

Technical Note

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Trimethylsilane ($C_3H_{10}Si$) Detection with Hydrides Chemcassette[®] and Midas

Overview

Trimethylsilane is classified as an organic Silane gas that is odorless and colorless. It is considered to be a safer alternative for processes currently utilizing Silane, because of its lower toxicity and flammability. Trimethylsilane has no established exposure limits and is considered non-toxic. Additionally, there are no established flammability limits. Trimethylsilane is a partially substituted hydride and will respond on the Hydrides Chemcassette[®] and MIDAS with TEOS and Hydrides sensors.

Toxicity

Though there are no established exposure limits, the manufacturers have adopted a 5 ppm TLV for exposure. This limit is based on the available data for Silane. Effects of exposure to this compound are considered minor. Prolonged contact to skin and eyes will cause some irritation. Inhalation will irritate respiratory passages slightly.

Detection

Based on the recent test results as shown below in the correlation chart, Honeywell Analytics recommends monitoring for low ppm levels of trimethylsilane with a Hydrides Chemcassette[®] using Hydrogen Selenide or Arsine calibration, and with MIDAS TEOS, MIDAS AsH₃ and MIDAS low level SiH₄ cartridges. Because the rate of stain development of trimethylsilane on the Hydrides and XP Hydrides Chemcassette[®] is quite different than that of silane and hydrogen selenide, the displayed readings on CM4 and Vertex would fluctuate. Contact Honeywell Analytics for additional information

**Trimethylsilane (3MS) Correlation
Hydrides and XP Hydrides Chemcassette[®] and Midas with TEOS and Hydride Sensors**

Instrument	Chemcassette [®]	Gas Calibration	Instruments readings at 3 different Trimethylsilane test gas concentrations		
			5.5 ppm 3MS	10.5 ppm 3MS	18 ppm 3MS
SPM	Standard Hydrides (P/N: 705502, 700300)	H ₂ Se (ppb)	28	43	150 ppb + *
	XP Hydrides (P/N: 1750-9300, 1740- 9300)	H ₂ Se (ppb)	93	140	150 ppb + *
CM4 Vertex	Standard Hydrides (P/N: 874300, 1295-0300)	SiH ₄ (ppm)	0	0	0.5 - 1.0
		H ₂ Se (ppb)	76 - 100	110	230 - 365
		AsH ₃ (ppb)	20	28	75
	XP Hydrides (P/N: 1874-9300, 1295-0228)	SiH ₄ (ppm)	0.4	0.5	1.4
		H ₂ Se (ppb)	85	100	225 - 300
		AsH ₃ (ppb)	22	28	85
MIDAS	MIDAS-S-TEO	TEOS (ppm)	3.3	8.7	16.5
	MIDAS-S-ASH	AsH ₃ (ppm)	0.05	0.11	0.20
	MIDAS-S-SHL	SiH ₄ (ppm)	0.4	0.7	1.4

- Note:
- *SPM H₂Se full scale = 150ppb
 - This correlation table is based on actual gas testing.
This table should be used as an approximation of 3MS gas concentrations.

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