



The 1990s saw a tremendous growth in air monitoring and emissions control. On November 15, 1990, The Clean Air Act Amendment of 1990 was signed. This act was designed to remove 56 billion tons a year of air pollution, reduce acid rain by 50% and reduce toxic air pollutants by 75%.

In support of the CAAA, Matheson offers a full line of Environmental Compliance Standards. Matheson Calibration Standards offer repeatable and precise calibrations to the end user. Our continuous involvement with the environmental marketplace gives us a unique understanding and perspective on calibration gas requirements.

### EPA Protocol Gases

Per 40CFR60 and 40CFR75, Continuous Emissions Monitoring systems (CEMs) for gaseous pollutants must be calibrated and audited using gas standards that are traceable directly to NIST Reference Standards. The 1% certification accuracy of Matheson's EPA Protocol calibration gases optimizes the daily calibrations and quarterly linearity tests specified in 40CFR75 for the Acid Rain Program. Matheson's 1% EPA Protocol gases assist CEM system performance during the Relative Accuracy Test Audits. Matheson's EPA Protocol certificate of analysis content exceeds the requirement of the EPA traceability document dated September, 1997.

#### Benefits of Matheson EPA Protocol Gases:

- EPA Protocol components and cylinders are each certified using NIST SRM and/or NTRM.
- Mixture certification accuracy of  $\pm 1\%$
- Certificates of Analysis and tag contents as prescribed by EPA guidelines.
- Reduction of lengthy cylinder lead times by implementation of Point-of-use Stocking Programs.
- A full complement of gas support equipment and Acid Rain CEM Zero Gases to meet each user's needs.
- Nitric Oxide EPA Protocols start at 1 ppm; and all nitric oxide mixtures have low NO<sub>2</sub> impurity.
- EPA Protocol G2, certification with dilution, is available for concentrations exceeding NIST SRM using FTIR interference free analysis.
- UniBlend™ manufactured batches of identical mixtures in cylinders are available. The reported values of EPA Protocol gas mixtures are individually analyzed by laboratory analysis.
- NO<sub>x</sub> EPA Protocols available. Please inquire.

### NIST Traceable Reference Material (NTRM) Program

Direct comparison of the EPA Protocol gas minor component to a NIST SRM enables the 1% certification accuracy. To ensure direct NIST traceability plus enhance cost effectiveness, Matheson has fully implemented a NIST Traceable Reference Material Program.

Availability of identical NTRM cylinders at all Matheson EPA Protocol production facilities ensures continuous EPA Protocol availability, plus reproducible component concentrations from multiple facilities.

### Cal-MAT™ Daily Standards

Many facilities are required to monitor emissions, but do not require an EPA Protocol Standard to do daily calibrations. Matheson's Cal-MAT-1™ and Cal-MAT-2™ Daily Standard Mixtures are designed to meet these calibration needs when an EPA Protocol mixture is not required. The Cal-MAT™ Daily Standards are designed to meet and exceed performance guidelines set forth by EPA compliance regulations. Cal-MAT™ Daily Standards can be customized to specific customer needs. If your requirement is not listed, please contact Matheson.

#### How to find what you need.

The following pages are organized as follows:

- EPA Protocol Gases
- Cal-MAT™ Standards
- Cal-MAT™ Zero Gases
- Environmental Compliance Equipment

## Matheson's Environmental Gas Mixtures for 40CFR60 Appendix A Test Methods

The following table outlines the mixture specifications for Matheson's EPA Protocol, Cal-MAT-1™ and Cal-MAT-2™ standards.

Mixture Grade	Blend Tolerance	Certification Accuracy	NIST Traceability
EPA Protocol	$\geq 50 \text{ ppm} \pm 5\%$	1%	SRM, NTRM
	$5 \text{ ppm to } < 50 \text{ ppm} \pm 10\%$		
	$< 5 \text{ ppm} \pm 20\%$		
Cal-MAT-1™	$5\% \text{ to } \leq 50\% \pm 1\%$	1%	SRM, NTRM
	$500 \text{ ppm to } < 5\% \pm 2\%$		
	$1 \text{ ppm to } < 500 \text{ ppm} \pm 5\%$		
Cal-MAT-2™	$5\% \leq 50\% \pm 5\%$	2%	NTRM, GMIS, or Titrimetric Std.
	$500 \text{ ppm to } < 5\% \pm 10\%$		
	$1 \text{ ppm to } < 500 \text{ ppm} \pm 20\%$		



