



UNIPHOS

**GAS DETECTOR
TUBE SYSTEM**

HANDBOOK

2nd Edition 2015

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About Us...

Uniphos Envirotronic Pvt. Ltd. (UEPL) is one of the largest manufacturer of toxic gas detection devices in India with a wide range of products, completely designed and developed through in-house R&D efforts. We are the only Indian manufacturer of chemical detector tubes. We also produce intrinsically safe personal/ portable monitors and flame proof fixed systems for the detection of several toxic and flammable gases.

Having developed several unique industry specific and application specific equipments, we have diversified into other areas of instrumentation like water quality analysis, oil quality measurement etc. and have many more instrument development programs based on Chemiluminescence, fluorescence and other spectroscopic techniques for gas detection.

With a focus on in-house R&D and technological self reliance, UEPL has developed the necessary expertise in every aspect of gas detection. With a highly qualified team of R&D scientists and engineers and equipped with the latest manufacturing and testing facilities, UEPL has the capability to design and supply instruments to meet the customer's divers requirements. We have an unmatched capability to provide the necessary technical support to customers in maintaining the instruments and calibrating them.

Our worldwide customers include large chemical and petro-chemical industries, oil refineries, government establishments, fumigators etc. Our products are exported to more than 30 countries including USA, Germany, UK, Spain, Mexico, South Africa, Argentina among others.

With our recent acquisition of the Colourimetric detector tube business of Germany's MSA Auer GmbH, now Kwik Draw Uniphos, we have expanded our global customer base with our top-quality reliable products.

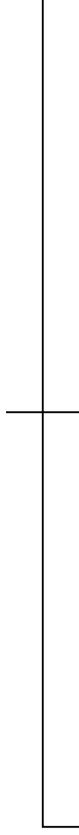
History of Uniphos Gas Detector Tube Measurement System

Since the development of the first detector tube by two American scientists as long back as 1919, this measurement technique has gone a long way and has become one of the standard measurement techniques for gas analysis. The first detector tube to be developed was for Carbon Monoxide and it was suitable only for qualitative analysis. But today the detector tube technique has matured and it provides quantitative results with a high degree of accuracy and selectivity.

The first Uniphos detector tube developed by United Phosphorus Limited was for Phosphine. It came out of a requirement of the metal phosphide laboratory of United Phosphorus Limited, where extensive R&D is carried out on new formulations of metal phosphides. Some of these studies involve several measurements of phosphine concentrations over long periods in experimental chambers. Simple phosphine sensing chemicals were filled in glass tubing and the phosphine containing air samples were drawn through the tubes using plastic syringe of known volume. Stain lengths were measured with a scale and were related to the phosphine concentration. Even these simple and crude detector tube devices provided very accurate phosphine measurement.

Encouraged by the initial success, phosphine detector tube along with a piston and barrel pump was perfected by the year 1994. Today we have more than 200 different detector tubes, for the measurement of more than 100 gases. Our list of detector tubes covering new gases and new ranges of measurement is growing. We have also developed other chemical detectors like detector strips, dosimeter tubes, charcoal tubes and several other chemical detectors. Ref. table No. 1

Uniphos Gas Detectors



SHORT- TERM TUBES

1. Detector tubes

LONG-TERM TUBES

1. Dosimeter tubes
2. Charcoal tubes

OTHER PRODUCTS

1. Detector strips
2. Dissolved substance detector tubes
3. Air Flow Indicator tubes

Table-1

SHORT-TERM DETECTOR TUBE SYSTEM

The short-term detector tube system consists of Uniphos Detector Tube and Uniphos Precision Air Sampling Pump (ASP-40). Together they form a short-term detector tube measurement system. Short-term detector tubes measure the gas concentration existing at the point of measurement at that instant of time.

Uniphos Detector Tubes

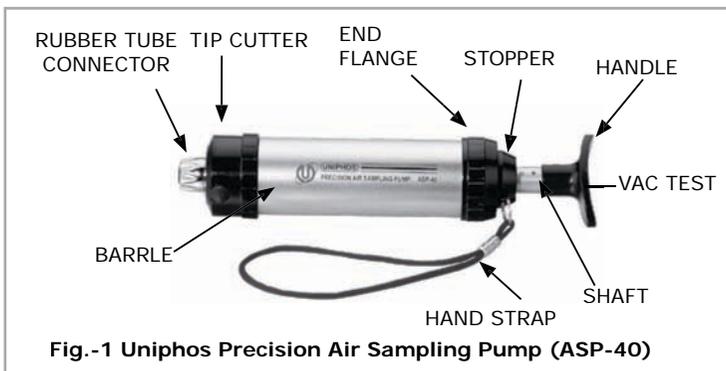
Uniphos detector tubes are glass tubes filled with gas specific sensing chemical and are sealed at both the ends. They show colour change when the sample air is drawn through it after breaking both the ends of the tube. A piston and barrel type pump (Uniphos Precision Air Sampling Pump) is used to draw the sample air through the tube. They are pre-calibrated using gas standards. The printed calibration scale enables the user to know the target gas concentration directly after the sampling.

Uniphos Precision Air Sampling Pump (ASP-40)

The Uniphos Precision Air Sampling pump figure -1 is meant for drawing a precisely defined volume of air sample through Uniphos detector tube to determine the target gas concentration in the sample air.

Standard features of air sampling pump

- It is a lightweight and rugged vacuum pump
- Piston and barrel type design for precise volumetric sampling.
- Cap seal gasket design provides reproducible vacuum holding capacity.
- Sampling is easy and accurate
- Can draw sample air of 50 cc, 100 cc or their multiples.
- Requires only periodic routine maintenance and carries a full five year warranty.



Advantages of Short-Term Detector Tube

- Provides a very simple, accurate and highly gas specific method of gas detection.
- These tubes are best suited for spot check of toxic gas concentration at work places at specified intervals.
- Suitable for leak detection in pipe lines, storage tanks etc.
- Useful for investigating confined spaces like sewers, canals, tunnels etc.

Filling reagents in Uniphos detector tubes

The filling reagents and external appearance of Uniphos detector tubes vary depending upon the target gas and its concentrations. There are three types of filling reagents,

1. Detecting reagents:

Detecting reagents are located behind the calibration scale inside the tube. They are special chemicals supported on suitable carriers like alumina, silica sand etc. and produce a distinct layer of colour change by the reaction with the target gas.

2. Pretreatment reagents:

Pretreatment reagents are located before the detecting reagents to treat the sample air before it reaches the sensing chemical. There are three types of pretreatment reagents; viz. 1) oxidizer, 2) scrubber of interfering gases and 3) dehumidifier/ humidifier. They consist of special chemicals supported on carriers.

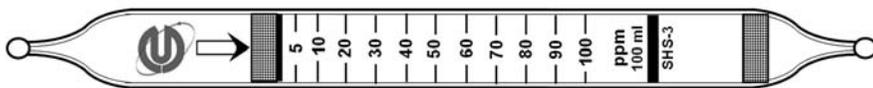
3. Post treatment Reagent:

Post treatment reagents supported on suitable carrier are used to neutralize the toxic end products of reaction at the sensing chemical. They are also used for flow control of sample air.

Uniphos tubes can be roughly classified into the following four types , based on filling reagents.

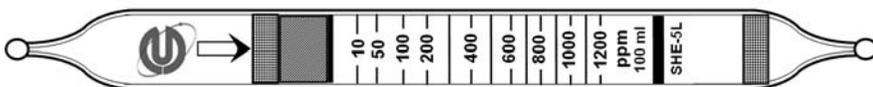
1. Single tube filled with detecting reagent:

Example: Hydrogen Sulphide detector tube



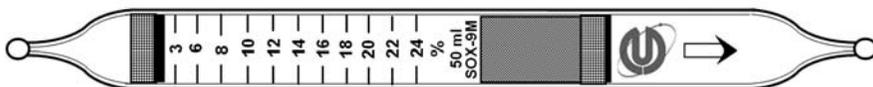
2. Single tube filled with pretreatment reagent and detecting reagent:

Example: n-Hexane detector tube



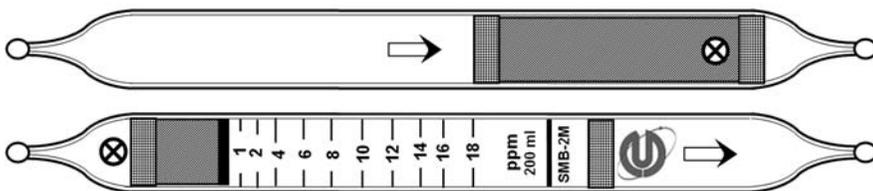
3. Single tube with post treatment reagent and detecting reagent:

Example: Oxygen detector tube



4. Double tube consisting of a separate pretreatment tube filled with pretreatment reagent and a separate detector tube filled with detecting reagent:

Example : Methyl Bromide detector tube



Sampling and measurement

The Uniphos air sampling pump and the detector tube together form a measuring system. Combining the tube with pump made by other manufacturers can result in considerable errors in the measurements and should be avoided.

How to make measurement with Uniphos Detector Tubes

- Break both ends of the detector tube using the tip cutter on the sampling pump (Model: ASP-40)



- Insert one end of the tube securely in the sampling pump inlet ensuring that the arrow on the detector tube points towards the pump. Align the guide marks (red dots) on the shaft and the stopper of the pump.



- Pull the handle at full stroke and wait for completion of sampling. Pull out the detector tube from the pump inlet and take the reading at the demarcation line between stained and unstained region.



- Check the possible cross sensitivities.
- Flush the pump with clean air after use.

Note: Before every measurement, the sampling pump should be checked for its Performance. Leakage of air leads to inaccurate readings.

How to check for air leaks in Uniphos Pump

The following steps are recommended.

- Insert a new detector tube without breaking its ends into the rubber tube connector.
- Align the red dots and pull the pump handle a full stroke.
- Wait for three minutes, and release the pump handle by turning it 90 degrees on left or right. To avoid violent flying back of the piston, the piston handle should be held and the piston be allowed to slowly come back. If the piston comes back fully to its original position it is an indication of leak free pump.

