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21 Authors

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22 Date of Revision

4 May 2017.

Magnesium Trisilicate

1 Nonproprietary Names

BP: Magnesium Trisilicate
PhEur: Magnesium Trisilicate
USP–NF: Magnesium Trisilicate

2 Synonyms

E553a; magnesii trisilicas; magnesium mesotrisilicate; silicic acid, magnesium salt (1 : 2), hydrate.

3 Chemical Name and CAS Registry Number

Magnesium trisilicate anhydrous [14987-04-3]
Magnesium trisilicate hydrate [39365-87-2]

4 Empirical Formula and Molecular Weight

$Mg_2Si_3O_8 \cdot xH_2O$ 260.86 (anhydrous)

The USP 40–NF 35 S1 describes magnesium trisilicate as a compound of magnesium oxide (MgO) and silicon dioxide (SiO_2) with varying proportions of water. It contains not less than 20.0% of magnesium oxide and not less than 45.0% of silicon dioxide.

The PhEur 9.2 similarly describes magnesium trisilicate as having a variable composition corresponding to the approximate formula $Mg_2Si_3O_8 \cdot xH_2O$. It contains not less than 29.0% of magnesium oxide and not less than the equivalent of 65.0% of silicon dioxide, both calculated with reference to the ignited substance.

5 Structural Formula

See Section 4.

6 Functional Category

Glidant.

7 Applications in Pharmaceutical Formulation or Technology

Magnesium trisilicate is used in oral pharmaceutical formulations and food products as a glidant.

8 Description

Magnesium trisilicate occurs as an odorless and tasteless, fine, white-colored powder that is free from grittiness.

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9 Pharmacopeial Specifications

See Table I.

Table I: Pharmacopeial specifications for magnesium trisilicate.

Test	PhEur 9.2	USP 40–NF 35 S1
Identification	+	+
Characters	+	–
Ratio of SiO_2 to MgO	–	2.10–2.37
Loss on ignition	17.0–34.0%	17.0–34.0%
Water-soluble salts	≤1.5%	≤1.5%
Chloride	≤500 ppm	≤0.055%
Sulfates	<0.5%	<0.5%
Alkalinity	+	+
Arsenic	≤4 ppm	≤8 ppm
Heavy metals	–	≤0.003%
Acid-absorbing capacity	≥100.0 mL[a]	140–160 mL[a]
Assay of MgO	≥29.0%[b]	≥20.0%
Assay of SiO_2	≥65.0%[b]	≥45.0%

(a) Of 0.1 N hydrochloric acid per gram.
(b) With reference to the ignited substance.

10 Typical Properties

Moisture content Magnesium trisilicate is slightly hygroscopic. At relative humidities of 15–65%, the equilibrium moisture content at 25°C is 17–23% w/w; at relative humidities of 75–95%, the equilibrium moisture content is 24–30% w/w.

Solubility Practically insoluble in diethyl ether, ethanol (95%), and water.

Spectroscopy

NIR spectrum *see* Figure 1.