

EPA Traceability Protocol for Gaseous Calibration Standards

TABLE 2-3. Maximum Certification Periods^a for Calibration Standards in Passivated Aluminum Cylinders

Components	Balance gas	Concentration range	Period (years)
Ammonia	Nitrogen	5 to 50 ppm	1
Carbon dioxide	Air ^b	360 to 420 ppm	8
Carbon dioxide	Nitrogen	5 ppm to 20%	8
Carbon monoxide	Air	40 to 500 ppb	TBD
Carbon monoxide	Air	500 ppb to 10%	8
Carbon monoxide	Nitrogen	1 ppm to 15%	8
Formaldehyde	Nitrogen	0.5 to 10 ppm	1
Hydrogen chloride ^c	Nitrogen	10 to 5000 ppm	2
Hydrogen sulfide	Nitrogen	1 to 1000 ppm	3
Methane	Air	1 to 1000 ppm	8
Methane	Nitrogen	500 ppb to 10%	8
Methanol or ethanol	Nitrogen or Air	75 to 500 ppm	4
Natural gas components ^d	Natural gas	Contact NIST	4
Nitric oxide	O ₂ -free nitrogen ^e	0.5 to 50 ppm	3
Nitric oxide	O ₂ -free nitrogen ^e	50 ppm to 1%	8
Nitrous oxide	Air	300 ppb to 5%	8
Oxides of nitrogen ^f	Air	3 ppm to 1%	3
Oxygen	Nitrogen	10 ppm to 25%	8
Propane	Air	0.1 to 500 ppm	8
Propane	Nitrogen	100 ppm to 2%	8
Sulfur dioxide	Nitrogen	1 to 50 ppm	4
Sulfur dioxide	Nitrogen	50 ppm to 1%-	8
Volatile organics	Nitrogen	1 ppb to 1 ppm	4
Zero air material ^g	Air	Not applicable	Unlimited
Multicomponent mixtures	—	—	See text
Mixtures with lower concentrations	—	—	See text

^a Specialty gas producers may elect to certify candidate standards for less than the maximum certification period. Each producer has discretion in this matter. See text.

^b "Air" is defined as a mixture of oxygen and nitrogen where the minimum concentration of oxygen is 10 percent and the concentration of nitrogen is greater than 60 percent.

^c Hydrogen chloride may be contained in passivated aluminum or nickel-coated steel cylinders.

^d Natural gas components are methane, ethane, propane, n-butane, iso-butane, n-pentane, iso-pentane, helium, nitrogen, and carbon dioxide.

^e O₂-free nitrogen contains ≤ 100 ppb of oxygen.

^f NIST defines its total NO_x standards as containing nitrogen dioxide plus contaminant nitric acid.

^g Concentrations of SO₂, NO_x, and THC are not >0.1 ppm; concentration of CO is not >1 ppm; and concentration of CO₂ is not >400 ppm as per 40 CFR Part 72.2. Zero air material may be contained in steel cylinders.