

## Technical Information

**Luviset® Clear AT 3**

PRD 30626433

Valid since 05.10.2020  
Revision 2.1  
WF-No. 25367  
Page 1 of 10

® = registered trademark of BASF in many countries    ™ = Trademark of BASF

**Care Chemicals****Film forming agent for hair-care products****INCI name(s)**

VP/Methacrylamide/Vinyl Imidazole Copolymer

**Chemical description**

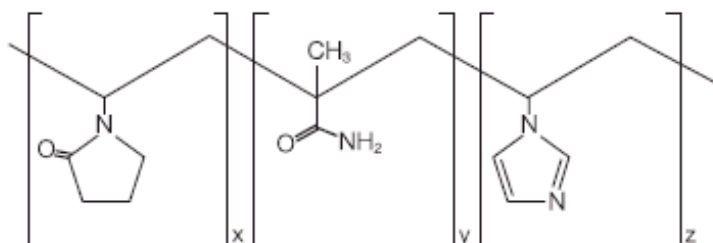
Copolymer of N-vinylpyrrolidone, methacrylamide and N-vinyl imidazole

**Physical form:**

Solution of approx. 20 % polymer in water

**Molecular weight**

average 270000 g/mol

**Structural Formula**

**CASR-No.**  
38139-93-4

**Ingredient**  
VP/Methacrylamide/Vinyl Imidazole Copolymer

## Technical Information

**Luviset® Clear AT 3**

PRD 30626433

Valid since	05.10.2020
Revision	2.1
WF-No.	25367
Page	2 of 10

® = registered trademark of BASF in many countries    ™ = Trademark of BASF

**Care Chemicals****Characteristic values**

The specifications stated in the paragraphs 'Quality control data' and 'Additional product descriptive data' finally and conclusively describe the properties of the product.

**Quality control data**

(Data which is used for quality release and is certified for each batch.)

<b>Test property</b>	<b>Specification</b>	<b>Test method</b>
Color (Gardner)	max. 2.0	PM/01599
Solid content	19 - 21 %	PM/01101
pH value (10 % in H <sub>2</sub> O)	6.0 - 7.5	Ph.Eur. 2.2.3
Viscosity (Brookfield, RVT, Sp. 4, 20 U/min, 23 °C)	700 - 2000 mPas	PM/00744
Vinylpyrrolidone (HPLC)	max. 50 ppm	PM/00727
Methacrylamide	max. 10 ppm	PM/01708

**Storage information****Shelf life**

24 months

**Storage temperature**

Between 0 °C and + 35 °C

**Storage conditions**

In original sealed containers and protected from moisture

**Additional information**

Low storage temperatures (< 0 °C) lead to the following phenomena: congealing which is reversible.

Higher storage temperatures (> 35 °C) lead to the following phenomena: properties will irreversibly be damaged.

## Technical Information

**Luviset® Clear AT 3**

PRD 30626433

Valid since	05.10.2020
Revision	2.1
WF-No.	25367
Page	3 of 10

® = registered trademark of BASF in many countries    ™ = Trademark of BASF

**Care Chemicals****Stabilising additives / Auxiliaries****Preservatives**

Mixture of 3-phenylpropanol, propan-1,3-diol, octan-1,2-diol, phenoxyethanol and tocopherol

**Antioxidants**

not present

**Solvents**

not present

**Others**

not present

**General information****Raw material basis**

Synthetic: (mineral oil/natural gas)

**Composition hints for finished product label****INCI Components**

INCI Name (US/EU/CN)	Content
VP/Methacrylamide/Vinyl Imidazole Copolymer	19 - 21 %

**Auxiliaries**

INCI Name (US/EU/CN)	Content
Preservative: Mixture of Phenoxyethanol (and) Phenylpropanol (and) Propanediol (and) Caprylyl Glycol (and) Tocopherol	max. 1 %

**Water Content**

Content
79 - 81 %



We create chemistry

## Technical Information

---

### **Luviset® Clear AT 3**

PRD 30626433

Valid since 05.10.2020  
Revision 2.1  
WF-No. 25367  
Page 4 of 10

---

® = registered trademark of BASF in many countries    ™ = Trademark of BASF

**Care Chemicals**

## Product properties

### **Solubility**

Luviset® Clear AT 3 (10 % polymer content) give a clear solution in water and water/ethanol mixtures up to 35 % ethanol.

