

SCOTT™ Method TO-14A/15/17 Calibration Standards



Benefits and Features

- SCOTT technical expertise in engineering Method 14A/15/17, HAPS and TIC calibration standards, sulfur mixes and vapor intrusion products meets virtually all challenging requirements.
- ISO-9001:2000 certified manufacturing procedures improve quality control and drive product consistency and reliability to ensure customer satisfaction.
- Custom development of calibration standards available for unique applications.
- Choice of three cylinder packages provides cost-effective mixture gas volumes to meet any application requirement.
- Proven long-term stability with mixture recertification services available.
- The world's first comprehensive air and emissions Proficiency Testing Program available for validation of your analytical capabilities.
- Extensive product portfolio that includes ALPHAGAZ™ pures, mixtures, SCOTTY™ Transportables and equipment, with delivery from local manufacturing facilities, makes Air Liquide the obvious choice as a single source for all your specialty and industrial gas needs.

Method TO-14A Certified Mixes

Available in 1 ppm and 100 ppb concentrations.

39-Component includes:

Components	CAS No.
Benzene	71-43-2
Bromomethane	74-83-9
Carbon Tetrachloride	56-23-5
Chlorobenzene	108-90-7
Chloroethane	75-00-3
Chloroform	67-66-3
Chloromethane	74-87-3
1,2-Dibromoethane	106-93-4
1,2-Dichlorobenzene	95-50-1
1,3-Dichlorobenzene	541-73-1
1,4-Dichlorobenzene	106-46-7
1,1-Dichloroethane	75-34-3
1,2-Dichloroethane	107-06-2
1,1-Dichloroethene	75-35-4
cis-1,2-Dichloroethene	156-59-2
1,2-Dichloropropane	78-87-5
cis-1,3-Dichloropropene	10061-01-5
trans-1,3-Dichloropropene	10061-02-6
Ethylbenzene	100-41-4
Halocarbon 11 (Trichlorofluoromethane)	75-69-4
Halocarbon 12 (Dichlorodifluoromethane)	75-71-8
Halocarbon 113 (1,1,2-Trichlorotrifluoroethane)	76-13-1
Halocarbon 114 (1,2-Dichlorotetrafluoroethane)	76-14-2
Hexachloro-1,3-butadiene	87-68-3
Methylene Chloride	75-09-2
Styrene	100-42-5
1,1,2,2-Tetrachloroethane	79-34-5
1,2,4-Trichlorobenzene	120-82-1
1,1,1-Trichloroethane	71-55-6
1,1,2-Trichloroethane	79-00-5
1,2,4-Trimethylbenzene	95-63-6
1,3,5-Trimethylbenzene	108-67-8
Tetrachloroethene	127-18-4
Toluene	108-88-3
Trichloroethylene	79-01-6
Vinyl Chloride	75-01-4
m-Xylene	108-38-3
o-Xylene	95-47-6
p-Xylene	106-42-3

41-Component includes 39 above plus:

Acrylonitrile	107-13-1
1,3-Butadiene	106-99-0

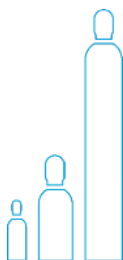
43-Component includes 41 above plus:

Allyl Chloride	107-05-1
4-Ethyltoluene	622-96-8

TO-14A Plus mixture includes 41-component above plus:

Acetaldehyde	75-07-0
Acrolein	107-02-8
Cumene	98-82-8
1,1,1,2-Tetrachloroethane	630-20-6

Toxic organic mixtures from Air Liquide provide reliable, accurate instrument calibration when measuring volatile and semi-volatile organic compounds (VOCs/SVOCs) in ambient air. TO mixtures comply with all U.S. EPA and state mandated methods, are NIST-traceable by weight**, and feature guaranteed accuracy and blend tolerance of all components. All mixtures have a balance gas of VOC free nitrogen (CAS No. 7727-37-9).



Cylinder Size	Gas Volume [†]	Diameter x Height
30AL (AL)	3,965 liters	8" x 53"
7AL (CL)	793 liters	6.9" x 21"
SCOTTY™ 110	110 liters	3.25" x 11.625"

Concentration	Blend Tolerance	Accuracy	Shelf Life
1 ppm	±10%	±5%	12 months
100 ppb	±20%	±10%	12 months*

* 6 month certification for ethanol and 2-propanol in Method TO-15/17 calibration standards.

