BIODEGRADATION OF HYDROTROPES

Applicable to these current Stepan products:

| STEPANATE® AXS | STEPANATE® SXS | STEPANATE® SCS-40 |

Applicable to these inactive Stepan products:

| STEPANATE® X-35 | STEPANATE® X-50 |

Biodegradation Information:
The available literature information indicates that CO2 evolution and the rate and the extent of ultimate biodegradation of Stepan's hydrotropes is similar to that of linear alkylbenzene sulfonates (LAS).

The results of biodegradation assays using UV absorbance to monitor xylene sulfonate removal in river water die-away tests indicate primary biodegradation reaching 100% in 8 days.

Ultimate or complete breakdown, using the modified Sturm test has been shown to reach 87% in 28 days with STEPANATE® SX (sodium xylene sulfonate). Therefore, Stepan's hydrotropes are considered readily biodegradable compounds.

References:

* Stepan Study (93-007).

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