PROPYLENE GLYCOL

Prepared at the 49th JECFA (1997), published in FNP 52 Add 5 (1997) superseding specifications prepared at the 46th JECFA (1996), published in FNP 52 Add 4 (1996). Metals and arsenic specifications revised at the 63rd JECFA (2004). An ADI of 0-25 mg/kg bw was established at the 17th JECFA (1973)

SYNONYMS Propanediol, Methyl glycol, INS No. 1520

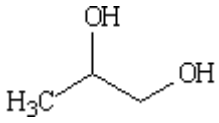
DEFINITION

Chemical names Propane-1,2-diol, 1,2-dihydroxypropane

C.A.S. number 57-55-6

Chemical formula $C_3H_8O_2$

Structural formula



Molecular weight 76.10

Assay Not less than 99.5% on the anhydrous basis

DESCRIPTION Clear, colourless, hygroscopic, viscous liquid

FUNCTIONAL USES Solvent, glazing agent, humectant

CHARACTERISTICS

IDENTIFICATION

Solubility (Vol. 4) Soluble in water, ethanol and acetone

Infrared absorption The infrared spectrum of a potassium bromide dispersion of the sample corresponds with the infrared spectrum below

PURITY

Water (Vol. 4) Not more than 1.0% (Karl Fischer)

Distillation range (Vol. 4) 99% v/v distils between 185-189°

Specific gravity (Vol. 4) d (20, 20): 1.035 - 1.040

Sulfated ash (Vol. 4) Not more than 0.07%
Test 5 g of the sample

Free acid Add 3-6 drops of phenol red TS to 50 ml water, then add 0.1N sodium hydroxide until solution remains red for 30 sec. To this solution add about

50 g of the sample accurately weighed. Titrate with 0.01N sodium hydroxide until the original red colour returns and remains for 15 sec. Not more than 1.67 ml of 0.01N sodium hydroxide are consumed by a sample of 50.0 g.

Lead (Vol. 4)

Not more than 2 mg/kg
Determine using an atomic absorption technique appropriate to the specified level. The selection of sample size and method of sample preparation may be based on the principles of the method described in Volume 4, “Instrumental Methods.”

METHOD OF ASSAY

Inject a 10-µl portion of the sample into a suitable gas chromatograph equipped with a thermal conductivity detector and a stainless steel column, 1-m x 1/4-in, packed with 4% Carbowax 20 M on 40/60-mesh Chromosorb T, or equivalent materials. The carrier gas is helium flowing at 75 ml/min. The injection port temperature is 240°, the column temperature 120 to 200°, programmed at a rate of 5° per min, and the block temperature 250°. Under the conditions described, the approximate retention time for propylene glycol is 5.7 min, and 8.2, 9.0, and 10.2 min for the three isomers of dipropylene glycol, respectively. Measure the area under all peaks by any convenient means, calculate the normalized area percentage of propylene glycol, and report as weight percentage.

Infrared spectrum: Propylene glycol

Infrared spectrum from Merck FT-IR Atlas (through courtesy of Dr. K.G.R. Pachler, Mr. F. Matlok and Dr. H-U. Gremlich, c/o Merck, Darmstadt, and VCH Verlagsgesellschaft GmbH, Weinheim, Germany.