**Varies by mixture.

† Gas volume based on full pressure cylinder. Certain mixtures may be vapor pressure restricted due to the concentration of components, thereby reducing the gas volume of the cylinder.

Air Monitoring Product Line

Air Liquide specializes in pure and mixed gases for all types of ambient air monitoring applications. In addition to all commonly used toxic organic calibration standards and mixtures for monitoring VOCs, we also manufacture a diverse range of products for monitoring Hazardous Air Pollutants (HAPs) and Toxic Industrial Chemicals (TICs). Air Liquide is the world's largest producer of EPA protocols, is an industry leader in the supply of other calibration gases for Continuous Emission Monitors (CEMs), and is the sole producer of gas phase Standard Reference Material (SRM) candidates for the National Institute of Standards and Technology (NIST).

Proficiency Testing

Validate the accuracy of your analytical capabilities with Method TO-14A and TO-15 Proficiency Testing. Air Liquide has partnered with Environmental Resource Associates to create the world's first comprehensive air and emissions Proficiency Testing Program.

Need Assistance?

Discuss your air monitoring needs with an Air Liquide air monitoring specialist today. Custom blended mixtures are also available. Call our Solutions Center toll-free at 800.217.2688 or email solutions.center@airliquide.com.



Method TO-14A GC/MS Tuning Mix

Available in 1 ppm and 100 ppb concentrations.

Components	CAS No.
p-Bromofluorobenzene	460-00-4

Internal/Tuning Standards

Available in 1 ppm and 100 ppb concentrations.

Components	CAS No.
Bromochloromethane	74-97-5
p-Bromofluorobenzene	460-00-4
Chlorobenzene-d5	3114-55-4
1,4-Difluorobenzene	540-36-3

BTEX Mixtures

Available in concentrations of 10 ppm, 1 ppm and 100 ppb in SCOTTY™ 74 and 110 cylinders.

Components

Mix 1	Mix 2	Mix 3	CAS No.
Benzene	Benzene	Benzene	71-43-2
Ethylbenzene	Ethylbenzene	Ethylbenzene	100-41-4
Toluene	Toluene	Toluene	108-88-3
o-Xylene	o-Xylene	o-Xylene	95-47-6
	m-Xylene	m-Xylene	108-38-3
	p-Xylene	p-Xylene	106-42-3
		Methyl-tert-butyl ether (MTBE)	1634-04-4

Additional analytes are available for single component or blended standards.

Below is a partial listing; many more are available. Please contact your Air Liquide air monitoring specialist.

Components	CAS No.	Components	CAS No.
Acetaldehyde	75-07-0	Formaldehyde	50-00-0
Acrolein	107-02-8	Isoprene	78-79-5
Acrylonitrile	107-13-1	Naphthalene	91-20-3
Benzyl Chloride	100-44-7	Vinyl Chloride	75-01-4
Cumene	98-82-8		

Additional single component or blended standards are available for other monitoring applications including:

- Homeland Security
- Fenceline Monitoring
- Landfill/Siloxane
- Microbial VOC
- Reduced Sulfur
- Vapor Intrusion
- Biogenic
- Head Space
- PIANO
- HRVOC

Method TO-14A CFC/HFC Standard

Available in 1 ppm and 100 ppb concentrations.

Components	CAS No.
Halocarbon 11 (Trichlorofluoromethane)	75-69-4
Halocarbon 12 (Dichlorodifluoromethane)	75-71-8
Halocarbon 113 (1,1,2-Trichlorotrifluoroethane)	76-13-1
Halocarbon 114 (1,2-Dichlorotetrafluoroethane)	76-14-2

Method TO-14A Chlorinated Hydrocarbon Mix

Available in 1 ppm and 100 ppb concentrations.

