

The Effect that Saturation of the Detector Has Upon Calibration



Detectors More Susceptible to Saturation:

Organic Analyses: ECD, ELCD, MS (when instrument configured for trace analysis)

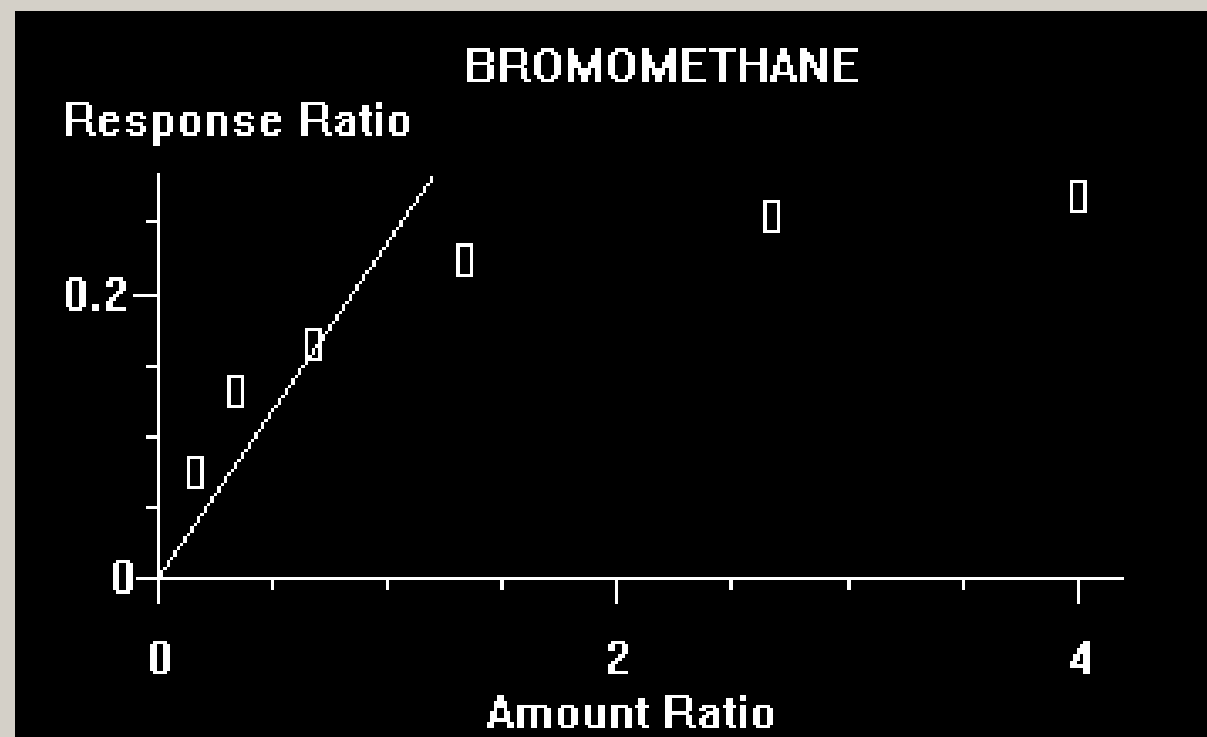
Inorganic Analyses: GF-AA, F-AA, Hg

Detectors Less Susceptible to Saturation:

Organic Analyses: FID, PID, MS (most uses), HPLC (UV and FI)

Inorganic Analyses: ICP-OES, UV-Vis





Amount Ratio	Response Ratio
0.16666667	0.07469963
0.33333333	0.13112941
0.66666667	0.16572025
1.33333333	0.22379795
2.66666667	0.25579725
4.00000000	0.26970577

