



Scientific Documentation

PR130, Propylene Glycol, USP

Not appropriate for regulatory submission.
Please visit www.spectrumchemical.com or
contact Tech Services for the most up-to-date
information contained in this information
package.

Spectrum Chemical Mfg Corp

769 Jersey Avenue
New Brunswick, NJ 08901
Phone 732.214.1300

Ver4.01 19.April.2016



Dear Customer,

Thank you for your interest in Spectrum's quality products and services.

Spectrum has been proudly serving our scientific community for over 45 years. It is our mission to manufacture and distribute fine chemicals and laboratory products with Quality and delivery you can count on every time.

To accomplish our mission, Spectrum utilizes our sourcing leverage and supplier qualification expertise in offering one of the industry's most comprehensive line of fine chemical products under one brand, in packaging configurations designed to meet your research and production requirements. Our product grades include: USP, NF, BP, EP, JP, FCC, ACS, KSA, Reagent grade, as well as DEA controlled substances. We operate facilities in the United States on the East Coast, West Coast, as well as in Shanghai, China in order to provide the best logistical support for our customers.

At Spectrum, Quality is priority number one. Suppliers with the best qualifications are preferred and we employ full-functioning in-house analytical laboratories at each of our facilities. Our facilities and systems are USFDA registered and ISO certified. We frequently host customer audits and cherish opportunities for improvements. Quality is engrained into our culture. Quality is priority number one.

In the following pages, we have designed and prepared documented scientific information to aid you in your initial qualification or your continual use of our products. Please do not hesitate to contact us if further information or the most up-to-date documentation is desired from any of the covered areas.

We appreciate your business and we look forward to hearing from you.

Sincerely,

A handwritten signature in black ink, appearing to read "Alan Wang", with a large, sweeping flourish at the end.

Alan Wang, MSQA, ASQ CQA
Senior Manager, Global Supplier Quality Assurance
qualityassurance@spectrumchemical.com

PR130, Propylene Glycol, USP

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spectrum[®]
CHEMICAL MFG CORP

Item Number	PR130
Item	Propylene Glycol, USP
CAS Number	57-55-6
Molecular Formula	C ₃ H ₈ O ₂
Molecular Weight	76.10
MDL Number	
Synonyms	1,2-Propanediol; (+/-)-Propane-1,2-diol

Test	Specification	
	Min	Max
ASSAY	99.5 %	
SPECIFIC GRAVITY @ 25°C	1.035 - 1.037	
ACIDITY	TO PASS TEST	
WATER		0.2 %
RESIDUE ON IGNITION		0.007 %
CHLORIDE (Cl)		0.007 %
SULFATES (SO ₄)		0.006 %
HEAVY METALS (as Pb)		5 ppm
IDENTIFICATION A	TO PASS TEST	
IDENTIFICATION B	TO PASS TEST	
IDENTIFICATION C	TO PASS TEST	
CERTIFIED KOSHER		
EXPIRATION DATE		
MANUFACTURE DATE		
RESIDUAL SOLVENTS	TO PASS TEST	

Spectrum Chemical Mfg Corp

Corporate Headquarters:
 769 Jersey Ave.
 New Brunswick, NJ 08901
 732.214.1300

West Coast Facility:
 14422 S. San Pedro St.
 Gardena, CA 90248
 310.516.8000

SAFETY DATA SHEET

Preparation Date: 9/18/2014

Revision Date: 1/26/2016

Revision Number: G2

1. IDENTIFICATION

Product identifier

Product code: PR130
Product Name: PROPYLENE GLYCOL, USP

Other means of identification

Synonyms: 1,2,-propanediol;
1,2-dihydroxypropane;
1,2-Propylene glycol;
alpha-Propyleneglycol;
Methyethylene glycol;
Monopropylene glycol;
Propane-1,2-Diol;
(+)-Propane-1,2-diol

CAS #: 57-55-6
RTECS # TY2000000
CI#: Not available

Recommended use of the chemical and restrictions on use

Recommended use: Solvent. Lubricant. Preservative. Skin-conditioning agent- humectant.
Uses advised against No information available

Supplier: Spectrum Chemical Mfg. Corp
14422 South San Pedro St.
Gardena, CA 90248
(310) 516-8000

Order Online At: <https://www.spectrumchemical.com>

Emergency telephone number Chemtrec 1-800-424-9300
Contact Person: Martin LaBenz (West Coast)
Contact Person: Ibad Tirmiz (East Coast)

2. HAZARDS IDENTIFICATION

Classification

This chemical is not considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Not a dangerous substance or mixture according to the Globally Harmonized System (GHS)

Label elements

Not classified

Hazards not otherwise classified (HNOC)

Not Applicable

Other hazards

Not available

3. COMPOSITION/INFORMATION ON INGREDIENTS

Components	CAS-No.	Weight %
Propylene Glycol 57-55-6	57-55-6	100

4. FIRST AID MEASURES

First aid measures

General Advice:

Poison information centers in each State capital city can provide additional assistance for scheduled poisons (13 1126)

Skin Contact:

Wash off immediately with soap and plenty of water removing all contaminated clothes and shoes. Get medical attention if irritation develops.

