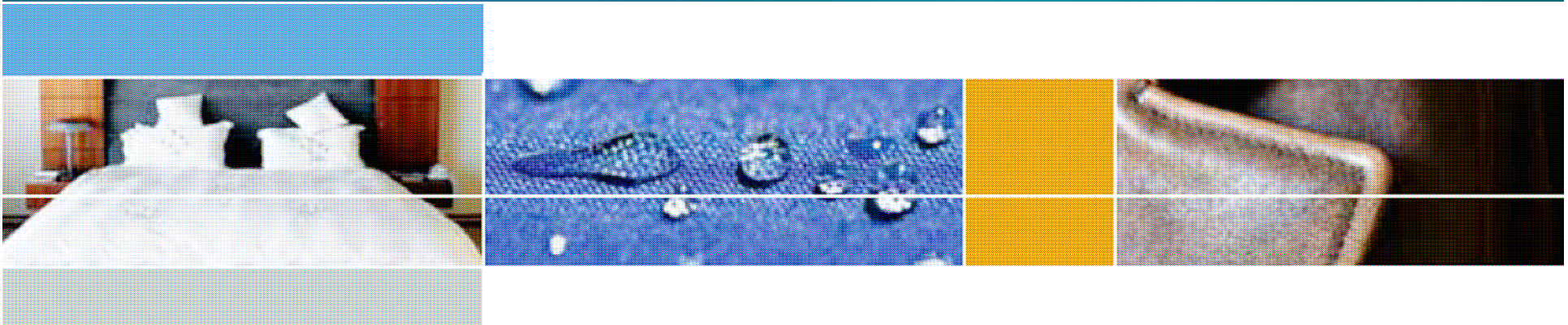


Textile Enhancers

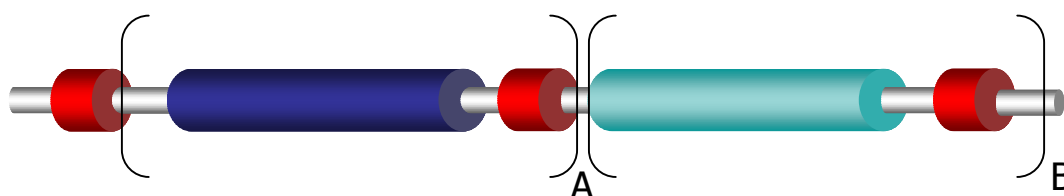
Multiple Benefits for Textile Finishing






Chemistry of Textile Enhancers

Linear $[AB]_n$ Silicone Copolymers

- Linear Structure *Improved Surface Coverage & Penetration*
- Amine-Quat Density *Surface Affinity, Bulky touch, Antistatic*
- Polyether Blocks *Hydrophilicity, Emulsifier, Antistatic*
- Polydimethylsiloxane Backbone *Slickness & Smoothness, Spreading*

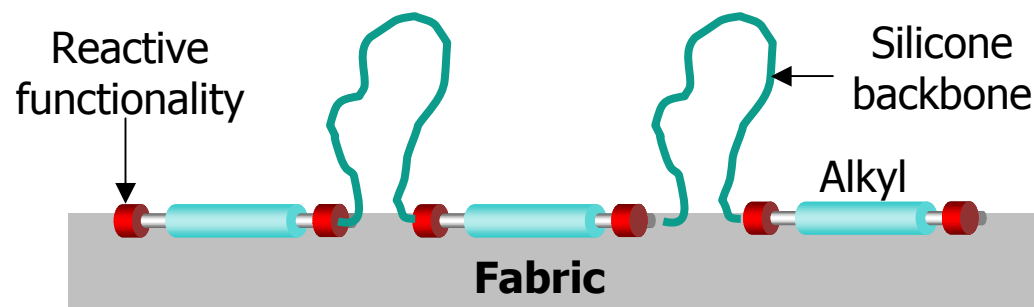


-  = **Amino or Quat functionality**
-  = **Alkyl, EO/PO**
-  = **Silicone**

Typical Data. Actual data may vary.

Copyright 2011 Momentive Performance Materials Inc. All rights reserved. CONFIDENTIAL