# Gas Mixtures – Products for Specialty Gas Applications

## Environmental Compliance Standards

### Matheson's Environmental Gas Mixtures for 40CFR60 Appendix A Test Methods - *continued*

Gas Mixtures

App. A Method No.	Test Method Title	EPA Protocol, Certified and Cal-MAT% Mixtures	Recommended Gas Mixture Grades
3A	Determination of Oxygen and Carbon Dioxide concentrations in emissions from stationary sources	Oxygen in Nitrogen; Carbon Dioxide in Nitrogen or Air; Carbon Dioxide/Sulfur Dioxide; Oxygen/Sulfur Dioxide in Nitrogen	EPA Protocol, Cal-MAT-2™
6C	Determination of Sulfur Dioxide emissions from stationary sources	Sulfur Dioxide in Nitrogen or Air; Sulfur Dioxide/Carbon Dioxide/Nitrogen; Sulfur Dioxide/Carbon Dioxide/Oxygen/Nitrogen	EPA Protocol, Cal-MAT-2™
7E	Determination of Nitrogen Oxides emissions from stationary sources	Nitric Oxide in Nitrogen	EPA Protocol, Cal-MAT-2™
10	Determination of Carbon Monoxide emissions from stationary sources	Carbon Monoxide in Nitrogen	EPA Protocol, Cal-MAT-2™
10A	Determination of Carbon Monoxide emissions in certifying continuous emissions monitoring systems at petroleum refineries	Carbon Monoxide in Nitrogen Carbon Monoxide in Nitrogen	EPA Protocol, Cal-MAT-2™ Cal-MAT-1™, Cal-MAT-2™
10B	Determination of Carbon Monoxide emissions from stationary sources	Carbon Monoxide in Nitrogen 1000 ppm Methane in Air	EPA Protocol, Cal-MAT-2™ Cal-MAT-2™
15	Determination of Hydrogen Sulfide, Carbonyl Sulfide, and Carbon Disulfide emissions from stationary sources	Hydrogen Sulfide, Carbonyl Sulfide, Carbon Disulfide in Nitrogen	Certified Grade
15A	Determination of total reduced sulfur emissions from sulfur recovery plants in petroleum refineries	Carbonyl Sulfide in Nitrogen	Certified Grade
16	Semicontinuous - determination of sulfur emissions from stationary sources	Hydrogen Sulfide, Methyl Mercaptan, Dimethyl Sulfide, and Dimethyl Disulfide in Nitrogen (and with Carbon Dioxide)	Certified Grade
16A	Determination of total reduced sulfur emissions from stationary sources (Impinger Technique)	Hydrogen Sulfide, Methyl Mercaptan, Dimethyl Sulfide, and Dimethyl Disulfide in Nitrogen (and with Carbon Dioxide); Hydrogen Sulfide in Nitrogen	Certified Grade; H <sub>2</sub> S as EPA Protocol
16B	Determination of total reduced sulfur emissions from stationary sources	Sulfur Dioxide in Nitrogen, Sulfur Dioxide/Carbon Dioxide/Nitrogen; Combustion Gas (<10 ppm THC, <50 ppb Sulfur, Nitrogen)	Cal-MAT-1™, EPA Protocol
18	Measurement of gaseous organic compound emissions by gas chromatography	VOC's in Nitrogen	Certified Grade
20	Determination of Nitrogen Oxides, Sulfur Dioxide, and diluent emissions from stationary gas turbines	Nitric Oxide in Nitrogen; Sulfur Dioxide in Nitrogen; Oxygen in Nitrogen; Carbon Dioxide in Air	Cal-MAT-1™, EPA Protocol
21	Determination of Volatile Organic Compounds - leaks.	VOC's in Nitrogen or Air; Methane in Air; Hexane in Air	Certified Grade
25	Determination of total gaseous nonmethane organic emissions as Carbon	Propane/Air: 20, 200, 3000 ppm CO <sub>2</sub> /Air: 50 ppm, 500 ppm, 1% MultiMix in Air: 50 ppm CO / 50 ppm CH <sub>4</sub> / 2% CO <sub>2</sub> / 20 ppm Propane Hexane/Air: 50 ppm Methanol/Air: 100 ppm	Certified Grade
25A	Determination of total gaseous organic concentration using Flame Ionization Analyzer	Propane in Air or Nitrogen	EPA Protocol
25B	Determination of total gaseous organic concentration using a nondispersive Infrared Analyzer	Propane in Air or Propane in Nitrogen	EPA Protocol
25C	Determination of Nonmethane Organic Compounds (NMOC) in MSW landfill gases	Method 25 mixtures	Certified Grade
25D	Determination of Volatile Organic Concentration of waste samples	1% 1,1-Dichloroethylene; 0-10% Propane in Nitrogen	Certified Grade
25E	Determination of vapor phase organic concentration in waste samples	Propane in Nitrogen or Air	Certified Grade



## Matheson's Environmental Gas Mixtures for 40CFR60 Appendix A Test Methods - *continued*

⚠ WARNING: This product can expose you to chemicals including Sulfur Dioxide, which is known to the State of California to cause birth defects or other reproductive harm. For more information go to [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov).

⚠ WARNING: This product can expose you to chemicals including Carbon Monoxide, which is known to the State of California to cause birth defects or other reproductive harm. For more information go to [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov).

⚠ WARNING: This product can expose you to chemicals including Methanol, which is known to the State of California to cause birth defects or other reproductive harm. For more information go to [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov).

⚠ WARNING: This product can expose you to chemicals including Carbon Disulfide, which is known to the State of California to cause birth defects or other reproductive harm. For more information go to [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov).