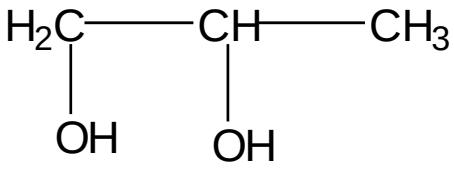
ProductInformation

1,2-PROPANEDIOL

Sigma Prod. Nos. P1009 and P6209

CAS NUMBER: 57-55-6
SYNONYMS: propylene glycol; methyl glycol; 1,2-dihydroxypropane



PHYSICAL DESCRIPTION:

Structure: dl-form
Appearance: clear colorless viscous liquid
Molecular formula: $C_3H_8O_2$
Molecular weight: 76.10
Melting point: -59 to -60°C[1,4]
Boiling point: at 760 torr, 188°C[1,4] (186-189°C)[2] at 10 torr, 83.2°C[1]
Vapor pressure at 25°C = 0.02 kPa (0.15 torr)[4]
Density: 1.0351-1.0364 g/mL at 25°C[2]
Effective molarity of pure liquid: 13.1 M
Refractive index: 1.432 at 20°C[3]
Viscosity at 25°C = 40.4 mPa·s[5]

STORAGE / STABILITY AS SUPPLIED:

The product is stable at room temperature for years[6], but at high temperatures it tends to oxidize.[1] Containers should be kept sealed since the product is hygroscopic.

SOLUBILITY / STABILITY OF SOLUTIONS:

1,2-Propanediol is completely miscible with water, acetone and chloroform. It is soluble in ether. It is an excellent solvent, but is immiscible with fixed oils. A 2% solution is iso-osmotic with serum.[7]

Solutions are stable indefinitely at room temperature, although are incompatible with some oxidizing agents. Solutions may be sterilized by filtration.[7]

GENERAL REMARKS:

P1009 is reagent grade. P6209 meets ACS specification shown in Sigma Catalog and 8th edition of the ACS Reagents.

1,2-Propanediol, more commonly called propylene glycol, has been widely used in pharmaceutical manufacturing as a solvent and vehicle especially for drugs unstable or insoluble in water. It may also be used as a stabilizing agent, plasticizer and as a preservative.

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GENERAL REMARKS: (continued)

U.S.P. Propylene glycol has been used extensively in foods and cosmetics, partly as a solvent, but more as a humectant and also for its preservative properties.[8] It has some antimicrobial value, based on the reduction in water activity. *Staphylococcus aureus* grew more slowly to lower maximum populations in the presence of propylene glycol at concentrations permitted in foods.[9]

Another major use is as an industrial antifreeze, substituting for ethylene glycol and glycerol.[1,10] The use of ethylene glycol as an automotive antifreeze poses a hazard for children and household pets (oral LD_{50} for rats = 4.7 g/kg[11]) due to its sweet taste. Propylene glycol is considerably less toxic (oral LD_{50} for rats = 20 g/kg[11]) and is being offered commercially as a safer alternative.[10]

REFERENCES:

1. *Merck Index*, 12th Ed., #8040 (1996).
2. Supplier data.
3. *Handbook of Chemistry and Physics*, 74th Ed., (CRC Press, 1993-94), p. 3-427.
4. Ibid., p. 15.48
5. Ibid., p. 6-137.
6. Sigma quality control.
7. *Martindale: The Extra Pharmacopoeia*, 28th Ed. (Pharmaceutical Press, 1982), ed. Reynolds, J., p. 708-709.
8. *Martindale: The Extra Pharmacopoeia*, 30th Ed. (Pharmaceutical Press, 1993), ed. Reynolds, J., p. 1406.
9. *Disinfection, Sterilization and Preservation*, 4th Ed., ed., Block, S. (Lea & Febiger, 1991), p. 823-4.
10. Goldfarb, B., *Chem Matters*, 14(3), 4-8 (1996). "Antifreeze Antidote."
11. Sigma Material Safety Data Sheet.