



DOW

®

Dow Hard Surface Care Kit

Ingredients for enhancing cleaning performance

Seek **Together**™

General Business

Home Care

Presenters

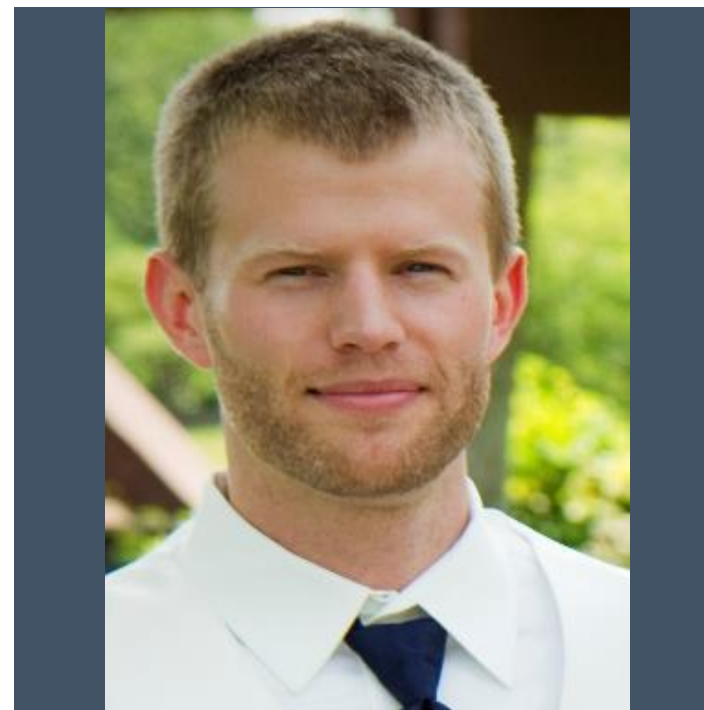
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R&D/TS&D Technologist





Agenda

- **Market Trends**
- High Throughput Research Capabilities
- Overview of Test Methods & Data Analysis
- Introduction of Dow Hard Surface Care Kit
- Highlighting Dow Ingredients in Hard Surface Care Kit



Key Unmet Needs in HSC & Wipes

MARKET TREND	UNMET NEEDS
Cleanliness and Convenience	<ul style="list-style-type: none">• Grease removal• Easy next Clean• Food soil dispersion polymers• Multi-functional polymers for surfactant reduction
Aesthetic Appearance	<ul style="list-style-type: none">• Shine• No streaks• Surface protection
Hygiene	<ul style="list-style-type: none">• Anti-dust, anti-stain• Anti-bacteria• Odor control
Sustainable Offerings	<ul style="list-style-type: none">• Concentrated formulation• Safe and reliable ingredients• Biodegradable• Bio-based Ingredients• Eco-labeling
Format Innovation	<ul style="list-style-type: none">• Cleaning robot/machines• Wipes• Unit dose



Hard Surface Care Market

2021

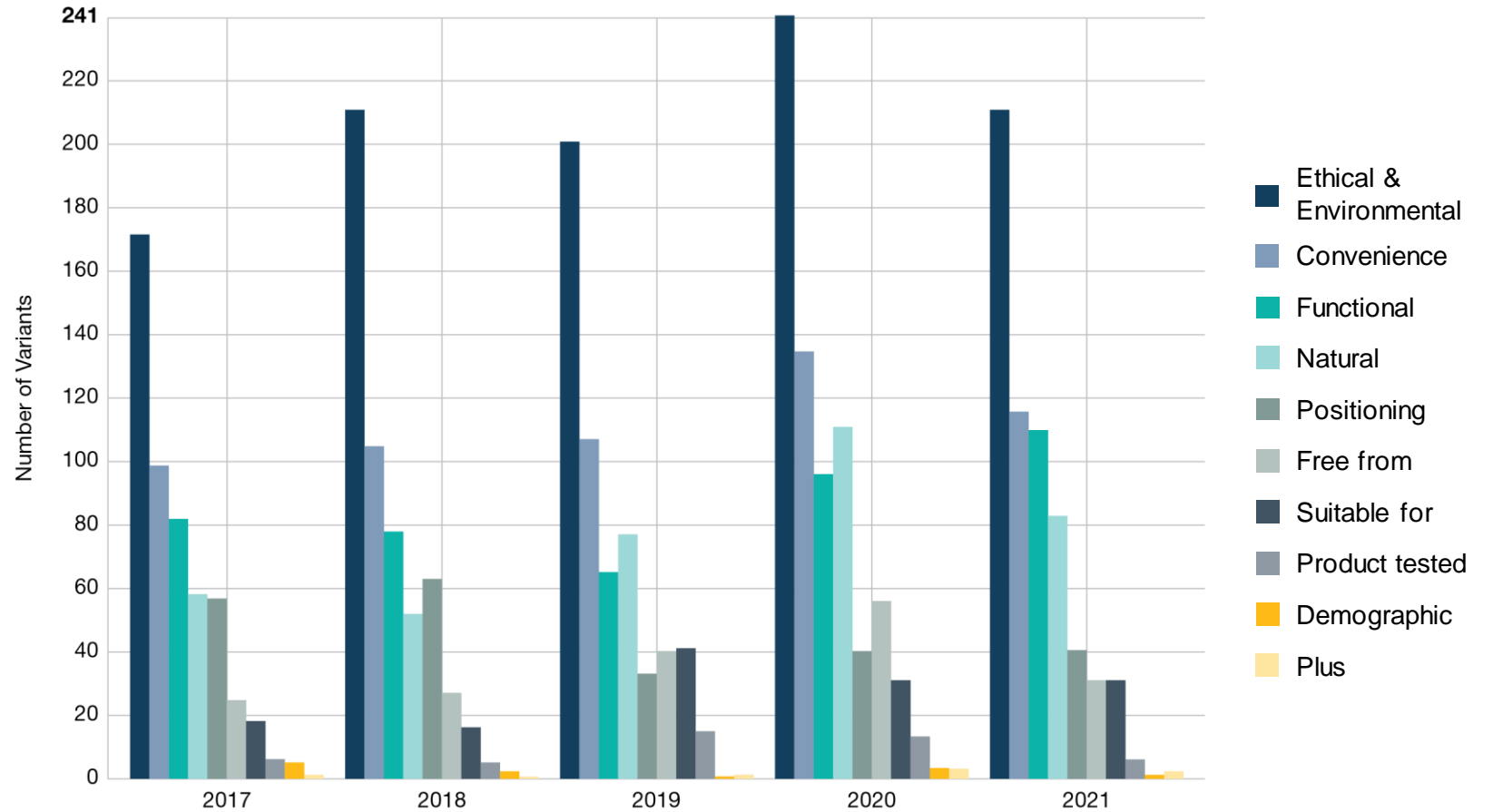
Hard Surface Care Market:

\$7.78B Retail Value
2.9% CAGR 2019-2022

Hard Surface Care Trends:

- High performing products
- Refill and monodose innovations
- Natural and sustainable cleaning products with ingredient transparency
- Convenience and ease of use

Hard Surface Care Product Launches by Claim Category



Source: Mintel



Home Care Ingredients that Address Consumer Trends

Acrylates

- ACUSOL™ Dispersants, Rheology Modifiers, Opacifiers

Surfactants

- ECOSURF™, TERGITOL™, DOWFAX™, TRITON™ Surfactants

Solvents

- PO/PG, DOWANOL™, CARBITOL™, CELLOSOLVE™ Solvent families

Glycols

- PEGs, CARBOWAX™, SENTRY™ Water Soluble Polymers

Polyethylene Oxide

- SUPRACARE™ Polymers

High
Throughput

Digitalization

Global
Reach

Inclusive
Workforce

Material
Science

Modified Cellulose

- SUPRACARE™ Polymers
- CELLOSIZE™ Hydroxyethyl Celluloses

Silicone Technology

- DOWSIL™ and XIAMETER™ Foam Control Agents
- Silicones for Fabric & Surface Care

Amines

- MEA, DEA, TEA, MIPA, DIPA

Chelants

- VERSENE™, VERSENEX™, VERSENOL™ Chelating Agents



Moving beyond clean



Hard Surface Care Kit

DOW

Moving beyond clean

**Grease Fighter
kitchen cleaner** →
High performing
degreaser for removing
baked on grease

**Streak Soldier glass
and window cleaner** →
Removes residue leaving
mirrors shiny and sparkling

**Bathroom Blaster
bathroom cleaner** →
Excellent for removing lime
scale and soap scum

**Multipurpose Warrior
concentrate all purpose
cleaner** → High performing
dilutable cleaner with great
grease cutting performance



High Throughput Research Capabilities - Hard Surface Cleaning

Formulation Development

- Ingredient selection & Modeling
- Coupling Efficiency
- Phase compatibility
- Heat-age stability

Performance Testing

- Foam profiles
- Soil solubilization
- Substrate cleaning (SCiD)

Analysis

- Image Analysis: Diam HTR / Image J
- Data Analysis: JMP/Excel

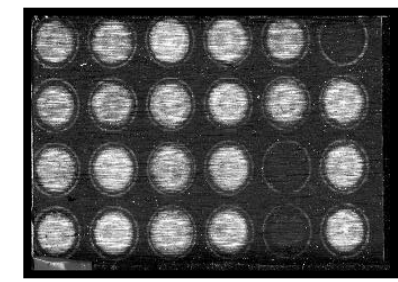
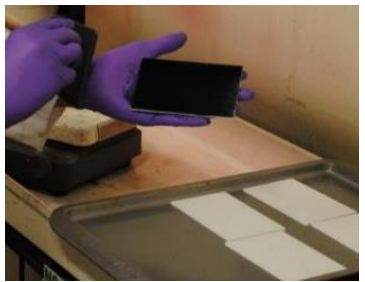
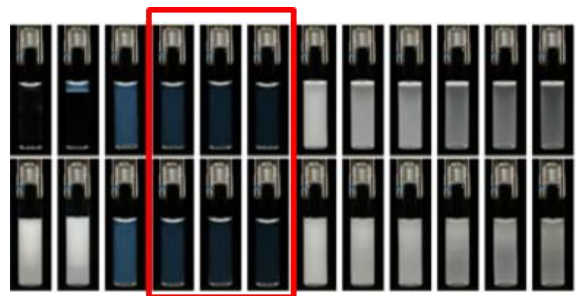
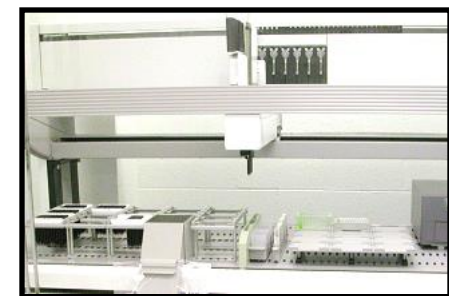
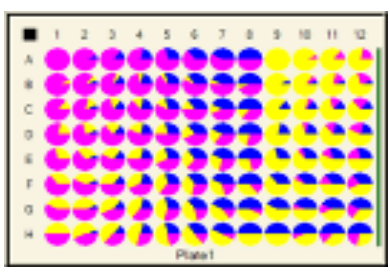


