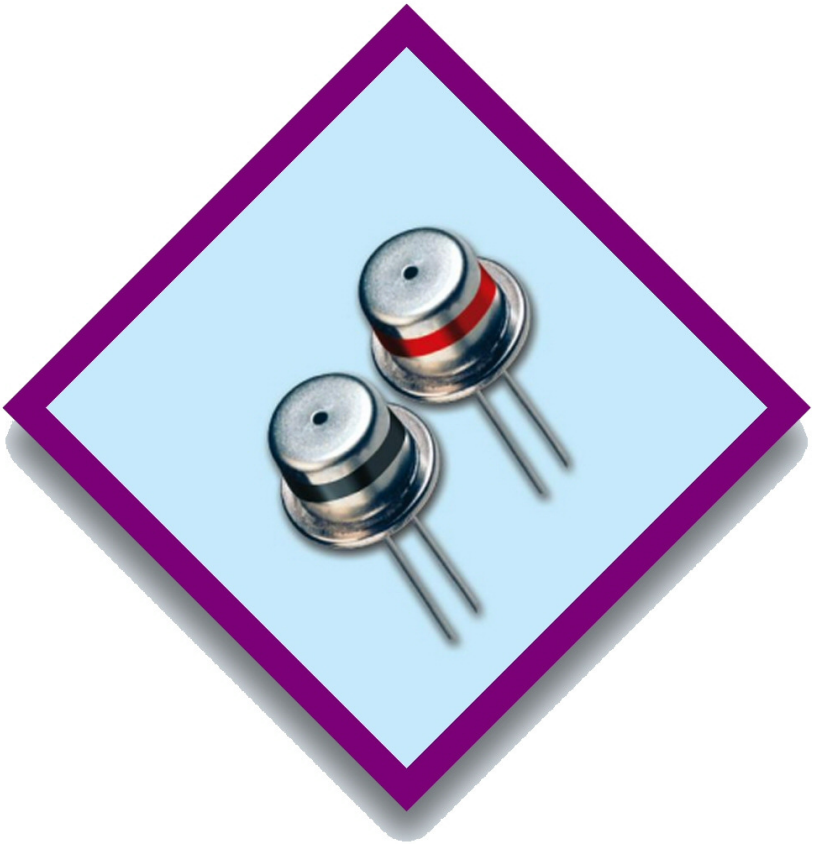
CHARACTERISATION DATA

NP-17 CATALYTIC PELLISTOR GAS SENSORS



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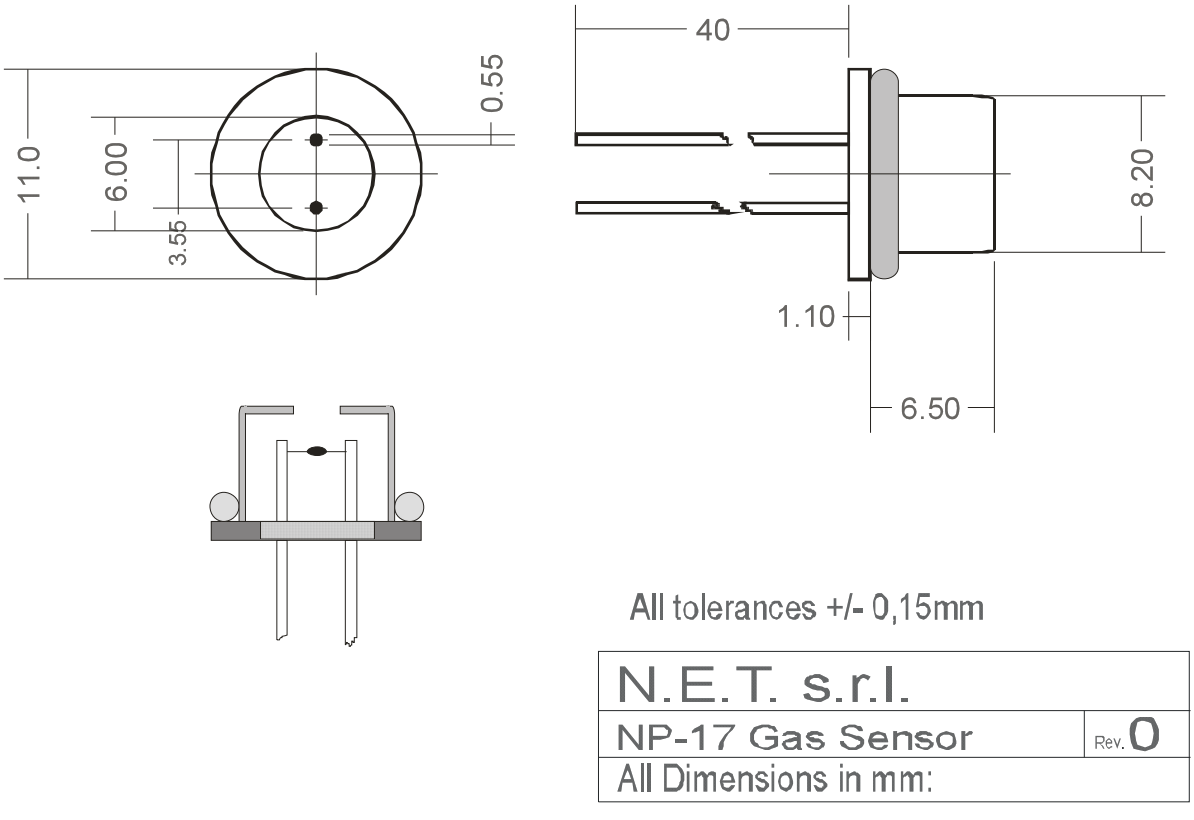
Introduction

