Technical Data Sheet

ACUSOL™ OP305 Opacifier

ACUSOL™ OP305 Opacifier is an aqueous styrene/acrylic emulsion designed for opacifying home and institutional care products. The polymer is used to impart a milky or lotionized appearance to a liquid product, generally at addition levels of 0.1 to 1.0%. ACUSOL™ OP305 Opacifier is offered at 40% solids and is compatible with most ingredients present in home and institutional care products. The polymer is safe in normal use.

Features & Benefits

- Uniform opacity
- Hides amber castle and haziness
- High whiteness
- Effective at very low use level
- Liquid
- Suitable for acidic systems
- Enhances the effect of dyes
- Low residual monomer

Composition

ACUSOL™ opacifiers are water-based styrene/acrylic emulsions that have been designed to scatter light effectively. These products are offered at pH values between 2 and 5 and may require neutralization. ACUSOL™ OP305 Opacifier is synthesized from styrene and acrylate comonomers and is made through emulsion polymerization.

Applications

- General purpose formulations
- Acid toilet cleaners
- Car shampoos
- Floor cleaning formulations
- Detergent applications
- Liquid dishwash
- Low pH household cleaners
- 2-in-1 liquid detergents
- Unit dose detergents

Typical Properties

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

Property	Unit	Result
Ionic Nature		Anionic
Appearance		Opaque, white to off-white liquid
Solvent		Water

Typical Properties (Cont.)

Property	Unit	Result
Solids	%	40
pH (As Supplied)		2.05–2.5
Average Particle Size	µm	0.3
Density	g/ml	1.03
Viscosity	cP	< 50
Preservative		None

Behavior Profile of ACUSOL™ Opacifiers

Corrosion Resistance

Tests have been performed for corrosion resistance under several different conditions on ACUSOL™ OP301 Opacifier as representative of the ACUSOL™ opacifier range. In the presence of a 304L stainless steel coupon heated to "sensitizing" temperature, no visible corrosion was noted nor was any change in product color observed, even at 60°C for 378 hours. The same results were obtained using 304L and 316L stainless steel coupons with welds present.

Microbial Resistance

ACUSOL™ OP305 Opacifier has a pH of 2.05 to 2.5 and is inherently not susceptible to microbial contamination. Random checks are carried out throughout the year to help ensure that there are no detectable microorganisms in the product. If ACUSOL™ OP305 Opacifier is stored diluted, then it must be suitably preserved.

Formulation Use and Guidelines

Order of Addition

It is recommended that the ACUSOL™ opacifiers be added last in the manufacturing cycle, after addition of dye, salt, perfume, etc. and following final pH adjustment. To avoid potential "shock" the product should be diluted with at least four times its own weight of product water (held out from the formulation), then added very slowly to the final mix, maintaining good agitation throughout the addition process.

Stability Testing

Stability testing should be carried out on all opacified products. Four week stability tests under the following conditions are recommended:

1. Room temperature (20 to 25°C)
2. Oven (40°C)
3. Cold (4 to 6°C)
4. Freeze/thaw, 3 cycles

Stability in Formulations

ACUSOL™ opacifiers offer excellent formulation stability. The following guidelines are provided to optimize their performance in this regard.

Formulation Use and Guidelines (Cont.)

Stability in Formulations (Cont.)
If ACUSOL™ opacifiers are being formulated with anionic surfactant systems, it may be necessary to add 1 to 3% of a hydrotrope (e.g.propylene glycol, isopropanol or sodium xylene sulphonate) to increase the solubility/compatibility of the surfactants at colder temperatures. Without the added hydrotrope, the anionic surfactants may have decreased solubility at lower temperatures and can crystallize out of solution, causing the ACUSOL™ opacifiers to precipitate as well.

If ACUSOL™ opacifiers are being formulated with nonionic surfactants at warm temperatures, the formation of water insoluble, nontransparent droplets may result (cloud point). If a cloud point is observed, try selecting a surfactant with more ethylene oxide/ ethoxylate groups (> 15) and possessing a higher HLB - hydrophilic/hydrophobic (lipophilic) balance value. Other suggestions include increasing the concentration of nonionic or presolubilizing the fragrance in a pre-warmed nonionic surfactant.

If instability of a formulation containing ACUSOL™ opacifiers is observed at both cold and warm temperatures, check the compatibility of the opacifier with the other ingredients in the formulation such as cationic surfactants, solvents and oxidizing agents. Then try using the suggested solutions listed above.

In all cases, it is important to follow the recommended addition sequence when using ACUSOL™ opacifiers to help ensure their optimum performance.

Process Equipment Cleaning
The Dow Chemical Company recommends that equipment containing ACUSOL™ opacifiers be cleaned with high pressure washing or the use of the following cleaning solution:

(1) 90 parts water
(2) 2.5 parts Sodium Lauryl Ether Sulfate (SLES) (27%)
(3) 2.5 parts nonionic surfactant (e.g. alcohol ethoxylate alternative)
(4) 5 parts sodium hydroxide (25%) or monoethanolamine (90%)

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

Keep from freezing; material may coagulate. The ACUSOL™ opacifiers are not freeze/ thaw stable and should therefore be kept at temperatures of 5 to 35°C. If kept under these conditions and in their unopened containers, the products will have a shelf life of 18 months or greater from the date of manufacture. If the ACUSOL™ opacifiers are stored diluted, then they must be suitably preserved.

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 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.

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