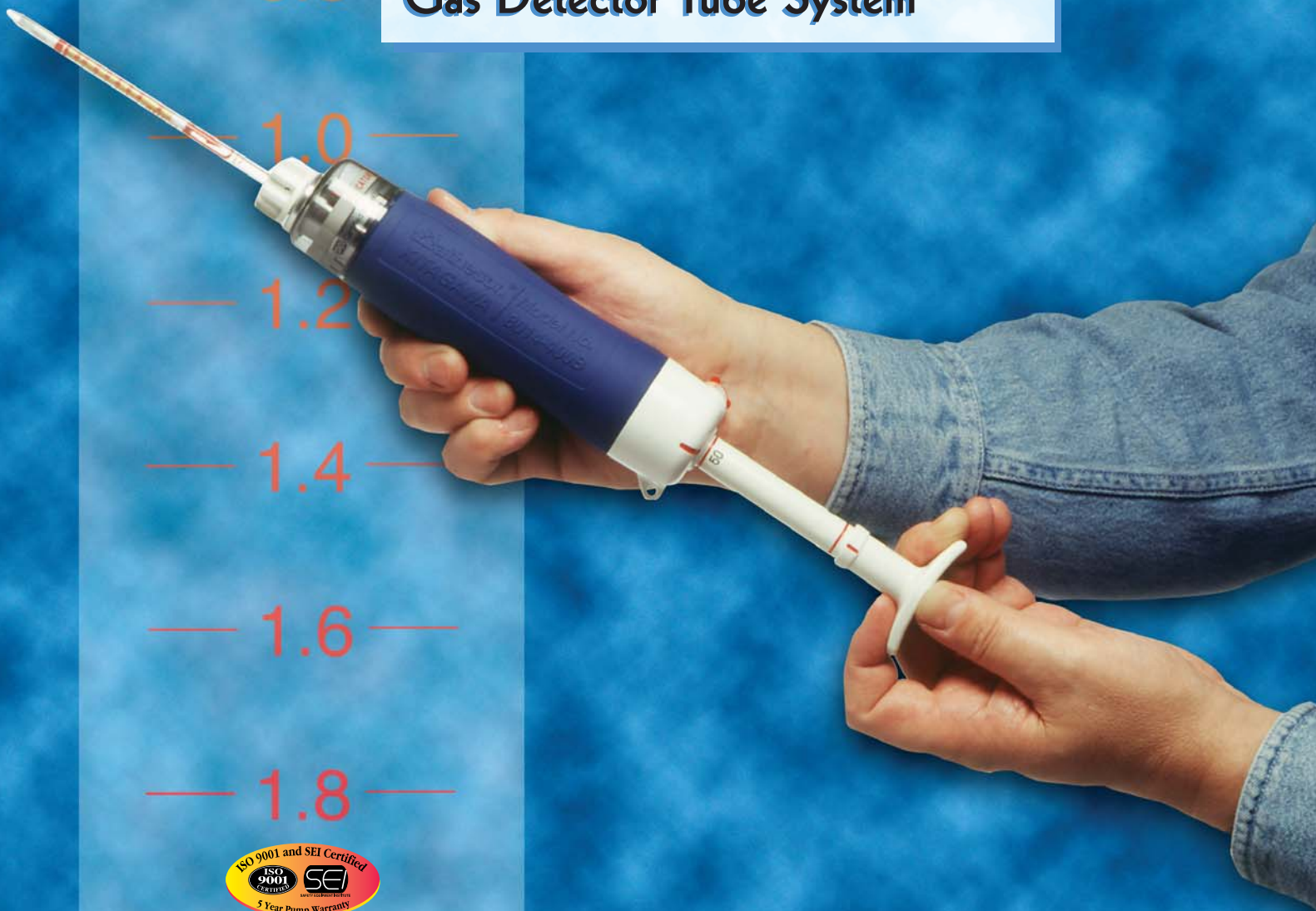




**MATHESON
TRI•GAS**

ask. . .The Gas Professionals™

**The Matheson-Kitagawa Toxic
Gas Detector Tube System**



2.0

The Matheson- Kitagawa Toxic Gas Detector Tube System:



*A complete sampling and analysis
system to detect and measure
hazardous gases and vapors. . .
on the spot.*

Description

The Matheson-Kitagawa Toxic Gas Detector System is an ideal, easy-to-use method for day to day checking, screening, QC in the lab, plant or office, and spot testing for a wide variety of hazardous gases and vapors. It has been well-proven through extensive use by leading industrial companies and government agencies.

