n-PROPANOL

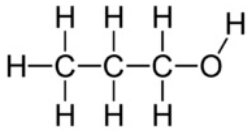
Chemical Formula: C_3H_8O

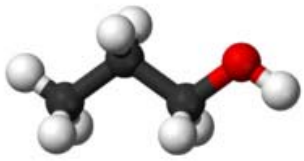
CAS Registry Number: 71-23-8

Molecular Weight: 60.1

Category: Alcohol

PRODUCT INFORMATION





Synonyms:

- 1-Hydroxypropane
- 1-Propanol
- Ethylcarbinol
- n-Propanol
- N-PROPYL ALCOHOL
- NSC 30300
- Optal
- Osmosol extra
- Propan-1-ol
- propane-1-ol
- PROPANOL
- Propyl alcohol
- UN 1274
- UN 1274

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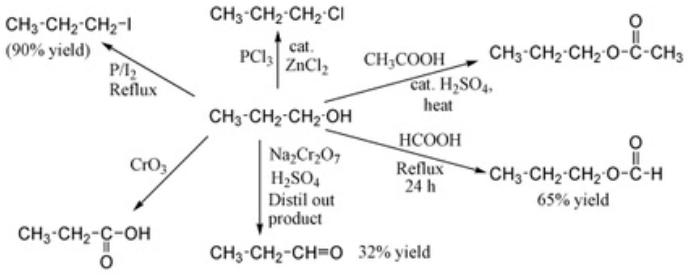
Propan-1-ol is a primary alcohol with the molecular formula of C_3H_8O. It is also known as 1-propanol, 1-propyl alcohol, n-propyl alcohol,n-propanol, or simply propanol. It is an isomer of propan-2-ol. It is used as a solvent in the pharmaceutical industry, and for resins and cellulose esters. It is formed naturally in small amounts during many fermentation processes.



1-Propanol shows the normal reactions of a primary alcohol. Thus it can be converted to alkyl halides; for example red phosphorus and iodine produce n-propyl iodide in 90% yield, while PCl3 with catalytic ZnCl2 gives 1-chloropropane. Reaction with acetic acid in the presence of an H2SO4 catalyst under Fischer esterification conditions gives propyl acetate, while refluxing propanol overnight with formic acid alone can produce propyl formate in 65% yield. Oxidation of 1-propanol with Na2Cr2O7 and H2SO4 gives only a 36% yield of propionaldehyde, and therefore for this type of reaction higher yielding methods using PCC or the Swern oxidation are recommended. Oxidation with chromic acid yields propionic acid.

Physical and Chemical Properties

Appearance: Clear, colorless liquid.
Odor: Alcohol odor.
Solubility: Infinitely soluble.
Specific Gravity: 0.804
pH: No information found.
% Volatiles by volume @ 21°C (70°F): 100
Boiling Point: 97°C (207°F)
Melting Point: -127°C (-197°F)
Vapor Density (Air=1): 2.07
Vapor Pressure (mm Hg): 21 @ 25°C (77°F)
Evaporation Rate (BuAc=1): 1.3

Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage.
Hazardous Decomposition Products:
Carbon dioxide and carbon monoxide may form when heated to decomposition. May produce acrid smoke and irritating fumes when heated to decomposition.
Hazardous Polymerization:
Will not occur.
Incompatibilities:

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Strong acids, aldehydes, halides, halogens, Reacts violently with potassium-tert-butoxide. Can react vigorously with oxidizing materials.

Conditions to Avoid:

Heat, flames, ignition sources and incompatibles.

Hazards Identification

Emergency Overview

WARNING! FLAMMABLE LIQUID AND VAPOR. HARMFUL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN. MAY AFFECT CENTRAL NERVOUS SYSTEM. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. ASPIRATION MAY CAUSE LUNG DAMAGE.

Health Rating: 2 - Moderate
Flammability Rating: 2 - Moderate
Reactivity Rating: 2 - Moderate
Contact Rating: 3 - Severe (Life)
Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES; CLASS B EXTINGUISHER
Storage Color Code: Red (Flammable)

Potential Health Effects

Inhalation:

Vapors have a mild narcotic effect and act as an upper respiratory tract irritant. Symptoms may include irritation of the eyes, nose, and throat, drowsiness, headache, and incoordination. Excessive exposures may lead to narcosis and central nervous system depression.

Ingestion:

Aspiration into the lungs may occur during swallowing or vomiting, resulting in lung damage. May cause nausea, vomiting, drowsiness, gastrointestinal pain, cramps and diarrhea. Large doses may cause death.

