

Rohm and Haas Company

Leather Wet End Technology

Leather Wet End Products

- Wet End Technology Base
 - Acrylic Polymers
 - Leukotans®
 - Acrylic Acid based retanning polymers
 - Lubritans®
 - Acrylic Acid / Ester based retanning/lubricating polymers

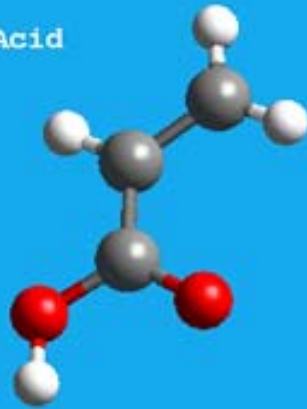
Lubritans®

- Acrylic acid / Ester based polymer compositions
 - Acrylic acid (Hydrophilic)
 - Impart Retanning Properties
 - Break
 - Fullness
 - Ester (Hydrophobic)
 - Impart Fatliquor Properties
 - Strength
 - Softness

Basic Acrylic Monomers

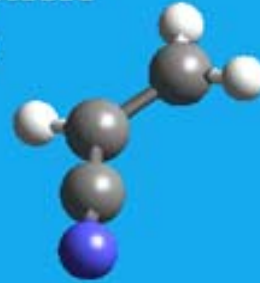
Acrylic Acid

AA



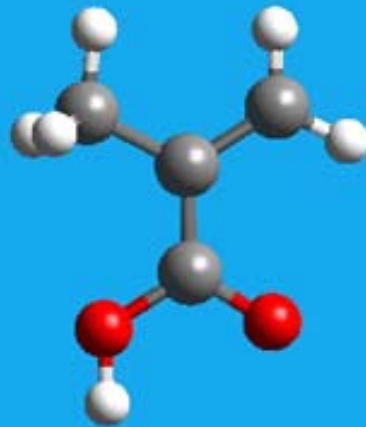
Acrylonitrile

AN



Methacrylic Acid

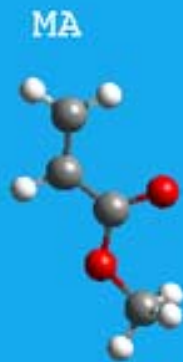
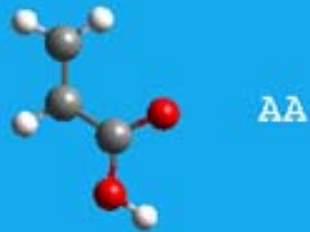
MAA



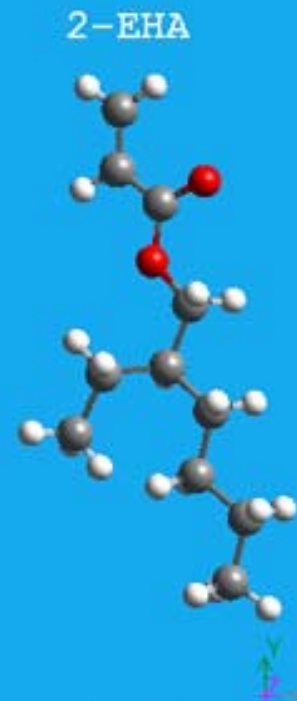
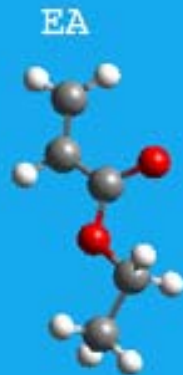
Display by S. Fitzwater

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Monomers Based on Acrylic Acid

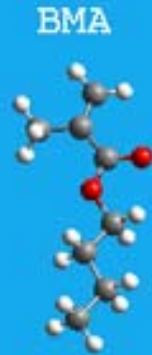


Luglas
Plexigum



Display by S. Fitzwater

Monomers Based on Methacrylic Acid



Acryloids

Display by S. Fitzwater



Polymer Variables Affecting Performance

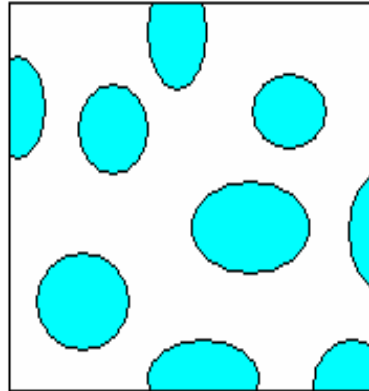
- **Composition**
- **Polymer Chain Length – Longer > more soft, hydrophobic**
- **Molecular Weight – Higher > more fullness**
- **Architecture - Branched > more full, firm**
- **Acid neutralization – Higher > more soft, full**

