

Environmental Mixtures.

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



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 Test Audits (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 was a pioneer in this program and has continued 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 that Air Liquide produces by G1 procedures and their shelf life. We also offer EPA Protocols containing multiple minor components when they are compatible in the mixture.

Shelf-Life of Product Range in Aluminum Cylinders

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 those customers requiring mixture accuracies that are better 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 the customer 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 achieve the relative accuracy requirements of the Acid Rain Program without any problems. For situations like this, Air Liquide offers our CEMs Grade EPA Protocols with an uncertainty of <+/-2%. These meet the minimum EPA Protocol guidelines and can save the customer money. Should the customer need an EPA Protocol outside the ranges prescribed above, often we can prepare EPA Protocols using the G-2 methods. These protocols are also ideal for use as daily calibration standards for CEMs monitors.

CEMS Zero Gases

Air Liquide also manufactures CEMS Zero grades of both Nitrogen and Air for calibration of the baseline zero of CEMS analyzers. These gases are essentially free of those contaminants that most specific analyzers are designed to monitor.

All EPA Protocols have distinct packaging features, including the SCANDINA™ cap.



EPA PRIMARY PROTOCOL GASES

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

New Part #	Minor Component	Concentration	Balance Gas	Volume	UOM
3726-30AL 3726-7AL 3751-30AL 3751-7AL	Carbon Dioxide EPA Primary Protocol	100 to 9999 ppm 1 to 20%	Nitrogen	142 32 142 32	SCF SCF SCF SCF
3755-16AL 3755-30AL 3755-7AL 3756-30AL 3756-7AL 3753-30AL 3753-7AL	Carbon Monoxide EPA Primary Protocol	10 to 99 ppm 100 to 999 ppm 0.1 to 3%	AG-1 Air	72 142 33 142 33 142 33	SCF SCF SCF SCF SCF SCF SCF
3759-30AL 3759-7AL 3871-30AL 3871-7AL 3757-16AL 3757-30AL 3757-7AL	Carbon Monoxide EPA Primary Protocol	10 to 99 ppm 100 to 999 ppm 0.1 to 10%	Nitrogen	142 33 142 33 72 142 33	SCF SCF SCF SCF SCF SCF SCF
5075-30AL 5075-7AL	Methane EPA Primary Protocol	10 to 1000 ppm	AG-1 Air	143 33	SCF SCF
5077-30AL 5077-7AL	Methane EPA Primary Protocol	10 to 1000 ppm	Nitrogen	143 33	SCF SCF
5433-30AL 5435-30AL	Nitrogen Dioxide EPA Primary Protocol	10 to 49 ppm 50 to 499 ppm	AG-1 Air	129 129	SCF SCF
5431-30AL 5431-7AL	Nitrogen Dioxide EPA Primary Protocol	10 to 750 ppm	Nitrogen	129 29	SCF SCF
5356-30AL 5356-7AL 5351-16AL 5351-30AL 5351-7AL 5357-30AL 5357-7AL	Nitric Oxide EPA Primary Protocol	10 to 29.9 ppm 30 to 599 ppm 600 ppm to 1%	Nitrogen	128 29 68 128 29 128 29	SCF SCF SCF SCF SCF SCF SCF

New Part #	Minor Component	Concentration	Balance Gas	Volume	UOM
5073-7AL 5703-30AL 5705-16AL	Oxygen EPA Primary Protocol	0.1 to 24.9%	Nitrogen	33 142 72	SCF SCF SCF
6021-30AL 6021-7AL	Propane EPA Primary Protocol	10 to 99 ppm	AG-1 Air	142 33	SCF SCF
6025-30AL 6025-7AL	Propane EPA Primary Protocol	10 ppm to 1%	Nitrogen	142 33	SCF SCF
6028-30AL 3028-7AL 6151-30AL 6151-7AL	Sulfur Dioxide EPA Primary Protocol	10 to 99 ppm 100 to 999 ppm	AG-1 Air	142 33 142 33	SCF SCF SCF SCF
6157-30AL 6157-7AL 6161-16AL 6161-30AL 6161-7AL 6156-30AL 6156-7AL	Sulfur Dioxide EPA Primary Protocol	10 to 99 ppm 100 to 999 ppm 0.1 to 1%	Nitrogen	142 33 76 142 33 142 33	SCF SCF SCF SCF SCF SCF SCF