Multiple performance from $[AB]_n$ silicone copolymers



Linear & stretched on surface

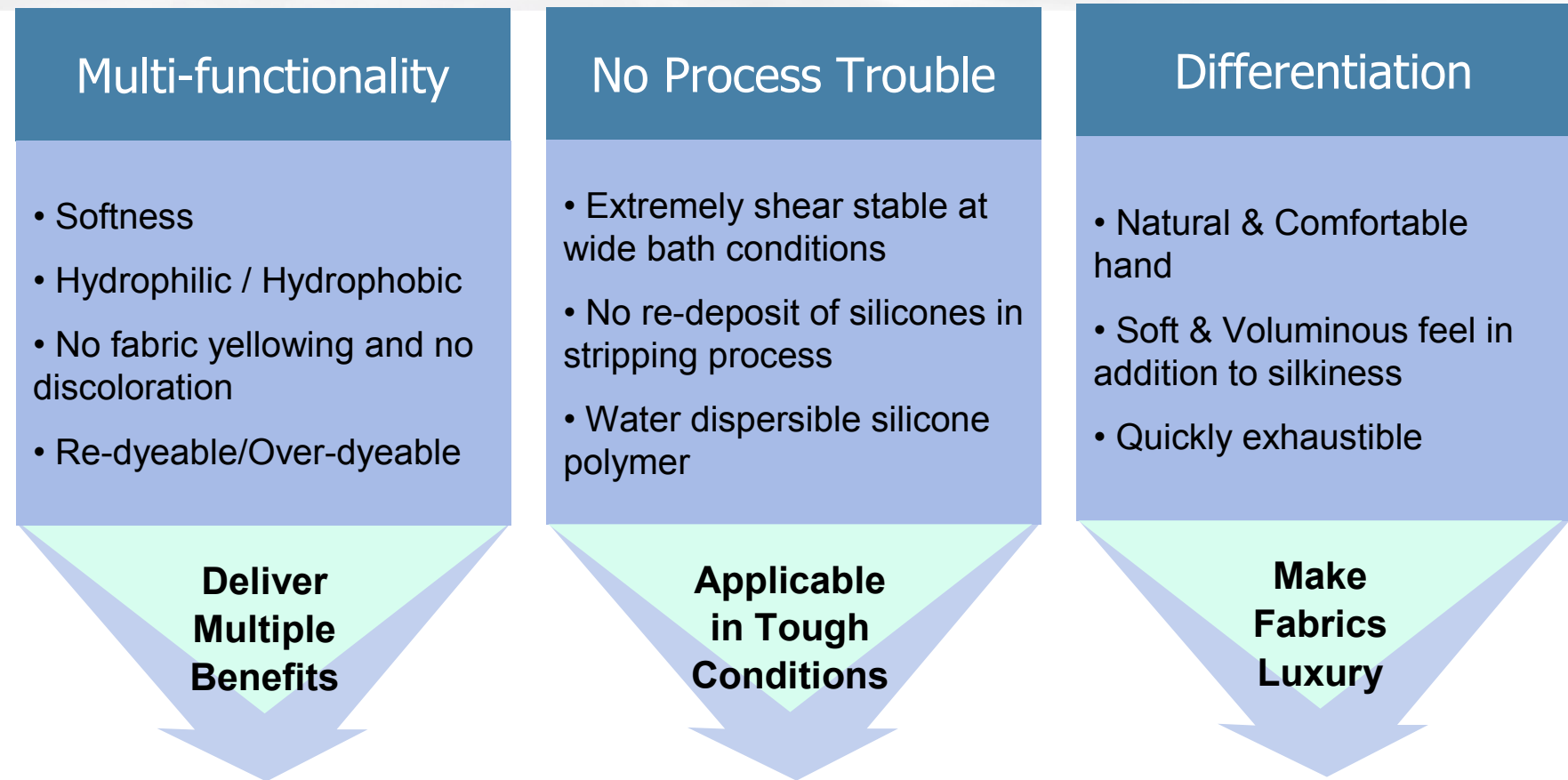
Silicone portion provides

- High substrate affinity
- Excellent soft hand feel
- Slickness (High MW)
- Non-sticky hand feel
- Non-yellowing
- No color change

Surfactant-like structure

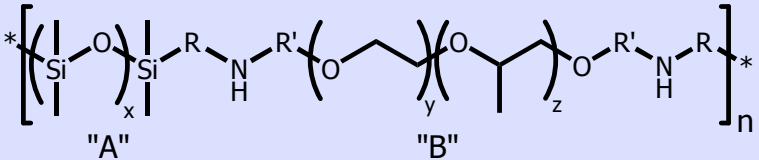
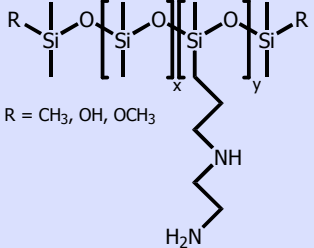
- Self-dispersion
- Extremely shear stable
- Non-oiling, no oil spots
- Excellent compatibility
- Re-dyeable, over-dyeable

Key Value of Textile Enhancers



Value-Adding & Cost Saving for Textile Mills

Textile Enhancers vs. Amino Silicone Softeners

Textile Enhancers	Conventional Amino Silicone Softeners
	
Stable at wide bath conditions at pH3~10 and 20~80°C → Virtually no process trouble in finishing bath	Stable at limited bath conditions at pH4~5 and 20~40°C → High risk to make the process trouble in finishing bath
Re-dyeable if required	Not re-dyeable even if required
No re-deposit of silicones to fabrics in a typical stripping condition at pH10/90°C	Re-deposit of silicone particles to fabrics in the typical stripping condition
Water-dispersible silicone polymer → Easily dilute with water and/or emulsifiers → Applicable at textile mills without emulsifying	Silicone polymer should be mechanically emulsified by textile formulators → Not applicable at textile mills without emulsifying
Natural & Comfortable hand feel: Soft and voluminous feel with slickness	Mostly slickness with limited soft and voluminous feel
Selectively designing for hydrophilic or hydrophobic	Hydrophobic only: A typical hydrophilic silicone is limited in the softness
Virtually no fabric yellowing and no color shade change	Fabric yellowing and color shade change: impact softness if intentionally designing for low fabric yellowing

Typical Data. Actual data may vary.