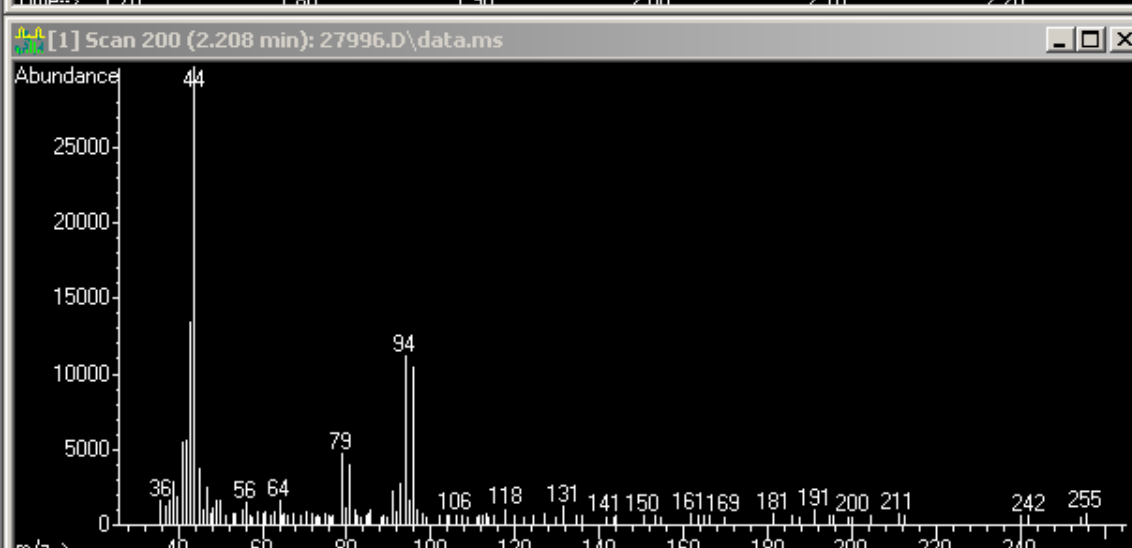
Resp Ratio = 2.37e-001 * Amt

RF Rel Std Dev = 66.1% Curve Fit: Avg RF





Execute



[7] TIC: 27996.D\data.ms

