Technical Information

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BIODEGRADATION OF ALPHA SULFO METHYL ESTERS (SMEs)

Applicable to these current Stepan products:

ALPHA-STEP® BSS-45 ALPHA-STEP® PS-65	ALPHA-STEP® MC-48 ALPHA-STEP® PS-85P	ALPHA-STEP® PC-48

Applicable to these inactive Stepan products:

ALPHA-STEP® BSN-15	ALPHA-STEP® ML-40	

Biodegradation Information:

The SMEs are shown to undergo both primary and ultimate biodegradation. The biodegradation of SMEs was first described by Gode et al[1] as readily biodegradable in the OECD Closed Bottle test. This was confirmed by Masuda[2] with the MITI test; and more recently with the Sealed Vessel Headspace CO_2 (OECD method 310)[3]. A 12-week modified SCAS test showed 99% degradation and the CO_2 Evolution (modified Sturm) test conducted with adapted sludge showed 90% degradation at 28 days.

The biodegradation pathway for SMEs as proposed by Steber and Wierich[4] is similar to that of LAS biodegradation and begins with -oxidation of the terminal carbon. Because this step requires oxygen, SMEs do not biodegrade in strict anaerobic environments. SMEs biodegrade at a faster rate than LAS.

SMEs are considered to be "readily biodegradable" according to the European labeling classifications[5]. European competent authority (CESIO) also concluded that SMEs are readily biodegradable.

The above listed products are in compliance with the EU Detergent Regulation No. 648/2004.

References:

1. HPV challenge program submission for Fatty Acid, C12-18 Me Esters, Sulfonated, Na Salts. Nov. 2008.
2. Gode, von P., Guhl, W., and Steber, J., Oekologische Bewertung von -Sulfofettsaeremethylester. Fat Sci. Technol., 1987, 89: 548-552.
3. OECD SIDS Hexadecanoic Acid, 2-Safo, 1-Methylester, Sodium Salt, 2003.
4. Masuda, M., Environmental Aspects of Detergent Materials-Biodegradation of Detergent Surfactants. Oils-Fats-Lipids, 1995, 3:649-653.
5. Steber, J., and Wierich, P., The Environmental Fate of Fatty Acid Sulfomethyl Esters. Tenside Surf. Det., 1989, 46: 406-411.
6. European Directive 67/548/EEC, Annex VI, 5.2.1.3.

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