Dow is a leading innovator in *High Throughput Research* focusing on new material and application development

Solvent Modeling

Use of Solvent Database and Predictive Toolset

SubstanceName	REDValue	ColEupParam	ColPolarParam	ColBifoldingPa	Col
ALCOHOL	1.2032E-05	15.3	18	6.1	6
BUTYL CELLULOSE	6.7394E-05	26	7.8	23.2	6
DIETHYL ETHER	9.9072E-05	33.3	2.4	2.2	2
DIETHYL FORMAMIDE	1.2037E-05	17.4	13.7	11.3	4
DIETHYL SULFIDE	1.3047E-05	18.4	15.4	13.2	6
METHYL ALCOHOL	1.0445E-05	15.2	12.3	23.2	6
METHYL ETHYL KETO	6.8034E-06	9	9	5.1	3
METHYL ISOBUTYL ME...	6.8034E-06	15.3	4.1	4.1	4
METHYL ACETATE	8.8037E-06	15.8	3.7	6.3	3
N-HEPTANE	1.7042E-05	15.3	6	6	2
N-PROPYL ALCOHOL	1.1267E-05	16	6.8	17.4	3



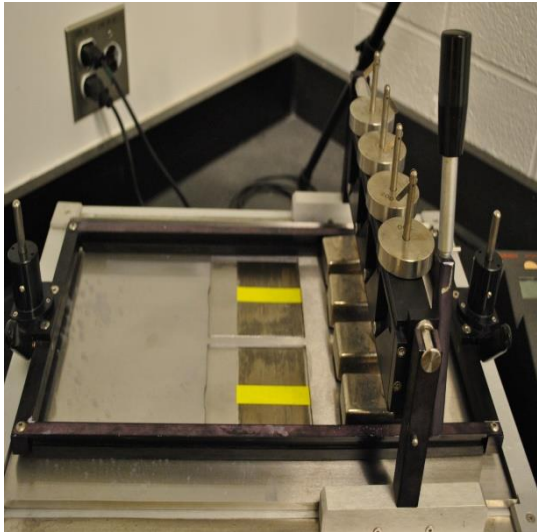
Common Soil Types – Hard Surface Cleaning

Soils are Not a Pure Composition

Kitchen	Bathroom	Window	Carpet
Grease	Ca ⁺⁺ , Mg ⁺⁺	Sebum	Particulates
Protein	Soap Scum	Particulates	Protein
Carbohydrates	Particulates	Grease	Carbohydrates
Particulates	Rust		Food Stains
Bacteria	Bacteria		Pets



Filming, Streaking & Cleaning Index Test Methods



Kitchen Grease

HCPA DCC-17A



Baked On Kitchen Grease

HCPA DCC-17B



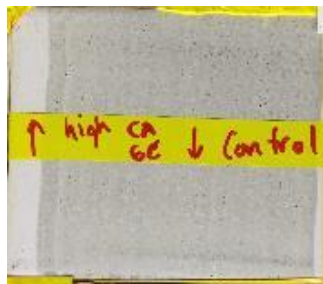
Lime Scale Bathroom

HCPA DCC-16



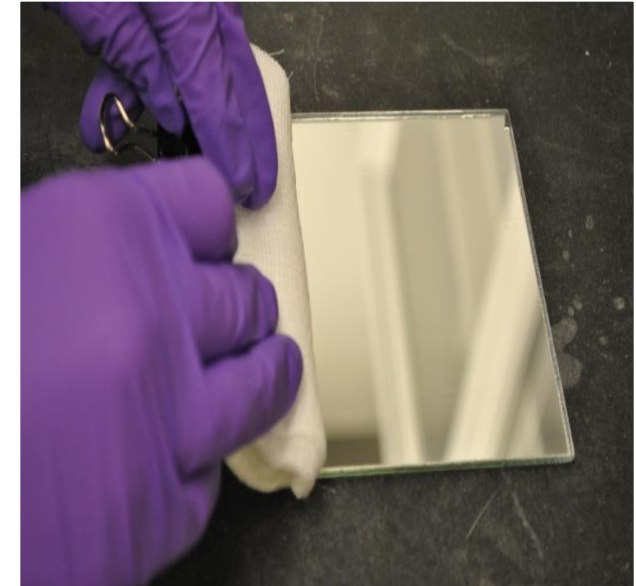
Soap Scum Bathroom

ASTM D5343-06



Filming & Streaking on Glass

HCPA DCC-09 /DCC-09A



*HCPA - Household & Commercial Products Association





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- **Introduction of Dow Hard Surface Care Kit**
- Highlighting Dow Ingredients in Hard Surface Care Kit



Dow Hard Surface Care Kit includes:

<ul style="list-style-type: none">• Grease Fighter Kitchen cleaner	High performing degreaser for removing baked on grease.
<ul style="list-style-type: none">• Bathroom Blaster Bathroom cleaner	Excellent for removing soap scum and very good lime soap removal.
<ul style="list-style-type: none">• Streak Soldier Glass & window cleaner	Excellent for removing residue. Leaves mirrors & reflective surfaces shiny & sparkling!
<ul style="list-style-type: none">• Multipurpose Warrior Concentrated dilutable all purpose cleaner	High performing dilutable cleaner with great grease cutting performance!



Grease Fighter Kitchen Cleaner

High performing degreaser for removing baked on grease

Featured Products	Attributes
DOWANOL™ PPh Solvent	Coalescing, Powerful solvency
ECOSURF™ EH-14 (90%) Surfactant	Exceptional wetting, Excellent oily soil removal
Monoisopropanolamine (MIPA)	Neutralizer, Improved oil solubility
Diisopropanolamine (DIPA)	Neutralizer, Improved cleaning
ACUSOL™ PRO Polymer	Grease removal, Easy next time cleaning

Benefits:

- Excellent baked-on grease removal (DCC 17-A Soil)
- Reduce filming and streaking



Grease Fighter Kitchen Cleaner

High performing degreaser for removing baked on grease

Grease Fighter Kitchen Cleaner		
Ingredient / Supplier	Description	Wt%
Deionized Water	Water	92.90%
DOWANOL™ PPh Glycol Ether / Dow	Solvent	1.00%
ECOSURF™ EH-14 Surfactant (90%) / Dow	Surfactant	2.00%
Monoisopropanolamine (MIPA) / Dow	Neutralizer	0.50%
Diisopropanolamine (DIPA) / Dow	Neutralizer	1.50%
ACUSOL™ PRO Polymer (25%) / Dow	Polymer	2.00%
Crisp Orchards UAJ10200/00 / Givaudan	Fragrance	0.10%
TOTAL		100%
Appearance	Clear liquid	
pH	~11	
Room Temperature	Stable	
50°C for 10 Days	Pass	
F/T (3 Cycles)	Pass	



Processing instructions: Add ingredients in the order listed, mixing well between additions. Note: For ease of handling it is recommended to prepare a 50% solution of the DIPA in water before adding to the formulation.

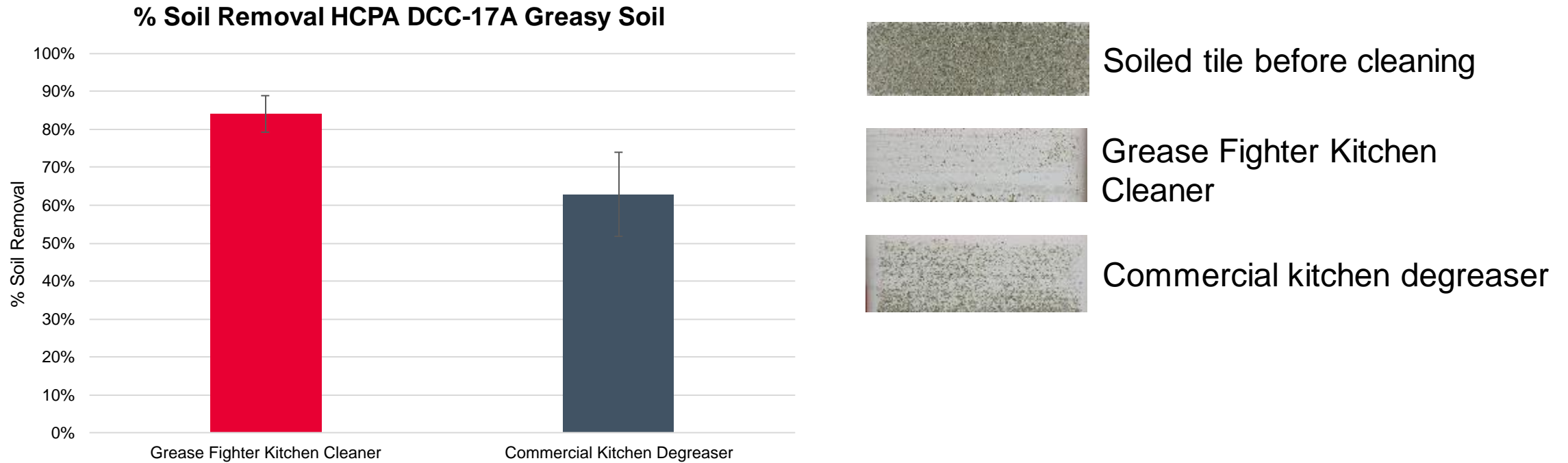
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Grease Fighter Kitchen Cleaner

