or prolonged skin contact may cause irritation.

Symptoms/injuries after eye contact : Causes serious eye damage.

SAFETY DATA SHEET(SDS) CONT.

Methanol Safety Data Sheet

according to 29 CFR 1910.1200 and Schedule 1 of Hazardous Products Regulations (HPR) (SOR/2015-17)



- Symptoms/injuries after ingestion** : Ingestion of as little as 10 ml of methanol can cause blindness and 30 ml (1 ounce) can cause death if victim is not treated. Ingestion causes mild central nervous system (CNS) depression with nausea, headache, vomiting, dizziness, incoordination and an appearance of drunkenness. Metabolic acidosis and severe visual effects can occur following an 8-24 hour latent period. Coma and death, usually due to respiratory failure, may occur if medical treatment is not received. Visual effects may include reduced reactivity and/or increased sensitivity to light, blurred, double and/or snowy vision, and blindness.
- Chronic symptoms** : Some teratogenic and fetotoxic effects, were observed in animal studies but are inconclusive.

4.3. Indication of any immediate medical attention and special treatment needed

Treat symptomatically. The severity of outcome following methanol ingestion may be more related to the time between ingestion and treatment, rather than the amount ingested. Therefore, there is a need for rapid treatment of any ingestion exposure. Antidote is fomepizole which enhances elimination of metabolic formic acid. This must be administered by a trained medical professional only. For specialist advice physicians should contact the Poison Control Centre.

SECTION 5: Firefighting measures

5.1. Extinguishing media

- Suitable extinguishing media** : Synthetic Fire fighting foam AR-FFF (3% solution). Dry powder. Carbon dioxide. Water spray. Sand.
- Unsuitable extinguishing media** : Do not use a heavy water stream. Water may be effective for cooling, diluting, or dispersing methanol, but may not be effective for extinguishing a fire because it will not cool methanol below its flash point. If water is used for cooling, the solution will spread if not contained. Mixtures of methanol and water at concentrations greater than 20% methanol are still considered flammable.

5.2. Special hazards arising from the substance or mixture

- Fire hazard** : Highly flammable liquid and vapor. Can accumulate in confined spaces, resulting in a toxicity and flammability hazard. Incomplete combustion releases dangerous carbon monoxide, carbon dioxide and other toxic gases. Under fire conditions closed containers may rupture or explode. Flame may be invisible during the day. The use of infrared and/or heat detection devices is recommended.
- Explosion hazard** : May form flammable/explosive vapor-air mixture.
- Reactivity** : Stable under normal conditions.

5.3. Advice for firefighters

- Firefighting instructions** : Use water spray or fog for cooling exposed containers. Exercise caution when fighting any chemical fire. Prevent fire-fighting water from entering environment.
- Protection during firefighting** : Fire fighters should wear complete protective clothing including self-contained breathing apparatus.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

- General measures** : Remove ignition sources. Use special care to avoid static electric charges. No open flames. No smoking.

6.1.1. For non-emergency personnel

- Protective equipment** : Wear suitable protective clothing, gloves and eye or face protection.
- Emergency procedures** : Evacuate unnecessary personnel.

6.1.2. For emergency responders

- Protective equipment** : Wear suitable protective clothing and eye or face protection.
- Emergency procedures** : Remove ignition sources. Ensure adequate ventilation. Avoid inhalation of vapors. Avoid contact with eyes, skin and clothing.

6.2. Environmental precautions

Prevent entry to sewers and public waters. Notify authorities if liquid enters sewers or public waters. Methanol's main physical behavior if spilled to water is described as "dissolves/evaporates" in the European Behaviour Classification system for chemicals (reported in IMO (2011)). GESAMP hazard profile: methanol does not bioaccumulate and is readily biodegradable in the aquatic environment (IMO2011). Methanol is fully miscible in water and cannot be recovered.