Correction for temperature

Uniphos detector tubes are calibrated with the tube temperature (not sample temperature) at 20°C (68°F). Generally the measurements are independent of temperature in the range of 0 - 40 °C (32 to 104 °F) and no temperature correction is necessary. However, for some tubes the measurements do depend upon temperature, necessitating a temperature correction. If readings are affected more than ± 10%, the temperature correction is necessary. The temperature correction chart is provided in the instruction sheet where it is applicable.

Correction for humidity

Uniphos detector tubes are calibrated with sample gas at 50% relative humidity at 20 °C. Generally no humidity correction is necessary when the relative humidity is in the range of 0 to 99%. In super saturation states, however, water vapour in the air condenses; diluting concentrations of water-soluble gases and for these tubes humidity corrections are necessary. Example: Hydrogen fluoride, Nitric acid, Hydrazine etc. When these tubes are used in other humidity, tube readings should be corrected. Humidity correction factors are given for such tubes in the instruction sheets.

Correction for atmospheric pressure

Uniphos detector tubes are calibrated at normal atmospheric pressure (1013 h Pa or 760 mm Hg). For pressure variation within ± 10%, no correction is necessary. However, when the pressure is more than ± 10%, of normal atmosphere pressure, the tube reading should be corrected according to the following formula.

$$\text{True concentration} = \frac{\text{Tube reading} \times 1013 \text{ (h Pa)}}{\text{Atmospheric pressure (h Pa)}}$$

Or

$$\frac{\text{Tube reading} \times 760 \text{ (mm Hg)}}{\text{Atmospheric pressure (mm Hg)}}$$

Extension of measuring range

When the specified volume of air (generally 100 ml) is drawn through a detector tube, the stain length may overshoot the highest mark on the tube, which is an indication that the gas concentration is more than the stated range of the tube. In such a case using only a half stroke (50 ml) the stain length may be brought within the calibration mark. The true concentration can be obtained multiplying the tube reading by the correction factor. Follow the instruction sheet. In some cases, when the specified volume is drawn no stain may appear on the tube. It may be an indication that the gas concentration is much lower than the detection limit. In such cases by increasing the number of strokes a stain may be obtained on the detector tube. The true concentration can be determined by multiplying the tube reading by the fractional correction given in the instruction sheet.

Effect of interfering substances

When the sample air contains substances, which can also react with the sensing chemical of the tube they interfere with the measurement and produce higher stain length giving higher reading of toxic gas.

LONG-TERM TUBES

1. Dosimeter tubes or TWA tubes

While the short-term detector tubes give the instantaneous concentration of target gas at the time of measurement, Dosimeter tubes or Time Weighted Average tubes give a stain length, which is proportional to the concentration time product. From this measurement Time Weighted Average concentration of exposure can be inferred. There are two types of dosimeter tubes, diffusion type (Passive sampling) and sampler type (Active sampling).

Passive sampling: Passive sampling works on the principle of diffusion following Fick 's law of diffusion.

Active sampling: In active sampling diffusion tube the sample is drawn through the tube using a precision air-sampling pump at a fixed rate for a stipulated period of time. In both cases, the stain length obtained on the tube is proportional to the concentration time product.

2. Charcoal tube

Charcoal tube is a glass tube filled with two layers of activated coconut shell charcoal and sealed at both ends. One of the layers is an active layer (sorber layer) and the second one is breakthrough layer. It is used for analyzing organic vapours like benzene, toluene xylene etc. in the atmosphere. Generally a known volume of sample air is made to pass through the charcoal tube and subsequently the trapped organic vapours are desorbed in a known amount of solvent and analyzed by GC to determine the organic vapour concentration in the air.

OTHER PRODUCTS

1. Detector strips

They are paper strips impregnated with gas specific sensing chemical by a special process. They detect gases by their change of colour. They are provided with a sensitivity chart indicating gas concentration against time required for specified colour change.

2. Dissolved substance detector tubes

These tubes are similar to the short-term detector tube in their look. They are suitable for a rapid & fully quantitative analysis of the concentration of sulphide and chloride ion in wastewater. Breaking both ends of the tube, it is immersed partially in the sample water. Sample rises due to the inherent capillary action of water through the support material, and produces a stain length on the tube, which is proportional to the target ion concentration in the sample.

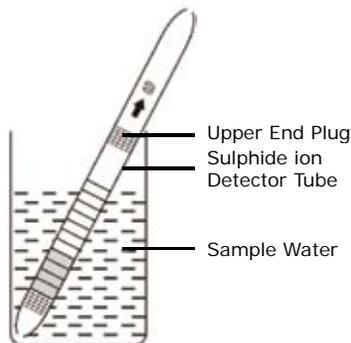


Fig. 2

These tubes are suitable for wastewater analysis in paper mills, petroleum refineries, or chemical industries.

3. Air flow indicator tubes

Air flow indicator tubes are filled with a SnCl₄ impregnated carrier material and are sealed at both ends. While using these tubes, we have to break both ends of the tube and allow air to pass through it by using a rubber bulb. When moist air passes through the tube, white fumes are liberated from the tube and it flows in the direction of air at that place. These tubes are used for airflow indication and respirator fit test.

Storage and disposal of Uniphos detector tubes

Detector tubes contain sensitive reagents that are highly reactive, and some reagents are also corrosive. Proper care should be taken during their storage and disposal.

Storage of detector tubes

To maintain the high quality of Uniphos detector tubes, it is necessary to store them at a temperature of 0 to 10 °C (32 to 50 °F) in a dark place. Keep the tubes (used and unused) out of the reach of unauthorized persons especially children.

Disposal of detector tubes

Used and expired detector tubes should be disposed off following the relevant local regulations.

Calibration gas generation methods

There are several methods for generating calibration gases. *Eg.* Static dilution method, Diffusion tube method, Dynamic dilution method, Permeation tube method, etc. Also many of the toxic gas and combustible gas standards are available in pressurized cylinders. Depending upon the nature of the target gas, one of these methods is chosen for calibration of detector tube.

Gas concentration Units and their conversions

Gas concentrations are expressed as the content of a substance in a reference substance. While measuring contaminants in air, they are expressed as amount of substance present compared to the air. Suitable unit of measurement is chosen to express the gas concentrations in simple and convenient figure.

Higher gas concentrations are expressed in terms of percent (% v/v). It means 1 part of a substance in 100 parts of air. For smaller gas concentration the unit ppm (parts per million) is used. The gas concentration of 1 ppm means, 1 part of a gas in 1 million parts of air, and ppb means 1 part of a substance in 1 billion parts of air. The conversion between these units is as given below.

$$1 \% \text{ v/v} = 10,000 \text{ ppm} = 10,000,000 \text{ ppb}$$

Sometimes in addition to gaseous components, air also contains particulate matter called aerosols. Their concentration is expressed in terms of mg/m^3 .

mg/m^3 (Milligram per cubic meter):

It is a ratio of the weight of a substance expressed in mg to the volume of its medium of 1m^3 (1000 Liters).

mg/l (Milligram per liter):

It is a ratio of the weight of a substance expressed in mg to the volume of its medium of 1 Liter.

Conversion units:

$$\text{mg/m}^3 = \frac{\text{Molecular weight [g]}}{\text{Molar volume [L]}} \times \text{ppm}$$

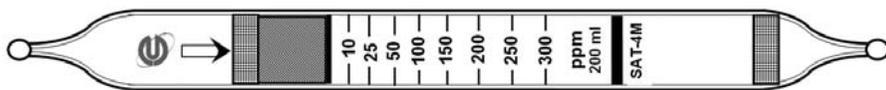
$$\text{ppm} = \frac{\text{Molar volume [L]}}{\text{Molecular weight [g]}} \times \text{mg/m}^3$$

Where: Molar volume of any gas is 24.1 L at 20°C and 1 atmospheric pressure.

$$\text{mg/l} = \text{mg/m}^3 \times 10^3$$

$$\text{mg/m}^3 = \text{mg/l} \times 10^{-3}$$

Uniphos Short-Term Detector Tubes

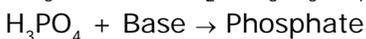


Performance:

Measurement Range	Extended	Standard	Extended
	Do not extend	10 – 300 ppm	Do not extend
No. of Pump Strokes		2 (200 ml)	
Volume Correction Factor (VCF)*		1.0	
Sampling Time	1.5 minutes per pump stroke (100 ml)		
Colour Change	Light Yellow → Light pink		
Detection Limit	10 ppm (for 2 pump strokes)		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

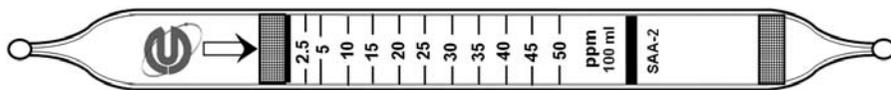
Compound	Concentration (ppm)	Interference	Colour Change / Comments
Acetone		+	Ring
Methyl isobutyl Ketone		+	Ring
Methyl ethyl Ketone		+	Ring
NH ₃	100	No	No effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

Static dilution method.



Performance:

Measurement Range	Extended	Standard	Extended
	Do not extend	2.5 – 50 ppm	Do not extend
No. of Pump Strokes		1 (100 ml)	
Volume Correction Factor (VCF)*		1.0	
Sampling Time	1 minute per pump stroke (100 ml)		
Colour Change	Pink → Yellow		
Detection Limit	2.5 ppm		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:

CH₃COOH + Base → Reaction product

Possible Interferences:

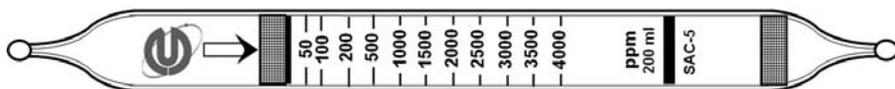
Compound	Concentration (ppm)	Interference	Colour Change / Comments
Chlorine		+	Pink – White
HCl		+	Pink – Yellow
HCN	50	No	No Effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

Diffusion tube method.

