



GC POLYOLS

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Coating and Painting Solutions

Updated as of June 2021

Company Introduction



PTT Global Chemical Public Company Limited



PTT Global Chemical Public Company Limited, or GC, Thailand's largest integrated petrochemical and refining business and a leading corporation in the Asia-Pacific region, both in size and product variety. GC has a combined olefins and aromatics capacity of 11.28 million tons/year. We committed to creating chemical innovations for a better future. We strongly support technological advances that meet today's lifestyles through products that span several sectors including automobiles, construction, medical products, electric and electronic equipment, agricultural products, environmentally friendly, and safe consumer products that benefit society and improve consumer satisfaction.

www.pttgcgroup.com

GC Polyols Company Limited



GC Polyols Company Limited, or GC Polyols is a joint venture company of PTT Global Company Limited (GC), Sanyo Chemical Industries, Ltd. (SC) and Toyota Tsusho Corporation (TTC) with nameplate capacity of 180 KT/year of polyether polyols, polymer polyols and PO system.

With fully integrated company, Producing all feedstocks and raw materials required for Polyols production in one location ensures consistent quality.

High Quality Product

Quality and consistency are key to producing our polyol grades. Sanyo technologies, Integrated manufacturing sites and R&D manufacturing process assurance system ensures a range of polyols with consistent high quality

www.gcpolyols.com

GC Glycol Company Limited

GC Glycol Company Limited, or GC Glycol is a subsidiary of PTT Global Chemical (GC), Thailand's largest and Asia's leading integrated petroleum refining and petrochemical company. GC Glycol is a sole producer of ethylene oxide (EO), ethylene glycol (EG) and derivative products of EO in Thailand which committed to offer high quality of products and services to customers on global level.



GC Glycol provides product to various fields of industries. Ethylene Glycol is applied as the main raw material for synthetic fibre, PET Resin for film and bottle. Ethanolamine (EA) could be applied as intermediate substance included personal and home care, agricultural, manufacturing and construction.

Apart from our current product portfolio, GC Glycol also cooperate with GC's innovation team that dedicatedly work on product development. This to enhance capability on having solution to our customer through exploring more opportunities that can be extended from our existing product.

With GC Glycol's integrated production and strong team in services that establish trust among customers. This makes GC Glycol to be among top producers of EO-Based derivative products in Southeast Asia.

PTT Phenol Company Limited



PTT Phenol Company Limited, or PPCL is a subsidiary of PTT Global Chemical Company Limited (GC), Thailand's largest and Asia's leading integrated petroleum refining and petrochemical company. PTT Phenol is a sole producer of Phenol, Acetone and Bis Phenol A in Thailand which committed to offer high quality of products and services to customers on global level.

PTT Phenol vision's is to be the largest and the most integrated phenol chain product supplier in Southeast Asia.

GC Logistics Solutions Company Limited



GC Logistics Solutions Company Limited, or GCL, a subsidiary of PTT Global Chemical Public Company Limited (GC). GCL is full logistics service for chemical business and other products. The services is including silo, bagging & packing, warehouse management, transportation, freight forwarding, and customs clearance etc. We are committed to strengthen our client's competitive advantage though high quality services, advanced technology and competitive cost.

www.gc-logic.com

Coating and Painting Solutions

The paint and coatings industry is an important and plays a key role in creating products that help beautify preserve and protect everything, from everyday objects to our most important infrastructure covered architectural, industrial to special purpose coatings.

Key trends in the paint and coatings Industry are the coating innovation those align with consumer and workers requirement focus on sustainability, durability & longevity, environmental health safety, cost efficiency/ functionality, energy saving convenience/ease of use, application simplification. Better environment for better living thru to help protect the environment and increase life comfort and well-being.

With strong technical roots and link to work in close collaboration with our customers, GC and Vencorex offer to help our customers by developing new solutions, and adding value through our vast experience, invaluable advice and dependable responsive service in term of both product and process.



Product Introduction

Business Trends

The paint and coatings industry is an important and plays a key role in creating products that help beautify preserve and protect everything, from everyday objects to our most important infrastructure covered Architectural, Industrial to Special purpose coatings.

Key trends in the paint and coatings industry are the coating innovation those align with consumer and workers requirement focus on sustainability, durability & longevity, environmental health safety, cost efficiency, functionality, energy saving Convenience/ease of use, application simplification. Better environment for better living thru to help protect the environment and increase life comfort and well-being.



Value Chain



Ingredient Producer



Paint Manufacturer

Benefit to Paint Manufacturer (Production Perspective) :

We are coating partner for sustainable business. We are committed to create product and solution with high performance, cost-efficient and more sustainable solutions which support paints and coatings manufacturers to advance their formulations.

Industrial User

Benefit to Industrial User (Marketing Perspective) :

We imagine, we create, we develop new solutions, new services and products, to make the difference and satisfy customers expectations

Consumer

Benefit to Consumer (User Experience Perspective) :

We are committed to safety, the environment, quality and corporate social responsibility. We endeavor to create products those combine protection and aesthetics with sustainable solution to better environment for our better living and well-being.

Solutions



Product Quality

GC Glycol operates under International ISO 9001, ISO 14001, ISO 50001, ISO 45001, and TIS 18001 standards, and we always commit to offering high-quality products to our customers.

Furthermore, GC Glycol also cooperates with GC's innovation team that dedicatedly works on product development. This to enhance capability on having a solution for our customers through exploring more opportunities that can be extended from our existing products.

Service Quality

We provide the highest quality services to our customers with technical support, strong logistics, and sales & marketing teams that establish trust among customers to be among the top producers of EO-Based derivative products.

