

SEMI C63-1107

GUIDELINE FOR ORGANOSILICATE PRECURSORS USED IN LOW K CVD PROCESSES

This standard was technically approved by the global Liquid Chemicals Committee. This edition was approved for publication by the global Audits and Reviews Subcommittee on September 5, 2007. It was available at www.semi.org in October 2007 and on CD-ROM in November 2007.

1 Purpose

1.1 The purpose of this document is to provide guidelines for organosilicate precursors used in Low K CVD processes for which a need has been identified.

2 Scope

2.1 The scope of this document lists the proposed impurity limits for organosilicate precursors (e.g., Dimethyldimethoxysilane, Octamethylcyclotetrasiloxane, Diethoxymethylsilane, Tetramethylcyclotetrasiloxane) used in the semiconductor industry.

NOTICE: This standard does not purport to address safety issues, if any, associated with its use. It is the responsibility of the users of this standard to establish appropriate safety and health practices and determine the applicability of regulatory or other limitations prior to use.

3 Limitations

3.1 None.

4 Referenced Standards and Documents

4.1 None.

5 Terminology

5.1 None.

6 Physical Property (for information only)

	<i>Dimethyldimethoxysilane</i>	<i>Octamethylcyclotetrasiloxane</i>	<i>Diethoxymethylsilane</i>	<i>Tetramethylcyclotetrasiloxane</i>
Chemical Formula	C ₄ H ₁₂ O ₂ Si	C ₈ H ₂₄ O ₄ Si ₄	C ₅ H ₁₄ O ₂ Si	C ₄ H ₁₈ O ₄ Si ₄
CAS#	1112-39-6	556-67-2	2031-62-1	2370-88-9
Appearance	Clear liquid	Clear liquid	Clear Liquid	Clear Liquid
Density	0.88 gm/mL	0.956 gm/mL	0.83 gm/mL	0.991 gm/mL
Mol. Wt	120.22 g/mol	296.62 g/mol	134.2 g/mol	240.51 g/mol
Boiling Point	82°C	175°C	95°C	134-135°C
Water Reactive	YES	NO	YES	NO

7 Requirements

7.1 The requirements for organosilicate precursors for Tier A are listed in Table 1 (Water Reactive) and Table 2 (Water Non Reactive).

8 Grade 1 Procedures

8.1 This section does not apply to this chemical.

9 Grade 2 Procedures

9.1 This section does not apply to this chemical.

10 Grade 3 Procedures

10.1 This section does not apply to this chemical.

11 Grade 4 Procedures

11.1 This section does not apply to this chemical.

12 Grade 5 Procedures

12.1 This section does not apply to this chemical.

13 Tier A Procedures

13.1 Standardized test methods are being developed for all parameters at the purity levels indicated. Until standardized test methods are published, test methodology shall be determined by user and producer.

14 Tier B Procedures

14.1 This section does not apply to this chemical.

15 Tier C Procedures

15.1 This section does not apply to this chemical.

16 Tier D Procedures

16.1 This section does not apply to this chemical.

Table 1 Impurity Limits and Other Requirements for Water Reactive Organosilicate Precursors

	Tier A
	(Guideline)
Assay	≥99.5%
Primary alcohols	0.03% max
Chloride	2 ppm max
Aluminum (Al)	1 ppb max
Antimony (Sb)	1 ppb max
Arsenic (As)	1 ppb max
Barium (Ba)	1 ppb max
Boron (B)	100 ppb max
Cadmium (Cd)	1 ppb max
Calcium (Ca)	2 ppb max
Chromium (Cr)	1 ppb max
Copper (Cu)	1 ppb max
Iron (Fe)	1 ppb max
Lead (Pb)	1 ppb max
Lithium (Li)	1 ppb max
Magnesium (Mg)	1 ppb max
Manganese (Mn)	1 ppb max
Nickel (Ni)	1 ppb max