Grease cleaning performance

Grease Fighter Kitchen Cleaner demonstrates excellent grease cutting performance



Cleaning Test Method: HCPA DCC-17A Kitchen grease

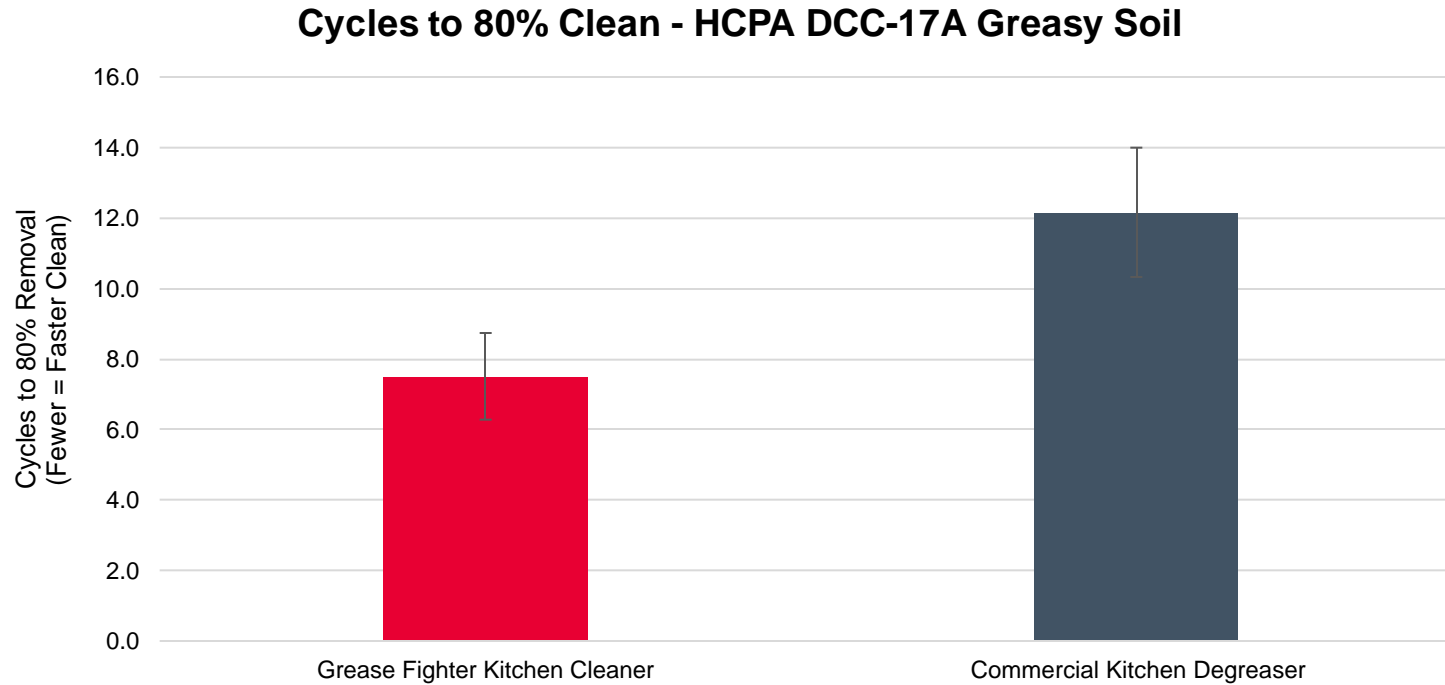
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Grease Fighter Kitchen Cleaner

Speed of greasy soil removal

Grease Fighter Kitchen Cleaner formulation yields faster soil removal



Cleaning Test Method: HCPA DCC-17A Kitchen grease

NOTE: The graphic representations are presented here for illustrative purposes only and should not be construed as product specifications. Users should confirm results by their own tests.



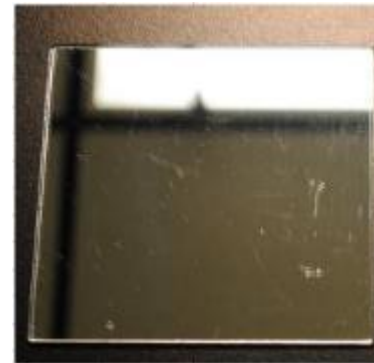
Grease Fighter Kitchen Cleaner

Filming and streaking performance

Grease Fighter Kitchen Cleaner provides outstanding Filming and Streaking performance

Product	Filming	Streaking
Grease Fighter Kitchen Cleaner	1	1
Commercial Kitchen Degreaser	6	4

Grease Fighter Kitchen Cleaner



Commercial Kitchen Degreaser



Rating scale:

0 = No visible filming or No visible streaking (*excellent performance*)

10 = High filming or high streaking (*poor performance*)

Test Method: HCPA DCC-09A Filming & Streaking Performance. **NOTE:** Typical values, not to be construed as specifications. Users should confirm results by their own tests.



Bathroom Blaster Bathroom Cleaner

Excellent for removing both lime scale & soap scum

Featured Products	Attributes
DOWANOL™ TPnB Solvent	Excellent solvency, Green circle
ECOSURF™ EH-14 (90%) Surfactant	Exceptional wetting, Good cleaning

Benefits:

- Great Lime Soap Removal (HCPA DCC-16)
- Outstanding Soap Scum Removal (ASTM D5343-06)
- Excellent Safety Profile: All Dow ingredients are EPA Safer Choice compliant



Bathroom Blaster Bathroom Cleaner

Excellent for removing both lime scale & soap scum

Bathroom Blaster Bathroom Cleaner		
Ingredient / Supplier	Description	Wt%
Deionized Water	Water	93.75%
DOWANOL™ TPnB Glycol Ether / Dow	Solvent	2.00%
ECOSURF™ EH-14 Surfactant (90%) / Dow	Surfactant	0.55%
Sodium Lauryl Sulfate / Sigma-Aldrich	Surfactant	0.60%
Citric acid (anhydrous) / Fisher Scientific	Neutralizer	3.00%
Fresh Springs UAJ18199/00 / Givaudan	Fragrance	0.10%
TOTAL		100%
Appearance		Clear, colorless liquid
pH		~2
Room Temperature		Stable
50°C for 10 Days		Pass
F/T (3 Cycles)		Pass



Processing instructions: Add ingredients in the order listed, mixing well between additions.

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Bathroom Blaster Bathroom Cleaner

Removal of soap scum

Bathroom Blaster Bathroom Cleaner provides excellent soap scum removal compared to leading commercial product controls.



Cleaning Test Method: ASTM D5343-06 Soap scum removal

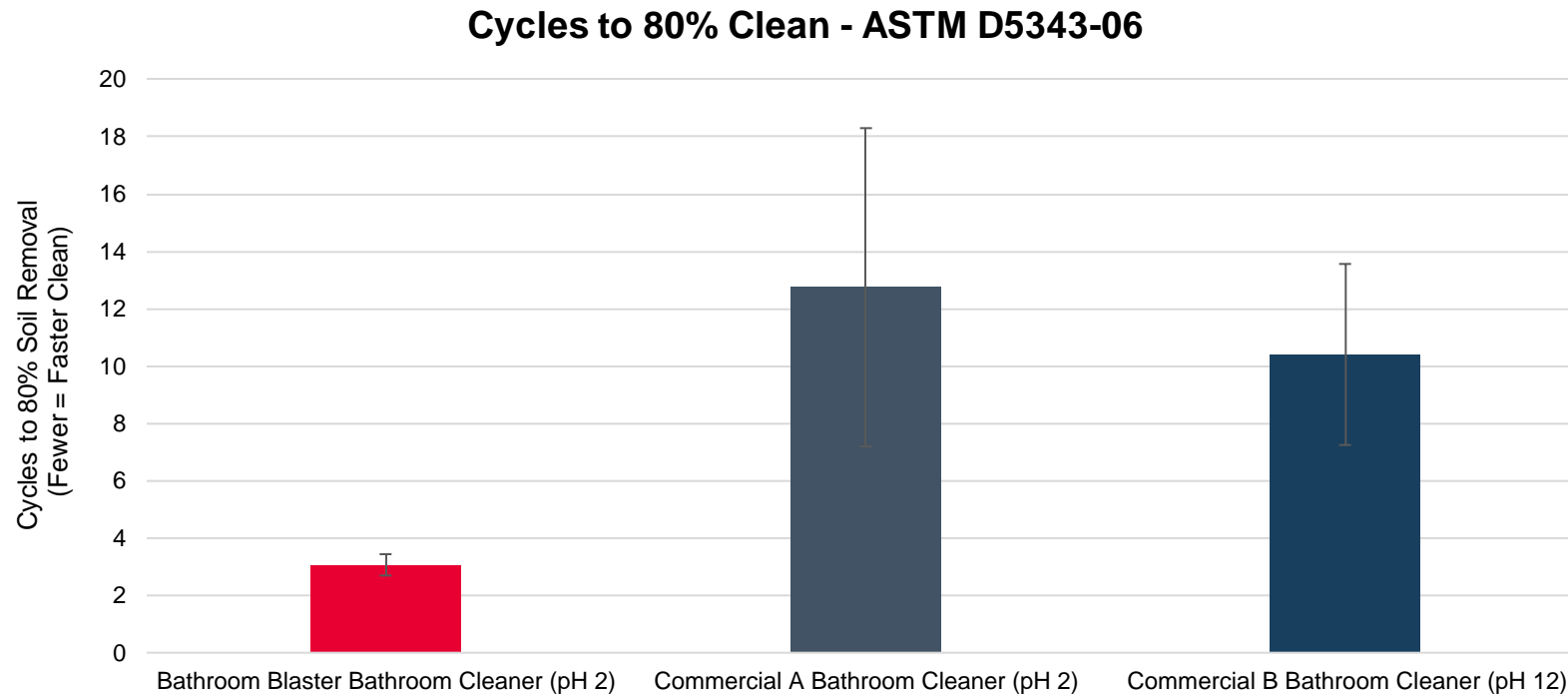
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Bathroom Blaster Bathroom Cleaner

Speed of soap scum removal

Bathroom Blaster Bathroom Cleaner offers faster removal of soap scum



Cleaning Test Method: ASTM D5343-06 Soap Scum Removal

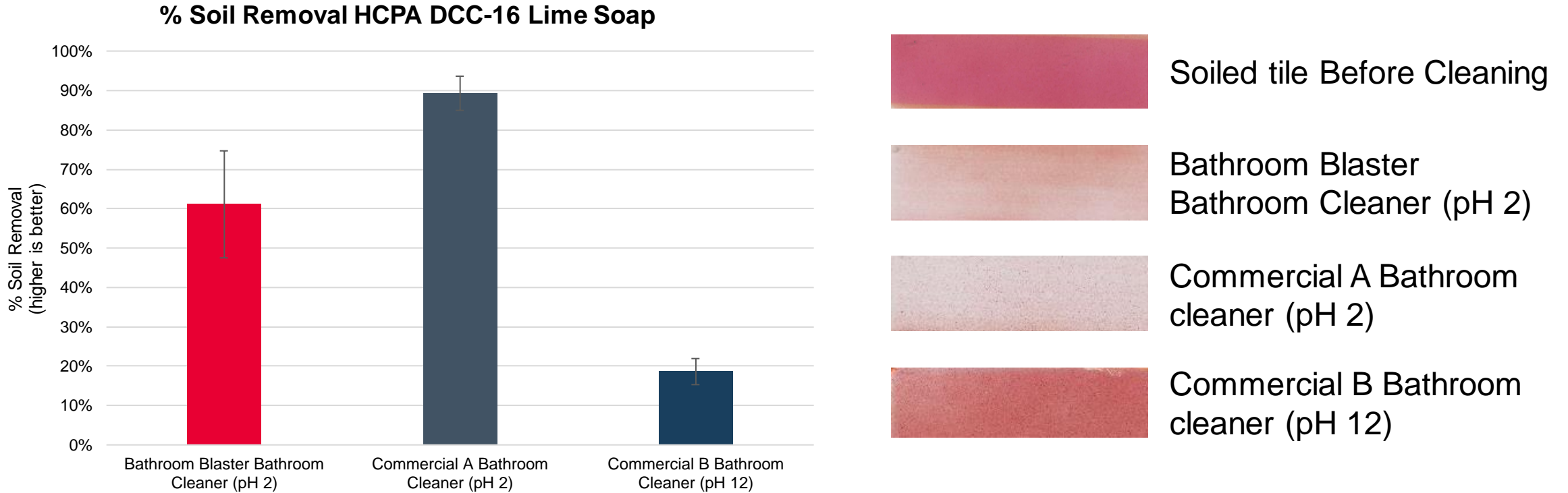
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Bathroom Blaster Bathroom Cleaner

Lime soap removal

Bathroom Blaster Bathroom Cleaner offers good lime soap removal



Cleaning Test Method: HCPA DCC-16 Lime Soap Removal

NOTE: The graphic representations are presented here for illustrative purposes only and should not be construed as product specifications. Users should confirm results by their own tests.



Streak Soldier Glass & Window Cleaner

Excellent for removing indoor or outdoor residues. Leaves mirrors & reflective surfaces shiny & sparkling!

Featured Products	Attributes
ACUSOL™ Millennium ER Rheology Modifier	Thickening/Vertical cling
TRITON™ CG-50 Surfactant	Low Streaking/Filming
Hexyl CELLOSOLVE™ Solvent	Cleaning/Streak-free
DOWANOL™ PnB Solvent	Cleaning/Streak-free

Benefits:

- Shine (low filming/streaking)
- Reduce bounce-back and increase drip time



Streak Soldier Glass & Window Cleaner

Excellent for removing indoor or outdoor residues. Leaves mirrors & reflective surfaces shiny & sparkling!

Streak Soldier Glass & Window Cleaner		
Ingredient / Supplier	Description	Wt%
Deionized Water	Water	97.88%
ACUSOL™ MILLENNIUM ER Rheology Modifier (31%) / Dow	Thickening agent	0.50%
Hexyl CELLOSOLVE™ Solvent / Dow	Solvent	0.50%
DOWANOL™ PnB Glycol Ether / Dow	Solvent	0.50%
Unicert K7015J Dye (2% solution) / Sensient	Dye	0.02%
TRITON™ CG-50 Surfactant (50%) / Dow	Surfactant	0.10%
Monoisopropanolamine (MIPA) / Dow	Neutralizer	0.50%
TOTAL		100%
Appearance	Clear, blue liquid	
pH	10.5-11	
Room Temperature	Stable	
50°C for 10 Days	Pass	
F/T (3 Cycles)	Pass	



Processing instructions: Add ingredients in the order listed, mixing well between additions. Formulation will start to thicken after addition of TRITON™ CG-50 Surfactant and continue to thicken with addition of MIPA.

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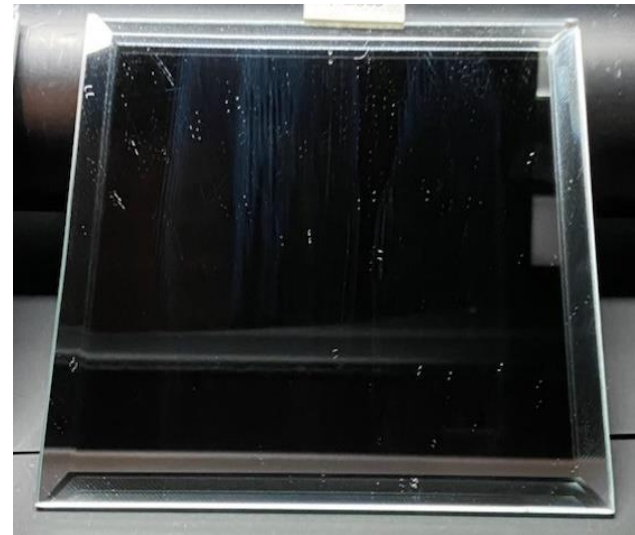
Streak Soldier Glass & Window Cleaner

High shine and low filming/streaking performance

Streak Soldier
Glass & Window Cleaner



Commercial Glass Cleaner



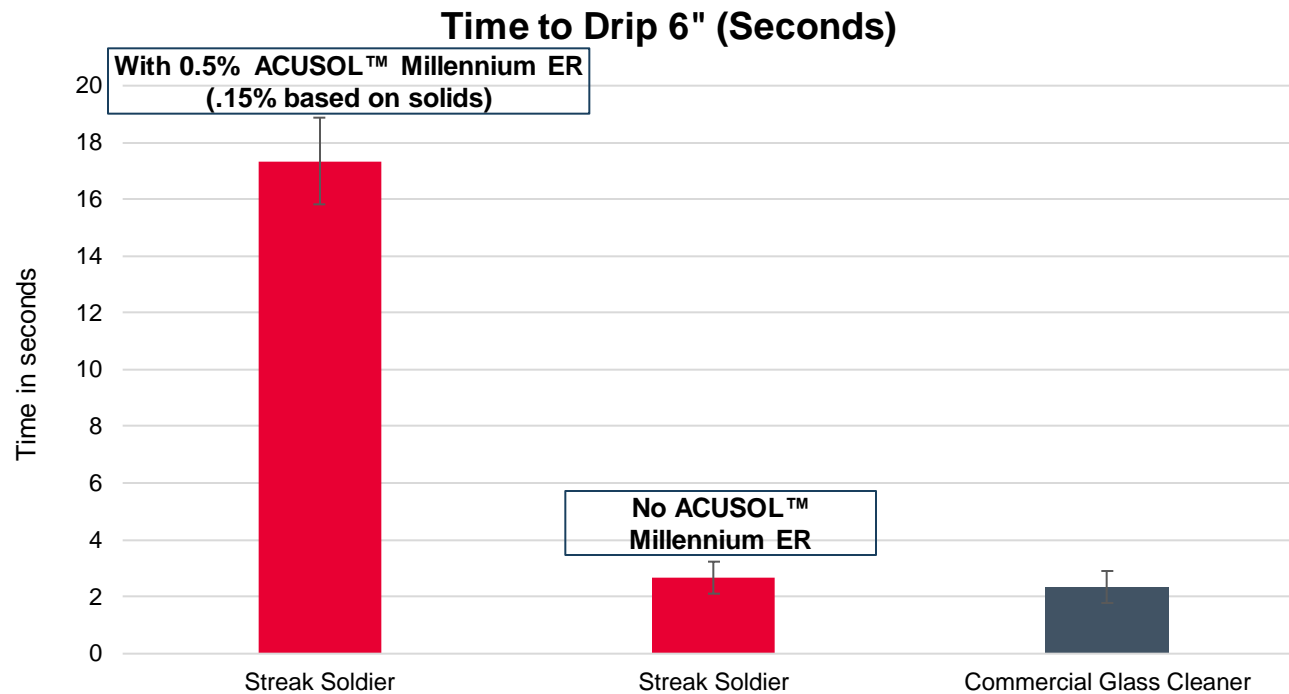
Streak Soldier Glass & Window Cleaner offers excellent shine (low filming/streaking) performance



Streak Soldier Glass & Window Cleaner

Vertical cling (dwell time)

Addition of ACUSOL™ Millennium ER Rheology Modifier offers increased dwell time (no drip) while maintaining excellent glass cleaning performance.



Vertical Cling
Drip Time After Spraying

Streak Soldier Glass & Window Cleaner (Two Seconds Post Spray)



Commercial Glass Cleaner (Two Seconds Post Spray)



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Multipurpose Warrior Concentrated Dilutable All Purpose Cleaner

High performing dilutable cleaner with great grease cutting performance!

Featured Products	Attributes
TERGITOL™ 15-S-9 Surfactant	Excellent primary cleaning, faster wetting & emulsification
Hexyl CARBITOL™ Solvent	Excellent grease removal, & high solvency power
Triisopropanolamine (TIPA 85%)	Neutralizer, Improved cleaning
DOWANOL™ EPh Solvent	Boosts cleaning

Benefits:

- Highly concentrated formulation
- Excellent primary cleaning
- Compatible with PVOH film



Multipurpose Warrior Concentrated Dilutable All Purpose Cleaner

Multipurpose Warrior Concentrate All Purpose Cleaner		
Ingredient / Supplier	Description	Wt% (as is)
TERGITOL™ 15-S-9 Surfactant / Dow	Surfactant	45.5
Hexyl CARBITOL Solvent / Dow	Solvent	20.0
Trisopropanolamine LFG-85 / Dow	Neutralizer	26.5
DOWANOL™ EPh Glycol Ether / Dow	Solvent	5.0
Seaberry UAJ18201/00 / Givaudan	Fragrance	3.0
Unicert Yellow K7005J / Sensient	Dye	0.01
TOTAL		100.00
Appearance	Clear, yellow liquid	
pH	10	
Room Temperature	Stable	
40°C for 4 weeks	Pass	
F/T (3 Cycles)	Pass	



1:20 dilution in water



Processing instructions: Add surfactants, solvents and amine while mixing. Add fragrance and dye and mix until uniform.

