
Technical Information

December 2006
Supersedes issue dated May 2005

MEMC 050410e-01/Page 1 of 20

Luviflex[®] Silk

® = Registered trademark
of BASF Aktiengesellschaft

Anionic film-forming agent with silicone surfactant for hair setting

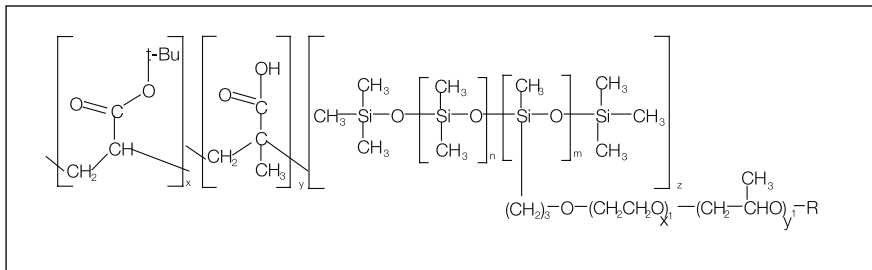
Cosmetic Solutions

- Hair Care
- Skin Care
- Oral Care

Description Luviflex Silk is a hair setting polymer which has been developed especially for hairsprays with little or no water content (VOC 80"/VOC 100"). The unique chemical /physical character gives this polymer exceptional sensory properties, such as giving the hair a pleasant soft, silky feel making it easy to comb and providing it with natural, flexible hold.

Chemical composition Luviflex Silk contains approx. 50% polymer and approx. 50% ethanol (abs.).

Formula



Chemical nature Reaction product of t-butyl acrylate, methacrylic acid and dimethicone copolyol.

INCI Name PEG/PPG-25/25 Dimethicone/Acrylates Copolymer

CAS No. 248935-80-0

PRD No. 30073679

Physicochemical properties

Appearance Colourless to faint yellow, clear to slightly opalescent, approx. 50% solution in ethanol.

Odour Weak characteristic odour

Solubility Luviflex Silk is a silicone-containing anionic polymer product. The acid groups are neutralised for use in hair setting.

This is usually done with AMP. After neutralisation with AMP (70 – 100%), Luviflex Silk forms clear solutions (5% solids) at room temperature in ethanol, isopropanol and an 8 : 2 ethanol-water mixture, i.e. Luviflex Silk is ideal for VOC 80 to VOC 100 formulations (with little or no water).

Polymer compatibility Luviflex Silk is perfectly compatible with many other hair setting polymers, such as with PVP, PVP/VA copolymer, polyvinylcaprolactam, acrylates copolymer, acrylates/acrylamide copolymer, octylacrylamide/acrylates copolymer, octylacrylamide/acrylates/ butylaminoethyl methacrylate copolymer, VA/ crotonates/vinyl neodecanoate copolymer and many other commercially available polymers (refer also to the statement on the „patent situation” on p. 16).

As Luviflex Silk is an anionic polymer, mixtures with cationic polymers can lead to incompatibilities (such as clouding and sedimentation).

Molecular weight (Mw) approx. 75 000 – 100 000 g/mol (determined with GPC)

Glass temperature (Tg) The glass temperature is approx. 55°C (according to DSC-measurement; storage at approx. 23°C and approx. 55% r.H.)

Specification

Parameter	Limits
Solids content	48.0 - 52.0%
K-value (1% in ethanol)	37.0 - 41.0
Acid value	65.0 - 85.0 mg KOH/g
Residual monomers (total)	≤100 mg/kg

Why silicones in hairsprays

Hairsprays often contain mixtures of hair setting polymers and silicones as additives. Silicones are known for having a positive effect on the sensory properties (such as hold, feel, gloss, flaking etc.). But it is the incorporation of silicone into hair setting formulations which often causes various disadvantages which do not occur in the case of Luviflex Silk.

The advantages of Luviflex Silk in comparison to mixtures of polymers with silicones commonly available in the market can be seen in the following (Fig. 1):

Fig. 1: Comparison of a formulation of a polymer/silicone mixture with Luviflex Silk

	Mixtures Polymer/ Silicone => Disadvantages	Luviflex Silk => Advantages
Compatibility polymer <==> silicone	often causes problems	no problem / good
Formulation expense (development time)	high	low
Stability/lifetime of the formulation	often short	long
Removal/Washing out „Build up effect“	often bad frequently causes problems	excellent no „Build up effect“
Setting effect	Decreasing Level depends on type of silicone and content	slight decrease opti- mised silicone contain- ing polymer

Comparison of Luviflex Silk to conventional hairstyling polymers

In comparison to conventional hair-setting polymers, Luviflex Silk has some clear advantages:

- exceptional sensory properties (such as hair is left feeling very pleasant, soft and silky)
- excellent combing properties when dry
- natural/flexible hold
- no flaking/beading before/after combing and
- washes out very well.

Due to its particular chemical/physical structure, Luviflex Silk not only gives hair a soft, velvety feel but also a less hard and rough hold compared in particular with acrylate-based polymers. In the following figures 2 and 3, the principle differences to conventional hairspray polymers can be seen.

