Recommended Cleaning Applications for DOWANOL P Series Glycol Ethers and PROGLYDE DMM Glycol Diethers

DOWANOL PnB, PnB/PM, PnP
- window cleaners
- window and multi-purpose cleaners
- kitchen cleaners
- all-purpose hard-surface cleaners

DOWANOL DPnB/DPM
- all-purpose hard-surface cleaners

DOWANOL DPnP
- concentrates:
  - kitchen cleaners
  - window cleaners
  - window/multi-purpose cleaners

DOWANOL DPnB/DPM, DPnP
- all-purpose hard-surface cleaners

The high efficiency of most Dow starting formulations means they can be diluted even further if required, thereby reducing costs.

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**P-Series Glycol Ethers**

Window Cleaners

Window cleaners consist primarily of water and solvent, the latter at a concentration which is typically in the range of 5% to 12%. Window cleaning products are usually sprays and are designed to be have minimal or minimal wet time on windows. Streaks can be caused by issues of dirt on the window or residues of non-volatile chemicals used in the formulation. A small quantity of surfactant must be added in order to wet the surface to be cleaned but since these surfactants are non-volatile they may cause smearing. The choice of surfactant is therefore important. Anionic surfactants are recommended because they have a high affinity for water. In contrast, cationic surfactants may be strongly absorbed by glass. Some non-ionic surfactants may absorb to the glass surface, especially those with low hydrophilic-lipophilic balance (HLB) values. A HLB value is a measure of a chemical’s tendency to partition between aqueous and organic phases. Another useful attribute of many anionic surfactants is their ability to increase the water solubility of hydrophobic ingredients, such as perfumes and some hydrophobic glycol ethers. Surfactants tend to be used in an acid form. To achieve the recommended alkaline pH of around 10, it is therefore necessary to add neutralizing or buffering agents, such as caustic soda or ethanolamines.

Minor additives used in window-cleaner formulations include dyes, chelating agents (when hard water is a concern) and electrolyte salts.

Use of DOWANOL P series glycol ethers in window cleaning formulations allows savings to be made by reducing the quantity of solvent needed without compromising cleaning performance. Often, solvent concentrations can be reduced significantly from typical levels of 5% to 12% down to 4% to 6%. The low surface tension of DOWANOL P series increases surface wetting, which reduces the cleaning task time.

**Window and Multi-purpose Cleaners**

Cleaners for Window Cleaners (spray):

- Performance Effectiveness for Window Cleaners (spray)

Cleaners for Window and Multi-purpose Cleaners (spray):

- Performance Effectiveness for Window and Multi-purpose Cleaners (spray)

Concentrated Window, or Window and Multi-purpose Cleaners

Concentrated products are usually supplied as refill packs, as they offer savings in the amount of water transported and in the amount of plastic packaging required.

DOWANOL DPnP is the solvent of choice for these formulations, thanks to its low odour and complete water solubility. In addition, its low surface tension gives excellent degreasing properties. DOWANOL DPnP can be used to replace DOWANOL PnP/DPM blends.

Use of DOWANOL DPnP may enable a formulation to be concentrated from four up to six times without stability problems.

The high water solubility of DOWANOL DPnP also makes it possible to use high HLB non-ionic surfactants along with anionic surfactants in these products.

- Propylene glycol n-propyl ether
- Propylene glycol n-butyl ether
- Propylene glycol monomethyl ether
- Dipropylene glycol dimethyl ether

![Chart showing performance effectiveness for window cleaners and multi-purpose cleaners](image-url)
Starting Formulations for Hard-surface Liquid Cleaners

Introduction

This brochure provides information on starting formulations developed and tested by Dow using DOWANOL® P series glycol ethers. The performance data and guidelines are for a variety of hard-surface cleaning products. Described in this brochure are:

- Window cleaners
- Kitchen and multi-purpose cleaners
- Kitchen cleaners
- All-purpose hard-surface cleaners
- Concentrated cleaners

The performance data apply to specific formulations prepared by Dow whose compositions fall within the range of the examples given or are very close to them. The cleaning test used by Dow is a standard one employed by the detergent industry. The formulations have been tested with leading brand-name cleaning products. A difference of 3% between test results is considered significant: already at this level, the difference in the performance of products becomes noticeable.

Note that the data relate to starting formulations. When formulating finished products, it is advisable to aim for a cloud point above 45°C. This is the temperature at which the formulation becomes turbid. There is a degree of freedom as to the range and percentage of chemicals which can be added to these formulations. However, even minor ingredients such as perfumes or dyes can have a major impact on the stability of a finished product.

Specific pH values are recommended in most cases. These values can be achieved by adding citric acid or caustic soda.

For more information on DOWANOL® P series glycol ethers, contact:

Dow Information Centre
International Business Reply Service
P.O. Box 13322
1180 AC Amsterdam Zuidoost
The Netherlands
Tel.: +31 20 98 16 268
Fax: +31 20 98 16 418

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Performance Effectiveness for Kitchen Cleaners (spray):

Performance Effectiveness for All-Purpose H/S Cleaners:

Performance Effectiveness for Window Cleaners (spray):

Dilution: 1.5 g cleaner/100 g water

Kitchen Cleaners

Kitchen cleaners are mostly non-dilutable sprays. They usually contain an active cleaning agent. They are sold under various brands and are intended for cleaning kitchens. A highly active alkali is normally preferred, and this is achieved by adding sodium or potassium carbonate.

Kitchen cleaners are concentrated formulations normally include hydrophobic solvents at concentrations of 10% or more, and anionic and nonionic surfactants. A highly active alkali is normally preferred, and this is achieved by adding sodium or potassium carbonate.

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