

BRENTAG MID SOUTH, INC.
 1405 Highway 136 West
 Henderson, Kentucky 42420-0020
 Tel. (270) 830-1200 • Fax (270) 826-1486

CERTIFICATE OF ANALYSIS

Propylene Glycol USP/Kosher

CUSTOMER:	LOT NUMBER: 261129678073151W
	DATE ANALYZED: 03/15/2018

PARAMETERS	ANALYSIS	SPECIFICATIONS
Identification by IR	PASS	Pass/Fail
Appearance	PASS	Clear, colorless with no suspended matter
Specific gravity @ 25°C (77°F)	1.036	1.035 to 1.037
Water Content, % by weight	0.01	0.2 Max.
Acidity, ml of 0.10N NaOH*	0.01	< 0.20mL Max.
Residue on Ignition*	0.29	3.5mg/50g Max.
Chlorides, Wt %*	<0.007	≤ 0.007%
Sulfates, Wt %*	<0.006	≤ 0.006%
Heavy Metals*	<5.0	5ppm Max.
Organic Volatile Impurities*	PASS	Meets requirements
Assay as C ₃ H ₈ O ₂ *	99.95	≥ 99.5%

*Analytical results as reported by vendor.

INCOMING PRODUCT INFORMATION (VENDOR AND CARRIER)	
VENDOR: DOW CHEMICAL CO	CARRIER: KIRBY
VENDOR LOT NUMBER: D20712H000	VEHICLE NUMBER: 11520

Analyst: JORDAN AACH	Approved: GENE RIXFORD
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cc: With Shipment
 Lab File

Direct questions concerning certification of this product to personnel at the location marked below.

- Kennesaw, GA 770-429-1405
- St. Louis, MO 314-832-5010

- Orlando, FL 407-857-9310
- Durham, NC 919-596-0681

Form Approval: James Clements
 Form Approval Date: May 15, 2017

C:\RD1\WORD\COA\PROP GLYCOL USP KOSH

"All information provided is believed to be accurate and complete. The data provided is representative of the product quality on the date of analysis for the lot number indicated. This certificate of analysis may not include all of the constituents of the product. Persons using this information should make their own determination regarding its suitability for their particular application. This certificate of analysis shall not in any way limit or preclude the operation and effect of the applicable terms and conditions of sale."

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Date: 03/08/2018

Certificate of Analysis

PO#

Material: PuraGuard(TM) Propylene Glycol USP/EP

Spec: 00111814-S

Cust Mt:

Mfg date: 02/17/2018

Expiration date: 02/17/2020

Delivery Note:

Batch Number: D207I2H000

Ship from: THE DOW CHEMICAL COMPANY FREEPORT TX UNITED STATES

Manufacturing Location: This product is manufactured in Freeport, Texas and/or Plaquemine, Louisiana

LOT NUMBER:
 2611296780731514

It is hereby certified that the material indicated above has been inspected and tested in accordance with the conditions and requirements of the contract or purchase order and, unless agreed otherwise conforms in all respects to the specification relevant thereto and it meets all requirements of the current United States Pharmacopoeia, current Food Chemical Codex, current European Pharmacopoeia and current Pharmacopoeia of Japan.

Feature	Units	Results		Limits		Method	
		D207I2H000	Minimum	Maximum			
Assay	%	99.95	99.80	----	Current USP		
Acidity	mL	0.01	----	0.20	Current USP		M
Chlorides	ppm <	70	----	70	Current USP		M
Heavy Metals	ppm <	5.0	----	5.0	Current USP		M
Residue on Ignition per 50g	mg	0.29	----	3.50	Current USP		M
Specific Gravity @ 25/25degC	-	1.036	1.035	1.037	Current USP		M
Sulfate	ppm <	60	----	60	Current USP		M
Water Content	%	0.007	----	0.200	Current USP		
IDENTIFICATION TEST A							
Identification matches IR scan		Passes			Current USP		M
IDENTIFICATION TEST B							
Ethylene Glycol		Passes			Current USP		
Diethylene Glycol		Passes			Current USP		
IDENTIFICATION TEST C							
Identification matches GC scan		Passes			Current USP		