Copyright 2011 Momentive Performance Materials Inc. All rights reserved. CONFIDENTIAL

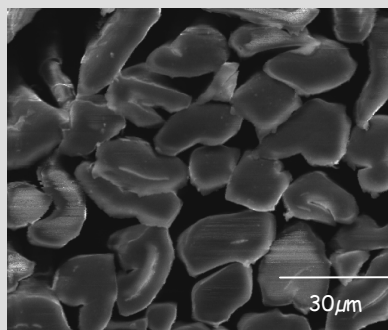
Silicone Distribution on Cotton: By EDX Analysis

Magnasoft* SilQ

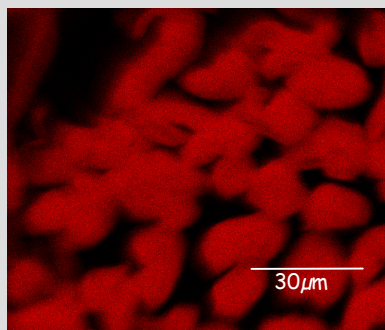
MOMENTIVE[™]

DWI
an der
ITMC RWTH
Lehrstuhl für Textilchemie
und Makromolekulare Chemie
Aachen e.V.

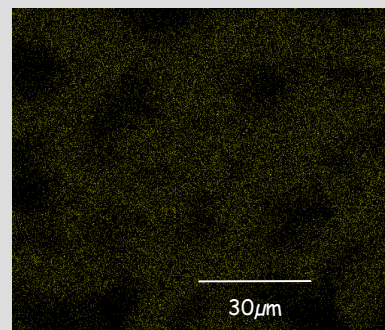
Exhaustion, 1:20 goods/liquor ratio, 40°C



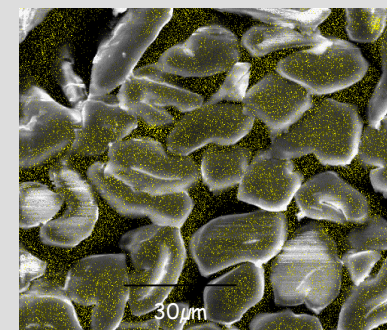
SEM micrograph



Carbon distribution



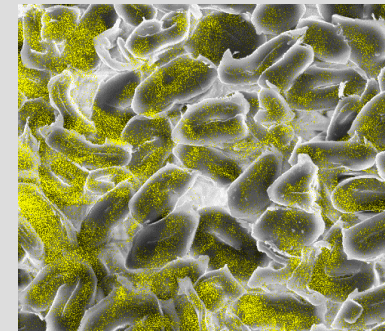
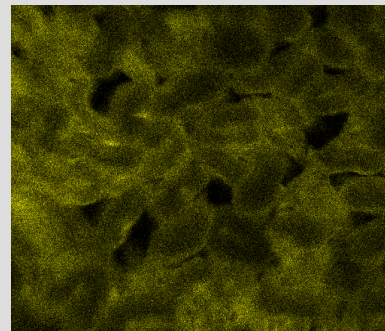
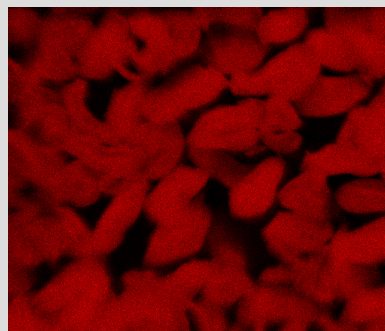
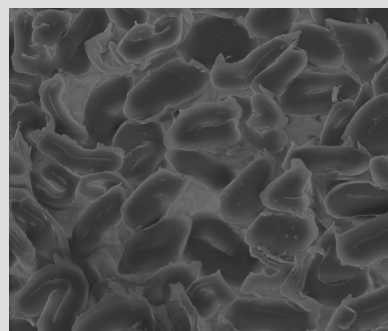
Silicon distribution



Overlapping of the E-micrograph and silicon distribution

No Treatment

Note: Test data. Actual results may vary



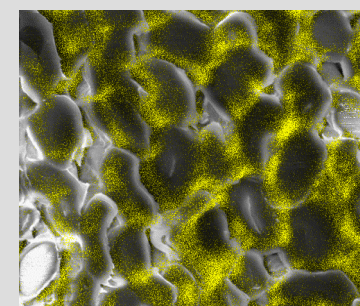
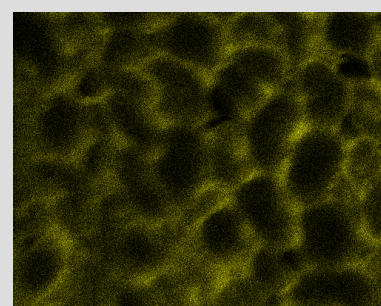
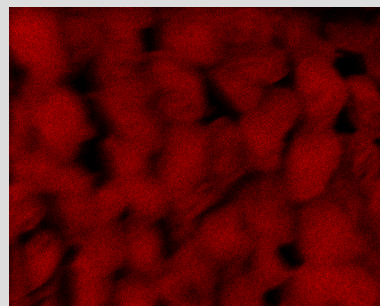
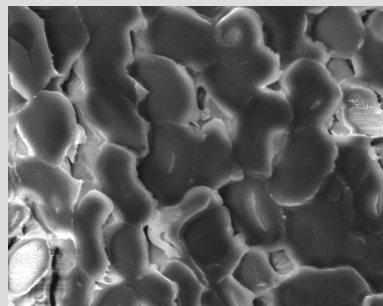
Treatment for 30 sec

Note: Test data. Actual results may vary

Silicone Distribution on Cotton: By EDX Analysis

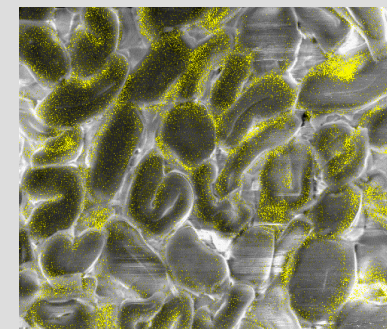
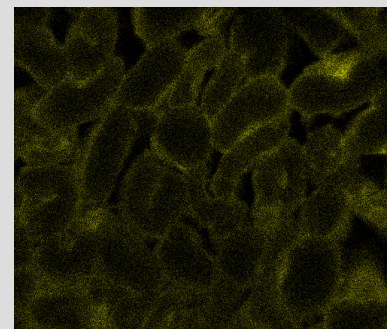
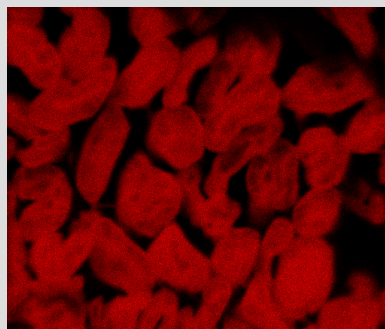
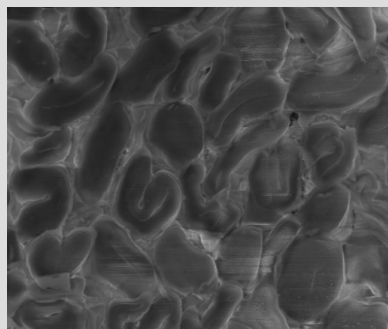
Magnasoft* SilQ

MOMENTIVE



Note: Test data. Actual results may vary

Treatment for 1,200 sec



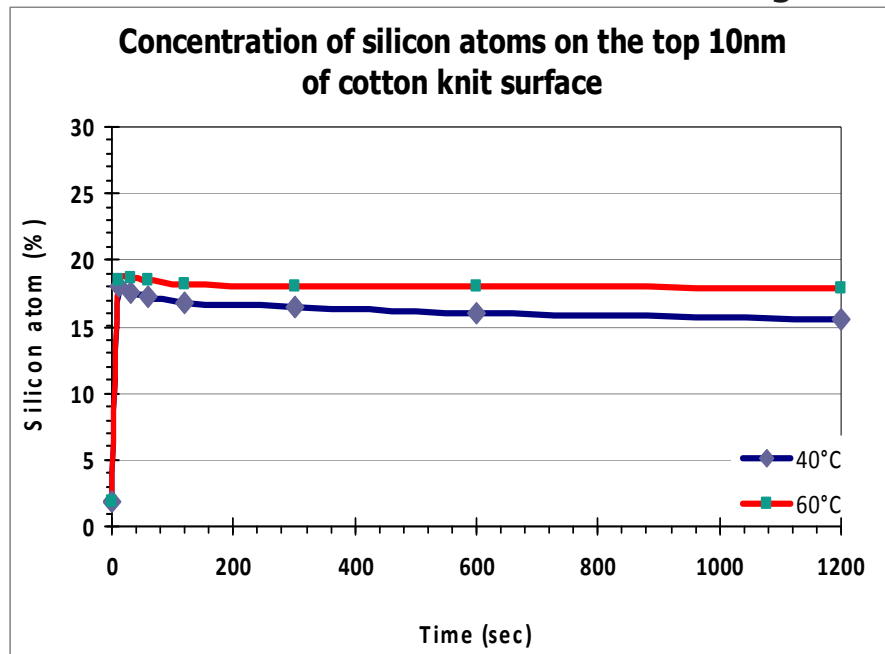
Note: Test data. Actual results may vary

Treatment for 1,800 sec

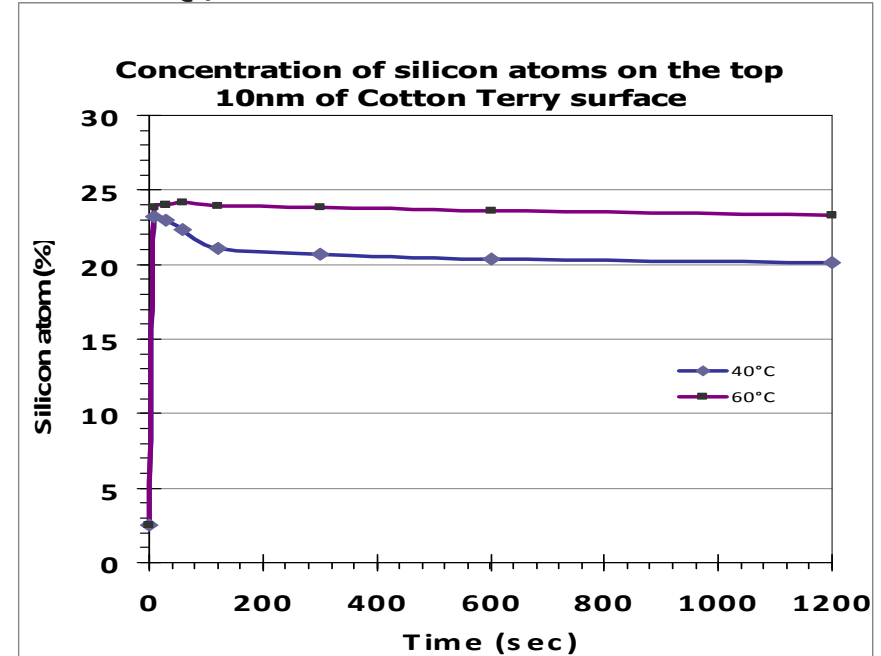
Rapid surface treatment, Effective softener

Silicone Contents on Fabric Surface by XPS Magnasoft* SilQ

Concentration of treatment solution: 5mg of Magnasoft SilQ / ml of solution



Note: Test data. Actual results may vary



Note: Test data. Actual results may vary

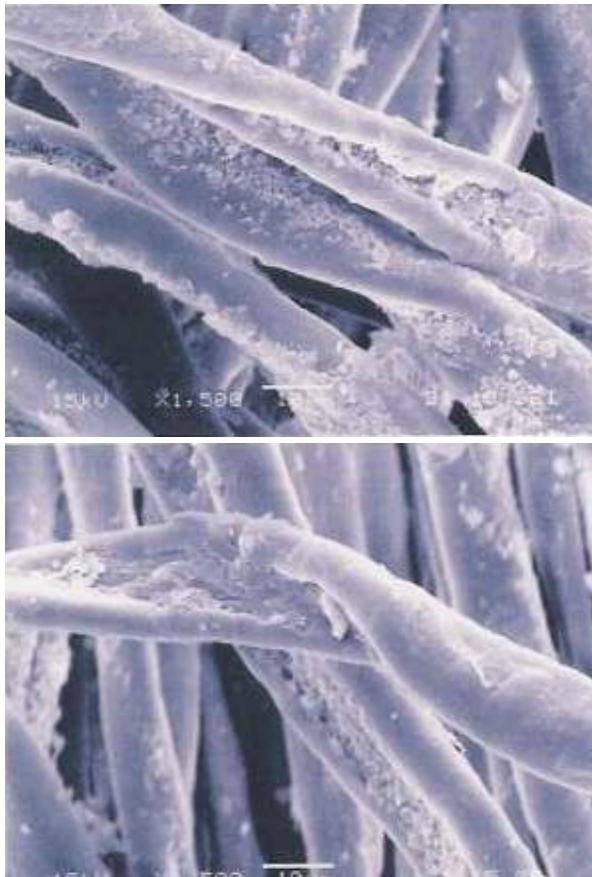
- Fast surface adsorption, surface saturation reached within 30 sec
- Cotton terry attracted higher amount of Silicone than cotton knit

May exhaust even by padding

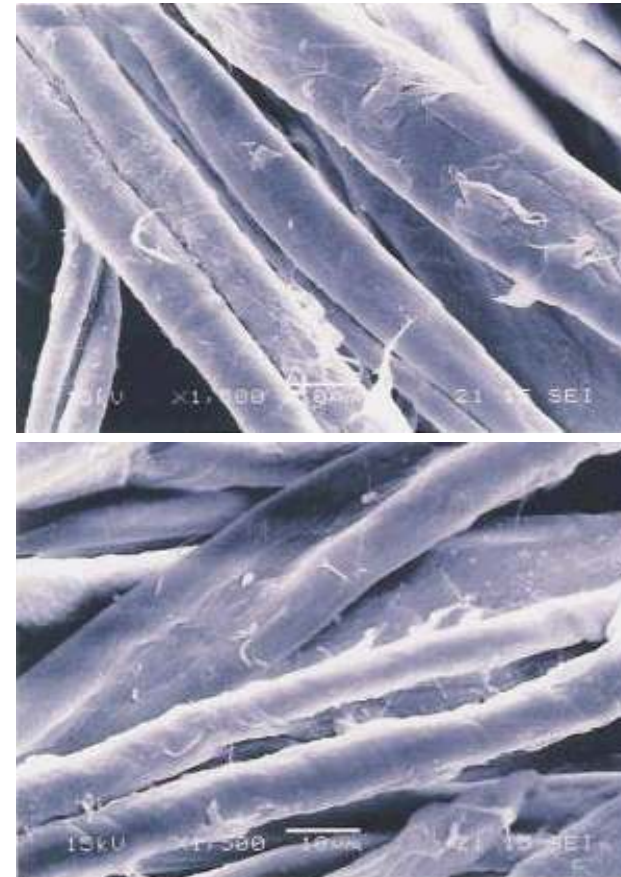
Silicone Deposit on Fibers

Magnasoft* SRS – Microscope scan (X 1500)

