I.C.C
اصفهان کوپلیمر

# ISFAHAN COPOLYMER

www.isfahancopolymer.com

**EO/PO COPOLYMERS**

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دارنده گواهینامه سیستم مدیریت یکپارچه (IMS)

I.C.C

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## Intouduction

Isfahan Copolymer Company has been established in 1990 as a leading chemical manufacturer in Iran.
ICC have utilized in 1996 by setting Pine Oil production line and thereafter continued by various chemical products in three sites of Ethoxylate, Propoxylate and mining chemicals , so supply different surfactants for various industries and also collector and frothers for mining processing. Now ICC by production capacity of 15000 MT, supply customer needs in different areas
ICC implemented ISO-9001 and ISO-14001 to ensure product quality level , factory work safety and environmental protection maintenance and also OHSAS 18001 to create a healthy, safe and supportive environment
ICC research and development section design and production products that meet particular and unique needs for customers.

## Policy of ICC

1- Improve product quality to increase customer satisfaction, with the vision of our responsibility against them to meet their needs
2- Utilizing personnel's creativity, science and ability to improve the research and development of new products and extend long-range development of company.
3- Improve control of costs and expenses, develop the market and trade.
4- Effective Continuous improvement of company structures and processes by modern management technologies
5- Respect to personnel personality and provide sufficient services to improve their position and living
6- Strengthening and development of human resources by the recruiting and training of personnel
7- Prevention of job injury and diseases
8- Prevention of environment polluting

## Products

ICC is a leading supplier of a full range of surfactants including anionic, cationic and nonionic variants. Among the chemicals offered are all kinds of ethoxylated, propoxylated, EO/PO copolymers products and polyols. These surface-active agents are used in formulation of industrials and house hold cleaning, emulsifiers, demulsifiers and production of rigid and elastic polyurethane foam.





## معرفی شرکت

شرکت اصفهان کوپلیمر (I.C.C) که درسال ۱۳۶۹ تاسیس گردید و در سال ۱۳۷۵ با تولید Pine Oil به بهره برداری رسید، با ایجاد تنوع در خطوط تولید به عنوان یکی از تولیدکنندگان اصلی محصولات متنوع شیمیایی از جمله اتوکسیله به تهیه سورفکتانت ها و نیز کلکتور ها و کف سازهای مورد استفاده در صنعت فراوری معادن می پردازد و هم اکنون با ظرفیت تولید سالانه حدود ۱۵۰۰۰ تن، مشتریان مختلف در حوزه های متنوع را پوشش داده است.
این شرکت در سایه تلاش روز افزون و با بهره گیری از علم و تکنولوژی و پشتوانه کارکنانی مجرب دامنه تولیدات خود را به بیش از ۵۰ محصول توسعه داده و همین امر سبب شد تا در زمره شرکت های بزرگ تولید کننده محصولات شیمیایی کشور تولیدات و خدمات خود را با بر مبنای استانداردهای OHSAS 18001، ISO 14001، ISO 9001 عرضه نماید.
واحد تحقیق و توسعه این شرکت آمادگی لازم جهت طراحی و تولید محصولات متناسب با نیازهای حوزه فعالیت مشتریان را دارا می باشد.
پشتیبانی مشتریان در زمان مصرف محصولات، جزء لاینفک تعهدات این شرکت می باشد.

## خط مشی شرکت اصفهان کوپلیمر

۱- ارتقاء سطح کیفیت محصولات تولیدی با هدف ارتقاء سطح رضایت مشتریان با درک و مسئولیت پذیری در برابر مشتریان و برآورده سازی نیازمندیهای مشتریان
۲- استفاده مطلوب از خلاقیت، دانش و توانمندی کارکنان شرکت در جهت انجام پروژه های جدید تحقیقاتی و توسعه محصولات
۳- دستیابی به اهداف درآمدی، فروش و توسعه بازار
۴- بهبود مستمر ساختار و فرآیندهای شرکت به منظور ارتقاء اثربخشی فرآیندها با استفاده از ابزارهای نوین مدیریتی
۵- احترام به شخصیت پرسنل و ارتقاء منزلت و معیشت کارکنان و خدمت رسانی به ایشان
۶- توسعه و توانمندسازی سرمایه های انسانی از طریق آموزش های مستمر
۷- پیشگیری از مصدومیت و بیماری های شغلی و تبعیت از الزامات قانونی قابل اعمال و سایر الزامات مرتبط
۸- پیشگیری از آلودگی محیط زیست و تبعیت از الزامات قانونی قابل اعمال و سایر الزامات مرتبط

## محصولات تولیدی

این شرکت انواع مختلف از سورفکتانت های آنیونی، کاتیونی و غیریونی را تولید می کند که از بین آنها میتوان به محصولات اتوکسیله، پروپکسیله، کوپلیمر های EO/ PO و پلی اولها اشاره کرد. این عوامل فعال کننده سطح، در فرمولاسیون پاک کننده های صنعتی و خانگی، امولسیفایرها، دی امولسیفایرها و ساخت فوم های پلی یورتانی سخت و نرم کاربرد دارند.

## کوپلیمرهای رندوم EO/PO

پلی اتر پلی اول های رندوم EO/PO، معمولا هترو پلی اتر پلی اول نامیده می شوند و مهمترین کوپلی اتر پلی اول ها برای فوم های پلی یورتانی انعطاف پذیر هستند.
عملا سنتز پلی اترهای رندوم EO/PO بسیار مشابه سنتز هموپلیمرهای پلی اتر PO می باشد، با این تفاوت که، استارتر با یک مخلوط هموژن از EO/PO واکنش می دهد.

## مزایای کوپلیمرهای EO/PO

- محصولات مختلف
- کنترل کف خوب
- پایداری حرارتی و شیمیایی
- مناسب برای فرمولاسیون اسیدی
- از لحاظ قیمتی مقرون به صرفه
- سازگار با محیط زیست
- خصوصیات مرطوب کنندگی خوب

## کاربردهای کوپلیمرهای EO/PO

کوپلیمرهای EO/PO با کف کنندگی پایین می توانند در انواع حلالها یا فرمولاسیون های پایه آب به کار برده می شوند مانند:

- کنستانتره امولسیون (EC)
- امولسیون آب در روغن (EW)
- امولسیون – سوسپانسیون (SE)
- کنستانتره محلول (SL)
- کنستانتره سوسپانسیون (SC)



## سورفکتانت های کوپلیمری EO/PO با کف پایین

تاریخچه سورفکتانت های غیر یونی دارای کف پایین با کشف ماده فعال سطحی شروع شد که به وسیله افزایش اتیلن اکساید EO به پلیمرهای پروپیلن اکساید PO بدست می آید.
ما محدوده محصولات الکل اتوکسیلاتهای اصلاح شده را به وسیله افزایش گاز PO یا بستن زنجیره با یک زنجیره آلکیلی توسعه داده ایم. این مواد غیر یونی با کف پایین سطح فعال خیلی خوبی دارند و برای محیط زیست خطری را ایجاد نمی کنند.

