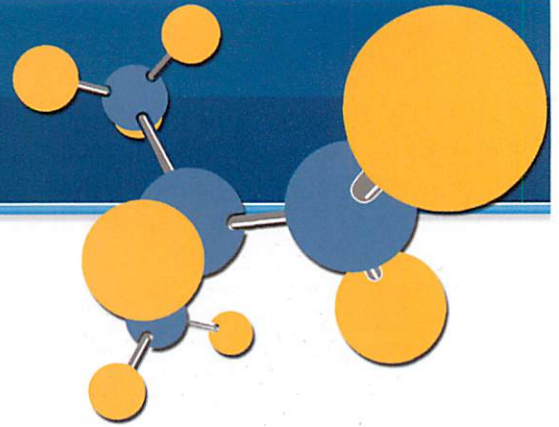




A Division of MESA International Technologies, Inc.

Domestic US: (866) 470-6372 International: (714) 434-7102 Fax: (714) 434-8006

Specialty Gases & Equipment



MESA Specialty Gases & Equipment Brochure

Domestic Toll Free: (866) 470-6372
International: (714) 434-7102



CUSTOM CALIBRATION GAS STANDARDS

MESA Specialty Gases is a manufacturer of calibration standards used in a wide variety of instrument applications in the refinery and petrochemical industries. Additional products include pure grade instrument support gases, calibration gases in small disposable cylinders, and related gas handling equipment.

Precise manufacturing of calibration mixtures involves many critical steps — consideration of chemical raw material purity as well as detailed impurity characterization; calculation of phase behavior for the calibration mixture; precise blending; and finally, independent confirming analysis of the final calibration mixture.

Incoming chemical raw material QC and detailed impurity characterization is the first critical step in all work done by MESA Specialty Gases. It is well known that pure hydrocarbons may contain a large number of trace level impurities. These impurities must be considered in many of the complex calibration mixtures used by our most demanding customers.

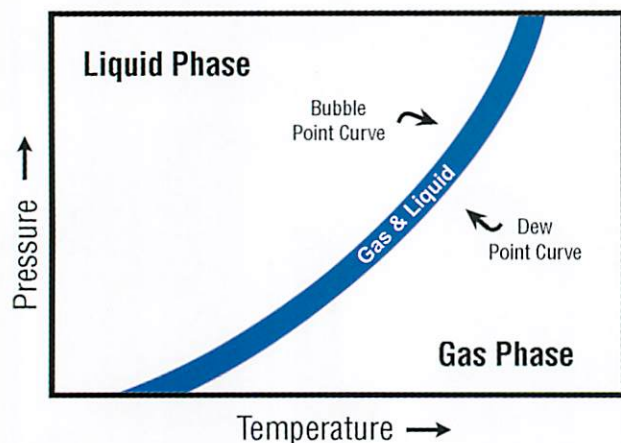
As part of our stringent QC procedures, all incoming hydrocarbon raw materials are immediately assigned to a quarantine area. Here they are subjected to exhaustive impurity analysis to establish the actual purity percentage. In addition, the material is completely characterized for all trace level impurities that need to be taken into consideration when using the raw material as a hydrocarbon component for calibration mixture blending.

Once we are satisfied that the raw material meets our strict criteria of purity and has been characterized for all critical impurities, it is released from quarantine by our QC specialists for use in the production of calibration mixtures.



Piston Cylinder and Optional Carrying Case

Before the final blending takes place, each mixture is evaluated for potential phase problems in the cylinder. It is critical that the mixture is sampled from the cylinder as a single phase, either gas or liquid. We do this evaluation by the use of advanced computer modeling of the phase behavior of the calibration standard under various temperature and pressure conditions as shown in the phase diagram. By use of this computer model and an extensive physical properties data base, MESA Specialty Gases is able to specify the correct conditions at which both gas and liquid phase calibration standards can be made and still maintain a single phase during sampling from the cylinder.



After the phase behavior has been evaluated, adjustments to the final calculations are made using impurity data from the original detailed QC of the raw materials. The mixture is then precisely blended to exacting specifications by MESA Specialty Gases using high sensitivity gravimetric balances. To assure complete accuracy to world class standards, the balances are calibrated using weights traceable to the US-NIST.

As the final step in the manufacturing process, the calibration mixture is analyzed in the laboratory by highly skilled technicians. This final analysis is done to confirm that all components are in the mixture and at the concentration levels specified by the customer. All analyses are done on the most current state-of-the-art laboratory analyzers using advanced electronics and computers for data processing.