Methanol Safety Data Sheet

according to 29 CFR 1910.1200 and Schedule 1 of Hazardous Products Regulations (HPR) (SOR/2015-17)



6.3. Methods and material for containment and cleaning up

- Methods for cleaning up** : Stop leak if safe to do so. Remove all sources of ignition. Small quantities of liquid spill: take up in non-combustible absorbent material and shovel into container for disposal. Use a non-sparking shovel. Wash spill area with soapy water. Large spills: Dike to collect large liquid spills. Alcohol resistant foams may be applied to spill to diminish vapour and fire hazard. Remove liquid by intrinsically safe pumps or vacuum equipment designed for vacuuming flammable materials (i.e. equipped with inert gases and ignition sources controlled). Place in suitable, covered, labelled containers.

6.4. Reference to other sections

SECTION 8: Exposure controls/personal protection. SECTION 13: Disposal considerations.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

- Additional hazards when processed** : Handle empty containers with care because residual vapors are flammable.
- Precautions for safe handling** : Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work. Provide good ventilation in process area to prevent formation of vapor. No open flames. No smoking. Use only explosion-proof equipment. Use only non-sparking tools. Do not breathe vapors.
- Hygiene measures** : Do not eat, drink or smoke when using this product. Wash hands and forearms thoroughly after handling.

7.2. Conditions for safe storage, including any incompatibilities

- Technical measures** : Proper grounding procedures to avoid static electricity should be followed. Ground/bond container and receiving equipment. Use explosion-proof electrical equipment. Have appropriate fire extinguishers and spill cleanup equipment in or near storage area.
- Storage conditions** : Keep only in the original container in a cool, well ventilated place away from : Ignition sources, Oxidising agents. Keep in fireproof place. Keep container tightly closed. Do not store in confined spaces.
- Storage area** : Store at room temperature. Keep out of direct sunlight. Store in a dry area. Keep container in a well-ventilated place. Fireproof storeroom. Keep locked up. Provide the tank with earthing. Unauthorized persons are not admitted.
- Packaging materials** : SUITABLE MATERIAL: Steel. Stainless steel. Iron. Glass. MATERIAL TO AVOID: Lead. Aluminum. zinc. Polyethylene. PVC.

7.3. Specific end use(s)

Solvent, Fuel, Feedstock.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Methanol (67-56-1)	
ACGIH :	200 ppm TWA 250 ppm STEL Skin - potential significant contribution to overall exposure by the cutaneous route
NIOSH :	200 ppm TWA; 260 mg/m3 TWA 250 ppm STEL; 325 mg/m3 STEL Potential for dermal absorption 6000 ppm IDLH
OSHA (US) :	200 ppm TWA; 260 mg/m3 TWA
Alberta :	200 ppm TWA; 262 mg/m3 TWA 250 ppm STEL; 328 mg/m3 STEL Substance may be readily absorbed through intact skin
British Columbia :	200 ppm TWA Skin notation 250 ppm STEL
Manitoba:	200 ppm TWA Skin - potential for cutaneous absorption Skin - potential significant contribution to overall exposure by the cutaneous route
New Brunswick:	200 ppm TWA; 262 mg/m3 TWA 250 ppm STEL; 328 mg/m3 STEL Skin - potential for cutaneous absorption
Northwest Territories:	200 ppm TWA Skin notation 250 ppm STEL

SAFETY DATA SHEET(SDS) CONT.

Methanol

Safety Data Sheet

according to 29 CFR 1910.1200 and Schedule 1 of Hazardous Products Regulations (HPR) (SOR/2015-17)



Methanol (67-56-1)	
Nova Scotia:	200 ppm TWA 250 ppm STEL Skin - potential significant contribution to overall exposure by the cutaneous route
Nunavut:	200 ppm TWA Skin notation 250 ppm STEL
Ontario:	200 ppm TWA 250 ppm STEL Danger of cutaneous absorption
Prince Edward Island:	200 ppm TWA 250 ppm STEL
Quebec:	200 ppm TWAEV; 262 mg/m3 TWAEV 250 ppm STEV; 328 mg/m3 STEV Skin designation
Saskatchewan:	200 ppm TWA 250 ppm STEL Potentially harmful after absorption through skin or mucous membranes
Yukon:	200 ppm TWA; 260 mg/m3 TWA 250 ppm STEL; 310 mg/m3 STEL Skin notation

