
Technical Information

July 2005
Supersedes issue dated May 2005

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Ultrahold[®] Strong

® = Registered trademark
of BASF Aktiengesellschaft

**Acrylic copolymer for hair-setting preparations based on alcohol
and water**

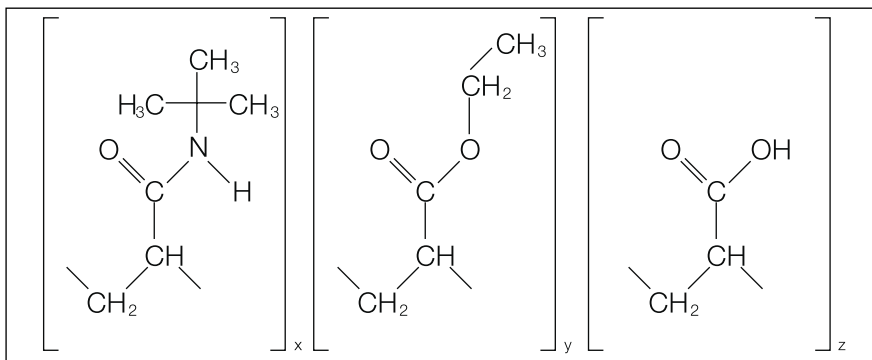
Cosmetic Solutions

- Hair Care
- Skin Care
- Oral Care

 **BASF**
The Chemical Company

Chemical nature

Copolymer derived from acrylic acid, ethyl acrylate, and N-tert.-butylacrylamide

**INCI name**

Acrylates/t-Butylacrylamide Copolymer

Physicochemical properties

Appearance: white, free-flowing fine granules
 Odour: faint inherent odour

Specification

Parameter	Method No.	Specification
K value (1% in ethanol)	02/0015.00	35.0-45.0
Loss on drying	02/0013.00	≤ 2%
Acid value (mg of KOH/g)	02/0014.00	70.0-85.0
Residual monomers	02/0016.00	≤ 0.1%
Compatibility propane/butane (-15°C)	02/00 12.00	conforms

Properties affecting performance

In neutralized form, Ultrahold Strong is an anionic film former for hair-setting preparations.

Hair setting

Ultrahold Strong has an excellent hair-setting effect even when it is 100% neutralized. The low water absorption at a degree of neutralization of 100% allows Ultrahold Strong to be used in arid and humid climatic zones.

The fact that Ultrahold Strong has a greater fixative effect than Ultrahold® 8 is illustrated in Fig. 1.

A comparison of the properties (Fig. 2) reveals the good curl retention of both resins and the much superior flexural strength and better compatibility with water of Ultrahold Strong (100% neutralized with AMP).

Fixing the hair style in a humid climate (curl retention) with Ultrahold Strong (in 2% form as spray; neutralized with AMP) was determined with hairpieces (ca. 2 g; 15.5 cm length) at 25°C and 90% relative humidity. Descriptions of the test methods used in the measurements for the performance characteristics presented in the diagram will be made available on request.

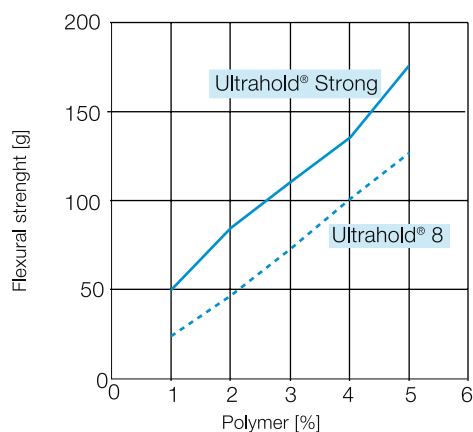


Fig. 1: Comparison of the flexural strength of Ultrahold Strong with that of Ultrahold 8

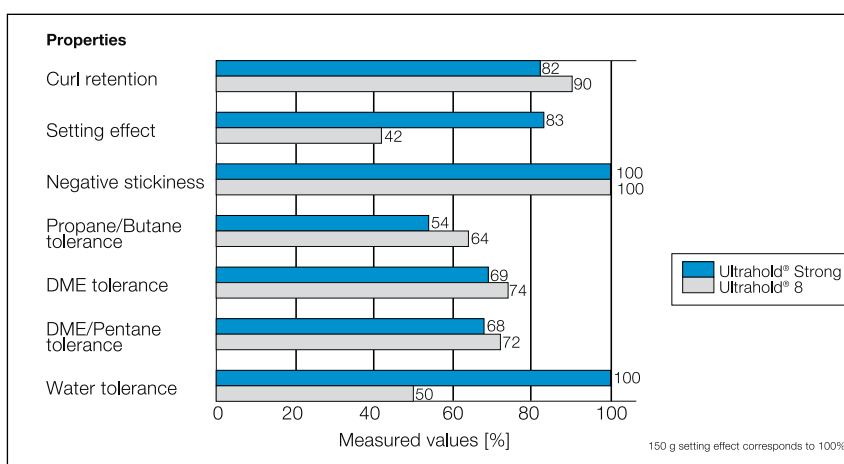


Fig. 2: Ultrahold Strong

Compatibility with propellant

Solutions of Ultrahold Strong in a wide range of concentrations are compatible with the propellants on the market, e. g. propane/butane, isobutane, DME, and its mixtures (Fig. 2).