(7) BROMOMETHANE (T)

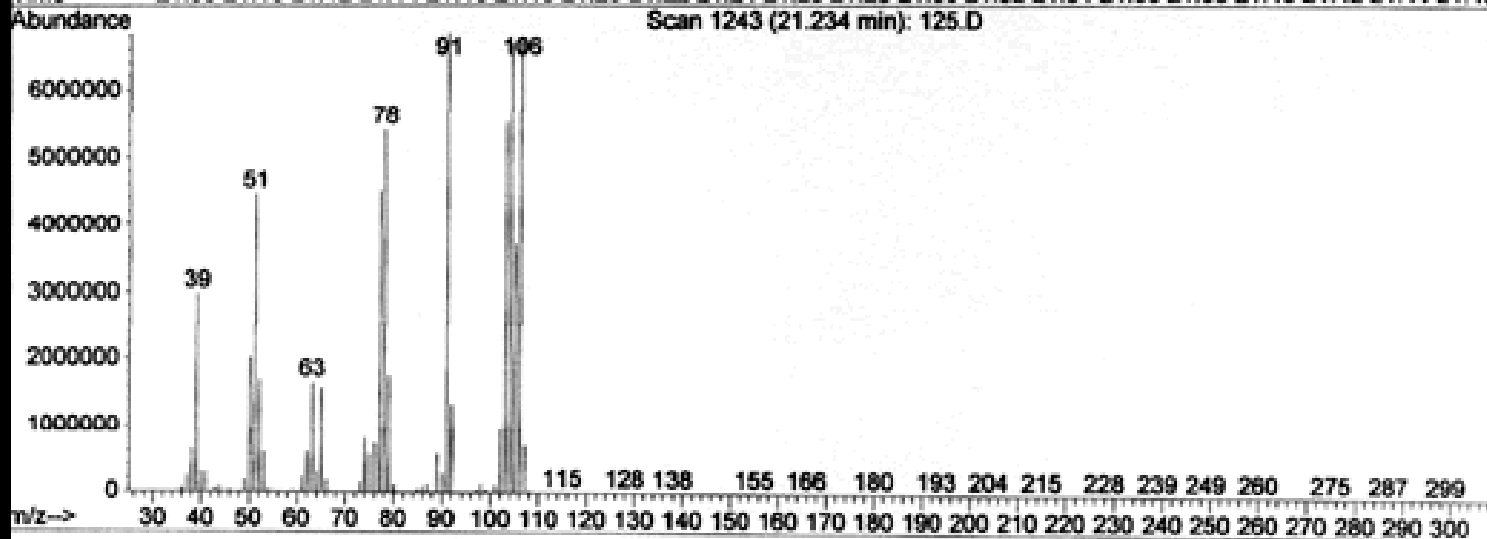
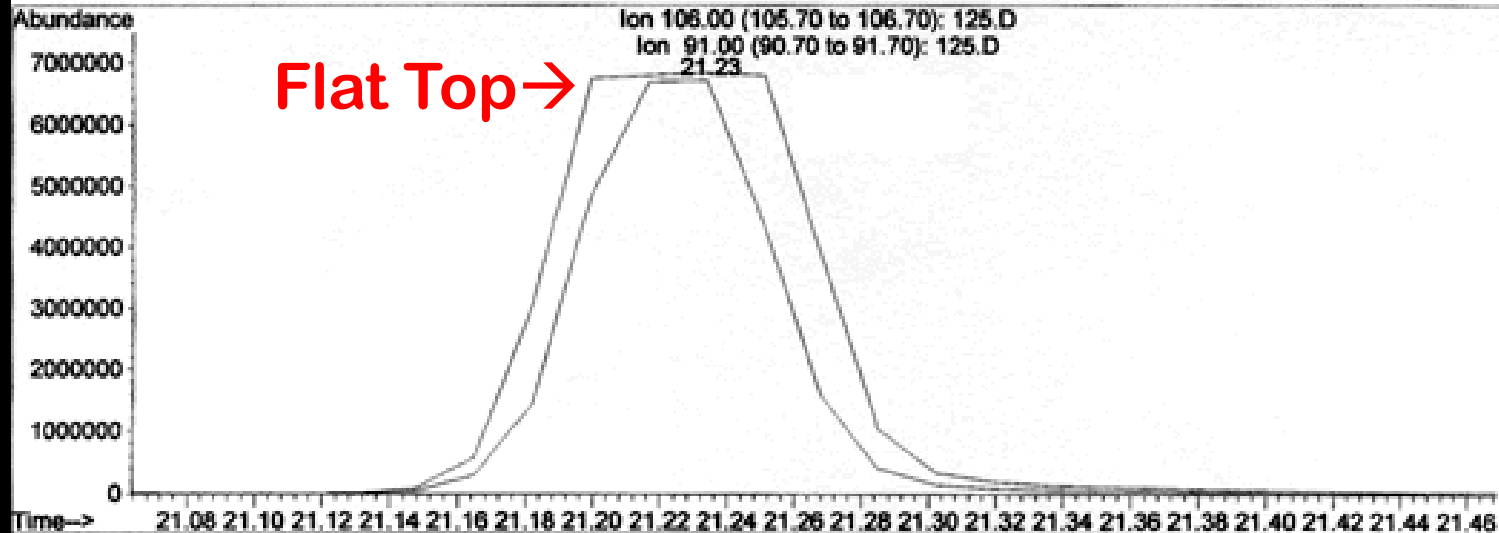
2.208min (-0.015) 39.05UG/L m

response 569068

Ion	Exp%	Act%
94.00	100	100
96.00	96.90	85.52
0.00	0.00	0.00
0.00	0.00	0.00

Difference In % Ratio

Saturation Effects on VOC Chromatography



TIC: 125.D

(63) o-xylene

21.23min 137.66ug/l

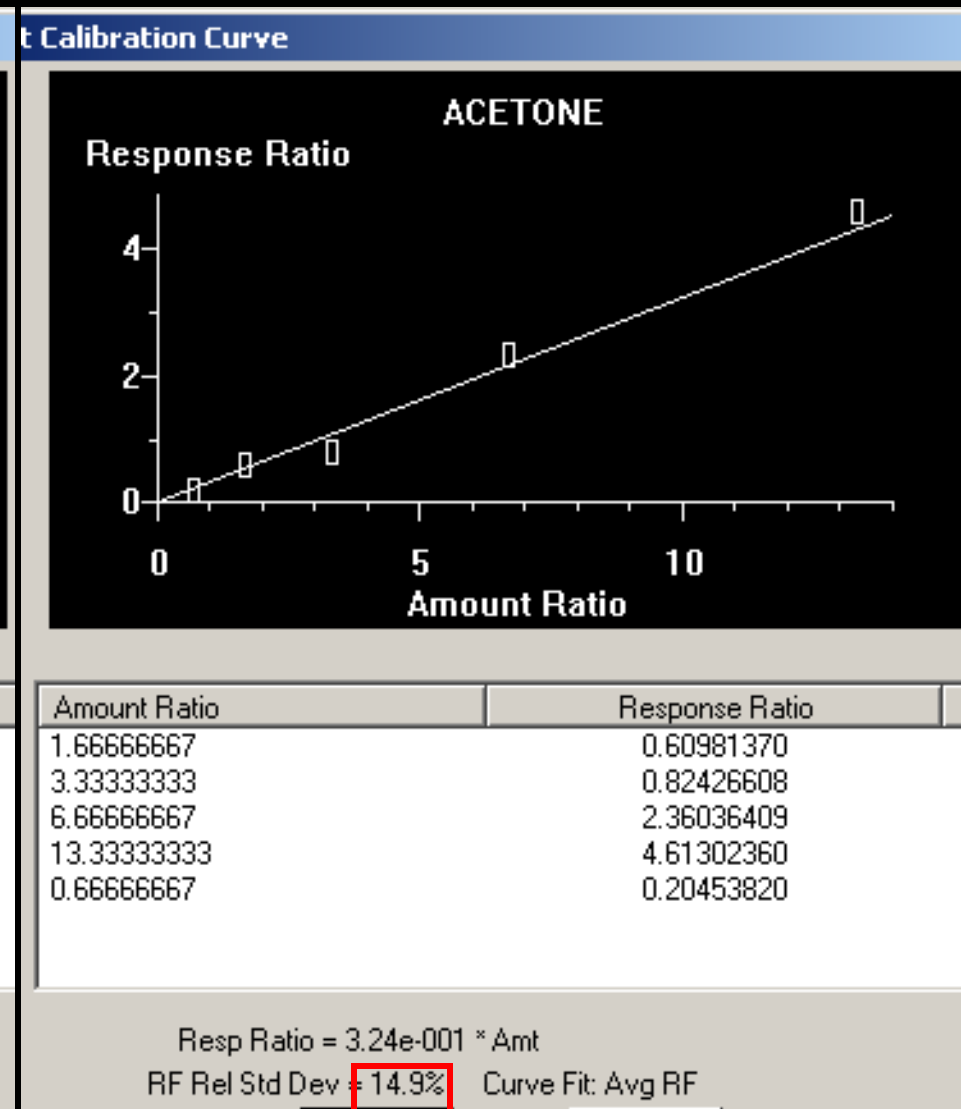
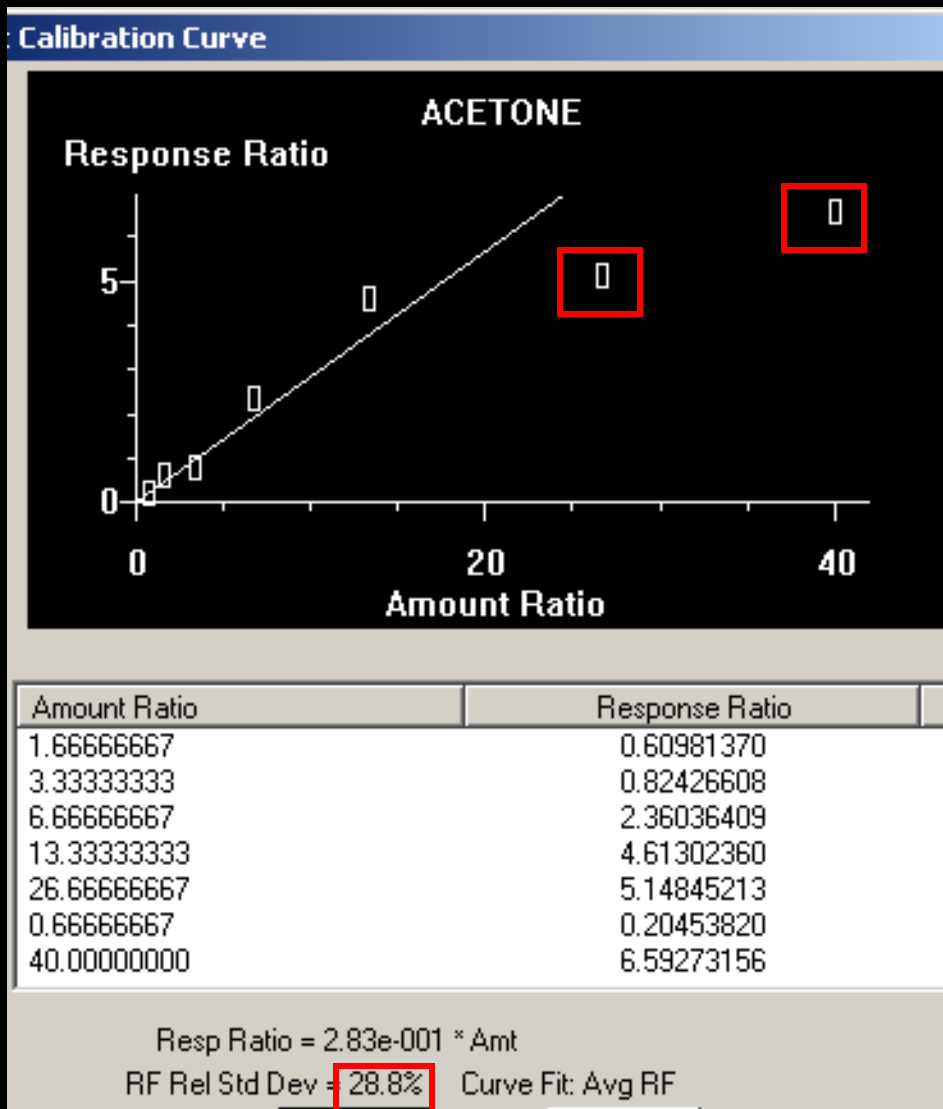
response 27644684

Ion	Exp%	Act%
106.00	100	100
91.00	204.00	101.99

← Ion Saturation

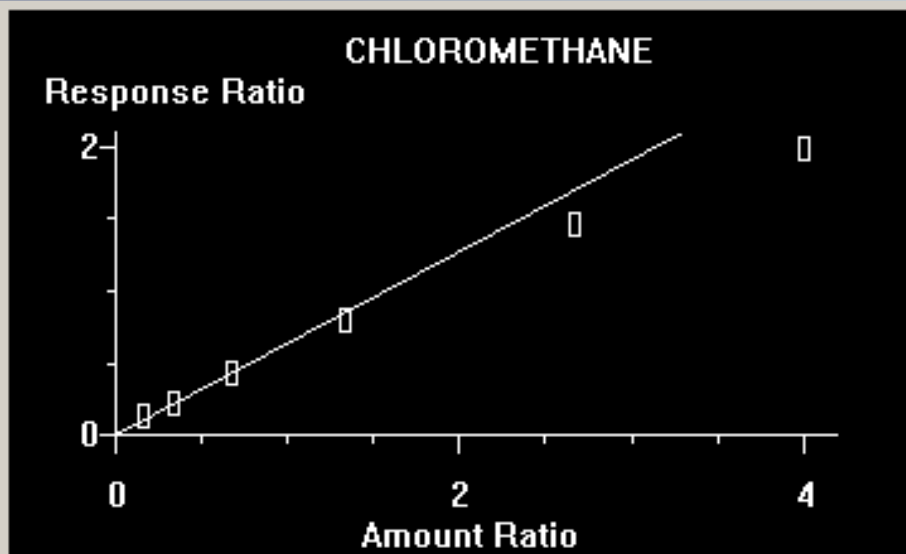
Slide Courtesy of
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Effect On Calibration Plot by Eliminating Saturated Points

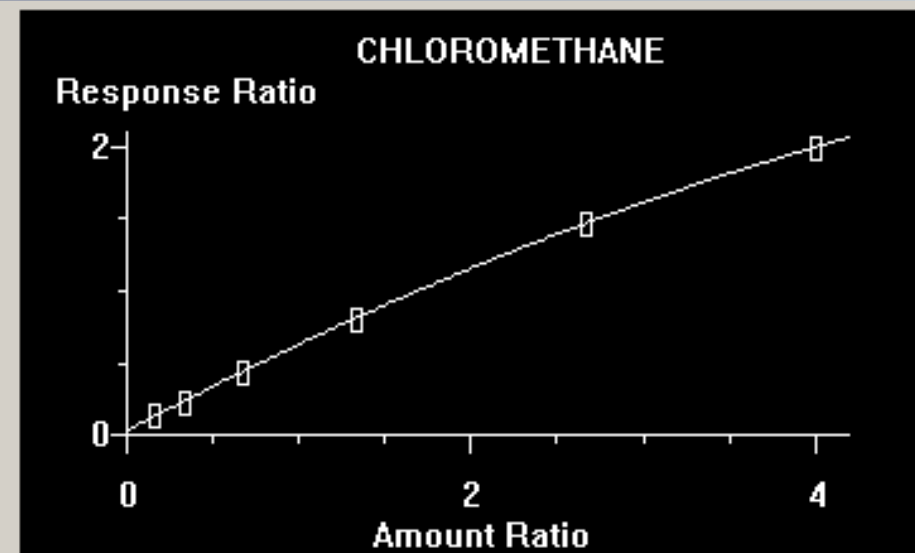
t Calibration Curve



Amount Ratio	Response Ratio
0.16666667	0.13316307
0.33333333	0.23406678
0.66666667	0.43940672
1.33333333	0.80621368
2.66666667	1.46740346
4.00000000	1.99300750

Resp Ratio = $6.36\text{e-}001 \times \text{Amt}$
 RF Rel Std Dev = 17.1% Curve Fit: Avg RF

t Calibration Curve



Amount Ratio	Response Ratio
0.16666667	0.13316307
0.33333333	0.23406678
0.66666667	0.43940672
1.33333333	0.80621368
2.66666667	1.46740346
4.00000000	1.99300750

$R = -3.57\text{e-}002 A^2 + 6.34\text{e-}001 A + 2.84\text{e-}002$
 Coef of Det (r^2) = 1.000 Curve Fit: Quadratic