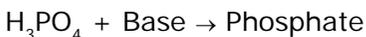
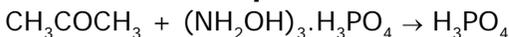


Performance:

Measurement Range	Extended	Standard	Extended
	Do not extend	50 – 4000 ppm	Do not extend
No. of Pump Strokes	2 (200 ml)		
Volume Correction Factor (VCF)*	1.0		
Sampling Time	1.5 minutes per pump stroke (100 ml)		
Colour Change	Yellow → Pink		
Detection Limit	50 ppm (2 pump strokes)		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Methyl Ethyl Ketone		+	Yellow to Pink
Ethyl Acetate		+	Yellow to Pink
Methyl Isobutyl Ketone	10000	No	No Effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40 °C (32 – 104 °F).
Relative humidity	Not necessary between 10 – 90%.

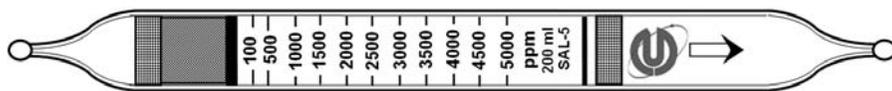
Calibration of the tube:

Static dilution method.

TWA (TLV): 500 ppm

STEL (TLV): 750 ppm

Flammable Range: 2.1 – 13%

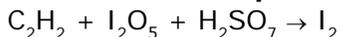


Performance:

Measurement Range	Extended	Standard	Extended
	Do not extend	100 – 5000 ppm	Do not extend
No. of Pump Strokes		2 (200 ml)	
Volume Correction Factor (VCF)*		1.0	
Sampling Time	1 minute per pump stroke (100 ml)		
Colour Change	White → Brown with green top		
Detection Limit	100 ppm (2 pump strokes)		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

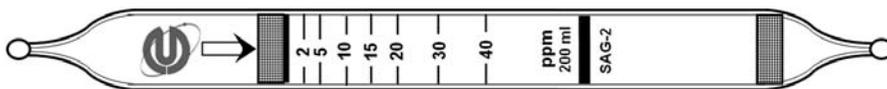
Compound	Concentration (ppm)	Interference	Colour Change / Comments
Benzene		+	Stain movement
1,1,1 Trichloroethane	500	No	No Effect
PH3	120	No	No Effect
Ethylene		+	Stain movement

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

Static gas dilution method.

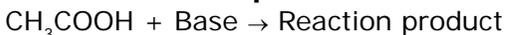


Performance:

Measurement Range	Extended	Standard	Extended
	1 – 20 ppm	2 – 40 ppm	1– 80 ppm
No. of Pump Strokes	4 (400 ml)	2 (200 ml)	1 (100 ml)
Volume Correction Factor (VCF)*	0.5	1.0	2.0
Sampling Time	1 minute per pump stroke (100 ml)		
Colour Change	Purple → Yellow		
Detection Limit	1 ppm (4 pump strokes)		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

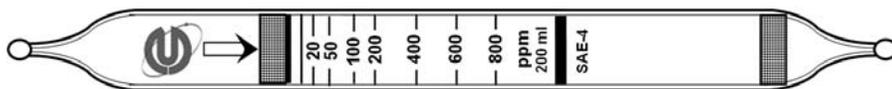
Compound	No. of stroke	Gas correction factor (GCF)*	Measuring Range (ppm)	Colour Change
HCl	2	5.8	11.6 – 232	Pink with yellow top
Cl ₂	2	0.6	1.2 – 24	White
Iodine	2	0.9	1.8 – 36	Greenish gray
NO ₂	2	1.9	3.8 – 76	Yellow
Nitric acid	2	6.6	13.2 – 264	Pink with yellow top

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40 °C (32 – 104 °F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

Diffusion tube method.

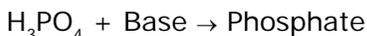
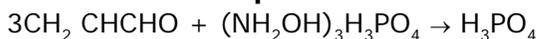


Performance:

Measurement Range	Extended	Standard	Extended
	Do not extend	10 – 800 ppm	Do not extend
No. of Pump Strokes	2 (200 ml)		
Volume Correction Factor (VCF)*	1.0		
Sampling Time	2.0 minutes per pump stroke (100 ml)		
Colour Change	Yellow → Pink		
Detection Limit	10 ppm (2 pump strokes)		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Aldehydes		+	Yellow to Pink
Ketones		+	Yellow to Pink

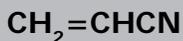
Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

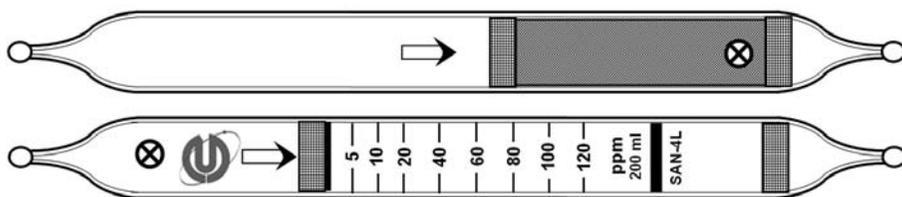
Calibration of the tube:

Static dilution method.

Acrylonitrile



SAN-4L

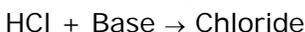
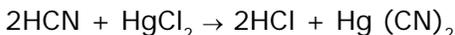


Performance:

Measurement Range	Extended	Standard	Extended
	Do not extend	5 – 120 ppm	Do not extend
No. of Pump Strokes		2 (200 ml)	
Volume Correction Factor (VCF)*		1.0	
Sampling Time	2.0 minutes per pump stroke (100 ml)		
Colour Change	Yellow → Red		
Detection Limit	5 ppm (2 pump strokes)		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
HCl	40	No	No Effect
Methanol	200	No	No Effect
Acetone	1000	No	No Effect
HCN	55	+	Yellow – Red

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40 °C (32 – 104 °F).
Relative humidity	Not necessary between 10 – 90%.

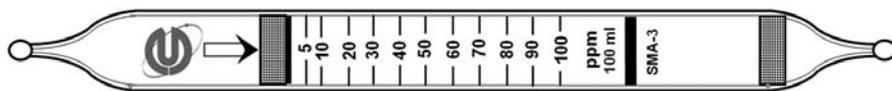
Calibration of the tube:

Static dilution method.

TWA (TLV): 2 ppm

STEL (TLV): NA

Flammable Range: 3 – 17%

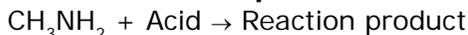


Performance:

Measurement Range	Extended 2.5–50 ppm	Standard 5–100 ppm	Extended 10–200 ppm
No. of Pump Strokes	2 (200 ml)	1 (100 ml)	0.5 (50 ml)
Volume Correction Factor (VCF)*	0.5	1.0	2.0
Sampling Time	1 minute per pump stroke (100 ml)		
Colour Change	Yellow → Blue		
Detection Limit	2.5 ppm (2 pump strokes)		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Measurable Substances:

Compound	No. of stroke	Gas Correction Factor GCF*	Measuring Range (ppm)	TLV (ppm)	Colour Change
Methylamine	1	1.0	5 – 100	5	Yellow – Blue
Ethylamine	1	0.85	4.25 – 85	5	Yellow – Blue
n-Butylamine	1	1.0	5 – 100	C5	Yellow – Blue
Trimethylamine	1	0.34	1.7 – 34	5	Yellow-Light green
Triethylamine	1	0.43	2.15 – 43	1	Yellow – Blue
Isopropylamine	1	0.64	3.2 – 64	5	Yellow – Blue
Ammonia	1	0.89	4.45 – 89	25	Yellow – Blue
Diethylamine	1	0.65	3.25 – 65	5	Yellow – Blue
Cyclohexylamine	1	1.3	6.65 – 133	10	Yellow – Blue
Ethanolamine	3	3.7	18.5 – 370	3	Yellow – Blue
tert -Butylamine	1	0.78	3.9 – 78	NA	Yellow – Blue
Morpholine	1	2.0	10 – 200	20	Yellow – Blue

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40 °C (32 – 104 °F).
Relative humidity	Not necessary between 10 – 90%.

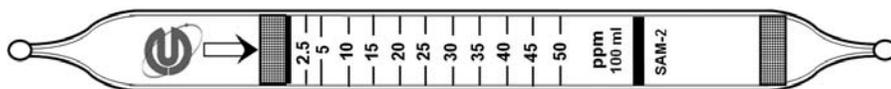
Calibration of the tube:

Static dilution method.

TWA (TLV): 5 ppm

STEL (TLV): 15 ppm

Flammable Range: 5–21%



Performance:

Measurement Range	Extended	Standard	Extended
	1.25 – 25 ppm	2.5 – 50 ppm	5 – 100 ppm
No. of Pump Strokes	2 (200 ml)	1 (100 ml)	0.5 (50 ml)
Volume Correction Factor (VCF)*	0.5	1.0	2.0
Sampling Time	1.5 minutes per pump stroke (100 ml)		
Colour Change	Yellow → Blue		
Detection Limit	1.25 ppm (2 pump strokes)		
Shelf Life	2 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Amines		+	Yellow to Blue
Hydrazine		+	Yellow to Blue
CO ₂	2%	+	Yellow to Blue
CO	100	+	Blue ring

Other Measurable Compounds:

Compound	Gas Correction factor (GCF)*	No of pump strokes	Measuring Range / Comments
Diethylamine	0.52	1	1.3 – 26 ppm

*Multiply the observed reading by the correction factor (VCF x GCF) to obtain the true concentration.

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40 °C (32 – 104 °F).
Relative humidity	Not necessary between 10 – 90%.

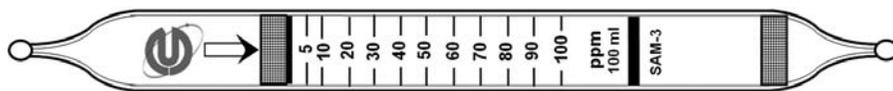
Calibration of the tube:

Standard gas cylinder method.

TWA (TLV): 25 ppm

STEL (TLV): 35 ppm

Flammable Range: 15–28%



Performance:

Measurement Range	Extended	Standard	Extended
	2.5 – 50 ppm	5 – 100 ppm	10 – 200 ppm
No. of Pump Strokes	2 (200 ml)	1 (100 ml)	0.5 (50 ml)
Volume Correction Factor (VCF)*	0.5	1.0	2.0
Sampling Time	1 minute per pump stroke (100 ml)		
Colour Change	Yellow → Blue		
Detection Limit	2.5 ppm (2 pump strokes)		
Shelf Life	2 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Amines		+	Yellow to Blue
Hydrazine		+	Yellow to Blue
CO ₂	50000	No	No Effect

Other Measurable Compounds:

Compound	Gas Correction factor (GCF)*	No of pump strokes	Measuring Range / Comments
n-Butyl amine	1	1	5 – 100 ppm
Diethyl amine	0.7	1	3.5 – 70 ppm

*Multiply the observed reading by the correction factor (VCF x GCF) to obtain the true concentration.

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40 °C (32 – 104 °F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

Standard gas cylinder method.

TWA (TLV): 25 ppm

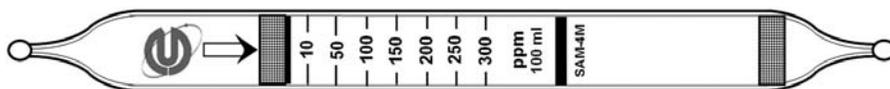
STEL (TLV): 35 ppm

Flammable Range: 15–28%

Ammonia



SAM-4M



Performance:

Measurement Range	Extended	Standard	Extended
	5 – 150 ppm	10 – 300 ppm	20–600 ppm
No. of Pump Strokes	2 (200 ml)	1 (100 ml)	0.5 (50 ml)
Volume Correction Factor (VCF)*	0.5	1.0	2.0
Sampling Time	1 minute per pump stroke (100 ml)		
Colour Change	Yellow → Blue		
Detection Limit	5 ppm (2 pump strokes)		
Shelf Life	2 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Amines		+	Yellow to Blue
Hydrazine		+	Yellow to Blue
CO ₂	5%	No	No Effect

Other Measurable Compounds:

Compound	Gas Correction factor (GCF) *	No of pump strokes	Measuring Range / Comments
n-Butyl amine	1	1	10 – 300 ppm
Diethyl amine	0.6	1	6 – 180 ppm

*Multiply the observed reading by the correction factor (VCF x GCF) to obtain the true concentration.

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40 °C (32 – 104 °F).
Relative humidity	Not necessary between 10 – 90%.

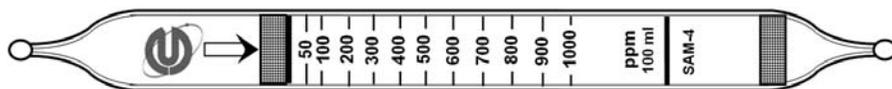
Calibration of the tube:

Standard gas cylinder method.

TWA (TLV): 25 ppm

STEL (TLV): 35 ppm

Flammable Range: 15–28%



Performance:

Measurement Range	Extended	Standard	Extended
	25 – 500 ppm	50 – 1000 ppm	100 – 2000 ppm
No. of Pump Strokes	2 (200 ml)	1 (100 ml)	0.5 (50 ml)
Volume Correction Factor (VCF)*	0.5	1.0	2.0
Sampling Time	1 minute per pump stroke (100 ml)		
Colour Change	Yellow → Blue		
Detection Limit	25 ppm (2 pump strokes)		
Shelf Life	2 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Amines		+	Yellow to Blue
Hydrazine		+	Yellow to Blue
CO ₂	5%	No	No Effect

Other Measurable Compounds:

Compound	Gas Correction factor (GCF)*	No of pump strokes	Measuring Range / Comments
n-Butyl amine	1	1	50 – 1000 ppm
Diethyl amine	0.6	1	25 – 500 ppm

*Multiply the observed reading by the correction factor (VCF x GCF) to obtain the true concentration.

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40 °C (32 – 104 °F).
Relative humidity	Not necessary between 10 – 90%.

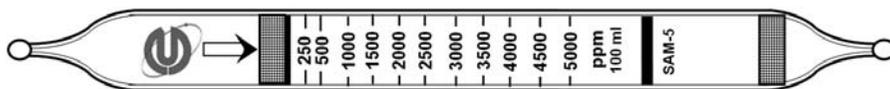
Calibration of the tube:

Standard gas cylinder method.

TWA (TLV): 25 ppm

STEL (TLV): 35 ppm

Flammable Range: 15–28%



Performance:

Measurement Range	Extended	Standard	Extended
	125 – 2500 ppm	250 – 5000 ppm	500 – 10000 ppm
No. of Pump Strokes	2 (200 ml)	1 (100 ml)	0.5 (50 ml)
Volume Correction Factor (VCF)*	0.5	1.0	2.0
Sampling Time	1 minute per pump stroke (100 ml)		
Colour Change	White → Blue		
Detection Limit	125 ppm (2 pump strokes)		
Shelf Life	2 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:

NH₃ + Acid → Reaction product

Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Amines		+	White to Blue
Hydrazine		+	White to Blue
CO ₂	4500	No	No Effect

Other Measurable Compounds:

Compound	Gas Correction factor (GCF) *	No of pump strokes	Measuring Range / Comments
n-Butyl amine	0.43	1	108 – 2150 ppm
Diethyl amine	0.44	1	110 – 2200 ppm

*Multiply the observed reading by the correction factor (VCF x GCF) to obtain the true concentration.

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40 °C (32 – 104 °F).
Relative humidity	Not necessary between 10 – 90%.

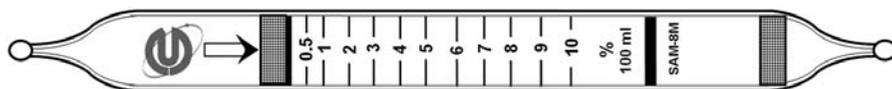
Calibration of the tube:

Standard gas cylinder method.

TWA (TLV): 25 ppm

STEL (TLV): 35 ppm

Flammable Range: 15–28%



Performance:

Measurement Range	Extended 0.25 – 5%	Standard 0.5 – 10%	Extended 1 – 20%
No. of Pump Strokes	2 (200 ml)	1 (100 ml)	0.5 (50 ml)
Volume Correction Factor (VCF)*	0.5	1.0	2.0
Sampling Time	1 minute per pump stroke (100 ml)		
Colour Change	Yellow → Blue		
Detection Limit	0.25% (2 pump strokes)		
Shelf Life	2 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

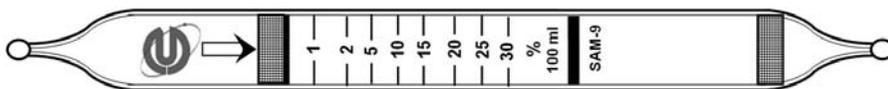
Compound	Concentration (ppm)	Interference	Colour Change / Comments
Amines		+	Yellow to Blue
Hydrazine		+	Yellow to Blue
CO ₂	10%	No	No Effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

Standard gas cylinder method.



Performance:

Measurement Range	Extended	Standard	Extended
	0.5 – 15%	1 – 30%	2 – 60%
No. of Pump Strokes	2 (200 ml)	1 (100 ml)	0.5 (50 ml)
Volume Correction Factor (VCF)*	0.5	1.0	2.0
Sampling Time	1 minute per pump stroke (100 ml)		
Colour Change	Yellow → Violet		
Detection Limit	0.5% (2 pump strokes)		
Shelf Life	2 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Amines		+	Yellow to Violet
Hydrazine		+	Yellow to Violet
CO ₂	10%	No	No Effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40 °C (32 – 104 °F).
Relative humidity	Not necessary between 10 – 90%.

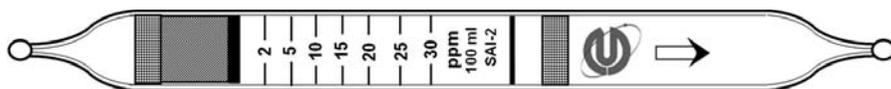
Calibration of the tube:

Standard gas cylinder method.

Aniline



SAI-2

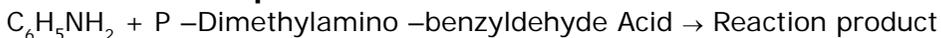


Performance:

Measurement Range	Extended	Standard	Extended
	Do not extend	2 – 30 ppm	Do not extend
No. of Pump Strokes		1 (100 ml)	
Volume Correction Factor (VCF)*		1.0	
Sampling Time	0.5 minute per pump stroke (100 ml)		
Colour Change	White → Yellow		
Detection Limit	2 ppm		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Amines		+	White – yellow
Ammonia	>70	+	Yellow ring
CO ₂	5%	No	No Effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

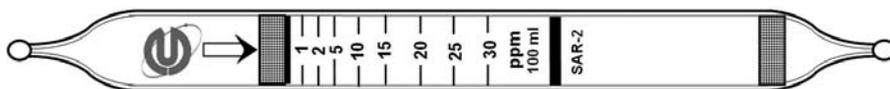
Calibration of the tube:

Static dilution method.

TWA (TLV): 2

STEL (TLV): NA

Flammable Range: 1.3 – 11%



Performance:

Measurement Range	Extended 0.5 – 15 ppm	Standard 1 – 30 ppm	Extended 2 – 60 ppm
No. of Pump Strokes	2 (200 ml)	1 (100 ml)	0.5 (50 ml)
Volume Correction Factor (VCF)*	0.5	1.0	2
Sampling Time	1 minute per pump stroke (100 ml)		
Colour Change	Off white → Purple		
Detection Limit	0.5 ppm (2 pump strokes)		
Shelf Life	2 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:

AsH₃ + Gold compound → Reaction product

Possible Interferences:

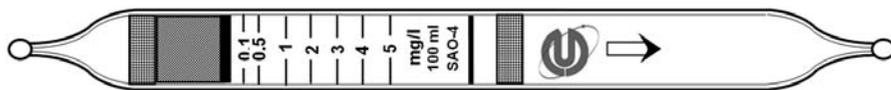
Compound	Concentration (ppm)	Interference	Colour Change / Comments
H ₂ S	25	+	Very faint Colour Change
NH ₃	100	+	Very faint Colour Change
SO ₂	200	No	No Effect
PH ₃	10	+	Off white to Purple

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

Static gas dilution method.



Performance:

Measurement Range	Extended	Standard	Extended
	Do not extend	0.1 – 5 mg/l	Do not extend
No. of Pump Strokes	1 (100 ml)		
Volume Correction Factor (VCF)*	1.0		
Sampling Time	1 minute per pump stroke (100 ml)		
Colour Change	White → Brown with green top		
Detection Limit	0.1 mg/l		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
H ₂ S	60	+	Light brown
Hexane	25	+	
Octane	5	+	
Gasoline	25	+	
Benzene	25	No	No Effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

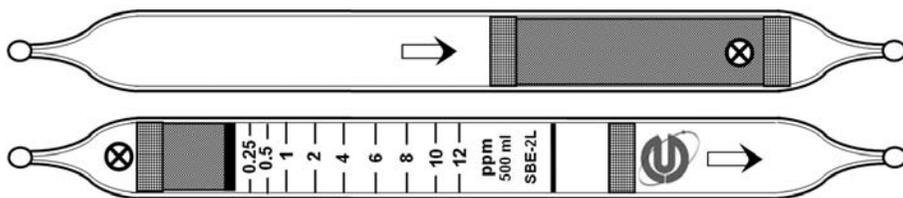
Calibration of the tube:

Diffusion tube method.

Benzene



SBE-2L

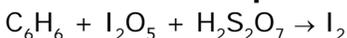


Performance:

Measurement Range	Extended	Standard	Extended
	Do not extend	0.25 – 12 ppm	Do not extend
No. of Pump Strokes		5 (500 ml)	
Volume Correction Factor (VCF)*		1.0	
Sampling Time	2.5 minutes per pump stroke (100 ml)		
Colour Change	White → Brownish green		
Detection Limit	0.25 ppm (5 pump strokes)		
Shelf Life	2 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
H ₂ S		+	Brown ring
Xylene		+	White to Brownish green
CO	10	No	No Effect
CH ₄	25000	No	No Effect
Isobutylene	106	No	No Effect
Styrene	50	No	No Effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40 °C (32 – 104 °F).
Relative humidity	Not necessary between 10 – 90%.

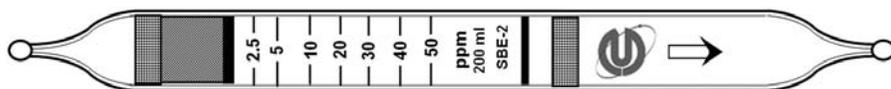
Calibration of the tube:

Static dilution method.

TWA (TLV): 0.5 ppm

STEL (TLV): 2.5 ppm

Flammable Range: 1–8%

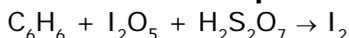


Performance:

Measurement Range	Extended 1.25 – 25	Standard 2.5 – 50 ppm	Extended 5 – 100
No. of Pump Strokes	4 (400 ml)	2 (200 ml)	1 (100 ml)
Volume Correction Factor (VCF)*	0.5	1.0	2
Sampling Time	1.5 minutes per pump stroke (100 ml)		
Colour Change	White → Brownish green		
Detection Limit	1.25 ppm (4 pump strokes)		
Shelf Life	2 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

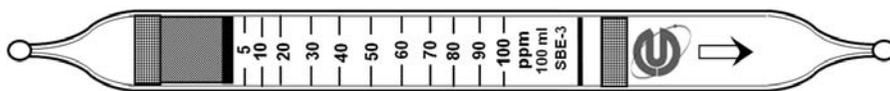
Compound	Concentration (ppm)	Interference	Colour Change / Comments
Aromatic hydrocarbon		+	Brownish green
H ₂ S	25	+	Brown ring
NO	100	No	No Effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40 °C (32 – 104 °F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

Static dilution method.

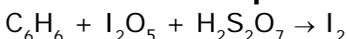


Performance:

Measurement Range	Extended	Standard	Extended
	2.5 – 50	5 – 100 ppm	10 – 200
No. of Pump Strokes	2 (200 ml)	1 (100 ml)	0.5 (50 ml)
Volume Correction Factor (VCF)*	0.5	1.0	2
Sampling Time	2 minutes per pump stroke (100 ml)		
Colour Change	White → Brownish green		
Detection Limit	2.5 ppm (2 pump strokes)		
Shelf Life	2 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Aliphatic hydrocarbon		No	
H ₂ S	50		Brown ring
Isobutylene	106	+	
Toluene		+	White to brownish green

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40 °C (32 – 104 °F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

Static dilution method.

TWA (TLV): 0.5 ppm

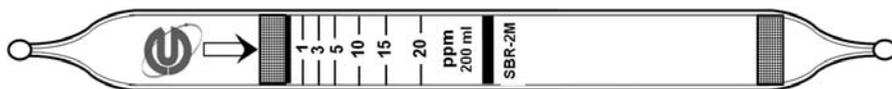
STEL (TLV): 2.5 ppm

Flammable Range: 1–8%

Bromine



SBR-2M



Performance:

Measurement Range	Extended	Standard	Extended
	Do not Extend	1 – 20 ppm	Do not Extend
No. of Pump Strokes		2 (200 m μ l)	
Volume Correction Factor (VCF)*		1.0	
Sampling Time	1.0 minute per pump stroke (100 m μ l)		
Colour Change	White \rightarrow Yellow		
Detection Limit	1.0 ppm (2 pump strokes)		
Shelf Life	2 year		
Relative standard deviation	\pm 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Chlorine dioxide		+	White to Yellow
Nitrogen dioxide		+	White to Yellow
Chlorine		+	White to Yellow

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

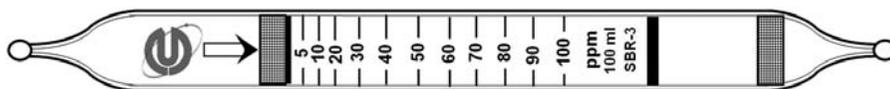
Calibration of the tube:

Static gas dilution method.

TWA (TLV): 0.1 ppm

STEL (TLV): 0.2 ppm

Flammable Range: NA



Performance:

Measurement Range	Extended	Standard	Extended
	Do not Extend	5 – 100 ppm	Do not Extend
No. of Pump Strokes		1 (100 mL)	
Volume Correction Factor (VCF)*		1.0	
Sampling Time	1.5 minute per pump stroke (100 mL)		
Colour Change	White → Yellow		
Detection Limit	5.0 ppm (1 pump strokes)		
Shelf Life	2 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:

Br₂ + o-Tolidine → Yellow reaction product

Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Chlorine dioxide		+	White to Yellow
Nitrogen dioxide		+	White to Yellow
Chlorine		+	White to Yellow

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

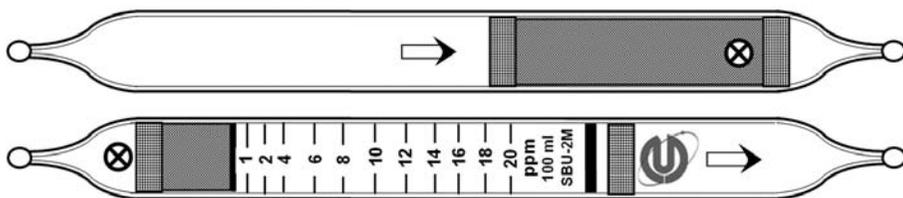
Calibration of the tube:

Static gas dilution method.

1,3 Butadiene



SBU-2M



Performance:

Measurement Range	Extended	Standard	Extended
	Do not extend	1 – 20 ppm	Do not extend
No. of Pump Strokes		1 (100 ml)	
Volume Correction Factor (VCF)*		1.0	
Sampling Time	2.5 minutes per pump stroke (100 ml)		
Colour Change	Pink → Off white		
Detection Limit	1.0 ppm		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:

1,3 Butadiene + $\text{KMnO}_4 \rightarrow$ Off white reaction product

Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Acetylene		+	White
H_2S		+	Pale yellow
HCN	55	No	No Effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

Static gas dilution method.

TWA (TLV): 2 ppm

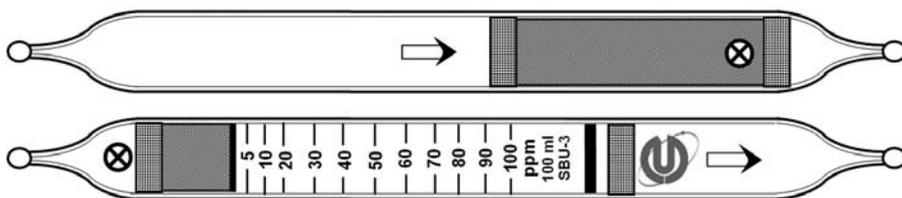
STEL (TLV): NA

Flammable Range: 10–16%

1,3 Butadiene



SBU-3



Performance:

Measurement Range	Extended	Standard	Extended
	Do not extend	5 – 100 ppm	Do not extend
No. of Pump Strokes		1 (100 ml)	
Volume Correction Factor (VCF)*		1.0	
Sampling Time	2.0 minutes per pump stroke (100 ml)		
Colour Change	Purple → Off White		
Detection Limit	5.0 ppm		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:

1,3 Butadiene + $\text{KMnO}_4 \rightarrow$ Off white reaction product

Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Acetylene		+	White
H_2S	15	+	Pale yellow
HCN		+	White
HCl	100	No	No Effect
NH_3	45	No	No Effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40 °C (32 – 104 °F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

Standard gas cylinder method.