Acidity	mL	0.02	----	0.05	Current EP		M
Boiling Point	degC	185	184	189	Current EP		M
Clarity		Passes			Current EP		M
Color		Passes			Current EP		M
Heavy Metals	ppm <	5.0	----	5.0	Current EP		M
Melting Point	degC	125	121	128	Current EP		O
Oxidizing Substances 0.05M sodium thiosulfate	mL	0.05	----	0.20	Current EP		M
Reducing Substances		Passes			Current EP		M
Refractive Index @ 20degC	-	1.433	1.431	1.433	Current EP		M
Relative Density @ 20/20degC	-	1.038	1.035	1.040	Current EP		M
Sulfated Ash	%	0.0041	----	0.0100	Current EP		M

For inquiries please contact Customer Service or local sales.

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Date 03/08/2018

Cust P.O.
Dlvy Note:
Material: PROPYLENE GLYCOL USP/EP BULK
Cust Mt:

Spec: 00111814-S

Feature	Units	Results		Limits		Method	
		D207I2H000	Minimum	Maximum			
Water Content	%	0.007	----	0.200	Current	EP	
Assay	%	99.95	99.80	----	Current	FCC	M
Acidity		Passes			Current	FCC	
Appearance		Passes			Current	FCC	
clear & colorless							
Distillation, IBP	degC	186.8	185.0	----	Current	FCC	M
Distillation, DP	degC	187.8	----	189.0	Current	FCC	M
Lead (Pb)	ppm <	1.0	----	1.0	Current	FCC	O
Identification		Passes			Current	FCC	M
matches IR scan							
Residue on Ignition	%	0.0028	----	0.0070	Current	FCC	M
Specific Gravity	-	1.036	1.035	1.037	Current	FCC	M
@ 25/25degC							
Water Content	%	0.007	----	0.200	Current	FCC	
Acidity		Passes			Current	JP	M
Arsenic	ppm <	2.0	----	2.0	Current	JP	M
Chlorides	% <	0.007	----	0.007	Current	JP	M
Distilling Range	% vol	98	95	----	Current	JP	M
184 - 189 degC							
Glycerine (Odor)		Passes			Current	JP	M
Heavy Metals	ppm <	5.0	----	5.0	Current	JP	M
Melting Point	degC	175	174	178	Current	JP	O
Odor		Passes			Current	JP	M
Residue on Ignition	%	0.0037	----	0.0050	Current	JP	M
Specific Gravity	-	1.038	1.035	1.040	Current	JP	M
@ 20/20degC							
Sulfate	% <	0.002	----	0.002	Current	JP	M
Water Content	%	0.007	----	0.500	Current	JP	
Acidity	%	0.0001	----	0.0020	DOWM	101370	
As Acetic Acid							
Appearance		Passes			Visual		
Clear, free of suspended matter							
Chlorides	ppm <	1.0	----	1.0	DOWM	101867	
Color, Pt-Co	-	2	----	10	ASTM	D5386	
Dimer, Trimer	%	0.047	----	0.100	DOWM	100687	
& Higher Polymers							
Ethylene Glycol	% <	0.0080	----	0.0080	DOWM	100687	
Diethylene Glycol	% <	0.0080	----	0.0080	DOWM	100687	
Iron	ppm	0.06	----	0.30	ASTM	E202	
Odor		Passes			Olfactory		M
practically odorless							
Spec. Grav. @ 20C	-	1.0380	1.0376	1.0389	ASTM	D4052	M

SOURCE OF ANALYSIS
M Quarterly Sample
O Annual Sample

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Date: 03/08/2018

Certificate of Analysis

Cust P.O.

Dlv Note:

Material: PROPYLENE GLYCOL USP/EP BULK

Spec: 00000059518

Cust Mtl:

Note:

Values reported for Assay, Ethylene Glycol and Diethylene Glycol under USP and for Assay under FCC are obtained using the validated Dow GC Method DOWM 100687.

Plant Quality Coordinator

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* Trademark of The Dow Chemical Company

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