



Lower Cost and Increase Performance of your Cleaning Formulations with Low Odor Glycol Ethers

Offering

A unique line of glycol ether solvents offering performance and cost benefits to cleaning formulators

Product Line

| Trade Name | Chemical Name |
|---------------------------|-------------------------------------|
| DOWANOL* PnB | Propylene Glycol n-Butyl Ether |
| DOWANOL DPnB | Dipropylene Glycol n-Butyl Ether |
| DOWANOL TPnB | Tripropylene Glycol n-Butyl Ether |
| DOWANOL PnP | Propylene Glycol n-Propyl Ether |
| DOWANOL DPnP | Dipropylene Glycol n-Propyl Ether |
| Hexyl CARBITOL™ Solvent | Diethylene Glycol Monoethyl Ether |
| Hexyl CELLOSOLVE™ Solvent | Ethylene Glycol Monoethyl Ether |
| Propyl CELLOSOLVE Solvent | Ethylene Glycol Mono-n-Propyl Ether |

Benefits

Reduced formulation costs

Dow's low odor glycol ethers reduce the amount of high-priced fragrances required to mask solvent odor. They also allow for less coupling agent and result in increased fragrance versatility.

Improved cleaning performance

Smaller amounts of fragrance in formulations reduce the amount of filming and streaking.

Use in Cleaning Applications

- Fragrance, not cleaning ability, is *the* deciding factor in product selection, according to consumer tests.
- Consumers can easily detect and react to fragrance.
- High fragrance = high cost.
- High fragrance = filming and streaking.
- Fragrance level is often dictated by the need to cover solvent odor

Table 1 • Negative effect of fragrance on filming and streaking

- The cleaning and streaking performance of a commercial cleaner (Reference) is compared to the same formulation with varying amounts of three types of fragrance:

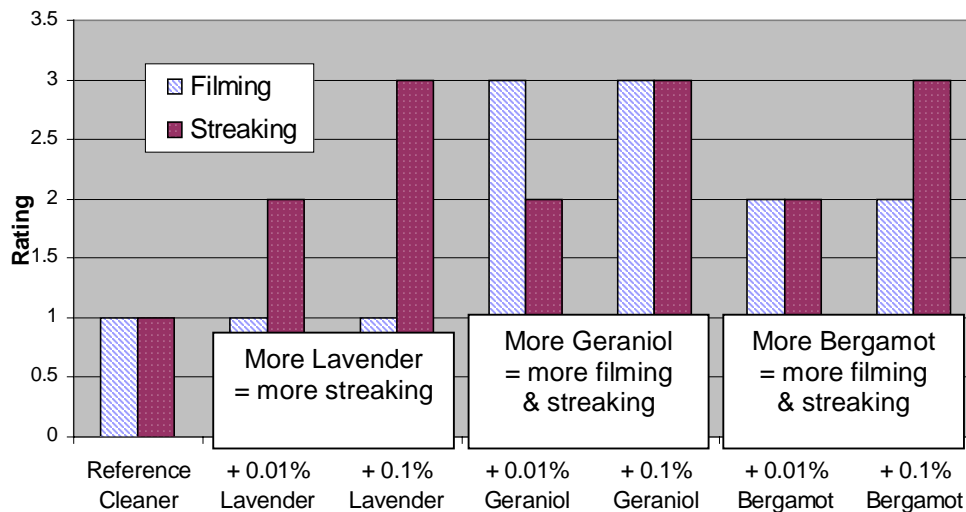


Table 2 • Significantly less fragrance required to mask solvent odor when comparing DOWANOL DPnB with other commercial products (Products 1 and 2)

- Use of DOWANOL Low Odor glycol ethers results in a reduction in fragrance requirement ranging from 30-85% by weight.
- For equal concentrations of glycol ether, Low Odor DPnB requires a lower amount of fragrance to mask odor compared to commercial DPnB products

