www.rigas.co.kr

RIGAS

Research Institute of Gas Analytical Science

Calibration Gas
rigas | ONE
rigas | PAS
Gas Regulator

RIGAS 리가스
Research Institute of Gas Analytical Science

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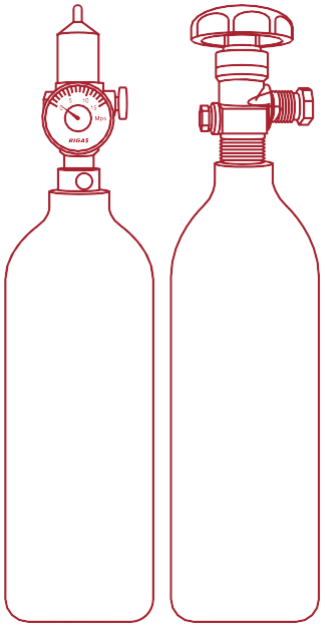


Company Information

Company specialized in Production, Analysis and Research of Standard Materials

RIGAS Co., Ltd. has the capability to manufacture and analyze various specifications of liquid and gas standard materials and supplies products in which customers can trust by application of our unique special cylinder inner-surface treatment technology essential for improving stability of low concentration reactive gases.

Our company also manufactures all standard gases in gravimetric method using high precision high capacity scale and guarantees the accuracy for the concentration of every components by quantifying and verifying it with various gas analyzers.

CRM Production Agency

RIGAS Co., Ltd. has been recognized the Reference Material Producer that complies with KS A ISO 17034 standards by the Korea Laboratory Accreditation Scheme (KOLAS), an organization of the Ministry of Trade, Industry and Energy. We have 79 Certified Reference Materials (CRM) based on KOLAS reliability.

Authorized Standard Gas Testing and Certification Agency in ROK

RIGAS Co., Ltd. has been appointed as a government-authorized standard gas testing and certification agency from Korea National Institute of Environmental Research and performs testing and analysis for gaseous standard materials. (Standard gas for calibrating continuous automatic chimney exhaust gas measuring instrument and continuous automatic air measuring instrument)

Company having Corporate-affiliated Research Institute

RIGAS Co., Ltd. established Research Institute of Gas Analytical Science in 1999 on the basis of Korea Basic Research Promotion and Technology Development Supporting Act, and has performed gas analysis research actively for development of new products such as undeveloped special gases and improvement of accuracy of gas analysis.

Company Information

• Company History

Dec 2021. Developing and supplying HF gas CRM in accordance with ISO 17034, KOLAS

Sep 2020. Relocating the headquater

Aug 2019. Selected as a smart factory support business (advancement)

Mar 2019. Accredited as the Reference Material Producer in accordance with ISO 17034, KOLAS

Jun 2018. Registered an International TradeMark (KR-2018-0000651)

Jul 2017. Accredited as a testing agency in accordance with ISO 17025, KOLAS

Feb 2017. Expansion of the 2nd plant in Daedeok Industrial Zone

Dec 2016. Obtained Clean mark as TOP3 of Reducing Exposure level

Jan 2014. Obtained Certificate of Good Workplace by Risk Assessment (Korea Occupational Safety & Health Agency)

Mar 2013. Selected as a hidden champion (Ministry of Employment and Labor)

Jun 2007. Obtained INNO-BIZ Certificate (Small & Medium Business Administration)

Jun 2007. Approved as Company of Daedeok Special R&D Zone (Ministry of Science and Technology)

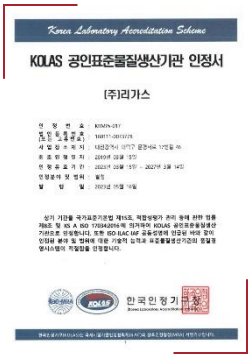
Apr 2002. Appointed as Clean Workplace (Korea Occupational Safety & Health Agency)

Sep 2001. Appointed as Standard Gas Testing Agency by Environmental Technology Development Act (Korea National Institute of Environmental Research)

Mar 1999. Obtained Certificated of Gas Analysis and Science Research Institute as Corporate-affiliated Research Institute (Korea Industrial Technology Association)

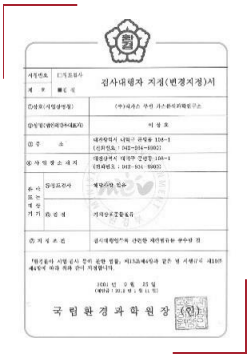
Sep 1998. Established a corporation in Daejeon, Korea.