This low cost, portable system is essentially comprised of two components: detector tubes, formulated to detect specific gases and vapors, and a sampling pump for drawing an air sample through the detector tube.

The Matheson-Kitagawa Precision Sampling Pump

The Model 8014KA is one of the most dependable, precise volumetric sampling pumps used with detector tubes. Its piston-type design reproducibly draws 100cc of sample air, and makes sampling easy and accurate. Unlike other pump designs, only a single stroke is needed for most analyses; there is no need for multiple volumes and stroke counters.

The precision sampling pump requires only periodic routine maintenance, and carries a full five-year warranty.

Matheson-Kitagawa Precision Detector Tubes

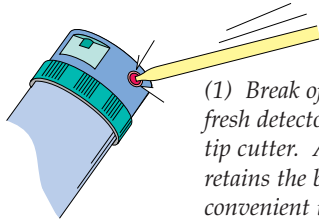
There are now more than 250 detector tubes available to measure for a wide variety of hazardous gases and vapors. Each is formulated with a specific high purity reagent that absorbs and reacts with the gas or vapor being measured, causing a colorimetric stain. Four types of tubes provide the needed flexibility for different gases and sampling conditions.

1. **Direct Reading Scale** - In this type, the colorimetric stain varies in length proportionally to the amount of gas or vapor being measured. The concentration is read directly off a scale etched on each tube. Most of the Matheson-Kitagawa tubes are of this type, and are signified by either the letter "S" or "U" appearing in the detector tube model number.
2. **Chart Comparison Tubes** - This type works similarly to the direct reading type. After a sample is taken, the stain length is compared to a printed concentration chart enclosed with each box of tubes.
3. **Color Comparison Tubes** - In this type, the intensity of color change, rather than the length of stain, is compared to a standard color chart.
4. **Multi-Part Tube Sets** - The multi-part tube sets utilize a pre-treat or primary reaction tube in addition to the detector tube. The "front-end" tube scrubs the sample air of either moisture or potentially interfering gases, which might otherwise cause erroneous results.

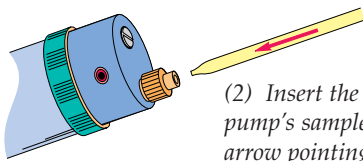
See the associated Matheson-Kitagawa Detector Tube Listing TB-102-1 for more detailed information regarding each of the more than 250 detector tubes available.

Sampling with the Matheson-Kitagawa System

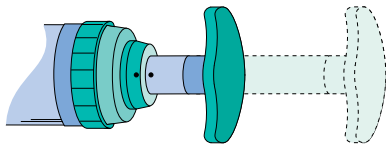
Only three quick and easy steps are necessary to operate the Matheson-Kitagawa system:



(1) Break off both ends of a sealed, fresh detector tube in the pump's tip cutter. A special compartment retains the broken tips until it is convenient to discard them.



(2) Insert the detector tube into the pump's sample inlet, with the air flow arrow pointing toward the pump.

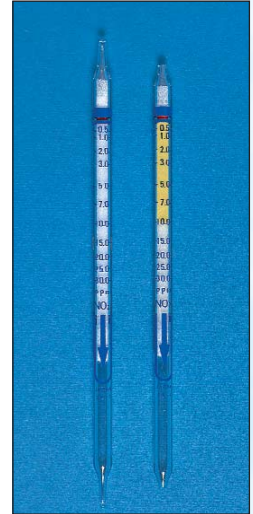


(3) Line up the red dots on the pump shaft and pump end collar, and pull the pump handle all the way out. The handle

automatically locks and the pump begins to draw a 100cc sample through the detector tube. A proprietary Sample Vue™ indicator shows when sampling is complete (typically less than one minute).

Matheson-Kitagawa Precision Detector Tubes are formulated with high purity reagents which absorb and react with the gas or vapor being measured. The reaction causes a colorimetric stain which varies in length proportional to the concentration of the gas or vapor being measured. For most tubes, the concentration is read directly from the measurement scale etched on each tube.

More detailed information regarding system operation is provided on an instruction card enclosed with each pump and box of detector tubes.