Fig. 2: Luviflex Silk in comparison to conventional hairspray polymers

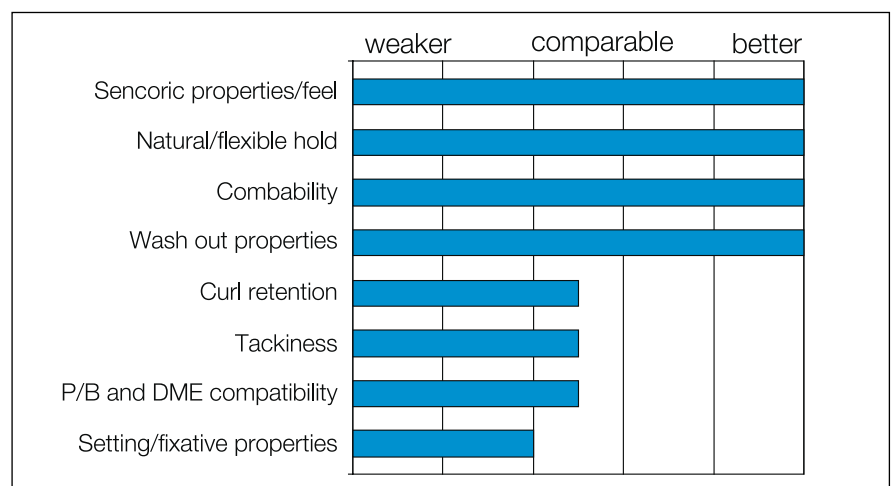
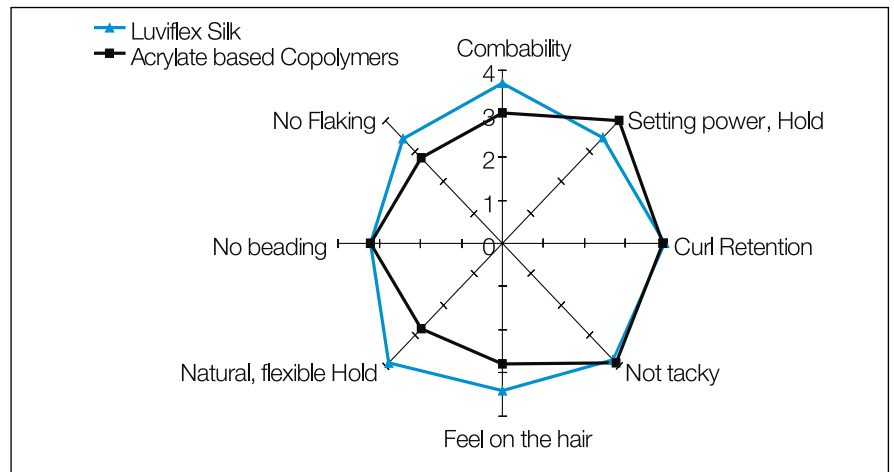


Fig. 3: Qualitative comparison of Luviflex Silk with acrylate based hair-setting polymers

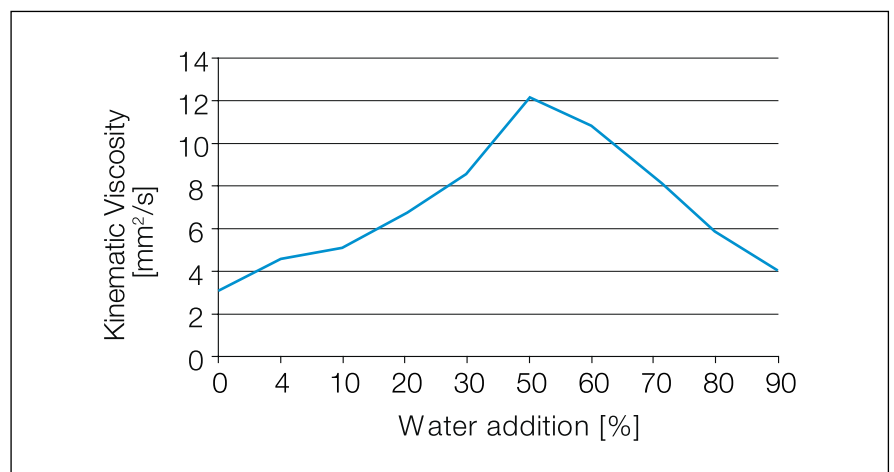


Technical properties of Luviflex Silk

Suitability for hairsprays

Luviflex Silk is used in hair cosmetics for hair-setting and forming a film. It has excellent properties for both aerosol sprays and non-aerosol products (pump-action sprays, lotions etc.). Luviflex Silk has been especially developed for hairsprays containing little or no water (VOC 80 / VOC 100). This acrylate polymer is not suitable for hairsprays with a high water content (VOC 55) due to the high viscosities and the correspondingly bad spray parameters (Fig. 4). Luviset® P.U.R. has especially been developed for this formulation area. However, formulations in the VOC 55 range with little or no water with the aerosol dispenser HFC 152 A work well.

Fig. 4: Dependency of the kinematic viscosity of the water content; 3% by weight polymer (solids)



Propellant compatibility

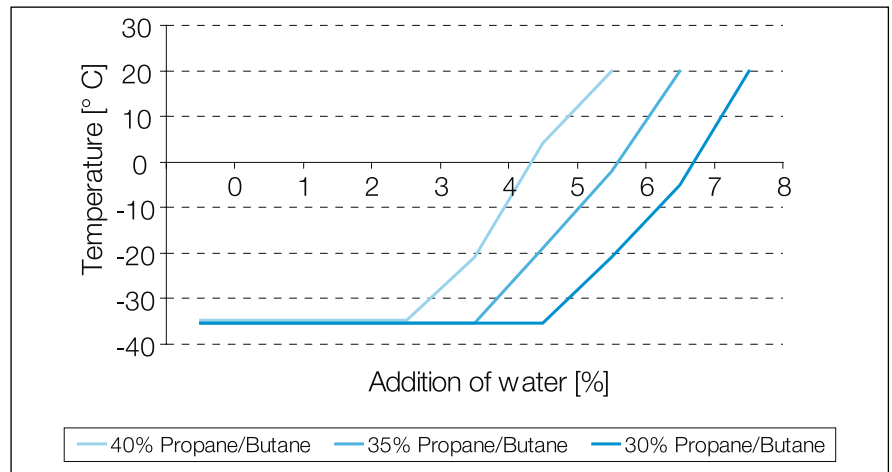
Alcoholic solutions with Luviflex Silk are perfectly compatible with propane/butane mixtures (45 – 50%) and dimethylether (55 – 65%).

In general, AMP (2-amino-methylpropanol) as a neutralising agent and a neutralisation degree of 70 - 100% are recommended. Using the neutralisation agent DEPA (3-diethylamino-1-propylamine) can however increase the propane/butane compatibility to approx. 65%.

Cloud point

The propane/butane compatibilities (cloud points) at various levels of water addition can be seen in Fig. 5. With formulations (3 - 5% Polymer solids) with approx. 30 - 40% propane/butane and approx. 4 - 6% water addition, cloud points below -20°C can be attained. Without water addition, formulations up to approx. 50% propane/butane are possible without any problem. The cloud points are then always below -30°C.

Fig. 5: Propane/butane compatibilities with water addition, 5% by weight polymer (solids)



If DME (Dimethylether) is chosen as the propellant, then formulations (3 - 5% polymer solids) with up to 55 - 65% DME and 0 - 20% water addition are also possible without any problem. The cloud points are then always below -20°C .

