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## Technical Information

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# Luviset<sup>®</sup> CAN

® = Registered trademark  
of BASF Aktiengesellschaft

**Active ingredient for the cosmetics industry.**

## Cosmetic Solutions

- Hair Care
- Skin Care
- Oral Care

<b>Description</b>	Luviset CAN is a fine transparent beads with a faint characteristic odor. It is a fixative polymer that has been developed for aerosol and pump hairsprays, and lotions. The properties of the polymer film are determined particularly by the type and quantity of the neutralising agent selected (amino component). This provides users with a wide selection of different film properties. It is possible to produce low-cost formulations with Luviset CAN.
<b>Composition</b>	Luviset CAN consists of almost 100% polymer and is in the form of fine transparent beads.
<b>Structural formula</b>	
<b>Chemical nature</b>	Terpolymer of vinyl acetate, crotonic acid and vinyl neodecanoate
<b>INCI name</b>	VA/Crotonates/Vinyl Neodecanoate Copolymer
<b>CAS No.</b>	58748-38-2
<b>Product number</b>	10211806
<b>Physicochemical properties</b>	
<b>Appearance</b>	Fine transparent beads
<b>Odour</b>	Faint, characteristic
<b>Solubility</b>	<p>Luviset CAN is an anionic polymer. To enable it to be used in hair fixatives, most or all of the acid groups must be neutralised.</p> <p>AMP (2-amino-2-methylpropanol) is usually used for this purpose. After 75 – 100% neutralisation with AMP, Luviset CAN forms clear 5% (solids) solutions in ethanol, isopropanol and a 1:1 ethanol/water mixture at room temperature. It must be completely neutralised to obtain a clear solution in water.</p>
<b>Polymer compatibility</b>	Luviset CAN is compatible with many other hair fixative polymers including PVP, VP/VA-Copolymers, Polyvinylcaprolactam, Acrylates Copolymer, Acrylates/Octyl-acrylamide Copolymer, Octylacrylamide/Acrylates/Butylaminoethyl Methacrylate Copolymer and many other commercially available polymers. As Luviset CAN is an anionic polymer, attempts to mix it with cationic polymers may run into problems, e.g. turbidity and precipitation.
<b>Molecular weight (Mw)</b>	90,000–110,000 g/mol (determined by light scattering)

## Specification

Parameter	Method-No.	Specification
Volatile components	02/0013.00	≤ 2%
Acid value	02/0014.00	60.0-70.0
K value (in THF)	02/0015.00	38.0-45.0
Bulk density	02/0377.00	0.70-0.80g/ml

## Technical properties of Luviset CAN

### Suitability for hairsprays

Luviset CAN is used in hair cosmetics as a film-forming agent and fixative. It possesses properties that make it suitable for both aerosol sprays and non-aerosol products (pump sprays, lotions etc.). It is possible to use Luviset CAN both in water-free and water-containing hair sprays (VOC 100 → VOC 55).

### Propellant compatibility/ Cloud point

Fig. 1 gives the maximum concentrations of different propellants that give clear solutions in ethanol with 3% Luviset CAN (75% neutralised with AMP) at -20°C, 0°C and room temperature.

Propellant	Temperature		
	-20°C	0°C	RT
Propane/butane (3.5 bar)	ca. 25%	ca. 35%	ca. 50%
DME	ca. 80%	> 80%	> 80%

Fig. 1: Propellant compatibility of Luviset CAN in ethanol at different temperatures

Dimethyl ether (DME) can be used in high concentrations even at low temperatures. It can also be used in mixtures with propane/butane (P/B) and pentane.

DME increases the compatibility of Luviset CAN with hydrocarbons.

Formulations with up to about 30% propane/butane as sole propellant present no problems.

The addition of water lowers the cloud point of P/B formulations (Fig. 2).

With DME formulations, adding water has no effect on the cloud point. With a DME content of up to ca. 65% and water contents of 0 – 40%, the cloud point is always below -20°C.