How to Handling and Storage

For storage conditions, the product is hygroscopic, water contamination should be avoided keep container tightly closed without air contamination the periods of exposure to high temperatures should be minimized and avoid directly contact with sunlight and higher temperature for longer term color stability, it is recommended that the product be stored under an inert atmosphere.

Before handling these products, please refer to the Safety Data Sheet for recommended protective equipment, storage, detailed precautionary and hazards information.



Product Quality

At PTT Phenol, we pay great attention to our production line, our laboratory and delivery procedure to ensure that we could produce the best quality product to serve our customers.

Service Quality

Our professional team of operation logistics and sales & marketing network will deliver the best quality product with on time delivery along with the reliable supply.

How to Handling and Storage

It is recommended that the product is kept in Acetone shore tank with appropriate condition ambient and temperature, to avoid product quality deterioration.

Before handling this product, please refer to the Safety Data Sheet for recommended protective equipment, storage, detailed precautionary and hazards information



Product Quality

At GC Polyols, we seek out the latest breakthroughs in products and processes to provide you with the most cutting-edge technology that best serves your needs.

Polyurethane application center resembles customers' production line to scale up and ensure consistent and highest quality of our products. We provide application testing for flexible and rigid foam at various scale.

Service Quality

Our on-site technical support and, strong logistics and sales & marketing network, mean we are at the forefront of delivering long-term solutions to our customers, whilst maintaining the highest standards of innovative Polyols product.

How to Handling and Storage

It is recommended that the product is kept in its original container and well-sealed after each usage. The container should be kept in a dry and well-ventilated place, avoiding flame and direct sunlight. The product should be stored at an appropriate ambient temperature, lower than 35 °C, to avoid product quality deterioration.

Before handling this product, please refer to the Safety Data Sheet for recommended protective equipment, storage, detailed precautionary and hazards information.

Ethylene Glycol Product

Properties	Test Method (ASTM)	Unit	MEG	DEG
Appearance	Visual Inspection	-	Clear, colorless	Clear, Colorless
Suspended matter	Visual Inspection	-	None	None
Specific gravity@ 20/20 °C	ASTM D4052-2015	-	1.1151 – 1.1156	1.1175 – 1.1195
MEG content	By Difference	% wt	99.9 (Minimum)	0.05 (Maximum)
DEG content	Based on ASTM E2409	% wt	0.02 (Maximum)	99.8 (Minimum)
TEG content	Based on ASTM E2409	% wt	-	0.05 (Maximum)
Water content	ASTM E1064	% wt	0.02 (Maximum)	0.1 (Maximum)
Distillation Range @760 mm Hg Initial Boiling Point Dry Point 5% to 95% Volume Range	ASTM D1078	°C °C °C	196 (Minimum) 199 (Maximum) 1 (Maximum)	242 - 250
UV Transmittance at 220 nm at 250 nm at 275 nm at 350 nm	ASTM E2193 ASTM E2193 ASTM E2193 ASTM E2193	% % % %	80 (Minimum) 90 (Minimum) 95 (Minimum) 99 (Minimum)	-
Color Pt-Co units Before Heating After Heating 4 hrs. After Heating with NaOH After Heating with HCl	ASTM D5386 DC-406 EO-548 DC-407	mg Pt/L mg Pt/L mg Pt/L mg Pt/L	5 (Maximum) 10 (Maximum) 10 (Maximum) 10 (Maximum)	10 (maximum)
Acidity (as Acetic Acid)	ASTM D1613	ppm wt	10 (Maximum)	50 (maximum)
Chloride	EO-635	ppm wt	0.1 (Maximum)	-
Iron (Fe)	ASTM E394	ppm wt	0.05 (Maximum)	0.1 (maximum)
Ash	ASTM D482	ppm wt	10 (Maximum)	50 (maximum)
Aldehydes (as Formaldehyde)	S-63C	ppm wt	8 (Maximum)	-

Ethanolamine Product : Monoethanolamine (MEA)

Properties	Specification	Unit	Test Method
Monoethanolamine	99.50 min	% wt	ST-35.180, ST-35.183
Diethanolamine	0.10 max	%wt	ST-35.180, ST-35.183
Color, Pt-Co Units	10 max	mg Pt/L	ASTM D5386
Water	0.200 max	%wt	ASTM E203

Ethanolamine Product : Triethanolamine (TEA)

Properties	Specification	Unit	Test Method
Triethanolamine	99.00 min	%wt	ST-35.99
Color, Pt-Co	40 max	mg Pt/L	ASTM D5386
Water	0.200 max	%wt	ASTM E203
Iron	10.00 max	ppm	ASTM E394
Equivalent weight	148-150	g/equiv.	ST-5.5

Non-VOC and Green Solvent

Properties	Unit	Specification		Test Method
		Min.	Max.	
Acetone Purity (dry basis)	wt%	99.50		Inhouse Method (Base on QCL-236)
Appearance		Clear		Visual
Permanganate Test	Minute	90		ASTM D-1363
Distillation Range	Deg C		1	ASTM D-1078
Water Content	wt%		0.40	ASTM D-1364
Specific Gravity at 20/20 deg C		0.791	0.793	ASTM D-4052
Nonvolatile Matter	g/100 ml		0.001	ASTM D-1353
Color	Pt-Co		5	ASTM D-1209

Monoethanolamine (MEA)

Properties	Test Method	Unit	Genix GA-5000	Genix PK-400	Genix PA-2000	Genix PK-1000
Appearance	Internal Method	-	Colorless to pale yellow liquid			
Color (Hazen)	ASTM D5386	-	10	10	10	10
Hydroxyl value	ISO 14900:2001	-	33.0	270	56.0	112
Water Content	ASTM D4672	wt %	0.02	0.02	0.02	0.02
pH	Internal Method	-	6.3	6.5	6.1	6.0
Viscosity (at 25 °C)	ASTM D445	mPa * s	900	70	325	150