With hydrofluorocarbons, e. g. HFC 152 A, alternative formulations in the low VOC-range (VOC 55) can be produced. In this case, formulations (3 - 5% polymer solids) with water additions up to approx. 10% and aerosol dispenser additions of 30 - 40% HFC 152 A or mixtures DME/HFC 152 A (e.g. 10% / 30%) are possible, whereby the cloud points are always below -15°C .

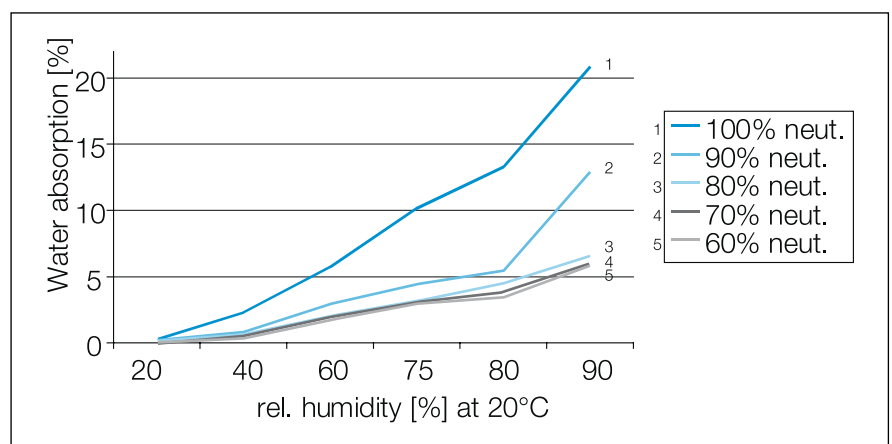
Neutralisation agent / Degree of neutralisation

For normal applications, 2-aminomethylpropanol (AMP) and a neutralisation degree of 70 - 100% are recommended.

Water absorption

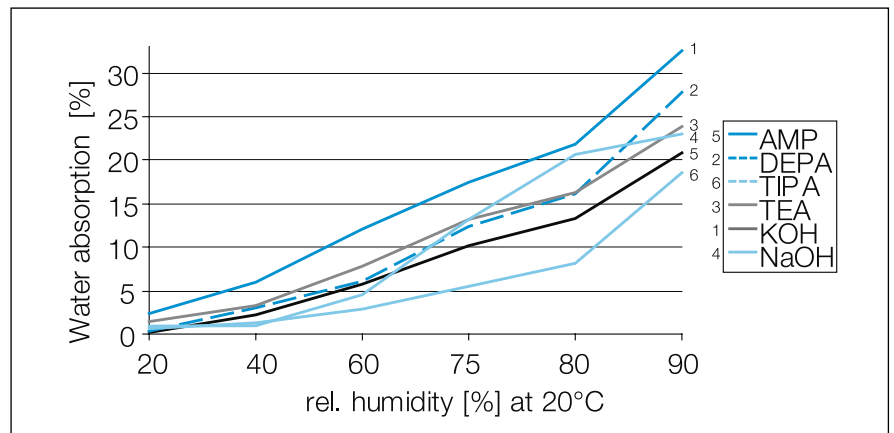
As an anionic, acrylate-containing polymer, Luviflex Silk has varying levels of water absorption at different degrees of neutralisation. The lower the degree of neutralisation, the lower the water absorption. But even with high degrees of neutralisation (up to 100%) and high air humidity (up to 90% relative humidity) Luviflex Silk only absorbs a small amount of water (max. 20% by weight, Fig. 6). In comparison to this, some other hair-setting polymers: PVP (Luviskol® K 30): approx. 55% water absorption; PVP/VA 60 : 40 (Luviskol VA 64): approx. 35 %; Luvimer® 100 P and other acrylate polymers: approx. 25 %; Luviskol Plus: approx. 25%.

Fig. 6: Water absorption with varying degrees of neutralisation



In comparison to other bases, with the neutralisation agent AMP Luviflex Silk has a very low level of water absorption, which has a very positive effect on the low level of tack. (Fig. 7)

Fig. 7: Water absorption with various neutralisation agents



Tack

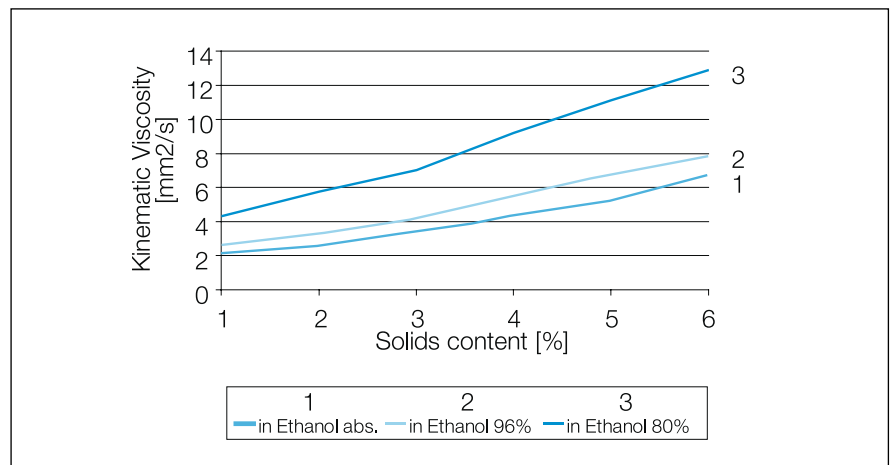
Formulations with Luviflex Silk (100% neutralised with AMP), analogue with formulations with acrylate copolymers, show no tack (at 20 – 30°C and up to 80% relative humidity)

Even at high levels of air humidity – in a subtropical climate of up to 90% relative humidity – and high temperatures (30 – 40°C), Luviflex Silk formulations feel either slightly/not at all tacky if only **neutralised at 80 – 90% with AMP**.