Lubritan GXL Application

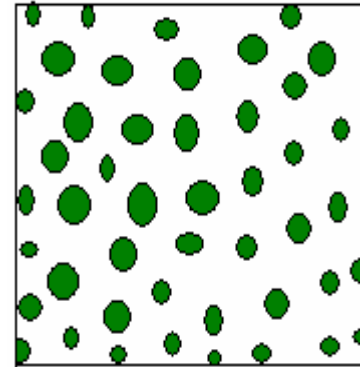
Leukotan / Lubritan GXL / Fatliquors



Leukotan
Free chain

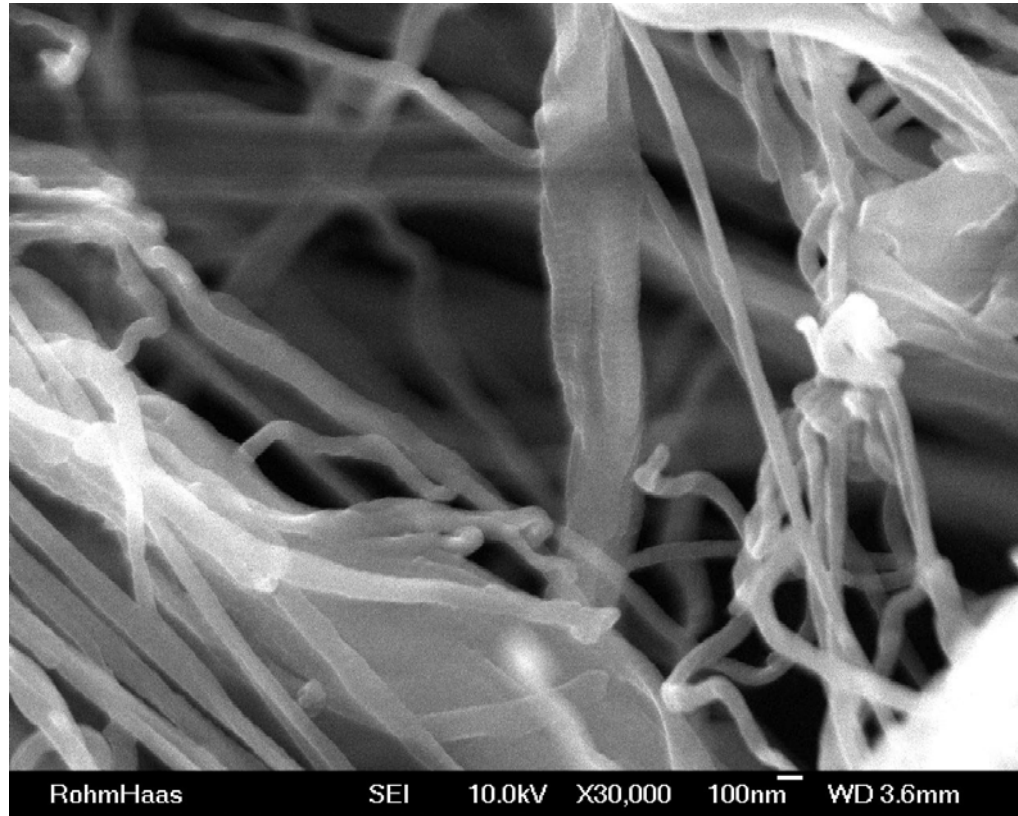


Lubritan
100-300nm

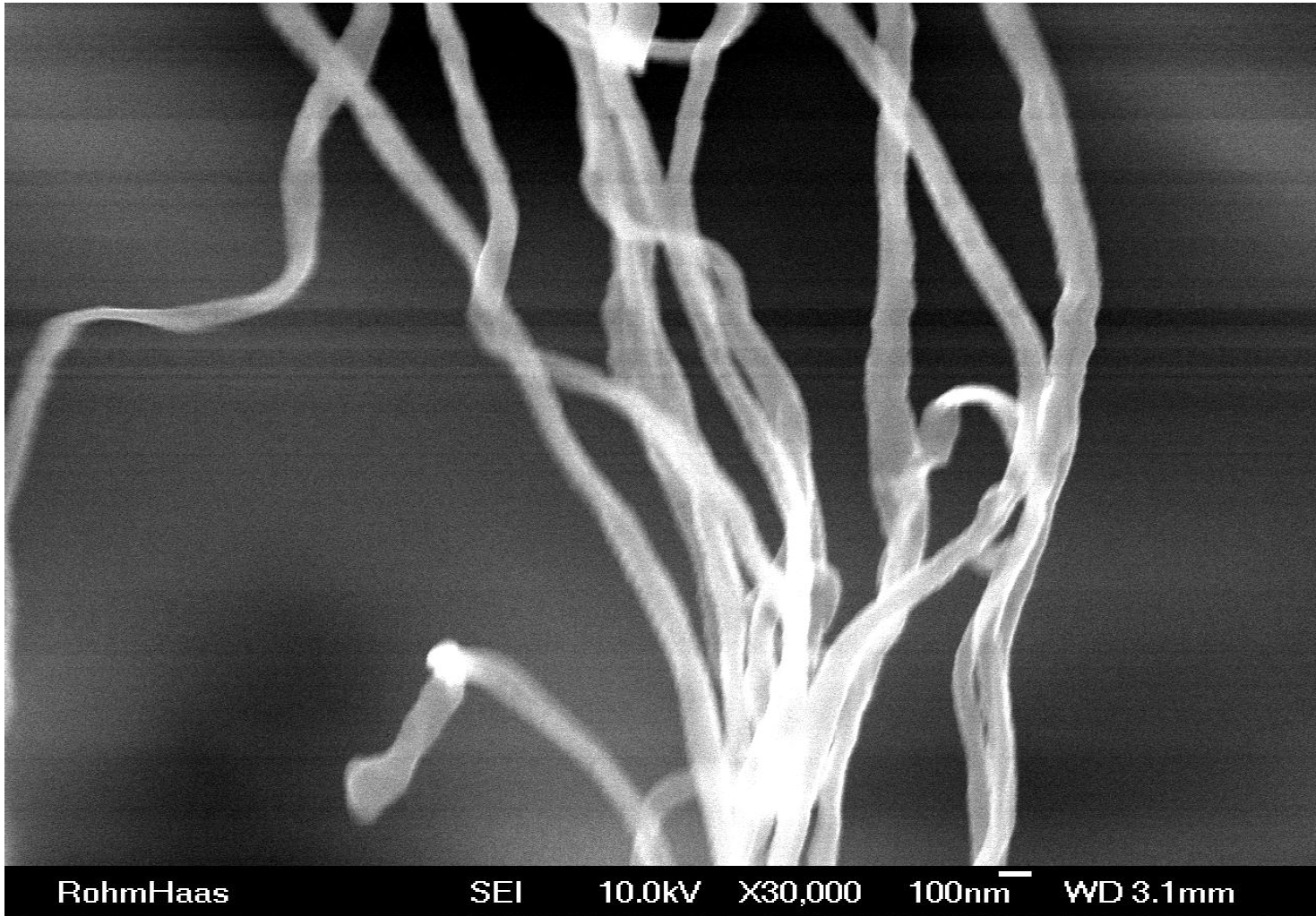


Fatliquor
~60nm(60°C)

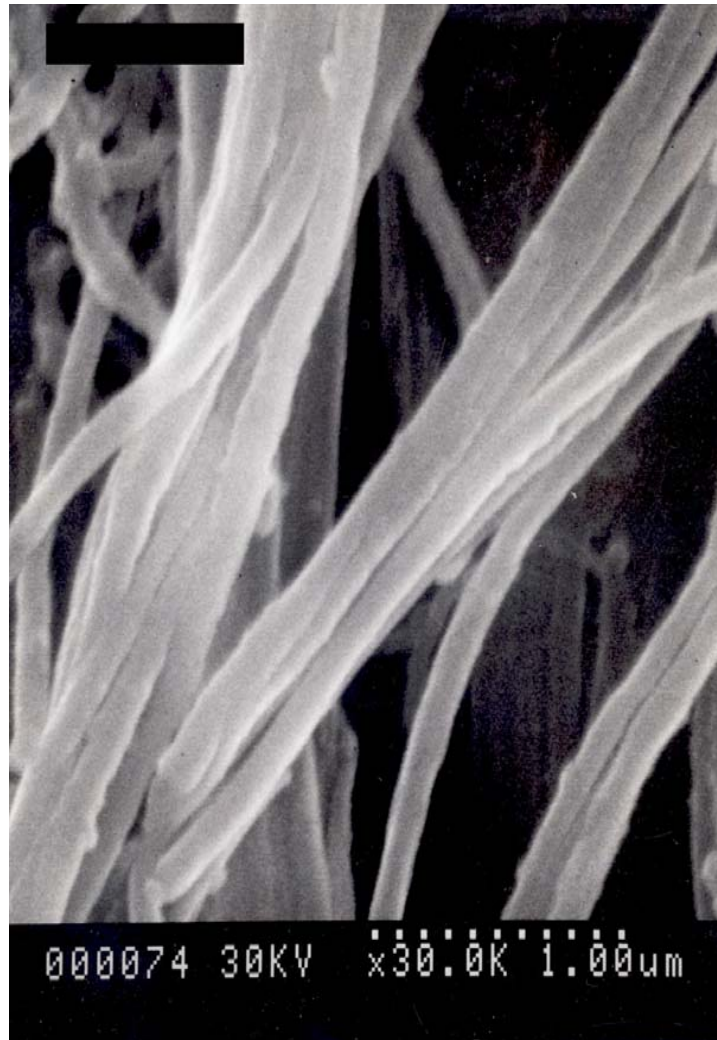
SEM of chrome-tanned fibrils



SEM Fatliquored within Fibrils



SEM Lubritan on Fibrils



Lubritan / Leukotan Properties

- **Strength**
- **Softness**
- **Resistance to ageing**
- **Water resistance**
- Filling
- Low density
- Dispersing
- Level Dyeing
- Water vapor permeability
- Resistance to extraction
- Low / non fogging
- High uptake – low effluent contribution
- Formaldehyde free