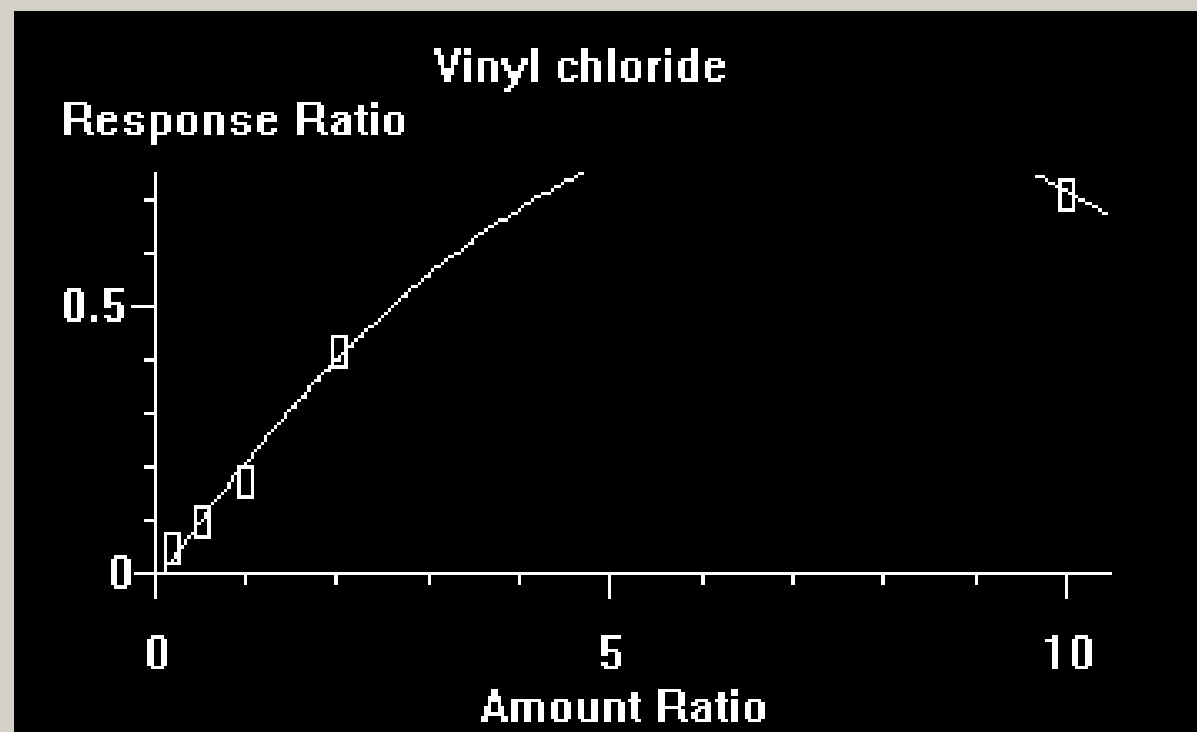
**Calibration Model Change to Accommodate Small Levels
Of Saturation**



Note: The option for non-linear calibration may be necessary to address specific instrumental techniques. However, it is not EPA's intent to allow non-linear calibration to be used to compensate for detector saturation or to avoid proper instrument maintenance.

*Ref: SW846 Method 8000C, Section 11.5,
Page 38, Rev. 3, March 2003*





Amount Ratio	Response Ratio
0.20000000	0.04841793
0.50000000	0.09951501
1.00000000	0.17524637
2.00000000	0.41744770
10.00000000	0.71263882

$$R = -1.70e-002 A^2 + 2.43e-001 A - 1.70e-002$$

Coef of Det (r^2) = 0.994 Curve Fit: Quadratic



Fit Analysis Output For Method File: "U:\TC4_METH\VV8264AZ.MTH"

Component Name: "Diesel (C10-C32)"

Date: 9/20/04 Time: 05:09 PM

Curve Parameters:

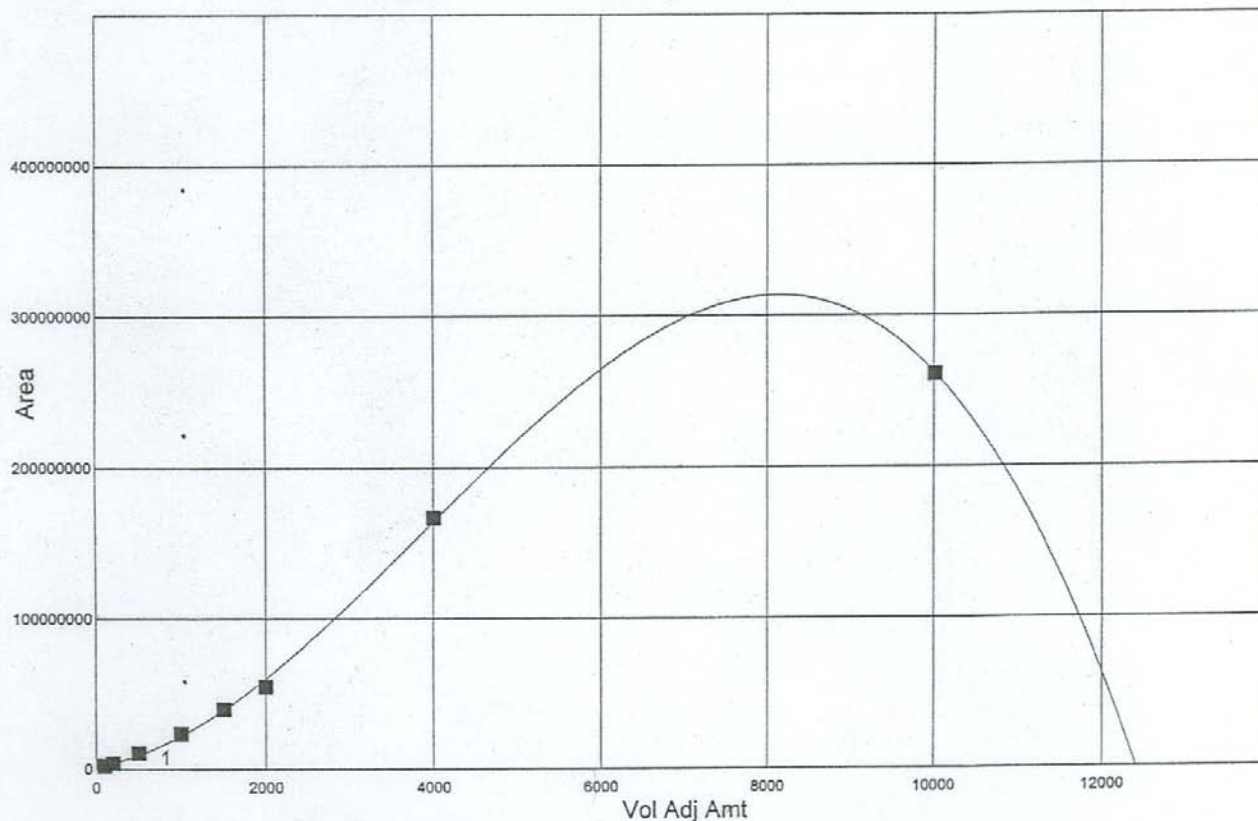
Curve #1 : 3rd Order

Weighting Factor = 1/x

$r^2 = 0.998512$

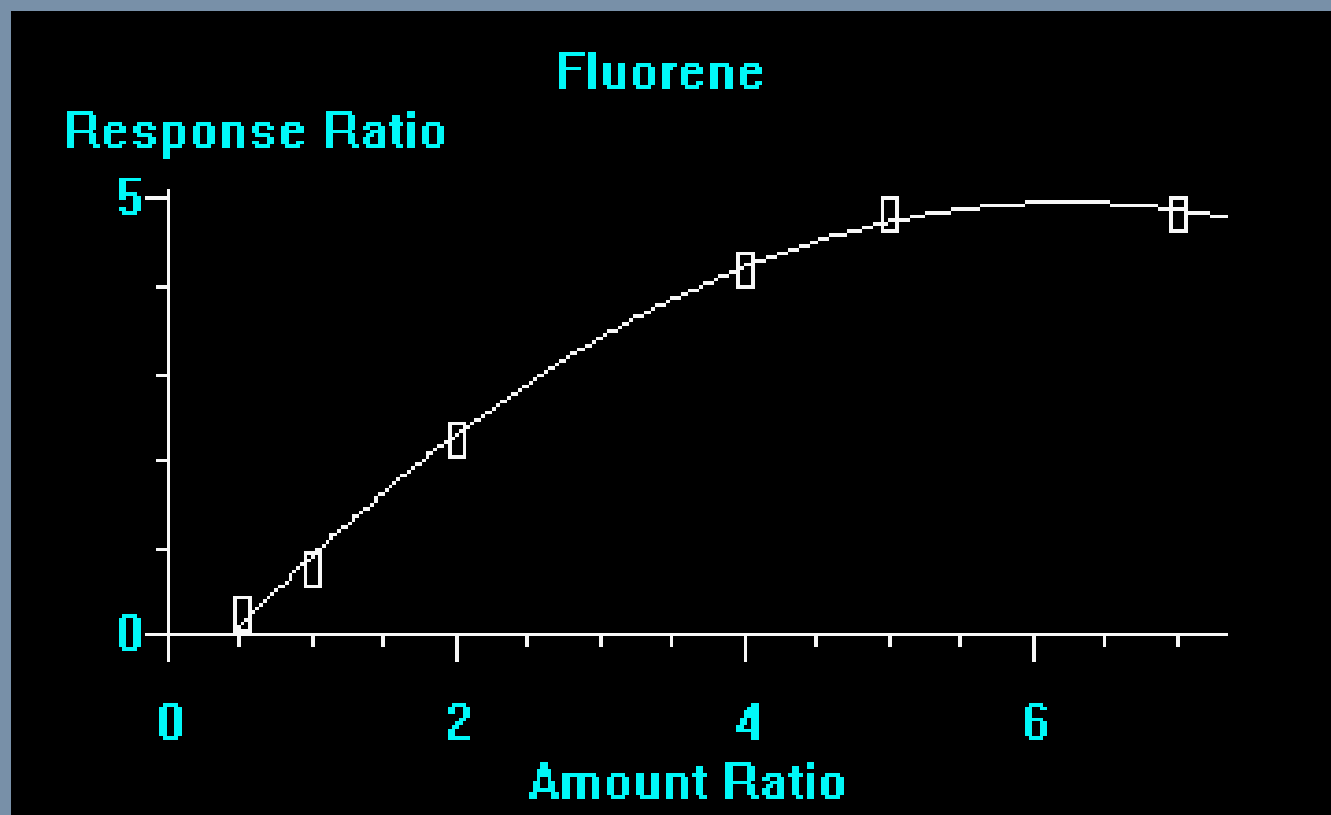
Calibration Curve = $(1698900.123376) - (3877.321731)X + (11.758973)X^2 + (-0.001015)X^3$