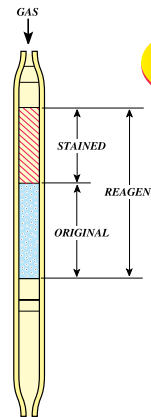


SEI Certification



The Matheson Model 8014-400A precision sampling pump and numerous detector tubes are certified by

the Safety Equipment Institute (SEI). SEI is a recognized organization that offers certification programs to assist the industrial safety equipment industry in providing the American worker protective equipment that meets recognized standards and current state of the art.



Ordering Information

Model	Description
8014KA	Toxic Gas Detector Kit - with pump (SEI approved), spare parts and carrying case with shoulder strap. Detector tubes not included, although carrying case designed to accommodate up to 6 boxes.
8014GSK	General Sampling Detector Kit - includes 8014KA plus 10 meter extension hose and one box of each of the following tubes: 8014-105SB, 118SB, 126SB, 106S, 110, 120SA, 117SB, 103SC
8014-002	Replacement rubber inlet flange, (6/pkg)
8014-003	Replacement lubricant
8014-017	5 meter extension hose (with tube holder) for remote sampling
8014-018	10 meter extension hose (with tube holder) for remote sampling
8014-300K	Air Flow Indicator Kit - with aspirator bulb, case, and one box of 8014-300 smoke tubes
8014-300	Air flow indicator tubes, (10/box)
8014-Book	Matheson-Kitagawa 317 page Handbook - contains extensive information regarding applications, system operating principles, detailed specifications for every tube, and much more
8014-400A	Replacement Sampling Pump

See the Matheson-Kitagawa Detector Tube Listing, Technical Bulletin, TB-102-1, for a complete listing of all available detector tubes.

Qualitative Analysis Tubes and HazMat Kit

For Determination of Unknown Gases and Vapors



Basic Kit, Model 8070

Description

Matheson's Qualitative Detector Tubes provide fast on-the-spot identification of unknown gases and vapors.

Many of today's gas monitors are designed for a specific gas or vapor. This requires the user to know in advance what it is he is trying to detect. There are many situations, however, where a material's identity is not known. Such is the case in the identification of an unknown chemical spill or waste disposal container, as in HazMat operations, or determining the cause of a strange odor or an employee's illness.

While there are other products and methodologies available for this "qualitative" identification of unknown gases and vapors, they are not as practical as the Matheson Qualitative Tubes and HazMat Kit.

- No need for grab samples or laboratory analyses. Provides on-the-spot results.
- Extremely fast. Identifies unknown gases and vapors within minutes.
- Unlike other detector tube approaches, does not require a complex "decision-tree" matrix. One tube identifies organics and one tube identifies inorganics.
- No need for electricity or batteries.
- No calibration required. Always ready for use.
- Ideal for HazMat and Emergency Response operations.

Two types of tubes are available. Model 8014-186B identifies a broad range of organic compounds, such as gasoline, alcohols, hydrocarbons, etc. Model 8014-131 identifies inorganic compounds, such as carbon monoxide, sulfur dioxide, chlorine, etc. Typically, both models are used in concert, to assure detection of both organic and inorganic compounds.



Principle of Operation

In operation, Matheson's Qualitative Tubes are used in the same way as conventional detector tubes. That is, the high precision Matheson-Kitagawa pump, Model 8014-400A, is used to draw the sample air through the tubes: * See "Sampling with the Matheson-Kitagawa System" on page 3.

However, unlike conventional tubes which are "length of stain" providing quantitative measurements, these tubes are comprised of several sections. Each section contains a blend of unique, high purity reagents that will absorb and react with particular gases or vapors, or family of gases and vapors. The resulting reaction causes a color change. The unknown gas or vapor is determined by which section(s) changed color, and to what colors they changed.

Tube 8014-131 is used to detect inorganic compounds and consists of 5 sections, labeled "A" to "E". Only one tube is needed to provide a complete analysis for inorganics.

Tube 8014-186B is used to detect organic compounds and consists of 4 sections, labeled "A" to "D". Because of the extensive number of detectable organic compounds, 2 tubes are required for a complete analysis. One tube is used for "A" side sampling, and is followed by a second, fresh tube for "D" side sampling. The combined results are used in unknown identification.