8.2. Exposure controls

Appropriate engineering controls	: Carry out operations in the open/under local exhaust/ventilation or with respiratory protection. Both local exhaust and good general room ventilation must be provided not only to control exposure but also to prevent formation of flammable mixtures. Emergency safety showers should be available in the immediate vicinity of any potential exposure. Use only explosion-proof equipment.
Personal protective equipment	: Avoid all unnecessary exposure.
Hand protection	: Wear natural rubber, neoprene, butyl rubber gloves. Disposal gloves must be replaced after each use.
Eye protection	: Chemical goggles or safety glasses. Face-shield.
Skin and body protection	: Wear chemical resistant overall.
Respiratory protection	: Where exposure through inhalation may occur from use, respiratory protection equipment is recommended. Wear a positive pressure full face self-contained breathing apparatus or a full face supplied air respirator.
Other information	: Smoking, eating and drinking should be prohibited in areas of storage and use.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	: Liquid
Appearance	: Clear.
Molecular mass	: 32.04 g/mol
Color	: Colorless.
Odor	: alcohol odor.
Odor threshold	: 4.2 - 5980 ppm
pH	: Not applicable
Relative evaporation rate (butyl acetate=1)	: 4.1
Melting point	: -97.8 °C
Freezing point	: -97.8 °C
Boiling point	: 64.7 °C
Flash point	: 11 °C
Auto-ignition temperature	: 464 °C
Decomposition temperature	: Not available
Flammability (solid, gas)	: No data available
Vapor pressure	: 12.8 kPa @ 20°C
Relative vapor density at 20 °C	: 1.1
Relative density	: 0.791 - 0.793 @ 20°C

Methanol

Safety Data Sheet

according to 29 CFR 1910.1200 and Schedule 1 of Hazardous Products Regulations (HPR) (SOR/2015-17)



Relative density of saturated gas/air mixture	: 1.0
Specific gravity / density	: 792 kg/m³
Solubility	: Miscible with water.
Partition coefficient: n-octanol/water	: -0.77 (log value)
Viscosity, kinematic	: No data available
Viscosity, dynamic	: 0.8 cP (25 °C)
Explosive properties	: vapors may form explosive mixture with air.
Oxidizing properties	: Not oxidizing.
Explosive limits	: 5.5 - 36.5 vol %

9.2. Other information

VOC content	: 100 %
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SECTION 10: Stability and reactivity

10.1. Reactivity

Stable under normal conditions.

10.2. Chemical stability

The product is stable under storage at normal ambient temperatures. Highly flammable liquid and vapor. May form flammable/explosive vapor-air mixture. Hygroscopic.

10.3. Possibility of hazardous reactions

Under fire conditions closed containers may rupture or explode.

10.4. Conditions to avoid

Direct sunlight. High temperature. Open flame. Ignition sources.

10.5. Incompatible materials

Oxidizing agents. Strong acids. Strong bases. Methanol is not compatible with gasket and O-rings materials made of Buna-N and Nitrile.

10.6. Hazardous decomposition products

Heat. Carbon monoxide. Carbon dioxide. Releases flammable gases. Formaldehyde.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Information on Likely Routes of Exposure

Inhalation	: Symptoms may include dizziness, headache, nausea and loss of coordination. CNS depression. Metabolic acidosis and severe visual effects can occur following an 8-24 hour latent period. Coma and death, usually due to respiratory failure, may occur if medical treatment is not received. Visual effects may include reduced reactivity and/or increased sensitivity to light, blurred, double and/or snowy vision, and blindness.
Skin Contact	: Repeated exposure to this material can result in absorption through skin causing significant health hazard. Repeated and/or prolonged skin contact may cause irritation.
Eye Contact	: Causes serious eye damage.
Ingestion	: Ingestion of as little as 10 ml of methanol can cause blindness and 30 ml (1 ounce) can cause death if victim is not treated. Ingestion causes mild central nervous system (CNS) depression with nausea, headache, vomiting, dizziness, incoordination and an appearance of drunkenness. Metabolic acidosis and severe visual effects can occur following an 8-24 hour latent period. Coma and death, usually due to respiratory failure, may occur if medical treatment is not received. Visual effects may include reduced reactivity and/or increased sensitivity to light, blurred, double and/or snowy vision, and blindness.
Acute toxicity	: Toxic if swallowed. Toxic in contact with skin. Toxic if inhaled.