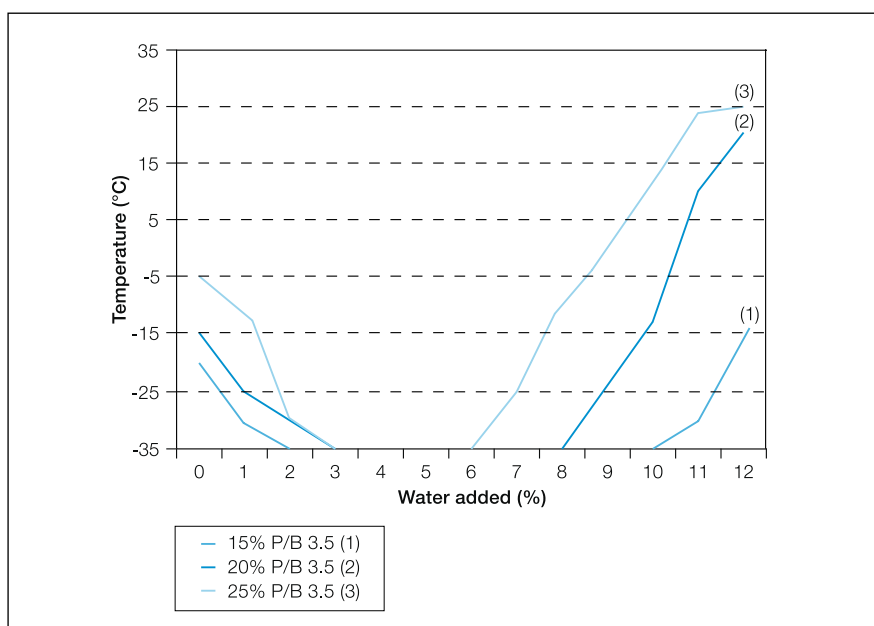


Fig. 2: P/B compatibility (3.5 bar) of Luviset CAN (75% neutralised with AMP; 4% solids) in ethanol with different amounts of water

To determine the cloud point, all the ingredients of the formulation (film-forming agent, solvent, propellant) are first filled into a glass aerosol jar. The solution is then cooled until it becomes turbid. The temperature at this point is read off a thermometer incorporated in the jar.

### Hold/Curl retention

The hold provided by Luviset CAN can be varied over a wide range via the degree of neutralisation. Increasing the degree of neutralisation gives a more flexible film, but it also becomes more hygroscopic and more soluble in water. As a typical degree of neutralisation, we recommend 75%, as this gives an optimum balance between hold and washing-out properties.

Fig. 3 shows the change in curl retention of Luviset CAN for different degrees of neutralisation.

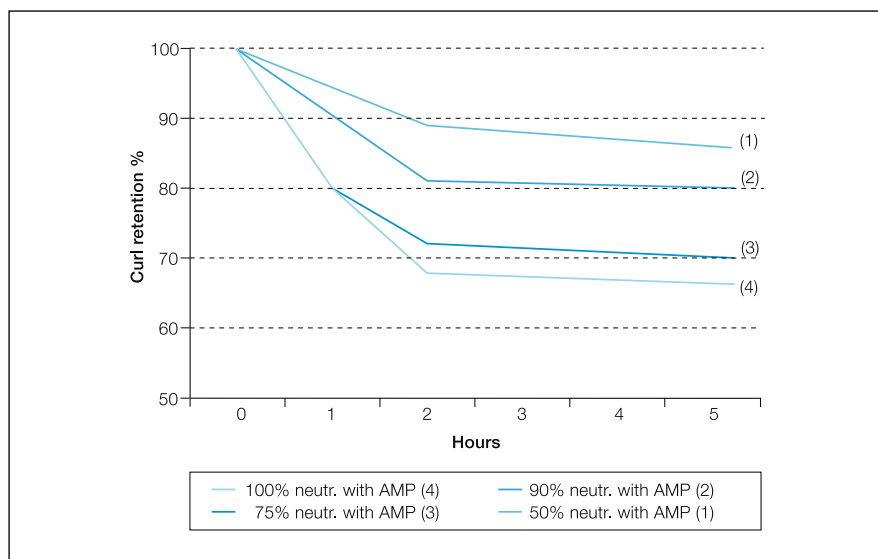


Fig. 3: Curl Retention of Luviset CAN as a function of the degree of neutralisation (25°C; 90% r.h.; 2% solids)

How well a hairstyle is held by Luviset CAN in a humid climate was determined by spraying swatches of hair with 2% solutions containing 40% ethanol and DME as propellant, neutralised with different quantities of AMP, in curl retention tests at 25°C and 90% relative humidity. We would be pleased to provide a full description of the method on request.

### Applications

Luviset CAN is a hair fixative polymer. Typical applications are aerosol and pump sprays, and lotions. Luviset® CAN offers a very favourable price/performance relationship.

In terms of technical properties such as curl retention and hold, Luviset CAN demonstrates good results.

### Processing

The solubility of Luviset CAN depends on its degree of neutralisation. Suitable neutralising agents include AMP, DEPA (diethylaminopropylamine) and TIPA (triisopropanolamine).

To prepare a solution of Luviset CAN, the neutralising agent must first be added to the solvent. Luviset CAN is then added in portions with thorough stirring. Dissolution can be accelerated by heating the solvent.

It is worth filtering the solution before filling it into spray cans or bottles, to remove any particulate matter.

The quantity of neutralizing agent required, N is calculated with the following formula:

$$N = x \cdot y \cdot \frac{Z}{100} \cdot A$$

where

x	=	Quantity of Luviset® CAN in kg	
y	=	Acid value	
Z	=	Degree of neutralization required	
A	=	Factor for	
		AMP	= 1.59
		DEPA	= 2.32
		TIPA	= 3.41

#### Example

1 kg of Luviset CAN with an acid value of 66 requires the following quantity of AMP to obtain 75% neutralisation:

$$N = 1 \cdot 66 \cdot \frac{75}{100} \cdot 1.59 \text{ g} = 78.7 \text{ g AMP}$$

If DEPA is used, N = 114.8 g and if TIPA is used, N = 168.8 g.

The following concentration ranges are recommended for the formulation of hair fixatives, depending on the desired effect and the type of hair:

Aerosol hairsprays:	1 – 5% Luviset CAN
Pump sprays:	1 – 6% Luviset CAN
Hair fixative lotions:	1 – 5% Luviset CAN

Softeners and substances that improve the condition of the hair can also be added; examples include:

Palatino® A (1) (diethyl phthalate)  
 Luvitol® EHO (1) (cetearyl octanoate)  
 Isopropyl myristate  
 Silicone fluid DC®<sup>1</sup> 556 (16).

®<sup>1</sup> = registered trademark of Dor Corning

**Typical formulations**

1. Examples for aerosol hairsprays (without water) with Luviset® CAN (Formulation No.; data in %; degree of neutralisation 75%)

**Hairspray with Luviset® CAN, Panthenol and Silicones No. 01/01148**

	%	Ingredients	Supplier	INCI name
A	0.30	AMP	(56)	Aminomethyl Propanol
	0.10	Belsil DMC 6031	(156)	PEG/PPG-25/25 Dimethicone
	0.10	D-Panthenol USP	(1)	Panthenol
	0.10	Perfume		
	70.40	Ethanol		Alcohol
B	4.00	Luviset CAN	(1)	VA/Crotonates/Vinyl Neodecanoate Copolymer
C	25.00	Propane/Butane		Propane/Butane

**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 phase C.

**Properties:**

Pressure: 3.3 bar (20°C)  
Density: 0.7242 g/ml  
Cloud point: -10°C clear

**Hairspray with Luviset® CAN, Vitamins and Silicone No. 01/01154**

	%	Ingredients	Supplier	INCI name
A	0.30	AMP	(56)	Aminomethyl Propanol
	0.10	Wacher Belsil DMC 6031	(156)	PEG/PPG-25/25 Dimethicone
	0.10	D-Panthenol USP	(1)	Panthenol
	0.10	Niacinamide		Niacinamide
	0.10	Perfume		
	70.30	Ethanol		Alcohol
B	4.00	Luviset CAN	(1)	VA/Crotonates/Vinyl Neodecanoate Copolymer
C	25.00	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:**

Pressure: 2.9 bar (20°C)  
Density: 0.7353 g/ml  
Cloud point: -15°C cloudy

**Hairspray with Luviset® CAN****No. 01/01141**

	%	Ingredients	Supplier	INCI name
A	0.22	AMP	(56)	Aminomethyl Propanol
	66.78	Ethanol abs./96%		Alcohol
	q.s.	Perfume		
B	3.00	Luviset CAN	(1)	VA/Crotonates/ Vinyl Neodecanoate Copolymer
C	30.00	DME		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 phase C.

**Properties:**

Cloud point: -35°C still clear  
Density: 0.7615 g/cm<sup>3</sup>  
Pressure: 2.6 bar  
Valve: 5227/1 Precision

**Hairspray with Luviset® CAN****No. 01/01142**

	%	Ingredients	Supplier	INCI name
A	0.37	AMP	(56)	Aminomethyl Propanol
	64.63	Ethanol		Alcohol
B	5.00	Luviset CAN	(1)	VA/Crotonates/Vinyl Neodecanoate Copolymer
C	30.00	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 phase C.

**Properties:**

Pressure: 2.6 bar (20°C)  
Density: 0.7830 g/ml  
Cloud point: -22°C clear

**Hairspray with Luviset® CAN and Panthenol****No. 01/01143**

	%	Ingredients	Supplier	INCI name
A	0.22	AMP	(56)	Aminomethyl Propanol
	0.10	D-Panthenol USP	(1)	Panthenol
	0.10	Perfume		
	46.58	Ethanol		Alcohol
B	3.00	Luviset CAN	(1)	VA/Crotonates/Vinyl Neodecanoate Copolymer
C	50.00	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 phase C.

**Properties:**

Pressure: 4.2 bar (20°C)  
Density: 0.7329 g/ml  
Cloud point: -35°C clear

2. Examples for aerosol hairsprays (without water) with Luviset® CAN in combination with nonionic (Luviskol® VA 37) and anionic (Luvimer® 100 P, Luviflex® Silk) polymers (Formulation No.; data in %; degree of neutralisation 75%)

**Hairspray with Luviset® CAN, Luviskol® VA 37 I****No. 01/01147**

	%	Ingredients	Supplier	INCI name
A	0.17	AMP	(56)	Aminomethyl Propanol
	27.03	Ethanol		Alcohol
	4.60	Luviskol VA 37 I	(1)	VP/VA Copolymer, Isopropyl Alcohol
	q.s	Perfume		
B	2.20	Luviset CAN	(1)	VA/Crotonates/Vinyl Neodecanoate Copolymer
C	22.00	n-Butane		n-Butane
D	44.00	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 phases C and D, one after another.

**Properties:**

Pressure: 4:3 bar (20°C)  
 Density: 0.6929 g/ml  
 Cloud point: -13°C clear

**Hairspray with Luviset® CAN, Luviskol® VA 37 I****No. 01/01149**

	%	Ingredients	Supplier	INCI name
A	0.24	AMP	(56)	Aminomethyl Propanol
	34.16	Ethanol		Alcohol
	2.30	Luviskol VA 37 I	(1)	VP/VA Copolymer, Isopropyl Alcohol
B	3.30	Luviset CAN	(1)	VA/Crotonates/Vinyl Neodecanoate Copolymer
C	21.00	n-Butane		n-Butane
D	39.00	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 phases C and D one after another.

**Properties:**

Pressure: 4.2 bar (20°C)  
 Density: 0.7157 g/ml  
 Cloud point: -27°C clear



**Hairspray with Luviset® CAN, Luviskol® VA 37 I,  
ultra strong hold****No. 01/01150**

	%	Ingredients	Supplier	INCI name
A	0.16	AMP	(56)	Aminomethyl Propanol
	33.44	Ethanol		Alcohol
	10.80	Luviskol VA 37 I	(1)	VP/VA Copolymer, Isopropyl Alcohol
	q.s	Perfume		
B	2.10	Luviset CAN	(1)	VA/Crotonates/Vinyl Neodecanoate Copolymer
C	18.20	n-Butane		n-Butane
D	35.30	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 phases C and D, one after another.

**Properties:**

Pressure: 4.2 bar (20°C)  
Density: 0.6959 g/ml  
Cloud point: -25°C clear

**Hairspray with Luviset® CAN, Luvimer® 100 P****No. 01/01216**

	%	Ingredients	Supplier	INCI name
A	65.18	Ethanol		Alcohol
	q.s.	Perfume		
	0.82	AMP	(56)	Aminomethyl Propanol
B	3.00	Luvimer 100 P	(1)	Acrylates Copolymer
	1.00	Luviset CAN	(1)	VA/Crotonates/Vinyl Neodecanoate Copolymer
C	30.00	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 phase C.

**Properties:**

Pressure: 2.5 bar (20°C)  
Density: 0.7525 g/cm<sup>3</sup>  
Cloud point: -35°C clear

**3. Examples for pump hairsprays (without water) with Luviset® CAN**  
(Formulation No.; data in %; degree of neutralisation 75%)

**Pump Setting Spray with Luviset® CAN and Silicones** **No. 01/01144**

	%	Ingredients	Supplier	INCI name
A	0.44	AMP	(56)	Aminomethyl Propanol
	0.10	Dow Corning 190 Surfactant	(16)	PEG/PPG-18/18 Dimethicone
	0.10	Dow Corning 344 Fluid	(16)	Cyclomethicone
	q.s.	Perfume		
	93.36	Ethanol 96%		
B	6.00	Luviset CAN	(1)	VA/Crotonates/Vinyl Neodecanoate Copolymer

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

**4. Examples for VOC 80 aerosol hairsprays (with water) with Luviset® CAN**  
and combinations of Luviset® CAN with anionic (Luvimer 100 P, Luviflex Silk) polymers (Formulation No.; data in %; degree of neutralisation 75%)

**Hairspray with n-Butane** **No. 01/01156**

	%	Ingredients	Supplier	INCI name
A	0.46	AMP	(56)	Aminomethyl Propanol
	0.10	Dow Corning 190 Surfactant	(16)	PEG/PPG-18/18 Dimethicone
	0.10	Uvinul® MC 80	(1)	Ethylhexyl Methoxycinnamate
	15.34	Water dem.		Water
	39.90	Ethanol abs./96%		Alcohol
B	3.00	Luviset® CAN	(1)	VA/Crotonates/Vinyl Neodecanoate Copolymer
	1.00	Luvimer® 100 P	(1)	Acrylates Copolymer
	q.s.	Perfume		
C	15.00	n-Butane		n-Butane
D	25.00	DME		Dimethyl Ether

With strong hold and UV protection; degree of neutralisation Luvimer 100 P: 100%;  
Luviset CAN: 75%

**Production:** Weigh the components of phase A and stir until a homogeneous solution is obtained. Stir phase B into phase A till the mixture is homogeneous. Fill into appropriate containers and charge with phases C and D after another.

**Properties:** Cloud point: -12°C  
Density: 0.7680 g/ml  
Pressure: 4.7 bar

5. Examples for VOC 80 pump hairsprays (with water) with Luviset® CAN  
(Formulation No.; data in %; degree of neutralisation 75%)

**Pump Setting Spray VOC 80 with Luviset® CAN**

**No. 01/01145**

	%	Ingredients	Supplier	INCI name
A	0.30	AMP	(56)	Aminomethyl Propanol
	0.10	Dow Corning 556 Cosmetic Grade Fluid	(16)	Phenyl Trimethicone
	0.10	Perfume		
	15.60	Water dem.		Aqua
	79.90	Ethanol		Alcohol
B	4.00	Luviset CAN	(1)	VA/Crotonates/Vinyl Neodecanoate Copolymer

**Production:**

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

**Pump Setting Spray VOC 80 with Luviset® CAN**

**No. 01/01146**

	%	Ingredients	Supplier	INCI name
A	0.44	AMP	(56)	Aminomethyl Propanol
	0.10	Wacher Belsil DMC 6031	(156)	PEG/PPG-25/25 Dimethicone
	0.05	Dow Corning 344 Fluid	(16)	Cyclomethicone
	0.10	Perfume		
	13.31	Water dem.		Aqua
	80.00	Ethanol		Alcohol
B	6.00	Luviset CAN	(1)	VA/Crotonates/Vinyl Neodeca- noate Copolymer

**Production:**

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

5. Examples for VOC 55 aerosol and pump hairsprays with Luviset® CAN (with a high proportion of water) (Formulation No.; data in %; degree of neutralisation 75%)

**Hairspray VOC 80 with Luviset® CAN, normal hold**

**No. 01/01138**

	%	Ingredients	Supplier	INCI name
A	0.22	AMP	(56)	Aminomethyl Propanol
	41.78	Water dem.		Aqua
	15.00	Ethanol		Alcohol
	q.s.	Perfume		
B	3.00	Luviset CAN	(1)	VA/Crotonates/Vinyl Neodecanoate Copolymer
C	40.00	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 phase C.

**Properties:**

Pressure: 4.6 bar (20°C)  
Density: 0.8580 g/ml  
Cloud point: -29°C clear

**Pump Setting Spray VOC 55 with Luviset® CAN; normal hold**

**No. 01/01140**

	%	Ingredients	Supplier	INCI name
A	0.22	AMP	(56)	Aminomethyl Propanol
	0.50	D-Panthenol USP	(1)	Panthenol
	0.10	Perfume		
	41.18	Water dem.		Aqua
	55.00	Ethanol		Alcohol
B	3.00	Luviset CAN	(1)	A/Crotonates/Vinyl Neodecanoate Copolymer

**Production:**

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

**Suppliers**

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**Stability/Storage**

Luviset CAN can be stored in the original sealed containers at room temperature for at least two years.

**Toxicology**

An examination of the raw material did not indicate any health risks for the concentrations used and the fields of application given. However, due to the large number of possible applications, also in combination with other products, the user must carry out his own safety assessment of his products.”

**Safety Data Sheet**

A Safety Data Sheet for Luviset CAN is available.

**Patent situation**

Luviset CAN can be used alone or in combination with nonionic or anionic polymers in hair cosmetics. Only when Luviset CAN is used in combination with Luviflex Silk – depending on the formulation – possible patent rights of third parties must be respected.

**Note**

„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.  
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