• Certificate

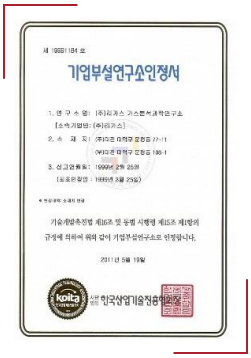


ISO17034

ISO9001



Certificate of Designated Testing Agent

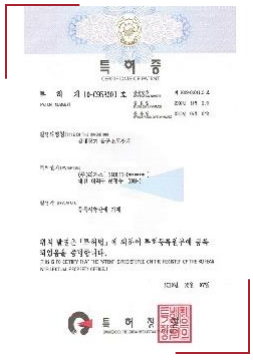


Certificate of corporate affiliated Research Institute

Certificate of Patent1

Certificate of Patent2

Certificate of Patent3

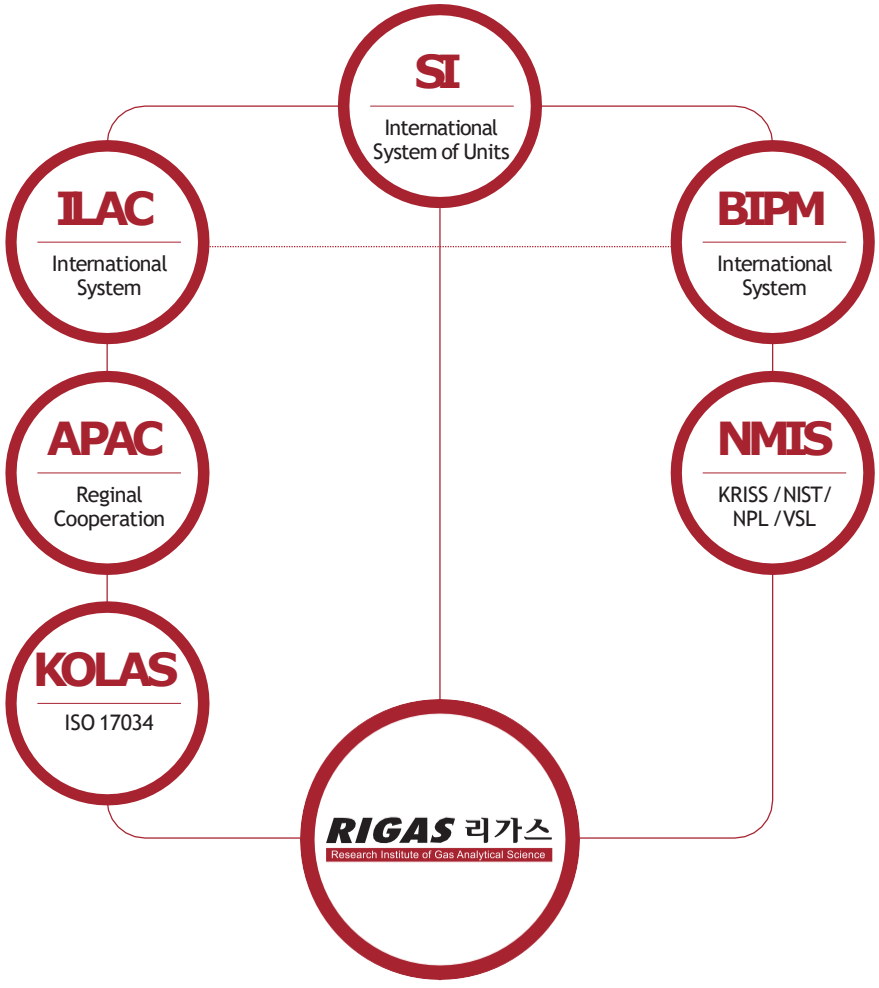


Certificate of Patent4

Certificate of Design

Maintaining Traceability

Our analytical operations are traceable through a calibration standard produced to either a recognized international standard such as KRISS, NIST, VSL, NPL or a gravimetrically manufactured Primary Reference Standard traceable to KRISS standard masses.



Product Line

01 Atmospheric Environmental Calibration Standards
02 Automobile Exhaust Gas Standards
03 Petrochemical and Natural Gas Standards
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Atmospheric Environmental Calibration Standards

Environment is one of critical elements affecting our life.
Therefore, accurate standard gas shall be used to monitor and measure industrial effluents.
RIGAS Co., Ltd. provides high accurate calibration standard gas for measuring various environmental pollutants.