Gas phase calibration standards can be supplied in a wide variety of cylinder types, pressures and volumes. Liquid mixtures can be supplied in cylinders fitted with dip tubes and head pressures of inert gas. In addition, liquid mixtures can also be offered in piston cylinders as shown above.



Full Line of High Pressure Regulators Available

A COMPLETE RANGE OF CALIBRATION STANDARDS FROM A SINGLE SOURCE

NATURAL GAS STANDARDS

Pipeline

- Calorimetric Natural Gas Standards
- GPA Natural Gas Standards
- Natural Gas Standards for Daniel Instruments

Natural Gas Processing

- Ethane Standards
- Propane Standards
- Butane Standards

POLYMER PLANTS

Propylene Standards

- PPM & % Hydrogen, Methane, Ethane, Ethylene, Propane, Butane, Isobutane, Propadiene, Methyl Acetylene & Cyclopropane
- PPM & PPB Carbon Monoxide & Carbon Dioxide
- PPM & PPB Hydrogen Sulfide, Carbonyl Sulfide & Methyl Mercaptan

Ethylene Standards

- PPM & % Hydrogen, Oxygen & Nitrogen
- PPM & PPB Carbon Monoxide & Carbon Dioxide
- PPM Methane, Ethane & Acetylene

BUTADIENE PLANTS

- PPM & % Methane, Ethane, Ethylene, Propane, Propylene, 1,2 Butadiene, Ethyl Acetylene, Vinyl Acetylene, Cis-2 Butene, Trans-2-Butene, Isobutylene, 1-Butene & Vinyl Cyclohexane

SULFUR STANDARDS

- Fuel Gas Plants (Method 11 Hydrogen Sulfide mixtures)
- Miscellaneous (PPB & PPM Hydrogen Sulfide, Carbonyl Sulfide, Sulfur Dioxide, Methyl Mercaptan, Ethyl Mercaptan, Thiophene, Carbon Disulfide & Dimethyl Disulfide)

MISCELLANEOUS CHEMICAL PLANT MIXTURES

- Ethylene Oxide standards
- Halocarbon mixtures

LIQUID MIXTURES

Aromatics

- Styrene (PPM non-aromatics, alpha-Methyl Styrene, Toluene, Ethylbenzene, Cumene, Xylenes)
- Benzene (PPM non-aromatics, Toluene, Ethylbenzene, Xylene)
- Paradiethyl Benzene
- Ethylbenzene (PPM Toluene, Benzene)
- Toluene (PPM Ethylbenzene, Xylene)
- Xylene (PPM Benzene, Toluene, Propylbenzene)

Natural Gas Processors

- Propane mixtures in piston cylinders
- Butane/Isobutane mixtures in piston cylinders
- Natural Gas Standards in piston cylinders

Gasoline & Oxygenates Including Numerous ASTM Standards



Full Line of Piston Cylinder Sizes Available

BLEND TOLERANCES & CERTIFICATION ACCURACY

MESA Specialty Gases offers three types of calibration standard for use in the refinery and petrochemical industries, **Primary, Certified and Gravimetric Standards.**

The **Primary Standard** is the most accurate and is made by weight. Unless stated otherwise, the mixture is certified to $\pm 1\%$ analytical accuracy of the reported values by independent laboratory analysis.

The **Certified Standard** is made by a combination of pressure and/or weight measurements. Unless stated otherwise, the mixture is certified to $\pm 2\%$ analytical accuracy of the reported values by independent laboratory analysis.

The **Gravimetric Standard** is made by weight. However, it is not confirmed by independent laboratory analysis. These mixes are intended for use in qualitative and semi-quantitative analysis such as retention time comparisons, etc.. They should not be used for precise analytical work or where reactive components are included as part of the mixture.

In the case of Primary and Certified standards, final mixtures are analyzed by gas chromatography or other suitable analytical methodology to confirm they are within the allowed tolerances. These mixtures are supplied with a "Certificate of Analysis" that details the requested and analytical values as well as preparative and analytical methods used by MESA Specialty Gases to prepare the calibration standard.

Gravimetric standards are supplied with a "Certificate of Conformance" that lists the components and the concentration blend range for each component as blended by MESA Specialty Gases.

