

## Magnasoft\* Plus

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#### Description

Magnasoft Plus textile softener is a specially engineered, low-aminocontaining, silicone fluid designed to maximize the soft, silky, full handle desired from conventional amino-modified silicone fluids but with significantly less yellowing.

Emulsions prepared from Magnasoft Plus textile softener fluid impart superior softness compared to conventional silicones when applied to 100% cotton knits and wovens, polyester/cotton blends, rayon, prints, and a variety of other fabrics, with and without durable press resin.

#### Typical Physical Properties

Form	Liquid
Color	Water white
Percent Actives	100
Viscosity at 25°C, cSt	4000
Specific Gravity, 25/25°C	0.97
Flash Point, Pensky-Martens Closed Cup, °C (°F)	>66 (>150)

#### Processing Recommendations

##### Whiteness

The following are examples of the superior low-yellowing performance of Magnasoft Plus textile softener fluid relative to competitive aminosilicones on 100% cotton printcloth, 65/35 = polyester/cotton, 100% rayon and 100% cotton knit fabrics, both initially and after accelerated scorching. Magnasoft Plus textile softener fluid exhibited superior softness on all fabrics.

#### Non-Yellowing Performance of Magnasoft Plus Textile Softener Fluid vs Competitive Aminosilicone Emulsion

Pad Bath Composition	Parts by Weight		
	1	2	3
DMDHEU Resin (38%)	15.00	15.00	15.00
Mg Cl <sup>2</sup> •6HOH Resin Catalyst (64%)	2.25	2.25	2.25
Competitive Aminosilicone Emulsion (20%)	—	5.00	—
Magnasoft Plus Emulsion (40%)	—	—	2.50
Water	82.75	77.75	80.25
Silicone Solids Add-on (100% wet pick-up), %	—	1.0	1.0
Dry/Cure at 171°C (340°F), min	1.5	1.5	1.5
Reflectance Data(1)	Scorched, 200°C		
	Initial	50 sec	100 sec
100% Cotton Printcloth			
Resin Only	74	58	46
Competitive Aminosilicone	58	38	30
Magnasoft Plus Textile Softener	70	54	41
65/35 = Polyester/Cotton Broadcloth			
Resin Only	74	66	57
Competitive Aminosilicone	58	47	38
Magnasoft Plus Textile Softener	69	60	55

(1) Reflectance was determined with a “Colorquest” Spectrocolorimeter; higher values indicate whiter fabrics

### Softness and Whiteness

The data presented below demonstrate the superior softness and whiteness provided by Magnasoft Plus textile softener fluid compared to competitive silicone emulsions on a variety of fabrics.

### Softness/Whiteness of Fabrics Treated with Magnasoft Plus Textile Softener Fluid vs Competitive Silicone Emulsions

100% Cotton Knit, Style 459			
Model Formulation			Parts by Weight
Silicone Emulsion (35%)			3.36
Distilled Water			96.64
Wet Pick-up, wt %		85	
Silicone Solids on Fabric, wt %		1.0	
Dry/Cure at 171°C (340°F), min		2	
Performance	Competitive Emulsion #1	Magnasoft Plus Textile Softener Fluid	Water Only
Softness Ranking <sup>(1)</sup>	4	1	10
Whiteness <sup>(2)</sup>			
Initial	74	74	73
100 sec at 200°C (392°F)	46	50	58

(1) 1 = Softest, 10 = Harshesht

(2) "Colorquest" Spectrocolorimeter; higher values indicate whiter fabrics

#### 100% Cotton Knit, Style 459

Model Formulation			Parts by Weight
Silicone Emulsion (20%)			5.88
Water			94.12
Wet Pick-up, wt %		85	
Silicone Solids on Fabric, wt %		1.0	
Dry/Cure at 171°C (340°F), min		2	
Performance	Competitive Emulsion #1	Magnasoft Plus Softener Fluid	Textile Water Only
Softness Ranking <sup>(1)</sup>	3	1	10
Whiteness <sup>(2)</sup>			
Initial	77	78	74
100 sec at 200°C (392°F)	41	45	45

(1) 1 = Softest, 10 = Harshesht

(2) "Colorquest" Spectrocolorimeter; higher values indicate whiter fabrics

#### 65/35 = Polyester/Cotton Broadcloth and 100% Cotton Printcloth

Model Formulation			Parts by Weight
DMDHEU Resin (38%)			15.00
MgCl <sub>2</sub> •6HOH Catalyst (64%)			2.25
Silicone Emulsion (20%)			5.88
Water			76.87
Wet Pick-up, wt %		85	
Silicone Solids on Fabric, wt %		1.0	
Dry/Cure at 171°C (340°F), min		1.5	
Performance	Competitive Emulsion #1	Magnasoft Plus Textile Softener Fluid	Water Only
Softness Ranking <sup>(1)</sup>			
65/35 = PE/C Broadcloth <sup>(2)</sup>	3	1	5
100% Cotton Printcloth <sup>(3)</sup>	2	1	5
Whiteness <sup>(4)</sup>			
65/35 = PE/C Broadcloth			
Initial	73	74	78
100 sec at 200°C (392°F)	60	62	67
100% Cotton Printcloth			
Initial	73	73	78
100 sec at 200°C (392°F)	53	53	57

(1) 1 = Softest, 5 = Harshesht

(2) Style 7409

(3) Style 400M

(4) "Colorquest" Spectrocolorimeter; higher values indicate whiter fabrics

### 100% Rayon Woven

Model Formulation		Parts by Weight
DMDHEU Resin (38%)		15.00
MgCl <sub>2</sub> •6HOH Catalyst (64%)		2.25
Silicone Emulsion (20%)		5.88
Water		76.87
Wet Pick-up, wt %	85	
Dry/Cure Cycle		
Dry at 250°F, min	4	
Cure at 325°F, min	1.5	
Silicone Solids Add-on, %	1.0	
Softness Ranking <sup>(1)</sup>		
Magnasoft Plus Textile Softener Fluid	1	
Competitive Silicone Emulsion #2	3	
Untreated Control	10	

(1) 1 = Softest, 10 = Harshesht

### Preparation of Milky Emulsions

When it is desirable to formulate a proprietary emulsion based on Magnasoft Plus textile softener fluid, the following model formulations and emulsification procedure are suggested as starting points. Depending on available emulsification equipment, the formulations and procedure may need to be modified.

### Model Formulations

Ingredients	Weight Percent		
	A	B	C
Magnasoft Plus Textile Softener Fluid	20.0	20.0	30.0
"Tergitol" Surfactant TMN-6 <sup>(1)</sup>	3.0	4.0	3.3
"Tergitol" Surfactant 15-S-7 <sup>(1)</sup>	2.0	—	—
"Neodol" 91-6 <sup>(2)</sup>	—	—	2.1
Initial Water #1	4.0	4.0	7.5
Initial Water #2	4.0	4.0	—
Initial Water #3	10.0	10.0	—
Final Water	57.0	57.1	46.0
Sodium Acetate (10% solution)	—	0.5	0.5
Glacial Acetic Acid	—	0.4	0.6

(1) Dow Chemical

(2) Shell Chemical Company

### Emulsification Procedure

1. Charge Magnasoft Plus textile softener fluid and emulsifier(s) to a suitable vessel and mix at ~300 RPM for approximately two minutes.
2. Slowly add Water #1 and stir for 10 minutes.
3. Slowly add Water #2 and stir for 10 minutes.

4. Slowly add Water #3 (when present) and stir for 10 minutes.
5. Slowly add Final Water and stir for five minutes.
6. Slowly add Glacial Acetic Acid (when present) and stir for five minutes.
7. Slowly add Sodium Acetate solution (when present) and stir for five minutes.

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