## کوپلیمرهای افزایشی EO/PO

کوپلیمرهای افزایشی EO/PO عموما دارای کشش سطحی پایین و CMC پایین و قدرت پخش کنندگی بالا هستند و با نمونه های آلکیل اتوکسیلات های مشابه خود قابل مقایسه اند. پروپیلن اکساید بلوک به عنوان یک شاخه اضافی بین کوپلیمرها منجر به مزایای بهتر مثل خواص امولسیون سازی و پایدار کنندگی بهتر می شوند.

## کوپلیمرهای بلوک EO/PO

این نوع از کوپلیمرهای EO/PO به عنوان پایدار کننده امولسیون، مرطوب کننده، عامل افزایش دهنده نفوذ یا پخش کنندگی عمل می کنند. از آنجا که خواص رطوبتی فرمولاسیون شما نیاز به بهبود دارد، مشتقات آلکیل استخلاف شده EO/PO بدون اینکه باعث تشکیل کف شوند گزینه مناسبی برای سموم آفت کش هستند.
آلکیل اتوکسیلاتها و کوپلیمرهای EO/PO مانند EP 2564 در آب سرد به سرعت حل می شوند که این مزیت خوبی را برای فرمولاسیون های پایه آب (SL, SC, SE) فراهم می کند.
بیشتر کوپلیمرهای آبگریز مانند کوپلیمر PF 10 به عنوان امولسیفایر و مرطوب کننده در حلال یا سیستم های پایه روغن (EC, EW) استفاده می شوند.

# EO/PO Copolymers

- **Low foaming surfactants**

**Get your foam under control**

# Product Range

- **EO/PO adducts**
- **EO/PO block Copolymers**
- **Random EO/PO Copolymers**



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## Low foaming surfactants

The history of low foaming nonionic surfactants began with the discovery that surface active substances can be obtained by addition of ethylene oxide (EO) to polymers of propylene oxide (PO). We extended our products range with alcohol ethoxylates modified by adding a well-defined amount of PO or endcapping by a short alkyl chain. These low foaming nonionics have excellent surface activity and most of them are ultimately biodegradable and not dangerous to the environment.
I.C.C manufactures a wide range of low foaming surfactants designed to provide the appropriate functionality for all of our customers application needs.
**We help you to get your foam under control.**
I.C.C's Home Care Business Line offers the consumer goods industry a wide spectrum of technical innovations and solution-oriented products as the basis for laundry, cleaning and cleansing products.
Our portfolio comprises a multifaceted range of products that meet consumers' household needs efficiently and comprehensively. We are the ideal partner when it comes to developing all types of solutions and innovations related to laundry, cleaning and cleansing.

## EO/PO adducts

Alkyl based EO/PO block copolymers typically have lower surface tensions, CMC and greater dispersing power compared to the corresponding simple alkyl ethoxylates.
The propylene oxide block acts as a branched residue within the copolymers leading to performance advantages like better solubilization and emulsification properties.

## EO/PO block polymers

EO/PO copolymers act as emulsion stabilizers, wetter's, penetration enhancers or dispersing agents. Whenever the wetting properties of your formulations need to be improved without causing increased foam formation alkyl-substituted EO/PO derivatives could be the right choice. Due to their different molecular weights and structures these types of surfactants are not necessarily enhancing the penetration through the leaf surface, which makes them suitable e.g. for the use with contact pesticides.
Alkyl alkoxylates and EO/PO copolymers like Copolymer EP 2564 showing fast cold-water solubility provide advantages especially in water based formulations (SL, SC, SE) and are favorable tank-mix additives.
More hydrophobic copolymers like copolymer PF 10 are used as emulsifiers and wetters in solvent or oil based systems (EC, EW).

## Random EO/PO Copolymers

The random copolyether polyols EO/PO, usually called heteropolyether polyols, are the most important polyether polyols for flexible PU slab stock foams.
Practically, the synthesis of random copolymers of EO/PO is very similar to the synthesis of polyether PO homopolymers, with the difference that the starter is reacted with an homogeneous mixture of EO/PO.

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## Advantages of EO/PO copolymers

- Variable product forms
- Perfect foam control
- Chemical and thermal stability
- Suitable for acidic formulations
- Very good cost-efficiency
- Environmentally compatible
- Excellent wetting properties

## Applications of EO/PO copolymers

Low-foaming EO-PO copolymers can be used in various solvent or water based formulation types e.g. like:

- Emulsifiable concentrate (EC)
- Oil-in-water emulsion (EW).
- Suspension-emulsion (SE).
- Soluble concentrate (SL).
- Suspension concentrate (SC).
- Brake fluid formulations.
- Lubricating-oil and grease compounding.
- Rubber processing
- Air-filter dust trapping
- Foam inhibiting

Nonionic emulsifiers contribute to the stability of the polymer latexes in two ways:

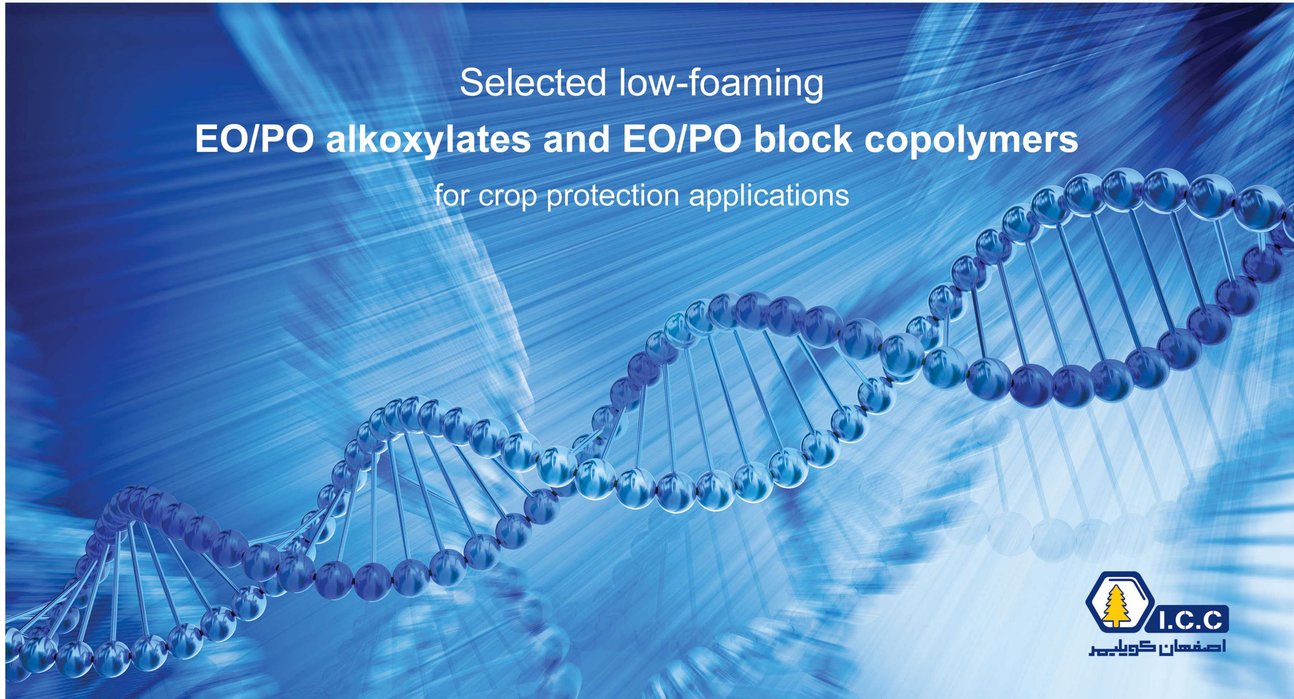
- They reduce the amount of coagulum formed during the polymerization and improve the final latex properties by enhancing the electrolyte and shear stability.

- Furthermore the presence of nonionic emulsifiers is beneficial for the freeze-thaw stability of polymer dispersions.

Prominent types of nonionic emulsifiers are fatty alcohol ethoxylates and block copolymers of ethylene and propylene oxide.







## EO/PO block polymers

These products serve as low foaming emulsifiers in the polymerization of pure acrylic, styrene-acrylic and vinyl acetate latexes.

### Product Range

# EO/PO block polymers

**Copolymer PF10**

**Nonionic emulsifier for emulsion polymerization**

**Copolymer PF10** is a low foaming, nonionic surfactant for the chemical industry. This clear, colorless liquid is composed of a block copolymer of propylene oxide and ethylene oxide.
**Copolymer PF10** has good wetting and dispersing action coupled with low foaming tendency.
**Copolymer PF10** is used as a low-foaming surfactant and defoamer in detergents and cleaning agents. Typical applications include rinsing aids, detergents for dishwashers and bottle-rinsing machines and industrial cleaning formulations. Copolymer PF 10 is also used as a low-foaming emulsifier in emulsion polymerization and as a dispersing agent for pigment pastes and preparations.

- Wetting, foam control and dispersing agents.
- Styrene/acrylate dispersions.
- Acrylate dispersions.
- Vinyl acetate dispersions.
- Used for water-borne decorative paints applications.





**Copolymer PF 20**

**Nonionic emulsifier for emulsion polymerization**

**Copolymer PF20** is a low foaming, nonionic surfactant and defoamer for use in detergents and cleaning agents. It is also used as a nonionic and low foaming emulsifier in emulsion polymerization of monomers like acrylates, styrene-acrylates and vinyl acetate and as a dispersing agent for pigment pastes and preparations. This product is a slightly cloudy, colorless liquid that is composed of block copolymer of propylene oxide and ethylene oxide.
**Copolymer PF20** has good wetting and dispersing action coupled with low foaming tendency.

- Styrene/acrylate dispersions.
- Acrylate dispersions.
- Vinyl acetate dispersions.
- Used for water-borne decorative paints applications.
- Wetting agent, emulsifier.
- Low-foaming, nonionic surfactant for the chemical industry.

**Copolymer PF 30**

**Nonionic emulsifier for emulsion polymerization**

**Copolymer PF30** is a low foaming, nonionic surfactant.
**Copolymer PF30** can be applied as a wetting agent and emulsifier for oils, waxes, paraffin and silicones,
as emulsifier for emulsion polymerization of acrylic monomers, styrene and vinyl acetate, as lubricant for polymers and resin processing and as reactant for polyethers, polyesters and polyurethanes.

- defoamer for use in detergents and cleaning agents.
- wetting and dispersing agent.
- nonionic and low foaming emulsifier in emulsion polymerization.
- Styrene/acrylate dispersions.
- Acrylate dispersions.
- Vinyl acetate dispersions.
- lubricant for polymers and resin processing and as reactant for polyethers, polyesters and polyurethanes.

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## Copolymer PF 40

**Nonionic emulsifier for emulsion polymerization**

**Copolymer PF40** is resistant to water hardness salts and to acids and alkalis in the concentrations normally used.
This cloudy, colourless solution has good wetting and dispersing action coupled with low foaming tendency.
**Copolymer PF40** is used as a low-foaming surfactant with very good dispersing action in detergents and cleaning agents. Typical applications include rinsing aids, detergents for dishwashers and bottle -rinsing machines and industrial cleaning formulations.
**Copolymer PF40** is used as nonionic emulsifier for the emulsion polymerization of monomers like acrylates, styrene- acrylates and vinyl acetate.

- nonionic and low foaming emulsifier in emulsion polymerization and as a dispersing agent for pigment pastes and preparations.
- Styrene/acrylate dispersions.
- Acrylate dispersions.
- Vinyl acetate dispersions.
- low foaming, nonionic surfactant and defoamer for use in detergents and cleaning agents.
- Emulsifier, wetting and dispersing agent.
- Low-foaming, nonionic surfactant for the chemical industry.

## Copolymer PF 80

**Nonionic emulsifier for emulsion polymerization**

**Copolymer PF80** is used as nonionic emulsifier for the emulsion polymerization of monomers like acrylates, styrene-acrylates and vinyl acetate.
**Copolymer PF80** Powder is a low-foaming, nonionic surfactant for the chemical industry. This white powder can be used in combination with other nonionic, anionic and cationic surfactants.
**Copolymer PF80** powder is resistant to water hardness salts and to acids and alkalis in the concentrations normally used. This product has good wetting and dispersing action coupled with low foaming tendency.
**Copolymer PF80** powder is used as a low-foaming surfactant with very good dispersing action in detergent and cleaning agent powders. These can be produced simply by mixing the powder components.
**Copolymer PF80** powder is also used as a low-foaming emulsifier in emulsion polymerization and as a dispersing agent for pigment pastes and preparations.