Diesel (C10-C32)



Level Name	Observed X-Value	Calculated X-Value	Delta	%Diff.	Observed Y-Value	Calculated Y-Value	Delta	%Diff.
1A	100.000000	69.909424	30.090576	43.042	2446575.399	2803256.101	-356680.702	-12.724
2A	200.000000	220.375448	-20.375448	-9.246	4435944.339	4136702.605	299241.734	7.234
3A	500.000000	557.351398	-57.351398	-10.290	10681423.673	9450695.924	1230727.749	13.023
4A	1000.000000	1041.640195	-41.640195	-3.998	23599731.947	22320861.453	1278870.494	5.729
5A	1500.000000	1514.954661	-14.954661	-0.987	40122718.575	39548279.981	574438.594	1.452
6A	2000.000000	1879.319171	120.680829	6.422	55057438.444	60371834.783	-5314396.339	-8.803
7A	4000.000000	4045.364217	-45.364217	-1.121	166909959.655	164405082.231	2504877.424	1.524
8A	10000.000000	10003.650984	-3.650984	-0.036	261334918.116	261551997.072	-217078.956	-0.083

Plot Calibration Curve



Amount Ratio	Response Ratio
0.50000000	0.25562297
1.00000000	0.77431682
2.00000000	2.23854158

$$R = -1.48e-001 A^2 + 1.84e+000 A - 7.79e-001$$

Curve Fit: Quadratic

OK

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DISPLAY CALIBRATION MODE - FLAME

PRINTER: ON

ELEMENT: NA

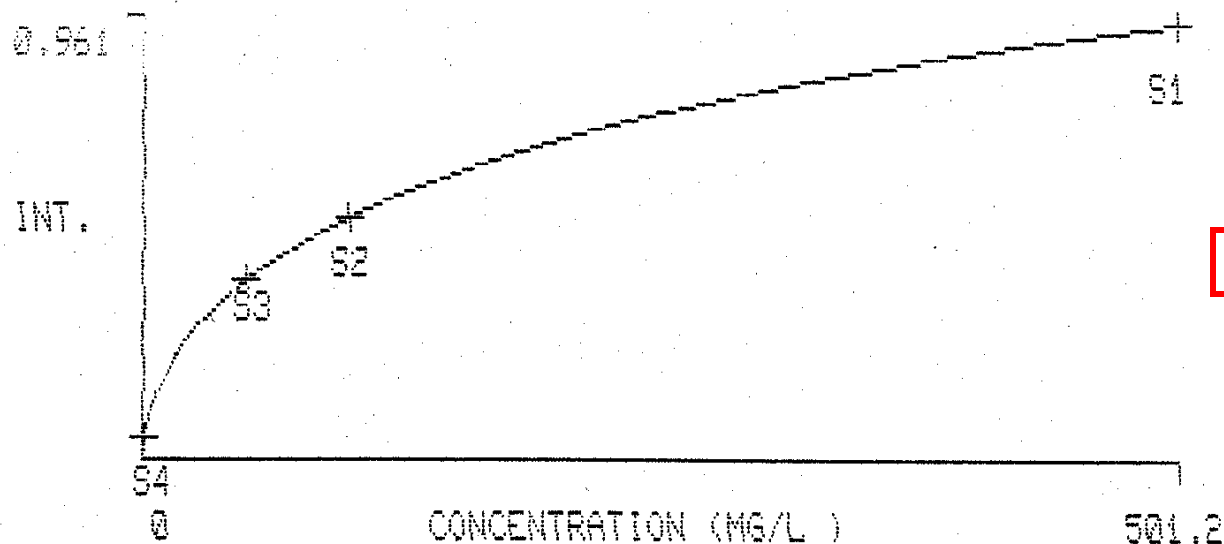
BG CORR: OFF

UNITS : MG/L

REPL. 0 OF 4

1.0

READY



AUTO

Corr. Coef.: 1.000

Slope:

C2H2: 2.5 L/MIN

Oxidant: 8.0 L/MIN

Flame: C2H2-AIR