

Propylene Glycol



C₃H₈O₂ 76.09
 1,2-Propanediol.
 1,2-Propanediol [57-55-6].

» Propylene Glycol contains not less than 99.5 percent of C₃H₈O₂.

Packaging and storage—Preserve in tight containers.

Change to read:

USP Reference standards <11>—*USP Propylene Glycol RS.* • *USP Diethylene Glycol RS.* *USP Ethylene Glycol RS.* • (RB 1-Feb-2010)

Change to read:

Identification

•NOTE—Compliance is determined by meeting the requirements of *Identification* tests A, B, and C.

A: • (RB 1-Feb-2010) *Infrared Absorption* <197F> on undried specimen.

•**B: Limit of Diethylene Glycol and Ethylene Glycol**

Diluent: Methanol

Standard solution: 2.0 mg/mL of USP Propylene Glycol RS, 0.050 mg/mL of USP Ethylene Glycol RS, 0.050 mg/mL of USP Diethylene Glycol RS, and 0.10 mg/mL of 2,2,2-trichloroethanol (internal standard) in methanol.

Sample solution: 50 mg/mL of Propylene Glycol and 0.10 mg/mL of 2,2,2-trichloroethanol (internal standard) in methanol.

Chromatographic system

(See *Chromatography* <621>, *System Suitability*.)

Mode: GC

Detector: Flame ionization

Column: 0.53-mm × 30-m fused-silica coated with 3.0-µm G43 stationary phase, and a deactivated split liner with glass wool.

Temperature

Injector: 220°

Detector: 250°

Column: See the temperature program table below.

Initial Temperature (°)	Temperature Ramp (°/min)	Final Temperature (°)	Hold Time at Final Temperature (min)
100	—	100	4
100	50	120	10
120	50	220	6

Carrier gas: Helium

Injection size: 1.0 µL

Flow rate: 4.5 mL/minute

Injection type: The split flow ratio is about 10 : 1.

System suitability

Sample: *Standard solution*

[NOTE—For informational purposes only. See the table below for relative retention times for ethylene glycol, internal standard, and diethylene glycol. The retention time for propylene glycol is 4 minutes.]

Component	Relative Retention Time (RRT)
Ethylene glycol	0.8
Propylene glycol	1.0
Internal standard	1.7
Diethylene glycol	2.4

Suitability requirements

Resolution: NLT 5 between ethylene glycol and propylene glycol

Analysis

Sample: *Sample solution*

Acceptance criteria

Diethylene glycol: If a peak at the retention time for diethylene glycol is present in the *Sample solution*, the peak response ratio relative to 2,2,2-trichloroethanol is not more than the peak response ratio for diethylene glycol relative to 2,2,2-trichloroethanol in the *Standard solution*: NMT 0.10% for diethylene glycol is found.

Ethylene glycol: If a peak at the retention time for ethylene glycol is present in the *Sample solution*, the peak response ratio relative to 2,2,2-trichloroethanol is not more than the peak response ratio for ethylene glycol relative to 2,2,2-trichloroethanol in the *Standard solution*: NMT 0.10% for ethylene glycol is found.

C: Examine the chromatograms obtained in *Identification* test B. The retention time of the propylene glycol peak in the chromatogram of the *Sample solution* corresponds to that obtained in the chromatogram of the *Standard solution*. • (RB 1-Feb-2010)

Specific gravity <841>: between 1.035 and 1.037.

Acidity—Add 1 mL of phenolphthalein TS to 50 mL of water, then add 0.1 N sodium hydroxide until the solution remains pink for 30 seconds. Then add 10 mL of Propylene Glycol, accurately measured, and titrate with 0.10 N sodium hydroxide until the original pink color returns and remains for 30 seconds: not more than 0.20 mL of 0.10 N sodium hydroxide is required.

Water, Method I <921>: not more than 0.2%.

Residue on ignition—Heat 50 g in a tared 100-mL shallow dish until it ignites, and allow it to burn without further application of heat in a place free from drafts. Cool, moisten the residue with 0.5 mL of sulfuric acid, and ignite to constant weight: the weight of the residue does not exceed 3.5 mg.

Chloride <221>—A 1-mL portion shows no more chloride than corresponds to 0.10 mL of 0.020 N hydrochloric acid (0.007%).

Sulfate <221>—A 5.0-mL portion shows no more sulfate than corresponds to 0.30 mL of 0.020 N sulfuric acid (0.006%).

Heavy metals <231>—Mix 4.0 mL with water to make 25 mL: the limit is 5 ppm.

Assay—

Chromatographic system (see *Chromatography* <621>)—The gas chromatograph is equipped with a thermal conductivity detector, and contains a 1-m × 4-mm column packed with 5% G16 on support S5. The injection port temperature is 240°, the detector temper-

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ature is 250°, and the column temperature is programmed at a rate of 5° per minute from 120° to 200°, and helium is used as the carrier gas. The approximate retention time for propylene glycol is 5.7 minutes, and the approximate retention times for the 3 isomers of dipropylene glycol, when present, are 8.2, 9.0, and 10.2 minutes, respectively.

Procedure—Inject a suitable volume, typically about 10 µL, of Propylene Glycol into a suitable gas chromatograph, and record the chromatogram. Calculate the percentage of C₃H₈O₂ in the Propylene Glycol by dividing the area under the propylene glycol peak by the sum of the areas under all of the peaks, excluding those due to air and water, and multiplying by 100.