Methanol (67-56-1)	
LD50 oral rat	5600 mg/kg
LD50 dermal rabbit	15800 mg/kg
LC50 inhalation rat (ppm)	64000 ppm/4h rat

SAFETY DATA SHEET(SDS) CONT.

Methanol

Safety Data Sheet

according to 29 CFR 1910.1200 and Schedule 1 of Hazardous Products Regulations (HPR) (SOR/2015-17)



Immediate Effects	: Poison. If swallowed there is a risk of blindness. Toxic if swallowed, in contact with skin or if inhaled. Causes serious eye irritation. May cause drowsiness or dizziness. Causes damage to organs: optic nerve, central nervous system, retina.
Delayed Effects	: May damage fertility or the unborn child.
Skin corrosion/irritation	: Not classified Based on available data, the classification criteria are not met pH: Not applicable
Serious eye damage/irritation	: Causes serious eye irritation. pH: Not applicable
Respiratory or skin sensitization	: Not classified Based on available data, the classification criteria are not met
Germ cell mutagenicity	: Not classified Based on available data, the classification criteria are not met
Carcinogenicity	: Not classified None of this product's components are listed by ACGIH, IARC, NTP, DFG or OSHA
Reproductive toxicity	: May damage fertility or the unborn child.
Specific target organ toxicity (single exposure)	: Causes damage to organs: optic nerve, central nervous system, retina. May cause drowsiness or dizziness.
Specific target organ toxicity (repeated exposure)	: Not classified Based on available data, the classification criteria are not met
Aspiration hazard	: Not classified Based on available data, the classification criteria are not met

SECTION 12: Ecological Information

12.1. Toxicity	
Methanol (67-56-1)	
LC50 fish	15400 - 29400 mg/l 96 h - Fish
EC50 Daphnia	> 10000 mg/l 48 h - Daphnia
EC50 other aquatic organisms 1	22000 mg/l 72h - Selenastrum carpicornutum (Pseudokichnerella subcapitata)
12.2. Persistence and degradability	
Methanol (67-56-1)	
Persistence and degradability	Rapidly degradable.
12.3. Bioaccumulative potential	
Methanol (67-56-1)	
BCF fish 1	< 10 (Leuciscus idus)
Log Pow	0.82
Bioaccumulative potential	Bioaccumulation unlikely. Based on the n-octanol/water partition coefficient accumulation in organisms is not expected.
12.4. Mobility in soil	
Methanol (67-56-1)	
Mobility in soil	Mobile

12.5. Other adverse effects

Other information : Avoid release to the environment.

SECTION 13: Disposal considerations

13.1. Waste treatment methods	
Waste treatment methods	: Methanol waste should be handled and stored in a similar manner to methanol products or mixtures. Avoid release to the environment. Collect methanol waste in secure and sealable containers. Refer to section 6 and 7 for information on accidental releases, handling and storage conditions. Methanol waste shall not be mixed together with other waste. Dispose methanol waste in a safe manner in accordance with local and/or national regulations. Use qualified hazardous waste companies to transport and dispose of methanol waste. Recycle wherever possible. Large volumes may be suitable for re-distillation. Empty containers may contain hazardous residue. Never weld, cut or grind empty containers. Empty containers should be thoroughly rinsed with large quantities of clean water. Rinse water should be disposed of as methanol waste.

