



## FOAMYSENSE™ 205 Polymer

INCI name: PEG-14M

### Features & Benefits

- Excellent friction reduction
- Slippery and lubricious in-wash feel
- Smooth after feel
- Foam density improvement
- Synergistic boost in conditioning when used with UCARE™ and SoftCAT™ Conditioning Polymers
- Improved tactile properties of water phase and overall aesthetics

### Composition

- Linear, high molecular weight, poly(ethylene oxide) polymers

### Applications

- Hair care
- Body washes
- Bar soaps
- Shaving products
- Skin care

### Typical Properties

Specification Writers: These values are not intended for use in preparing specifications.

Test <sup>1</sup>	Property	Unit	Result
DOWM 101962	Viscosity (5% aqueous solution)	cP	4500–8800
DOWM 102175	pH (25°C, 5% aqueous solution)		8.0–10.0
	Molecular weight <sup>2</sup>	g/mol	600,000

1. DOWM: Dow Test Method.
2. Based on rheological measurements. Molecular weights obtained by other methods, including light scattering and gel permeation chromatography, may not be directly compatible.

### Description

FOAMYSENSE™ Polymers are linear, high molecular weight, poly(ethylene oxide) polymers that are supplied as white powders. These nonionic polymers bring hydrodynamic drag reduction and a slippery feel to personal care products. FOAMYSENSE™ Polymers also boost foam volume and enhance foam creaminess for an excellent in-use experience.

## Formulating Tips

The relative ease of dissolving FOAMYSENSE™ Polymers directly in water depends on three factors: (a) rate of viscosity buildup (which is a function of solution concentration and molecular weight), (b) particle size, and (c) type of agitation employed. The underlying factor, once again, is to obtain good polymer dispersion before the solution viscosity builds to a point where it is no longer possible to disperse additional resin without high shear. This is best accomplished by adding the FOAMYSENSE™ Polymers at just the “right” rate of addition. If you add it too slowly, the viscosity will build too rapidly, and you will not be able to add the rest of the resin. On the other hand, if you add the resin too rapidly, it will clump up and not dissolve.

Solutions of FOAMYSENSE™ Polymers can be prepared by direct addition of the dry resin to water using a marine-type propeller. These stirrers create a large vortex with only moderate shear. Stir rapidly to create a vortex initially (about 600 rpm), sprinkle in FOAMYSENSE™ Polymers at just the “right” rate, and then decrease the rpm to about 60. Continue stirring for 30–60 minutes until the solution appears homogeneous. In this way, as the viscosity increases, the shear degradation will be minimal.

FOAMYSENSE™ Polymers can undergo chain cleavage via auto-oxidation. Therefore, these products will degrade to lower molecular weight hence lower solution viscosity. Variables such as time, elevated temperature, and exposure to oxygen can impact the rate at which these polymers degrade. The rate of degradation is also dependent on the grade. Higher molecular weight grades are more sensitive than the lower molecular weight grades. The rate of auto-oxidation can be minimized through the addition of antioxidants and by controlling storage conditions. FOAMYSENSE™ Polymers are supplied with a typical range of butylated hydroxytoluene (BHT) content from 50 to 1000 ppm.

## Mechanism of Action

### Lubricity

The turbulence of flowing water increases drag. Adding FOAMYSENSE™ Polymers to water decreases hydrodynamic drag by altering the dynamics at the interface between the water and the surface with which it is in contact. The linear structure of the FOAMYSENSE™ Polymers allows the molecule to stretch. When a solution containing FOAMYSENSE™ Polymers is subjected to greater and greater linear forces (known as laminar flow), the FOAMYSENSE™ Polymers extend and stretch in solution. The resultant increase in the length of the FOAMYSENSE™ Polymers removes energy from the flowing system to decrease the building turbulence that accompanies the mounting force of the flowing solution. The overall effect is that the entire solution flows more smoothly.