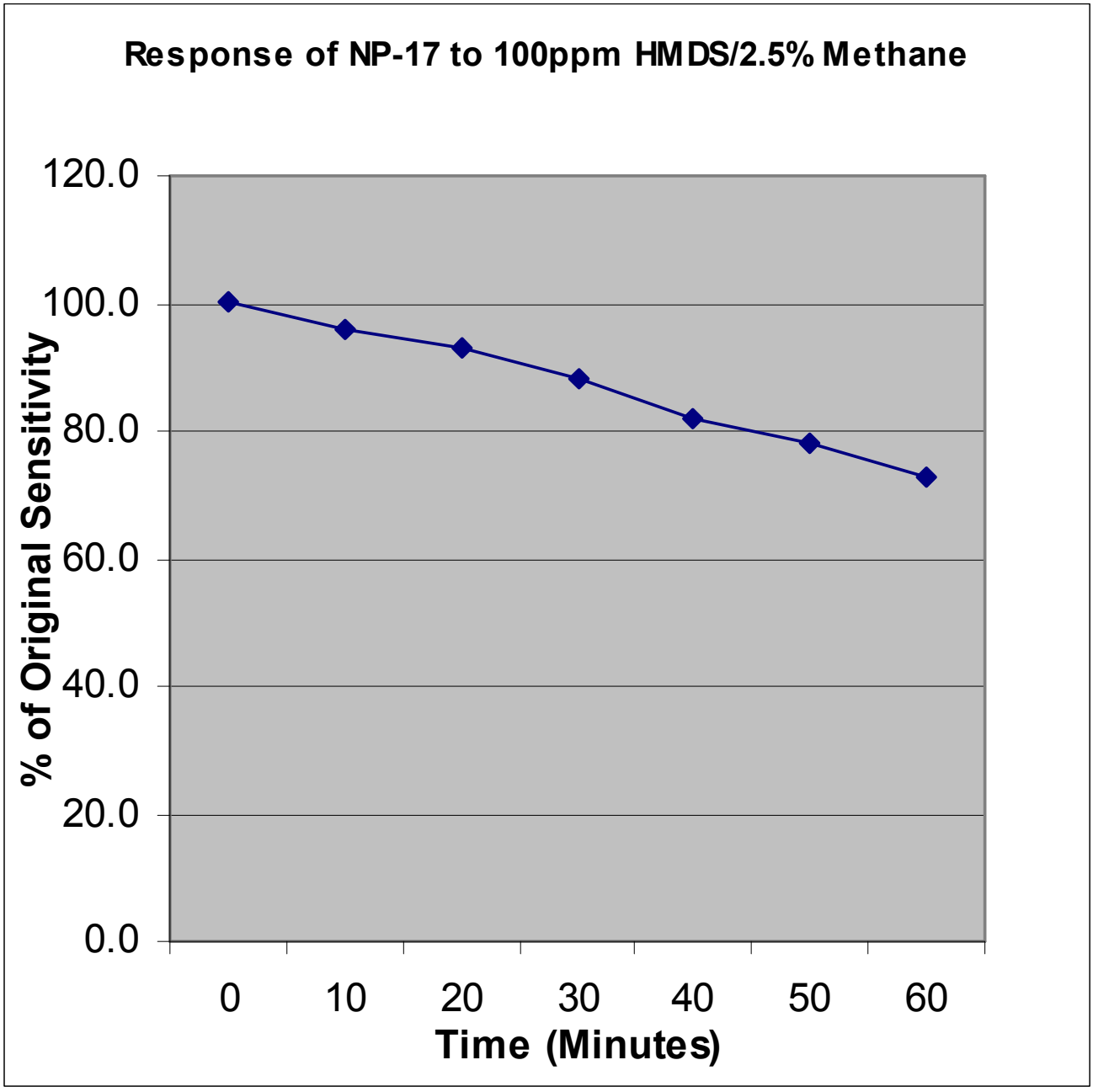
The Nemoto NP-17 is a catalytic (pellistor) type flammable gas sensor supplied as a matched pair of elements mounted on headers and protected by a metal enclosure. The sensor detects and measures the presence of flammable gases and vapours in air, in the range 0-100% of the Lower Explosive Limit (LEL) of the gas or vapour being measured. Designed as a sensing platform for use in fixed flammable gas detection systems, the NP-17 exhibits excellent long term zero and sensitivity stability and a high level of resistance to catalytic poisons. The device is compatible with a wide range of commercially available Gas Detection Systems and remote flammable gas detection heads.

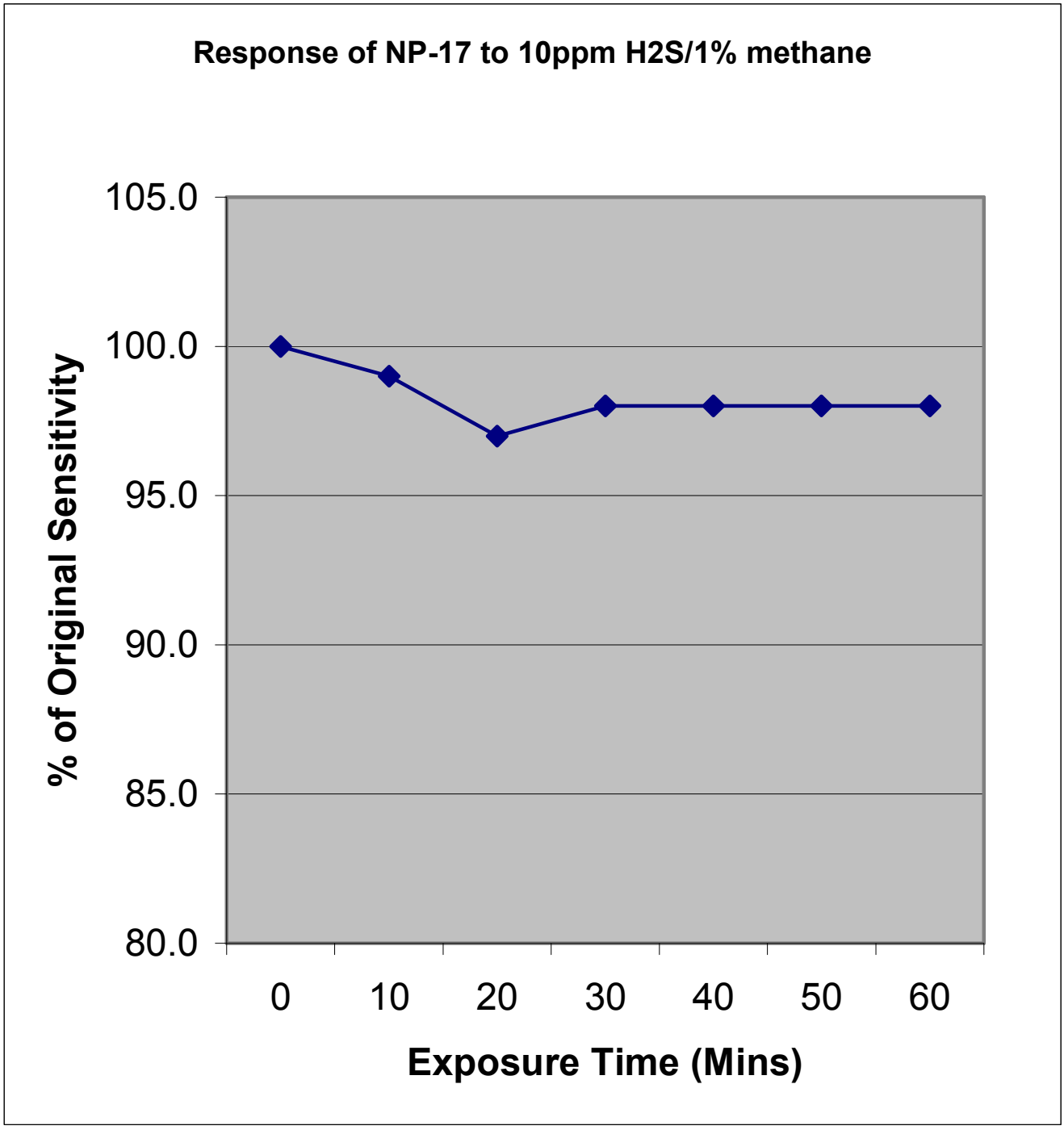
The highly automated manufacturing procedure employed by Nemoto results in a repeatable reliable sensor which, unlike similar devices, requires no trimming resistor to enable the detector to be matched with a compensator.

