CYTEC®

PRODUCT DATA SHEET Specialty Additives

AEROSOL® OT surfactant

Chemical: Sodium dioctyl sulfosuccinate

AEROSOL OT surfactant is an excellent wetting agent and emulsifier, characterized by its very quick migration to the interface. Its surface modifying properties can be utilized to reduce surface tension and to increase absorbency and penetration.

PHYSICAL AND CHEMICAL PROPERTIES

	OT-100	OT-75	OT-70 PG	OT-75 PG	OT-B	GPG	OT-S	OT-N
Appearance at 25°C	waxy solid	viscous liquid	clear slightly yellow viscous liquid	clear slightly yellow viscous liquid	white granular solid	clear slightly viscous	transparent light amber liquid	clear to slightly hazy viscous liquid
Solids, % by weight	98 min	75±1.0	70.5±1.5	75±1.0	98 min (85 active)	70±2.0	70±2.0	70±2.0
Moisture, % by weight maximum	2.0	–	–	–	2.0	–	0.5	–
Solvent or diluent	–	water alcohol	water propylene glycol	water propylene glycol	sodium benzoate	water alcohol	light petroleum	water alcohols
Color, APHA, maximum (50% solids)	100	35	50	50	–	125	150 (as is)	75
Specific gravity, 25°C	1.1	1.09	1.09	1.09	1.1	1.08	1.1	1.09
Viscosity, cps @ 25°C	–	~200	100-300	100-300	–	~200	200-300	300 max
Melting point, °C	153-157	–	–	–	300	–	–	–
Flash point (Pensky Marten), °F	Not applicable	85	>212	>212	Not applicable	81	131	103
Freezing point, °C	–	-40	–	–	–	-40	–	–
pH, 1% solution	–	5-7	5-7	5-7	–	5-7	6-8	5-7
Acid number, as is maximum	2.5 (solid basis)	1.0	1.0	1.0	2.5	2.0	1.0	2.0 max
Iodine value, as is maximum	0.25 (solid basis)	0.20	0.25	0.25	0.25	0.5	0.25	0.5 max
Solubility (See also Tables 1, 2 and 3) Organic polar solvents Organic non-polar solvents	 excellent excellent	 excellent good	 excellent good	 excellent good	 excellent insoluble	 excellent good	 excellent good	 excellent good
CMC %, % by weight	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12

SOLUBILITY

Solubility Limits of AEROSOL OT Surfactant in Water, (based on solids)

Temperature		AEROSOL OT surfactant g/100 mL water
°C	°F	
25	77	1.5
30	86	1.8
40	104	2.3
50	122	3.0

Interfacial Tension of Solutions of AEROSOL OT Surfactant (based on solids) in Mineral Oil vs Water and in Water vs Mineral Oil

Solution	Age of Interface	Interfacial tension, dynes/cm
0.1% AEROSOL OT-100 surfactant in Water vs Mineral Oil	6 seconds 30 seconds 15 minutes	35.5 31.2 27.8
0.1% AEROSOL OT-100 surfactant in Water vs Mineral Oil	1 minute 5 minutes 15 minutes	6.82 6.08 5.86

Organic Solvents Capable of Solubilizing Aqueous Solutions of AEROSOL OT

Solvent	Solvent required for 10% solution, % by weight	Solvent required for 25% solution, % by weight
Acetone	17.5	–
Amyl alcohol (clear thick gel)	5.9	–
2-Butanol	11.5	–
Butyl Carbitol[1] diethylene glycol monobutyl acetate	12.0	15.0
Butyl Cellosolve[1] ester ethylene glycol monobutylether (q.v.)	12.0	15.0
Diacetone alcohol	18.0	15.0
Diethylene glycol	15.0	12.0
Ethanol (SDA 2-B)	15.0	12.0
Ethyl lactate	10.0	–
Furfuryl alcohol	7.4	–
Isopropyl alcohol	17.5	15.0
Methanol	12.5	13.0
Methyl acetate	15.0	15.0
Pine oil	not satisfactory	5.0
Tetrahydro furfuryl alcohol	9.9	–

SURFACE TENSION

Surface Tension of Solutions of AEROSOL OT Surfactant in Water, NaCl and Na_2S0_4