Eye Contact:

Flush eyes with water for 15 minutes. Get medical attention if irritation occurs. If symptoms persist, call a physician.

Inhalation:

Move to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Ingestion:

Do not induce vomiting without medical advice. Never give anything by mouth to an unconscious person. Consult a physician if necessary.

Most important symptoms and effects, both acute and delayed

Symptoms

May cause eye/skin irritation. May cause digestive (gastrointestinal) tract irritation. May cause nausea and vomiting. Central nervous system effects.

Indication of any immediate medical attention and special treatment needed

Notes to Physician:

Treat symptomatically

Protection of first-aiders

First-Aid Providers: Avoid exposure to blood or body fluids. Wear gloves and other necessary protective clothing. Dispose of contaminated clothing and equipment as bio-hazardous waste

5. FIRE-FIGHTING MEASURES

Extinguishing Media

Suitable Extinguishing Media:

Carbon dioxide (CO₂). Dry chemical. Water spray mist or foam.

Unsuitable Extinguishing Media:

No information available.

Specific hazards arising from the chemical

Hazardous Combustion Products:

Carbon monoxide; Carbon dioxide

Specific hazards:

May be combustible at high temperatures
May be ignited by heat, sparks or flames
Container explosion may occur under fire conditions or when heated

Special Protective Actions for Firefighters

Specific Methods:

No information available.

Special Protective Equipment for Firefighters:

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

Personal Precautions:

Ensure adequate ventilation. Use personal protective equipment. Avoid contact with skin, eyes and clothing. Remove all sources of ignition.

Environmental precautions

Prevent further leakage or spillage if safe to do so. Prevent product from entering drains. Prevent entry into waterways, sewers, basements or confined areas.

Methods and material for containment and cleaning up

Methods for containment

Stop leak if you can do it without risk. Absorb spill with inert material (e.g. vermiculite, dry sand or earth).

Methods for cleaning up

Use appropriate tools to put the spilled material in a suitable chemical waste disposal container. Clean contaminated surface thoroughly.

7. HANDLING AND STORAGE

Precautions for safe handling

Technical Measures/Precautions:

Provide sufficient air exchange and/or exhaust in work rooms. Keep away from incompatible materials.

Safe Handling Advice

Wear personal protective equipment. Avoid contact with skin, eyes and clothing. Do not ingest. Do not breathe vapors or spray mist. Keep away from heat and sources of ignition. Handle in accordance with good industrial hygiene and safety practice.

Conditions for safe storage, including any incompatibilities

Technical Measures/Storage Conditions:

Hygroscopic. Protect from moisture. Keep container tightly closed in a dry and well-ventilated place. Store at room temperature in the original container. Store away from incompatible materials.

Incompatible Materials:

Oxidizing agents. Acids. Bases. Reducing agents.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

National occupational exposure limits

U.S Occupational Exposure Limits: Not determined

United States

Components	OSHA	NIOSH	ACGIH	AIHA WHEEL
Propylene Glycol 57-55-6	None	None	None	10 mg/m ³ TWA

Canada

Canada Occupational Exposure Limits: Not determined

Components	Alberta	British Columbia	Ontario	Quebec
Propylene Glycol 57-55-6	None	None	10 mg/m ³ TWA aerosol only 50 ppm TWA aerosol and vapor 155 mg/m ³ TWA aerosol and vapor	None

Australia and Mexico

Occupational Exposure Limits for Australia and Mexico: Not determined

Components	Australia	Mexico
Propylene Glycol 57-55-6	150 ppm TWA 474 mg/m ³ TWA 10 mg/m ³ TWA	None

Appropriate engineering controls

Engineering measures to reduce exposure:

Ensure adequate ventilation. Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors and mist below their respective threshold limit value.

Individual protection measures, such as personal protective equipment

Personal Protective Equipment

- Eye protection:** Goggles. Safety glasses with side-shields.
- Skin and body protection:** Long sleeved clothing. Chemical resistant apron. Gloves.
- Respiratory protection:** Respiratory protection is not necessary for normal handling. Good room ventilation or use of local exhaust (fume hood) is sufficient. Use a vapor respirator under conditions where exposure to the substance is apparent (e.g. generation of high concentrations of mist or vapor, inadequate ventilation, development of respiratory tract irritation), and engineering controls are not feasible. Be sure to use an approved/certified respirator or equivalent. .
- Hygiene measures:** Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product. When using, do not eat, drink or smoke.

