

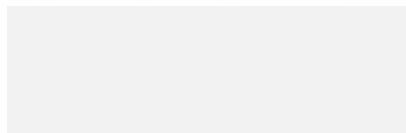
Lyondell South Asia Pte. Ltd.

78 Shenton Way #25-01
Singapore 079120 Singapore

Certificate Of Analysis

Certificate of Analysis Contact:

Ship-To Address:



Lyondell Material : 8820 Propylene Glycol USP/EP
Batch Number : GX14010218
Vehicle Number : SANTA PLACIDA V 083S
Estimated Quantity : 17.200 MT

Customer Order No. : 4504220921
Customer Number : 53895
Date Shipped : March 20, 2014
Lyondell Order No. : 3297889 000010
Delivery Item No. : 86173434 000010

Vendor Number: 112650
Product Code: PROGLYUSPLY-215
Batch Number: GX14010218
Purchase Order: 4504220921

Test Description	Test Result	Specifications		Unit of Measure
		Minimum	Maximum	
Vehicle Type	SEFFICIENCY 261113			
Vehicle ID	SEFFICIE 261113			
Miscellaneous Text	4900165163/USA ORIGIN/DFA			
Inspection Lot	662843			
Manufacturing Date	20130904			
Expiration Date	20150904			
Acidity as acetic acid HOC 0210	0.0008		0.0020	weight %
Acidity (ml 0.1N NaOH/10 ml) Appearance HOC 0650	< 0.03 Pass	Pass	0.03	
Assay as PG, on a dry basis HOC 0540	99.95	99.90		weight %
PG Retention Time, ID Test C Chlorides HOC 0221	Pass < 0.5	Pass	0.5	ppm
Color, Pt-Co HOC 0641	5		10	APHA Color
Heavy Metals as Pb HOC 0274	< 1		5	weight ppm
Lead (Pb)	< 1.0		1.0	weight ppm
Iron	0.10		0.50	weight ppm

(** Continued **)

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Test Description	Test Result	Specifications		Unit of Measure
		Minimum	Maximum	
HOC 0290 Odor	Pass	Pass		
HOC 0610 Suspended matter	Pass	Pass		
HOC 0171 Residual Solvents	Pass	Pass		
HOC 0350 Water	0.024		0.200	weight %
HOC 0316				
TYPICAL VALUES	SHOWN BELOW			
Arsenic as As HOC 0242	< 1		1	weight ppm
CONEG Metals D3335	Pass	Pass		
IR Spectrum HOC 0411	Pass	Pass		
Distillation IBP @760 mmHg HOC 0154	187.1	186.0		degrees C
Distillation DP @760 mmHg HOC 0154	188.6		189.0	degrees C
Oxidiz Subst as ml thiosulfate Reducing Substances BP	< 0.2		0.2	Milliliter
Residue on Ignition HOC 0140	0.0010		0.0050	weight %
Specific Gravity @ 20/20 °C HOC 0132	1.0380	1.0377	1.0389	
Specific Gravity @ 25/25C HOC 0132	1.0356	1.0352	1.0364	
Sulfate HOC 0225	< 0.006		0.006	weight %
Solubility @25 deg. C. HOC 0160	Pass	Pass		
Refractive Index @ 20 C HOC 0740	1.4328	1.4310	1.4330	

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		Minimum	Maximum	

Compendia

Lyondell Chemical Company Propylene Glycol USP meets or exceeds all requirements of the United States Pharmacopeia, the European Pharmacopeia and the Food Chemicals Codex.

This product is not for use as an Active Pharmaceutical Ingredient (API)

EU Food and Animal Feed Regulations and Certifications

Propylene Glycol USP/EP manufactured at our European plants is both HACCP and GMP+ certified. Propylene Glycol USP/EP is listed on the European Catalogue for Feed Materials under number 13.11.1.

Site of Manufacture

All propylene glycol USP sold by Lyondell Chemical Company in the United States, Canada and Central and South America is manufactured at the Lyondell Bayport plant at 10801 Choate Road, Pasadena, TX 77507.

All propylene glycol USP sold by Lyondell Chemical Company in Europe, the Middle East and Africa is manufactured at the Lyondell Chemie Nederland (RB) plant at Theemsweg 14, 3197 KM Rotterdam and Lyondell Chimie France (FL) plant at Route du Quai Mineralier, 13270, Fos-sur-Mer.

Date of Manufacture

For shipments from Lyondell's Bayport, Rotterdam and Fos plants the date of manufacture is shown as the Manufacturing Date in the data fields above. The date is in the format yyyyymmdd, where yyyy is the year, mm is the month and dd is the day. This date of Manufacture also applies to the European packaged material shipped from our Fos facility.

For shipments from terminals in Europe, the date of manufacture may be determined from the batch number. The batch number is shown in format Source-YY-MM-DD-sequence number. For example, a batch number of AD11100501 indicates that the batch was finalized on 05th October, 2011 at terminal ADPO.

For shipments from the IMTT terminals in Bayonne, NJ, and Lemont, IL, the date of manufacture may be determined from the Lot Number in the Test Description portion of the Certificate of Analysis. The Lot Number is the format DATE-SOURCE-TANK. For example, a Lot Number of 50811-IMTT-14100 indicates that the material shipped from the IMTT terminal, the manufacturing date was August 11, 2005, (ymmdd) and the product shipped from tank 14100. Each bulk storage tank has a unique number.

This coding applies only to shipments made by Lyondell from Lyondell-owned or leased bulk storage tanks. It does not apply when a new lot number is assigned by a third party such as a chemical distributor.

Lot Number and Traceability

For shipments from Lyondell's plant lot traceability may be maintained through either the Batch Number or Delivery Item No. in the header or through the Inspection Lot in the data field under Test Description

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		Minimum	Maximum	

Batch number is coded as Plant code-Year-month-date-sequence number (BA-Y-MM-DD-XXX).

Plant codes: RB-Botlek, FL-Fos, AD-ADPO, EC-Cogex. All LyondellBasell PG USP/EP batches starting with "EC" are manufactured at Fos-sur-Mer.

Shelf Life

The shelf life of propylene glycol USP manufactured and delivered by Lyondell Chemical Company when stored and handled under appropriate conditions is two years from the manufacturing date. Subsequent handling and/or repackaging by intermediaries such as distributors may affect shelf life. Therefore, the user of this material should confirm this shelf life via testing or with their immediate supplier.

Residual Solvents

The United States Pharmacopeia Current Edition of USP, in section <467> "Residual Solvents", specifies limits on Residual Solvents. Section <467> lists classes of Residual Solvents which may not be completely removed by practical manufacturing techniques.

None of the solvents listed as Class 1, Class 2, Class 3 or those listed in Table 4 are used as raw materials or processing aids, none are expected to be by-products of the manufacturing process, and none are added to the final product. Therefore this product meets USP guidelines for Residual Solvents.

Propylene glycol is manufactured by the reaction of propylene oxide and water and no other solvents are used. By virtue of the manufacturing process no residual propylene oxide is likely to be present in propylene glycol.

Dipropylene glycol, which is typically present at 0.10 - 0.20%, is not currently listed in USP current ed. <467> as a residual solvent.

PG Retention Time (Identification Test C)

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.

Typical Properties

Analytical test parameters listed under Typical Properties are not tested on every lot of material based on our knowledge of the manufacturing process and controlled handling, shipping and storage of the material. Random, statistical sampling has shown that Lyondell Chemical Company Propylene Glycol USP, if tested, will fall within the limits indicated under Test Result.

This is a computer generated letter. No signature is required

Print Date: March 19, 2014

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