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APPENDICES

Appendix A Surfactant Properties

Tergitol 15-S-7 is a secondary alcohol ethoxylate non-ionic surfactant. It is under a trademark of Union Carbide. It has an alcohol group located at various positions along a chain of 11–15 carbon atoms with an average ethylene oxide number of 7.3. It is used to formulate high performance cleaners and detergents, especially hard surface cleaners. It can be used in paper and textile processing, paints and coatings, agrochemical, and oil field chemicals. Moreover, Tergitol 15-S-7 passed OECD 301 test for ready biodegradability that prove the environmentally friendly property.

Properties

Identifiers

Chemical Type:	Secondary alcohol ethoxylate nonionic
Structural formula:	$C_{11-15}H_{23-31}O(CH_2CH_2O)_{7.3}H$

Typical physical properties

Molecular weight:	515
Density at 20°C:	0.992 g/ml
Appearance:	Transparent, colorless liquid
Cloud point temperature:	37°C
Viscosity at 25°C:	51 cP

Typical performance properties

CMC at 25°C:	39 ppm
Surface tension at 25°C:	43 dynes/cm, 1 wt%
Foam height at 25°C:	117/28 mm Ross-Miles method, at 0.1 wt% initial / 5 min

Appendix B Solute properties

The solute can be classified into 2 types; aromatic and chlorinated hydrocarbon series. The aromatic hydrocarbon series are benzene (BEN), toluene (TOL), and ethylbenzene (ETB). While the chlorinated hydrocarbon consist of 1,1-dichloroetyhlene (1,1-DCE), trichloroethylene (TCE), and tetrachloroethylene (PCE).

Table B1 Physical and chemical properties of all solutes

Solutes	Molecular weight	Density (g/cm^3)	Water solubility (mg/l)	Log octanol-water partition coefficient, log Kow	Molar volume, V_x (cm3/mol)*	Henry's law constant (Pa m^3/mol)
BEN	78.11	0.8786	1770	2.13	89.1	576
TOL	92.14	0.8669	533	2.69	106.3	673
ETB	106.18	0.867	169	3.15	122.4	854
1,1-DCE	96.94	1.213	2500	1.32	79.46	2675.0
TCE	131.39	1.465	1370	2.29	89.02	970.7
PCE	165.83	1.623	151	3.4	102	1852

*observed at 20 °C

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