Methanol

Safety Data Sheet

according to 29 CFR 1910.1200 and Schedule 1 of Hazardous Products Regulations (HPR) (SOR/2015-17)



SECTION 14: Transport Information

In accordance with DOT/TDG	
Transport document description	: UN1230 Methanol, 3, II
UN-No.	: 1230
DOT NA no.	: UN1230
Proper Shipping Name	: Methanol
Transport hazard class(es)	: 3 - Class 3 - Flammable and combustible liquid 49 CFR 173.120
Hazard labels	: 3 - Flammable liquid 6.1 - Poison inhalation hazard



Packing group	: II - Medium Danger
DOT Packaging Exceptions (49 CFR 173.xxx)	: 150
DOT Packaging Non Bulk (49 CFR 173.xxx)	: 202
DOT Packaging Bulk (49 CFR 173.xxx)	: 242
DOT Quantity Limitations Passenger aircraft/rail (49 CFR 173.27)	: 1 L
DOT Quantity Limitations Cargo aircraft only (49 CFR 175.75)	: 60 L
Marine pollutant	: No

Transport by sea

UN-No. (IMDG)	: 1230
Proper Shipping Name (IMDG)	: METHANOL
Class (IMDG)	: 3 - Flammable liquids
Packing group (IMDG)	: II - substances presenting medium danger
Subsidiary risks (IMDG)	: 6.1

Air transport

UN-No. (IATA)	: 1230
Proper Shipping Name (IATA)	: METHANOL
Class (IATA)	: 3 - Flammable Liquids
Packing group (IATA)	: II - Medium Danger
Subsidiary risks (IATA)	: 6.1

SECTION 15: Regulatory Information

15.1. US Federal Regulations

Methanol (67-56-1)	
This material contains one or more of the following chemicals required to be identified under SARA Section 302 (40 CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65), CERCLA (40 CFR 302.4), TSCA 12(b), and/or require an OSHA process safety plan.	
SARA 313:	1 % de minimis concentration
CERCLA:	5000 lb final RQ : 2270 kg final RQ
SARA Section 311/312 Hazard Classes (40 CFR 370 Subparts B and C) 2016 reporting categories:	Acute Health: Yes Chronic Health: Yes Fire: Yes Pressure: No Reactivity: No
SARA Section 311/312 (40 CFR 370 Subparts B and C) 2017 reporting categories:	Flammable; Acute toxicity; Reproductive Toxicity; Serious Eye Damage/Eye Irritation; Specific Target Organ Toxicity

15.2. Canada Federal Regulations

Methanol (67-56-1)	
CEPA - Priority Substances List:	None of this product's components are on the list.
Ozone Depleting Substances:	None of this product's components are on the list.
Council of Ministers of the Environment - Soil Quality Guidelines:	None of this product's components are on the list.

SAFETY DATA SHEET(SDS) CONT.

Methanol

Safety Data Sheet

according to 29 CFR 1910.1200 and Schedule 1 of Hazardous Products Regulations (HPR) (SOR/2015-17)



Methanol (67-56-1)													
Council of Ministers of the Environment - Water Quality Guidelines:						None of this product's components are on the list.							
15.3. Component Analysis - Inventory													
Methanol (67-56-1)													
US	CA	EU	AU	PH	JP - ENCS	JP - ISHL	KR KECI - Annex 1	KR KECI - Annex 2	KR - REACH CCA	CN	NZ	MX	TW
Yes	DSL	EIN	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
15.4. US State Regulations													
Methanol (67-56-1)													
U.S. - California - Proposition 65 - Developmental Toxicity							Yes						
State or local regulations							U.S. - California - Hazardous Substance List U.S. - Massachusetts - Right To Know List U.S. - Minnesota - Hazardous Substance List U.S. - New Jersey - Right to Know Hazardous Substance List U.S. - Pennsylvania - RTK (Right to Know) List						