If DME in proportions of more than 30% is used as a propellant, it is generally recommended that pentane be added as a pressure reducer.

Solutions of 3.0% Ultrahold Strong in ethanol (absolute) neutralized with 0.35% of AMP tolerate 50-55% of propane/butane and have a cloud point below -20°C.

Solubility

Ultrahold Strong forms clear to slightly opaque solutions in the organic solvents that are normally used for hair care preparations, e. g. ethanol and isopropanol. After 100% neutralization with AMP, Ultrahold Strong is also clearly soluble in water.

In the preparation of hairspray and hair-setting lotions, it is advisable to filter the solution of active substance before it is filled in order to remove any slight traces of insolubles that may be present.

Processing

Ultrahold Strong is obtained as a fine pearl polymer, with the result that low dusting is ensured on a production scale.

Neutralization

In order to ensure excellent hair-setting effect and optimum washing out properties, Ultrahold Strong should be neutralized, preferably to an extent of 100%. The best results are obtained with AMP as neutralizing agent. The normal amine derivatives can be used as neutralization aids, e. g. AMP (2-amino-2-methyl-1-propanol), DEPA (diethyleneaminopropylamine), or TIPA (triisopropanolamine). The requisite amount of neutralization aid is calculated as follows.

The following amount of neutralization aid N in grams must be added to x kg of Ultrahold Strong with an acid value of y in order to obtain a degree of neutralization of z%:

$$N = x y z A/100.$$

The factor A for

AMP is 1.59

DEPA is 2.32

TIPA is 3.41

Example

The following amount of neutralization aid N is required to obtain a degree of neutralization of 100% for 1 kg of Ultrahold Strong with an acid value of 74.

$$N = 1 \times 74 \times 100 \times 1.59/100 = 117.7 \text{ g of AMP}$$

Note: Since a reaction between amines and keto compounds gives rise to Schiff bases, solvents such as acetone cannot be recommended.

Suggested formulations

Hairsprays

Hairspray with Ultrahold® Strong and Luviskol® Va 37 E No. 01/00880

	%	Ingredients	Supplier	INCI name
A	6.00	Luviskol VA 37 E	(1)	VP/VA Copolymer
	50.65	Ethanol		Alcohol
	q.s.	Perfume		
B	3.00	Ultrahold Strong	(1)	Acrylates/ t-Butylacrylamide Copolymer
	0.35	AMP	(56)	Aminomethyl Propanol
C	40.00	Dimethyl Ether		Dimethyl Ether

Production:

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

Properties:

Cloud point: still clear at -35°C
 Pressure: 2.8 bar
 Density: 0.7520 g/ml

Hairspray with Ultrahold® Strong**No. 01/00881**

	%	Ingredients	Supplier	INCI name
A	0.75	AMP	(56)	Aminomethyl Propanol
	43.25	Ethanol		Alcohol
	q.s.	Perfume		
B	6.00	Ultrahold Strong	(1)	Acrylates/ t-Butylacrylamide Copolymer
C	50.00	Propane/Butane		Propane/Butane

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

Properties: Cloud point: still clear at -35°C
 Pressure: 4.0 bar
 Density: 0.6640 g/ml

Hairspray (80% VOC)**Hairspray with Ultrahold® Strong****No. 01/01087**

	%	Ingredients	Supplier	INCI name
A	0.47	AMP	(56)	Aminomethyl Propanol
	q.s.	Perfume		
	15.53	Water dem.		Aqua
	40.00	Ethanol		Alcohol
B	4.00	Ultrahold Strong	(1)	Acrylates/t-Butylacrylamide Copolymer
C	6.00	n-Butane		n-Butane
D	34.00	Dimethyl Ether		Dimethyl Ether

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

Properties: Pressure: 4.0 bar (20°C)
 Density: 0.8200 g/ml
 Cloud point: -20°C clear

Pump spray**Pump Setting Spray VOC 80 with Ultrahold® Strong, strong hold****No. 01/00882**

	%	Ingredients	Supplier	INCI name
A	0.60	AMP	(56)	Aminomethyl Propanol
	14.40	Water dem.		Aqua
	80.00	Ethanol		Alcohol
	q.s.	Perfume		
B	5.00	Ultrahold Strong	(1)	Acrylates/t-Butylacrylamide Copolymer

Production: Weigh out the components of phase A and mix them. Add phase B into phase A and stir until a clear solution is obtained.

Supplier**1. BASF Aktiengesellschaft**

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67056 Ludwigshafen, Germany
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1500 E. Lake Cook Road
Buffalo Grove, Illinois 60089, USA
Tel.: 8 47-2 15-86 00
Telefax: 8 47-2 15-8626

Stability

Ultrahold Strong has a shelf life of up to two years at 25°C in unopened containers.

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 data sheet is available.

Note

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July 2005