9. PHYSICAL AND CHEMICAL PROPERTIES

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state: Liquid.	Appearance: No information available	Color: Clear. Colorless.
Odor: Practically odorless.	Taste Practically tasteless.	Formula: C3-H8-O2
Molecular/Formula weight: 76.10	Flammability: No information available	Flash point (°C): No data available
Flashpoint (°C/°F): 99 °C/210 °F 107 °C/224.6 °F	Flash Point Tested according to: Closed cup Open cup	Autoignition Temperature (°C/°F): 371 °C/700 °F
Lower Explosion Limit (%): 2.6%	Upper Explosion Limit (%): 12.5%	pH: No information available
Melting point/range(°C/°F): -59 °C/-74.2 °F	Boiling point/range(°C/°F): 188 °C/370.4 °F	Decomposition temperature(°C/°F): No information available
Bulk density: No information available	Density (g/cm3): 1.036 @ 20 °C	Specific gravity: No information available
Vapor pressure @ 20°C (kPa): 0.017	Evaporation rate: No information available	Vapor density: 2.62
VOC content (g/L): No information available	Odor threshold (ppm): No information available	Partition coefficient (n-octanol/water): -0.92
Viscosity: No information available	Miscibility: No information available	Solubility: No information available

10. STABILITY AND REACTIVITY

Reactivity

Incompatible with chloroformates, strong acids (nitric acid, hydrofluoric acid), caustics, aliphatic amines, isocyanates, strong oxidizers, acid anhydrides, silver nitrate, reducing agents.

Chemical stability

Stability: Stable under recommended storage conditions

Possibility of Hazardous Reactions: Hazardous polymerization does not occur

Conditions to avoid: Heat. Ignition sources. Exposure to moisture. Exposure to moist air. Incompatible materials.

Incompatible Materials: Oxidizing agents. Acids. Bases. Reducing agents.

Hazardous decomposition products: Carbon monoxide. Carbon dioxide.

Other Information

Corrosivity: No information available

Special Remarks on Corrosivity: No information available

11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Product code: PR130

Product name: PROPYLENE GLYCOL,
USP

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Principal Routes of Exposure:
Skin. Ingestion. Eyes.

Acute Toxicity

Component Information

Propylene Glycol - 57-55-6

LD50/oral/rat = 20000 mg/kg Oral LD50 Rat
LD50/oral/mouse = 20300-22000 mg/kg Oral LD50 Mouse
LD50/dermal/rat = No information available
LD50/dermal/rabbit = 20800 mg/kg Dermal LD50Rabbit
LC50/inhalation/rat = No information available
LC50/inhalation/mouse = No information available
Other LD50 or LC50information = 22000 mg/kg Oral LD50 Dog
18350-19600 mg/kg Oral LD50 Guinea Pig
18500 mg/kg Oral LD50 Rabbit

Product Information

LD50/oral/rat =
VALUE- Acute Tox Oral = 20000mg/kg

LD50/oral/mouse =
Value - Acute Tox Oral = 20300-22000mg/kg

LD50/dermal/rabbit
VALUE-Acute Tox Dermal = 20800mg/kg

LD50/dermal/rat
VALUE -Acute Tox Dermal = No information available

LC50/inhalation/rat
VALUE-Vapor = No information available
VALUE-Gas = No information available
VALUE-Dust/Mist = No information available

LC50/Inhalation/mouse
VALUE-Vapor = No information available
VALUE - Gas = No information available
VALUE - Dust/Mist = No information available

Symptoms

Skin Contact: May cause skin irritation. Mild skin irritation. It may be absorbed through the skin and cause systemic effects similar to those of ingestion.

Eye Contact: May cause eye irritation. May cause mild eye irritation with some immediate, transitory stinging, lacrimation, blepharospasm, and mild transient conjunctival hyperemia. There is no residual discomfort or injury once it is washed away. No corneal injury has been reported.

Inhalation May cause irritation of respiratory tract.

Ingestion Low acute toxicity. It may cause gastrointestinal tract irritation with nausea and vomiting. It may affect behavior/central nervous system(CNS depression, drowsiness, dizziness, fatigue, stupor, confusion, dysarthria, general anesthetic, convulsions, seizures, ataxia, tetany, somnolence, stupor, muscle contraction or spasticity, coma), brain (changes in surface EEG). It may cause metabolic acidosis. Effects on the cardiovascular system(hypotension, bradycardia, arrhythmias, cardiac arrest) have been noted in cases with rapid intravenous injection.

Aspiration hazard No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Chronic Toxicity Prolonged or repeated skin contact may dryness and redness of the skin skin, mild irritation, and rarely allergic contact dermatitis.
 Ingestion: Prolonged or repeated ingestion may cause hyperglycemia or hypoglycemia and may affect behavior/CNS (stupor, seizures, and other symptoms similar to that of acute ingestion). Chronic ingestion of larger amounts may also cause lactic acidosis or metabolic acidosis. Chronic exposure may also affect the kidneys and blood (changes in serum composition, reduction in red blood cell count, elevation in white blood cell count).
 Medical Conditions Aggravated by Exposure: Kidney disease, impaired renal function. Lactic acidosis has been reported in individuals with renal impairment or failure.

Sensitization: No information available

Mutagenic Effects: May affect genetic material

Carcinogenic effects: Not considered carcinogenic.