SECTION 16: Other Information

Summary of Changes

: Updated: 03/30/2017

Other information

Key / Legend

: ACGIH - American Conference of Governmental Industrial Hygienists; ADR - European Road Transport; AU - Australia; BOD - Biochemical Oxygen Demand; C - Celsius; CA - Canada; CA/MA/MN/NJ/PA - California/Massachusetts/Minnesota/New Jersey/Pennsylvania*; CAS - Chemical Abstracts Service; CFR - Code of Federal Regulations (US); CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CLP - Classification, Labelling, and Packaging; CN - China; CPR - Controlled Products Regulations; DFG - Deutsche Forschungsgemeinschaft; DOT - Department of Transportation; DSD - Dangerous Substance Directive; DSL - Domestic Substances List; EC - European Commission; EEC - European Economic Community; EIN - European Inventory of (Existing Commercial Chemical Substances); EINECS - European Inventory of Existing Commercial Chemical Substances; ENCS - Japan Existing and New Chemical Substance Inventory; EPA - Environmental Protection Agency; EU - European Union; F - Fahrenheit; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; ICAO - International Civil Aviation Organization; IDL - Ingredient Disclosure List; IDLH - Immediately Dangerous to Life and Health; IMDG - International Maritime Dangerous Goods; ISHL - Japan Industrial Safety and Health Law; IUCLID - International Uniform Chemical Information Database; JP - Japan; Kow - Octanol/water partition coefficient; KR KECI Annex 1 - Korea Existing Chemicals Inventory (KECI) / Korea Existing Chemicals List (KECL); KR KECI Annex 2 - Korea Existing Chemicals Inventory (KECI) / Korea Existing Chemicals List (KECL); KR - Korea; LD50/LC50 - Lethal Dose/ Lethal Concentration; LEL - Lower Explosive Limit; LLV - Level Limit Value; LOLI - List Of Lists™ - ChemADVISOR's Regulatory Database; MAK - Maximum Concentration Value in the Workplace; MEL - Maximum Exposure Limits; MX - Mexico; NDSL - Non-Domestic Substance List (Canada); NFPA - National Fire Protection Agency; NIOSH - National Institute for Occupational Safety and Health; NJTSR - New Jersey Trade Secret Registry; NTP - National Toxicology Program; NZ - New Zealand; OSHA - Occupational Safety and Health Administration; PEL - Permissible Exposure Limit; PH - Philippines; RCRA - Resource Conservation and Recovery Act; REACH - Registration, Evaluation, Authorisation, and restriction of Chemicals; RID - European Rail Transport; SARA - Superfund Amendments and Reauthorization Act; STEL - Short-term Exposure Limit; TCCA - Korea Toxic Chemicals Control Act; TDG - Transportation of Dangerous Goods; TLV - Threshold Limit Value; TSCA - Toxic Substances Control Act; TW - Taiwan; TWA - Time Weighted Average; UEL - Upper Explosive Limit; UN/NA - United Nations /North American; US - United States; VLE - Exposure Limit Value (Mexico); WHMIS - Workplace Hazardous Materials Information System (Canada).

- NFPA health hazard : 1 - Exposure could cause irritation but only minor residual injury even if no treatment is given.
- NFPA fire hazard : 3 - Liquids and solids that can be ignited under almost all ambient conditions.
- NFPA reactivity : 0 - Normally stable, even under fire exposure conditions, and are not reactive with water.



