

## CERTIFICATE OF ANALYSIS



**Univar Solutions**  
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Date: 16 May 2024  
 Product: Propylene Glycol  
 Material Grade: USP/K  
 Univar Solutions Material #: 104078  
 Univar Solutions Batch #: 0003528719

Manufacture Name: The Dow Chemical Company  
 Manufacture Lot Number #: D357O3T001  
 Manufacture Location: Freeport, TX  
 Date of Manufacture: 29 Mar 2024  
 Recommended Retest Date: 29 Mar 2026

Storage Conditions: Preserve in tight containers.

Analysis Description	Test Method	UoM	Specification		Results
			Min.	Max.	
Appearance	LAB-UNS-101	Visual	Free of suspended particles		Pass
Identification by FT-IR	USP 197	-	Matches IR Scan		Pass
GC Limit DEG/EG	USP 621	ID	Identified as propylene glycol		Pass
		%DEG	-	0.1	< 0.1
		%EG	-	0.1	< 0.1
Specific Gravity @ 25.0°C	USP 841	-	1.035	1.037	1.0357
Water Determination	USP 921	weight%	-	0.2	0.043

Identity of Authorized Individual for Approval,



Lucas Bennett

Chemist


**Note:**

**GMP compliance:** This batch of product has been handled under cGMP conditions using dedicated equipment.

**Compendial Standards:** This batch of product complies with the current requirements listed in the United States Pharmacopoeia (USP). Product has been repackaged to meet USP Testing Requirements.

**Other Certification Statements:** This batch of product is Kosher Certified.

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 THE DOW CHEMICAL COMPANY	UNIVAR SOLUTIONS USA LLC MORRISVILLE BRANCH 200 DEAN SIEVERS PL MORRISVILLE PA 19067-3700	<b>MATERIAL# 104078</b> <b>BATCH# 0003528719</b>
	Ship From: CARTERET KINDER MORGAN Sub Mft CARTERET New Jersey, United States	


Certificate of Analysis		Customer Information	
Product Number	00000360603	Customer Name	UNIVAR SOLUTIONS USA LLC
Product Name	PuraGuard™ Propylene Glycol USP/EP	Customer PO number	4526925345
Delivery No.	827551066 / 000010	Customer Product Code	000000000016141941
Order Number	116199336	Container ID	QUAL E701446
Shipping Units	20429.824 KG	Specification Number	000000133084
Date Shipped	2024-05-13 (YYYY-MM-DD)		
Shipment No.	44530013		

Batch Number	D35703T001				
Seal Number	1729450	1729451	1729452	1729453	1729454
	1729455	1729456	1729457	1729458	1729459
Expiration Date	2026-03-29 (YYYY-MM-DD)				
Manufacturing Date	2024-03-29 (YYYY-MM-DD)				
Quantity	20429.824 KG				
Net Weight	45040.089 LB				
Manufacturing Plant	FREEPORT PO, PG, EO Plant				
Manufacturer Address	B-1706, 2301 BRAZOSPORT BLVD. FREEPORT Texas 77541-3203				

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.

Test	Unit	Lower Limit	Upper Limit	Value	Method
Assay	%	99.80	-	99.95	Current USP
M Acidity	ml	-	0.20	0.02	Current USP
M Chlorides	ppm	-	70	< 70	Current USP
S Residue on Ignition USP	%	-	0.0070	0.0012	Current JP
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


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 THE DOW CHEMICAL COMPANY		UNIVAR SOLUTIONS USA LLC MORRISVILLE BRANCH 200 DEAN SIEVERS PL MORRISVILLE PA 19067-3700  Ship From: CARTERET KINDER MORGAN Sub Mft CARTERET New Jersey, United States				
M ID Test A	-	-	-	Pass	Current USP	
matches IR scan						
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	0.02	Current EP	
M Boiling Point	°C	184	189	184	Current EP	
M Clarity	-	-	-	Pass	Current EP	
M Color	-	-	-	Pass	Current EP	
O Melting Point	°C	121	128	125	Current EP	
M Oxidizing Substances	ml	-	0.20	0.02	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						
S Sulfated ash	%	-	0.0100	0.0020	Current JP	
EP						
Water Content	%	-	0.200	0.010	Current EP	
Assay	%	99.80	-	99.95	Current FCC	
M Acidity	-	-	-	Pass	Current FCC	
M Appearance	-	-	-	Pass	Current FCC	
clear & colorless						
M Distillation, IBP	°C	185.0	-	185.2	Current FCC	
M Distillation, DP	°C	-	189.0	186.0	Current FCC	
O Lead (Pb)	ppm	-	1.0	< 1.0	Current FCC	
M Identification	-	-	-	Pass	Current FCC	
matches IR scan						
S Residue on Ignition	%	-	0.0070	0.0012	Current JP	
FCC						

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 THE DOW CHEMICAL COMPANY		UNIVAR SOLUTIONS USA LLC MORRISVILLE BRANCH 200 DEAN SIEVERS PL MORRISVILLE PA 19067-3700			
		Ship From: CARTERET KINDER MORGAN Sub Mft CARTERET New Jersey, United States			
M Specific Gravity @ 25/25degC		1.035	1.037	1.036	Current FCC
Water Content	%	-	0.200	0.010	Current FCC
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	-	99	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
S Residue on Ignition JP	%	-	0.0050	0.0012	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	0.0001	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	0.047	DOWM 100687
Ethylene Glycol	%	-	0.0080	< 0.0080	DOWM 100687
Diethylene Glycol	%	-	0.0080	< 0.0080	DOWM 100687
Odor practically odorless	-	-	-	Pass	Olfactory
Iron	ppm	-	0.30	0.00	ASTM E394
M Spec. Grav. @ 20C		1.0376	1.0389	1.0380	ASTM D4052
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					

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 THE DOW CHEMICAL COMPANY	UNIVAR SOLUTIONS USA LLC MORRISVILLE BRANCH 200 DEAN STEEVERS PL MORRISVILLE PA 19067-3700  Ship From: CARTERET KINDER MORGAN Sub Mft CARTERET New Jersey, United States
Method DOWM 100687.  Note 2: Values reported for residue on ignition and sulfated ash under USP, EP and FCC are obtained using the JP method which is allowed per the ICH Global Harmonization Q4B and General Provisions and Requirements Applying to Specifications, Tests, and Assays of the Food Chemicals Codex. M:Quarterly Sample O:Annual Sample S:Semi-annual	
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	