

CERTIFICATE OF ANALYSIS



Univar USA Inc  
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Morrisville, PA 19067  
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DATE: 09-11-2017

PRODUCT: PROPYLENE GLYCOL

MANUFACTURER: DOW

PRODUCT GRADE: USP, KOSHER

MANUFACTURE DATE: 08-18-2017

UNIVAR PRODUCT CODE: 645489

MANUFACTURER LOT:

UNIVAR LOT/PJO NUMBER:

MANUFACTURE SITE: FREEPORT, TX

<u>TEST</u>	<u>RESULTS</u>	<u>SPECIFICATIONS</u>
VISUAL	PASS	CLEAR/CLEAN FREE OF SUSPENDED PARTICLES
COLOR	PASS	COLORLESS
WATER CONTENT	0.056	MAX 0.2
SPECIFIC GRAVITY AT 25°C	1.0358	MIN 1.035
LIMIT % DEG EG	<0.025 <0.025	MAX 0.1 MAX 0.1
IR	PASS	IDENTIFIED AS PROPYLENE GLYCOL
ODOR	ODORLESS	ODORLESS

Univar USA Inc.


ELISSA GILRONAN


LAB SUPERVISOR


**NOTE:** Univar uses dedicated equipment in the process area for this product where solvents are present. Univar packages this product to meet USP.

Please consult the SDS for further information.

Univar USA Inc. ("Univar") represents only that the Product shall meet the specifications herein. All transactions involving this Product are subject to Univar's standard Terms and Conditions, available at [www.univarusa.com](http://www.univarusa.com) or upon request. Univar makes no additional representations or warranties, express or implied, as to the Product.

 THE DOW CHEMICAL COMPANY		UNIVAR USA INC MORRISVILLE BRANCH 200 DEAN SIEVERS PL MORRISVILLE PA 19067-3700			
		Ship From: FREEPORT PO, PG, EO Plant FREEPORT Texas, United States			
<b>Certificate of Analysis</b>		<b>Customer Information</b>			
Product Number	00000360603	Customer Name	UNIVAR USA INC		
Product Name		Customer PO number	MV-684957		
PuraGuard™ Propylene Glycol USP/EP		Customer Product Code	360603		
Delivery No.	810922337 / 000010	Container ID	DOWX072762		
Order Number	106950492	Specification Number	000000133084		
Shipping Units	80648.658 KG				
Date Shipped	2017-08-22 (YYYY-MM-DD)				
Shipment No.	30285612				
Batch Number					
Seal Number		723195, 723197, 723192, 723199			
Expiration Date		2019-08-18 (YYYY-MM-DD)			
Manufacturing Date		2017-08-18 (YYYY-MM-DD)			
Quantity		80648.658 KG			
Net Weight		177800.001 LB			
Manufacturing Plant		FREEPORT PO, PG, EO Plant			
Manufacturer Address		B-1706, 2301 BRAZOSPORT BLVD. FREEPORT Texas 77541-3203			
<p>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.</p>					
<b>Test</b>	<b>Unit</b>	<b>Lower Limit</b>	<b>Upper Limit</b>	<b>Value</b>	<b>Method</b>
Assay	%	99.80	-	99.95	Current USP
M Acidity	ml	-	0.20	0.01	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	-	3.50	0.90	Current USP
M Specific Gravity @ 25/25degC		1.035	1.037	1.036	Current USP
M Sulfate	ppm	-	60	< 60	Current USP
Water Content	%	-	0.200	0.010	Current USP
M ID Test A matches IR scan	-	-	-	Pass	Current USP


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ID Test B	-	-	-	Pass	Current USP
Limit of Ethylene Glycol					
ID Test B	-	-	-	Pass	Current USP
Limit of Diethylene Glycol					
ID Test C	-	-	-	Pass	Current USP
Matches GC Scan					
M Acidity	ml	-	0.05	0.01	Current EP
M Boiling Point	°C	184	189	184	Current EP
M Clarity	-	-	-	Pass	Current EP
M Color	-	-	-	Pass	Current EP
M Heavy Metals	ppm	-	5.0	< 5.0	Current EP
O Melting Point	°C	121	128	125	Current EP
M Oxidizing Substances	ml	-	0.20	0.06	Current EP
0.05M sodium thiosulfate					
M Reducing Substances	-	-	-	Pass	Current EP
M Refractive Index		1.431	1.433	1.433	Current EP
@ 20degC					
M Relative Density		1.035	1.040	1.038	Current EP
@ 20/20degC					
M Sulfated ash	%	-	0.0100	0.0008	Current EP
Water Content	%	-	0.200	0.010	Current EP
Assay	%	99.80	-	99.95	Current FCC
M Acidity	-	-	-	Pass	Current FCC
Appearance	-	-	-	Pass	Current FCC
clear & colorless					
M Distillation, IBP	°C	189.0	-	187.0	Current FCC
M Distillation, DP	°C	-	189.0	188.4	Current FCC
O Lead (Pb)	ppm	-	1.0	< 1.0	Current FCC
M Identification	-	-	-	Pass	Current FCC
matches IR scan					
M Residue on Ignition	%	-	0.0070	0.0013	Current FCC
M Specific Gravity		1.035	1.037	1.036	Current FCC
@ 25/25degC					
Water Content	%	-	0.200	0.010	Current FCC

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		Ship From: FREEPORT FO, PG, EO Plant FREEPORT Texas, United States			
M Acidity	-	-	-	Pass	Current JP
M Arsenic	ppm	-	2.0	< 2.0	Current JP
M Chlorides	%	-	0.007	< 0.007	Current JP
M Distilling Range 184 - 189 degC	% vol	95	-	97	Current JP
M Glycerine (Odor)	-	-	-	Pass	Current JP
M Heavy Metals	ppm	-	5.0	< 5.0	Current JP
O Melting Point	°C	174	178	175	Current JP
M Odor	-	-	-	Pass	Current JP
M Residue on Ignition	%	-	0.0050	0.0042	Current JP
M Specific Gravity @ 20/20degC		1.035	1.040	1.038	Current JP
M Sulfate	%	-	0.002	< 0.002	Current JP
Water Content	%	-	0.500	0.010	Current JP
Acidity as acetic acid	%	-	0.0020	0.0003	DOWM 101370
Appearance clear, free of suspended matter	-	-	-	Pass	Visual
Chlorides	ppm	-	1.0	< 1.0	DOWM 101867
Color, Pt-Co	-	-	10	3	ASTM D5386
Dimer, Trimer & Higher Polymers	%	-	0.100	0.048	DOWM 100687
Ethylene Glycol	%	-	0.0080	< 0.0080	DOWM 100687
Diethylene Glycol	%	-	0.0080	< 0.0080	DOWM 100687
Odor practically odorless	-	-	-	Pass	Olfactory
M Spec. Grav. @ 20C		1.0376	1.0389	1.0380	ASTM D4052
Iron	ppm	-	0.30	0.03	ASTM E394
Note 1: Values reported for Assay, Ethylene Glycol and Diethylene Glycol under USP and for Assay under FCC are obtained using the validated equivalent Dow GC Method DOWM 100687.					
M:Quarterly Sample O:Annual Sample					

Date

2017-08-22 (YYYY-MM-DD)

Time 15:18:22 (Greenwich Mean Time) Page 4 of 4

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Plant Quality Coordinator  For inquiries please contact Customer Service or local sales ® ™ Trademark of The Dow Chemical Company ("Dow") or an affiliated company of Dow	

**Please note**  
Univar packaged this product  
to meet USP specifications only.