Methanol

Safety Data Sheet

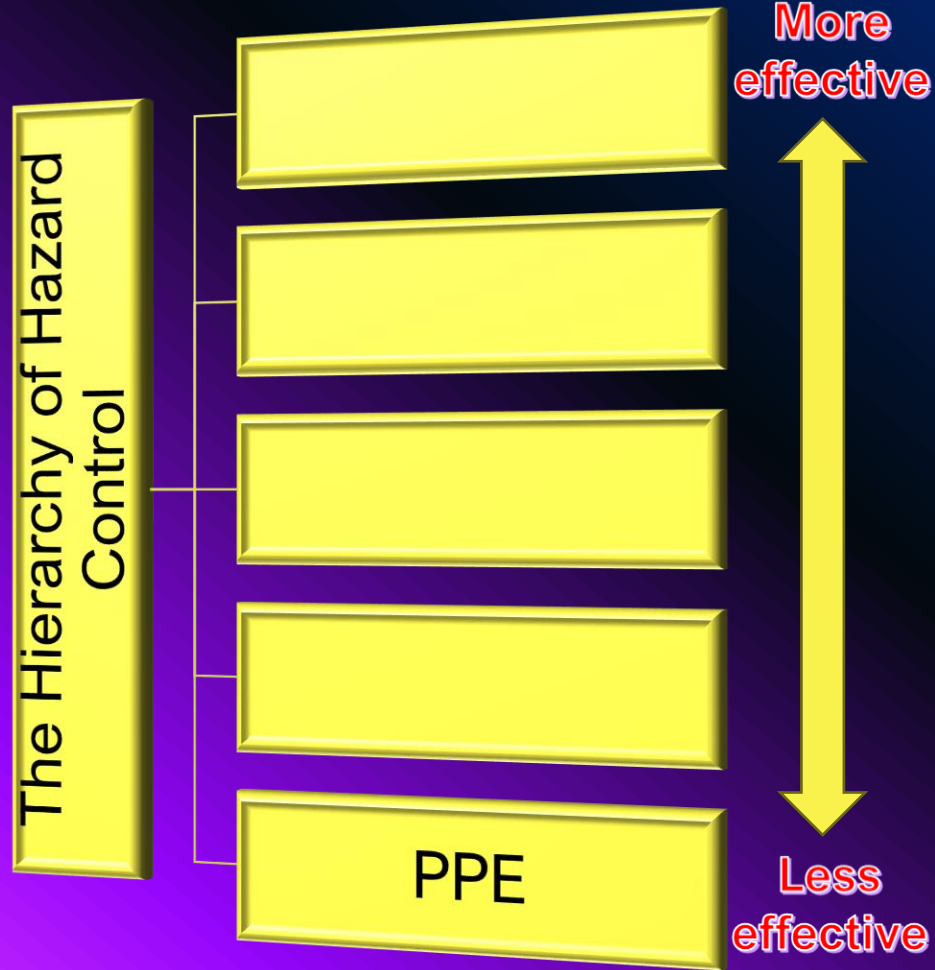
according to 29 CFR 1910.1200 and Schedule 1 of Hazardous Products Regulations (HPR) (SOR/2015-17)



HMIS VI Rating

Health	: 4 Severe Hazard - Life-threatening, major or permanent damage may result from single or repeated overexposures * Chronic Hazard - Chronic (long-term) health effects may result from repeated overexposure
Flammability	: 3 Serious Hazard
Physical	: 0 Minimal Hazard

The information above is believed to be accurate and represents the best information currently available to us. Users should make their own investigations to determine the suitability of the information for their particular purposes. This document is intended as a guide to the appropriate precautionary handling of the material by a properly trained person using this product. Methanex Corporation and its subsidiaries make no representations or warranties, either express or implied, including without limitation any warranties of merchantability, fitness for a particular purpose with respect to the information set forth herein or the product to which the information refers. Accordingly, Methanex Corp. will not be responsible for damages resulting from use of or reliance upon this information.



PERSONAL PROTECTIVE EQUIPMENT (PPE)

- ❖ Protect the worker with protective equipment (PPE).
- ❖ Wear appropriate Personal Protective Equipment(PPE).
 - Safety goggles or face shield.
 - Chemical gloves.
 - Flame resistant coveralls.
 - Rubber Boots.



SPILL RESPONSE & ENVIRONMENT PROTECTION



Spill Response

- Evacuate area if large spill occurs; eliminate all ignition sources.
- Contain spill with **non-combustible absorbent material** (e.g., vermiculite, sand).
- Use **spark-proof tools** for cleanup.
- Dispose of waste according to local hazardous waste regulations.



ENVIRONMENT PROTECTION

- Prevent methanol from entering **storm drains, waterways, or soil**.
- Ensure **spill containment systems** are in place and regularly inspected.



METHANOL SAFE HANDLING VIDEO



THANK YOU

Abdellatif Moujahid

Raleigh Water

Q&A