Components	IARC	ACGIH - Carcinogens	NTP	OSHA HCS - Carcinogens	Australia - Notifiable Carcinogenic Substances	Australia - Prohibited Carcinogenic Substances
Propylene Glycol	Not listed	Not listed	Not listed	Not listed	Not listed	Not listed

Reproductive toxicity No data is available

Reproductive Effects: No information available
Developmental Effects: No information available
Teratogenic Effects: No information available

Specific Target Organ Toxicity

STOT - single exposure No information available
STOT - repeated exposure No information available
Target Organs: No information available

12. ECOLOGICAL INFORMATION

Ecotoxicity

Ecotoxicity effects: Aquatic environment.

Propylene Glycol - 57-55-6

Freshwater Algae Data: 19000 mg/L EC50 Pseudokirchneriella subcapitata 96 h
Freshwater Fish Species Data: 41 - 47 mL/L LC50 Oncorhynchus mykiss 96 h static 1
51400 mg/L LC50 Pimephales promelas 96 h static 1
51600 mg/L LC50 Oncorhynchus mykiss 96 h static 1
710 mg/L LC50 Pimephales promelas 96 h 1
Water Flea Data: 1000 mg/L EC50 Daphnia magna 48 h

Persistence and degradability: No information available

Bioaccumulative potential: Potential for bioconcentration in aquatic organisms is low.

Mobility: It is expected to have very high mobility based on estimated Koc.

13. DISPOSAL CONSIDERATIONS

Disposal Methods

Waste from residues / unused products:

Waste must be disposed of in accordance with Federal, State and Local regulation.

Contaminated packaging:

Empty containers should be taken for local recycling, recovery or waste disposal

Components	RCRA - F Series Wastes	RCRA - K Series Wastes	RCRA - P Series Wastes	RCRA - U Series Wastes
Propylene Glycol	None	None	None	None

14. TRANSPORT INFORMATION

DOT

UN-No: Not regulated
Proper Shipping Name: No information available
Hazard Class: No information available
Subsidiary Risk: No information available
Packing Group: None
ERG No: No information available
Marine Pollutant: No data available
DOT RQ (lbs): No information available

TDG (Canada)

UN-No: Not regulated
Proper Shipping Name: No information available
Hazard Class: No information available
Subsidiary Risk: No information available
Packing Group: No information available
Description: No information available

ADR

UN-No: Not regulated
Proper Shipping Name: No information available
Hazard Class: No information available
Packing Group: No information available

14. TRANSPORT INFORMATION

Subsidiary Risk: No information available
Classification Code: No information available
Description: No information available
CEFIC Tremcard No: No information available

IMO / IMDG

UN-No: Not regulated
Proper Shipping Name: No information available
Hazard Class: No information available
Subsidiary Risk: No information available
Packing Group: No information available
Description: No information available
IMDG Page: No information available
Marine Pollutant No information available
MFAG: No information available
Maximum Quantity: No information available

RID

UN-No: Not regulated
Proper Shipping Name: No information available
Hazard Class: No information available
Subsidiary Risk: No information available
Packing Group: No information available
Classification Code: No information available
Description: No information available

ICAO

UN-No: Not regulated
Proper Shipping Name: No information available
Hazard Class: Not regulated
Subsidiary Risk: No information available
Packing Group: No information available
Description: No information available

IATA

UN-No: Not regulated
Proper Shipping Name: No information available
Hazard Class: No information available
Subsidiary Risk: No information available
Packing Group: No information available
Description: No information available

15. REGULATORY INFORMATION

International Inventories

Components	U.S. TSCA	KOREA KECL	Philippines (PICCS)	Japan ENCS	CHINA	Australia (AICS)	EINECS-No.
<i>Propylene Glycol</i>	Present	Present KE-29267	Present	Present (2)-234	Present	Present	Present 200-338-0

U.S. Regulations

Propylene Glycol

New Jersey RTK Hazardous Substance List: 3595
Pennsylvania RTK: Present
Minnesota - Hazardous Substance List: Present

Propylene Glycol

FDA - Food Additives Generally Recognized as Safe (GRAS): 21 CFR 184.1666

FDA - 21 CFR - Total Food Additives 169.175 175.300 175.320 176.180 176.210 177.1390 177.1680 177.2420 177.2600
177.2800 178.3300 184.1666 582.4666 73.30

California Prop. 65: Safe Drinking Water and Toxic Enforcement Act of 1986.

Chemicals Known to the State of California to Cause Cancer:

This product does not contain a chemical requiring a warning under California Prop. 65. (See table below)

Chemicals Known to the State of California to Cause Reproductive Toxicity:

This product does not contain a chemical requiring a warning under California Prop. 65. (See table below)

Components	Carcinogen	Developmental Toxicity	Male Reproductive Toxicity	Female Reproductive Toxicity:
Propylene Glycol	Not Listed	Not Listed	Not Listed	Not Listed

CERCLA/SARA

Components	CERCLA - Hazardous Substances and their Reportable Quantities	Section 302 Extremely Hazardous Substances and TPQs	Section 302 Extremely Hazardous Substances and RQs	Section 313 - Chemical Category	Section 313 - Reporting de minimis
Propylene Glycol	None	None	None	None	None

U.S. TSCA

Components	TSCA Section 5(a)2 - Chemicals With Significant New Use Rules (SNURS)	TSCA 8(d) -Health and Safety Reporting
Propylene Glycol	Not Applicable	Not Applicable

Canada

WHMIS hazard class:

Non-controlled

Propylene Glycol

Uncontrolled product according to WHMIS classification criteria

Canada Controlled Products Regulation:

This product has been classified according to the hazard criteria of the CPR (Controlled Products Regulation) and the MSDS contains all of the information required by the CPR.