## Technical Information

**Luviset® Clear AT 3**

PRD 30626433

Valid since	05.10.2020
Revision	2.1
WF-No.	25367
Page	5 of 10

® = registered trademark of BASF in many countries    ™ = Trademark of BASF

**Care Chemicals****Miscellaneous information****Polymer compatibility**

Luviset® Clear AT 3 is compatible with thickening polymers, e.g. Carbomer, Acrylates/C10-30 Acrylate Crosspolymer and Acrylates/Beheneth-25 Methacrylate Copolymer.

**Glass transition temperature (T<sub>g</sub>)**

The glass transition temperatures of Luviset® Clear AT 3 is significantly higher than those of PVP. A glass transition temperature above room temperature (25 °C) is a requirement for good setting performance. The glass transition temperatures of Luviset® Clear AT 3 remain significantly above room temperature at high humidity (Fig. 1).

Fig. 1: **Glass transition temperature of Luviset® Clear AT 3 compared to PVP at different relative humidity in °C (DSC-Method)**

Relative humidity (°C)	Luviset® Clear AT 3 (°C)	PVP (°C)
0 %, dry film	219°C	172°C
52 %	85 °C	50 °C
76 %	51 °C	24 °C

**Mechanical properties**

Polymer films of Luviset® Clear AT 3 exhibit a higher tensile strength at break (Fig. 2) than PVP.

Nanoindentation measurement is a powerful tool to measure mechanical properties of polymer films at different relative humidities (Ref. 3 - 5). Luviset® Clear AT 3 is not tacky at high humidity (Fig. 3), and the surface has a low friction coefficient (Fig. 4). These properties correlate with the application properties on hair, e.g. high setting, low tackiness and good combing behavior, as well as high resistance against mechanical damage of the film on hair, e.g. touch, wind, brush.

Technical Information

**Luviset® Clear AT 3**

PRD 30626433

Valid since 05.10.2020  
 Revision 2.1  
 WF-No. 25367  
 Page 6 of 10

® = registered trademark of BASF in many countries    ™ = Trademark of BASF

**Care Chemicals**

Fig. 2: Tensile strain at break (stress strain measurement of polymer films at 55 % relative humidity)

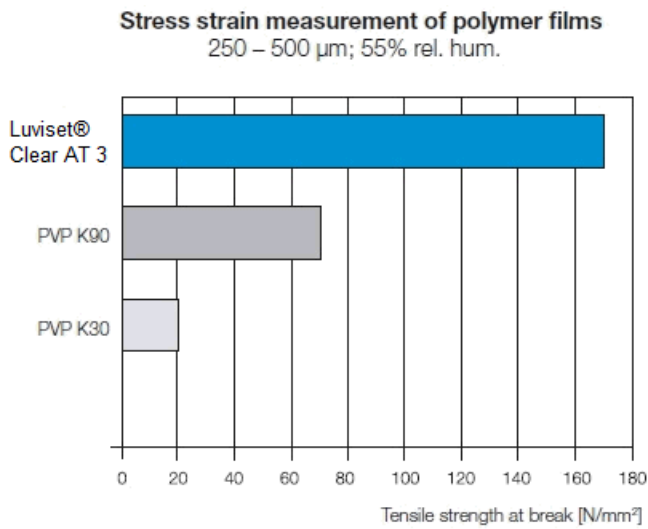
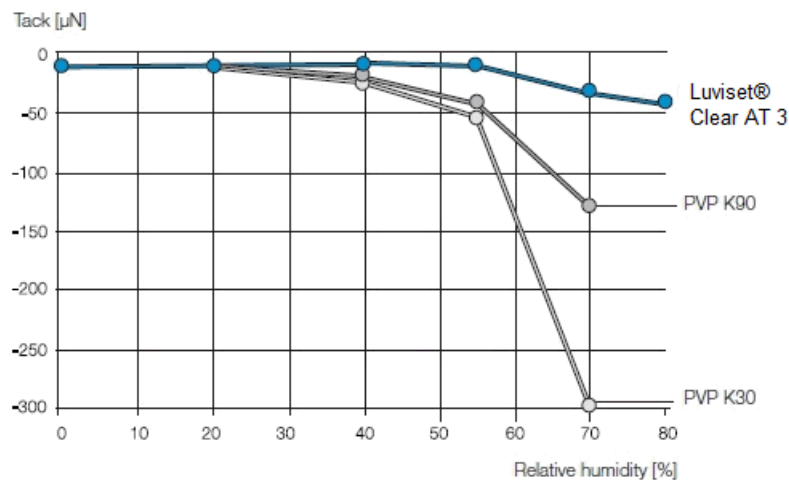