AEROSOL OT Concentration % solids	Water	Surface Tension, dynes/cm			
		0.25% NaCl	0.5% NaCl	1.0% Na_2SO_4	0.25% Na_2SO_4
0	72.0	–	–	72.5	72.8
0.001	68.6	52.4	40.1	42.0	41.5
0.005	47.3	–	–	–	–
0.02	45.9	26.3	25.3	25.9	26.0
0.1		24.9	24.8	24.6	25.2
0.25	29.0	24.5	25.2	25.6	25.4
0.5	27.5	25.3	25.5	25.2	25.2
1.0	26.1	cloudy	cloudy	cloudy	cloudy

ROSS-MILES FOAM TEST

ASTM G-1173, 0.5% solution, 25°C	AEROSOL		
	OT-75	OT-B	GPG
Initial foam height, mL	320	315	335
Foam height after 15 minutes, mL	100	10	130

Interfacial Tension (Pendant Drop Method) of Solutions of AEROSOL OT Surfactants vs Mineral Oil

Concentration of AEROSOL OT surfactant in water, % solids	Age of interface, minutes	Interfacial tension vs Mineral Oil dynes/cm
None		Unaffected
0.01	.25 1 15	27.6 21.7 20.7
0.05	1 5 15	11.8 11.0 10.7
0.1	1 5 15	6.82 6.08 5.86
0.25	.5 5 15	4.37 3.98 3.58
0.5	1 5 15	3.54 3.48 3.41
1.0	1 5 10 15	1.97 1.92 1.85 1.84

Solubility of AEROSOL OT Surfactant (except OT-B) in Organic Solvents

Method of Solution		Specific gravity @ 25%		Surfactant in solution		Viscosity solution, poises
Dissolved at room temperature	Heated then cooled	Solvent	Solution	g/100mL	% by weight	
Carbon tetrachloride	–	1.59	1.31	73.8	56.4	1.65
Petroleum ether	–	0.688	0.950	70.1	75.0	0.65
–	Solvent naptha	0.864	0.701	70.5	69.8	0.65
–	Dibutyl phtthalate	1.03	1.07	70.7	66.1	8.84
–	Paraffin oil	0.881	1.00	69.5	69.5	12.9

Interfacial Tension (Pendant Drop Method) of AEROSOL OT Surfactant in Water and Electrolyte Solutions vs Organic Liquids

Interfacial tension, dynes/em at 25°C, surface age= 5 seconds

Concentration of solids	OT in Water	OT in 0.25% NaCl	OT in 0.50% NaCl	OT in 1.0% Na_2SO_4	OT in 2.0% Na_2SO_4
AEROSOL OT Surfactant vs Toluene					
0	33.7	–	–	–	–
0.001	15.8	13.2	10.4	10.7	10.9
0.02	6.84	0.76	1.01	1.21	1.58
0.1	1.95	0.51	0.87	0.94	1.35
0.25	1.07	0.42	0.82	0.99	1.38
0.5	0.66	0.38	0.74	0.84	1.27
1.0	0.38	Cloudy	Cloudy	Cloudy	Cloudy
AEROSOL OT Surfactant vs Mineral Oil					
0	54*	–	–	–	–
0.02	16.8*	3.43	2.13	3.02	2.49
0.1	5.86*	1.14	2.12	1.72	1.42
0.25	3.58*	1.14	1.02	1.38	1.33
0.5	3.41*	1.09	1.02	1.17	1.28
1.0	1.84*	Cloudy	Cloudy	Cloudy	Cloudy
AEROSOL OT Surfactant vs Carbon Tetrachloride					
0	44.7	–	–	–	–
0.001	36.0	30.9	37.1	36.4	38.0
0.02	12.00	0.92	1.00	1.62	1.62
0.1	1.15	0.51	0.94	Cloudy	1.67
0.25	0.86	Cloudy	Cloudy	Cloudy	1.59
0.5	0.54	Cloudy	Cloudy	Cloudy	Cloudy
1.0	Cloudy	Cloudy	Cloudy	Cloudy	Cloudy
AEROSOL OT Surfactant vs Air					
0	72.0	–	–	72.5	72.8
0.001	62.8	52.4	40.1	42.0	41.5
0.02	38.9	26.3	25.3	25.9	26.0
0.1	28.7	24.9	24.8	24.6	25.2
0.25	28.5	24.5	25.2	25.6	25.4
0.5	27.5	25.3	25.5	25.2	25.2
1.0	26.0	Cloudy	Cloudy	Cloudy	Cloudy

* Age of interface= 15 seconds.

WETTING (DRAVES TEST)

Draves Sinking Time in seconds at 25± 1°C AEROSOL OT Surfactant (based on solids)

% Concentration	0.5	0.25	0.1	0.05	0.025	0.01
Time in seconds	<0.2	<0.2	3.0	6.0	16.6	52.5

ELECTROLYTE TOLERANCE

Calcium Tolerance

AEROSOL OT Surfactant Concentration, % solids	Calcium Tolerance ppm
0.01	2250
0.025	630
0.05	520
0.10	250
0.25	340
0.50	540

REPRESENTATIVE APPLICATIONS FOR AEROSOL OT SURFACTANT

AEROSOL OT, besides being an excellent wetting agent, also finds utility in a number of applications requiring emulsification, stabilization and dispersion. A few representative applications where AEROSOL OT exhibits distinct performance advantages are listed below:

Printing Ink / Overprint Varnish Systems

AEROSOL OT is widely used as a wetting/leveling agent in water-based printing ink formulations due to the following reasons:

- Rapid and dramatic lowering in surface tension of the formulation, leading to improved wetting of the substrate. This in turn improves adhesion, gloss and color resolution.
- Improved flow characteristics, leading to uniform coating of the substrate.
- Rapid wetting is compatible with very fast printing rates.

Emulsion Polymerization

AEROSOL OT can also be used as a primary or co-emulsifier, and as a post-add, for the manufacture of a wide variety of latex types, especially acid/AMD-modified styrenebutadiene latexes. It exhibits the following performance features as an emulsifier in latex systems:

- Low CMC provides efficient particle generation at low usage level.
- Can produce latexes with very low particle size and narrow distribution.
- Latexes produced with AEROSOL OT have very low levels of coagulum, and high conversion and molecular weight.
- Works very well with AEROSOL MA-80I and AEROSOL A-196 as a co-emulsifier in styrene-butadiene latex systems.
- Extremely effective as a post-add in all types of latexes (including acrylic, styrene-acrylic, vinyl acetate, vinyl acrylic, styrene-butadiene) in lowering surface tension and improving flow and leveling characteristics.

Miscellaneous Application Areas For AEROSOL OT

- **Textile and Paper:** very effective as a wetting and dispersing agent.
- **Paint Formulations:** provides excellent flow and leveling characteristics, as well as promoting better wetting and hence paint adhesion. Its excellent organic solubility also makes it compatible with a wide variety of paint additives/formulations.
- **Dry Cleaning:** The very good wetting, dispersing, penetrating, and emulsifying capability of AEROSOL OT can make it very effective in liquid dry cleaning formulations. It is also very effective in cleaning solutions for glass windows, automobile windshields, etc.
- **Agrochemical:** AEROSOL OT-B is widely used in the preparation of readily wettable and dispersible agricultural free-flowing powder and water soluble granule formulations. AEROSOL OT-A ND is used in emulsion concentrate formulations. AEROSOL OT is used in serveral types of agrochemical formulations as a flow and wetting agent.

- **Anti-Stat:** AEROSOL OT is effective as an anti-stat/softening agent.
- **Organic/Hydrocarbon-Based Systems:** AEROSOL OT-S is very compatible and effective as a wetting/solubilizing/dispersing agent in a wide variety of organic/hydrocarbon/oil-based systems.
- **As a wetting agent** for a number of substrates such as metal, glass, plastic, etc.

STORAGE AND HANDLING

In order to ensure the required level of quality of the AEROSOL OT product range, the product must be stored in a cool/dry environment at ambient temperature.

Handling and storage information on these products can be found in the corresponding Cytec Industries Inc. Material Safety Data Sheet.

AEROSOL OT 75 E
Containers must be bonded and grounded when pouring or transferring material.

Containers filled with AEROSOL OT-75 surfactant should be kept closed when not in use, as evaporation of water and solvent may cause gelation. The system composed of AEROSOL OT-75 surfactant plus water and solvent is sensitive to loss of liquid through evaporation causing reversion to a gel state. The quality of the AEROSOL OT-75 surfactant is not affected by this physical change.

If a batch of AEROSOL OT-75 surfactant should gel, a small amount of ethanol should be added and the drum rolled until the gel has disappeared (1-2% of ethanol on the weight of the batch is sufficient). To effect more rapid liquefaction, the drum should be put in a steam-heated chest.

The efficacy of AEROSOL OT-75 surfactant is not impaired by freezing and thawing. However, if a freeze-thaw occurs, it is recommended that the entire contents of the container be agitated prior to use.

HEALTH AND SAFETY INFORMATION

Before handling this material, read the corresponding Cytec Industries Inc. Material Safety Data Sheet for safety, health and environmental data.

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