ALTAIR® 2X, 4X & 5X Gas Detectors

Electrochemical Sensor Cross-Sensitivity Data*

MSA
The Safety Company

It is quite common for electrochemical sensors to be cross-sensitive to specific gases other than the target gas of interest. Cross-sensitivities are limited as much as possible by sensor design, but some interactions still exist. The tables below are a general guide to these common cross-sensitivities which can be used to understand gas detector readings in environments where multiple gases may be present.

Using Cross-Sensitivity Data

Below you will find multiple scenarios to aid in the use of the provided cross-sensitivity data. It is important to note that cross-sensitivities are additive. Thus when the target gas and cross-sensitive gas are present, the sensor reading will combine both concentrations to provide a summed reading on the detector.

XCell CO Sensors

Scenario	Gas in Environment	Environmental Gas Concentration (ppm)	CO Cross-Sensitivity	Gas Detector CO Reading (ppm)	Actual CO in Environment (ppm)
Target Gas Concentration	CO	50	100%	50	50
Cross-Sensitive Gas in Environment	NO	50	84%	42	0
Target Gas & Cross-Sensitive Gas in Environment	CO/NO	50 CO/50 NO	100% CO/ 84% NO	50 + 42 = 92	50
Negative Cross-Sensitive Gas in Environment	HCN	20	−5%	−1	0
Target Gas & Cross-Sensitive Gas in Environment	CO/HCN	50 CO/20 HCN	100% CO/−5% HCN	50 + (−1) = 49	50

MSA XCell® Sensor Cross-Sensitivity Data*

XCell CO & CO-HC Sensors

Gas Applied	Concentration Applied (ppm)	CO Cross-Sensitivity	CO Reading**
CO	100	100%	100
H_2S	40	0%	0
SO_2	9	−4%	−1
NO_2	11	0%	0
NH_3	25	0%	0
Cl_2	10	0%	0
NO	50	84%	42
HCN	30	−5%	−2
Toluene	53	0%	0
Isopropanol	100	−8%	−8
H_2	100	48%	48

XCell H_2S & H_2S-LC Sensors

Gas Applied	Concentration Applied (ppm)	H_2S Cross-Sensitivity	H_2S Reading**
H_2S	40	100%	40
CO	100	1%	1
SO_2	9	14%	2
NO_2	11	−1%	−1
NH_3	25	−1%	−1
Cl_2	10	−14%	−2
NO	50	25%	13
HCN	30	−3%	−1
Toluene	53	0%	0
Isopropanol	100	−3%	−3
H_2	100	0%	0

XCell SO_2 (Single) Sensors

Gas Applied	Concentration Applied (ppm)	SO_2 (Single) Cross-Sensitivity	SO_2 Reading**
SO_2	24.5	100%	25
CO	1000	0.0%	0
H_2S	199	0.1%	1
NO_2	10	−80%	−8
NH_3	121	−0.1%	−1
Cl_2	15.3	0.7%	1
PH_3	5	18%	1
HCN	50.4	5%	3
Isopropanol	500	0%	0
H_2	2000	1%	20
Acetylene	100	4%	4

XCell SO_2 (Two-Tox) Sensors

Gas Applied	Concentration Applied (ppm)	SO_2 Cross-Sensitivity	SO_2 Reading**
NO_2	10 ppm	28%	3
CO	60 ppm	2%	2
HCN	4.7 ppm	30%	2
PH_3	0.3 ppm	0%	0
O_3***	1 ppm	−24%	−1
NH_3	25 ppm	0%	0
H_2	2500 ppm	0%	0
Acetylene	10 ppm	423%	43

*** Transient effect

* These cross-sensitivity values are intended for reference only and may change under varying environmental conditions, varying concentrations, varying sensor lots, and varying sensor age. These tables do not contain a complete or inclusive list of cross-sensitive gases, but rather is a sampling of the most common examples.
** All values have been rounded up to the nearest 1 ppm

*Because every life has a **purpose…***

MSA XCell® Sensor Cross-Sensitivity Data*

XCell CO H$_2$-RES Sensors

Gas Applied	Concentration Applied (ppm)	CO H$_2$–RES Cross-Sensitivity	CO Reading**
CO	100	100%	100
H$_2$S	40	0%	0
SO$_2$	9	–4%	–1
NO$_2$	11	0%	0
NH$_3$	25	0%	0
Cl$_2$	10	0%	0
NO	50	130%	65
HCN	30	–5%	–2
Toluene	53	0%	0
Isopropanol	100	–8%	–8
H$_2$	100	5%	5

XCell NH$_3$ Sensors

Gas Applied	Concentration Applied (ppm)	NH$_3$ Cross-Sensitivity	NH$_3$ Reading**
NH$_3$	25	100%	25
CO	45	0%	0
H$_2$S	20	75%	15
SO$_2$	10	–39%	–4
NO$_2$	2	–74%	–2
H$_2$	1000	0%	0

XCell NO$_2$ Sensors

Gas Applied	Concentration Applied (ppm)	NO$_2$ Cross-Sensitivity	NO$_2$ Reading**
NO$_2$	10	100%	10
CO	60	3.3%	2
SO$_2$	10	–86%	–9
H$_2$S	20	–271%	–55
NH$_3$	25	0%	0
O$_3$	1	100%	1
HCN	4.7	2%	1
Acetylene	100	–1%	–1
H$_2$	1000	–0.1%	–1
NO	50	3%	2

XCell Cl$_2$ Sensors

Gas Applied	Concentration Applied (ppm)	Cl$_2$ Cross-Sensitivity	Cl$_2$ Reading**
Cl$_2$	10	100%	10
CO	45	0%	0
H$_2$S	20	–0.7%	–1
SO$_2$	10	–34%	–4
NO$_2$	2	19%	1
H$_2$	1000	0%	0

Cross-Sensitivity Data (Non-XCell Exotic Sensors)

NO$_2$ Sensors

Gas Applied	Concentration Applied (ppm)	NO$_2$ Cross-Sensitivity	NO$_2$ Reading**
CO	300	0%	0
H$_2$S	15	–8%	–2
SO$_2$	5	0%	0
NO	35	0%	0
Cl$_2$	1	100%	1

PH$_3$ Sensors

Gas Applied	Concentration Applied (ppm)	PH$_3$ Cross-Sensitivity	PH$_3$ Reading**
AsH$_3$	0.15	67%	1
SiH$_4$	1	90%	1
B$_2$H$_6$	0.3	35%	1
GeH$_4$	0.6	92%	1
SO$_2$	5	20%	1
H$_2$	1000	0.1%	1
C$_2$H$_4$	100	1%	1
CO	1000	0.1%	1

NO Sensors

Gas Applied	Concentration Applied (ppm)	NO Cross-Sensitivity	NO Reading**
CO	300	0%	0
SO$_2$	5	0%	0
NO$_2$	5	30%	2
H$_2$S	15	10%	2

ClO$_2$ Sensors

Gas Applied	Concentration Applied (ppm)	ClO$_2$ Cross-Sensitivity	ClO$_2$ Reading**
Alcohols	1000	0%	0
CO	100	0%	0
Cl$_2$	1	60%	1
O$_3$	0.25	280%	1
H$_2$	3000	0%	0
H$_2$S	20	–25%	–5

HCN Sensors

Gas Applied	Concentration Applied (ppm)	HCN Cross-Sensitivity	HCN Reading**
H$_2$S	20	300%	60
NO$_2$	10	–180%	–18
Cl$_2$	10	12%	2
NO	50	1%	1
SO$_2$	20	10%	2
CO	400	0.1%	1
H$_2$	400	0.1%	1
C$_2$H$_4$	80	0.1%	1
NH$_3$	20	1%	1
CO$_2$	50000	0.1%	50

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