Cotton knits applied by
a typical amino functional silicone



Cotton knits applied by
Magnasoft* SRS

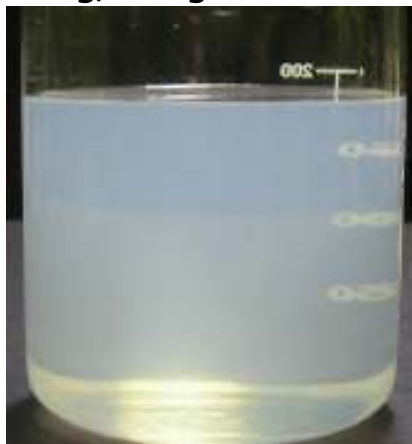


Note: Test data. Actual results may vary

Stability in Finishing Bath

Magnasoft* JSS & Magnasoft SRS

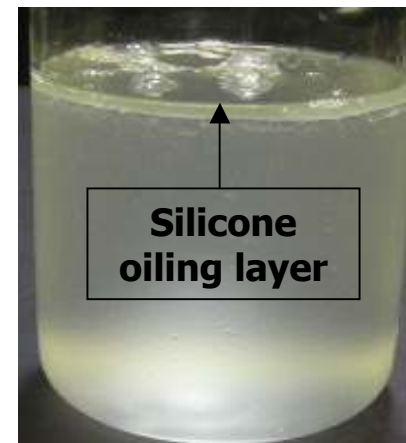
10g/l Magnasoft JSS



Test Conditions

- Adjust to bath pH 12
- Boil at 100°C
- Observe the stability

10g/l of 20% actives
Amino silicone micro-emulsion



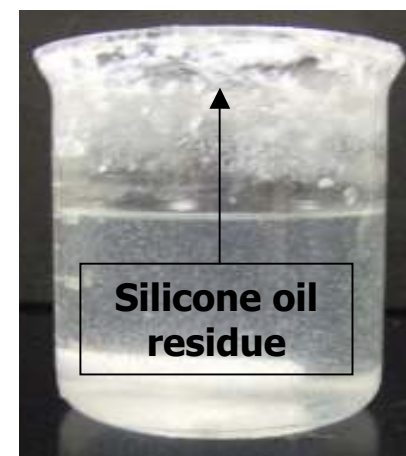
15g/l of 12% dilution
Magnasoft SRS



Test Conditions

- Adjust to bath pH 5
- Boil at 100°C
- Observe the stability

15g/l of 20% actives
Amino silicone micro-emulsion



Note: Test data. Actual results may vary

Example of Re-dyeability after Finishing



Note: Test data. Actual results may vary

Test condition for 100% cotton knit

- 1) Dye with 0.5% navy blue reactive dyes
- 2) Drop 50% solution of 18% solids amino micro-emulsion softener and Magnasoft SRS (18% dilution with water) respectively
- 3) Dry at 120°C x 2min and cure at 160°C x 1min
- 4) Stripping with 5g/l stripping agent and 10g/l NaOH(38° Be) at 90°C x 30min
- 5) Visually observe any silicone residue on the fabric after stripping

Example of Over-dyeability without Stripping



Note: Test data. Actual results may vary

Test condition for 100% cotton knit

- 1) 1st dyeing with 0.5% navy blue reactive dyes
- 2) Drop 50% solution of 18% solids amino macro-emulsion softener and Magnasoft SRS (18% dilution with water) respectively
- 3) Dry at 120°C x 2min and cure at 160°C x 1min
- 4) Over-dyeing with 0.3% light yellow reactive dyestuff without stripping of the silicone
- 5) Visually observe the over-dyeability

Magnasoft* Textile Enhancers



Voluminous & Bulky Feel with Hydrophilic Functionality

	Magnasoft DerMa NT	Magnasoft SilQ	Magnasoft SciTex*
Typical Target Fabrics	Cotton knits & yarns, Viscose, Towels, Denim	Brushed cotton fabrics, Terry towels, Cotton knits	Brushed or raised cotton fabrics, Terry towels, Cotton knits
Typical Hand feel	Soft, Voluminous	Limp, Drape	Drape, Voluminous
Water Absorption	5~10 sec	1~3 sec	1~3 sec
Wash Durability of Softness	8~10 cycles	8~10 cycles	8~10 cycles
Stretch Recovery	Very Good	Good	Good
Shear Stability	Good	Very Good	Very Good
Alkaline Stability	Very Good	Very Good	Very Good
Emulsifiability	Easy with emulsifiers	Easy with emulsifiers	Easy with emulsifiers
[AB]n Silicone Polymer %	85%	90%	90%

Typical Data. Actual data may vary.