Viscosity of the polymer solution

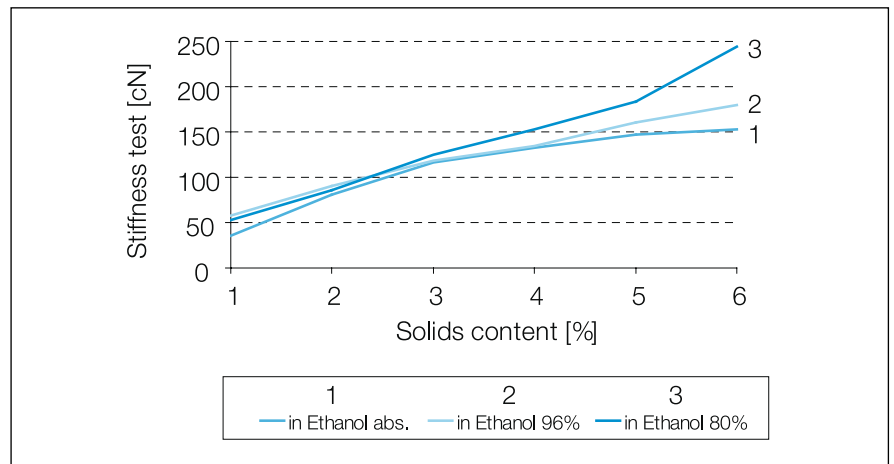
In Fig. 8 it can be seen that various types of formulation (with little or no water / VOC 80) differ in their kinematic viscosity. The higher the water addition, the higher the increase in viscosity. However all 3 types of formulation (ethanol abs., 96% ethanol, VOC 80) with a polymer solids content of 2 - 6% spray well.

Fig. 8: Kinematic viscosity depending on the solids content



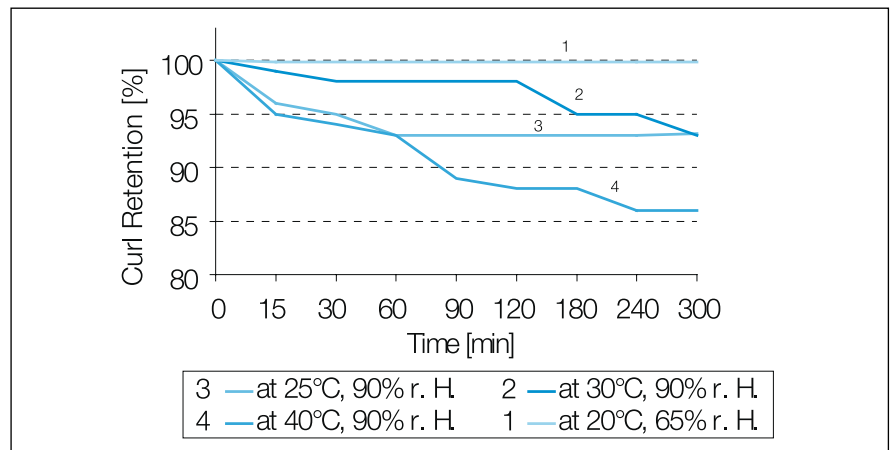
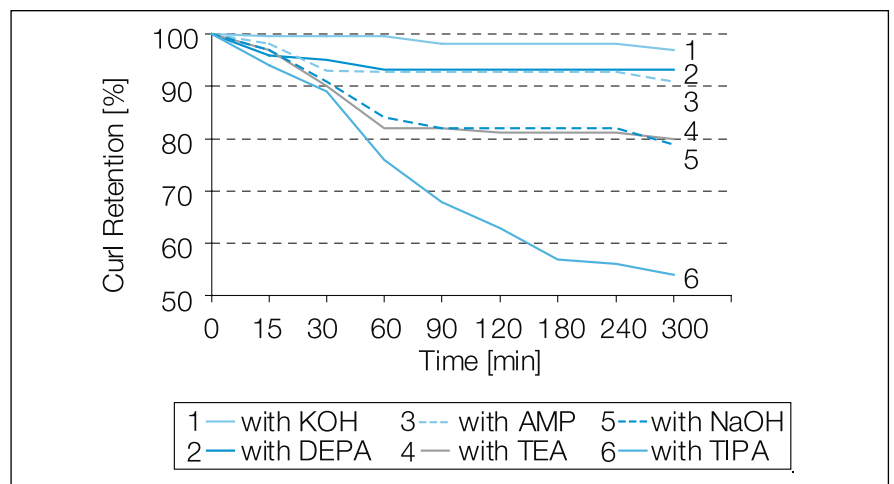
Setting effect/Hold

Although Luviflex Silk has slightly less hold with anhydrous formulations than pure acrylate copolymers (such as Luvimer®- and Ultrahold® types), it instead gives the hair a natural, flexible with exceptional sensory properties. However if a little water is added to the formulation (max. 20%), then in particular with a high polymer solids content (4 - 6%) a significantly higher setting effect can be seen (Fig. 9).

Fig. 9: Setting effect depending on the solids content**Curl retention**

Luviflex Silk not only has excellent Curl Retention (100% after 5 hours) in a dry climate (20°C; 65% relative humidity) but also under extreme climate conditions (30°C; 90% relative humidity) it still has an unexpectedly high Curl Retention of approx. 93% after 5 hours (Fig. 10).

In this case as well, AMP is the best aminic neutralisation agent which produces the highest Curl Retention values (approx. 95% after 5 hours, Fig. 11).

Fig. 10: Curl Retention at various levels of air humidity (1.8% solids, 100% neut. with AMP)**Fig. 11: Curl Retention with various neutralisation agents (1.8% solids, 100% neut.; 30°C; 90% relative humidity)**

Flexibility

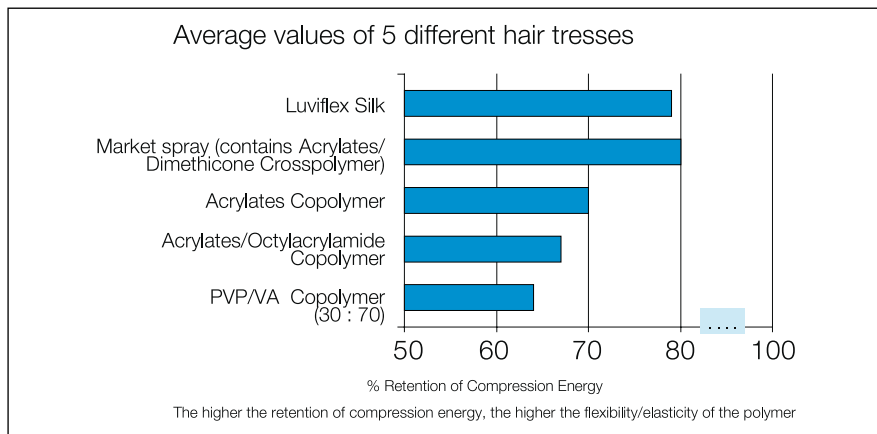
Luviflex Silk provides excellent flexible hold which has been proven in a “Flexibility test”. This test was developed with the Textile Research Institute (TRI) in Princeton / NJ:

Hair laid out in a circle was pulled through a ring with a diameter of 3.75 cm several times. Then the change in the compression energy between the first and the fifth cycle was measured. Elastic polymers show a smaller change in the compression energy; hard, inflexible polymers show a higher change in the compression energy.