Fig. 3: Tack measurement with Hysitron Nanoindenter



Technical Information

**Luviset® Clear AT 3**

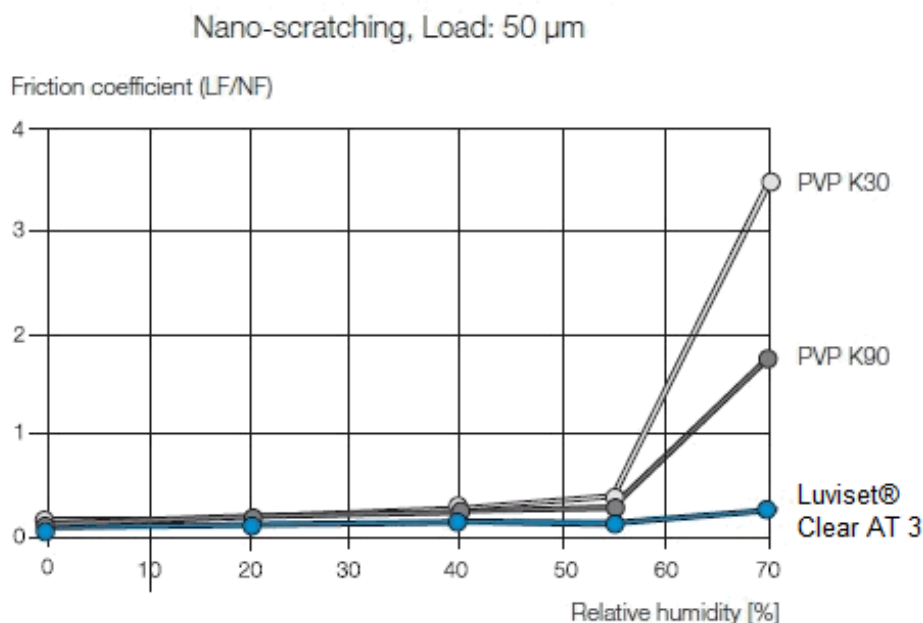
PRD 30626433

Valid since 05.10.2020  
 Revision 2.1  
 WF-No. 25367  
 Page 7 of 10

® = registered trademark of BASF in many countries    ™ = Trademark of BASF

**Care Chemicals**

Fig. 4: Friction coefficient with Hysitron nanoindenter



**Application properties in hair gels**

Luviset® Clear AT 3 is recommended as fixative polymers in hair gel formulations. It is compatible with almost every commercially available cosmetic thickener. Absolutely clear gels can be achieved by using Acrylates/ C10 - C30 Alkyl Acrylate Crosspolymer (Ultrez® 21, Noveon), Acrylates Beheneth- 25 Methacrylate Copolymer (Aculyn® 28, Rohm & Haas) and Carbomer (Carbopol® 940, Noveon). The standard way to produce clear gels with this thickeners based on polyacrylic acid is as follows:

- a) Prepare the thickener solution 0.4 - 0.5 % Ultrez® 21 or Carbomer, or 1.0% Aculyn® 28, respectively.
- b) Slightly overneutralize with triethanolamine to pH 7.1.
- c) Add 1.0 - 7.0 % Luviset® Clear (polymer content).

Gels with 3 % Luviset® Clear AT 3 (polymer content) provide already very high setting effect. Luviset® Clear AT 2 combine excellent hair setting up to 90 % relative humidity with almost no tackiness together with the ability to form brilliant clear hair gels.

Technical Information

**Luviset® Clear AT 3**

PRD 30626433

Valid since 05.10.2020  
 Revision 2.1  
 WF-No. 25367  
 Page 8 of 10

® = registered trademark of BASF in many countries    ™ = Trademark of BASF

**Care Chemicals**

Fig. 5: Properties of Luviset® Clear AT 3 in gels (3 % Luviset® Clear AT 3 (polymer content); 0.5 % Ultrez® 21)

Properties of Luviset® Clear AT 3 in hair gels 3 % polymer content; 0.5 % Ultrez® 21			
	Luviset® Clear AT 3	PVP K90	PVP K30
Clarity * T (%)	<b>crystal clear 99.2</b>	clear 96.8	clear 98.8
Tackiness **	<b>0 - 1</b>	3	3
Stiffness test (cN)	<b>190 - 200</b>	125 - 145	70 - 80
Curl retention 90 % rel. hum. (%)	<b>&gt; 90</b>	61	47

