

AEROSOL[®] MA-80 Surfactant

Type:	Anionic
Chemical:	Sodium dihexyl sulfosuccinate
CAS No.:	3006-15-3
Molecular Formula:	C ₁₆ H ₂₉ O ₇ NaS
Molecular Weight:	388
EPA Status:	Exempt 40 CFR 180.1001(d)

AEROSOL MA-80 surfactant is a surface tension depressant and an emulsifying, dispersing and solubilizing agent exhibiting high electrolyte tolerance. It promotes penetration and spreading of organic liquids as films which break up into minute droplets.

Physical and Chemical Properties

Appearance at 25°C (77°F)	Clear, slightly viscous liquid
Solids, % by weight	80 ± 1.0
Solvent	Water, alcohol
Color, APHA, Maximum	50
Specific gravity, g/cc 25°C	~1.13
Density, lb/gal	~9.4
Melting point, 100% solids, °C	199-202
Freezing point, °C	-28 (-18°F)
Flash point, °C Setflash, (closed cup)	46 (115°F)
Autoignition temperature	Does not promote spontaneous combustion
pH, 10% solids solution	5-7
Acid number, solids basis, maximum	2.0
Iodine value, as is, maximum	0.2

Surface Active Properties

Critical Micelle Concentration (CMC), % by weight	1.2-1.6
Interfacial tension, dynes/cm 1% active solution vs mineral oil	4.2
Surface tension	See Table 1
Wetting (Draves Test)	See Table 2
Ross Miles Foam Test, ASTM D-1173 0.5% solution, 25°C	
Initial foam volume, ml	40
Foam volume after 15 minutes, ml	5

Solubility

Solubility limits in water, solids basis

Temperature, °C	g/100 ml water
25	34.3
30	35.4
40	37.5
50	39.8
60	42.1
70	44.7

Solubility in polar organic solvents – Good

Solubility in non-polar organic solvents – Good

Acetone	Soluble
2B Alcohol	Soluble
Benzene	Soluble
Carbon tetrachloride	Soluble
Glycerine	Soluble
Kerosene	Soluble
Mineral Oil	Insoluble
Oleic acid	Soluble
Olive oil	Soluble, hot
Pine Oil	Soluble

Electrolyte Tolerance

Calcium tolerance

<u>AEROSOL MA-80 Surfactant</u>	<u>Calcium as CaCo₃ ppm</u>
0.01%	2250
0.25%	1120

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Surface Tension

Table 1 – Surface Tension of AEROSOL MA-80 Surfactant

Concentration MA-80 % solids	Water	Surface tension, dynes/cm		
		1% Na ₂ SO ₄	2% Na ₂ SO ₄	5% Na ₂ SO ₄
0	72.0	72.5	72.8	73.4
0.001	69.5	64.6	64.6	61.6
0.2	60.6	41.6	39.0	34.4
0.1	45.8	30.4	27.0	24.7
0.25	38.2	25.0	24.8	23.9
0.5	30.8	25.1	24.5	23.4
1.0	27.8	25.4	24.4	23.0
2.0	27.5	-	-	-

Wetting (Draves Test)

Table 2 – Wetting Time vs. AEROSOL MA-80 Surfactant Concentration

Draves Sinking Time in Seconds
AATCC-17-1952, 1.5 g hook, 25°C

AEROSOL MA	Temp. °C	Surfactant Concentration, %											
		0.3	0.25	0.15	0.125	0.075	0.05	0.04	0.03	0.025	0.02	0.015	0.01
In water	30	10	15	53	84								
	50	11	16	56	90								
	75	15	20	70	130								
In 5% NaCl	30					10	28	48	99				
	50					12	30	52	110				
	75					14	35	53	115				
In 8% NaCl	30								13	26	63		
	50								14	30	70		
	75								16	35	83		
In 12% NaCl	30									10	16	33	92
	50									12	21	43	120
	75									15	27	55	150

Polymerization of Vinyl Acetate – Butyl Acrylate – N-Methylolacrylamide-Methacrylic acid tetrapolymer