Or: the higher the retention of compression energy, the higher the flexibility/elasticity of the polymer.

Compared with acrylates and PVP/VA copolymers, Luviflex Silk has the highest flexibility. This result has been confirmed by user tests (Panel Tests).

Fig. 12: Comparison of the elasticity / flexibility of some hair-setting polymers



Panel Test

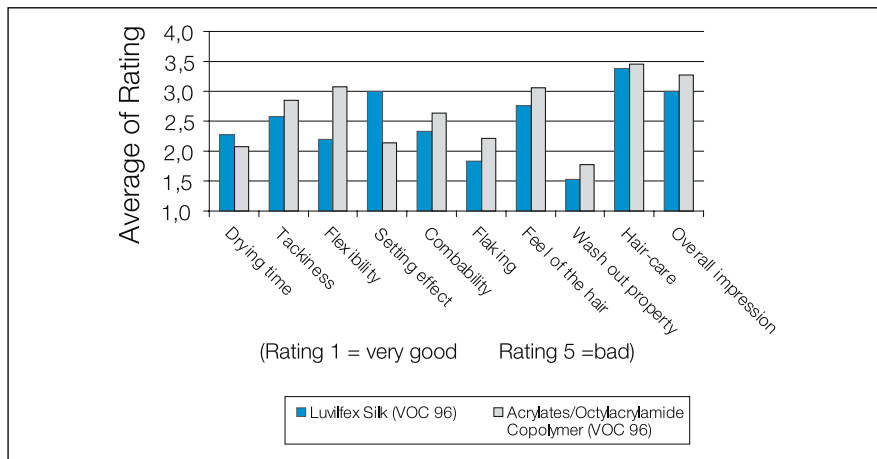
A Luviflex Silk formulation (VOC 96) was compared to an acrylates/ octylacrylamide copolymer formulation (VOC 96) with regards to various application-related parameters (flexibility, feel of the hair, ability to comb, hold/ setting effect, flaking, ability to wash out, tack and overall impression). Both formulations contained 4% polymer solids, 56% ethanol abs. and 40% propane/ butane. The Panel Test was carried out over several weeks as a double-blind study with 20 test persons.

Luviflex Silk provided better results in comparison to acrylates/octylacrylamide copolymer in:

- Flexibility
- Feel of the hair
- Ability to comb
- Flaking
- Ability to wash out
- Overall impression

Some of the testers only noticed the slightly better hold of the acrylates/ octylacrylamide copolymer formulation (Fig. 13).

Fig. 13 Panel Test: Comparison of Luviflex Silk (VOC 96) with acrylates/ octylacrylamide copolymer (VOC 96)



Examples of formulations

1. Examples for aerosol hairsprays (without water) with Luviflex® Silk (Formulation No.; Figures given in %; Degree of neutralisation 100%)**Hairspray "Feel the Silk"****No. 01/01160**

	%	Ingredients	Supplier	INCI name
A	8.00	Luviflex® Silk	(1)	PEG/PPG-25/25 Dimethicone/ Acrylates Copolymer
	0.95	AMP	(56)	Aminomethyl Propanol
	50.95	Ethanol abs.		Alcohol
	0.10	D-Panthenol USP	(1)	Panthenol
	q.s.	Perfume		
B	40.00	Propane/Butane		Propane/Butane

Production:

Weigh out the components of phase A and stir until a homogeneous solution is obtained. Fill into appropriate containers and charge with phase B.

Properties:

Cloud point: -35°C still clear
 Density: 0.7740 g/cm³
 Pressure: 3.9 bar
 Valve: 3731/1 Precision

Gloss-Hairspray with Luviflex® Silk, normal hold**No. 01/01180**

	%	Ingredients	Supplier	INCI name
A	6.00	Luviflex Silk	(1)	PEG/PPG-25/25 Dimethicone/ Acrylates Copolymer
	0.72	AMP	(56)	Aminomethyl Propanol
	0.50	Dow Corning 556 Cosmetic Grade Fluid	(16)	Phenyl Trimethicone
	52.78	Ethanol		Alcohol
B	40.00	Propane/Butane		Propane/Butane

Production:

Weigh out the components of phase A and stir until a homogeneous solution is obtained. Fill into appropriate containers and charge with phase B.

Properties:

Pressure: 3.9 bar (20°C)
 Density: 0.7280 g/ml

Hairspray with Luviflex® Silk and UV-protection**No. 01/01230**

	%	Ingredients	Supplier	INCI name
A	6.00	Luviflex Silk	(1)	PEG/PPG-25/25 Dimethicone/ Acrylates Copolymer
	0.72	AMP	(56)	Aminomethyl Propanol
	52.78	Ethanol abs.		Alcohol
	0.50	Uvinul® MS 40	(1)	Benzophenone-4
	q.s.	Perfume		
B	40.00	DME		Dimethylether

Production: Weigh out the components of phase A and stir until a homogeneous solution is obtained. Fill into appropriate containers and charge with phase B.

Properties: Cloud point: -35°C still clear
Density: 0.7500 g/cm³
Pressure: 3.7 bar
Valve: 5227/1 Precision

2. Examples for aerosol hairsprays (without water) with Luviflex® Silk combined with nonionic (Luviskol VA 37, Luviskol Plus) and anionic (Luvimer, Ultrahold, Luviset CAN) polymers (Formulation No.; Figures given in %; Degree of Neutralisation 100%)

Hairspray with Luviflex® Silk, Luviskol® VA 37 E**No. 01/01164**

	%	Ingredients	Supplier	INCI name
A	4.80	Luviflex Silk	(1)	PEG/PPG-25/25 Dimethicone/ Acrylates Copolymer
	1.20	Luviskol VA 37 E	(1)	VP/VA Copolymer
	0.57	AMP	(56)	Aminomethyl Propanol
	53.43	Ethanol		Alcohol
B	40.00	Dimethyl Ether		Dimethyl Ether

Production: Weigh out the components of phase A and stir until a homogeneous solution is obtained. Fill into appropriate containers and charge with phase B.