Components	CAS No.
Carbon Tetrachloride	56-23-5
Chloroform	67-66-3
Chloromethane	74-87-3
1,1-Dichloroethane	75-34-3
1,2-Dichloroethane	107-06-2
1,1-Dichloroethene	75-35-4
cis-1,2-Dichloroethene	156-59-2
1,2-Dichloropropane	78-87-5
cis-1,3-Dichloropropene	10061-01-5
trans-1,3-Dichloropropene	10061-02-6
Ethyl Chloride	75-00-3
Hexachloro-1,3-Butadiene	87-68-3
Methylene Chloride	75-09-2
1,1,2,2-Tetrachloroethane	79-34-5
1,1,1-Trichloroethane	71-55-6
1,1,2-Trichloroethane	79-00-5
Tetrachloroethene	127-18-4
Trichloroethylene	79-01-6
Vinyl Chloride	75-01-4

Method TO-14A Aromatics Mix

Available in 1 ppm and 100 ppb concentrations.

Components	CAS No.
Benzene	71-43-2
Chlorobenzene	108-90-7
1,2-Dichlorobenzene	95-50-1
1,3-Dichlorobenzene	541-73-1
1,4-Dichlorobenzene	106-46-7
Ethylbenzene	100-41-4
Styrene	100-42-5
1,2,4-Trichlorobenzene	120-82-1
1,2,4-Trimethylbenzene	95-63-6
1,3,5-Trimethylbenzene	108-67-8
Toluene	108-88-3
m-Xylene	108-38-3
o-Xylene	95-47-6
p-Xylene	106-42-3

Method TO-15/17 Certified 62-Component includes:

Available in 1 ppm and 100 ppb concentrations.

Components	CAS No.	Components	CAS No.
Acetone	67-64-1	Halocarbon 11 (Trichlorofluoromethane)	75-69-4
Benzene	71-43-2	Halocarbon 12 (Dichlorodifluoromethane)	75-71-8
Benzyl Chloride	100-44-7	Halocarbon 113 (1,1,2-Trichlorotrifluoroethane)	76-13-1
Bromoform	75-25-2	Halocarbon 114 (1,2-Dichlorotetrafluoroethane)	76-14-2
Bromomethane	74-83-9	Heptane	142-82-5
Bromodichloromethane	75-27-4	Hexachloro-1,3-butadiene	87-68-3
1,3-Butadiene	106-99-0	Hexane	110-54-3
2-Butanone (MEK)	78-93-3	2-Hexanone (MBK)	591-78-6
Carbon Disulfide	75-15-0	4-Methyl-2-Pentanone (MIBK)	108-10-1
Carbon Tetrachloride	56-23-5	Methylene Chloride	75-09-2
Chlorobenzene	108-90-7	Methyl-tert-butyl ether (MTBE)	1634-04-4
Chloroethane	75-00-3	2-Propanol	67-63-0
Chloroform	67-66-3	Propylene	115-07-1
Chloromethane	74-87-3	Styrene	100-42-5
Cyclohexane	110-82-7	1,1,2,2-Tetrachloroethane	79-34-5
Dibromochloromethane	124-48-1	1,1,1-Trichloroethane	71-55-6
1,2-Dibromoethane	106-93-4	1,1,2-Trichloroethane	79-00-5
1,2-Dichlorobenzene	95-50-1	1,2,4-Trichlorobenzene	120-82-1
1,3-Dichlorobenzene	541-73-1	1,2,4-Trimethylbenzene	95-63-6
1,4-Dichlorobenzene	106-46-7	1,3,5-Trimethylbenzene	108-67-8
1,1-Dichloroethane	75-34-3	Tetrachloroethene	127-18-4
1,2-Dichloroethane	107-06-2	Tetrahydrofuran	109-99-9
1,1-Dichloroethene	75-35-4	Toluene	108-88-3
cis-1,2-Dichloroethene	156-59-2	Trichloroethylene	79-01-6
trans-1,2-Dichloroethene	156-60-5	Vinyl Acetate	108-05-4
1,2-Dichloropropane	78-87-5	Vinyl Chloride	75-01-4
cis-1,3-Dichloropropene	10061-01-5	m-Xylene	108-38-3
trans-1,3-Dichloropropene	10061-02-6	o-Xylene	95-47-6
1,4-Dioxane	123-91-1	p-Xylene	106-42-3
Ethanol	64-17-5		
Ethyl Acetate	141-78-6		
Ethylbenzene	100-41-4		
4-Ethyltoluene	622-96-8		

64-Component includes 62 above plus:

Components	CAS No.	Components	CAS No.
Acrolein	107-028	Methyl Methacrylate	80-62-6

Method TO-15/17 Subset 25

Consists of 25 components not in our standard Method TO-14A calibration mixes. Available in 1 ppm and 100 ppb concentrations.