Components	
Nitric oxide	NO
Nitrogen dioxide	NO_2
Sulfur dioxide	SO_2
Carbon monoxide	CO
Oxygen	O_2
Hydrogen chloride	HCl
Hydrogen fluoride	HF
Ammonia	NH_3
Carbon dioxide	CO_2

Mixture Example

Components & Matrix	Nominal Fraction Range			Urel (k=2) %	Shelf (year)
	From	To	Unit		
Hydrogen chloride	1	10,000	µmol/mol	±2 ~ ±5	1 ~ 2
Hydrogen fluoride	1	200	µmol/mol	±2 ~ ±10	1 ~ 2
Nitric oxide Sulfur dioxide Carbon monoxide	1 1 1	5,000 5,000 10,000	µmol/mol µmol/mol µmol/mol	±1 ~ ±3	1 ~ 2
				Determined in accordance with the customer's needs	

※ If you have any inquiry on products and mixing besides the above components and concentration, ask for consultation and we will provide further information.
E-mail : master@rigas.co.kr (Domestic-Korea), sales@rigas.co.kr (Overseas)
※ Urel. : relative expanded uncertainty

Automobile Exhaust Gas Standards

Environment is one of critical elements affecting our life.
Therefore, accurate standard gas shall be used to monitor and measure industrial effluents.
RIGAS Co., Ltd. provides high accurate calibration standard gas for measuring various environmental pollutants.

Components	
Carbon dioxide	CO_2
Propane	C_3H_8
Carbon monoxide	CO
Oxygen	O_2

Mixture Example

Components & Matrix	Nominal Fraction Range			Urel (k=2)%	Shelf (year)
	From	To	Unit		
Carbon dioxide	5.0	20.0	cmol/mol	±1 ~ ±2	1 ~ 2
Propane	0.01	1.00	cmol/mol	Determined in accordance with the customer's needs	
Carbon monoxide	0.1	5.0	cmol/mol		
Oxygen	0.1	2.0	cmol/mol		
Nitric Oxide	0.01	0.5	cmol/mol		

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Petrochemical and Natural Gas Standards

RIGAS standard materials for petrochemical process are supplied in gas or liquid phase. Also, multi-compounds standard materials such as alkanes, alkens, aromatics or other are available.

Group	Components	
Hydrocarbons Gas or Liquid Mixtures	Methane	CH_4
	Ethane	C_2H_6
	Ethylene	C_2H_4
	Propane	C_3H_8
	Cyclopropane	C_3H_6
	Propylene	C_3H_6
	iso-Butane	iso-C_4H_{10}
	n-Butane	n-C_4H_{10}
	Propadiene	C_3H_4
	Acetylene	C_2H_2
	trans-2-Butene	trans-2-C_4H_8
	1-Butene	1-C_4H_8
	iso-Butylene	iso-C_4H_8
	Cyclopentane	C_5H_{10}
	cis-2-Butene	cis-2-C_4H_8
	2,2-Dimethyl propane	2,2-C_5H_{12}
	iso-Pentane	iso-C_5H_{12}
	n-Pentane	n-C_5H_{12}
	1,2-Butadiene	1,2-C_4H_6
	1,3-Butadiene	1,3-C_4H_6
	Methyl acetylene	C_3H_4
	Vinyl acetylene	C_4H_4
	Ethyl acetylene	C_4H_6
	trans-2-Pentene	trans-2-C_5H_{10}
	etc.	

Mixture Example - Gas Phase

Component & Matrix	Nominal Fraction Range		Urel (k=2) %	Shelf (year)
	Concentration	Unit		
Nitrogen	0.50	cmol/mol	±1 ~ ±2	1 ~ 2
Carbon dioxide	1.00	cmol/mol		
Ethane	8.00	cmol/mol		
Propane	4.00	cmol/mol		
iso-Butane	1.00	cmol/mol		
n-Butane	1.00	cmol/mol	Determined in accordance with the customer's needs	
iso-Pentane	0.05	cmol/mol		
neo-Pentane	0.05	cmol/mol		
n-Pentane	0.05	cmol/mol		
n-Hexane	0.05	cmol/mol		
Methane	balance			

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Petrochemical and Natural Gas Standards

RIGAS standard materials for petrochemical process are supplied in gas or liquid phase. Also, multi-compounds standard materials such as alkanes, alkens, aromatics or other are available.

Mixed example-Gas Phase

cmol/mol = %mol/mol = 10^{-2}mol/mol

Component & Matrix	Nominal Fraction Range		Urel (k=2) %	Shelf (year)
	Concentration	Unit		
Methane	2.50	cmol/mol	±1 ~ ±3	1 ~ 2
Ethane	100	cmol/mol		
Ethylene	1.00	cmol/mol		
Propane	0.70	cmol/mol		
Propylene	4.00	cmol/mol		
iso-Butane	1.00	cmol/mol	Determined in accordance with the customer's needs	
n- Butane	0.30	cmol/mol		
trans-2-Butene	0.90	cmol/mol		
1-Butene	1.00	cmol/mol		
iso-Butylene	1.50	cmol/mol		
cis-2-Butene	1.00	cmol/mol		
iso-Pentane	1.00	cmol/mol		
n-Pentane	0.10	cmol/mol		
1,3-Butadiene	0.10	cmol/mol		
1-Pentene	1.00	cmol/mol		
N-Hexane	1.00	cmol/mol		
Nitrogen	balance			