Ratio: 87/9/3/1

I. Recipe: Bo/D/132A

A) Kettle Charge: Parts Per Weight

D. water	120
AEROSOL A102	9.7
Potassium persulphate	1.0
VA	16
BA	3
Sodium metabisulfite	0.1
D. water	10

B) Monomer Pre-emulsion Charge:

D. water	70
Sodium metabisulfite	0.5
Sodium bicarbonate	0.9
Diammonium hydrogen phosphate	0.3
Methanol	5.0
AEROSOL MA-80	2.5
VA	150
BA	23
MAA	2
NMA 48%	12.5

II. Procedure

(A) Preparation of Kettle Charge

- Add 9.7 parts of AEROSOL A102 to 111 parts of distilled water.
- Add to this solution 1.0 parts potassium persulphate.
- Purge the solution with nitrogen while stirring and heat to 60°C.
- A mix of 16 parts vinyl acetate and 3 parts butyl acrylate and a mix of 0.10 parts sodium metabisulfite and 10 parts water are set aside for initiation.

(B) Preparation of Pre-emulsified Monomer Charge

- Dissolve 2.5 parts of AEROSOL MA-80 in 65 parts of water. Add 0.5 parts sodium metabisulfite, 0.9 parts sodium bicarbonate and 0.3 parts diammonium hydrogen phosphate.
- To this solution add under good stirring a solution of 150 parts vinyl acetate, 23 parts butyl acrylate and 2.0 parts methacrylic acid.
- At the same time add 12.5 parts 48% N-methylolacrylamide. This pre-emulsion is placed in an addition vessel equipped with an agitator.
- Agitation is maintained throughout addition of the pre-emulsion to the polymerization kettle.

(C) Addition of Pre-emulsified Monomer to Polymerization Flask

- When the contents of the polymerization kettle reach 60°C, the nitrogen flow is reduced to a minimum and the mixes of monomer and catalyst for initiation are added to the reactor.
- After initiation and maximum exotherm, the addition of pre-emulsion is started at a rate of 1.5 parts per minute.
- Total addition time requires about 3 hours.
- Following monomer addition, the latex is held at 60°C for 1 hour, then cooled to room temperature and filtered into a suitable container.

III. Reaction Profile

Initiation	<5"
Max. temperature (°C)	71
Time Max. Temp.	100"

IV. Results

Solids %	47.8
pH	5.5
PS	398
Visc (mPa.s, #2,20RPM)	384
Coagulum	0.3%

V. Acetone Insolubles:

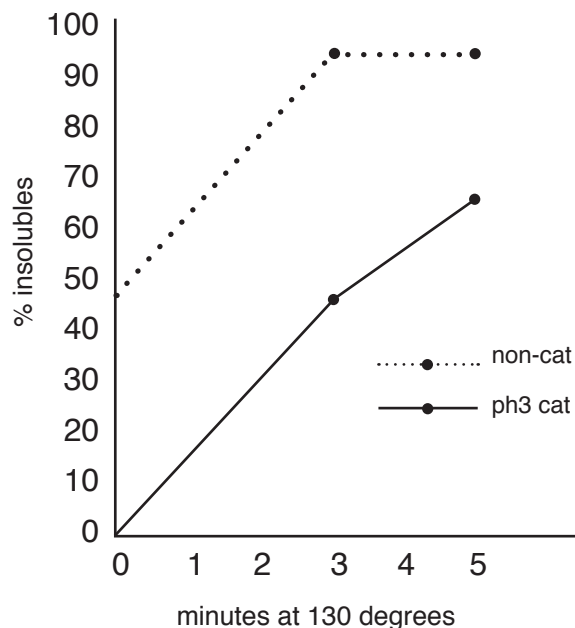
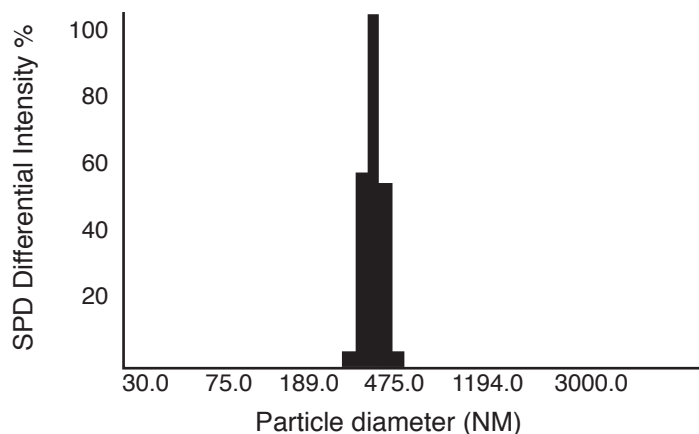