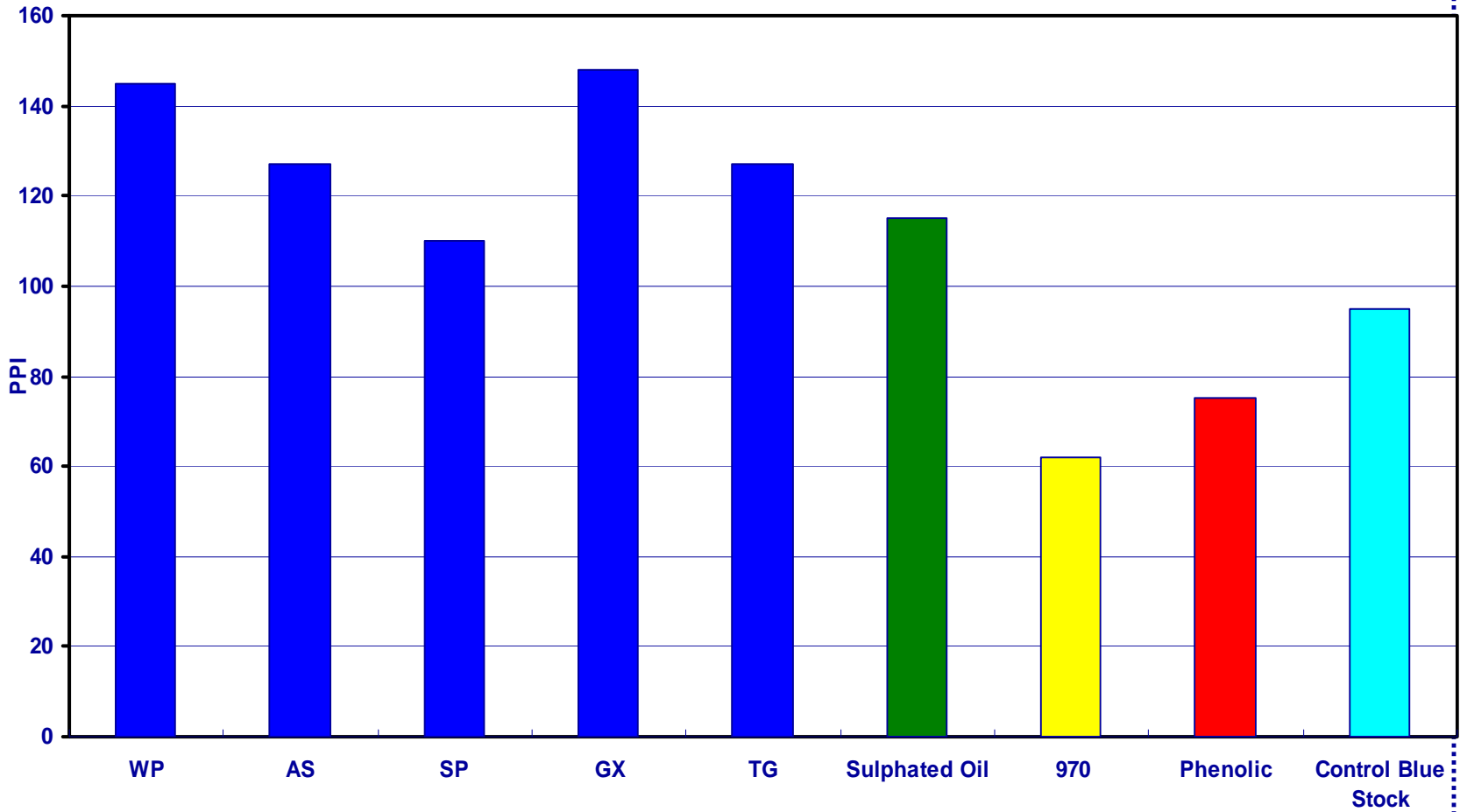
Upholstery Products

- Leukotan 1084 – fullness, embossing
- **Leukotan ERN - fullness, embossing, dispersing**
- Leukotan 8090- pocket filling, grain tightening
- Leukotan 970- break tightening
- Leukotan FW-46 – coloring, feel, fill
- Leukotan MBA - dispersing
- Leukotan NS3 - softness, strength' water resist
- **Lubritan GX / GXL - softness, strength**
- **Lubritan AS - softness, strength, water resist**
- **Lubritan SP - softness, strength, break**
- **Lubritan TG – strength, fullness**

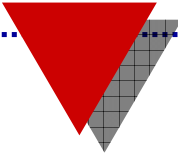
Lubritan GXL – Best Uses

- **Automotive**
 - Tear strength, break, color fastness, light/heat resistance, filling, softness, low fogging, low volatile emissions
- **White Sport Shoe**
 - Tear strength, break, color fastness, light/heat resistance, filling, fullness, softness
- **Splits**
 - Tear strength, buffing, coloring filling, softness
- **High Performance shoe**
 - Tear strength, break, filling, softness
- **High Performance furniture**
 - Tear strength, light/heat resistance, filling, softness

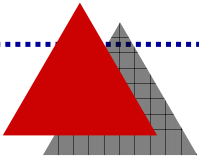
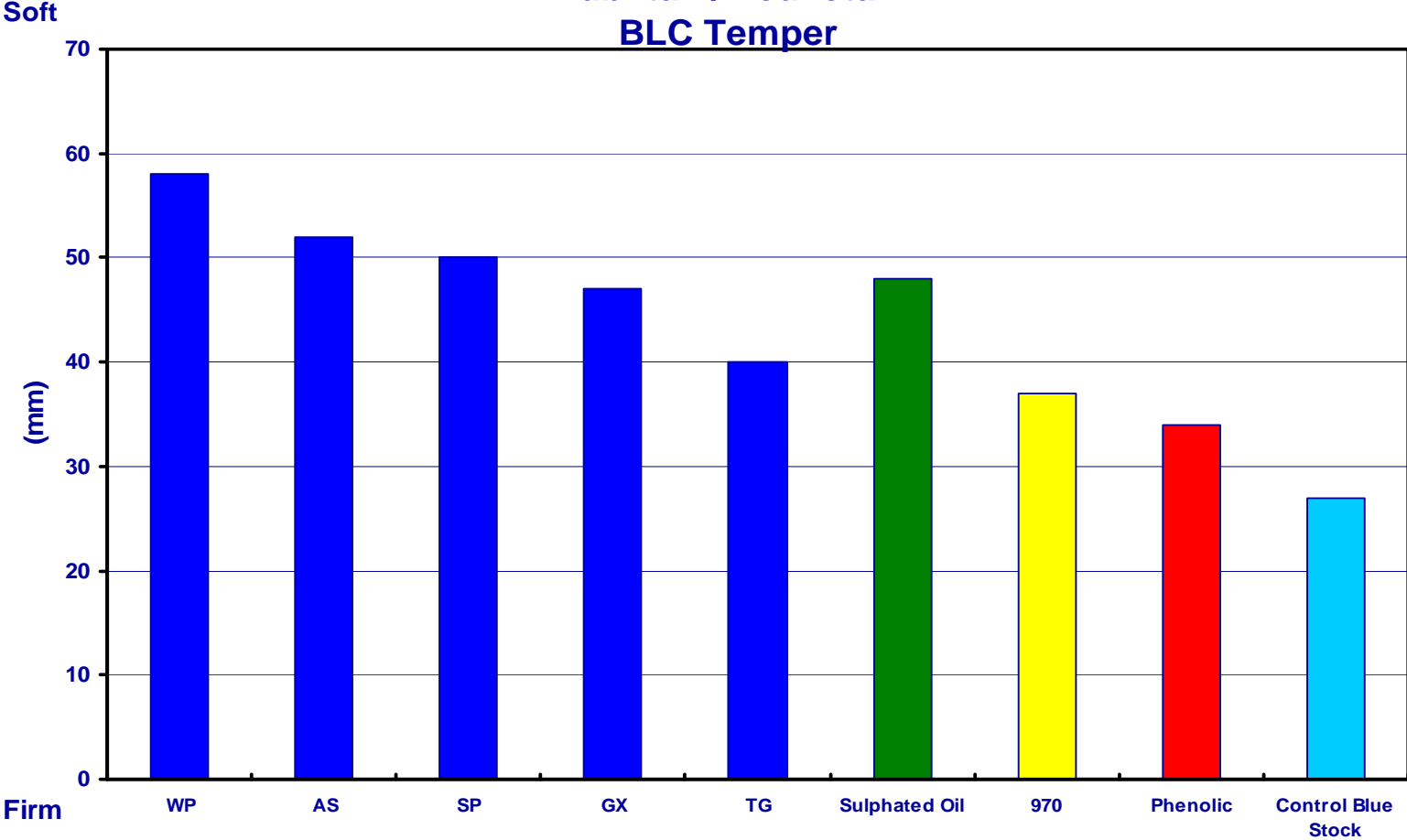
Tongue Tear