Skin Contact:

Defatting agent. May cause skin irritation. Skin absorption may occur with symptoms paralleling those from inhalation exposure.

Eye Contact:

Vapors are irritating to the eyes. Splashes may cause severe irritation, with stinging, tearing, redness and pain. May cause corneal injury or blindness.

Chronic Exposure:

Prolonged or repeated skin contact may cause dermatitis. No systemic chronic effects have been reported in humans.

Aggravation of Pre-existing Conditions:

Persons with pre-existing skin problems or impaired respiratory function may be more susceptible to the effects of this substance.

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First Aid Measures

Inhalation:
Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.
Ingestion:
Aspiration hazard. Do NOT induce vomiting. Give large amounts of water. Never give anything by mouth to an unconscious person. Get medical attention.
Skin Contact:
In case of contact, immediately flush skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. Call a physician.
Eye Contact:
Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

Note to Physician:
Treat CNS depression supportively. Rule out other causes. Treat ingestion with gastric lavage and saline catharsis. Metabolite acetone may be detected in urine.

Fire Fighting Measures

Fire:
Flash point: 23C (73F) CC
Autoignition temperature: 412C (774F)
Flammable limits in air % by volume:
lel: 2.3; uel: 13.7
Flammable Liquid and Vapor!
Explosion:
Above flash point, vapor-air mixtures are explosive within flammable limits noted above. Vapors can flow along surfaces to distant ignition source and flash back. Ignites on contact with potassium tertbutoxide.
Fire Extinguishing Media:
Water spray, dry chemical, alcohol foam, or carbon dioxide. Water spray may be used to keep fire exposed containers cool.
Special Information:
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. If a leak or spill has not ignited, use water spray to disperse the vapors, to protect personnel attempting to stop leak, and to flush spills away from exposures.

Accidental Release Measures

Ventilate area of leak or spill. Remove all sources of ignition. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Use non-sparking tools and equipment. Collect liquid in an appropriate container or absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! Water can be used to dilute to raise flashpoint and to flush away from possible sources of ignition.

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Handling and Storage

Protect against physical damage. Store in a cool, dry well-ventilated location, away from any area where the fire hazard may be acute. Outside or detached storage is preferred. Separate from incompatibles. Containers should be bonded and grounded for transfers to avoid static sparks. Storage and use areas should be No Smoking areas. Use non-sparking type tools and equipment, including explosion proof ventilation. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.

Exposure Controls/Personal Protection

Airborne Exposure Limits:
-OSHA Permissible Exposure Limit (PEL):
200 ppm (TWA), 250 ppm (STEL)

-ACGIH Threshold Limit Value (TLV):
100 ppm (TWA)
Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.
Personal Respirators (NIOSH Approved):
If the exposure limit is exceeded and engineering controls are not feasible, a full facepiece respirator with organic vapor cartridge may be worn up to 50 times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. For emergencies or instances where the exposure levels are not known, use a full-facepiece positive-pressure, air-supplied respirator. WARNING: Air purifying respirators do not protect workers in oxygen-deficient atmospheres. This compound possibly exists in both particulate and vapor phase. A particulate (NIOSH type N95 or better) prefilter should be used for the particulate.
Skin Protection:
Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.
Eye Protection:
Use chemical safety goggles. Maintain eye wash fountain and quick-drench facilities in work area.

Ecological Information

Environmental Fate:
When released into the soil, this material is expected to readily biodegrade. When released into the soil, this material is expected to leach into groundwater. When released into the soil, this material is expected to quickly evaporate. When released into water, this material is expected to readily biodegrade. When released to water, this material is expected to quickly evaporate. This material is not expected to significantly bioaccumulate. This material has a log octanol-water partition coefficient of less than 3.0. When released into the water, this material is expected to have a half-life between 1 and 10 days. When released into the air, this material is expected to be readily degraded by reaction with photochemically produced hydroxyl radicals. When released into the air, this material is expected to be readily removed from the atmosphere by wet deposition.
Environmental Toxicity:
The LC50/96-hour values for fish are between 1 and 10 mg/l. This material is expected to be toxic to aquatic life.

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Other Information

NFPA Ratings: Health: **1** Flammability: **3** Reactivity: **0**
Label Hazard Warning:
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Label Precautions:
Keep away from heat, sparks and flame.
Avoid breathing vapor.
Avoid contact with eyes, skin and clothing.
Keep container closed.
Use with adequate ventilation.
Wash thoroughly after handling.

Label First Aid:
In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. In all cases call a physician.

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