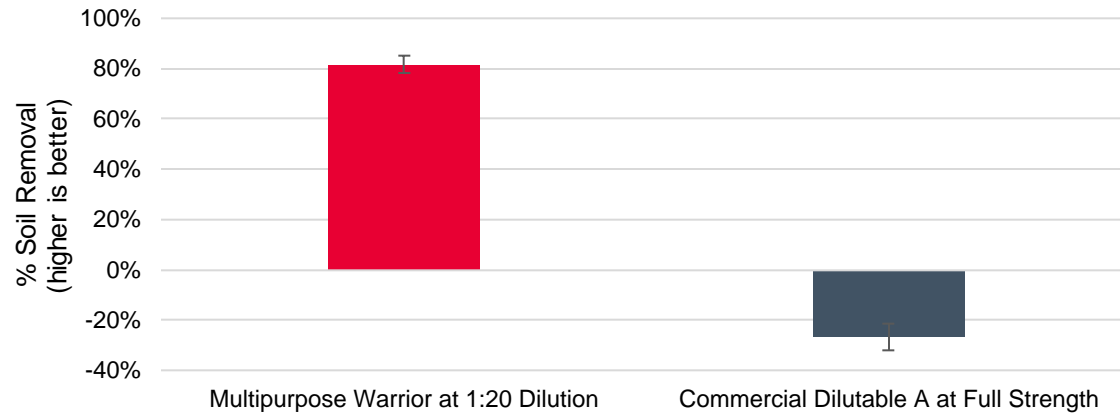
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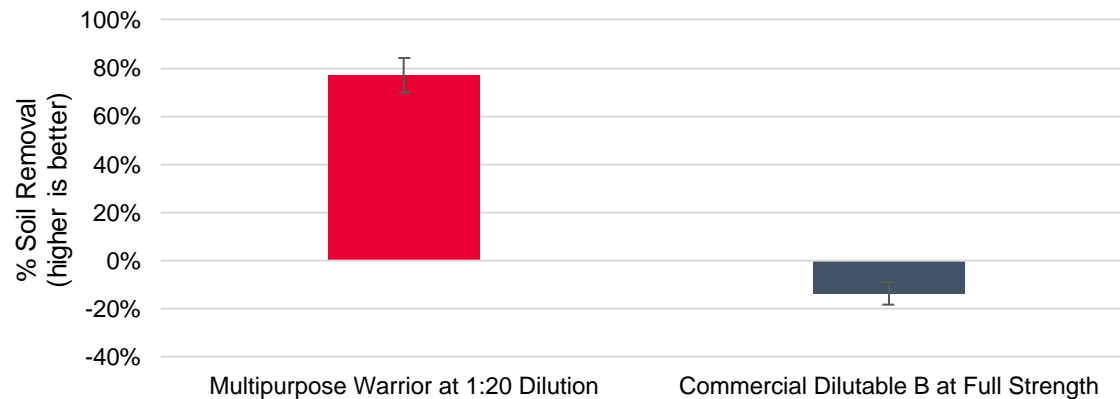
Multipurpose Warrior All Purpose Cleaner

Greasy soil removal

% Soil Removal HCPA DCC-17A Greasy Soil



% Soil Removal HCPA DCC-17A Greasy Soil



Multipurpose Warrior enables exceptional cleaning performance even at 1:20 dilution



Multipurpose Warrior at 1:20 dilution



Commercial Dilutable A at full strength



Multipurpose Warrior at 1:20 dilution



Commercial Dilutable B at full strength

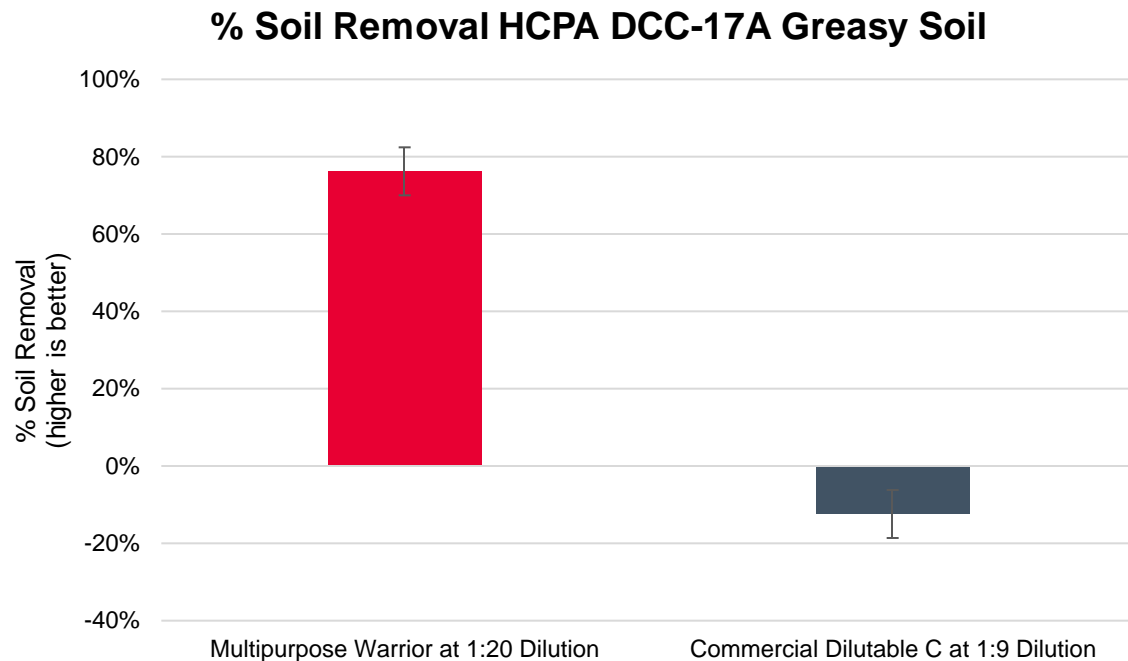
Cleaning Test Method: HCPA DCC-17A Greasy Soil Removal

NOTE: The graphic representations are presented here for illustrative purposes only and should not be construed as product specifications. Users should confirm results by their own tests.



Multipurpose Warrior All Purpose Cleaner

Greasy soil removal



Multipurpose Warrior at 1:20 dilution



Commercial Dilutable C at 1:9 dilution

Dow's DOWANOL™ Glycol ether solvents, Surfactant and TIPA worked synergistically to boost cleaning performance even after 1:20 dilution compared to commercial dilutable hard surface cleaners.

Cleaning Test Method: HCPA DCC-17A Greasy Soil Removal

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Dow Glycol Ether Solvents

Improved cleaning effectiveness with less product, shine, stability



Hexyl CARBITOL

Hydrophobic

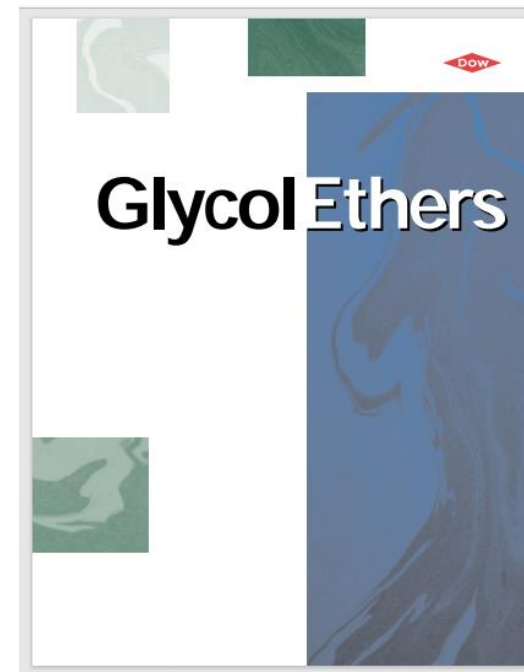
Hydrophilic



TERGITOL 15-S-5

- ✓ Interfacially active
- ✓ Varying water solubility
- ✓ Solvency
- ✓ Coupling ability

[Dow | The Materials Science Company | Explore Products](#)



Readily biodegradable



CleanGredients



EPA inerts list

Key Properties of Glycol Ethers for Cleaning Applications

- Dissolve Oil Soluble and Water Soluble Soils

- Alcohol & aliphatic component helps to dissolve both water-soluble soil and oil-soluble soils
- Hexyl CELLOSOLVE™, Hexyl CARBITOL, DOWANOL™ DPnB, PPh, EPh, PnB, etc

- Surface Tension Reduction



- Improve the wetting of the surface to be cleaned
- Help to loosen soil and keep it emulsified (suspended) and dispersed in the cleaning solution

- DOWANOL™ DPnB, TPnB, PnB, etc

- Excellent Coupling Ability



- Work in combination with surfactants to pull oil- and water-soluble dirt from the soiled material. Also helps to keep soil suspended preventing re-deposition.
- This coupling ability can also help enhance product performance and shelf life

- CARBITOL™, BUTYL™ CARBITOL™ Solvent, DOWANOL™ PnB, PM, etc.

- Evaporation Rate Flexibility

- DOW glycol ethers offer a wide range of evaporation rates for formulation requirements
- **Fast Evap.:** DOWANOL™ PM, DPM, PnB, PnP, Butyl CELLOSOLVE™, Hexyl CELLOSOLVE™ Solvent, etc.
- **Slow Evap.:** DOWANOL™ PPh, Butyl CARBITOL™ Solvent, Hexyl CARBITOL™ Solvent, etc

Examples of VOC Exempt Solvents for Cleaning

Solvent	Chemical Name	Solubility @ 25oC (wt% in Water)	Surface Tension (dynes/cm @ 25°C)	US EPA Inerts Listing
Hexyl CELLOSOLVE™ – Solvent	Ethylene Glycol Hexyl Ether	0.88%	27.7	Nonfood Use
CARBITOL™ Solvent	Diethylene glycol ethyl ether	100%	31.8	40 CFR 180.940c
Butyl CARBITOL™ – Solvent	Diethylene glycol mono n-butyl ether	100%	30.0	-
Hexyl CARBITOL™ – Solvent	Diethylene Glycol Hexyl Ether	2.0%	29.2	Nonfood Use
DOWANOL™ EPh	Ethylene glycol phenyl ether	2.5%	42.0	Nonfood Use
DOWANOL™ EPh6	Polyethylene Glycol Phenyl Ether	100%	45.2	Nonfood Use
DOWANOL™ DPMA	Dipropylene Glycol Methyl Ether Acetate	16%	27.3	-
DOWANOL™ DPnB	Dipropylene Glycol n-Butyl Ether	4.5%	28.4	Nonfood Use
DOWANOL™ DPnP	Dipropylene Glycol n-Propyl Ether	19.6%	27.8	Nonfood Use
DOWANOL™ TPM	Tripropylene glycol methyl ether	100%	30.0	Nonfood Use
DOWANOL™ TPnB	Tripropylene glycol n-butyl ether	4.5%	29.7	Nonfood Use
DOWANOL™ PPh	Propylene Glycol Phenyl Ethe	1,5%	38,1	Nonfood Use
DIAMOSOLV™ 323	Ethyl laurate	-		-

Examples of Non LVP Solvents for Cleaning Applications

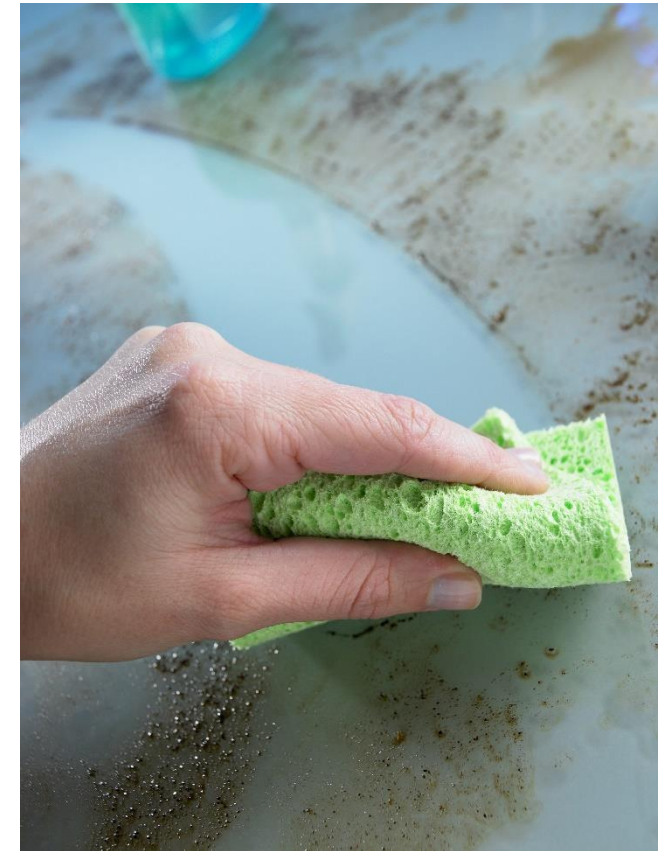
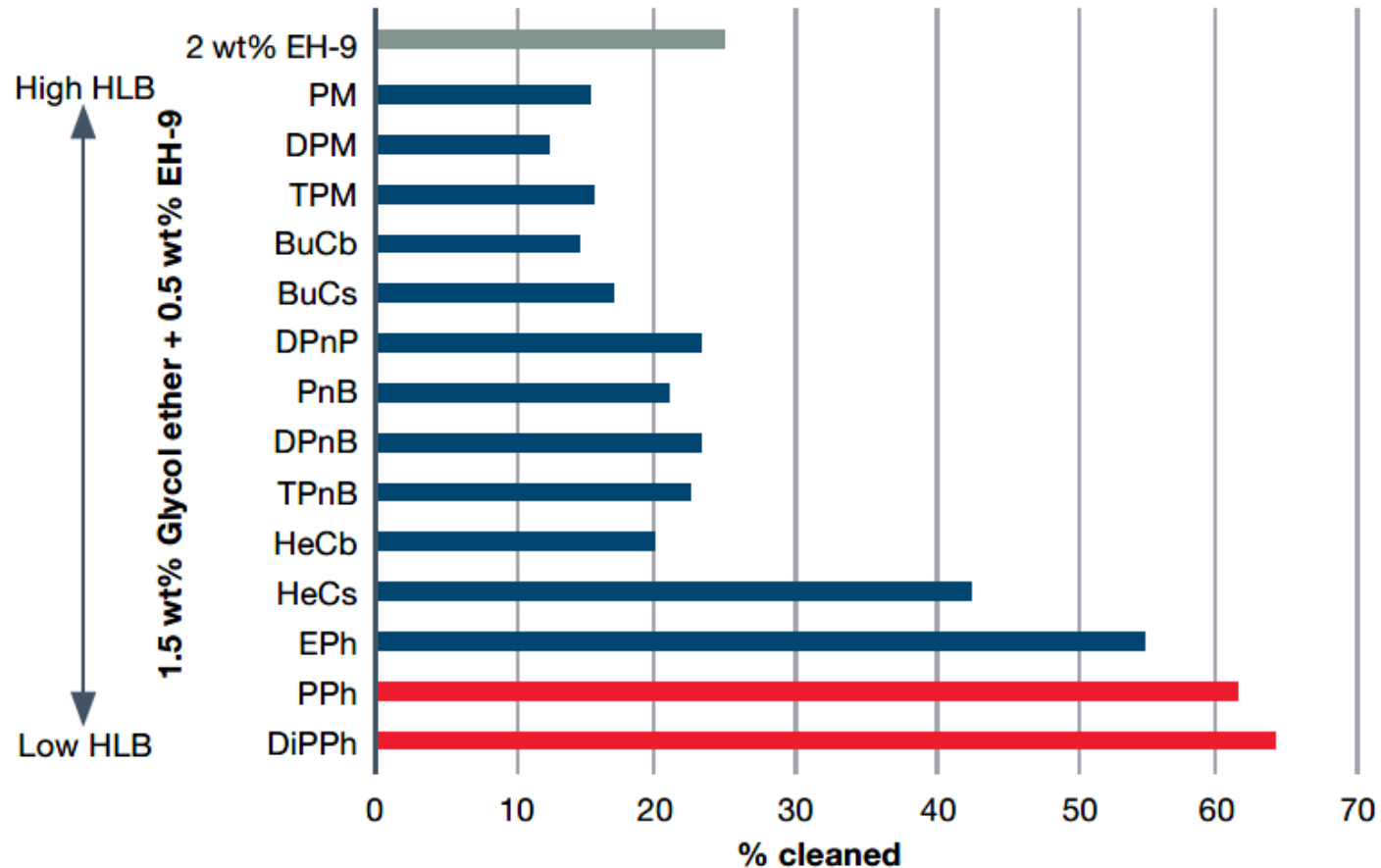
Solvent	Chemical Name	Solubility @ 25oC (wt% in Water)	Surface Tension (dynes/cm @ 25°C)	US EPA Inerts Listing
Butyl CELLOSOLVE™ – Solvent	Ethylene Glycol n-Butyl Ether	100%	27.4	40 CFR 180.940c
DOWANOL™ PM	Propylene Glycol Methyl Ether	100%	27.7	Nonfood Use
DOWANOL™ PMA	Propylene Glycol Methyl Ether Acetate	16%	28.9	-
DOWANOL™ PnP	Propylene Glycol n-Propyl Ether	100%	25.4	-
DOWANOL™ PnB	Propylene Glycol n-Butyl Ether	5.5%	27.5	Nonfood Use
DOWANOL™ DPM	Dipropylene Glycol Methyl Ether	100%	28.8	Nonfood Use

Note: These are typical properties, not to be construed as specifications.



Selecting Solvents for Greasy Soil Removal

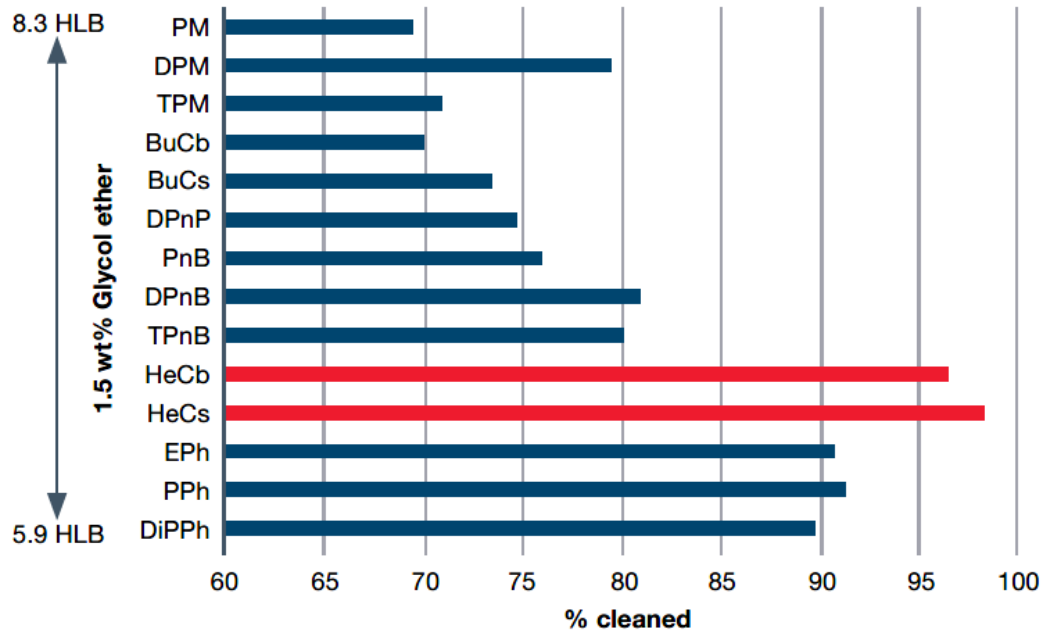
Aqueous formulation with 1.5% Glycol Ether Solvent + 0.5% ECOSURF™ EH-9 Surfactant



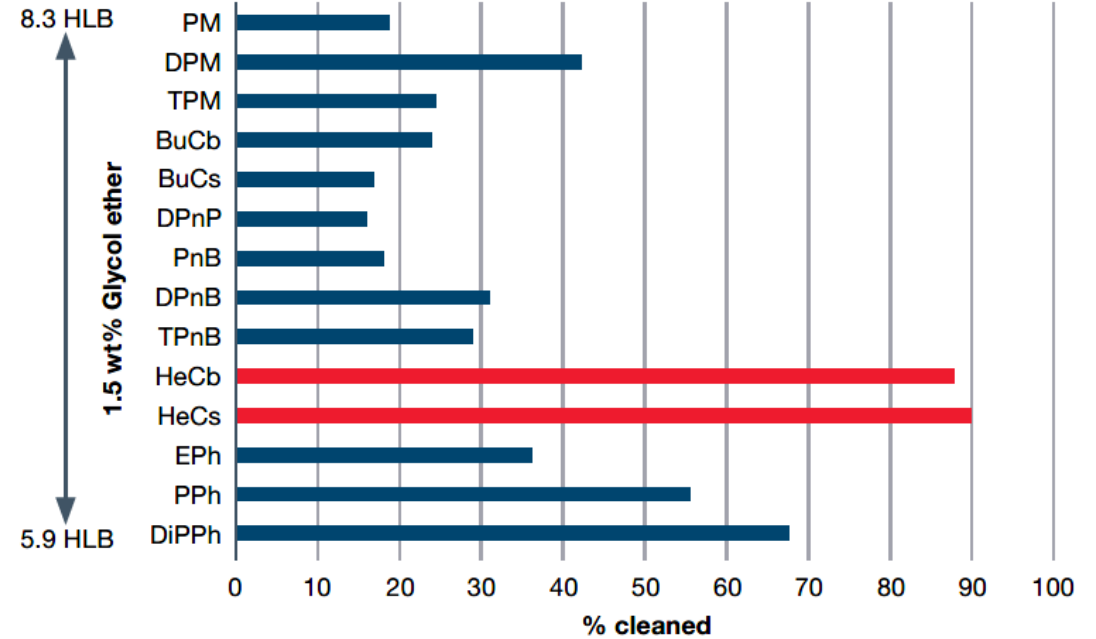
Note: These are typical properties, not to be construed as specifications.

Selecting Solvents for Bathroom – Soap Scum & Lime Scale

Soap Scum with 1.5% Glycol



Lime Scale with 1.5% Glycol



Note: These are typical properties, not to be construed as specifications.



Dow Surfactants for Home Care

Improved performance and cleaning efficacy, bio-based options



CleanGredients



Readily biodegradable



EPA inerts list

[Dow | The Materials Science Company | Explore Products](#)



Surfactants for Hard Surface Cleaning & Disinfecting Formulations

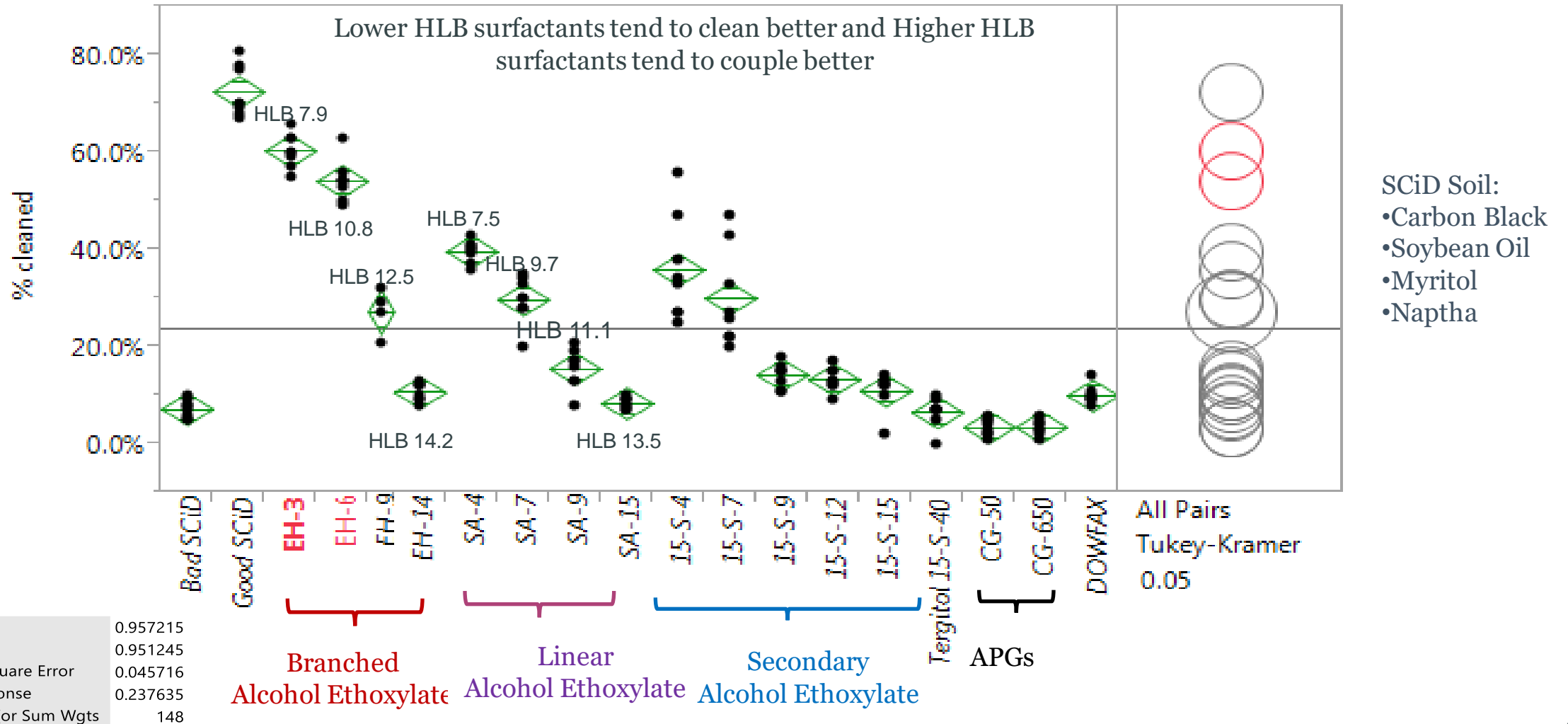
Product	Structure	Readily Biodegradable	Safer Choice / CleanGredients Options	EPA Listed	Benefits
ECOSURF™ EH Surfactant Series	2-Ethyl hexanol EO-PO nonionic surfactant	Yes	Yes	Yes / 180.940a	Exceptional wetting and hard surface cleaning, low odor, excellent formulation properties, very low aquatic toxicity
ECOSURF™ SA Surfactant Series	Seed oil surfactant	Yes	No	Yes / 180.940a	Based on seed oil, low odor, no gel range, rapid dissolution, excellent wetting and detergency, effective emulsifier
TERGITOL™ 15-S Surfactant Series	Secondary alcohol ethoxylate surfactant	Yes	Yes	Yes / 180.940a	Excellent detergency, rapid dissolution and good rinseability, low odor, excellent formulation and handling properties
TERGITOL™ L Surfactant Series	EO-PO nonionic low foam surfactant	Yes	Yes	Yes / 180.940a. 180.960	Efficient foam control agent, wetting agent
ECOSURF™ LFE Surfactant Series	Branched alcohol ethoxylate	Yes	Yes	Yes / 180.940a	Excellent oil removal, good wetting, Rapid dissolution and good rinseability, no gel range
TRITON™ APG Surfactant Series	Alkyl polyglucosides	Yes	Yes	Yes / 180.940a & Nonfood use options	Soluble in highly alkaline solutions, mild, good detergent and wetter, high stable foam
DOWFAX™ 2A1, 8390, C10L Surfactant Series	Alkyldiphenyloxide Disulfonate Salts	No	No	Yes / Nonfood use	Excellent choice for formulations containing acids, bleach, or caustic. They provide excellent solubility and stability in concentrated electrolytes, and they're remarkably resistant to oxidative and thermal degradation

Note: These are typical properties, not to be construed as specifications.



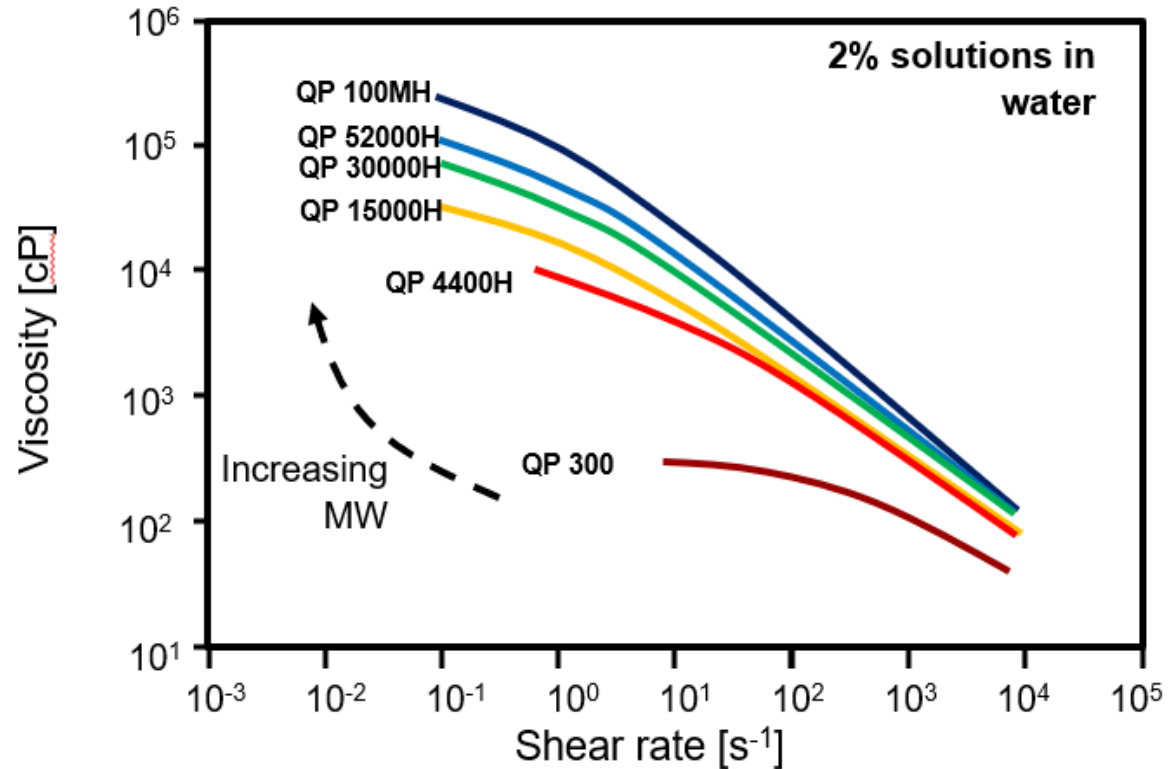
Selecting Surfactants for Targeted Applications – Greasy Soil

Cleaning Performance of 2% Surfactant vs Greasy (Soya oil) on SCiD



CELLOSIZE™ Hydroxyethyl Cellulose Rheology Modifiers

Controlled flow properties, stabilized formulations, suspends particles, vertical wall cling, reduced misting



High molecular weight polymers will give more shear-thinning rheology



CleanGredients

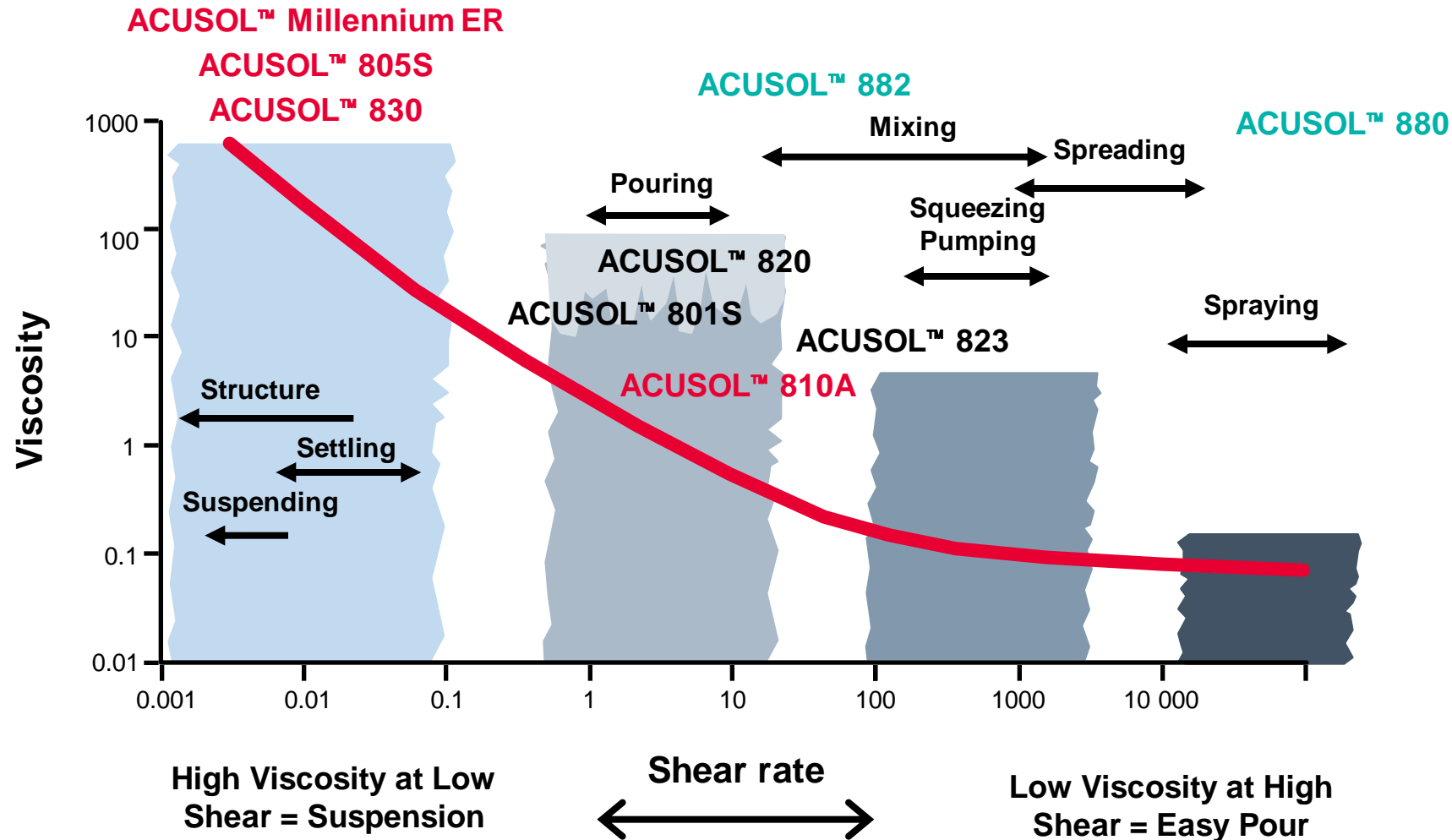


EPA inerts list

General Business

ACUSOL™ Rheology Modifiers

Controlled flow properties, stabilized formulations, suspends particles, vertical wall cling, reduced misting



(H)ASE
Micro-Gels
 HEUR



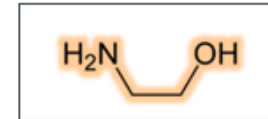
Amine Neutralizers – Ethanolamines & Isopropanolamines

Alkalinity, efficient cleaning, exceptional filming and streaking performance

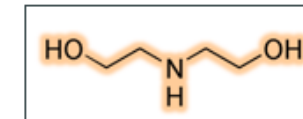
Products	Application	Benefits
<u>ETHANOLAMINES</u>	Cleaning products	Enabling multi-functional cleaning products with low streaking and filming Contributing to excellent stability for a longer shelf life
MEA (MONOETHANOLAMINE)		
TEA (TRIETHANOLAMINE)		
<u>ISOPROANOLAMINES</u>	Multi-use emulsifier	Offering excellent corrosion protection and emulsifying capabilities
MIPA (MONOISOPROANOLAMINE)		
DIPA (DIISOPROANOLAMINE)		
TIPA (TRIISOPROANOLAMINE)		



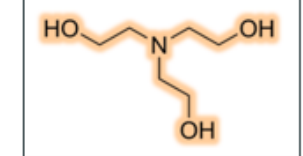
MEA Monoethanolamine	DEA Diethanolamine	TEA Triethanolamine
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Typical Physical Properties	
Molecular Weight	61.08
Freezing Point	10.5°C
Specific Gravity (20/ 20°C)	1.017
pH of 5 wt. % Solution	11.8

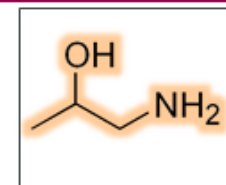


Typical Physical Properties	
Molecular Weight	105.14
Freezing Point	28.0°C
Specific Gravity (20/ 20°C)	1.092
pH of 5 wt. % Solution	11.35

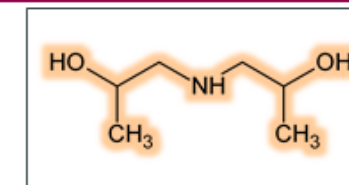


Typical Physical Properties	
Molecular Weight	149.19
Freezing Point	21.6°C
Specific Gravity (20/ 20°C)	1.126
pH of 5 wt. % Solution	10.7

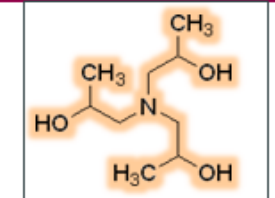
MIPA Monoisopropanolamine	DIPA* Diisopropanolamine	TIPA* Triisopropanolamine
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Typical Physical Properties	
Molecular Weight	75.11
Freezing Point	3°C
Specific Gravity (20/ 20°C)	0.960
pH of 5 wt. % Solution	11.3



Typical Physical Properties	
Molecular Weight	133.19
Freezing Point	44°C
Specific Gravity (20/ 20°C)	0.992
pH of 5 wt. % Solution	11.35

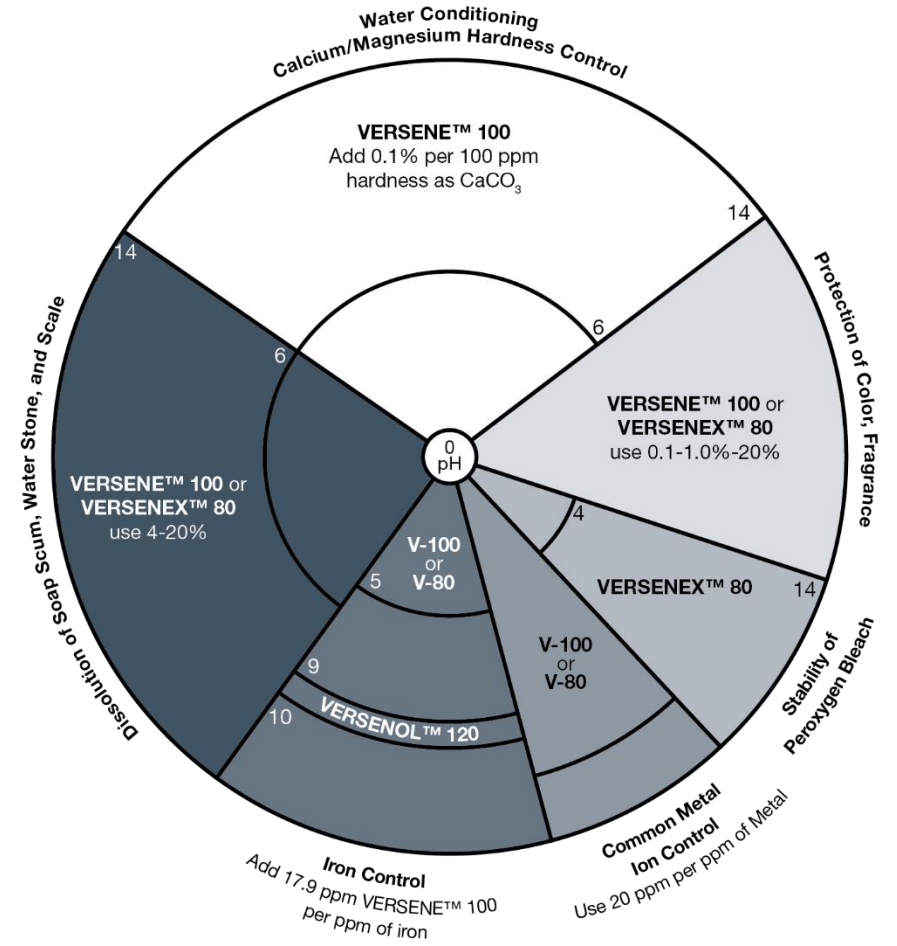


Typical Physical Properties	
Molecular Weight	191.27
Freezing Point	44°C
Specific Gravity (20/ 20°C)	0.988
pH of 5 wt. % Solution	10.7

VERSENE™ Chelating Agents for Hard Surface Care

Control Reactive Metal Ions and Improve Cleaning Performance

Products	Benefits
VERSENE™ 100 Chelating Agent	The strongest, most versatile, and widely used for controlling metal ions over a broad pH range in aqueous systems
VERSENE™ 220 Crystals Chelating Agent	A dry, crystalline version of VERSENE™ 100. It is useful in formulating dry products or concentrates
VERSENE™ K4EDTA Chelating Agent	An aqueous solution of the tetrapotassium salt of ethylenediaminetetraacetic acid
VERSENEX™ 80 Chelating Agent	An aqueous solution of the pentasodium salt of diethylenetriaminepentaacetic acid, Na5DTPA. Useful in formulating products containing oxidizers such as peroxide



Dow Hard Surface Kit – Summary



Hard Surface Care Kit

DOW

Moving beyond clean

**Grease Fighter
kitchen cleaner** →
High performing
degreaser for removing
baked on grease

**Streak Soldier glass
and window cleaner** →
Removes residue leaving
mirrors shiny and sparkling

**Bathroom Blaster
bathroom cleaner** →
Excellent for removing lime
scale and soap scum

**Multipurpose Warrior
concentrate all purpose
cleaner** → High performing
dilutable cleaner with great
grease cutting performance



For More Information...

<https://www.dow.com/en-us/market/mkt-home-care-ind-inst-cleaning.html>

Home Care, Industrial and Institutional Cleaning

Moving Beyond Clean



Opening the door to innovative cleaning solutions

Whether you're developing a high-efficiency laundry detergent that goes beyond primary cleaning or a formulation for commercial kitchen surface care that has to cut tough grease, you know it's not as easy as it might seem to deliver efficiency, multifunctional performance and sustainability in a single product. Through collaboration we can create more sustainable products without sacrificing performance. Our broad portfolio of solutions includes:

- Antifoams, surfactants, chelants, solvents, dispersants and polymers that enable high-performance fabric care such as high-efficiency laundry detergents, monodose formulations and laundry additives
- Surfactants, dispersants, chelants, solvents and rheology modifiers that improve hard surface care formulations so they clean more efficiently
- Floor care polymers that protect, maintain and add shine in floor polishes and sealers
- Dispersants, surfactants, chelants and specialty polymers that help control scale and remove dirt in dish and warewash applications

Low 1,4 Dioxane Levels in Dow Products
Transparency to Help Ensure Compliance

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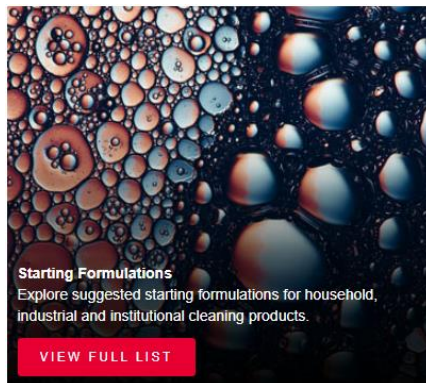
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General Business