Imagine the possibilities™



Lubritan / Leukotan BLC Temper

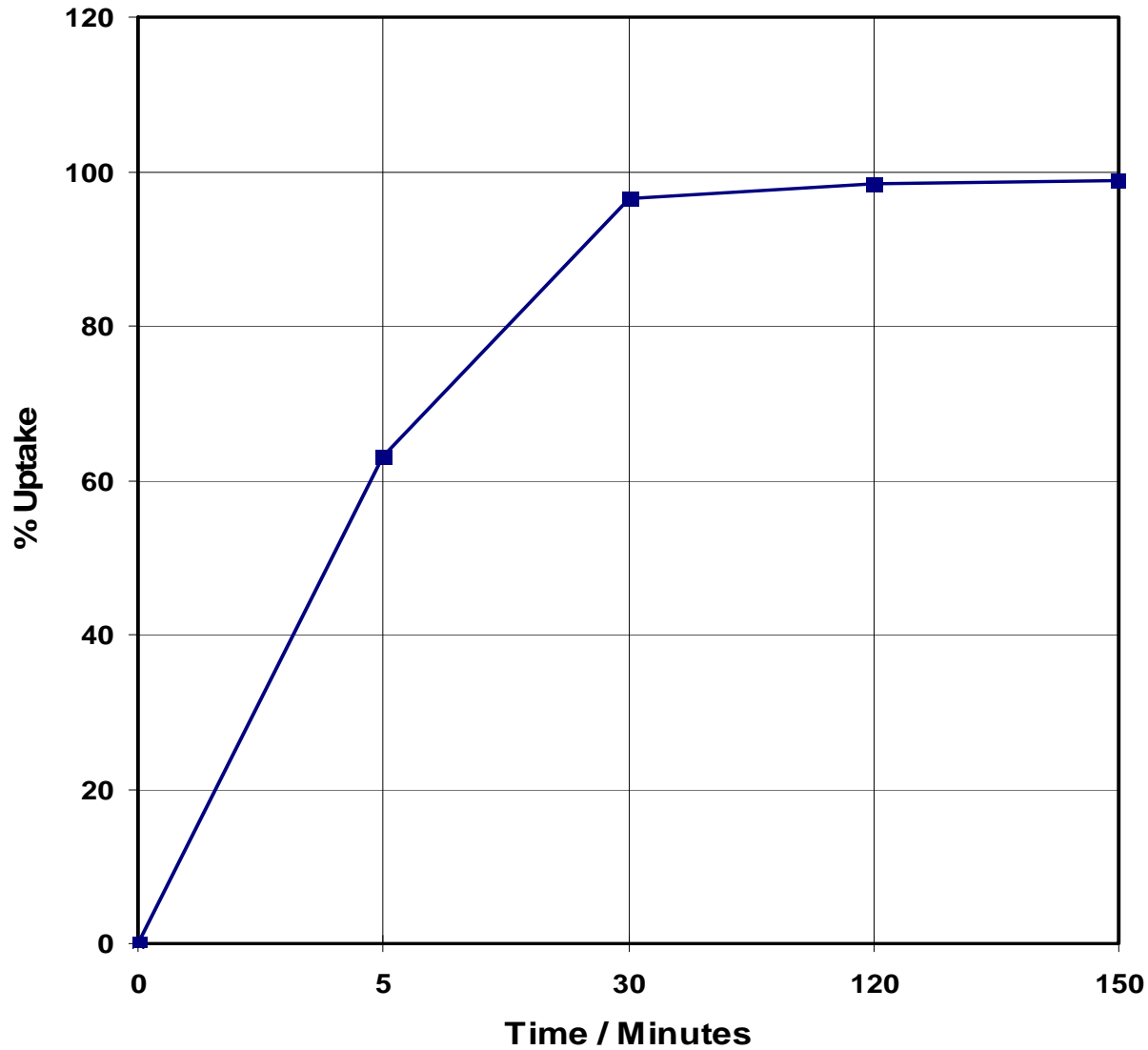


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Lubritan Water Resistance

Lubritan	NS3	SP	TG	AS	GXL	Cont.
Maeser flex x 1000	100+	25	5	35	1	0.1
% Water Absorption	25	29	35	28	70	100

Float Exhaustion of Lubricating Acrylic Syntan (20% Product Offer =7% Solids)



Typical Lubritan Fog Data

	<u>Gravimetric</u>	<u>Reflectance</u>
	(Mg.)	(%)
<u>Lubritan GX</u>		
Blue Stock	0.44	67
Neutralized Blue	0.29	73
GX Crust	0.30	76
<u>Lubritan SP</u>		
Neutralized Blue	0.55	76
4% SP (<i>solids</i>)	0.55	83
6% SP (<i>solids</i>)	0.63	83