While these tubes are designed primarily for qualitative analysis, some degree of quantitative analysis is also possible. In other words, a minimum concentration is necessary to produce a visible color change, or an entire section changing color would indicate a much higher concentration. However, for accurate quantitative analysis, conventional Kitagawa detector tubes should be used.

**For complete instructions, please refer to the Operator's Manual.*

Specifications

Gases Detected	Inorganic	Organic
Detector Tube Part Number	8014-131	8014-186B
Detector Tubes Per Box	10	10
Analyses Per Box	10	5
Pump Strokes (100 ml/Stroke)	1	1, "A" side 1, "D" side
Sampling Time	20 sec.	30 sec., "A" side 30 sec., "D" side
Shelf Life	1 year	1 year
Operating Temp.	0 - 40 C°	0 - 40 C°

Temperature and humidity correction are not necessary.

Ordering Information

Model No.	Description
8014-131	Inorganic gas detector tubes, (10/box)
8014-186B	Organic gas detector tubes, (10/box)
8070	Basic Qualitative Analysis Kit, complete with 8014-400A sampling pump, maintenance items, 1 box 8014-131 inorganic tubes, 2 boxes 8014-186B organic tubes and hard shell carrying case with shoulder strap
8014-002	Replacement rubber inlet flange (6/pkg)
8014-003	Replacement lubricant
8014-017	5 meter extension sampling hose (with tube holder) for remote sampling
8014-018	10 meter extension sampling hose (with tube holder) for remote sampling
8014-300K	Air Flow Indicator Kit - with aspirator bulb, case and one box of 8014-300 smoke tubes
8014-300	Air flow indicator tubes, (10/box)
8014-400A	Replacement Sampling Pump

For a complete listing of conventional Matheson-Kitagawa detector tubes, request Technical Bulletin, TB-102-1.

COMPOUNDS DETECTED AND DETECTABLE LIMITS (ppm)

INORGANIC TUBE

Model 8014-131

Acetic Acid (15)
Acetylene (10)
Ammonia (5)
Amines (5)
Carbon Monoxide (10)
Chlorine (5)
Hydrogen Chloride (20)
Hydrogen Sulfide (10)
Methyl Mercaptan (10)
Nitrogen Dioxide (5)
Phosphine (2)
Sulfur Dioxide (10)

ORGANIC TUBE

Model 8014-186B

Acetaldehyde (100)
Acetone (500)
Acetylene (100)
Aniline (50)
Benzene (100)
Butadiene (1000)
Butane (10)
1-Butanol (100)
Butyl Acetate (100)
Carbon Disulfide (100)
Cresol (20)
Ethyl Acetate (500)
Ethylamine (100)
Ethyl Benzene (400)
Ethyl Cellosolve (100)
Ethylene (10)
Ethylene Oxide (100)
Formaldehyde (10)
Gasoline (0.1 mg/l)
Heptane (10)
Hexane (10)
Isopropyl Alcohol (500)
Kerosene (0.1 mg/l)
Methyl Alcohol (100)
Methyl Ethyl Ketone (100)
Methyl Isobutyl Ketone (100)
Methyl Mercaptan (20)
Pentane (10)
Phenol (10)
Propane (100)
Styrene (100)
Tetrachloroethylene (100)
Tetrahydrofuran (100)
Toluene (200)
Trichloroethane (1000)
Trichloroethylene (10)
Vinyl Chloride (10)
Xylene (1000)

Indoor Air Quality Test Kit, Model 8078

Description

The Matheson Model 8078 is a complete kit for analyzing many parameters pertaining to indoor air quality. All of the items included are also available as standalone products and are described elsewhere in this brochure.

The heart of the Model 8078 kit is the Matheson-Kitagawa precision air sampling pump. It is used in conjunction with a variety of detector tubes. Included in the kit are tubes for measuring the concentration of formaldehyde, carbon monoxide, carbon dioxide and organic hydrocarbons. And although not included in the kit as standard, tubes are available for ammonia, ozone and a host of other gases and vapors. See Technical Bulletin, TB-102-1, for a complete listing. Qualitative tubes are also included for analysis of unknown materials. An air flow indicator kit (smoke tubes) is provided for determining ventilation patterns. And a 10 meter extension sampling hose is provided for remote sampling in hard to reach places. All of these products are packaged with relevant maintenance items in a convenient, extremely durable carrying case.