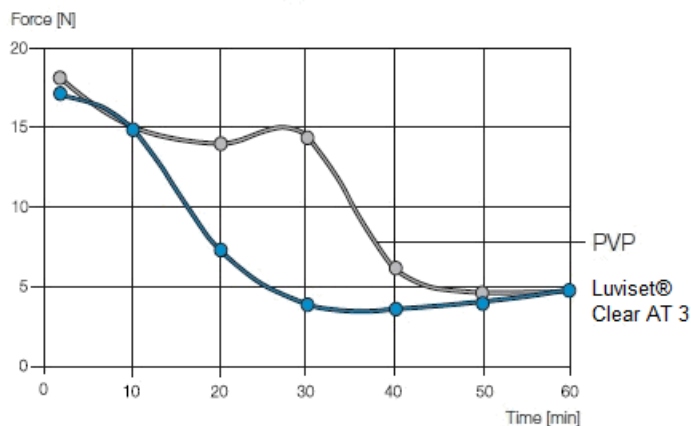
\* Visually in 250 ml glass tubes, Transmission T (600 nm) measured in Polystyrol-cuvettes

\*\* 0 = No tack, 5 = Very tacky

Luviset® Clear AT 3 is significantly less tacky during drying compared to PVP in water-based formulations.

Fig. 6: Tackiness of polymer films in the drying process – Diastron method

Stickiness of polymer films in the drying process – Diastron method  
 Hair gels with 3% content



A panel test confirms these objective measurements.

Technical Information

**Luviset® Clear AT 3**

PRD 30626433

Valid since 05.10.2020  
 Revision 2.1  
 WF-No. 25367  
 Page 9 of 10

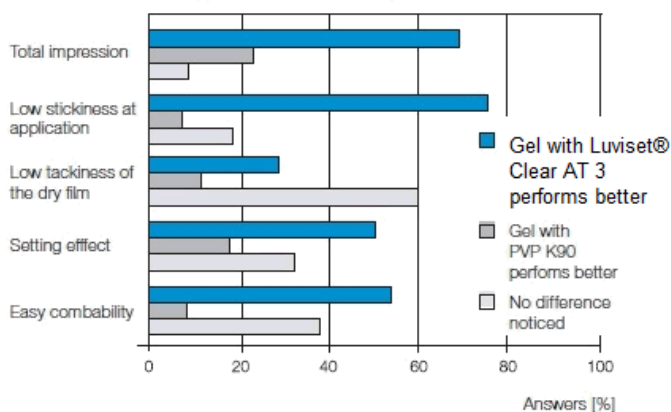
® = registered trademark of BASF in many countries    ™ = Trademark of BASF

**Care Chemicals**

Fig. 7: Panel test Luviset® Clear AT 3 versus PVP; 3 % polymer content, 0.4 % Ultrez® 21

Panel test - Direct comparison of hair gels with Luviset® Clear AT 3 and PVP K90

3% polymer content; 4.0% Ultrez 21; 28 panelists



**Application properties in mousses**

Luviset® Clear AT 3 is recommended as fixative polymers in hair mousse formulations either as single polymers or in combination with cationic polymers like Luviquat® Hold AT 2/Hold. or Luviquat® Style/Style AT 1. The recommended use level of Luviset® Clear AT 3 is 2 - 5 % (polymer content) and 1 - 2 % for Luviquat® Hold AT 2/Hold. or Luviquat® Style/ Style AT 1 (polymer content), respectively. The most highly recommended combination is Luviset® Clear AT 3 plus Luviquat® Hold AT 2/Hold.

**Example of use**

Luviset® Clear AT 3 is a high performance hair styling polymer designed primarily for clear gels. It works equally well in mousses, setting lotions and alternative styling products and provides crystal clear, non-tacky, humidity resistant properties.



We create chemistry

## Technical Information

---

### **Luviset® Clear AT 3**

PRD 30626433

Valid since 05.10.2020  
Revision 2.1  
WF-No. 25367  
Page 10 of 10

---

® = registered trademark of BASF in many countries    ™ = Trademark of BASF

**Care Chemicals**

### **Intended for use as cosmetic ingredient**

### **Disclaimer**

This document, or any answers or information provided herein by BASF, does not constitute a legally binding obligation of BASF. 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. It does not relieve our customers from the obligation to perform a full inspection of the products upon delivery or any other obligation. 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, DATA OR INFORMATION SET FORTH, OR THAT THE PRODUCTS, DESIGNS, 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.