

Air Liquide Canada is dedicated to delivering premium service, expert advice, and reference-quality products to our customers.



Below is the list of the binary EPA Primary and CEMS Grade Protocol that we offer. Other EPA protocols may be available outside these ranges. Multi-component protocols are also available. Please contact us for assistance.

EPA PROTOCOL Mixtures	CEMS GRADE concentration	PRIMARY GRADE concentration	Cylinder size	Content		Pressure		Valve outlet
				m ³	ft ³	kPa	psig	
Carbon Dioxide in Nitrogen	100 ppm to 20%	100 ppm to 20%	30AL	3.94	142	12830	1900	580
			7AL	0.89	32			
Carbon Monoxide in Air	0.5 ppm to 3%	10 ppm to 3%	30AL	3.94	142	12830	1900	590
			7AL	0.92	33			
Carbon Monoxide in Nitrogen	0.5 ppm to 10%	0.1 to 10%	30AL	3.94	142	12830	1900	350
			7AL	0.92	33			
Hydrogen Sulfide in Nitrogen	5 to 200 ppm	Not available	30AL	3.97	143	12830	1900	330
			7AL	0.92	33			
Hydrogen Sulfide in Nitrogen (Method 11)	60-999 ppm	Not available	30AL	3.88	140	12830	1900	330
Methane in Air	10-1000 ppm	10-1000 ppm	30AL	3.97	143	12830	1900	590
			7AL	0.92	33			
Methane in Nitrogen	10-1000 ppm	10-1000 ppm	30AL	3.97	143	12830	1900	350
			7AL	0.92	33			
Nitric Oxide in Nitrogen	1 ppm to 1%	10 ppm to 1%	30AL	3.55	128	12830	1900	660
			7AL	0.80	29			
Nitrogen Dioxide in Air	5 to 499 ppm	Not available	30AL	3.55	128	12830	1900	660
			7AL	0.80	29			
Nitrogen Dioxide in Nitrogen	10 to 750 ppm	Not available	30AL	3.55	128	12830	1900	660
			7AL	0.80	29			
Oxygen in Nitrogen	0.1 to 24.9%	0.1 to 24.9%	30AL	3.94	142	12830	1900	580 or 590
			7AL	0.89	32			
Propane in Air	1 to 99 ppm	10 to 99 ppm	30AL	3.97	143	12830	1900	590
			7AL	0.92	33			
Propane in Nitrogen	1 ppm to 1%	10 ppm to 1%	30AL	3.97	143	12830	1900	350
			7AL	0.92	33			
Sulfur Dioxide in Air	10 to 999 ppm	10 to 999 ppm	30AL	3.97	143	12830	1900	660
			7AL	0.92	33			
Sulfur Dioxide in Nitrogen	10 ppm to 1%	10 ppm to 1%	30AL	3.97	143	12830	1900	660
			7AL	0.92	33			

For all your specialty mixtures needs, please contact your nearest Air Liquide Canada Specialty Gas Representative

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EPA Protocol Mixtures



Air Liquide offers a full product line of both EPA Protocols and CEM standards to meet our customers' needs.

Our customers can be sure of getting the best quality in every gas we produce.

We closely control the quality and consistency of each gas

ENVIRONMENTAL MONITORING STANDARDS

The Clean Air Act brought about many changes in the early 1990s. The EPA set forth a plan to require that any industry burning fossil fuel is required to monitor the emissions from their processes. Continuous Emission Monitors (CEMs) of stack emissions for pollutants such as sulfur dioxide, carbon monoxide, nitric oxides, and carbon dioxide are required to be calibrated routinely. The gas industry offered CEMs standards to calibrate these instruments on a daily basis. The EPA also required that stacks with higher levels of emissions undergo periodic Relative Accuracy Trial Assessments (RATA) tests where CEMs monitors have to be calibrated with standards directly traceable back to NIST reference standards. Since NIST was not capable of supplying the quantities of calibration standards required for these tests, the EPA Protocol Program was developed with the Gas Manufacturers to provide EPA Protocol Standards. Air Liquide is a pioneer in this program and continues to be a participant in good standing with the EPA.

EPA PROTOCOL STANDARDS

- Air Liquide produces EPA Protocol calibration standards at several of its laboratories.
- All follow the procedures outlined in EPA-600R-97/121 that details preparation methods, analytical methods, and reporting of the standards.
- All EPA Protocols must be certified to an accuracy of +/-2% but most standards have uncertainties of +/-1% or less.

Below is a list of the general ranges of EPA Protocols, and their shelf life, that Air Liquide produces by G1 procedures. We also offer EPA Protocols containing multiple minor components when they are compatible in the mixture.