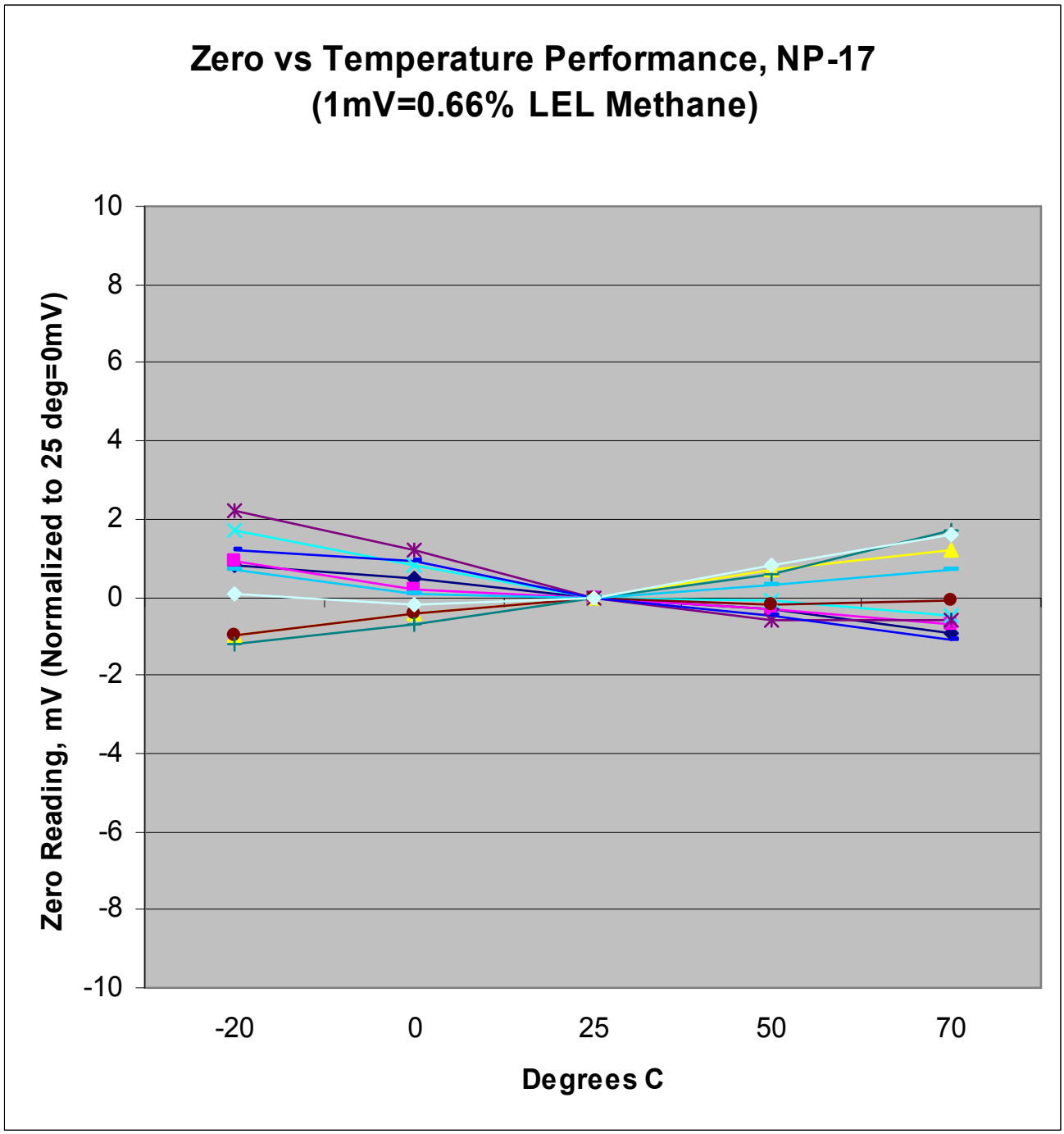


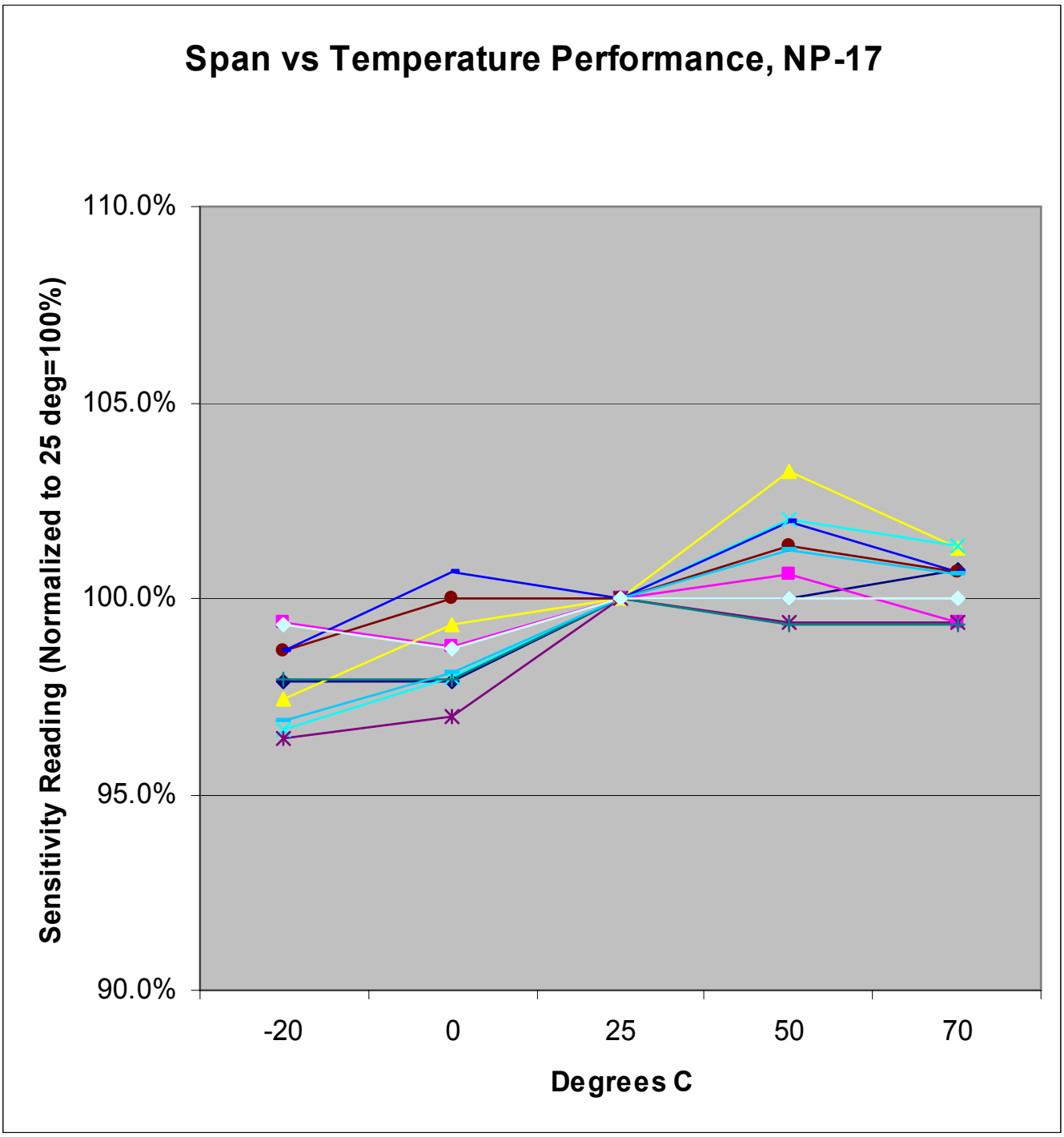
This characterisation document does not constitute a specification but is intended as a guide, informing the instrument designer of the performance characteristics of the sensor which were observed by Nemototech's Engineers.