Mixture Example - Liquid Phase

cmol/mol = %mol/mol = 10^{-2}mol/mol

Component & Matrix	Nominal Fraction Range		Urel (*k*=2) %	Shelf (year)
	Concentration	Unit		
Ethane	2.00	cmol/mol	±1 ~ ±3	1 ~ 2
Ethylene	2.00	cmol/mol		
Propane	35.0	cmol/mol		
Cyclopropane	0.10	cmol/mol		
Propylene	1.00	cmol/mol		
iso-Butane	20.0	cmol/mol	Liquid phase (Dip tube + He head pressure) Determined in accordance with the customer's needs	
trans-2-Butene	0.20	cmol/mol		
1-Butene	0.20	cmol/mol		
iso-Butylene	0.20	cmol/mol		
cis-2-Butene	0.20	cmol/mol		
iso-Pentane	0.40	cmol/mol		
n-Pentane	0.10	cmol/mol		
1,3-Butadiene	0.10	cmol/mol		
n-Butane	38.5	cmol/mol		

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※ Urel. : relative expanded uncertainty

Laser Gas Mixtures

RIGAS excimer laser gas is used widely including semiconductor manufacturing process, medical area or precision process.

Vision Correction

PRK, LASIK
ArF = 193 nm

Angioplasty & TMR

XeCl = 308 nm

Microlithography

ArF = 193 nm
KrF = 248 nm

Mixture Example

cmol/mol = %mol/mol = 10^{-2}mol/mol

Component & Matrix	Excimer Laser Gas Mixtures	
	Type	Concentration
Fluorine Argon Neon	ArF (193 nm)	0.2 cmol/mol 9.0 cmol/mol
Hydrogen Chloride Hydrogen Xenon Neon	XeCl (308 nm)	0.06 cmol/mol 0.03 cmol/mol 1.50 cmol/mol
Fluorine Krypton Neon	KrF (248 nm)	0.10 cmol/mol 1.00 cmol/mol

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※ Urel. : relative expanded uncertainty

Odor Standards

This is RIGAS standard gas for detecting and measuring odor.
Odor is caused by one or more volatile chemical materials in low density generally, which is recognized by human or animals.

Mixture Example - Gas Phase

Group	Components	
Formaldehyde	Formaldehyde	HCHO
Sulfur Compounds	Hydrogen sulfide	H2S
	Methyl mercaptan	CH3SH
	Dimethyl sulfide	(CH3)2S
	Dimethyl disulfide	(CH3)2S2
Amine Compounds	Ammonia	NH3
	Trimethyl amine	(CH3)3N
Aldehydes	Acetaldehyde	CH3CHO
	Propionaldehyde	C2H5CHO
	n-Butyraldehyde	n-C3H7CHO
	n-Valeraldehyde	n-C4H9CHO
	iso-Valeraldehyde	iso-C4H9CHO
Alcohol & Ketones	iso-Butyl alcohol	iso-C4H9OH
	Ethyl acetate	CH3CO2C2H5
	Methyl isobutyl ketone	C4H9COCH3
BTEXS	Toluene	C7H8
	Styrene	C8H8
	p-Xylene	p-C6H4C2H6
	Propionic acid	C2H5CO2H
Acids	n-Butyric acid	n-C3H7CO2H
	n-Valeric acid	n-C4H9CO2H
	iso-Valeric acid	iso-C4H9CO2H

Mixture Example

Component & Matrix	Nominal Fraction Range			Urel (k=2)%	Shelf (year)
	From	To	Unit		
Formaldehyde	2	20	μmol/mol	±2 ~ ±5	1 ~ 2
Hydrogen sulfide	2	100	μmol/mol	±1 ~ ±5	1 ~ 2
Methyl mercaptan	2	100	μmol/mol		
				Determined in accordance with the customer's needs	

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Volatile Organic Compound Standards (VOCs)

VOCs in certain period may cause long term damage on human health, so it shall be monitored.

The followings are calibration gas of volatile organic compound measuring system supplied by RIGAS Co., Ltd. and required and recommended generally.