Components	WHMIS Ingredient Disclosure List -
Propylene Glycol	1 %

Inventory

Components	Canada (DSL)	Canada (NDSL)
Propylene Glycol	Present	Not Listed

Components	CEPA Schedule I - Toxic Substances	CEPA - 2010 Greenhouse Gases Subject to Mandatory Reporting
Propylene Glycol	Not listed	Not listed

EU Classification

R-phrase(s)

not determined (not applicable)

S -phrase(s)

none

Components	Classification	Concentration Limits:	Safety Phrases
Propylene Glycol		No information	

The product is classified in accordance with Annex VI to Directive 67/548/EEC

Indication of danger:

Not dangerous

16. OTHER INFORMATION

16. OTHER INFORMATION

Preparation Date: 9/18/2014
Revision Date: 1/26/2016
Prepared by: Sonia Owen

Disclaimer:

All chemicals may pose unknown hazards and should be used with caution. This Safety Data Sheet (SDS) applies only to the material as packaged. If this product is combined with other materials, deteriorates, or becomes contaminated, it may pose hazards not mentioned in this SDS. The physical properties reported in this SDS are obtained from the literature and do not constitute product specifications. Information contained herein does not constitute a warranty, whether expressed or implied, as to the safety, merchantability or fitness of the goods for a particular purpose. Spectrum Chemicals & Laboratory Products, Inc. assumes no responsibility for results obtained or for incidental or consequential damages, including lost profits, arising from the use of these data. No warranty against infringement of any patent, copyright or trademark is made or implied. It shall be the user's responsibility to develop proper methods of handling and personal protection based on the actual conditions of use. While this SDS is based on technical data judged to be reliable, Spectrum assumes no responsibility for the completeness or accuracy of the information contained herein.

End of Safety Data Sheet



Manufacturer

Product Covered: PR130, Propylene Glycol, USP

Spectrum takes ownership as the manufacturer for the Spectrum product listed above and provides full quality assurance, customer service, and technical product support.

While information concerning the raw material manufacturer of our starting materials is considered proprietary, such information can be made available upon request contingent on demonstration of business volume justification and successful execution of confidential disclosure agreement (CDA).

Requests for disclosure of proprietary raw material manufacturer information may be submitted to the assigned account representative for consideration.

Sincerely,

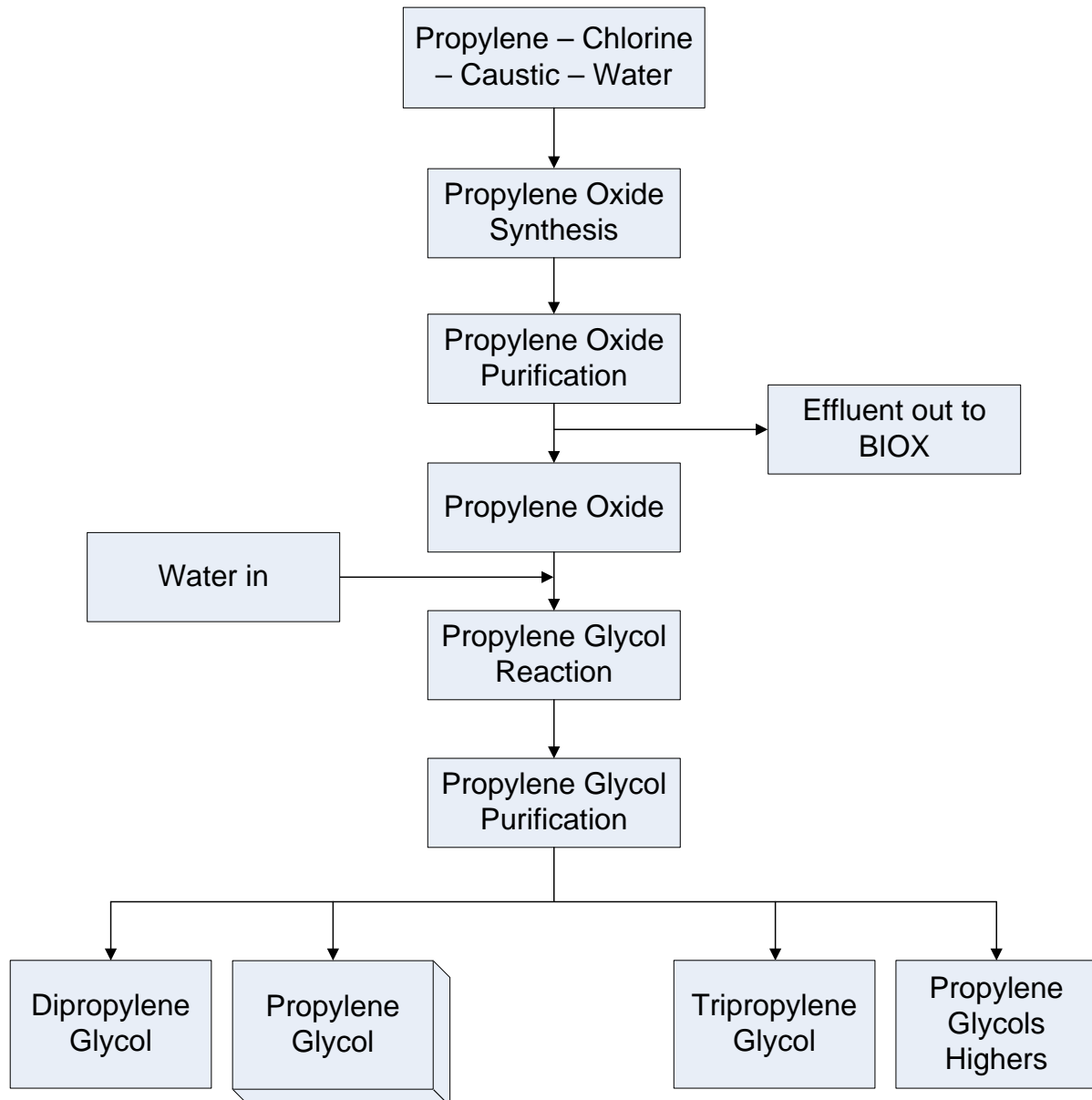
A handwritten signature in black ink, appearing to read "Alan Wang", with a large, sweeping flourish at the end.