Leukotan ERN

Valued Properties

- Break
- Softness
- Fullness
- Dispersing
- Light & Heat Resistance
- Coloring
- Water / Solvent Resistance
- Low Fogging
- High Exhaustion
- Low Volatiles

Leukotan ERN

Dispersing of Lubritan



Without Leukotan

With Leukotan 1084

With Leukotan ERN

Lubritan GXL

Valued Properties

- **Strength**
- **Break**
- **Lightfast & Heat Resistant**
- **Filling**
- **Softness**
- **Coloring**
- **Low Fogging**
- **Good Buffing**
- **Low Volatile emissions**

Lubritan GXL Heat Ageing

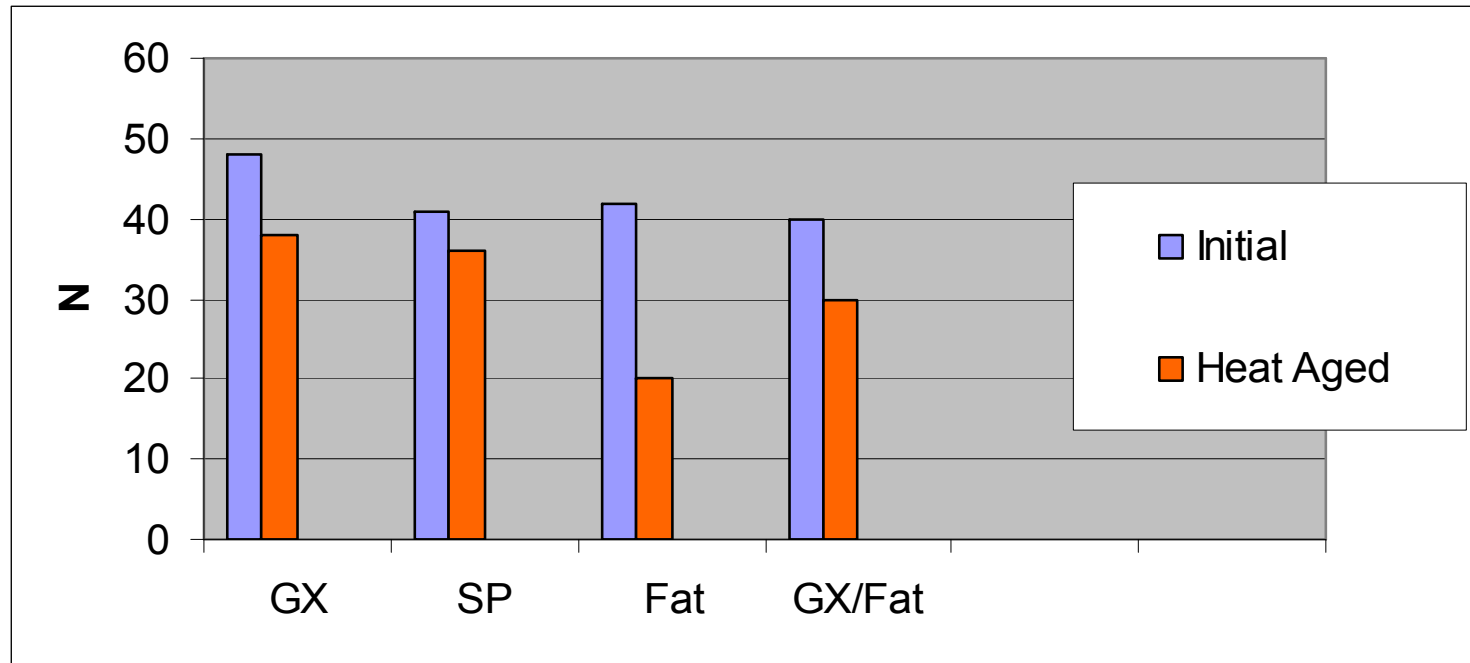


Lubritan GXL

Ageing Resistance

	Initial Tear	Δ 120°C Tear
Fatliquor 1	34 N	2 N
Atlas 95A	43 N	16 N
Lubritan GXL	53 N	20 N

Aged Tear Strength

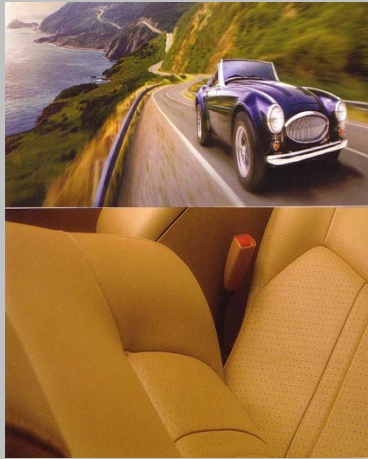


Lubritan GXL

Total volatile carbon emissions

VDA 277 method	Blank control	Lubritan GXL
Acetaldehyde	1.3 ppm	1.1 ppm
Formaldehyde	< 1.0 ppm	< 1.0 ppm