Properties: Pressure: 3.8 bar (20°C)
Density: 0.8296 g/ml
Cloud point: -35°C clear

Hairspray with Luviflex® Silk and Luviskol® VA 37 E**No. 01/01173**

	%	Ingredients	Supplier	INCI name
A	3.00	Luviflex Silk	(1)	PEG/PPG-25/25 Dimethicone/ Acrylates Copolymer
	3.00	Luviskol VA 37 E/I	(1)	VP/VA Copolymer
	0.36	AMP	(56)	Aminomethyl Propanol
	53.64	Ethanol abs.		Alcohol
	q.s.	Perfume		
B	40.00	DME		Dimethylether

Production: Weigh out the components of phase A and stir until a homogeneous solution is obtained. Fill into appropriate containers and charge with phase B.

Properties: Cloud point: -35°C still clear
Density: 0.8040 g/cm³
Pressure: 3.8 bar
Valve: 5227/1 Precision

Hairspray with Luviflex® Silk, Luviskol® Plus; normal hold**No. 01/01169**

	%	Ingredients	Supplier	INCI name
A	4.80	Luviflex Silk	(1)	PEG/PPG-25/25 Dimethicone/ Acrylates Copolymer
	1.50	Luviskol Plus	(1)	Polyvinylcaprolactam
	0.57	AMP	(56)	Aminomethyl Propanol
	53.13	Ethanol		Alcohol
B	40.00	Propane/Butane		Propane/Butane

Production: Weigh out the components of phase A and stir until a homogeneous solution is obtained. Fill into appropriate containers and charge with phase B.

Properties: Pressure: 4.2 bar
Density: 0.7360 g/ml
Cloud point: -35°C clear

Hairspray with Luviflex® Silk and Luviskol® Plus**No. 01/01176**

	%	Ingredients	Supplier	INCI name
A	1.20	Luviflex Silk	(1)	PEG/PPG-25/25 Dimethicone/ Acrylates Copolymer
	6.00	Luviskol Plus	(1)	Polyvinylcaprolactam
	0.14	AMP	(56)	Aminomethyl Propanol
	52.66	Ethanol abs.		Alcohol
	q.s.	Perfume		
B	40.00	Propane/Butane		Propane/Butane

Production: Weigh out the components of phase A and stir until a homogeneous solution is obtained. Fill into appropriate containers and charge with phase B.

Properties: Cloud point: -35°C still clear
Density: 0.7200 g/cm³
Pressure: 4.3 bar
Valve: 3731/1 Precision

3. Examples for pump hairsprays (without water) with Luviflex® Silk and combinations of Luviflex® Silk with nonionic (Luviskol Plus) and anionic (Ultrahold) polymers (Formulation No.; Figures given in %; Degree of neutralisation 100%)

Gloss Pump Setting Spray with Luviflex® Silk

No. 01/01184

	%	Ingredients	Supplier	INCI name
A	14.00	Luviflex Silk	(1)	PEG/PPG-25/25 Dimethicone/ Acrylates Copolymer
	1.66	AMP	(56)	Aminomethyl Propanol
	0.80	Dow Corning 556 Cosmetic Grade Fluid	(16)	Phenyl Trimethicone
	83.54	Ethanol		Alcohol

Production:

Weigh out the components of phase A and stir until a homogeneous solution is obtained.

Pump Setting Spray with Luviflex® Silk, Luviskol® Plus

No. 01/01171

	%	Ingredients	Supplier	INCI name
A	11.20	Luviflex Silk	(1)	PEG/PPG-25/25 Dimethicone/ Acrylates Copolymer
	3.50	Luviskol Plus	(1)	Polyvinylcaprolactam
	1.34	AMP	(56)	Aminomethyl Propanol
	83.96	Ethanol		Alcohol

Production:

Weigh out the components of phase A and stir until a homogeneous solution is obtained.

Pump-Setting-Spray with Luviflex® Silk and Ultrahold® Strong

No. 01/01168

	%	Ingredients	Supplier	INCI name
A	11.20	Luviflex Silk	(1)	PEG/PPG-25/25 Dimethicone/ Acrylates Copolymer
	1.51	AMP	(56)	Aminomethyl Propanol
	85.89	Ethanol abs.		Alcohol
	q.s.	Perfume		
B	1.40	Ultrahold Strong	(1)	Acrylates/t-Butylacrylamide Copolymer

Production:

Weigh out the components of phase A and stir until a homogeneous solution is obtained. Add phase B and stir again until a homogeneous solution is obtained.

4. Examples for VOC 80 aerosol hairsprays (with water) with Luviflex® Silk and combinations of Luviflex® Silk with nonionic (Luviskol VA 37, Luviskol Plus) and anionic (Luviset CAN, Luviset P.U.R., Luvimer) polymers (Formulation No.; Figures given in %; Degree of neutralisation 100%)

Pump-Setting-Spray with Luviflex® Silk and Luviskol® VA 37 E in VOC 80 No. 01/01186

	%	Ingredients	Supplier	INCI name
A	4.80	Luviflex Silk	(1)	PEG/PPG-25/25 Dimethicone/Acrylates Copolymer
	1.20	Luviskol VA 37 E/1	(1)	VP/VA Copolymer
	0.57	AMP	(56)	Aminomethyl Propanol
	37.00	Ethanol abs.		Alcohol
	16.43	Water, dem.		Aqua
	q.s.	Perfume		
B	40.00	DME		Dimethylether

Production: Weigh out the components of phase A and stir until a homogeneous solution is obtained. Fill into appropriate containers and charge with phase B.