Figure 1: Acetone Insolubles

Time	Non-cat	pH3 cat
0'/130°C	0.0%	45.5%
3'/130°C	51.9%	91.8%
5'/130°C	68.7%	91.3%

SPD Intensity Results with 1 peak

Mean size (NM)	398
Size S.D. (NM)	60
Size C.V. (%)	15



Biodegradability

AEROSOL MA-80 surfactant was biodegraded to only 52% in eight days when the sewage was acclimatized to AEROSOL OT surfactant.

EPA Status*

Under the provisions of Section 180.1001 (d) of the Pesticides Chemicals Regulations, AEROSOL MA-80 surfactant is exempted from the requirement of a tolerance when used in accordance with good agricultural practice as an inert ingredient of pesticide formulations applied to growing crops.

**21 CFR 182.92 Adjuvants for Pesticide Chemicals. Adjuvants identified and used in accordance with 40 CFR 180.1001 (c) and (d), which are added to pesticide use dilutions by a grower or applicator prior to application to the raw agricultural commodity, are exempt from the requirement of tolerance.*

Health & Safety Information

Before handling this material, read the corresponding Cytec Industries Inc. Material Safety Data Sheet for safety, health and environmental data. The acute oral LD₅₀ of AEROSOL MA-80 surfactant for rats has been found to be 1.75 g/kg in terms of solids content. By absorption through the intact skin of rabbits, the single dose LD₅₀ was found to be 5.0 ml/kg. The product is severely irritating to rabbit eyes and to the skin of rabbits when held in continuous contact for 24 hours. This property is common to many anionic surface active agents. When AEROSOL MA-80 surfactant was added to the diets of rats and fed for 32 days, levels as high as 0.5 g/kg/day were without effect. On the basis of these studies it may be concluded that prolonged or repeated skin contact with concentrated solutions of AEROSOL MA-80 surfactant should be avoided and care should be exercised to prevent entry of the product into the eye.

Phytotoxicity

AEROSOL MA-80 surfactant is not phytotoxic if used in spray solutions at a concentration below 0.25%.

TSCA Information

This product is manufactured in compliance with all provisions of the Toxic Substances Control Act, 15 U.S.C.

Storage and Handling

Solutions of AEROSOL MA-80 surface active agent may be stored and used in a wide variety of containers or reaction vessels. Stainless steel, aluminum, and Monel are recommended for reaction and storage vessels; glass and rubber are suitable lining materials. Some of the sprayed resinous coatings are satisfactory in stationary tanks in which the coating can be built up more heavily than is customary in drums. In permanent installations, however, the added expense of aluminum stainless steel or cladsteel frequently is justified. Containers of AEROSOL MA-80 surfactant should be kept closed when not in use, as evaporation of water and solvent may cause gelation. The system containing AEROSOL MA-80 surfactant plus water and solvent is sensitive to loss of liquid through evaporation, causing reversion to a gel state. The quality of the AEROSOL MA-80 surfactant is not affected by this physical change. If AEROSOL MA-80 surfactant should gel, add a small amount of 2B ethanol and roll the drum until the gel has disappeared (1-2% of ethanol on the weight of the batch is sufficient). To liquefy more rapidly, put the drum in a steam-heated chest.

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