### Foam Stabilization

FOAMYSENSE™ Polymers, although nonionic, are slightly electronegative. This is due to the lone pair of electrons in the ether oxygen present in the chemical structure of FOAMYSENSE™ Polymers. This slight negativity allows the resin to associate with the counter ions (i.e. Na or NH<sub>3</sub>) of the surfactant and the hydrogens in the water molecules to strengthen the foam bubble structure, and thus provide additional stabilization. Since a single molecule of the FOAMYSENSE™ Polymers is interacting with many surfactant molecules present in the surface layer, it helps bind them together electrochemically.

## Product Suggestions

Low Mw  High Mw

WSR N10 // WSR N750 // WSR N3000 // WSR 205 // WSR N12K // WSR N60K // WSR 301 // WSR COAG // WSR 308

Optimal clarity in surfactant systems

High lubricity, improved spreadability (shaving products, styling)

Liquid hand soaps & bar soaps

Synergistic effect with UCARE™ and SoftCAT™ Polymers for improved compatibility, feel, and deposition of actives

## Handling Precautions

PRODUCT SAFETY INFORMATION REQUIRED FOR SAFE USE IS NOT INCLUDED IN THIS DOCUMENT. BEFORE HANDLING, READ PRODUCT AND SAFETY DATA SHEETS AND CONTAINER LABELS FOR SAFE USE, PHYSICAL AND HEALTH HAZARD INFORMATION. THE SAFETY DATA SHEET IS AVAILABLE ON THE DOW WEBSITE AT DOW.COM, OR FROM YOUR DOW SALES APPLICATION ENGINEER, OR DISTRIBUTOR, OR BY CALLING DOW CUSTOMER SERVICE.

## Usable Life and Storage

Product should be stored in a dry location at a temperature of less than 40°C (104°F).

## Packaging Information

Product is sold in 140 lb bags.

## Limitations

This product is neither tested nor represented as suitable for medical or pharmaceutical uses.

## Health and Environmental Information

To support customers in their product safety needs, Dow has an extensive Product Stewardship organization and a team of product safety and regulatory compliance specialists available in each area.

For further information, please see our website, [dow.com](http://dow.com) or consult your local Dow representative.

## Disposal Considerations

Dispose in accordance with all local, state (provincial) and federal regulations. Empty containers may contain hazardous residues. This material and its container must be disposed in a safe and legal manner.

It is the user's responsibility to verify that treatment and disposal procedures comply with local, state (provincial) and federal regulations. Contact your Dow Technical Representative for more information.

## **Product Stewardship**

Dow has a fundamental concern for all who make, distribute, and use its products, and for the environment in which we live. This concern is the basis for our product stewardship philosophy by which we assess the safety, health, and environmental information on our products and then take appropriate steps to protect employee and public health and our environment. The success of our product stewardship program rests with each and every individual involved with Dow products - from the initial concept and research, to manufacture, use, sale, disposal, and recycle of each product.

## **Customer Notice**

Dow strongly encourages its customers to review both their manufacturing processes and their applications of Dow products from the standpoint of human health and environmental quality to ensure that Dow products are not used in ways for which they are not intended or tested. Dow personnel are available to answer your questions and to provide reasonable technical support. Dow product literature, including safety data sheets, should be consulted prior to use of Dow products. Current safety data sheets are available from Dow.

dow.com

**NOTICE:** No freedom from infringement of any patent owned by Dow or others is to be inferred. Because use conditions and applicable laws may differ from one location to another and may change with time, Customer is responsible for determining whether products and the information in this document are appropriate for Customer's use and for ensuring that Customer's workplace and disposal practices are in compliance with applicable laws and other government enactments. The product shown in this literature may not be available for sale and/or available in all geographies where Dow is represented. The claims made may not have been approved for use in all countries. Dow assumes no obligation or liability for the information in this document. References to "Dow" or the "Company" mean the Dow legal entity selling the products to Customer unless otherwise expressly noted. NO WARRANTIES ARE GIVEN; ALL IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE ARE EXPRESSLY EXCLUDED.

