

SEMI C95-0516

GUIDE FOR PENTAKIS DIMETHYLAMINO TANTALUM

This Standard was technically approved by the Liquid Chemicals Global Technical Committee. This edition was approved for publication by the global Audits and Reviews Subcommittee on March 16, 2016. Available at www.semiviews.org and www.semi.org in May 2016.

1 Purpose

1.1 The purpose of this Document is to provide a guide for pentakis dimethylamino tantalum (PDMAT) for which a need has been identified.

2 Scope

2.1 The scope of this Document covers a tier of PDMAT, which is used in the semiconductor industry for the deposition of tantalum nitride based layers by atomic layer deposition.

NOTICE: SEMI Standards and Safety Guidelines do not purport to address all safety issues associated with their use. It is the responsibility of the users of the Documents 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 *Abbreviations and Acronyms*

5.1.1 *PDMAT* — pentakis dimethylamino tantalum (or pentakis dimethylamido tantalum)

6 Properties

Table 1 Properties of PDMAT

Molecular Formula	Ta[N(CH ₃) ₂] ₅
Molecular Weight	401.33 g/mol
CAS Number	19824-59-0
Melting Point	>100°C (dec)
Solubility in Water	Reacts
Appearance	Orange crystals

7 Suggested Values

7.1 The suggested values for PDMAT for Tier A are listed in Table 2.

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 Tier A Procedures

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

13 Tier B Procedures

13.1 This section does not apply to this chemical.

14 Tier C Procedures

14.1 This section does not apply to this chemical.

15 Tier D Procedures

15.1 This section does not apply to this chemical.

Table 2 Suggested Values for PDMAT

<i>Previous SEMI Reference #</i>	--
	<i>Tier A</i>
	<i>(Guide)</i>
Assay (¹ H NMR)	≥99%
Hydrocarbons (¹ H NMR)	≤1%
Chloride (Cl)	5 ppm
Aluminum (Al)	5000 ppb
Antimony (Sb)	500 ppb
Arsenic (As)	300 ppb
Barium (Ba)	500 ppb
Boron (B)	--
Cadmium (Cd)	500 ppb
Calcium (Ca)	3000 ppb
Chromium (Cr)	4000 ppb
Copper (Cu)	3000 ppb
Iron (Fe)	5000 ppb
Lead (Pb)	2000 ppb
Lithium (Li)	2000 ppb
Magnesium (Mg)	2000 ppb
Manganese (Mn)	2000 ppb
Nickel (Ni)	3000 ppb
Potassium (K)	5000 ppb
Sodium (Na)	4000 ppb
Tin (Sn)	500 ppb
Titanium (Ti)	--