Cola®Caps

LOW-FOAM NONIONIC SURFACTANTS

Patented : Cola®Cap is covered under patent #6,878,682
CAS#: 620610-66-4, 675869-02-0, and 675869-05-3
EINECS/REACH: Polymer Exempt

benefits

The Cola®Cap Series are low-foam nonionic surfactants that offer the following features:

- Very low foaming
- Biodegradable
- Excellent detergency
- Good food soil defoaming properties
- Stable on solid caustic and other alkaline builders
- 100% active
- Co-polymerizable in emulsion polymer applications
- Stable over a wide pH range of 1.5 to 12

applications

- Anytime low foam products are beneficial
- High pressure spray metal cleaners
- Mechanical dish wash detergents and rinse aids
- Floor scrubbing cleaners
- Low foam textile wetting agents
- Bottle washing
- Dairy cleaning
- Steam cleaning
- Food plant cleaning
- Laundry detergents

introduction

With more emphasis being placed on environmentally friendly cleaners and detergents, Colonial Chemical set out to develop a series of biodegradable, low foam, capped non-ionics useful in formulating environmentally safe cleaners of all types. The Cola®Caps are "All-Purpose Low-Foaming Surfactants" and are unique new products that offer advantages over existing competitive products. The Cola®Cap Series of products vary in cloud point and critical micelle concentrations, to enable the formulator to select the optimum product for each particular application.

The chemistry utilized for the Cola®Cap products results in very low foaming surfactants that provide excellent product color and chemical stability over the a wide pH range. This new patented process permits tight control of product cloud point, stability and foaming characteristics. Variations within the series also permit optimization of detergency, wetting and food soil defoaming characteristics. The Cola®Cap's are supplied as 100% active products to provide maximum formulation flexibility.

description

The Cola®Cap's chemistry introduces a novel capping group in the molecule, modifying the polar hydroxyl group in conventional nonionics to provide excellent chemical stability. This structural modification can be activated by the use of specific catalysts to allow copolymerization with specific monomers. This can provide polymerizable surfactants which will enhance polymer mechanical, chemical, and freeze-thaw stability.

Most low-foaming nonionic surfactants available are not stable when formulated on strong solid caustic (NaOH, KOH, etc.). This is due to either poor reaction control or the poor choice of capping structures. Colors developing (yellow, brown) indicate an oxidation of residual hydroxyl groups and can be correlated with a subsequent increase in product cloud point. Loss of low-foaming characteristics is frequently observed.

The Cola®Caps chemistry provides a capping group, which compared to competitive low-foamers, provides unique functionality and greater biodegradability and does not interfere with wetting, detergency or surface activity. It is also structurally sufficient to provide good food soil defoaming properties.

The Cola®Cap products develop their low foaming properties without the use of propylene oxide capping. It is known that propylene oxide groups in a molecule will inhibit biodegradation, thus PO capped nonionics have poor biodegradability.

Cola®Cap's foaming properties decrease with increasing temperature, and for minimum foam, use temperatures at least 15 – 30 °C above the solution cloud point are recommended.

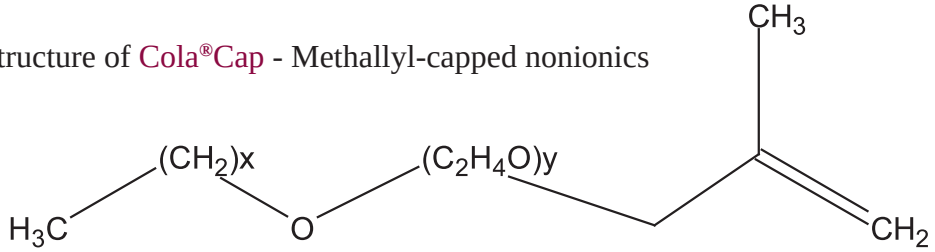
typical properties

	MA026	MA257	MA259	MA1610
Color, Gardner (D1544-98)	< 1	1	< 1	< 1
Cloud Point (1%, Tap water), °C	< 0	19	30	36
Foam Height (0.1%, 25°C), cm				
Immed.	2.7	2.6	4.1	4.5
5 sec.	1.7	2.6	4.1	4.4
15 sec.	0.5	2.5	4.1	4.4
30 sec.	0.3	2.5	4.1	4.2
60 sec.	0.3	1.7	2.2	2.3
Draves wetting (0.1% active),				
25°C, seconds	6.1	44.0	14.3	6.0
Caustic Stability (5% on NaOH)				
7 days - 60°C	white	white	white	white

Note: These products are TSCA registered.

structure

Generalized structure of Cola®Cap - Methallyl-capped nonionics



acid stability

Cola®Cap products were tested for stability at room temperature (1 hour) and for 5 minutes at boiling in hydrochloric acid, sulfuric acid, and phosphoric acid, all at 1 N.

Conclusion:
Cola®Cap is stable in HCl, sulfuric acid, and phosphoric acid. There is essentially no change in cloud point after treatment with these acids.

caustic stability

Cola®Cap products were tested for stability at room temperature and at 90°C in NaOH solutions (20, 25, and 50%).

Conclusion:
Cola®Cap is stable in all caustic solutions, including 50%.

hydrotrope

Solutions of Cola®Caps can be easily hydrotroped into 10% KOH using standard hydrotropes, such as Cola®Trope INC and Cola®Trope OD and Cola®Trope CA.

biodegradability

Cola®Cap products were tested for biodegradability, under OECD 301D test conditions. The products showed a biodegradability of greater than 90% after 28 days.

HLB values

Calculated HLB values for the Cola®Caps are as follows:

MA-026	10.5
MA-257	11.1
MA-259	12.0
MA-1610	12.5

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detergency testing

Detergency Test:

- Metal panels are washed successively in detergent, IPA, water, and then acetone.
- They are then dried and stored in a vacuum desiccator overnight.
- Panels are then dipped in oil and aged in an oven at 30-40°C for an hour.
- The panel is placed in the test solution for 15 minutes with agitation at 60°C.
- The panel is rinsed under water for 2 minutes, and then evaluated for % clean.

results

Surfactant	Average % Clean
Cola®Cap MA1610	35
Cola®Cap MA259	21
Cola®Cap MA257	23
Cola®Cap MA026	36
Neodol 91-6	25
Antarox BL-225	20
Triton DF-12	26
Surfonic L61	4

Test solutions: 0.1% Active surfactant, 1% NaOH

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