

Polyethylene Glycol 4000 (KEPEG 4000)

Industrial grade



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Technical Data Sheet



Polyethylene Glycol 4000 (KEPEG 4000)

Chemical Name:

Polyethylene Glycol 4000

Trade Name:

KEPEG 4000/Industrial grade

Introduction:

Polyethylene glycols (PEGs) are condensation polymers of ethylene oxide and water with the general formula $\text{H}(\text{OCH}_2\text{CH}_2)_n\text{OH}$. They are the most commercially important type of polyether. The low molecular weight compounds up to 700 are colorless, odorless viscous liquids with a freezing point from -10°C (diethylene glycol), while polymerized compounds with higher molecular weight than 1,000 are wax like solids with melting point up to 67°C for $n=180$. While PEGs with different molecular weights find use in different applications and have different physical properties (e.g. viscosity) due to chain length effects, their chemical properties are nearly identical.

The numbers that are often included in the names of PEGs indicate their average molecular weights, e.g. a PEG with $n=9$ would have an average molecular weight of approximately 400 and would be labeled PEG 400. Most PEGs include molecules with a distribution of molecular weights, i.e. they are polydisperse.

PEGs are soluble in water, methanol, benzene, dichloromethane and is insoluble in diethyl ether and hexane.

The typical characteristics of polyethylene glycols are:

- Highly compatible to various kinds of organic compounds:
PEG is compatible with most organic solvents, and has excellent water-solubility.
- High boiling point:
Effective as a non-volatile solvent because of its high boiling point.
- Easy control of the degree of condensation:
As the degree of condensation is properly governed, PEG has a broad spectrum of products ranging from rigid solids to oily liquids.



- **Controllable hygroscopic property:**
Every PEG type surfactant has excellent hygroscopic property, and this is controllable by adjusting the degree of condensation.
As the degree of condensation increases, the hygroscopic property is decreased.
- **Less toxicity:**
PEG is characterized by less toxicity and less skin irritation. There is no damage in case of contact with skin or lips.

General Applications:

Polyethylene glycols are non-toxic, odorless, neutral, lubricating, nonvolatile and nonirritating and are used in a variety of Industrial applications such as adhesives, ceramic, pulp and paper, metalworking, lubricants, agrochemicals, detergents and cleaners.

Ceramics:

Polyethylene Glycols are used in ceramic industry as carrier, binder and plasticizer. They are distributed easily in ceramic mixture to provide excellent lubrication and increase the strength. Due to Polyethylene Glycols are non-toxic, there is no problem during firing operations.

Adhesives:

Polyethylene Glycols are used as plasticizers to increase the lubrications and as humectants in adhesives to maintain wet-track strength. Water soluble Polyethylene Glycols are used in aqueous emulsions of PVA to produce water resistant adhesives.

Household Products:

Polyethylene Glycols could be used in polishes, soaps and detergents due to water solubility and inactivity toward other ingredients. The low-toxicity of them is a great advantage. They could also be used as viscosity modifiers in detergent formulations.

Agriculture:

Polyethylene Glycols are water soluble and good solubilizes for naturally derived insecticides. Actually they are carriers for plant hormones and herbicides. They are also used as an excipient in pesticide and insecticide formulations. Polyethylene Glycols are humectants and so they are used as anti-dusting agents in formulations.

**Metalworking:**

Polyethylene Glycols are rolling agents in metalworking. They are also used in the formulations of cutting fluids, grinding fluids and in polishing compounds. Soldering fluids which are formulated using Polyethylene Glycols spread easily on the surfaces also washed easily, so there is no residue after charring.

Lubricants:

Polyethylene Glycols are water soluble and low volatile. So they are used extensively in lubricants in metal working, plastic and rubber and textile industry.

Paints:

Polyethylene Glycols are used in the formulation of polyester resins and alkyd resins to improve the water dispersibility in these resins. Polyethylene Glycols are also used in the formulation of coatings which are water removable.

Inks:

Polyethylene Glycols are used as humectants, solvent. Lubricant, and dye carrier in ink formulations.

Rubber:

Polyethylene Glycols are used as lubricant and mold release agent in synthetic and natural rubbers. After usage they can be easily removed from the surfaces by water.

Paper:

Liquid Polyethylene Glycols are used as softeners in papers. They also used to impart flexibility and slip characters, and also preventing from swelling in humid weather. Solid Polyethylene Glycols are added as ingredients in paper coating compositions to prepare gloss and smoothness in paper. Polyethylene Glycols are also used as stabilizers and plasticizers in paper industry.

Textile:

Polyethylene Glycols are lubricants, antistatic agent and softener in textiles. Most of the time esters of Polyethylene Glycols are used as finishing aids and processing aids in weaving, spinning and knitting of fibers and yards

**Wood Treatments:**

Polyethylene Glycols are used for dimensional stabilization of wood without shrinking, cracking and drying. Soaking of woods in Polyethylene Glycol solutions can facilitate cutting and wood working operations.

Packaging:

Packaging Type	Net weight	No. of bags per pallet	No. of pallets in a 20 FLC	Shelf life	IMCO Class
PE bags	25 Kgs	40	20	2 yrs	Non-Imco

Notice:

We can produce other types of industrial grades of polyethylene Glycols (PEGs), moreover customized packing will be available according to customer's request.

Safety, Handling & Storage:

Full information on the safety, handling and storage of pharmaceutical PEGs is available in the corresponding Material Safety Data Sheet ([MSDS](#)).



Polyethylene Glycol 4000

Trade Name: **KEPEG 4000/Industrial grade**

Specification

No.	Test	Standard	Reference
1	Completeness and Color of Solution, 5g/50ml of Water	Slightly Hazy	USP42-NF37
2	Viscosity at 98.9°C, cSt	110-158	USP42-NF37
3	pH, 5% Solution	4.5-7.5	USP42-NF37
4	Hydroxyl Value, mg KOH/g	26.5-29.5	ASTM D4252
5	Assay (Average Molecular Weight), g/mol	3600-4400	USP42-NF37
6	Water, percent	Max. 2.0	ASTM E203

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