What is Indoor Air Quality?

Indoor Air Quality (IAQ) is normally associated with non-industrial environments such as office buildings, schools, hotels, residences, etc. As these structures typically do not employ readily identifiable hazardous materials, the cause of a poor indoor air quality condition can be difficult to troubleshoot.

Tighter building envelopes (designed to minimize heat and air conditioning losses), and HVAC systems balanced to recirculate a greater percentage of their air and bring in less fresh air from outside, tend to concentrate air contaminants over time rather than exhaust them outside or dilute them with fresh air. The contaminants are not actually due to new sources, but are now more noticeable because of their tendency to accumulate. For example, the following contaminants existed long before the problems associated with poor indoor air quality:

Formaldehyde:	Particle board furniture and sub-flooring, foam insulation
Carbon Monoxide:	Leaky furnaces/boilers, vehicle exhaust entrainment into building
Carbon Dioxide:	Human respiration
Volatile Organic	
Carbons (VOCs):	Carpeting, adhesives, paints
Ozone:	Photocopiers, laser printers
Ammonia:	Blueprint duplicators, cleaners
Trichloroethylene:	Dry cleaning residue

Ordering Information

Model Description

Model	Description
8078	Indoor Air Quality Test Kit, complete with the following items:
(1)	8014-400A Air sampling pump
(1)	8014-002 Replacement rubber inlet flange, (6/pkg)
(1)	8014-003 Replacement lubricant
(5)	8014-106SB Carbon monoxide tubes, 5-50 ppm, (10/box)
(7)	8014-126SC Carbon dioxide tubes, 300-7000 ppm, (10/box)
(5)	8014-187S General hydrocarbons tubes 50-1400 ppm, (10/box)
(10)	8014-171SB Formaldehyde tubes, 1-35 ppm, (10/box)
(1)	8014-131 Qualitative inorganic tubes, (10/box)
(2)	8014-186B Qualitative organic tubes, (10/box)
(1)	8014-300K Air Flow Indicator Kit - with aspirator bulb, case, and one box of 8014-300 smoke tubes
(1)	8014-018 10 meter extension hose (with tube holder) for remote sampling
(1)	---- Hard shell carrying case

For a complete listing of Matheson-Kitagawa detector tubes, request Technical Bulletin, TB-102-1.

Compressed Breathing Air Analysis Kit, Model 8014BAK



Description

The Matheson Model 8014BAK is an on-line analysis kit for ensuring the quality of compressed breathing air. It quickly and easily measures the levels of carbon monoxide, carbon dioxide, oil mist, water vapor, and oxygen.

Unlike other methods, there is no need to take a grab sample and analyze it off line; the 8014BAK is designed to connect directly to the compressed breathing air source. It is available with a choice of three connections - CGA 346, CGA 347, and 1/4" NPT Female.

It is very important that the correct connection type be selected to match the application:

The Model 8014BAK-01 is fitted with a CGA 346 connection, and is rated for inlet pressures of 0-3000 psig. This model should be selected for analyzing compressed air in U.S. D.O.T. approved cylinders with a Stamped Service Pressure in the range of 0-3000 psig.

The Model 8014BAK-03 is fitted with a CGA 347 connection, and is rated for inlet pressures of 3001-5500 psig. This model should be selected for analyzing compressed air in U.S. D.O.T. approved cylinders with a Stamped Service Pressure in the range of 3001-5500 psig.

The Model 8014BAK-02 is fitted with a 1/4" NPT Female connection, and is rated for inlet pressures of 0-400 psig. This model should be selected for analyzing compressed air from non-cylinder sources having pressures no greater than 400 psig.

CAUTION: Adapters must not be used which connect a high pressure source to equipment rated at a lower pressure.

Some Typical Applications

The Model 8014BAK is ideal for anyone involved with the filling, generating, or usage of compressed breathing air. It has been proven through use in a variety of industries and applications.

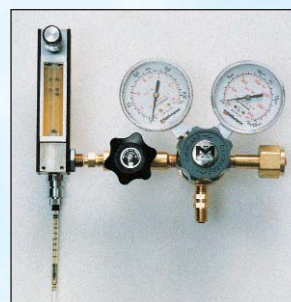
- Emergency air packs/respirators
- Fire departments/rescue squads
- Scuba/diving
- Hazardous waste cleanup

Components Measured

	Range	Sampling Time
Carbon Monoxide	5-100 ppm	2 min.
Carbon Dioxide	100-3000 ppm	2 min.
Oil Mist	0.3-5 mg/m ³	25 min.
Water Vapor	20-160 mg/m ³	1 min.
Oxygen	2-24%	1 min.