- Styrene/acrylate dispersions.
- Acrylate dispersions.
- Vinyl acetate dispersions.
- Emulsifier.





## Copolymer 4084

**Nonionic emulsifier for emulsion polymerization**

**Copolymer 4084** is used as nonionic emulsifier for the emulsion polymerization of monomers like pure acrylic, styrene-acrylic acid esters and vinyl acetate.
**Copolymer 4084** is a nonionic emulsifier for emulsion polymerization. This pale yellow wax is composed of block copolymer of propylene oxide and ethylene oxide.
**Copolymer 4084** is used in emulsion polymerization of polyvinyl acetate, acrylate and styrene/acrylate dispersions to stabilize the rheological behavior of the polymer dispersions and to improve the electrolyte and shear stability. It can be used in combination with other nonionic, anionic and cationic surfactants.
**Copolymer 4084** is Ethylene oxide-propylene oxide block copolymers. It is compatible with vinyl and acrylic resins. It reduces the amount of coagulum formed during the polymerization and improves the final latex property.

- Emulsion polymerization.
- Styrene/acrylate dispersions.
- Acrylate dispersions.
- Vinyl acetate dispersions.

# Description

## Copolymer PF 10

**Copolymer PF 10** is a low foaming, nonionic surfactant for the chemical industry. This clear, colorless liquid is composed of a block copolymer of propylene oxide and ethylene oxide. Copolymer PF 10 has good wetting and dispersing action coupled with low foaming tendency. Within the Copolymer PF series, the products with a lower degree of ethoxylation have a better foam-suppressing effect than the products with a higher degree of ethoxylation.
**Copolymer PF 10** is used as a low-foaming surfactant and defoamer in detergents and cleaning agents. Typical applications include rinsing aids, detergents for dishwashers and bottle-rinsing machines and industrial cleaning formulations. To clarify aqueous solutions of the product, the addition of solubilizers such as ethanol or isopropanol is required. Copolymer PF 10 is also used as a low-foaming emulsifier in emulsion polymerization and as a dispersing agent for pigment pastes and preparations.

## Copolymer PF 20

**Copolymer PF 20** is a low foaming, nonionic surfactant and defoamer for use in detergents and cleaning agents. It is also used as a low foaming emulsifier in emulsion polymerization and as a dispersing agent for pigment pastes and preparations. This product is a slightly cloudy, colorless liquid that is composed of block copolymer of propylene oxide and ethylene oxide.
**Copolymer PF 20** has good wetting and dispersing action coupled with low foaming tendency. Within the Copolymer PF series, the products with a lower degree of ethoxylation have a better foam-suppressing effect than the products with a higher degree of ethoxylation. Typical applications include rinsing aids, detergents for dishwashers and bottle-rinsing machines and industrial cleaning formulations.

## Copolymer PF 30

**Copolymer PF 30** nonionic surfactants are block copolymers of propylene oxide and ethylene oxide. The propylene oxide block is sandwiched between two ethylene oxide blocks.
**Copolymer PF 30** surfactants: are better emulsifiers, are better dispersants, cover a broader range of molecular weights, are terminated by primary hydroxyl groups (higher reactivity and acidity). Wetting agent, emulsifier, demulsifier, viscosity control agent, dispersant, antistatic agent, lubricant - agricultural, cosmetics, metal cleaning, paper, textile, paints.





## Copolymer PF 40

**Copolymer PF 40** is a low-foaming nonionic surfactant for the chemical industry. It can be used in combination with other nonionic, anionic and cationic surfactants.
**Copolymer PF 40** is resistant to water hardness salts and to acids and alkalis in the concentrations normally used. This cloudy, colorless solution has good wetting and dispersing action coupled with low foaming tendency.
**Copolymer PF 40** is used as a low-foaming surfactant with very good dispersing action in detergents and cleaning agents. Typical applications include rinsing aids, detergents for dishwashers and bottle -rinsing machines and industrial cleaning formulations. **Copolymer PF 40** is also used as a low-foaming emulsifier in emulsion polymerization and as a dispersing agent for pigment pastes and preparations.

## Copolymer PF 80

**Copolymer PF 80** Powder is a low-foaming, nonionic surfactant for the chemical industry. This white powder can be used in combination with other nonionic, anionic and cationic surfactants. **Copolymer PF 80** powder is resistant to water hardness salts and to acids and alkalis in the concentrations normally used. This product has good wetting and dispersing action coupled with low foaming tendency.

### Ethylene Oxide – Propylene Oxide Block Copolymers

Copolymer 4084 is used in emulsion polymerization of polyvinyl acetate, acrylate and styrene/acrylate dispersions to stabilize the rheological behavior of the polymer dispersions and to improve the electrolyte and shear stability.
Low-foaming Copolymer PF 10, 20, 40 and 80 grades are used as a surfactant and defoamer in detergents and cleaning agents. They are also used as an emulsifier in emulsion polymerization, improving the emulsion stability and preventing foam during the spray drying of dispersion powders. As a wetting agent in aqueous coatings, they reduce the surface tension of the coating formulation, improve the stability and shelf life and the adhesion of the coating onto the coated surface. They also serve as intermediate in chemical reactions.
Copolymer PF 80 Powder can also be added to solid admixtures in the construction industry to improve the wetting and redispersing of the powder, resulting in higher plastification and improved workability and overall performance of the plaster. Copolymer PF 30 can be applied as a wetting agent and emulsifier for oils, waxes, paraffin and silicones, as emulsifier for emulsion polymerization of acrylic monomers, styrene and vinyl acetate, as lubricant for polymers and resin processing and as reactant for polyethers, polyesters and polyurethanes.

# Additives for the Paints Industry

## Your paint's performance booster

## Surfactant-type Dispersing Agents

## Decorative paints

- **Copolymer PF 10**
- **Copolymer PF 20**

**Copolymer PF 10, Copolymer PF 20 are EO/PO block copolymers. Acts as a low foaming, non-ionic surfactant. Used for water-borne decorative paints applications.**

I.C.C – Coatings & Construction Chemicals offers a broad range of additives for Paint and Coatings formulations and manufacturing of pigment preparations. Designed to boost paint performance, this selection of additives includes: wetting and dispersing agents (such as compatibilizers, stabilizers, synergists, and supplements), humectants, foam control agents, and biocides/preservatives.





