Table II: FCC[5] and JPE[10] specifications for diethyl sebacate.

Test	FCC 10 S2	JPE 2004
Description	+	+
Identification	+	+
Acid value	≤1.0	≤0.5
Refractive index at 20°C	1.435–1.438	1.435–1.437
Specific gravity at 25°C	0.960–0.965	0.958–0.968
Ester value	–	411–435
Iodine value	–	≤0.5
Heavy metals	–	≤20 ppm
Arsenic	–	≤2 ppm
Residue on ignition	–	≤0.10%
Assay	≥98%	–

2 Yamanaka M, *et al.* Development and evaluation of a tacrolimus cream formulation using a binary solvent system. *Int J Pharm* 2014; 464(1–2): 19–26.
3 Takahashi K, *et al.* Effect of fatty acid diesters on permeation of anti-inflammatory drugs through rat skin. *Drug Dev Ind Pharm* 2002; 28: 1285–1294.
4 Matsui R, *et al.* Skin permeation of lidocaine from crystal suspended oily formulations. *Drug Dev Ind Pharm* 2005; 31: 729–738.
5 *Food Chemicals Codex*. [online] Bethesda, MD: United States Pharmacopeia. http://publications.usp.org (accessed 31 March 2017).
6 Soga F, *et al.* Contact dermatitis due to lanoconazole, cetyl alcohol and diethyl sebacate in lanoconazole cream. *Contact Dermatitis* 2004; 50(1): 49–50.
7 Narita T, *et al.* Allergic contact dermatitis due to diethyl sebacate in a hand cream. *Contact Dermatitis* 2006; 55(2): 117.
8 Lewis RJ, editor. *Sax's Dangerous Properties of Industrial Materials*, 11th edn. New York: John Wiley and Sons Inc, 2004: 1286.
9 Zhang X, *et al.* Micelles of enzymatically synthesized PEG-poly(amine-co-ester) block copolymers as pH-responsive nanocarriers for docetaxel delivery. *Colloids Surf B Biointerfaces* 2014; 115: 349–358.
10 Japan Pharmaceutical Excipients Council. *Japanese Pharmaceutical Excipients 2004*. Tokyo: Yakuji Nippo, 2004; 237.

20 General References

ScienceLab.com, Inc. Material safety data sheet: Diethyl sebacate, June 2008.
Sigma-Aldrich. Material safety data sheet: Diethyl sebacate, December 2012.

21 Authors

ME Quinn, RC Rowe.

22 Date of Revision

4 May 2017.

Diethylene Glycol Monoethyl Ether

1 Nonproprietary Names

BP: Diethylene Glycol Monoethyl Ether
PhEur: Diethylene Glycol Monoethyl Ether
USP–NF: Diethylene Glycol Monoethyl Ether

2 Synonyms

Carbitol; DEGEE; DGME; diethylenglycoli aether monoethilicus; 3,6-dioxa-1-octanol; ethoxydiglycol; ethyl carbitol; ethyl digol; ethyl dioxitol; 1-hydroxy-3,6-dioxaoctane; *Transcutol HP*; *Transcutol P*.

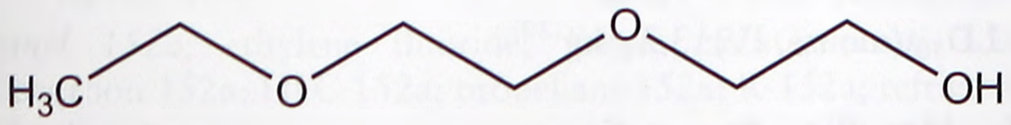
3 Chemical Name and CAS Registry Number

2-(2-Ethoxyethoxy)ethanol [111-90-0]

4 Empirical Formula and Molecular Weight

$C_6H_{14}O_3$ 134.17

5 Structural Formula



6 Functional Category

Solubilizing agent; solvent.

7 Applications in Pharmaceutical Formulation or Technology

Diethylene glycol monoethyl ether is a solubilizing agent with broad chemical compatibility and widely used in oral, dermal, and parenteral pharmaceutical preparations. It is used as a cosolvent in oral drug delivery systems to enhance drug solubility, with the level of use limited to 10%. Purified diethylene glycol monoethyl ether is also used in some injectable products.[1]

Diethylene glycol monoethyl ether has been reported to enhance skin penetration for a variety of drugs, and is used in creams, lotions, microemulsions, and aqueous gels.[2–14] Diethylene glycol monoethyl ether is also used in cosmetic formulations.

8 Description

Diethylene glycol monoethyl ether is a clear, colorless, hygroscopic liquid with a mild odor.

9 Pharmacopeial Specifications

See Table I.

10 Typical Properties

Autoignition temperature
201°C for *Carbitol*;[15]
204°C for *Transcutol*.[16]
Boiling point
201°C for *Carbitol*;
198°C for *Transcutol*.
Density 0.988 g/cm^3