* Magnasoft SciTex, new product will be launched in Q2, 2013

Magnasoft* Textile Enhancers

Drape & Smooth Feel with Hydrophilic Functionality



	Magnasoft STE	Magnasoft OPS	Magnasoft CJS	Magnasoft JSS
Typical Target Fabrics	Brushed or raised cotton knits & woven, All cotton blends	Cotton knits & woven, Poly-Cotton blends, Cotton-Rayon blends	Cotton sheets & wovens, Cotton/Spandex blends, Tencel	Enzyme treated cotton knits, Viscose rayon, Tencel
Typical Hand feel	Slick, full	Drape, silky & full	Silky, smooth	Dry, smooth
Water Absorption	5~10 sec	6~12 sec	9~15 sec	3~8 sec
Wash Durability of Softness	3~5 cycles	3~5 cycles	3~5 cycles	3~5 cycles
Stretch Recovery	Very Good	Excellent	Good	Moderate
Shear Stability	Good	Good	Good	Excellent
Alkaline Stability	Very Good	Very Good	Very Good	Excellent
Emulsifiability	Easy with emulsifiers	Ready-to-Use, Macro-emulsion	Easy with emulsifiers	No need to emulsify
(AB)n Silicone Polymer %	100%	20%	100%	67%

Typical Data. Actual data may vary.