TWA (TLV): 2 ppm

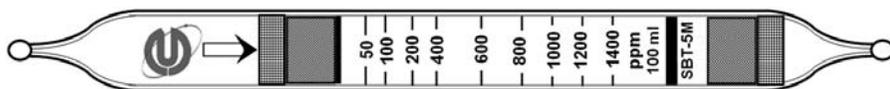
STEL (TLV): NA

Flammable Range: 10–16%

n-Butane



SBT-5M

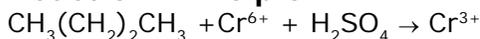


Performance:

Measurement Range	Extended	Standard	Extended
	Do not extend	50 – 1400 ppm	Do not extend
No. of Pump Strokes		1 (100 ml)	
Volume Correction Factor (VCF)*		1.0	
Sampling Time	4.5 minutes per pump stroke (100 ml)		
Colour Change	Pale yellow → Pale green		
Detection Limit	50 ppm		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Propane	500	+	
Isobutylene	106	+	
N - Pentane	200	+	
Hexane	1500	+	
H ₂ S	500	+	Ring

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

Static gas dilution method.

TWA (TLV): NA

STEL (TLV): 1000 ppm

Flammable Range: 1.6 – 8.5 %

1-Butanol



SNB-4L

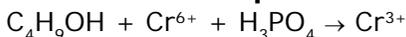


Performance:

Measurement Range	Extended	Standard	Extended
	Do not extend	10–150 ppm	Do not extend
No. of Pump Strokes		2 (200 ml)	
Volume Correction Factor (VCF)*		1.0	
Sampling Time	2.5 minutes per pump stroke (100 ml)		
Colour Change	Yellow → Pale green		
Detection Limit	10 ppm (2 pump strokes)		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Alcohol		+	Yellow to Pale green

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40 °C (32 – 104 °F).
Relative humidity	Not necessary between 10 – 90%.

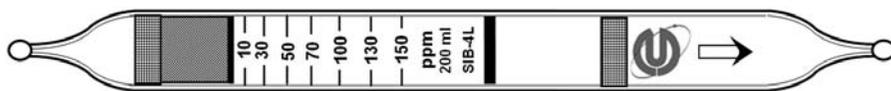
Calibration of the tube:

Static dilution method.

TWA (TLV): 20 ppm

STEL (TLV): NA

Flammable Range: 1.4–11.2%

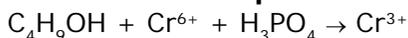


Performance:

Measurement Range	Extended Do not extend	Standard 10–150 ppm	Extended Do not extend
No. of Pump Strokes		2 (200 ml)	
Volume Correction Factor (VCF)*		1.0	
Sampling Time	3.5 minutes per pump stroke (100 ml)		
Colour Change	Yellow → Pale green		
Detection Limit	10 ppm (2 pump strokes)		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

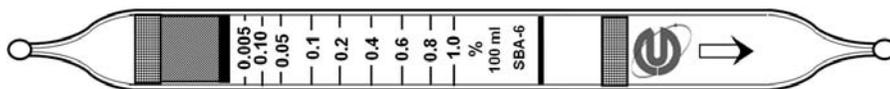
Compound	Concentration (ppm)	Interference	Colour Change / Comments
Alcohol		+	Yellow to Pale green

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40 °C (32 – 104 °F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

Static dilution method.

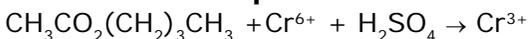


Performance:

Measurement Range	Extended	Standard	Extended
	Do not extend	0.005 – 1%	Do not extend
No. of Pump Strokes		1 (100 ml)	
Volume Correction Factor (VCF)*		1.0	
Sampling Time	1.5 minutes per pump stroke (100 ml)		
Colour Change	Yellow → Brownish green → Green		
Detection Limit	0.005%		
Shelf Life	2 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

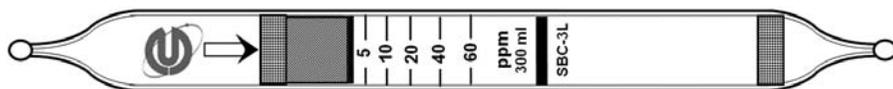
Compound	Concentration (ppm)	Interference	Colour Change / Comments
Alcohol / esters/ ketones		+	
Propane	0.05	+	Yellow – Brownish green
H ₂ S	0.1	+	Diffuse boundary
SO ₂	0.1	+	Ring

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

Static dilution method.

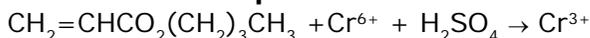


Performance:

Measurement Range	Extended	Standard	Extended
	Do not extend	5 – 60 ppm	Do not extend
No. of Pump Strokes		3 (300 ml)	
Volume Correction Factor (VCF)*		1.0	
Sampling Time	2.0 minute per pump stroke (100 ml)		
Colour Change	Yellow → Pale blue		
Detection Limit	5.0 ppm (3 pump strokes)		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Alcohols		+	Yellow to pale blue
Esters		+	Yellow to pale blue
Ketones		+	Yellow to pale blue

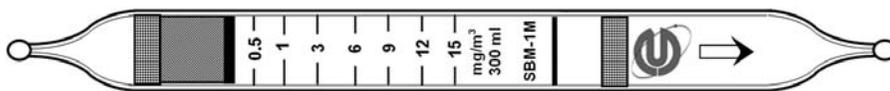
Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

Static dilution method.

t-Butyl Mercaptan

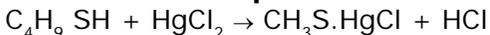
**SBM-1M**

Performance:

Measurement Range	Extended	Standard	Extended
	Do not extend	0.5-15 mg/m ³	Do not extend
No. of Pump Strokes		3 (300 ml)	
Volume Correction Factor (VCF)*		1.0	
Sampling Time	1.5 minutes per pump stroke (100 ml)		
Colour Change	Yellow → Pink		
Detection Limit	0.5 mg/m ³ (3 pump strokes)		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (mg/m ³)	Interference	Colour Change / Comments
Other Mercaptan		+	Yellow to Pink
PH ₃		+	Yellow to Pink
H ₂ S		+	Yellow to Pink
NH ₃	15	-	No effect
SO ₂	30	-	No effect

Other measurable compounds:

Compound	Correction Factor	No. of pump strokes	Measuring range
Ethyl Mercaptan	1	3	0.5 - 15 mg/m ³
Methyl Mercaptan	1	3	0.5 - 15 mg/m ³

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40 °C (32 – 104 °F).
Relative humidity	Not necessary between 10 – 90%.

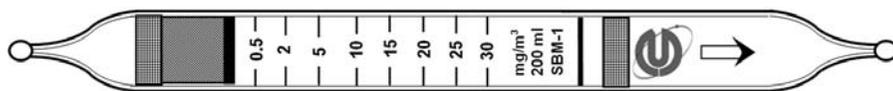
Calibration of the tube:

Static dilution method.

TWA (TLV): 0.5 ppm

STEL (TLV): NA

Flammable Range: NA

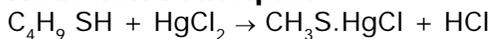


Performance:

Measurement Range	Extended	Standard	Extended
	Do not extend	0.5 - 30 mg/m ³	Do not extend
No. of Pump Strokes		2 (200 ml)	
Volume Correction Factor (VCF)*		1.0	
Sampling Time	1 minute per pump stroke (100 ml)		
Colour Change	Yellow → Pink		
Detection Limit	0.5 mg/m ³ (2 pump strokes)		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (mg/m ³)	Interference	Colour Change / Comments
Other Mercaptan		+	Yellow to Pink
PH ₃		+	Yellow to Pink
H ₂ S		+	Yellow to Pink
NH ₃	15	-	No effect
SO ₂	30	-	No effect

Other measurable compounds:

Compound	Correction Factor	No. of pump strokes	Measuring range
Ethyl Mercaptan	1	2	0.5 - 30 mg/m ³
Methyl Mercaptan	1	2	0.5 - 30 mg/m ³

Correction for Environmental Parameters:

Temperature	Not necessary between 0 - 40 °C (32 - 104 °F).
Relative humidity	Not necessary between 10 - 90%.

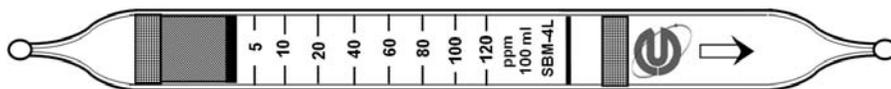
Calibration of the tube: Static dilution method.

TWA (TLV): 0.5 ppm

STEL (TLV): NA

Flammable Range: NA

t-Butyl Mercaptan

**SBM-4L**

Performance:

Measurement Range	Extended	Standard	Extended
	2.5- 60 ppm	5-120 ppm	10- 240 ppm
No. of Pump Strokes	2 (200 ml)	1 (100 ml)	0.5 (50 ml)
Volume Correction Factor (VCF)*	0.5	1.0	2.0
Sampling Time	1.5 minutes per pump stroke (100 ml)		
Colour Change	Yellow → Pink		
Detection Limit	2.5 ppm (2 pump strokes)		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Mercaptans		+	Yellow to Pink
PH ₃		+	Yellow to Pink
H ₂ S		+	Yellow to Pink
Arsine		+	Yellow to Pink
HCN		+	Yellow to Pink
NH ₃	100	No	No effect
SO ₂	30	No	No effect

Other measurable compounds:

Compound	Correction Factor	No. of pump strokes	Measuring range
Ethyl Mercaptan	1	1	5 - 120 ppm
Methyl Mercaptan	1	1	5 - 120 ppm

Correction for Environmental Parameters:

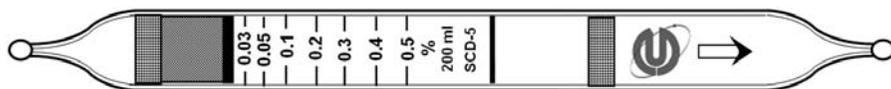
Temperature	Not necessary between 0 – 40 °C (32 – 104 °F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube: Static dilution method.