Group	Components	
Hydrocarbons Gas or Liquid Mixtures	Benzene	C_6H_6
	Toluene	C_7H_8
	Ethylbenzene	$C_6H_5C_2H_5$
	o-Xylene	o-$C_6H_4C_2H_6$
	m-Xylene	m-$C_6H_4C_2H_6$
	p-Xylene	p-$C_6H_4C_2H_6$
	Styrene	C_8H_8
	1,2-Dichlorobenzene	1,2-$C_6H_4Cl_2$
	1,2,4-Trimethylbenzene...etc.	1, 2, 4 - $C_6H_3(CH_3)_3$...etc.
CFCs / HCFCs / HFCs / PFCs	Trichloro fluoromethane	CCl_3F
	Dichloro difluoromethane	CCl_2F_2
	1,1,2-Trichloro trifluoroethane	$C_2Cl_3F_3$
	1,2-Dichloro tetrafluoroethane	1, 2 - $C_2Cl_2F_4$
Chlorinated Hydrocarbons	Methyl chloride	CH_3Cl
	Ethyl chloride	C_2H_5Cl
	Vinyl chloride	C_2H_3Cl
	Methylene chloride	CH_2Cl_2
	Chloroform	$CHCl_3$
	Carbon tetrachloride	CCl_4
	1,1-Dichloroethane	1, 1 - $C_2H_4Cl_2$
	1,2-Dichloroethane...etc.	1, 2 - $C_2H_4Cl_2$...etc.

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The followings are calibration gas of volatile organic compound measuring system supplied by RIGAS Co., Ltd. and required and recommended generally.

Mixture Example

Component & Matrix	Nominal Fraction Range			Urel (k=2)%	Shelf (year)
	From	To	Unit		
Benzene	1	100	μmol/mol	±1 ~ ±5	1 ~ 2
Toluene	1	100	μmol/mol		
Ethylbenzene	1	100	μmol/mol		
o-Xylene	1	100	μmol/mol		
m-Xylene	1	100	μmol/mol		
p-Xylene	1	100	μmol/mol	Determined in accordance with the customer's needs	
Styrene	1	100	μmol/mol		
Nitrogen	balance				

Component & Matrix	Nominal Fraction Range			Urel (k=2)%	Shelf (year)
	From	To	Unit		
Vinyl chloride	5	10	μmol/mol	±2 ~ ±3	1 ~ 2
1,3-Butadiene	5	10	μmol/mol		
Dichloromethane	5	10	μmol/mol		
Acrylonitrile	5	10	μmol/mol		
Chloroform	5	10	μmol/mol		
Carbon tetrachloride	5	10	μmol/mol		
Benzene	5	10	μmol/mol		
1,2-Dichloroethane	5	10	μmol/mol		
Trichloroethylene	5	10	μmol/mol		
Tetrachloroethylene	5	10	μmol/mol		
Ethylbenzene	5	10	μmol/mol		
Styrene	5	10	μmol/mol	Determined in accordance with the customer's needs	
Aniline	5	10	μmol/mol		
Nitrogen	balance				

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※ Urel. : relative expanded uncertainty

Other Gas Mixtures

RIGAS Co., Ltd. also supplies illuminating gas, rare gas or semiconductor gas mixture according to various customer needs. We, RIGAS Co., Ltd., will produce gas according to your order.

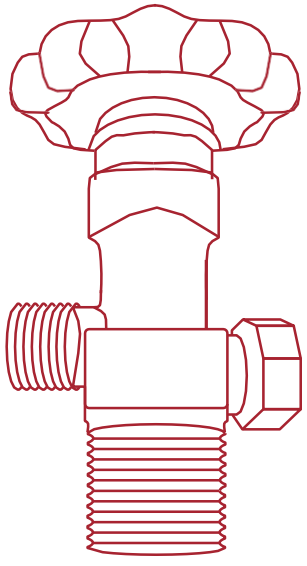
- Illuminating Gas Mixtures
- Semiconductor Gas Mixtures
- Research and Development Gas Mixtures
- High Purity Gases
- Toxic Gases
- Rare Gases
- Hydrocarbons
- Etc.

Cylinder

Material	Size	Material	Size
Steel	3.4 L	Aluminum	1 L
	10 L		3.7 L
	15 L		10 L
	40 L		15 L
	47 L		30 L
	118 L		ETC.
	ETC.		-

Valve

Standard	Specification	Material
JIS	W22mm-14th -RH	Brass, Ni-Plated, SUS
	W22mm-14th -LH	
	W23mm-14th -RH	Brass
CGA	CGA 350	Brass, Ni-Plated, SUS
	CGA 510	Brass
	CGA 180	SUS
	C10 Valve	Ni-Plated
BS	Valve connector is available	
DIN	Valve connector is available	



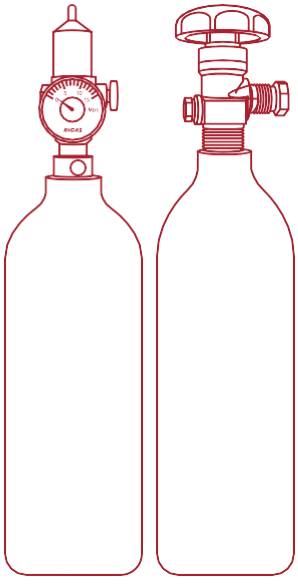
※ The above cylinders and valves may be limited depending on the components requested by a customer. Details will be delivered when an estimate is provided.

rigas I ONE

RIGAS 1L standard gas with refillable and high-pressure cylinders.