Properties: Cloud point: -35°C still clear
Density: 0.8204 g/cm³
Pressure: 3.7 bar
Valve: 5227/1 Precision

Hairspray VOC 80 with Luviflex® Silk and Luviskol® Plus; high curl retention No. 01/01189

	%	Ingredients	Supplier	INCI name
A	4.80	Luviflex Silk	(1)	PEG/PPG-25/25 Dimethicone/Acrylates Copolymer
	1.50	Luviskol Plus	(1)	Polyvinylcaprolactam
	0.57	AMP	(56)	Aminomethyl Propanol
	16.43	Water dem.		Aqua
	36.70	Ethanol		Alcohol
B	40.00	Dimethyl Ether		Dimethyl Ether

Production: Weigh out the components of phase A and stir until a homogeneous solution is obtained. Fill into appropriate containers and charge with phase B.

Properties: Pressure: 3.6 bar (20°C)
Density: 0.8284 g/ml
Cloud point: -35°C clear

5. Examples for VOC 80 pump hairsprays (with water) with Luviflex® Silk and combinations of Luviflex® Silk with nonionic (Luviskol VA 37) and anionic (Luviset P.U.R.) polymers (Formulation No.; Figures given in %; Degree of neutralisation 100%)

Pump-Setting-Spray with Luviflex® Silk

No. 01/01197

%	Ingredients	Supplier	INCI name
14.00	Luviflex Silk	(1)	PEG/PPG-25/25 Dimethicone/ Acrylates Copolymer
1.66	AMP	(56)	Aminomethyl Propanol
73.00	Ethanol abs.		Alcohol
11.04	Water, dem.		Aqua
0.30	Niacinamide		Niacinamide
q.s.	Perfume		

Production: Weigh out the components and stir until a homogeneous solution is obtained.

Pump-Setting-Spray with Luviflex® Silk VOC 80

No. 01/01232

%	Ingredients	Supplier	INCI name
14.00	Luviflex Silk	(1)	PEG/PPG-25/25 Dimethicone/ Acrylates Copolymer
1.66	AMP	(56)	Aminomethyl Propanol
73.50	Ethanol abs.		Alcohol
10.54	Water, dem.		Aqua
0.30	DC 556 Cosmetic Grade Fluid	(16)	Phenyl Trimethicone
q.s.	Perfume		

Production: Weigh out the components and stir until a homogeneous solution is obtained.

6. Examples for VOC 55 aerosol hairsprays with Luviflex® Silk (with water and hydrofluorocarbon [HFC 152 A]) (Formulations No.; Figures given in %; Degree of neutralisation 100%)

Hairspray VOC 55 with Luviflex® Silk and DME/HFC 152 A, No. 01/01200 normal hold

	%	Ingredients	Supplier	INCI name
A	6.00	Luviflex Silk	(1)	PEG/PPG-25/25 Dimethicone/ Acrylates
	q.s.	Perfume		
	0.72	AMP	(56)	Aminomethyl Propanol
	21.28	Water dem.		Aqua
	32.00	Ethanol		Alcohol
B	20.00	Dimethyl Ether		Dimethyl Ether
C	20.00	HFC 152 A		Hydrofluorocarbon 152 a

Production: Weigh out the components of phase A and stir until a homogeneous solution is obtained. Fill into appropriate containers and charge with phases B and C, one after another.

Properties: Pressure: 4.5 bar (20°C)
Density: 0.8976 g/ml
Cloud point: -10°C clear

Hairspray VOC 55 with Luviflex® Silk and HFC 152 A, strong hold**No. 01/01199**

	%	Ingredients	Supplier	INCI name
A	10.00	Luviflex Silk	(1)	PEG/PPG-25/25 Dimethicone/ Acrylates Copolymer
	1.19	AMP	(56)	Aminomethyl Propanol
	48.81	Ethanol		Alcohol
B	40.00	HFC 152 A		Hydrofluorocarbon 152 a

Production:

Weigh out the components of phase A and stir until a homogeneous solution is obtained.
Fill into appropriate containers and charge with phase B.

Properties:

Pressure: 4.3 bar (20°C)
Density: 0.8990 g/ml
Cloud point: -35°C clear

7. Examples for stable Luviflex Silk formulations with different additives (0.5% by weight)

Tested formulation:

Ingredient	Amount	INCI Name
Luviflex Silk	6.00%	PEG/PPG-25/25 Dimethicone/Acrylates Copolymer
AMP	0.71% (100% neutr.)	Amino Methyl Propanol
Additive	0.50%	
Ethanol abs. / 96%	52.79%	Alcohol
DME or P/B	40.00%	Dimethylether or Propane/Butane

Tested additives:

- Uvinul MS 40
- Uvinul P 25
- Belsil CM 1000
- Belsil PDM 200
- Belsil DM 1000
- Belsil DMC 6031
- DC 190
- DC 345
- DC 556 Cosmetic Grade Fluid
- Niacinamide
- α-Tocopherolacetate
- D-Panthenol USP
- Abil 200
- Hydrolyzed wheat protein (e.g. Crospesol W/Croda)

8. Examples for some high sophisticated* Luviflex® Silk formulations with additives
(Formulation No.; Figures given in %; Degree of neutralisation 100%)

Hairspray with Luviflex® Silk and UV-Protection

No. 01/01233

	%	Ingredients	Supplier	INCI name
A	8.00	Luviflex Silk	(1)	PEG/PPG-25/25 Dimethicone/ Acrylates Copolymer
	1.01	AMP	(56)	Aminomethyl Propanol
	50.39	Ethanol 96%		Alcohol
	0.10	D-Panthenol USP	(1)	Panthenol
	0.05	Niacinamide		Niacinamide
	0.05	Tocopherolacetate	(1)	Tocopheryl Acetate
	0.10	Uvinul® MS 40	(1)	Benzophenone-4
	0.30	DC 556 Cosmetic Grade Fluid	(16)	Phenyl Trimethicone
	q.s.	Perfume		
B	40.00	DME		Dimethylether

Production:

Weigh out the components of phase A and stir until a homogeneous solution is obtained. Fill into appropriate containers and charge with phase B.