TWA (TLV): 0.5 ppm

STEL (TLV): NA

Flammable Range: NA

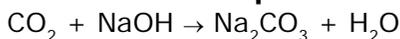


Performance:

Measurement Range	Extended	Standard	Extended
	0.015 – 0.25%	0.03 – 0.5%	0.06 – 1%
No. of Pump Strokes	4 (400 ml)	2 (200 ml)	1 (100 ml)
Volume Correction Factor (VCF)*	0.5	1.0	2.0
Sampling Time	2.5 minutes per pump stroke (100 ml)		
Colour Change	Blue → Off White		
Detection Limit	0.015% (4 pump strokes)		
Shelf Life	2 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
CO	3000	No	No effect
NH ₃	50000	No	No effect
NO ₂	200	No	No effect
SO ₂	2050	+	
n-Hexane	1500	No	No effect
Toluene	400	No	No effect

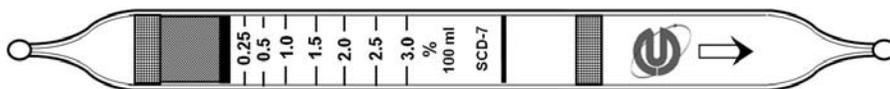
Correction for Environmental Parameters:

Temperature (°C):	4	20	30	40
Temperature Correction Factor (TCF)*	0.9	1	1.1	1.2
Relative humidity	Not necessary between 10 – 90%.			

*Multiply the observed reading by the correction factor (VCF x TCF) to obtain the true concentration.

Calibration of the tube:

Static gas dilution method.

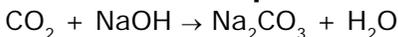


Performance:

Measurement Range	Extended 0.125 – 1.5%	Standard 0.25 – 3%	Extended 0.5 – 6%
No. of Pump Strokes	2 (200 ml)	1 (100 ml)	0.5 (50 ml)
Volume Correction Factor (VCF)*	0.5	1.0	2.0
Sampling Time	2.5 minutes per pump stroke (100 ml)		
Colour Change	Blue → Off White		
Detection Limit	0.125% (2 pump strokes)		
Shelf Life	2 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
CO	1.5	No	No Effect
H ₂ S	0.2	+	
NH ₃	5	No	No Effect
Isobutylene	0.01	No	Dark blue ring
Benzene	0.01	No	Dark blue ring
SO ₂	0.02	+	

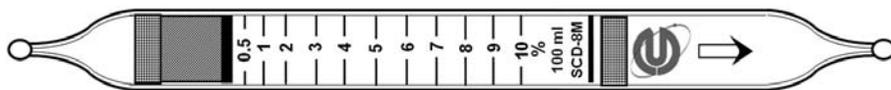
Correction for Environmental Parameters:

Temperature (°C):	4	20	30	40
Temperature Correction Factor (TCF)*	0.82	1	1.03	1.13
Relative humidity	Not necessary between 10 – 90%.			

*Multiply the observed reading by the correction factor (VCF x TCF) to obtain the true concentration.

Calibration of the tube:

Static gas dilution method.

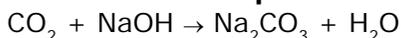


Performance:

Measurement Range	Extended	Standard	Extended
	0.25–5%	0.5–10%	1–20%
No. of Pump Strokes	2 (200 ml)	1 (100 ml)	0.5 (50 ml)
Volume Correction Factor (VCF)*	0.5	1.0	2.0
Sampling Time	2.5 minutes per pump stroke (100 ml)		
Colour Change	Blue → Off White		
Detection Limit	0.25% (2 pump strokes)		
Shelf Life	2 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
CO	1.5	+	Colour darkens
H ₂ S	0.2	+	
NH ₃	5	No	No Effect
Isobutylene	0.01	No	Dark blue ring
Benzene	0.01	No	Dark blue ring

Correction for Environmental Parameters:

Temperature (°C):	4	20	30	40
Temperature Correction Factor (TCF)*	0.93	1	1.06	1.24
Relative humidity	Not necessary between 10 – 90%.			

*Multiply the observed reading by the correction factor (VCF x TCF) to obtain the true concentration.

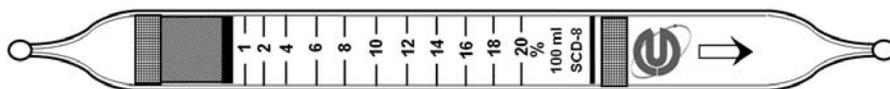
Calibration of the tube:

Static gas dilution method.

TWA (TLV): 5000 ppm

STEL (TLV): 30,000 ppm

Non Flammable

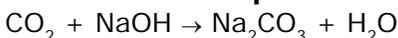


Performance:

Measurement Range	Extended 0.5–10%	Standard 1–20%	Extended 2–40%
No. of Pump Strokes	2 (200 ml)	1 (100 ml)	0.5 (50 ml)
Volume Correction Factor (VCF)*	0.5	1.0	2.0
Sampling Time	2.5 minutes per pump stroke (100 ml)		
Colour Change	Blue → Off White		
Detection Limit	0.5% (2 pump strokes)		
Shelf Life	2 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
CO	1.5	+	Colour darkens
H ₂ S	0.2	+	
Isobutylene	0.01	No	Dark blue ring
Benzene	0.01	No	Dark blue ring

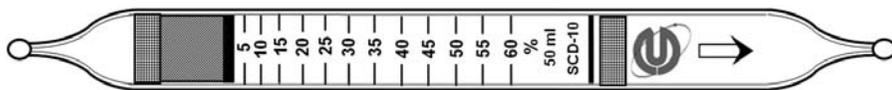
Correction for Environmental Parameters:

Temperature (°C):	4	20	30	40
Temperature Correction Factor (TCF)*	0.93	1	1.06	1.24
Relative humidity	Not necessary between 10 – 90%.			

*Multiply the observed reading by the correction factor (VCF x TCF) to obtain the true concentration.

Calibration of the tube:

Static gas dilution method.

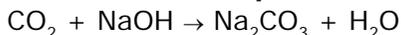


Performance:

Measurement Range	Extended 2.5 – 30%	Standard 5 – 60%	Extended Do not extend
No. of Pump Strokes	1 (100 ml)	0.5 (50 ml)	
Volume Correction Factor (VCF)*	0.5	1.0	
Sampling Time	2.0 minutes per pump stroke (100 ml)		
Colour Change	Blue → Off White		
Detection Limit	2.5% (1 pump strokes)		
Shelf Life	2 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
CH ₄	2.5	No	No Effect
CO	3.8	No	No Effect
NH ₃	0.05	No	No Effect
NO	0.01	No	No Effect
H ₂ S	1	No	No Effect
SO ₂	3.5	No	No Effect
n-Hexane	0.12	No	No Effect
Toluene	0.01	No	No Effect

Correction for Environmental Parameters:

Temperature (°C):	4	20	30	40
Temperature Correction Factor (TCF)*	0.93	1	1.06	1.24
Relative humidity	Not necessary between 10 – 90%.			

*Multiply the observed reading by the correction factor (VCF x TCF) to obtain the true concentration.

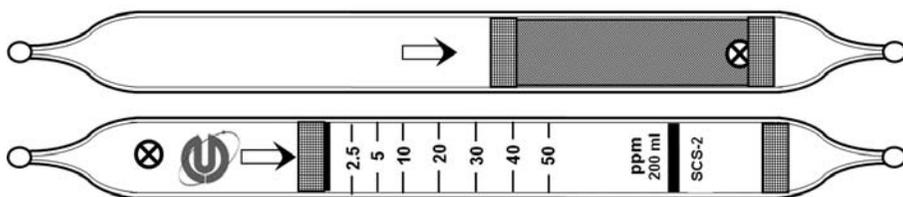
Calibration of the tube:

Static gas dilution method.

Carbon Disulphide

CS₂

SCS-2

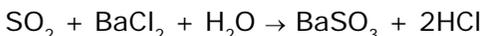
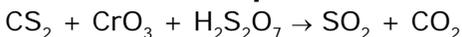


Performance:

Measurement Range	Extended	Standard	Extended
	1.25 – 25 ppm	2.5 – 50 ppm	5 – 100 ppm
No. of Pump Strokes	4 (400 ml)	2 (200 ml)	0.5 (50 ml)
Volume Correction Factor (VCF)*	0.5	1.0	2.0
Sampling Time	1.5 minutes per pump stroke (100 ml)		
Colour Change	Blue → Yellow		
Detection Limit	1.25 ppm (4 pump strokes)		
Shelf Life	2 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
H ₂ S	50	+	
Ammonia	70	No	No Effect
CH ₄	10000	+	
Hexane	35	No	No Effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40 °C (32 – 104 °F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

Static dilution method.

TWA (TLV): 1 ppm

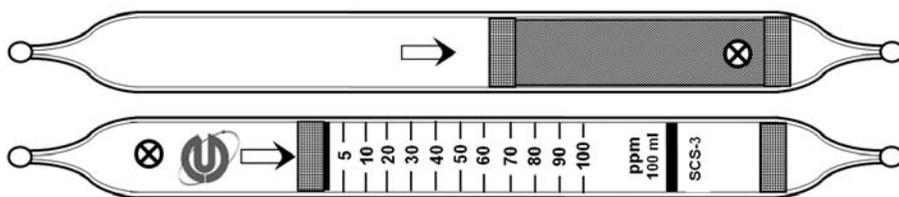
STEL (TLV): NA

Flammable Range: 1.3 – 50%

Carbon Disulphide

CS₂

SCS-3

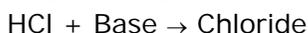
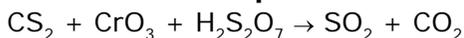


Performance:

Measurement Range	Extended	Standard	Extended
	2.5 – 50 ppm	5 – 100 ppm	10 – 200 ppm
No. of Pump Strokes	2 (200 ml)	1 (100 ml)	0.5 (50 ml)
Volume Correction Factor (VCF)*	0.5	1.0	2.0
Sampling Time	1.5 minutes per pump stroke (100 ml)		
Colour Change	Greenish blue → Yellow		
Detection Limit	2.5 ppm (2 pump strokes)		
Shelf Life	2 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Ammonia	70	No	No Effect
HCN	55	No	Ring
H ₂ S	95	+	
SO ₂	30	+	

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40 °C (32 – 104 °F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

Static dilution method.