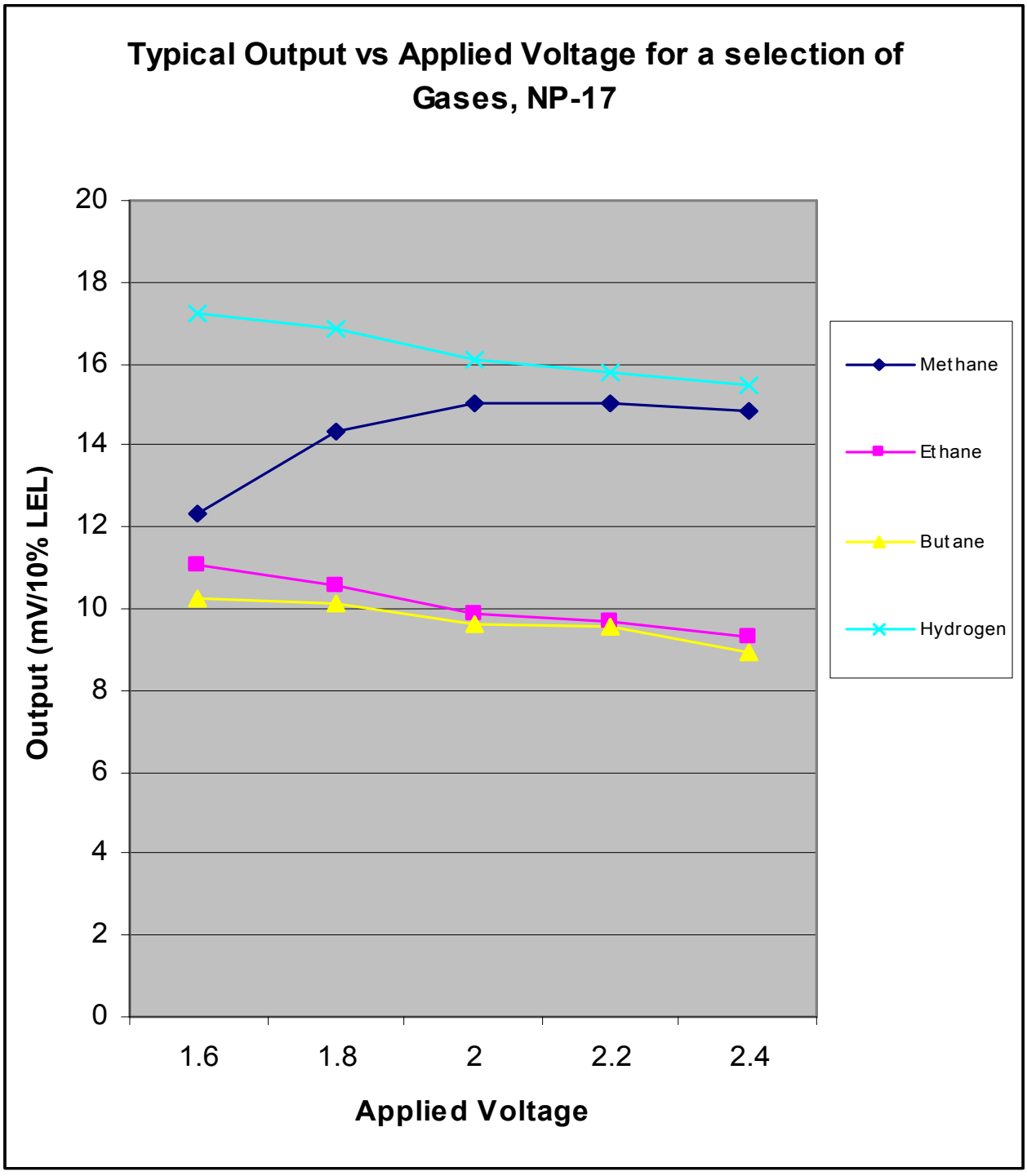
It should be read in conjunction with Technical Information Sheet ds-np17.doc which include the full technical specification for the NP-17 Pellistor Gas Sensor.