# Exactly your Emulsifier

## Surfactants for Emulsion Polymerization

### Emulsion polymerization

- **Copolymer PF 10**
- **Copolymer PF 20**
- **Copolymer PF 40**

These products serve as low foaming emulsifiers in the polymerization of pure acrylic, styrene-acrylic and vinyl acetate latexes.

**Emulsion polymerization**

I.C.C is offering a broad range of surfactants to be used as emulsifiers in the emulsion polymerization process.

### Product Range

## EO/PO block polymers

**Copolymer PL 1**
**Copolymer PL 2**
**Copolymer PL 3**
**Copolymer PL 4**
**Copolymer PL 35**
**Copolymer PL 31**
**Copolymer PL 43**
**Copolymer PL 81**

**Nonionic emulsifier for emulsion polymerization**

Pluronic L is a difunctional block copolymer surfactant terminating in primary hydroxyl groups. A nonionic surfactant that is 100% active and relatively nontoxic.
Copolymer PL nonionic surfactants are block copolymers of propylene oxide and ethylene oxide. The propylene oxide block is sandwiched between two ethylene oxide blocks.
Copolymer PL surfactants are better emulsifiers, are better dispersants, cover a broader range of molecular weights, are terminated by primary hydroxyl groups (higher reactivity and acidity).

### Alkyl alkoxylates

The low-foaming Copolymer EP grades are suitable for rinsing aids, detergents for dishwashers and bottle-rinsing machines and industrial cleaning formulations. They also serve as low foaming wetting agent for pigment pastes and preparations as well as for wood coatings, architectural paints and industrial coatings.

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# Product Range

## EO/PO adducts

**Copolymer EP2524**

**Copolymer EP2524** is a EO/PO copolymer, made by block wise addition of ethylene oxide and propylene oxide.
It is a low foaming surfactant with good wetting properties and is used as cloud point defoamer.
- Low foaming surfactant for all type of cleaners.
- Low foaming wetting agents and detergents, rinse off agents for automatic dish washing.

**Copolymer EP2525**

**Copolymer EP2525** is a low foaming surfactant for all type of cleaners.
laundry powders & tabs, laundry liquids, automatic dishwashing, automatic dishwashing rinses, hard surface cleaning.
- Low foaming surfactant for all type of cleaners.
- Suitable to replace defoamers in heavy duty detergent powders.

**Copolymer EP2544**
**(Copolymer 20-103)**

**Copolymer EP2544** is a low foaming surfactant for home and industrial care products.
Copolymer EP2544 is a colorless to pale yellow, clear liquid low foaming nonionic surfactant for the detergent industry. It is especially suitable for the manufacture of low foaming cleaners and rinse aids for automatic dish-washing.
- Excellent low foaming surfactant for all types of cleaners and laundry liquids.
- Suitable for high pressure cleaners.
- Low foaming wetting agents and detergents, rinse off agents for automatic dish washing.

**Copolymer EP2545**

**Copolymer EP 2545** is a low foaming surfactant and rinse aid for home and industrial care products.
liquid and powder cleaning agents, automatic dishwashing rinses.
- Excellent low foaming surfactant for cleaners and liquid laundry.
- Excellent low foaming surfactant and rinse aid for automatic dishwashing liquids, tabs and rinses.

**Copolymer EP2552**

**Copolymer EP2552** is a low foaming surfactant for industrial and home care products.
**Copolymer EP2552** is a colorless to pale yellow, clear liquid low foaming nonionic surfactant for the detergent industry.
It is especially suitable for the manufacture of low foaming cleaners and rinse aids for automatic dish-washing.
- Excellent low foaming surfactant for all types of cleaners and laundry liquids.
- Suitable to replace defoamers in heavy duty powders.
- Low foaming wetting agents and detergents, rinse off agents for automatic dish washing.





**Copolymer EP2554**

**Copolymer EP2554**
**Copolymer EP2454** is a low foaming surfactant and rinse aid for home and industrial care products.
liquid and powder cleaning agents, automatic dishwashing rinses.
- Excellent low foaming surfactant for all types of cleaners and laundry liquids.
- Excellent low foaming surfactant and rinse aid for automatic dishwashing liquids, tabs and rinses.

**Copolymer EP2564**
**(Copolymer 20-101)**

**Copolymer EP2564**
**(Copolymer 20-101)**
Copolymer EP2564 is an alkoxylate wetting agent and low foaming surfactant used in industrial and home care products, in metal cleaners and in crop protection applications.
Rinse aid for home and industrial care products.
Copolymer EP2564 is an almost colorless liquid low foaming nonionic surfactant for the detergent industry. It is especially suitable for the manufacture of low foaming cleaners and rinse aids for automatic dish-washing.
- Excellent low foaming surfactant for all types of cleaners and laundry liquids.
- Excellent low foaming surfactant and rinse aid for automatic dishwashing liquids, tabs and rinses.
- Low foaming wetting agents and detergents, rinse off agents for automatic dish washing.

**Copolymer EP2584**

**Copolymer EP2584**
**Copolymer EP2584** is a low foaming surfactant used in industrial lubricants, industrial care products as well as in crop protection.
**Copolymer EP2584** is a cloudy liquid low foaming non-ionic surfactant for the detergent industry. It is especially suitable for the manufacture of low foaming cleaners and rinse aids for automatic dish-washing.
- Excellent low foaming surfactant for all types of cleaners and laundry liquids.
- Excellent low foaming surfactant and rinse aid for automatic dishwashing liquids, tabs and rinses.
- Low foaming wetting agents and detergents, rinse off agents for automatic dish washing.

# EO/PO block copolymers

Typical physical properties

| | Form | Specific gravity, at 25°C | Viscosity, cps at 25°C | Pour point | Cloud point (1% aqueous) | HLB | pH (2.5% aqueous) | Solubility in water at 25°C |
|---|---|---|---|---|---|---|---|---|
| **Copolymer PL1** Block Copolymer Surfactant | Liquid | 1.01 | 325 | -29°C | 24°C | 3 | 5-7.5 | Insoluble |
| **Copolymer PL2** Block Copolymer Surfactant | Liquid | 1.03 | 450 | -4°C | 32°C | 1-7 | 5-7.5 | >10% |
| **Copolymer PL3** Block Copolymer Surfactant | Liquid | 1.04 | 490 | <-4°C | 34°C | 8-11 | 5-7.5 | >10% |
| **Copolymer PL4** Block Copolymer Surfactant | Liquid | 1.05 | 850 | 16°C | 58°C | 12-18 | 5-7.5 | >10% |
| **Copolymer PL10** Block Copolymer Surfactant | Liquid | 1.04 | 660 | -5°C | 32°C | 12-18 | 5-7.5 | >10% |
| **Copolymer PL31** Block Copolymer Surfactant | Liquid | 1.02 | 175 | -32°C | 37°C | 1-7 | 5-7.5 | >10% |
| **Copolymer PL35** Block Copolymer Surfactant | Liquid | 1.06 | 375 | 7°C | 73°C | 18-23 | 5-7.5 | >10% |
| **Copolymer PL43** Block Copolymer Surfactant | Liquid | 1.04 | 310 | -1°C | 42°C | 7-12 | 5-7.5 | >10% |
| **Copolymer PL44** Block Copolymer Surfactant | Liquid | 1.05 | 440 | 16°C | 65°C | 16 | 5-7.5 | >10% |
| **Copolymer PL81** Block Copolymer Surfactant | Liquid | 1.02 | 475 | -37°C | 20°C | 1-7 | 5-7.5 | Insoluble |
| **Copolymer PL92** Block Copolymer Surfactant | Liquid | 1.03 | 700 | 7°C | 26°C | 1-7 | 5-7.5 | >1% |
| **Copolymer PL101** Block Copolymer Surfactant | Liquid | 1.02 | 800 | -23°C | 15°C | 1-7 | 5-7.5 | Insoluble |
| **Copolymer PL121** | Liquid | 1.01 | 1200 | 5°C | 14°C | 1-7 | 6-7.5 | Insoluble |





# Product Range

Typical physical properties

| | Active content (%) | Appearance (20°C) | Cloud point BDG (°C) | Cloud point $H_2O$ (°C) | HLB value |
|---|---|---|---|---|---|
| **Copolymer EP2524** low foaming surfactant | 100 | Liquid | 24.5-27.5 | Not applicable | — |
| **Copolymer EP2525** low foaming surfactant | 100 | Liquid | 26-28 | Not applicable | — |
| **Copolymer EP2544** low foaming surfactant | 100 | Liquid | 31.0-33.0 | 16.0-19.0 | 10 |
| **Copolymer EP2545** low foaming surfactant | 100 | Liquid | 32.0-34.0 | 19.0-21.0 | — |
| **Copolymer EP2552** low foaming surfactant | 100 | Liquid | 39.0-41.0 | Not applicable | 10.5 |
| **Copolymer EP2554** low foaming surfactant | 100 | Liquid | 40.0-42.0 | 28.0-30.0 | — |
| **Copolymer EP2564** low foaming surfactant | 100 | Liquid | 43.0-45.0 | 27.0-31.0 | 11 |
| **Copolymer EP2584** low foaming surfactant | 100 | Liquid | 47.0-49.0 | 39.0-42.0 | 12 |

## Product Range

# EO/PO block copolymers

Typical physical properties

| | Active content (%) | Appearance (20°C) | Cloud point BDG (°C) | Cloud point $H_2O$ (°C) | HLB value |
|---|---|---|---|---|---|
| **Copolymer PF10** nonionic emulsifier for the emulsion polymerization | 100 | Liquid | 33.0-37.0 | 23.0-27.0 | Approx. 2 |
| **Copolymer PF20** nonionic emulsifier for the emulsion polymerization | 100 | Liquid | 55.0-58.0 | 34.0-36.0 | Approx. 4 |
| **Copolymer PF30** nonionic emulsifier for the emulsion polymerization | 100 | Liquid | | | Approx. 6 |
| **Copolymer PF40** nonionic emulsifier for the emulsion polymerization | 100 | Liquid | 66.0-70.0 | 58.0-62.0 | Approx. 8 |
| **Copolymer PF80** nonionic emulsifier for the emulsion polymerization | 100 | Waxy | Not applicable | 69.0-72.0 | Approx. 16 |
| **Copolymer 4084** nonionic emulsifier for the emulsion polymerization | 100 | Waxy | Not applicable | 68.0-70.0 | Approx. 12 |





# Propoxylation Products

## Polypropylene Glycols

Isfahan Copolymer Company is a science and technology based company and one of producers of polyalkylene glycols. Polypropylene glycols are clear, low to medium viscosity liquids with a slightly sweet odor. Polypropylene glycols are polymers of propylene oxide. They are clear, low to medium viscous liquids with low pour points and slightly sweet odor. Viscosity increases and water solubility decreases with increasing molecular weight. PPG 500, PPG 1000, PPG 2000, PPG 3000 and PPG 4000 are polypropylene glycol with an average molecular weight of 500, 1000, 2000 and 4000. They are 100% active, nearly colorless, somewhat viscous liquids. I.C.C polypropylene glycols are used in a variety of applications. They offer a wide range of hydrophile-lipophile balances and molecular weights, expanding formulating possibilities. When used as functional fluids, they offer excellent lubricity and solvency. To learn which specific I.C.C PPGs are appropriate for your application, choose from the options below.

### Market application:

**Fiber and Textile Processing**
**Metalworking**
**Paper Processing**
**Personal Care**
**Plastics**
**Water and Wastewater Treatment**

### Functional applications:

**Chemical Intermediates**
**Foam Control**
**Heat Transfer Fluids**
**Industrial Surfactants**
**Synthetic Lubricants**

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## Market applications:
### Fiber and Textile Processing
**Polypropylene Glycols-Fiber and Textile Processing**

**Overview** Polyglycols are key raw materials or used as additives for the production of spin finish lubricants for synthetic fibers and fiber finishing processes.

**Products** The following products can be used in fiber and textile processing applications. Although each product has unique properties based on molecular weight, they all share some common properties.

- PPG 1000
- PPG 2000

**Specific applications**

**Spin Finish Lubricants** Polypropylene glycols are preferred base stocks for spin finish lubricants, due to their excellent lubrication properties and non-varnish formation at high temperatures.

**Defoaming** Polypropylene glycols are very effective defoamers in textile processing applications, where elimination of excessive foam is critical.

## Market applications:
### Metalworking
**Polypropylene Glycols-Metalworking**

**Products** The following product can be used in metalworking applications:

- PPG 500

**Specific applications**

Specific uses of polyglycols in metalworking applications include:

- buffing and polishing compounds
- cutting and grinding fluids
- lubricants for metal stamping, rolling and forming
- aluminum rolling





## Market applications:
### Paper Processing
**Polypropylene Glycols-Paper Processing**

**Overview** In paper processing applications, polypropylene glycols are typically used as processing aids (defoaming and deinking agents). They are also used as additives, to achieve specific properties within the final paper product.

**Products** The following products can be used in paper processing applications. Although each product has unique properties based on molecular weight and the monomer used, they all share some common properties.

- PPG 1000
- PPG 2000

**Specific applications**

**Defoaming** Polypropylene glycols are very effective foam control agents in the paper making process.

## Market applications:
### Personal Care
**Polypropylene Glycols-Personal Care**

**Overview** Polypropylene glycols are widely used in personal care products. There are many typical properties of these products beneficial to personal care formulations:

- neutral and low in odor
- relatively low toxicity and low skin irritation potential
- do not become rancid and seldom react with other ingredients
- dissolve many cosmetic ingredients

**Products** The following polypropylene glycols can be used in personal care products. Although each product has unique properties based on molecular weight, they all share some common properties.

- PPG 500
- PPG 1000
- PPG 4000

**Functionality** The choice of polypropylene glycol brings different benefits to personal care formulations.

**Polypropylene glycols are Skin Conditioning Agents.**

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**Polypropylene Glycols-Fiber and Textile Processing**

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**Polypropylene glycols are Skin Conditioning Agents.**

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## Market applications:

### Plastics

**Polypropylene Glycols-Plastics**

**Overview** In plastic applications, polypropylene glycols (PPGs) are used as radiation stabilizers, and as additives to impart anti-static and scratch resistance properties.

**Products** The following polypropylene glycols can be used in plastics applications. Although each product has unique properties based on the molecular weights and the oxides used, they all share some common properties.

- PPG 500
- PPG 2000
- PPG 4000

**Specific applications**

**Radiation stabilizers** PPGs can be used for stabilizing polycarbonate against gamma radiation by acting as the "radical scavenger". If the radicals were to form in the polycarbonate, the resin turns a yellow to brown color.

**Anti-static and scratch resistance** Polyglycol 4000 has shown good scratch resistance in ABS and High Impact Polystyrene.

## Market applications:

### Water and Wastewater Treatment

**Polypropylene Glycols-Water and Wastewater Treatment**

**Overview** Polypropylene glycols are commonly used for foam control in water and wastewater treatment applications. They can be used either as neat products or as components of foam-control formulations.

**Products** The following polypropylene glycols can be used in water and wastewater treatment applications. Although each product has unique properties based on molecular weight, they all share some common properties.

- PPG 1000
- PPG 2000





## Functional applications:

### Chemical Intermediates

**Polypropylene Glycols-Chemical Intermediates**

**Overview** Polypropylene glycols are used as chemical intermediates in a wide range of industries. All I.C.C polypropylene glycols have one or more terminal hydroxy groups which can be further reacted to modify the properties of a final product. Polypropylene glycols (PPGs) have two secondary hydroxy groups. Polypropylene glycols are water soluble at low molecular weights (PPG 500), but most of the product line is considered sparingly soluble in water. They are liquids down to very low temperatures, such as -35 ºC. The secondary hydroxy group of polypropylene glycols is not as reactive as the primary hydroxy group on polyethylene glycols.

**Products** Any polypropylene glycol can be used as a chemical intermediate. The following products are the most commonly used. Although each polyglycol has unique properties based on molecular weight, they all share some common properties.

- PPG 500
- PPG 1000
- PPG 2000
- PPG 4000

**Specific Applications**

**UV Radiation Curable Coatings** Polypropylene glycols are reacted with either acrylic acid or methacrylic acid to produce reactive monomers for radiation curable coatings. Lower molecular products are typically used – PPG 500.

**Epoxy Resins** The terminal hydroxy groups of polypropylene glycols are epoxidized to produce resins used in coating applications where flexibility is a requirement.

## Functional applications:

### Foam Control

**Polypropylene Glycols-Foam Control**

**Overview** I.C.C polypropylene glycols offer effective foam control at low concentrations without adversely affecting the process or end product. These products are ideal for use when the process surface requires a post-treatment, because they are easily removed and leave no residue. I.C.C polypropylene glycols are widely used in a range of foam control applications, either as neat products, or a component of foam-control formulations. For those applications where a formulated product is required, they dissolve in a wide variety of organic liquids and aliphatic hydrocarbons. Typical applications include fermentation, food processing, paper processing, chemical processing, acid gas treatment, mining, oil drilling, and textile processing.

**Products** The following products can be used in foam control applications. Although each polyglycol has unique properties based on molecular weight, they all share some common properties.

- PPG 1000
- PPG 2000
- PPG 4000

**Polyglycol based antifoams,**

A light foam is generally not problematic in most applications however heavy foaming can often lead to various processing problems. These problems range from inaccurate readings from control and measuring equipment such as temperature, level and density controllers to poor mixing of reactants in chemical reaction vessels and products hanging in the foam, all too often leading to losses in production. Finally the presence of foaming can give a bad image of the way a process is operated in the eyes of a customer. The presence of foam in discharged effluent can cause complaints from local people and authorities even if the foam is harmless to people and the environment.

**I.C.C manufactures a wide range of Polyglycol based antifoams.**





## Functional applications:

### Heat Transfer Fluids

**Polypropylene Glycols-Heat Transfer Fluids**

**Overview** Polypropylene glycols (PPGs) feature low vapor pressure and high thermal conductivity, making them excellent heat transfer fluids. Some applications may require the use of additives such as antioxidants and corrosion inhibitors to maintain product quality at higher temperatures. Ventilation or exhaust systems may be needed to minimize vapor exposures.

**Products** The following products are appropriate for use in heat transfer fluids. Although each product has unique properties based on molecular weight and the monomer used, they all share some common properties.

- PPG 500

## Functional applications:

### Industrial Surfactants

**Polypropylene Glycols-Industrial Surfactants**

**Overview** The versatility of I.C.C polypropylene glycols enables them to be used in multitude of industrial applications. These include wetting agents in agricultural formulations, emulsifiers for water treatment, dispersing aids for formulated products and coupling agents for incompatible components.

**Products** The following products can be used in industrial surfactants. Although each polypropylene glycol has unique properties based on molecular weight, they all share some common properties.

- PPG 500
- PPG 1000

## Functional applications:

### Synthetic Lubricants

### Polypropylene Glycols-Synthetic Lubricants

**Overview** Polypropylene glycols (PPGs) are used as synthetic lubricants in many diverse applications where petroleum oil based products do not provide the desired performance. PPG characteristics that lead to their improved performance over petroleum based products are:

- lower pour point
- higher viscosity index
- lower tendency of varnish or coke formation
- increased solvency
- wider range of solubilities, including water solubility
- lower vapor pressure and ash content

PPGs are often formulated with additives to improve oxidation stability, extreme pressure loading, and corrosion inhibition.

**Products** The following products can be used as components or base stocks in synthetic lubricants. Although each product has unique properties based on molecular weight and the monomer used, they all share some common properties.

- PPG 500
- PPG 1000
- PPG 2000
- PPG 4000

### Specific Applications

PPGs display minimal tendency toward the formation of varnish and coke deposits at high temperatures and are used as carriers for solid lubricants, such as graphite and molybdenum disulfide. Formulated with thickeners, PPGs are used as greases in high temperature applications where mineral oil formulations would result in coke-type deposits.

PPGs are used in synthetic lubricants including:

- hydraulic fluid lubricant
- gear lubricant
- calendar lubricant
- textile processing
- LDPE hyper-compressor
- two-stroke engine

**I.C.C manufactures a wide range of polypropylene glycols.**



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**PPG 500**
Polypropylene glycols are polymers of propylene oxide. They are clear, viscous liquids with low pour points. Viscosity increases and water solubility decreases with increasing molecular weight. Polypropylene glycol. PPG 9.

**PPG 1000**
Polypropylene glycols are polymers of propylene oxide. They are clear, viscous liquids with low pour points. Viscosity increases and water solubility decreases with increasing molecular weight. Polypropylene glycol. PPG 17.

**PPG 2000**
Polypropylene glycols are polymers of propylene oxide. They are clear, viscous liquids with low pour points. Viscosity increases and water solubility decreases with increasing molecular weight. Polypropylene glycol. PPG 34.

**PPG 4000**
Polypropylene glycols are polymers of propylene oxide. They are clear, viscous liquids with low pour points. Viscosity increases and water solubility decreases with increasing molecular weight. Polypropylene glycol. PPG 68.

Typical physical properties

| | Appearance | Hydroxyl value, mg KOH/g | Density at 25°C, g/ml | Viscosity at 25°C, cP | Water,percent | Color APHA |
|---|---|---|---|---|---|---|
| PPG500 | Clear,viscous liquid | 250-276 | 1.007±0.02 | 60-100 | Max. 0.15 | Max. 25 |
| PPG1000 | Clear,viscous liquid | 106-118 | 1.006±0.02 | 150±10 | Max. 0.1 | Max. 25 |
| PPG2000 | Clear,viscous liquid | 54-62 | 1.002+0.02 | 260-300 | Max. 0.1 | Max. 25 |
| PPG4000 | Clear,viscous liquid | 26-29.5 | 1.004 | 790 | 0.08 | Max. 25 |

## Functional applications:

### Synthetic Lubricants

### Polypropylene Glycols-Synthetic Lubricants

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PPGs are used in synthetic lubricants including:

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- gear lubricant
- calendar lubricant
- textile processing
- LDPE hyper-compressor
- two-stroke engine

**I.C.C manufactures a wide range of polypropylene glycols.**





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**PPG 4000**
Polypropylene glycols are polymers of propylene oxide. They are clear, viscous liquids with low pour points. Viscosity increases and water solubility decreases with increasing molecular weight. Polypropylene glycol. PPG 68.

Typical physical properties

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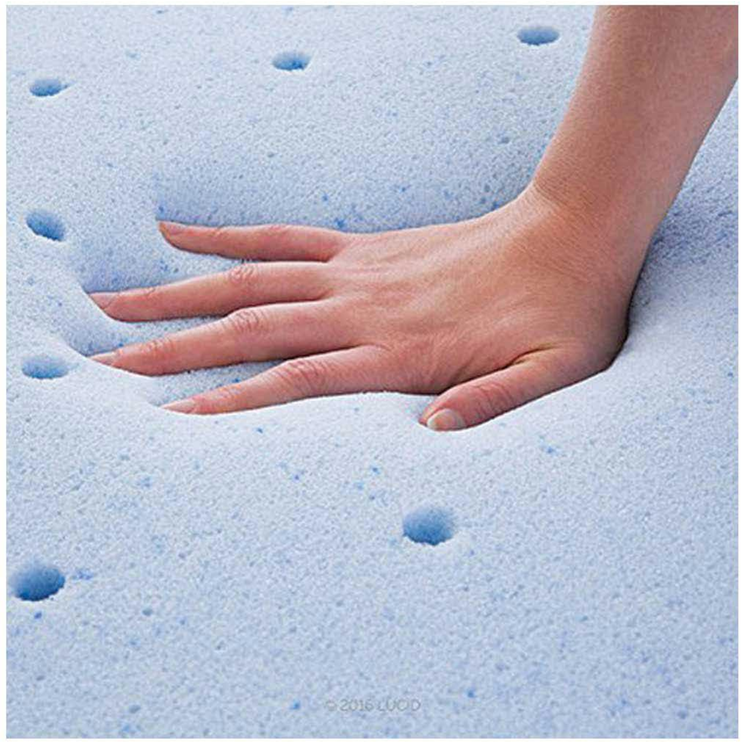
| PPG2000 | Clear,viscous liquid | 54-62 | 1.002+0.02 | 260-300 | Max. 0.1 | Max. 25 |
| PPG4000 | Clear,viscous liquid | 26-29.5 | 1.004 | 790 | 0.08 | Max. 25 |

# Polyols for Polyurethanes

The polyurethanes are a special group of heterochain polymers. Polyols used in polyurethane manufacture are divided from the structural point of view in two groups. In the first group there are the low molecular weight (MW) polyols, very well described in organic chemistry, having unitary and concrete MW. The second group of polyols for polyurethane contains low MW polymers (oligomers with a maximum MW of 10,000 daltons) with terminal hydroxyl groups (hydroxy telechelic oligomers), called oligo-polyols, characterized by an average molecular weight and having a molecular weight distribution (MWD) of homologous species.

- Oligo-Polyols for Elastic Polyurethanes
- Polyether Polyols for Rigid Polyurethane Foams



I.C.C

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