Alan Wang, MSQA, ASQ CQA
Senior Manager, Global Supplier Quality Assurance
qualityassurance@spectrumchemical.com

19.Apr.2016

Manufacturing Process Flowchart

Propylene Glycol, USP - PR130



Spectrum Chemical Mfg Corp

Corporate Headquarters:

769 Jersey Ave.
New Brunswick, NJ 08901
732.214.1300

West Coast Facility:

14422 S. San Pedro St.
Gardena, CA 90248
310.516.8000

Certificate of Registration

This is to certify that the quality management system of

Spectrum China Ltd.

Building A20, No. 3802, Shengang Road, Songjiang District, Shanghai, China

has been assessed and registered by Intertek as conforming to the requirements of

ISO 9001: 2008

The quality management system is applicable to:

Provision of service of purchase, testing and sales for chemical products, repacking of non-hazardous chemical products.

Organization Code: 77762704-8
Certificate Number: 111310001-01
Certificate Issue Date: 17 November 2015
Certificate Expiry Date: 14 September 2018

Authorised Signature: Calin Moldovean President, Business Assurance
Intertek Certification Limited, 10A Victory Park, Victory Road, Derby DE24 8ZF, United Kingdom
Intertek Certification Limited is a UKAS accredited body under schedule of accreditation no. 014.

In the issuance of this certificate, Intertek assumes no liability to any party other than to the client, and then only in accordance with the agreed upon Certification Agreement. This certificate's validity is subject to the organization maintaining their system in accordance with Intertek's requirements for systems certification. Validity may be confirmed via email at certificate.validation@intertek.com or by scanning the code to the right with a smartphone.
The annual validity of the certificate can also be checked through the website <http://www.cnca.gov.cn> of CNCA in China.

The certificate remains the property of Intertek, to whom it must be returned upon request.



March 31, 2016

Certificate of cGMP

Dear Valued Customer:

Spectrum Chemicals and Laboratory Products certify that the following product(s) is produced, processed, packaged and held in compliance with current Good Manufacturing Practices (cGMP) in accordance with the applicable parts of 21 CFR, parts 210 and 211 of the Code of Federal Regulations.

Catalog Number	Product Name
PR130	Propylene Glycol, USP

Spectrum is an FDA registered and inspected drug establishment. Our United States Food and Drug Administration (USFDA) Registration numbers are as follows:

Spectrum-Gardena, CA: 2020632
Spectrum-New Brunswick, NJ: 2246824
Spectrum-Shanghai, China: 3006174778

Thank you for your interest with Spectrum products. Please feel free to contact the Quality Assurance department at 310-516-8000 or via email at qualityassurance@spectrumchemical.com if we may be of further assistance.

Sincerely,

Michelle Weston
Quality Assurance Specialist



March 31, 2016

Re: Propylene Glycol, USP- PR130

To Whom It May Concern:

Thank you for your interest in Spectrum high quality chemicals.

We at Spectrum Chemical Mfr. Corp. understand the concern regarding Bovine Spongiform Encephalopathy (BSE). Please be assured that the chemical

Propylene Glycol, USP- PR130

is BSE/TSE free.