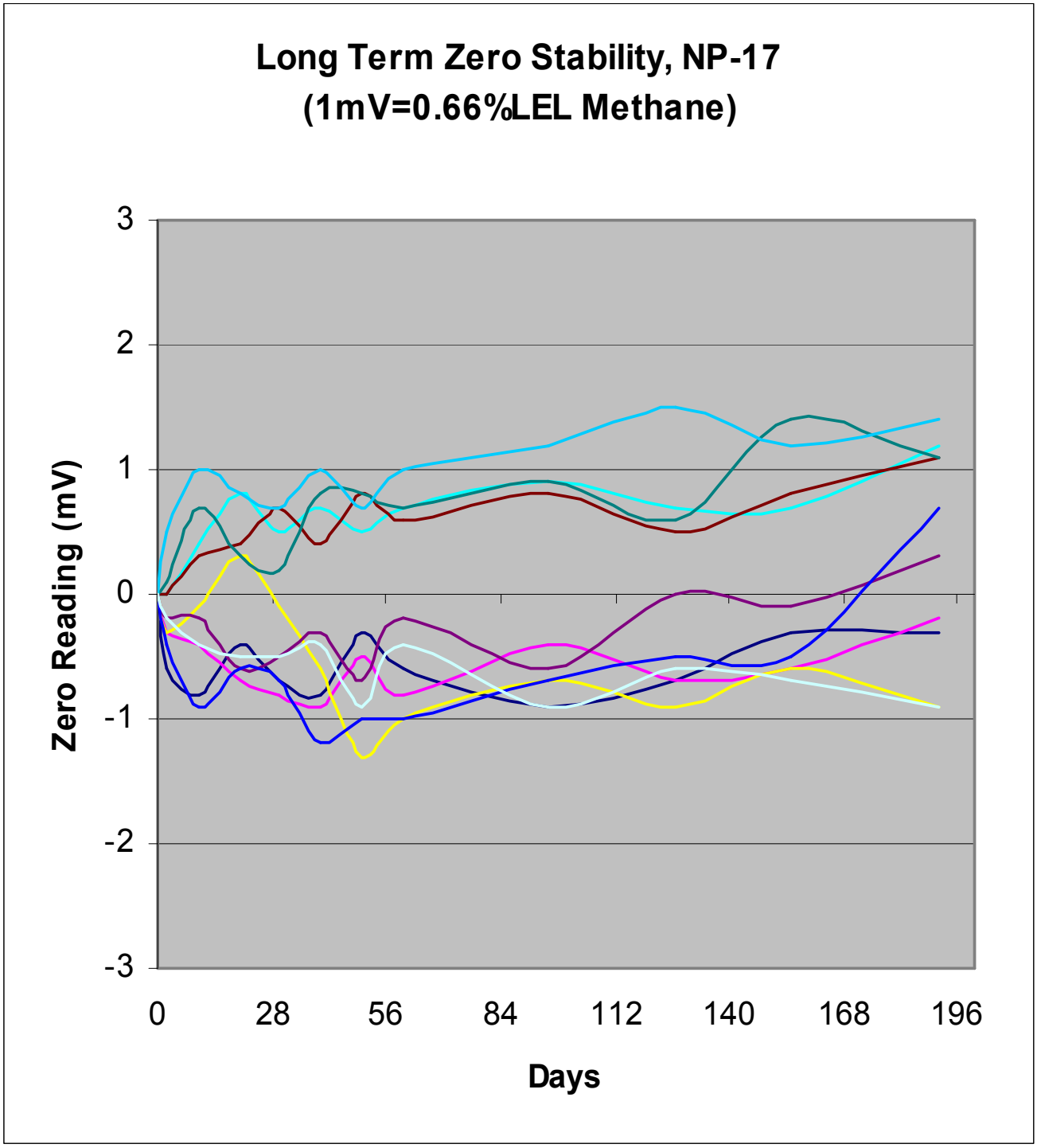

Response of NP-17 to 100ppm HMDS/2.5% Methane
120.0
100.0
80.0
60.0
40.0
20.0
0.0
% of Original Sensitivity
0
10
20
30
40
50
60
Time (Minutes)

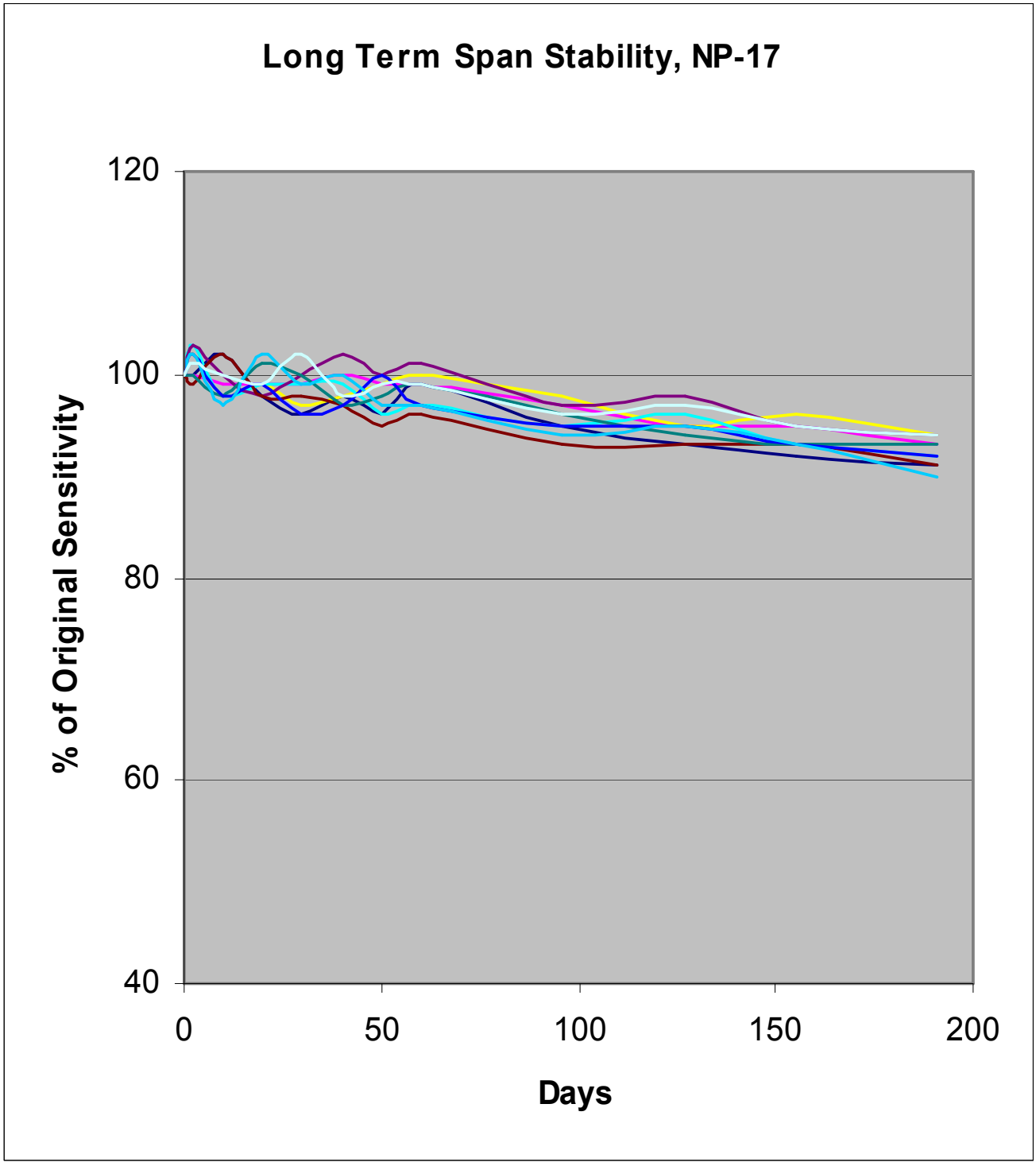

Response of NP-17 to 10ppm H2S/1% methane
105.0
100.0
95.0
90.0
85.0
80.0
% of Original Sensitivity
0
10
20
30
40
50
60
Exposure Time (Mins)

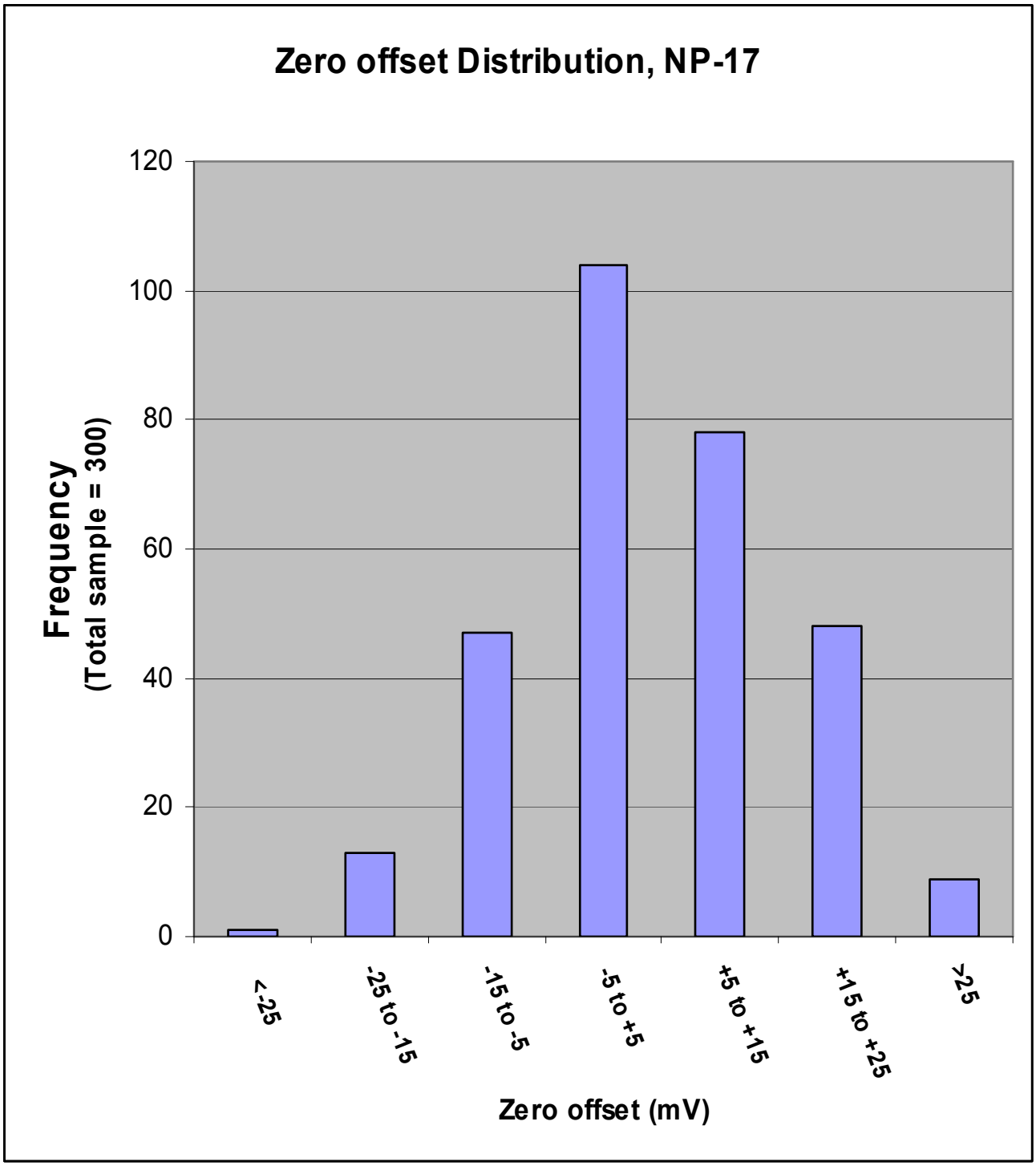

Zero vs Temperature Performance, NP-17
(1mV=0.66% LEL Methane)
Zero Reading, mV (Normalized to 25 deg=0mV)
10
8
6
4
2
0
-2
-4
-6
-8
-10
-20
0
25
50
70
Degrees C

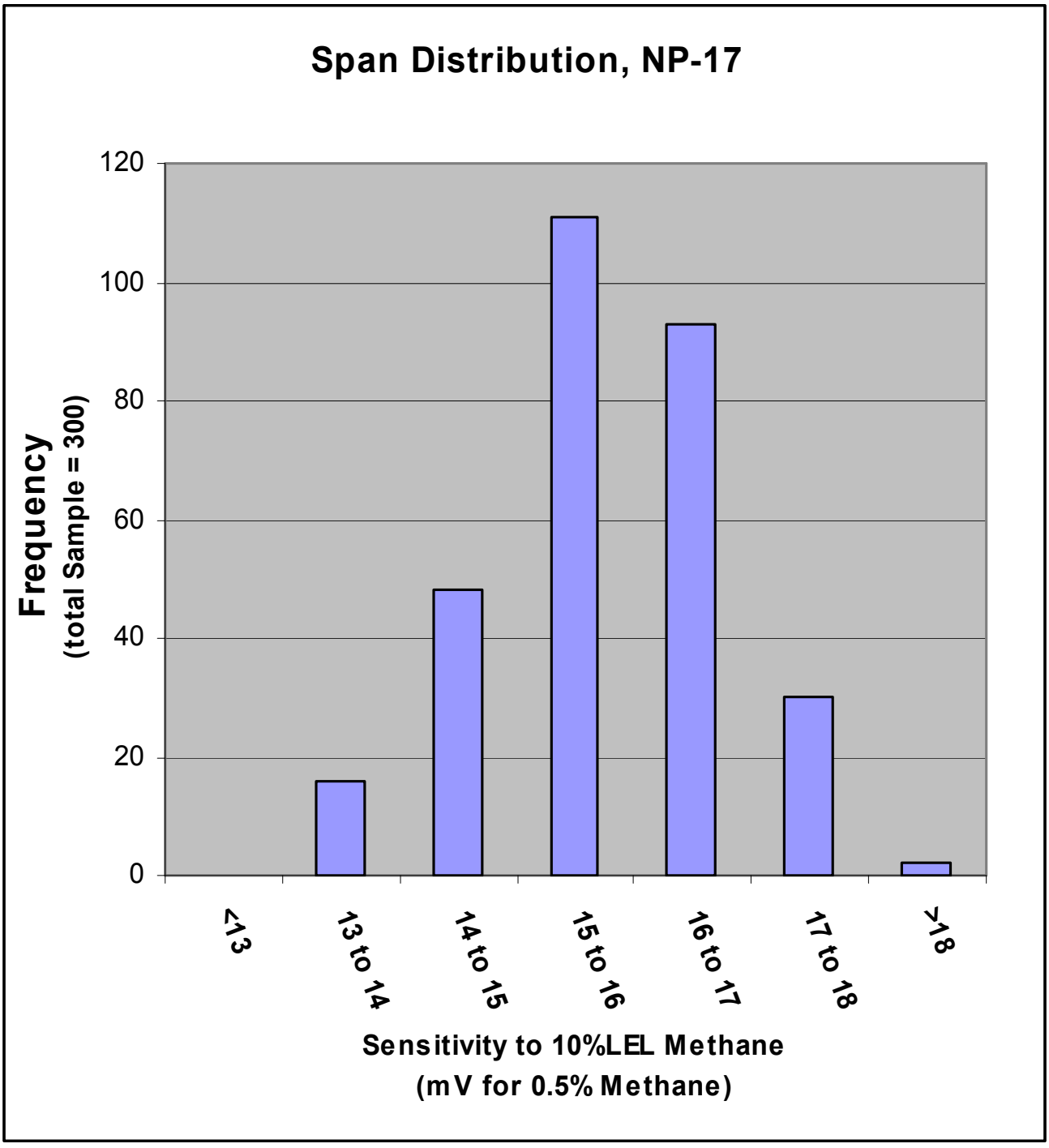

Span vs Temperature Performance, NP-17
Sensitivity Reading (Normalized to 25 deg=100%)
110.0%
105.0%
100.0%
95.0%
90.0%
-20
0
25
50
70
Degrees C

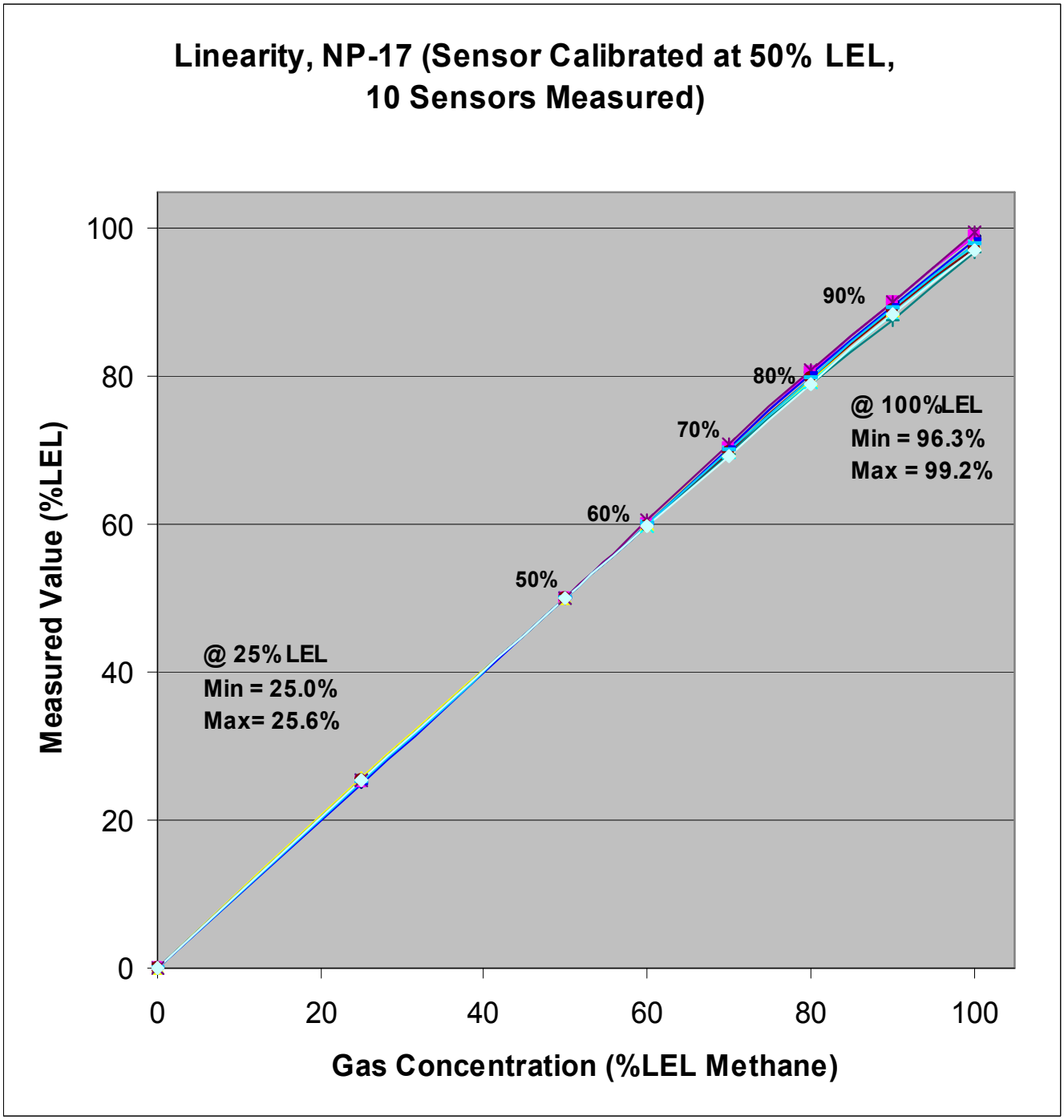

Typical Output vs Applied Voltage for a selection of Gases, NP-17
Output (mV/10% LEL)
20
18
16
14
12
10
8
6
4
2
0
1.6
1.8
2
2.2
2.4
Applied Voltage
Methane
Ethane
Butane
Hydrogen