Principle of Operation

The Model 8014BAK system is essentially comprised of a pressure regulator, flowmeter, and a variety of detector tubes.



In operation, measurements are made by passing the breathing air through each detector tube at a specified flow rate, pressure, and time interval. Each detector tube is formulated with a high purity reagent which absorbs and reacts with the component being measured.

This causes a colorimetric stain whose length is directly proportional to the amount of component in the breathing air. Its concentration is read directly from the scale printed on each tube.

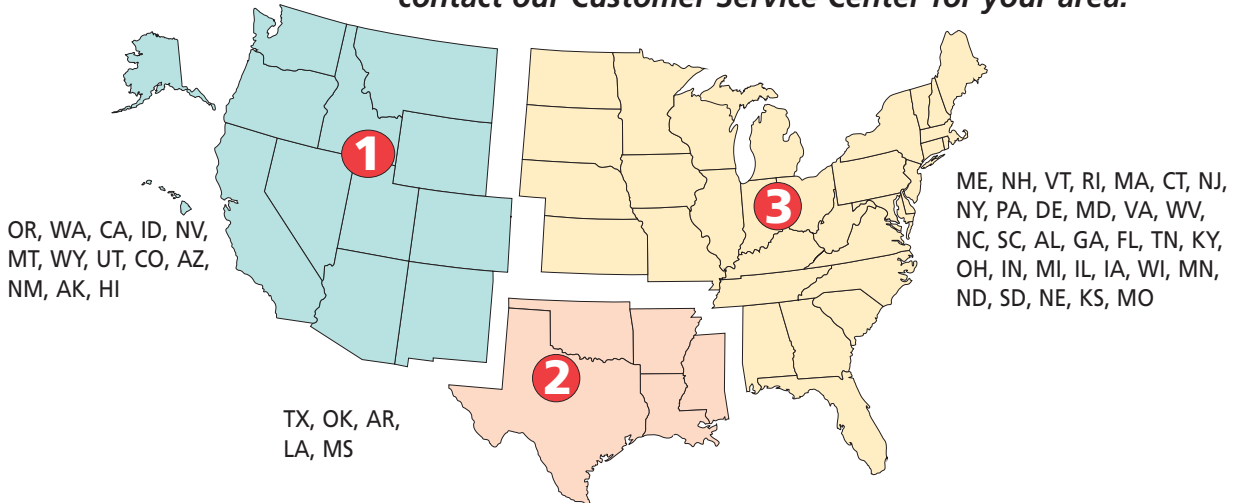
Ordering Information

Model	Description
8014BAK-01	Compressed Breathing Air Analysis Kit, complete with CGA 346 connection, regulator, flowmeter, tube connector, tube tip cutter, timer, wrench, and carrying case. No detector tubes included.
8014BAK-02	Same as above except with 1/4" NPT connection
8014BAK-03	Same as above except with CGA 347 connection
8014-600SP	Carbon monoxide detector tubes, (10/box)
8014-601SP	Carbon dioxide detector tubes, (10/box)
8014-602SP	Oil mist detector tubes, (10/box)
8014-603SP	Water vapor detector tubes, (10/box)
8014-604SP	Oxygen detector tubes, (10/box)
8014-002	Replacement rubber inlet flange (6/pkg)



MATHESON TRI•GAS CUSTOMER SERVICE CENTERS

To place an order, or to obtain more information, please contact our Customer Service Center for your area:



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1
 6775 Central Avenue
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 Fax: 510-790-6241
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 2200 Houston Avenue
 Houston, TX 77007
 Phone: 713-869-7351
 Fax: 713-869-0994
 Email: mtghouston@matheson-trigas.com

3
 166 Keystone Drive
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CHEMTREC
 Phone: 800-424-9300

MATERIAL SAFETY DATA SHEETS (MSDS)

Data Sheets for gases can be downloaded from the Matheson Tri-Gas, Inc. Web site at www.mathesontrigas.com/msds



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