If you have any further questions, please contact Tech Services at (310) 516-8000 Extension 5471, or by email at techservices@spectrumchemical.com.

Sincerely,

Darlene Dagdag- Lyudmirskiy
Technical Services
Spectrum Chemical Mfr. Corp.

This document has been produced electronically and is valid without a signature



March 31, 2016

Re: Propylene Glycol, USP- PR130

To Whom It May Concern:

Thank you for your interest in Spectrum high quality chemicals.

We at Spectrum Chemical Mfr. Corp. understand the concern regarding the presence of allergens in raw materials. Please be assured that the following chemical does not contain (Amyl cinnamal (amyl cinnamic aldehyde), Benzyl alcohol, Cinnamyl alcohol, Citral, Eugenol, Hydroxy-citronellal, Isoeugenol, Amylcinnamyl alcohol, Benzyl salicylate, Cinnamal (cinnamic aldehyde), Coumarin, Geraniol, Hydroxy-methylpentylcyclohexenecarboxaldehyde, Anisyl alcohol, Benzyl cinnamate, Farnesol, 2-(4-t-Butylbenzyl)propionaldehyde (Lilial), Linalool, Benzyl benzoate, Citronellol, Hexyl cinnam-aldehyde, D-Limonene, Methyl heptene carbonate, 3-Methyl-4-(2,6,6-trimethyl-2-cyclohexen-1-yl)-3-buten-2-one (gamma-Methylionone), Oak moss extracts, Treemoss extract, and known food allergens and products thereof such as: Cereals containing gluten, Crustaceans, Eggs, Fish, Peanuts, Soybeans, Milk, Nuts, i.e. Almond, Hazelnut, Walnut, Cashew, Pecan nut, Brazil nut, Pistachio nut, Macadamia nut and Queensland nut, Celery, Mustard, Sesame seeds, Sulphur dioxide and Sulphites, Lupine, Mollusks.).

Propylene Glycol, USP- PR130

If you have any further questions, please contact Tech Services at (310) 516-8000 Extension 5471, or by email at techservices@spectrumchemical.com.

Sincerely,

Darlene Dagdag- Lyudmirskiy
Technical Services
Spectrum Chemical Mfr. Corp.

This document has been produced electronically and is valid without a signature

Label Information

The Spectrum label presents technical and safety information in an easily understood format. Our technical specialists stay abreast of the latest requirements of the Globally Harmonized System for Classification and Labelling of Chemicals (GHS), as well as the Occupational Safety and Health Administration (OSHA), the Food and Drug Administration (FDA) and other government regulatory agencies in order to ensure compliance, accuracy and concise hazard communication.

SPECTRUM[®]
PR130 — **E** — 4 L

Propylene Glycol
(1,2-Propanediol)
U.S.P. **L** **KSA**
KOSHER

F — CAS 57-55-6

G **CAUTION:** For manufacturing, processing or repacking. **Read and understand the label and Safety Data Sheet (SDS) prior to use.**

H **Chemical Emergency: (800)424-9300**
www.SpectrumChemical.com

I $C_3H_8O_2$ — **F.W.** 76.10

Assay Min. 99.5%
Specific Gravity @ 25°C 1.035-1.037
MAXIMUM LIMITS

Acidity To pass test
Water 0.2%
Residue on Ignition 0.007%
Chloride (Cl) 0.007%
Sulfate (SO₄) 0.006%
Heavy Metals (as Pb) 5 ppm
Residual Solvents To pass test

WARNING: This product contains a chemical known to the State of California to cause cancer.

WARNING: This product contains a chemical known to the State of California to cause birth defects or other reproductive harm.

HYGROSCOPIC: Keep tightly closed.

G 9/D9GHS A **M** Lot No. 062233 — **K**

J Exp. Date: 03-31-2025

A **USE CARE:** This material has been evaluated per GHS/OSHA criteria and is not classified as hazardous. All chemicals may pose unknown hazards and must be used with caution. Use personal protection and safe handling methods consistent with proper workplace safety practices. Consult SDS for additional properties and precautions. If adverse reaction occurs seek medical attention.

B **KEEP FROM CHILDREN**

C Product Catalog Number

D Item Name, Form, Grade

E Size/Quantity

M Storage Color Band

SPECTRUM CHEMICAL MFG. CORP. Gardena, CA 90248 • New Brunswick, NJ 08901

- A** Bar Code
- B** Warning, Safety Data and Precautionary Information
- C** Product Catalog Number
- D** Item Name, Form, Grade
- E** Size/Quantity
- M** Storage Color Band
- F** Chemical Abstracts Service (CAS) Registry Number
- G** Caution Information
- H** Toll-Free 24-Hour Chemical Emergency Telephone Number
- I** Empirical Formula, Formula Weight and Technical Specifications Panel
- J** Expiration Information
- K** Lot Number
- L** Kosher Certified by Kosher Supervision of America (KSA).