STANDARD SPECIFICATIONS FOR CALIBRATION MIXTURES			
Product Grade	Concentration Range	Blend Tolerance ¹	Certification Accuracy ¹
Primary	Below 5 ppm ²	± 10 to 15%	± 1 to 2%
	5 to 100 ppm	$\pm 5\%$	$\pm 1\%$
	101 to 5000 ppm	$\pm 5\%$	$\pm 1\%$
	Above 0.5%	$\pm 2\%$	$\pm 1\%$ ¹
Certified	Below 5 ppm ²	± 15 to 20%	± 2 to 5%
	5 to 100 ppm	$\pm 10\%$	$\pm 2\%$
	101 to 5000 ppm	$\pm 10\%$	$\pm 2\%$
	Above 0.5%	$\pm 5\%$	$\pm 2\%$
Gravimetric ³	Below 5 ppm ²	$\pm 20\%$	Non-Certified by Independent Laboratory Analysis. Concentration Ranges are Reported Based on the Gravimetric Values.
	5 to 5000 ppm	$\pm 10\%$	
	Above 0.5%	$\pm 5\%$	

1. The Blend Tolerances and Certification Accuracy are expressed as the relative percentage deviation from the requested concentration of the individual components. Certification Accuracy for Primary Standards over 2% concentration will be $\pm 0.02\%$ absolute of the reported value.
2. Tolerances of minor components below 5 ppm may vary depending on the component and the complexity of the mixture.
3. Each component is reported at the requested concentration \pm the % stated for the concentration range.

See our Web Page at www.mesagas.com for a comprehensive list of typical components available in Gas and Liquid Mixes

SMALL DISPOSABLE CYLINDERS FOR INSTRUMENT APPLICATIONS

Small portable and disposable cylinders offer a cost-effective alternative for low gas volume applications such as found in Industrial Hygiene and Laboratory instrument calibration. In order to guarantee the accuracy of these mixtures, MESA Specialty Gases follows the same NIST traceable procedures to manufacture the small portable cylinders as we use for manufacturing the larger cylinders used in Process Analyzer applications.

Zero and Pure Grade Gases (Air and Nitrogen)

Instrument Calibration Standards in Air or Nitrogen

- Ammonia (10-50 PPM)
- BTXE (5-20 PPM)
- Carbon Dioxide (100 PPM – 15%)
- Carbon Monoxide (10 PPM – 7%)
- Ethylene Oxide (10-50 PPM)
- Hydrogen (800 PPM – 2%)
- Hydrogen Sulfide (5-100 PPM)
- Nitric Oxide & Nitrogen Dioxide (5-800 PPM)
- Nitrous Oxide (10-500 PPM)
- Oxygen (4-21%)
- Sulfur Dioxide (5-35 PPM)
- Various Hydrocarbons, BTU and RGA Mixes

Workplace Area Monitoring

- LEL* Mixes of Various Hydrocarbons
- Carbon Monoxide
- Ethylene Oxide
- Hydrogen Sulfide
- Oxygen Deficiency

*LEL Component is Methane, Propane or Pentane depending on the mixture ordered

Confined Space Entry

- 10-90 PPM Hydrogen Sulfide/25-50% LEL/10-300 PPM Carbon Monoxide/12-21% Oxygen in Nitrogen
- 10-50% LEL/20-500 PPM Carbon Monoxide/12-21% Oxygen in Nitrogen
- 30-50% LEL/15-21% Oxygen in Nitrogen

Wide Range of Non-refillable Cylinder Sizes from 17-103 Liters of Gas Capacity

- 17 and 103 liter gas capacity steel cylinders for non-reactive gases including Zero & Pure Grade Gases as well as mixtures of Carbon Dioxide, Carbon Monoxide, Hydrocarbon and LEL standards, Hydrogen, Nitrous Oxide and Oxygen
- 20 liter gas capacity steel cylinder for flammable mixes including BTU and RGA standards
- 58 liter gas capacity aluminum cylinder for low level and reactive gas mixtures including Ammonia, BTXE, Ethylene Oxide, Hydrogen Sulfide, Nitric Oxide, Nitrogen Dioxide, and Sulfur Dioxide

Complete Line of Regulators and Carrying Cases

- 17L Regulators for 17 liter cylinders with pre-set flow range as follows: 0.25; 0.3; 0.5; 1.0; 1.5 LPM
- 20L Regulators for 20 liter cylinders with adjustable delivery pressures
- 58/103L Regulators for 58 and 103 liter cylinders with pre-set flow range as follows: 0.2; 0.3; 0.5; 1.0; 1.5; 2.5; 6.0 LPM
- Multiflow regulator for 58/103L cylinders switch selectable as follows: 0.2; 0.3; 0.5; 1.0; 1.5; 2.5; 5.0; 6.0 LPM
- Carrying Cases to hold 1-4 cylinders plus regulators