Components	CAS No.	Components	CAS No.
Acetone	67-64-1	4-Ethyltoluene	622-96-8
Allyl Chloride	107-05-1	n-Heptane	142-82-5
Benzyl Chloride	100-44-7	n-Hexane	110-54-3
Bromodichloromethane	75-27-4	2-Hexanone (MBK)	591-78-6
Bromoform	75-25-2	4-Methyl-2-Pentanone (MIBK)	108-10-1
1,3-Butadiene	106-99-0	Methyl-tert-butyl ether (MTBE)	1634-04-4
2-Butanone (MEK)	78-93-3	2-Propanol	67-63-0
Carbon Disulfide	75-15-0	Propylene	115-07-1
Cyclohexane	110-82-7	2,2,4-Trimethylpentane	540-84-1
Dibromochloromethane	124-48-1	Tetrahydrofuran	109-99-9
trans-1,2-Dichloroethene	156-60-5	Vinyl Acetate	108-05-4
1,4-Dioxane	123-91-1	Vinyl Bromide	593-60-2
Ethyl Acetate	141-78-6		

U.S. EPA PAMS Calibration Standard

Available in 1 ppm and 100 ppb concentrations. EPA-specified ppb concentrations are below.

Components	EPA (ppb)	CAS No.
Acetylene	40	74-86-2
Benzene	30	71-43-2
n-Butane	40	106-97-8
1-Butene	30	106-98-9
cis-2-Butene	35	107-01-7
trans-2-Butene	25	107-01-7
Cumene	40	98-82-8
Cyclohexane	40	110-82-7
Cyclopentane	20	287-92-3
n-Decane	30	124-18-5
m-Diethylbenzene	40	141-93-5
p-Diethylbenzene	25	105-05-5
2,2-Dimethylbutane	40	75-83-2
2,3-Dimethylbutane	50	79-29-8
2,3-Dimethylpentane	50	565-59-3
2,4-Dimethylpentane	40	108-08-7
n-Dodecane	40	112-40-3
Ethane	25	74-84-0
Ethylbenzene	25	100-41-4
Ethylene	20	74-85-1
m-Ethyltoluene	25	620-14-4
o-Ethyltoluene	30	611-14-3
p-Ethyltoluene	40	622-96-8
n-Heptane	25	142-82-5
n-Hexane	30	110-54-3
1-Hexene	60	592-41-6
Isobutane	25	75-28-5
Isopentane	40	78-78-4
Isoprene	40	78-79-5
2-Methylheptane	25	592-27-8
3-Methylheptane	25	589-81-1
2-Methylhexane	25	591-76-4
3-Methylhexane	25	589-34-4
2-Methylpentane	20	107-83-5
3-Methylpentane	40	96-14-0
Methylcyclohexane	30	108-87-2
Methylcyclopentane	25	96-37-7
n-Nonane	25	111-84-2
n-Octane	30	111-65-9
n-Pentane	25	109-66-0
1-Pentene	25	109-67-1
cis-2-Pentene	35	627-20-3
trans-2-Pentene	25	646-04-8
Propane	40	74-98-6
n-Propylbenzene	30	103-65-1
Propylene	25	115-07-1
Styrene	40	100-42-5
1,2,3-Trimethylbenzene	25	526-73-8
1,2,4-Trimethylbenzene	40	95-63-6
1,3,5-Trimethylbenzene	25	108-67-8
2,2,4-Trimethylpentane	30	540-84-1
2,3,4-Trimethylpentane	25	565-75-3
Toluene	40	108-88-3
n-Undecane	30	1120-21-4
m-Xylene-(combined w/p)	40	108-38-3
o-Xylene	25	95-47-6
p-Xylene-(combined w/m)	40	106-42-3

Modified TO-15 New Jersey Standard

Available in 1 ppm and 100 ppb concentrations.
Method TO-15/17 64-component mixture plus the following:

Components	CAS No.	Components	CAS No.
n-Butane	106-97-8	n-Nonane	111-84-2
tert-Butyl Alcohol	53001-22-2	n-Pentane	109-66-0
3-Chloropropene	107-05-1	n-Propylbenzene	103-65-1
2-Chlorotoluene	95-49-8	2,2,4-Trimethylpentane	540-84-1
Cumene	98-82-8	Vinyl Bromide	593-60-2

Japanese Hazardous Air Pollutants Calibration Mix (JHAP-9)

Available in 1 ppm and 100 ppb concentrations.