This color-coded band indicates the hazard most likely to be posed by that material under storage conditions. The criteria used to assign band colors have been established by the Storage Code working group of the Society for Chemical Hazard Communication (SCHC). It is recommended that like colors be stored together, unless otherwise stated, based on the color codes indicated to the right. However, it is the responsibility of the customer to check with their local fire department for possible conflicts with our recommendations when storing hazardous chemicals.

- YELLOW:** Oxidizer
- RED:** Flammable
- GREEN:** General Storage
- BLUE:** Health Hazard
- WHITE:** Corrosive

Spectrum Chemical Mfg Corp

Corporate Headquarters:

769 Jersey Ave.
New Brunswick, NJ 08901

732.214.1300

West Coast Facility:

14422 S. San Pedro St.
Gardena, CA 90248

310.516.8000

Item Number	PR130	Lot Number	2FB0132
Item	Propylene Glycol, USP		
CAS Number	57-55-6		
Molecular Formula	C ₃ H ₈ O ₂	Molecular Weight	76.10

Test	Specification		Result
	min	max	
ASSAY	99.5 %		99.94 %
SPECIFIC GRAVITY @ 25°C	1.035 - 1.037		1.035
ACIDITY	TO PASS TEST		PASSES TEST
WATER		0.2 %	0.011 %
RESIDUE ON IGNITION		0.007 %	0.0022 %
CHLORIDE (Cl)		0.007 %	<0.007 %
SULFATES (SO ₄)		0.006 %	<0.006 %
HEAVY METALS (as Pb)		5 ppm	<5 ppm
IDENTIFICATION A	TO PASS TEST		PASSES TEST
IDENTIFICATION B	TO PASS TEST		PASSES TEST
IDENTIFICATION C	TO PASS TEST		PASSES TEST
CERTIFIED KOSHER			KOSHER
EXPIRATION DATE			02-NOV-2017
MANUFACTURE DATE			03-NOV-2015
RESIDUAL SOLVENTS	TO PASS TEST		NO RESIDUAL SOLVENTS USED
APPEARANCE			CLEAR COLORLESS LIQUID

Spectrum Chemical Mfg Corp
755 Jersey Avenue
New Brunswick 08901 NJ

Certificate of Analysis Results Certified By:




Mulbah F. Dwanah
Laboratory Supervisor
Spectrum Chemicals & Laboratory Products

All pharmaceutical ingredients are tested using current edition of applicable pharmacopeia.

January 26, 2016

RE: Lot Numbering System

Dear Valued Customer:

This letter is to inform you of Spectrum Chemicals and Laboratory Products' Lot Numbering System. The system is based on an alpha-numerical sequence which provides the month, year and location of production.

The lot numbering system utilized until 2010 is a sequence of **six characters**, two letters followed by four numbers. The first letter represents the year, for example, Y denotes 2009 and Z denotes 2010. The second letter represents the month and site, for example, A-L denotes January through December at Spectrum's Gardena, CA facility, while M-X denotes January through December at the New Brunswick, NJ facility. The following four numbers are sequentially assigned.

Example: ZI0928 = The 928th material produced in California in September 2010

The lot numbering system utilized for 2011 and forward, is a sequence of **seven characters**. The first character, a number, represents the production facility:

- 1 = Gardena, CA Facility
- 2 = New Brunswick, NJ Facility
- 3 = China Facility

The second character, a letter, represents the year. For example, A denotes 2011 and B denotes 2012. The third character, a letter, represents the month, with A denoting January and L denoting December. The following four numbers are sequentially assigned.

Example: 2AA0706 = The 706th material produced in New Jersey in January 2011

Thank you for your interest with Spectrum products. Please feel free to contact us at 310-516-8000 or via email at qualityassurance@spectrumchemical.com if we may be of further assistance.

Sincerely,



Michael Dang
Manager, GMP Compliance



Stability – Shelf Life Guidance

Product Covered: PR130, Propylene Glycol, USP

Spectrum Chemical's manufacturing partner has assigned the following shelf life guidance for the product listed above.

The product, PR130, Propylene Glycol, USP, is assigned a 24 months shelf life from date of manufacturing. The quality and integrity of the chemical depends on the handling and storage conditions. Please refer to the Safety Data Sheet for proper storage and handling procedures.

Adan R. Hernandez
Quality Control Manager

A handwritten signature in black ink, appearing to read "Adan R. Hernandez".

Corporate Headquarters
769 Jersey Avenue
New Brunswick, NJ 08901-3605



KOSHER SUPERVISION OF AMERICA

בס"ד
Feb 08, 2016

The following product(s) prepared by the named company are certified kosher with the stated requirements:

Spectrum Laboratory Products, Inc.

S-0032

14422 S. San Pedro Street
Gardena CA 90248
USA

Product Name Propylene Glycol USP - PR130

Brand Spectrum

UKD-ID KSAV3-H8Y2M1

D/P/M P

Symbol Required KSA

Special Conditions

This certificate expires on
Feb 28, 2017

Rabbi Binyomin Lisbon
Kashrus Administrator

Placing the KSA logo on products not listed above constitutes an un-authorized use of the KSA symbol, which is a federally registered trademark.