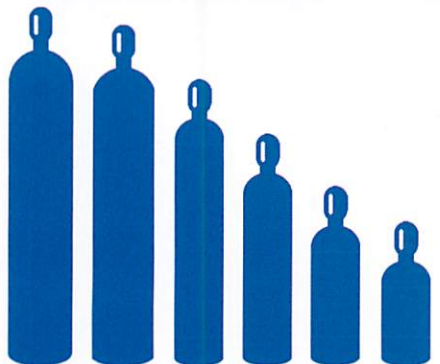


Full Line of Disposable Cylinder Sizes Available



Full Line of Regulators for Disposable Cylinders

CYLINDER OPTIONS FOR EVERY CALIBRATION GAS NEED



049-HP 044-HP 028-HP 016-HP 010-HP 008-HP

HIGH PRESSURE STEEL TO 2640 PSI

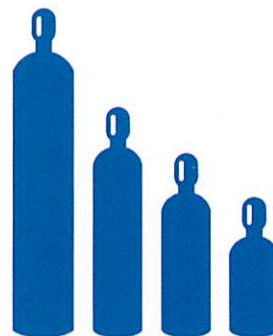
Cylinder Designation	Water Capacity (liters)	Diameter (inches)	Height w/ Valve (inches)	Nominal Shipping Weight (lbs)*
049-HP	49-50	9.25	60	150
044-HP	43-44	9.00	56	125
028-HP	27-28	7.00	47	70
016-HP	16-17	7.00	36	53
010-HP	10-11	7.00	28	38
008-HP	7-8	7.00	23	31

*Includes estimated weight of contents.

HIGH PRESSURE ALUMINUM TO 2200 PSI

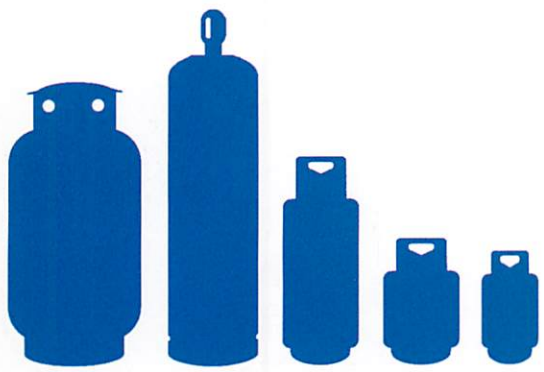
Cylinder Designation	Water Capacity (liters)	Diameter (inches)	Height w/ Valve (inches)	Nominal Shipping Weight (lbs)*
A030-HP	29-30	8.00	53	65
A016-HP	15-16	7.25	38	45
A010-HP	10-11	7.25	29	32
A006-HP	5-6	7.00	21	22

*Includes estimated weight of contents.



A030-HP A016-HP A010-HP A006-HP

LOW PRESSURE STEEL & ALUMINUM TO 240 PSI



216-LP 110-LP 043-LP 022-LP 012-LP

Cylinder Designation	Water Capacity (liters)	Diameter (inches)	Height w/ Valve (inches)	Nominal Shipping Weight (lbs)*
Steel Cylinders				
216-LP	216-217	24	40	173
110-LP	108-110	15	50	75
065-LP	64-65	12	43	46
043-LP	43-44	12	29	30
028-LP	27-28	9	35	28
022-LP	21-22	12	18	19
012-LP	11-12	9	17	14
Aluminum Cylinders				
A022-LP	21-22	12	18	13

*Does not include weight of contents.

DISPOSABLE & TRANSPORTABLE

Cylinder Designation	Material	Outlet Fitting	Service Pressure (psi)	Gas Contents (liters)	Diameter (inches)	Height (inches)
17L	Steel	CGA-600	240	17	3	11
20L	Steel	CGA-160*	240	20	3	13
LB	Steel	CGA-170/180	1800	55	2	15
103L	Steel	C-10**	1000	103	3	14
550L	Steel	***	2200	550	4	24
A58L	Aluminum	C-10**	500	58	3.5	14.5
A104L	Aluminum	CGA-180	1800	104	3	12

*CGA-160 = Same as 1/8" FNPT; **C-10 5/8"-18 UNF; ***Standard CGA outlet depends on gas composition.