Minor components	Balance Gas	Shelf-life
100 ppm to 22% Carbon Dioxide	Nitrogen	36 months
10 ppm to 8% Carbon Monoxide	Air/Nitrogen	36 months
3 ppm to 4 ppm Nitric Oxide	Nitrogen	6 months
4 ppm to 5000 ppm Nitric Oxide	Nitrogen	24 months
5 ppm to 500 ppm Nitrogen Dioxide	Air	24 months
0.1% to 24.9% Oxygen	Nitrogen	36 months
10 ppm to 1000 ppm Methane	Air/Nitrogen	36 months
3 ppm to 250 ppm Propane	Air/Nitrogen	36 months
10 ppm to 40 ppm Sulfur Dioxide	Air/Nitrogen	6 months
40 ppm to 500 ppm Sulfur Dioxide	Air/Nitrogen	24 months
500 ppm to 1% Sulfur Dioxide	Air/Nitrogen	36 months
5 ppm to 200 ppm Hydrogen Sulfide	Nitrogen	12 months
100 ppm to 1000 ppm Hydrogen Sulfide (Method 11)	Nitrogen	12 months

EPA PROTOCOL STANDARDS OFFERED BY AIR LIQUIDE

Primary Grade EPA Protocols

Air Liquide offers our Primary Grade EPA Protocols for customers requiring mixture accuracies that are greater than the minimum requirements of the EPA. These protocols are analyzed against NIST traceable standards to give an uncertainty of +/-1% or less. All the standards are prepared and analyzed following G-1 procedures. Most of the components and their concentration ranges listed above are available as Primary Grade Protocols.

Primary Grade EPA Protocols can offer customers some distinct advantages over ordinary EPA Protocols. If a customer can achieve a relative accuracy of less than 7.5% for their Acid Rain Monitoring Program, they may be eligible to reduce the frequency of RATA testing, saving thousands of dollars each year.

CEMS Grade EPA Protocols

Many customers can easily achieve the relative accuracy requirements of the Acid Rain Program. For situations like this, Air Liquide offers our CEMS (Continuous Emission Monitoring Standard) Grade EPA Protocols with an uncertainty of <+/-2%. These meet the minimum EPA Protocol guidelines and can save the customer money.

If the customer needs an EPA Protocol outside the ranges prescribed above, we can often prepare EPA Protocols using the G-2 methods. These protocols are also ideal for use as daily calibration standards for CEM monitors.



CERTIFICATE of ANALYSIS

Interference-Free Multi-Component EPA Protocol Gases

NOTE: Analytical uncertainty and NIST traceability are in compliance with EPA-600/R-97/121
Section 2.2 Procedure: G-1

Customer: Air Liquid America
P.O. Number:
Item Number:
Notes:
Assay Date: 28-Sep-08
Expiration Date: 27-Sep-08

Cylinder Number: CC11419
Shipping Order #: 222
Transfer #: 222
LOT #: LPK110
Valve: CGA580
Cyl. Pressure: 1900psig
*Cylinder should not be used when gas pressure is below 100 psig

Component	Requested Concentration	Assay Concentration
Nitric Oxide	110 ppm	114 ±1 ppm
Carbon Dioxide	4.4 %	4.37 ±0.04 %
Total NOX		114 ppm
Nitrogen	Balance	Balance

Reference Standard(s) Employed For Analysis:

Std Name	Std #	Conc.	Units	Std. Error	Comp.	Balance	Cyl. No.	Exp. Date	Sample No.
GMS323	GMS323	103.5	ppm	0.04	NO	N2	CC58972	1/10/2008	N.A.
GMS316	GMS316	5.01	%	0.03	CO2	N2	CC107004	1/6/2008	N.A.

Analysis Information:

Component 1: Nitric Oxide	First Trial Analysis On: 8/27/2008			Second Trial Analysis On: 8/28/2008				
	Trial 1	Trial 2	Trial 3	Units	Trial 1	Trial 2	Trial 3	Units
Manufacturer: AUSA Analytic								
Model Number: DN5004	Zero	8.42	8.43	8.51	Zero	9.36	9.33	9.48
Serial Number: 3034	Reference	99.87	99.96	99.41	Reference	100.80	99.80	99.44
Analytical Principle: FTIR	Calibration	100.33	100.38	100.48	Calibration	100.80	100.34	100.78
MPC Calibrated: 0821490	Result	113.87	113.88	113.78	Result	114.34	113.85	113.83
		Mean Result:		113.58	Mean Result:			113.58

Component 2: Carbon Dioxide	First Trial Analysis On: 8/27/2008			Second Trial Analysis On: 8/28/2008				
	Trial 1	Trial 2	Trial 3	Units	Trial 1	Trial 2	Trial 3	Units
Manufacturer: AUSA Analytic								
Model Number: DN5004	Zero	8.34	8.34	8.34	Zero			
Serial Number: 3034	Reference	5.17	5.15	5.18	Reference			
Analytical Principle: FTIR	Calibration	4.85	4.87	4.88	Calibration			
MPC Calibrated: 081495	Result	4.41	4.33	4.38	Result			
		Mean Result:		4.37	Mean Result:			

Analyst Signature: _____ Calculated by: _____