- Automotive



	Leather Type:	Low Fog, Low Density Automotive
ID 8406	Date:	Stock: 1.2 MM blue shaved sides

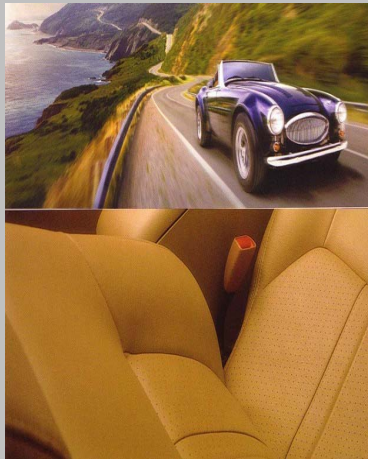
	%		Comment
ID		Test	
		B/S Wgt	
Wash		5' Water @ 40° C.	Combine strips
Add:	100	Water @ 40° C.	
	2.0	Leukotan 970	Rum 20'
	0.5	Sod. Bicarbonate	
	1.0	Tanigan PAK N	
Wash	2.0	Atlas 975 ES 5' @ 40° C.	Rum 40' , pH5.2
Add:	50	Water @ 25° C.	
Add:	3	Leukotan 1084	Rum 20'
Add:	4	Baygenal Black BLD	
	3	Tanigan BN	
	2	TARA Extract	Rum 90'
Heat to 50C			Rum 20'
Add:	1.0	Formic acid (to 4.0)	Rum 10+30' pH 4.0-4.3, Drain
Refloat	100	Water @ 40° C.	
	9	Lubritan GXL	
	6	Atlas -95A	
	2	Levatan L	Rum 90'
Add:	0.5	Formic acid (to <4.0)	Rum 20'
wash		5' Water @ 30C	horse

Vacuum dry @ 45C 3 min; Adjust moisture 18%; Stake @7, Mill 8 Hrs.

Leather Type	Chrome free automotive leather	Stock: 1.1MM Wet White
Key Products	TANIGAN BN / EUREKA 95A / Lubritan GXL	

8/10/06	%	ID	Remarks
Pretanned Shaved Weight			
Wash	300	water 40° C.	
	0.2	Baymol AN	
	2.0	Tanigan PR	Run 20', Drain
Refloat	200	Water @ 25° C.	
	1.0	TANIGAN BN	
	1.0	Leukotan 970	Run 30' pH
Add	1.5	Sodium formate	
	0.5	Sodium bicarbonate	Run 60' pH: 5.1, Drain
Refloat	100	Water @ 35° C.	
Add	5.0	EUREKA 975 ES	
	2.0	Eureka 400R	Run 40' pH
Add	4.0	Tara	
	4.0	Tanigan BN	
	2.0	Twilight Beige	Run 20' , ϕ cut 50 %
Add	5.0	Tara	
	5.0	Tanigan BN	Run 60' ϕ cut 50 % 90 %
Add	20	Water 50°C with 95A	50°C
	5.0	EUREKA 95 A	
	3.0	Lubritan GXL	
	10	Water 40°C with GXL	Run 60' , 50°C, Exhaust cloudy
	0.5	Formic Acid @ 10%	Run 20' , Exhaust Good pH: 4.1- 4.3; Drain
Refloat	100	Water 40°C.	
	3.0	Leukotan FW 46	
	6.0	EUREKA 95 A	
	5.0	Lubritan GXL	Run 60' 40°C; pH:
	1.25	Formic acid in .5% feeds	Run 30' pH 3.8; Drain
Wash 5'	200	Water 25° C.	

- Wet White Automotive



Lubritan GXL Finish Adhesion

Wet adhesion

800 / 800

Dry adhesion

1050 / 1150



BOD COMPARISON

Mg/L

Vegetable Retan Fatliquor

1840

Leukotan Retan Lubritan

697

Methylene Chloride Extractables

% Extractables

Chrome Stock Control

0.75

Retan Process

8.4% Lubritan

0.89

Lubritan GXL Colorimetry

	ΔL (+ black)	Δa (- green)	Δb (+ yellow)	ΔE (Shift >.4)
Blue Stock	-5.68	-2.36	11.89	13.39
Atlas 95A	-4.28	-2.07	10.82	11.82
Lubritan GXL	-4.67	-2.27	6.14	8.00
Fatliquor 1	-9.19	-0.01	18.23	20.41