Components	CAS No.
Acrylonitrile	107-13-1
Benzene	71-43-2
1,3-Butadiene	106-99-0
Chloroform	67-66-3
1,2-Dichloroethane	107-06-2
Dichloromethane	75-09-2
Tetrachloroethene	127-18-4
Trichloroethylene	79-01-6
Vinyl Chloride	75-01-4

Massachusetts APH Calibration Standard

Manufactured to measure gaseous-phase concentrations of volatile aliphatic and aromatic petroleum hydrocarbons in air and soil gas, as outlined by Method for the Determination of Air-Phase Petroleum Hydrocarbons (APH), published by the Massachusetts Department of Environmental Protection. Concentration for all compounds below are according to MA DEP method (in ppb).

Components	ppb	CAS No.
Benzene	310	71-43-2
1,3-Butadiene	450	106-99-0
Butylcyclohexane	170	1678-93-9
Cumene	200	98-82-8
Cyclohexane	290	110-82-7
n-Decane	170	124-18-5
2,3-Dimethylheptane	190	3074-71-3
2,3-Dimethylpentane	240	565-59-3
n-Dodecane	140	112-40-3
Ethyl Benzene	230	100-41-4
n-Heptane	240	142-82-5
n-Hexane	280	110-54-3
Isopentane	330	78-78-4
p-Isopropyltoluene	180	99-87-6
1-Methyl-3-Ethylbenzene	200	620-14-4
Methyl-tert-butyl ether (MTBE)	270	1634-04-4
Napthalene	190	91-20-3
n-Nonane	190	111-84-2
n-Octane	210	111-65-9
Toluene	260	108-88-3
1,2,3-Trimethylbenzene	200	526-73-8
1,3,5-Trimethylbenzene	200	108-67-8
n-Undecane	150	1120-21-4
m-Xylene	230	108-38-3
o-Xylene	230	95-47-6
p-Xylene	230	106-42-3





Method TO-14A/15/17

Calibration Standards

TCEQ Calibration Standard

The Texas Commission on Environmental Quality (TCEQ) uses this 102-component calibration standard (in a balance of VOC free nitrogen) for determining contaminants in ambient air. Air Liquide's TCEQ Standard includes compounds at concentrations specified by TCEQ. Contact your Air Liquide air monitoring specialist for more information.

Recommended Regulators

Model 206

- High-purity, single-stage stainless steel with low internal volume of 3.03 cc allows for rapid purging in instrument applications
- Sintered filter protects internal parts and extends regulator service life; for use with 30AL (AL) or 7AL (CL) cylinders
- CGA-350



Model 226

- Single-stage aluminum body for use with SCOTTY 110 cylinder
- Elgiloy® diaphragm minimizes diffusion resistance and provides accurate, stable pressure control
- Sintered filter protects internal parts and extends regulator service life
- CGA-180



SCOTTY™ 110 Transportable Cylinder

When only limited quantities of instrument calibration gases are needed, SCOTT™ brand toxic organic products from Air Liquide are available in a convenient SCOTTY nonreturnable high-pressure aluminum cylinder.

- Economical 110 liter gas volume is ideal for smaller laboratory applications.
- Nonreturnable design eliminates cylinder rental normally associated with larger high-pressure cylinders—with no return shipping.
- Light weight and small size reduces expensive shipping costs.
- Easy to handle size provides “go anywhere” portability.
- Long-term guaranteed stability for extended shelf life.
- SCOTT pressure regulators also available for delivery of gas to point-of-use.



Founded in 1902, Air Liquide is the world leader in industrial and medical specialty gases and related services, providing innovative solutions for the manufacture of everyday products and for the protection of life.

NOTE: This brochure is intended for general information purposes only and is not intended as a representation or warranty of any kind, or as a statement of any terms or condition of sale. The information herein is believed to be correct, but is not warranted for correctness or completeness or for applicability to any particular customer or situation.

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