Magnasoft* Textile Enhancers

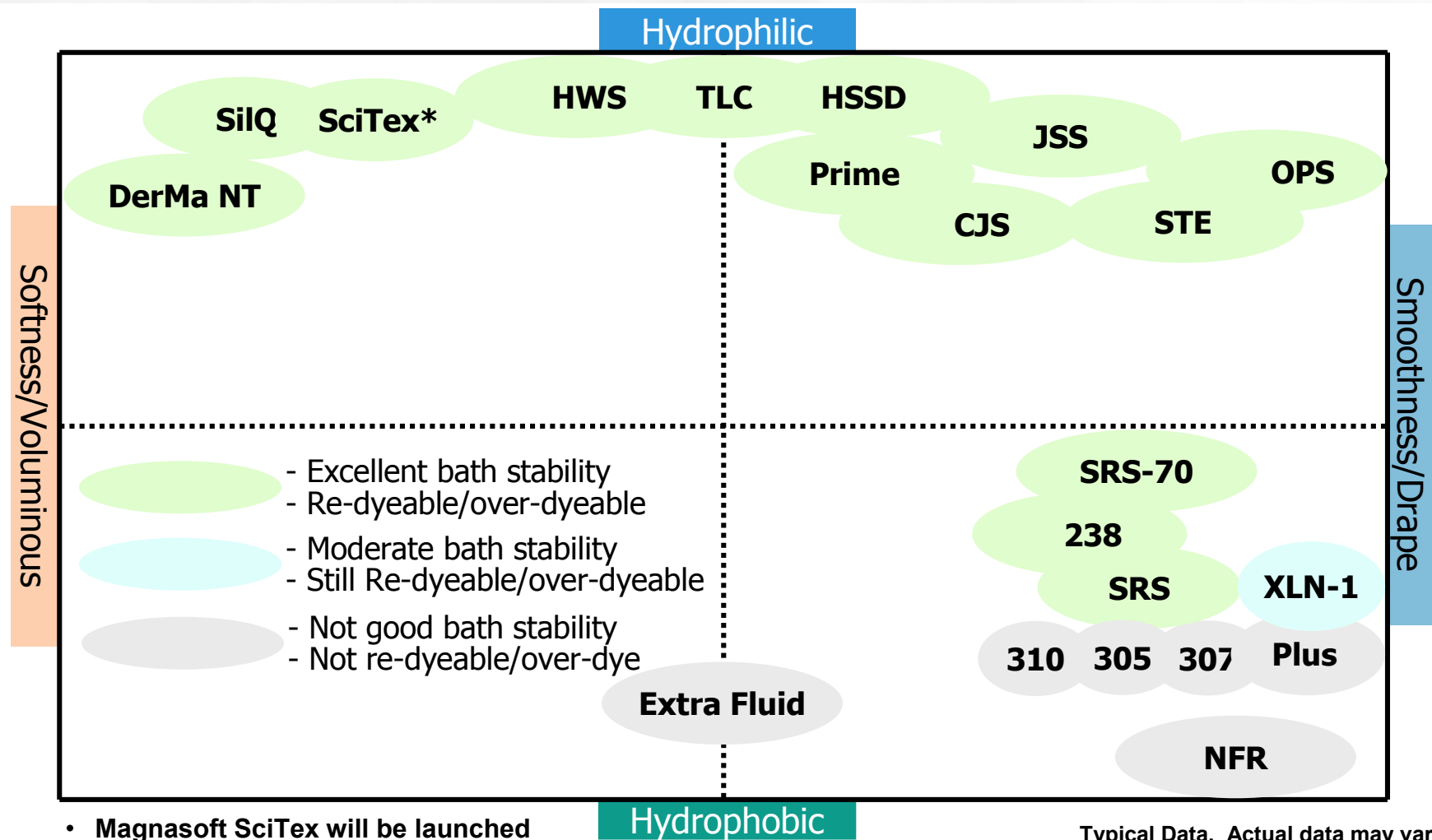
Non-Hydrophilic Functionality



	Magnasoft 238	Magnasoft SRS	Magnasoft SRS-70	Magnasoft XLN-1
Typical Target Fabrics	Replace amino silicone softeners for polyester & cotton	Polyester/cotton fleece, Cotton velure, Wool/Cashmere, Acrylics	Polyester & polyester blends, Cotton velure	All types of synthetic, wool/cashmere and its blends
Typical Hand feel	Bouncy, Limp	Silky, slippery	Silky, smooth	Slick, Drape
Water Absorption	~120 sec	~120 sec	~30 sec	~120 sec
Wash Durability of Softness	2~3 cycles	2~4 cycles	2~4 cycles	3~5 cycles
Stretch Recovery	Good for polyester & PES blends	Good	Good	Good
Shear Stability	Very Good	Very Good	Good	Moderate but good at bath pH 5
Alkaline Stability	Very Good	Very Good	Excellent	Moderate but good at bath pH 5
Emulsifiability	Very Good	Very Good	Very Good	Very Good
(AB)n Silicone %	30%	30%	70%	30%

Typical Data. Actual data may vary.

Performance Mapping Magnasoft* for Textile Softeners



- Magnasoft SciTex will be launched in Q2, 2013

Typical Data. Actual data may vary.

DISCLAIMER: THE MATERIALS, PRODUCTS AND SERVICES OF MOMENTIVE PERFORMANCE MATERIALS INC., MOMENTIVE PERFORMANCE MATERIALS USA INC., MOMENTIVE PERFORMANCE MATERIALS ASIA PACIFIC PTE. LTD., MOMENTIVE PERFORMANCE MATERIALS WORLDWIDE INC., MOMENTIVE PERFORMANCE MATERIALS GmbH, THEIR SUBSIDIARIES AND AFFILIATES DOING BUSINESS IN LOCAL JURISDICTIONS (collectively "SUPPLIERS"), ARE SOLD BY THE RESPECTIVE LEGAL ENTITY OF THE SUPPLIER SUBJECT TO SUPPLIERS' STANDARD CONDITIONS OF SALE, WHICH ARE INCLUDED IN THE APPLICABLE DISTRIBUTOR OR OTHER SALES AGREEMENT, PRINTED ON THE BACK OF ORDER ACKNOWLEDGMENTS AND INVOICES, AND AVAILABLE UPON REQUEST. ALTHOUGH ANY INFORMATION, RECOMMENDATIONS, OR ADVICE CONTAINED HEREIN IS GIVEN IN GOOD FAITH, SUPPLIERS MAKE NO WARRANTY OR GUARANTEE, EXPRESS OR IMPLIED, (i) THAT THE RESULTS DESCRIBED HEREIN WILL BE OBTAINED UNDER END-USE CONDITIONS, OR (ii) AS TO THE EFFECTIVENESS OR SAFETY OF ANY DESIGN INCORPORATING SUPPLIERS' PRODUCTS, MATERIALS, SERVICES, RECOMMENDATIONS OR ADVICE. AFOREMENTIONED EXCLUSIONS OR LIMITATION OF LIABILITY ARE NOT APPLICABLE TO THE EXTENT THAT THE END-USE CONDITIONS AND/OR INCORPORATION CONDITIONS CORRESPOND TO THE RECOMMENDED CONDITIONS OF USE AND/OR OF INCORPORATION AS DESCRIBED BY SUPPLIER IN ITS PRODUCT DATA SHEET AND/OR PRODUCT SPECIFICATIONS. EXCEPT AS PROVIDED IN SUPPLIERS' STANDARD CONDITIONS OF SALE, SUPPLIERS AND THEIR REPRESENTATIVES SHALL IN NO EVENT BE RESPONSIBLE FOR ANY LOSS RESULTING FROM ANY USE OF ITS MATERIALS, PRODUCTS OR SERVICES DESCRIBED HEREIN. Each user bears full responsibility for making its own determination as to the suitability of Suppliers' materials, services, recommendations, or advice for its own particular use. Each user must identify and perform all tests and analyses necessary to assure that its finished parts incorporating Suppliers' products, materials, or services will be safe and suitable for use under end-use conditions. Nothing in this or any other document, nor any oral recommendation or advice, shall be deemed to alter, vary, supersede, or waive any provision of Suppliers' Standard Conditions of Sale or this Disclaimer, unless any such modification is specifically agreed to in a writing signed by Suppliers. No statement contained herein concerning a possible or suggested use of any material, product, service or design is intended, or should be construed, to grant any license under any patent or other intellectual property right of Suppliers or any of its subsidiaries or affiliates covering such use or design, or as a recommendation for the use of such material, product, service or design in the infringement of any patent or other intellectual property right.

Patent Status: Technical subject matter in this publication is described and protected by one or more pending US patent applications.

*Magnasoft is a trademark of Momentive Performance Materials Inc.

Momentive and the Momentive logo are trademarks of Momentive Performance Materials Holdings LLC.