

Product Information

POLYOXYETHYLENE SORBITAN MONOOLEATE

Sigma Prod. Nos. P1754, P8074, P0567, and P8466

CAS NUMBER: 9005-65-6

SYNONYMS: Tween 80^{R 1}; polyoxyethylene sorbitol ester; polysorbate 80; PEG (20) sorbitan monooleate

PHYSICAL DESCRIPTION:²

Appearance: viscous liquid, clear yellow, sometimes with greenish cast

Molecular formula: C₆₄H₁₂₄O₂₆³

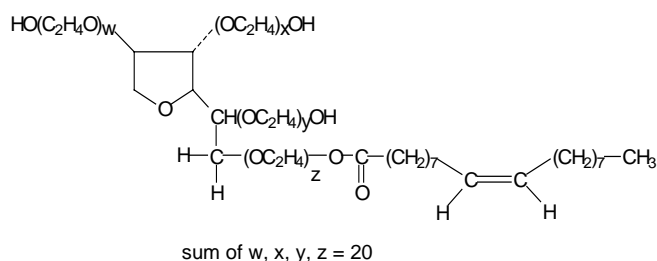
Molecular weight: 1310³

Specific gravity: 1.07 at 25°C

HLB value: 15.0⁴

Critical micellar concentration (CMC): 13-15 mg/L^{4,5}

Viscosity: 400-620 cps at 25°C



STABILITY / STABILITY AS SUPPLIED:

The product is stable for years at room temperature, if protected from oxidation. Over time, particularly at high temperatures, any ether linkage is subject to oxidation to form peroxides. This should be re-evaluated for continued suitability in user application every three to five years.

SOLUBILITY / SOLUTION STABILITY:

Tween 80 dissolves at 1 mL in 10 mL water to give a clear to slightly hazy faint yellow solution. A 1% solution has pH 5.5-7.2.⁶ It is reported to be soluble in alcohol, cottonseed oil, corn oil, ethyl acetate, methanol and toluene, but insoluble in mineral oil.³ Solutions are reasonably stable at 2-8°C for short periods. Solutions and the neat liquid may undergo autoxidation over time.⁷

The product is not sterile. Autoclaving of solutions is generally not advised. Sterile-filtration is more easily done if the liquid is warmed to about 40°C and alternate portions of hot distilled water and Tween 80 are poured through the 0.22 µm filter. The Tween 80 will blend and remain in solution.⁸

POLYOXYETHYLENE SORBITAN MONOOLEATE
Sigma Prod. Nos. P1754, P8074, P0567, and P8466

METHOD OF PREPARATION:

Sorbitol is treated with approximately 20 mole-equivalents ethylene oxide to form this product. Typically the composition is 70% oleic acid, with the balance being primarily linoleic, palmitic and stearic acids.⁶ This product is bleached with peroxides to lighten the color to its yellow-amber color.⁴

GENERAL REMARKS:

Tween detergents are nonionic surfactants comprised of a sorbitan ring, an alkyl group and \approx 20 ethylene oxide units. Tween 80 has been widely used in biochemical applications including: solubilizing proteins, isolating nuclei from cells in culture⁹, growing of tubercule bacilli¹⁰, and emulsifying and dispersing substances in medicinal and food products. It has little or no activity as an anti-bacterial agent.⁴ To the contrary, it has been shown to have an adverse effect on the antibacterial effect of methyl paraben and related compounds.¹¹

Because of special application needs, Sigma offers these additional Tween 80 products.

P4675 and P4780 - tested in cell culture applications

P5188 - tested in molecular biology applications

P8074 - SigmaUltra - extensively tested for trace metals

P0567 - specially processed, low-peroxide, low-carbonyl, with preservative

P8466 - specially processed, low-peroxide, low-carbonyl, but preservative-free

REFERENCES:

1. TWEEN is a trademark owned by ICI Americas.
2. Supplier information, unless specified otherwise.
3. Based on assumption that structure contains 20 ethylene oxide units, one sorbitan and oleic acid as the primary fatty acid; *Merck Index*, 11th Ed., #7559 (1989).
4. *Data for Biochemical Research*, 3rd Ed., eds. Dawson, R.M.C et al. (Oxford Press, 1987) p. 289.
5. *Protein Purification Applications: A Practical Approach*, eds. Harris and Angal (IRL Press, 1990) p. 71.
6. Sigma quality control.
7. *Martindale: The Extra Pharmacopoeia*, 29th Ed., ed. Reynolds, J. (Pharmaceutical Press, 1989) p. 1247.
8. Private communication to Research Technical Service.
9. Fisher, H.W. and H. Harris, *Proc. R. Soc. B*, 156, 521 (1962).
10. Dubos, R.J. and B.D. Davis, *J. Exp. Med.*, 83, 409 (1946).
11. *Disinfection, Sterilization & Preservation*, 4th Ed., Block, S.S. (Lea & Febiger Pub., 1991) Chapter 4.