Properties:

Cloud point: -35°C still clear
Density: 0.7500 g/cm³
Pressure: 3.5 bar
Valve: 5227/1 Precision

Hairspray with Luviflex® Silk, Vitamins

No. 01/01208

	%	Ingredients	Supplier	INCI name
A	8.00	Luviflex Silk	(1)	PEG/PPG-25/25 Dimethicone/ Acrylates Copolymer
	1.01	AMP	(56)	Aminomethyl Propanol
	0.10	D-Panthenol USP	(1)	Panthenol
	0.05	Niacinamide		Niacinamide
	0.05	Vitamin E Acetate	(1)	Tocopheryl Acetate
	0.10	Perfume		
	0.30	Dow Corning 556 Cosmetic Grade Fluid	(16)	Phenyl Trimethicone
	50.39	Ethanol 96%		Alcohol
B	40.00	Dimethyl Ether		Dimethyl Ether

Production:

Weigh out the components of phase A and dissolve them clearly. Fill into appropriate containers and charge with phase B.

Properties:

Pressure: 3.2 bar (20°C)
Density: 0.8000 g/ml
Cloud point: -35°C clear

Hairspray with Luviflex® Silk, Vitamins; normal hold**No. 01/01209**

	%	Ingredients	Supplier	INCI name
A	8.00	Luviflex Silk	(1)	PEG/PPG-25/25 Dimethicone/ Acrylates Copolymer
	1.01	AMP	(56)	Aminomethyl Propanol
	0.10	D-Panthenol USP	(1)	Panthenol
	0.05	Niacinamide		Niacinamide
	0.50	Uvinul® MC 80	(1)	Ethylhexyl Methoxycinnamate
	0.10	Perfume		
	50.24	Ethanol		Alcohol
B	40.00	Propane/Butane		Propane/Butane

Production:

Weigh out the components of phase A and stir until a homogeneous solution is obtained.
Fill into appropriate containers and charge with phase B.

Properties:

Pressure: 2.5 bar (20°C)
Density: 0.7115 g/cm³
Cloud point: -35°C clear

Pump-Setting-Spray with Luviflex® Silk and UV-Protection No. 01/01235

	%	Ingredients	Supplier	INCI name
	13.33	Luviflex Silk	(1)	PEG/PPG-25/25 Dimethicone/ Acrylates Copolymer
	1.68	AMP	(56)	Aminomethyl Propanol
	84.01	Ethanol 96%		Alcohol
	0.16	D-Panthenol USP	(1)	Panthenol
	0.08	Niacinamide		Niacinamide
	0.08	Tocopherolacetate	(1)	Tocopheryl Acetate
	0.16	Uvinul® MS 40	(1)	Benzophenone-4
	0.50	DC 556 Cosmetic Grade Fluid	(16)	Phenyl Trimethicone
	q.s.	Perfume		

Production:

Weigh out the components and stir until a homogeneous solution is obtained.

9. Hair-cocktail with Luviflex® Silk and Luvigel EM: „Hair Slicker“**Hair treatment****No. 03/00011**

	%	Ingredients	Supplier	INCI name
A	1.00	Cremophor® A 25	(1)	Ceteareth-25
	1.00	Luvitol® EHO	(1)	Cetearyl Ethylhexanoate
	4.00	Cetyl stearyl alcohol		Cetearyl Alcohol
B	4.00	Luviquat® Excellence	(1)	Polyquaternium-16
	2.00	D-Panthenol 50 P	(1)	Panthenol. Propylene Glycol
	q.s.	Preservative		
	88.00	Water dem.		Aqua dem.
C	q.s.	Perfume		

Production:

Heat phase A and B separately to 80°C. Stir phase B into phase A and C whilst homogenizing; homogenize. Cool to about 40°C whilst stirring. Add phase C and homogenize again.

Properties:

pH value: 7.0
 Viscosity: 3000 mPa·s Haake Viscotester VT-02
 Pressure: 3.5 bar

Suppliers

1. **BASF AG**
 67056 Ludwigshafen, Germany
 Tel.: (0621) 60-0
 Telefax (0621) 60-42525
16. **Dow Corning Corporation**
 P.O. Box 17 67, Dept. 2291 Midland, Michigan 48686-0994, USA
 Tel.: +1-517-496-6000
 Fax: +1-517-496-5324
56. **Angus Chemical Company**
 1500 E. Lake Cook Road, Buffalo Grove, Illinois 60089, USA
 Tel.: +1-847-215-8600
 Fax: +1-847-215-8626
156. **Wacker Chemie GmbH**
 Johannes-Hess-Str. 24, 84480 Burghausen, Germany
 Tel.: +49-8677-83-4998
 Fax: +49-8677-83-4735

Storage/Stability	Can be stored in the original containers unopened at room temperature for at least 2 years.
Toxicology	„An examination of the raw material did not indicate any health risks for the concentrations used and the areas of application given. However, due to the large number of possible applications, also in combination with other products, the user has to carry out his own safety assessment of his products.”
Safety Data Sheet	A safety datasheet for Luviflex Silk is available.
Patent situation	<p>BASF has filed international applications WO 99/04750 A2 and WO 01/13884 A2 covering the product Luviflex Silk.</p> <p>BASF has investigated the patent situation of Luviflex Silk in Europe. BASF is convinced that the production and marketing of Luviflex Silk does not infringe validly granted european patents.</p> <p>Depending on the individual formulation containing the product Luviflex Silk, the customer will have to evaluate possibly relevant third party rights, as for example EP 1 084 694 A1; EP 1 084 695 A1; EP 1 084 696 A1; EP 1 084 697 A1; EP 1 084 698 A1; EP 1 084 699 A1.</p>
Note	<p>„While the descriptions, designs, data and information contained herein are presented in good faith and believed to be accurate, it is provided for your guidance only. Because many factors may affect processing or application/use, we recommend that you make tests to determine the suitability of a product for your particular purpose prior to use.</p> <p>NO WARRANTIES OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, ARE MADE REGARDING PRODUCTS DESCRIBED OR DESIGNS, OR THAT DATA OR INFORMATION MAY BE USED WITHOUT INFRINGING THE INTELLECTUAL PROPERTY RIGHTS OF OTHERS. IN NO CASE SHALL THE DESCRIPTIONS, INFORMATION, DATA OR DESIGNS PROVIDED BE CONSIDERED A PART OF OUR TERMS AND CONDITIONS OF SALE.</p> <p>Further, you expressly understand and agree that the descriptions, design, data and information furnished by BASF hereunder are given gratis and BASF assumes no obligation or liability for the description, designs, data and information given or results obtained, all such being given and accepted at your risk.“</p>

December 2006

