

SEMI C94-0516

GUIDE FOR CYCLOHEXANONE

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 cyclohexanone for which a need has been identified.

2 Scope

2.1 The scope of this Document covers tiers of cyclohexanone which are used in the semiconductor industry.

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 *SEMI Standards and Safety Guidelines*

SEMI C1 — Guide for the Analysis of Liquid Chemicals

NOTICE: Unless otherwise indicated, all documents cited shall be the latest published versions.

5 Synonyms

5.1 Cyclohexanone, anon, pimelinketon.

6 Properties

Table 1 Properties of Cyclohexanone

Molecular Formula	C ₆ H ₁₀ O
Molecular Weight	98.15g/mol
CAS Number	108-94-1
Refractive Index (n _D)	1.450 at 20°C
Density	0.9478 g/cm ³ at 20°C
Boiling Point	156°C (312.17°F) at 1013 hPa
Melting Point	-47°C (-53°F)
Solubility in Water	8.6 g/100mL at 20°C
Flashpoint	44°C (111°F)
Appearance	Colorless liquid with a smell of peppermint

7 Suggested Values

7.1 The suggested values for cyclohexanone for Tier A and B are listed in Table 3.

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. The Liquid Chemicals Global Committee considers a method to be valid only if method validation according to SEMI C1 has been demonstrated.

12.2 Assay

12.2.1 Analyze the sample by gas chromatography (see SEMI C1, 'Assay by Wide Bore Column Gas Chromatography'), using the parameters cited in Table 2.

Table 2 Chromatography Conditions for Column Type RTX-200 or Similar

<i>Injector Temperature</i>	250°C
<i>Detector Temperature</i>	280°C
<i>Furnace Temperature</i>	50°C, ramp up by 6°C/min. to 250°C starting after 4 minutes
<i>Column</i>	Rtx-200 Dimension: 60 m × 0.32 mm ID 1.5 µm Split 1:100
<i>Sample Size</i>	1 µL
<i>Carrier Gas</i>	1 mL/min. Helium
<i>Detector</i>	WFID (Flame ionisation detector)

12.3 *Water* — Analysis performed by coulometric Karl Fisher titration with the use of the appropriate anodic and cathodic coulometric reagents.

12.3.1 Prior to start the analysis, verify the cleanliness of the cell and prevent any exposure of the system to the humidity of the air.

12.3.2 Weigh accurately (± 0.001 g) approximately 1.5 g of sample using an analytical balance.

12.3.3 Inject the sample through the septum and start the automatic titration until the equilibrium end-point.

12.4 *Residue After Evaporation* — Weigh accurately ~50 g of sample in a quartz crucible, evaporate completely under nitrogen flow, cool in a desiccator, and weigh (see SEMI C1, 'Determination of Residue after Evaporation').

12.5 *Acidity* — To 50 g of sample in a 250 mL conical flask, add 25 mL of methanol and 0.5 mL of phenolphthalein indicator solution (see SEMI C1). Titrate with 0.1 N methanolic sodium hydroxide solution until a slight pink color persists for at least 15 seconds.

$$\text{ppm Acidity (CH}_3\text{COOH)} = \frac{\text{Volume of NaOH (mL)} \times \text{Normality of NaOH (mole/L)} \times 60,000}{\text{Mass of sample (g)}}$$