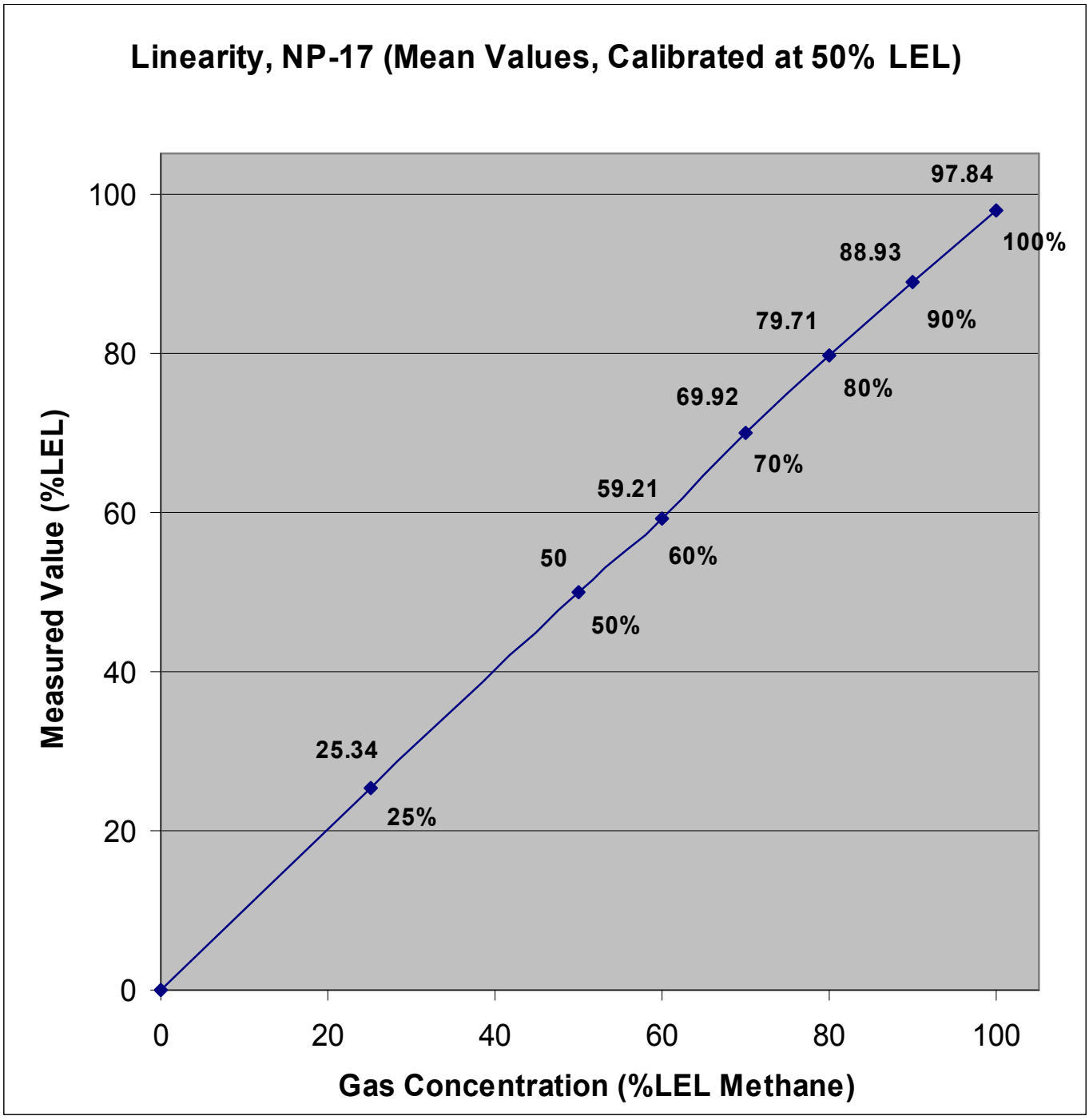

Long Term Zero Stability, NP-17
(1mV=0.66%LEL Methane)
Zero Reading (mV)
3
2
1
0
-1
-2
-3
0
28
56
84
112
140
168
196
Days


Long Term Span Stability, NP-17
120
100
80
60
40
% of Original Sensitivity
0
50
100
150
200
Days


Zero offset Distribution, NP-17
Frequency
(Total sample = 300)
120
100
80
60
40
20
0
<-25
-25 to -15
-15 to -5
-5 to +5
+5 to +15
+15 to +25
>25
Zero offset (mV)


Span Distribution, NP-17
120
100
80
60
40
20
0
Frequency
(total Sample = 300)
<13
13 to 14
14 to 15
15 to 16
16 to 17
17 to 18
>18
Sensitivity to 10%LEL Methane
(mV for 0.5% Methane)


Linearity, NP-17 (Sensor Calibrated at 50% LEL,
10 Sensors Measured)
Measured Value (%LEL)
Gas Concentration (%LEL Methane)
0
20
40
60
80
100
50%
60%
70%
80%
90%
@ 25% LEL
Min = 25.0%
Max= 25.6%
@ 100%LEL
Min = 96.3%
Max = 99.2%


Linearity, NP-17 (Mean Values, Calibrated at 50% LEL)
Measured Value (%LEL)
Gas Concentration (%LEL Methane)
0
20
40
60
80
100
25.34
25%
50
50%
59.21
60%
69.92
70%
79.71
80%
88.93
90%
97.84
100%

Selected Relative Response Data, NP-17

(With respect to Methane = 1)

Gas/Vapour	LEL (CENELEC Standards)	Relative Response (with respect to Methane)	Gain Adjustment
Acetic Acid	5.4%	0.20	5.00
Acetone	2.6%	0.60	1.67
Ammonia	15%	0.55	1.82
Butyl Acetate	1.4%	0.40	2.50
Cyclo-hexane	1.3%	0.50	2.00
Cyclo-pentane	1.4%	0.55	1.82
Decane	0.75%	0.20	5.00
Dioxane	2.0%	0..55	1.82
Ethane	3.0%	0.80	1.25
Ethanol	3.3%	0.75	1.33
Ethyl Acetate	2.2%	0.55	1.82
Ethylene	2.7%	0.70	1.43
Hydrogen	4.0%	1.00	1.00
Iso-Butane	1.8%	0.60	1.67
Iso-butyl Alcohol	1.7%	0.25	4.00
Iso-Octane	0.95%	0.40	2.50
Iso-Pentane	1.4%	0.50	2.00
Iso-Propyl Alcahol (IPA)	2.2%	0.60	1.67
Methane	5%	1.00	1.00
Methanol	6.7%	1.00	1.00
Methyl Ethyl Ketone (MEK)	1.9%	0.50	2.00
n-Butane	1.8%	0.60	1.67
n-Heptane	1.05%	0.45	2.22
n-Hexane	1.02%	0.50	2.00
Nonane	0.85%	0.25	4.00
n-Pentane	1.4%	0.55	1.82
n-propanol	2.2%	0.55	1.82
n-Propyl Alcahol	2.2%	0.55	1.82
Propane	2.1%	0.70	1.43
Propylene	2.4%	0.75	1.33
Styrene Monomer	1.1	0.30	3.33
Toluene	1.2%	0.45	2.22
Xylene	1.1%	0.40	2.50
Benzene	1.3%	0.45	2.22
Iso-Butyl methyl ketone	1.2%	0.25	4.00