Non-reactive gas

Components	Concentration	Unit
iso-Butane	0.9	cmol/mol
Oxygen	15	cmol/mol
Oxygen	18	cmol/mol
Carbon monoxide	50	μmol/mol
Carbon monoxide	75	μmol/mol
Hydrogen	2	cmol/mol
Methane	2.5	cmol/mol
Methane	2.2	cmol/mol
Propane	0.525	cmol/mol
Propane	1.1	cmol/mol
Nitrogen	99.999	cmol/mol



Reactive gas

Components	Concentration	Unit
iso-Butylene	10	μmol/mol
iso-Butylene	100	μmol/mol
Nitric oxide	18	μmol/mol

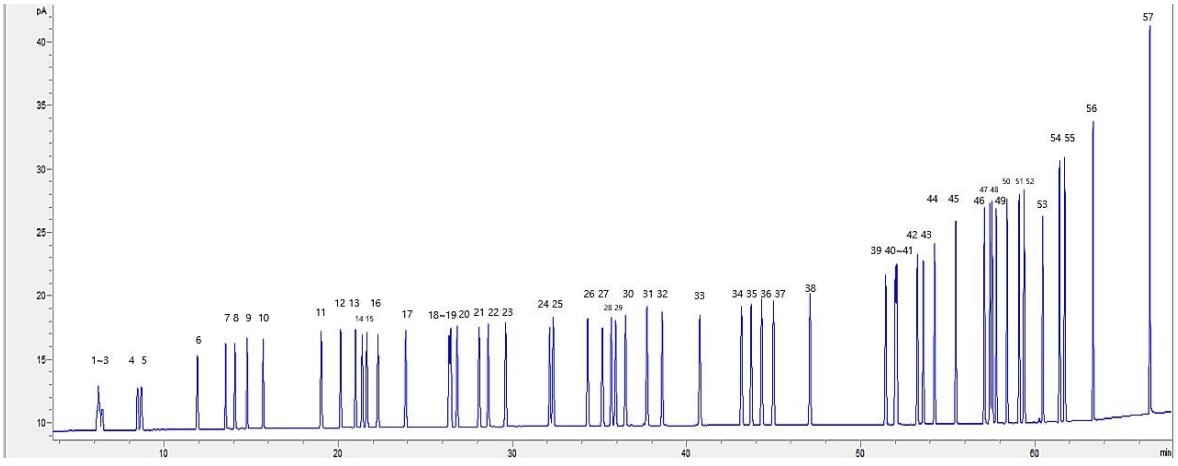
rigas I ONE PAMS 57 Components mix (Ozone Precursor)

VOCs measured by the Photochemical Assessment and Measurement Station (PAMS) as precursors contributing to ozone generation.

Special features

- **1 µmol/mol (ppm) in Nitrogen, 110 L, 10 MPa**
  5 nmol/mol (ppb) in Nitrogen, 110 L, 10 MPa
- Highly convenient and portable small 1L container
- Highly reliable values proven through short-term/long-term stability assessment
- Manufactured in accordance with KS I ISO 6142 (Gas analysis-Preparation of calibration gas mixture-Gravimetric method)
- Cylinders with special internal treatment
- Validity period of 12 months
- Precise measurement of components with low-vapor pressure and additional cylinder heating/regulator heating devices

Chromatogram & components



1~10	11~20	21~30	31~40	41~50	51 ~ 57
Ethylene	Isopentane	3-Methylpentane	2,2,4-Trimethylpentane	p-Xylene	1,2,4-Trimethylbenzene
Acetylene	1-Pentene	1-Hexene	n-Heptane	Styrene	n-Decane
Ethane	n-Pentane	n-Hexane	Methylcyclohexane	o-Xylene	1,2,3-Trimethylbenzene
Propylene	isoprene	Methylcyclopentane	2,3,4-Trimethylpentane	n-Nonane	m-Diethylbenzene
Propane	trans-2-Pentene	2,4-Dimethylpentane	Toluene	isopropylbenzene	p-Diethylbenzene
isoButane	cis-2-Pentene	Benzene	2-Methylheptane	n-Propylbenzene	n-Undecane
1-Butene	2,2-Dimethylbutane	Cyclohexane	3-Methylheptane	m-Ethyltoluene	n-Dodecane
n-Butane	Cyclopentane	2-Methylhexane	n-Octane	p-Ethyltoluene	-
trans-2-Butene	2,3-Dimethylbutane	2,3-Dimethylpentane	Ethylbenzene	1,3,5-Trimethylbenzene	-
cis-2-Butene	2-Methylpentane	3-Methylhexane	m-Xylene	o-Ethyltoluene	-

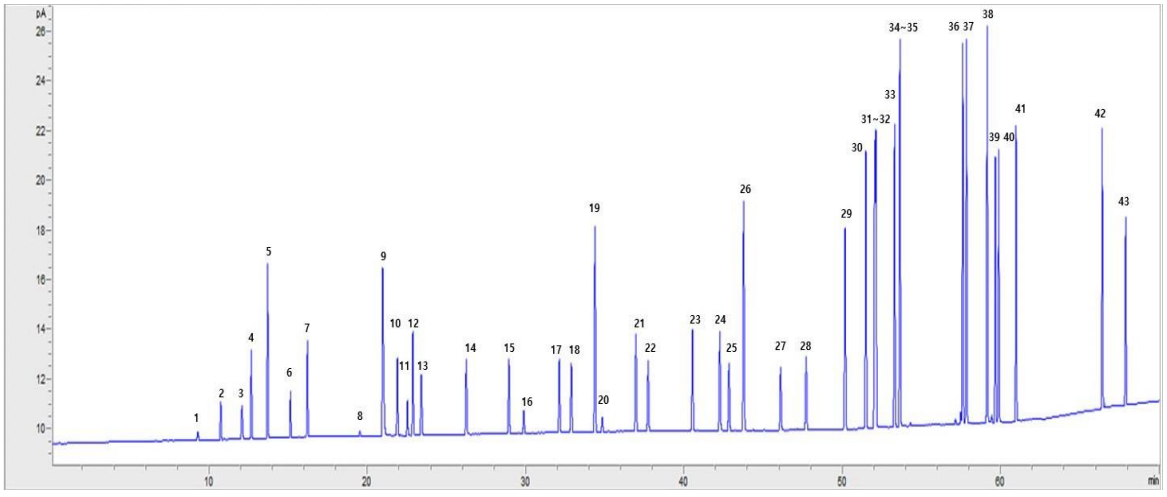
rigas I ONE TO-14A 43 Components mix (Toxic Organics)

VOCs according to the US Environmental Protection Agency (EPA) standards as hazardous air pollutants in the atmosphere

Special features

- **1 μmol/mol (ppm) in Nitrogen, 110 L, 10 MPa**
  10 nmol/mol (ppb) in Nitrogen, 110 L, 10 MPa
- Highly convenient and portable small 1L container
- Highly reliable values proven through short-term/long-term stability assessment
- Manufactured in accordance with KS I ISO 6142 (Gas analysis-Preparation of calibration gas mixture-Gravimetric method)
- Cylinders with special internal treatment
- Validity period of 12 months
- Precise measurement of components with low-vapor pressure and additional cylinder heating/regulator heating devices

Chromatogram & components



1~9	10~18	19~27	28~36	37~43
Dichlorodifluoromethane	1,1-Dichloroethene	Benzene	Tetrachloroethylene	1,3,5-Trimethylbenzene
Chloromethane	Methylene Chloride	Carbon Tetrachloride	Chlorobenzene	1,2,4-Trimethylbenzene
Freon-114	3-Chloropropene	1,2-Dichloropropane	Ethylbenzene	1,3-Dichlorobenzene
Vinyl chloride	Freon-113	Trichloroethylene	p-Xylene	1,4-Dichlorobenzene
1,3-Butadiene	1,1-Dichloroethane	cis-1,3-Dichloropropene	m-Xylene	1,2-Dichlorobenzene
Bromomethane	cis-1,2-Dichloroethylene	trans-1,3-Dichloropropene	Styrene	1,2,4-Trichlorobenzene
Chloroethane	Chloroform	1,1,2-Trichloroethane	o-Xylene	Hexachloro-1,3-Butadiene
Freon-11	1,2-Dichloroethane	Toluene	1,1,2,2-Tetrachloroethane	-
Acrylonitrile	1,1,1-Trichloroethane	1,3-Dibromoethane	4-Ethyltoluene	-

rigas | PAS Pre Analysis System

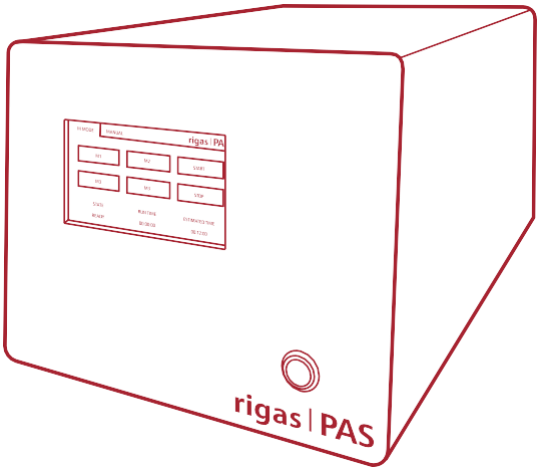
Pre Analysis System (PAS), a cleaning system that removes corrosive and adsorbent substances within sample introduction parts and equipment before/after analysis.

Special features

- Reduces analysis time : Rapidly removes previously analyzed components
- Reduces maintenance cost of analysis equipment: Removes air and moisture from systems before use
- Improves analysis accuracy : Delivers accurate analysis values by reducing effects of reactive/adsorbent components.
- Easy to use : Simple touch display

When to use

- Frequent system corrosion
- When using different types of gas
- If accurate analysis values are required
- In laboratory settings where equipment management is important



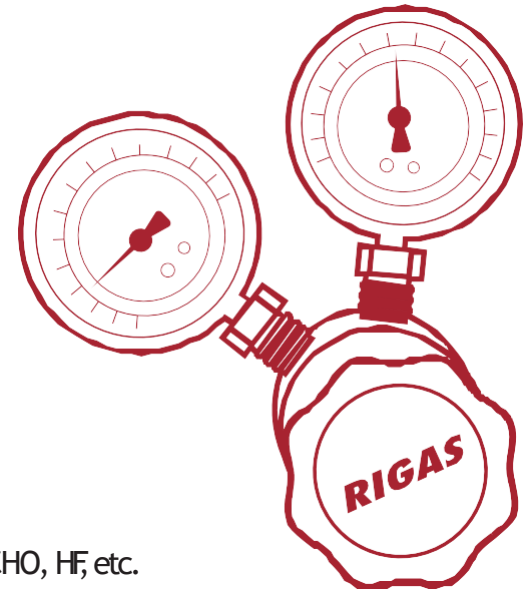
Specification

Size (H×W×D)	18 cm×22 cm×35 cm	**Display**	4.3 inch
Port size	1/8 inch	**Power**	220 V
Mode	Composed of M mode, MANUAL mode		

RIGAS Regulator for Calibration Gases

Special features

- 1Stage(Single-stage) and 2Stage(Double-stage) Construction
- Body : Brass(Ni-Plated), SUS316L
- Seat : PCTFE / PTFE
- Diaphragm : SUS316L / Hastelloy
- Stem : SUS316L
- Temperature Range : -40°C ~ 74°C
- Inlet and outlet port size : 1/4 Inch NPT
- Maximum Inlet Pressure : 25 MPa



Typical Application

- Research Laboratories
- Gas Chromatography
- Laser Gas System
- Process Analyzer
- Zero & Calibration Gases
- Purging Systems
- In use for Calibration gas of HCl, Amine, BTEX, HCHO, HF, etc.

Order Information

Series	Material	Stage	Inlet pressure gauge	Pressure control range	Inlet connections (Nut type)	Outlet connections (Male connector)
G	S : SUS316L B : Brass (Ni-Plated)	1 : 1stage 2 : 2stage	25 : 25 MPa	06 : 0.6 MPa 10 : 1.0 MPa	R : 22 mm-RH L : 22 mm-LH C : CGA180 N : no option E : etc.	0 : no option 1 : 1/4“ LOK 2 : 1/8” LOK 3 : 1/16” LOK 4 : etc.
S	S : SUS316L	1 : 1stage				

20 Components Subjected to Measure Calorific Value at Flare stack

The flare system is a process for combusting exhaust gases generated at industrial sites, such as refineries and chemical plants.
To properly control these hazardous materials, a monitoring system capable of evaluating the performance of the flare system is required.

As the parts of the monitoring system, 20 components of hazardous air pollutants are designated to measure its calorific value, as shown below.
Verifying the emission status, one of the following methods must be selected: Mass spectrometry, Gas chromatography, or Calorific value analysis.

No.	성분	Nominal Fraction Range		
		From	To	Unit
1	Benzene	1	100	μmol/mol
2	Toluene	1	100	μmol/mol
3	o,m,p-Xylene	1	100	μmol/mol
4	Styrene	1	100	μmol/mol
5	Ethyl benzene	1	100	μmol/mol
6	1,3-Butadiene	1	10	μmol/mol
7	Propylene oxide	1	10	μmol/mol
8	Ethylene oxide	1	10	μmol/mol
9	Phenol	1	10	μmol/mol
10	Carbon tetrachloride	1	10	μmol/mol
11	Dimethyl disulfide	1	10	μmol/mol
12	Aniline	1	10	μmol/mol
13	Chloroform	1	10	μmol/mol
14	Formaldehyde	1	20	μmol/mol
15	Acetaldehyde	1	10	μmol/mol
16	Naphthalene	1	10	μmol/mol
17	Dichloro methane	1	10	μmol/mol
18	1,2-Dichloro ethane	1	10	μmol/mol
19	Trichloro ethylene	1	10	μmol/mol
20	Acrylo nitrile	1	10	μmol/mol

* For components: Phenol and Naphthalene, μmol/mol of Methanol is included.

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