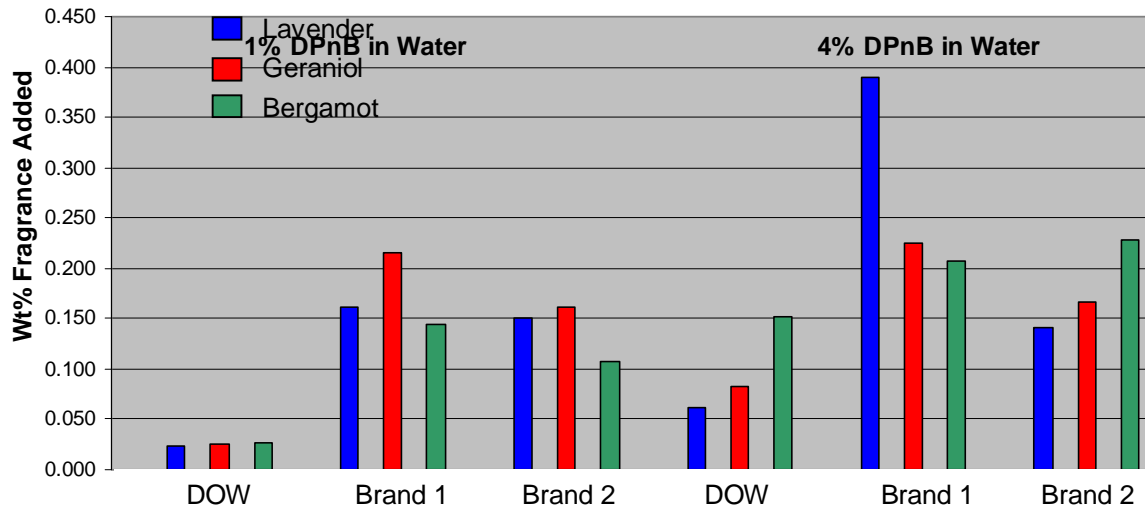


Table 3 • Significantly less fragrance required to mask solvent odor when comparing DOWANOL PnB with other products (Products 1 and 2)

- For equal concentrations of glycol ether, Low Odor PnB requires a lower amount of fragrance to mask odor compared to commercial PnB products

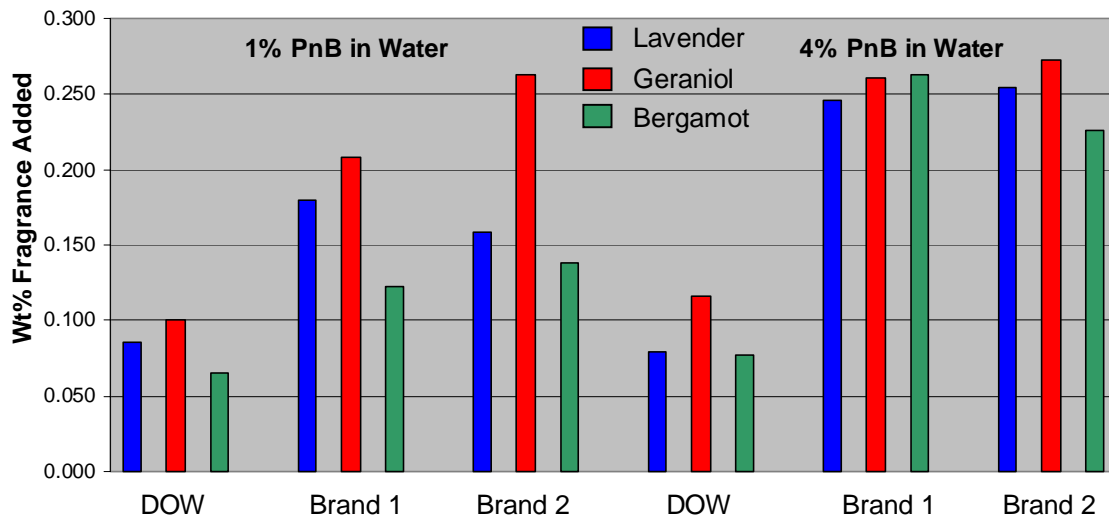


Table 4 • Comparison of Odor Characteristics

- Tested solvents were slowly added to 50mL of water until an odor could be detected from the solution.
- Higher Odor Detection Threshold Value = Lower Odor
- Major decrease in odor comparing DOWANOL DPnB to other brands
- Particularly suited for odor sensitive applications, DOWANOL DPnB is nearly odorless
- Significant decrease in odor comparing DOWANOL PnB and Hexyl CELLSOLVE Solvent to other brands as indicated by the odor detection threshold

| | <u>ODOR DETECTION THRESHOLD, DPnB wt. added in 50 ml WATER</u> | <u>REDUCED ALDEHYDES/ALCOHOL</u> | <u>ODOR CHARACTERISTICS</u> |
|------------------------------------|--|--------------------------------------|-----------------------------|
| DOWANOL Low Odor DPnB | 0.39 | YES | NEARLY ODORLESS |
| BRAND 1 | 0.05 | NO | MODERATE ETHEREAL + PnB |
| BRAND 2 | 0.04 | NO | MODERATE ETHEREAL + PnB |
| BRAND 3 | 0.03 | NO | MODERATE ETHEREAL + PnB |
| | <u>ODOR DETECTION THRESHOLD, PnB wt. added in 50 ml WATER</u> | <u>REDUCED ALDEHYDES/ALCOHOL</u> | <u>ODOR CHARACTERISTICS</u> |
| DOWANOL Low Odor PnB | 0.18 | YES | ETHEREAL |
| BRAND 1 | 0.04 | NO | ETHEREAL |
| BRAND 2 | 0.07 | NO | ETHEREAL |
| BRAND 3 | 0.08 | NO | ETHEREAL + ALDEHYDE |
| | <u>ODOR DETECTION THRESHOLD, HxCs wt. added in 50 ml WATER</u> | <u>REDUCED ALDEHYDES/ALCOHOL</u> | <u>ODOR CHARACTERISTICS</u> |
| Hexyl CELLOSOLVE - Low Odor | 0.17 | YES | ETHEREAL |
| BRAND 1 | 0.06 | NO | ETHEREAL |
| BRAND 2 | 0.03 | NO | ETHEREAL + ALDEHYDE |

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