

Interoffice
Communication

To: OSHA File

From: Randy Istre
Date: April 12, 1990

VISTA

Subject: Determination of 95% Confidence Limits as
Required by OSHA

The analysis intervals for VCM at the 95% confidence level set forth by OSHA are shown below. The same criteria was applied to the EDC analysis; although OSHA has no such limits at this time.

0.0 to 0.5 ppm $\pm$ 50%
0.5 to 1.0 ppm $\pm$ 35%
Over 1.0 ppm $\pm$ 25%

Eight analyses of VCM and EDC standard gases at three different concentration levels were completed. The gases were tested at six hour exposure intervals. The statistical evaluation of these analyses are shown in the attached tables. All data for the vinyl analysis meets the required OSHA limits. Based on the data presented, only the upper limit of the .205 ppm EDC standard and the lower limits of the 3.85 ppm EDC standard lie outside the assumed OSHA concentration range and these by only .042 ppm and .115 ppm respectively. Ten blank wafers were also tested in an attempt to determine a corrected area for the EDC peaks. 1360 was subtracted from each area for EDC. We need improvement on this method next year. No further work will be done this year to verify the 95% confidence limits of this analysis.

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lk
cc: PLF

VVV 000017854

TABLE I
95% Confidence Limit Determination
For
Vinyl Chloride

.200 ppm VCM Standard

1)	.2287	N=9
2)	.1723	$\sqrt{N}=3$
3)	.2010	T=1.833
4)	.1917	$\underline{S}=.0247$
5)	.2093	$\bar{X}=.1936$
6)	.1747	Upper limit $=\bar{X} + ts/\sqrt{N}=.2087$
7)	.2103	Lower limit $=\bar{X} - ts/\sqrt{N}=.1785$
8)	.1477	OSHA Requirement $=.200 \pm 50\% =.10$ to $.30$
9)	.2063	

.502 ppm VCM Standard

1)	.4923	N=9
2)	.3793	$\sqrt{N}=3$
3)	.5417	T=1.833
4)	.4507	$\underline{S}=.0553$
5)	.4823	$\bar{X}=.4628$
6)	.4487	Upper limit $=\bar{X} + ts/\sqrt{N}=.4966$
7)	.5003	Lower limit $=\bar{X} - ts/\sqrt{N}=.4290$
8)	.3770	OSHA Requirement $=.502 \pm 35\% =.3263$ to $.6777$
9)	.4927	

.572 ppm VCM Standard

1)	.5761	N=9
2)	.4762	$\sqrt{N}=3$
3)	.5783	T=1.833
4)	.4516	$\underline{S}=.0755$
5)	.6057	$\bar{X}=.5307$
6)	.4751	Upper limit $=\bar{X} + ts/\sqrt{N}=.5768$
7)	.6252	Lower limit $=\bar{X} - ts/\sqrt{N}=.4846$
8)	.4175	OSHA Requirement $=.572 \pm 35\% =.3718$ to $.7722$
9)	.5703	

4.02 ppm VCM Standard

1)	4.3920	N=9
2)	3.7852	$\sqrt{N}=3$
3)	4.1339	T=1.833
4)	3.5750	$\underline{S}=.5189$
5)	4.1498	$\bar{X}=3.9179$
6)	3.8572	Upper limit $=\bar{X} + ts/\sqrt{N}=4.2349$
7)	4.3101	Lower limit $=\bar{X} - ts/\sqrt{N}=3.6009$
8)	2.7435	OSHA Requirement $=4.02 \pm 25\% =3.015$ to 5.025
9)	4.3142	

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TABLE II
95% Confidence Limit Determination
For EDC

.205 ppm EDC Standard

1)	.2180	N=9
2)	.2159	$\sqrt{N}=3$
3)	.2530	T=1.833
4)	.2607	$\underline{S}=.1041$
5)	.2238	$\bar{X}=.2854$
6)	.2119	Upper limit = $\bar{X} + ts/\sqrt{N} = .3490$
7)	.4076	Lower limit = $\bar{X} - ts/\sqrt{N} = .2218$
8)	.2659	OSHA Requirement = $.205 \pm 50\% = .1025 \text{ to } .3075$
9)	.5114	

.440 ppm EDC Standard

1)	.5189	N=9
2)	.3344	$\sqrt{N}=3$
3)	.5262	T=1.833
4)	.4513	$\underline{S}=.0910$
5)	.4479	$\bar{X}=.4926$
6)	.6606	Upper limit = $\bar{X} + ts/\sqrt{N} = .5482$
7)	.4584	Lower limit = $\bar{X} - ts/\sqrt{N} = .4370$
8)	.4676	OSHA Requirement = $.440 \pm 35\% = .2860 \text{ to } .5940$
9)	.5679	

.604 ppm EDC Standard

1)	.5994	N=9
2)	.5178	$\sqrt{N}=3$
3)	.7286	T=1.833
4)	.4974	$\underline{S}=.0995$
5)	.5832	$\bar{X}=.5470$
6)	.5391	Upper limit = $\bar{X} + ts/\sqrt{N} = .6078$
7)	.5574	Lower limit = $\bar{X} - ts/\sqrt{N} = .4862$
8)	.3504	OSHA Requirement = $.604 \pm 35\% = .3926 \text{ to } .8154$
9)	.5501	

3.85 ppm EDC Standard

1)	3.9192	N=9
2)	3.4721	$\sqrt{N}=3$
3)	3.0827	T=1.833
4)	2.4975	$\underline{S}=.5000$
5)	3.0601	$\bar{X}=3.0777$
6)	2.9987	Upper limit = $\bar{X} + ts/\sqrt{N} = 3.3832$
7)	3.2597	Lower limit = $\bar{X} - ts/\sqrt{N} = 2.7722$
8)	2.2139	OSHA Requirement = $3.85 \pm 25\% = 2.8875 \text{ to } 4.8125$
9)	3.1950	