TWA (TLV): 1 ppm

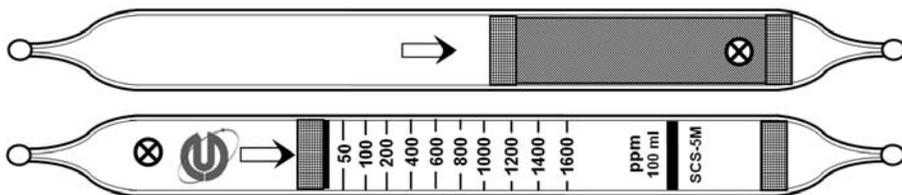
STEL (TLV): NA

Flammable Range: 1.3 – 50%

Carbon Disulphide

CS₂

SCS-5M

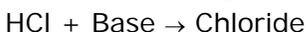
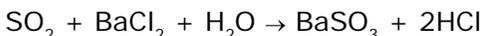
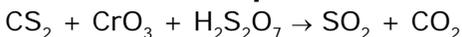


Performance:

Measurement Range	Extended	Standard	Extended
	Do not extend	50 – 1600 ppm	Do not extend
No. of Pump Strokes		1 (100 ml)	
Volume Correction Factor (VCF)*		1.0	
Sampling Time	1.5 minutes per pump stroke (100 ml)		
Colour Change	Blue → Yellow		
Detection Limit	50 ppm		
Shelf Life	2 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Hexane	300	No	No Effect
H ₂ S	100	+	
SO ₂	20	+	

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

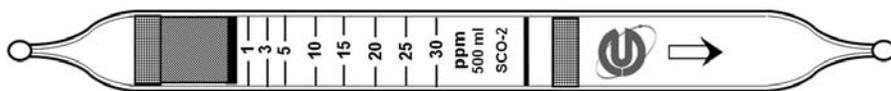
Calibration of the tube:

Static dilution method.

TWA (TLV): 1 ppm

STEL (TLV): NA

Flammable Range: 1.3 – 50%

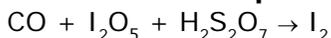


Performance:

Measurement Range	Extended	Standard	Extended
	Do not extend	1 – 30 ppm	Do not extend
No. of Pump Strokes		5 (500 ml)	
Volume Correction Factor (VCF)*		1.0	
Sampling Time	3.0 minutes per pump stroke (100 ml)		
Colour Change	White → Brownish green		
Detection Limit	1.0 ppm (5 pump strokes)		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

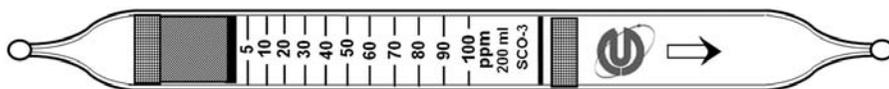
Compound	Concentration (ppm)	Interference	Colour Change / Comments
H ₂ S	100	No	No Effect
NH ₃	120	No	No Effect
Hydrogen	99.9%	No	No Effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

Static gas dilution method.

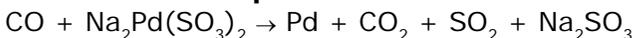


Performance:

Measurement Range	Extended	Standard	Extended
	2.5– 50 ppm	5 – 100 ppm	10– 200 ppm
No. of Pump Strokes	4(400 ml)	2 (200 ml)	1 (100 ml)
Volume Correction Factor (VCF)*	0.5	1.0	2
Sampling Time	2.5 minutes per pump stroke (100 ml)		
Colour Change	Yellow → Greenish brown		
Detection Limit	2.5 ppm (4 pump strokes)		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

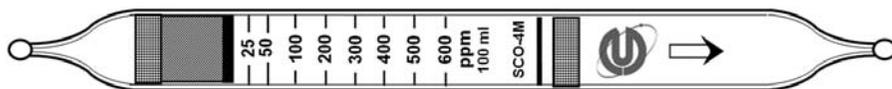
Compound	Concentration (ppm)	Interference	Colour Change / Comments
H ₂ S	100	+	
NO	200	No	No Effect
n-Hexane	100	No	No Effect
Toluene	100	No	No Effect
Ammonia	300	No	Ring

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

Static gas dilution method.

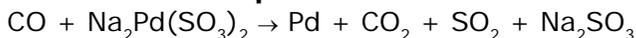


Performance:

Measurement Range	Extended	Standard	Extended
	12.5– 300 ppm	25–600 ppm	50– 1200 ppm
No. of Pump Strokes	2 (200 ml)	1 (100 ml)	0.5 (50 ml)
Volume Correction Factor (VCF)*	0.5	1.0	2
Sampling Time	4 minutes per pump stroke (100 ml)		
Colour Change	Yellow → Greenish brown		
Detection Limit	12.5 ppm (2 pump strokes)		
Shelf Life	2 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
H ₂ S	100	+	
NO	200	No	No Effect
n-Hexane	400	No	No Effect
Toluene	100	No	No Effect
Ammonia	300	No	Ring

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

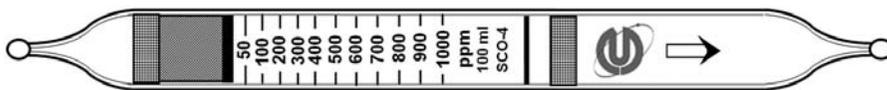
Calibration of the tube:

Static gas dilution method.

Carbon Monoxide

CO

SCO-4

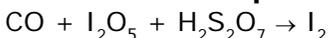


Performance:

Measurement Range	Extended	Standard	Extended
	25– 500 ppm	50 – 1000 ppm	100– 2000 ppm
No. of Pump Strokes	2 (200 ml)	1 (100 ml)	0.5 (50 ml)
Volume Correction Factor (VCF)*	0.5	1.0	2
Sampling Time	1.5 minutes per pump stroke (100 ml)		
Colour Change	White → Brownish green		
Detection Limit	25 ppm (2 pump strokes)		
Shelf Life	2 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
H ₂ S	100	No	No Effect
NH ₃	180	No	No Effect
n-Hexane	400	No	Ring
Toluene	100	No	No Effect
Hydrogen	99.9%	No	No Effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

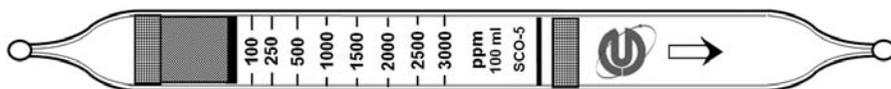
Calibration of the tube:

Static gas dilution method.

TWA (TLV): 25 ppm

STEL (TLV): NA

Flammable Range: 13–74%

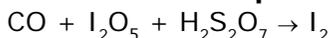


Performance:

Measurement Range	Extended	Standard	Extended
	50 – 1500 ppm	100 – 3000 ppm	200 – 6000 ppm
No. of Pump Strokes	2(200 mℓ)	1(100 mℓ)	0.5 (50 mℓ)
Volume Correction Factor (VCF)*	0.5	1.0	2
Sampling Time	2.5 minutes per pump stroke (100 mℓ)		
Colour Change	White → Brownish green		
Detection Limit	50 ppm (2 pump strokes)		
Shelf Life	2 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

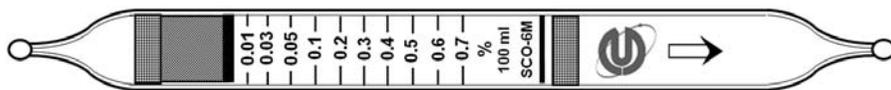
Compound	Concentration (ppm)	Interference	Colour Change / Comments
H ₂ S	100	No	No Effect
NH ₃	180	No	No Effect
n-Hexane	400	No	Ring
Hydrogen	99.9%	No	No Effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

Static gas dilution method.

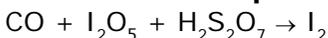


Performance:

Measurement Range	Extended	Standard	Extended
	0.005 – 0.35%	0.01 – 0.7%	0.02 – 1.4%
No. of Pump Strokes	2 (200 ml)	1 (100 ml)	0.5 (50 ml)
Volume Correction Factor (VCF)*	0.5	1.0	2
Sampling Time	3.5 minutes per pump stroke (100 ml)		
Colour Change	White → Brownish green with green top		
Detection Limit	0.005% (2 pump strokes)		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (%)	Interference	Colour Change / Comments
H ₂ S	0.01	No	No Effect
NH ₃	0.03	No	No Effect
Hydrogen	99.9	No	No Effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

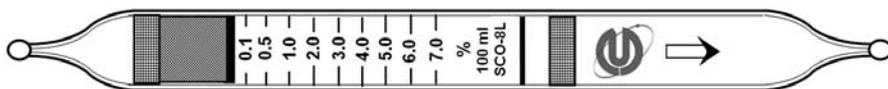
Calibration of the tube:

Static gas dilution method.

Carbon Monoxide

co

SCO-8L

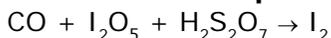


Performance:

Measurement Range	Extended	Standard	Extended
	Do not extend	0.1 – 7%	Do not extend
No. of Pump Strokes		1 (100 ml)	
Volume Correction Factor (VCF)*		1.0	
Sampling Time	3.0 minutes per pump stroke (100 ml)		
Colour Change	White → Brown with green top		
Detection Limit	0.1%		
Shelf Life	2 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (%)	Interference	Colour Change / Comments
H ₂ S	0.01	No	No Effect
NH ₃	0.03	No	No Effect
CH ₄	2.50	No	No Effect
Hexane	0.12	No	Ring
Toluene	0.01	No	No Effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

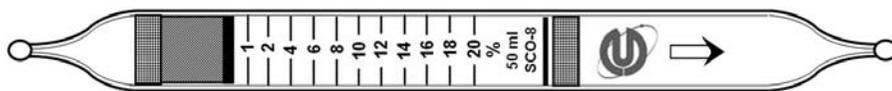
Calibration of the tube:

Static gas dilution method.

TWA (TLV): 25 ppm

STEL (TLV): NA

Flammable Range: 13–74%

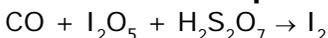


Performance:

Measurement Range	Extended 0.5 – 10%	Standard 1 – 20%	Extended Do not extend
No. of Pump Strokes	1 (100 ml)	0.5 (50 ml)	
Volume Correction Factor (VCF)*	0.5	1	
Sampling Time	2 minutes for half pump stroke (50 ml)		
Colour Change	White → Dark brown		
Detection Limit	0.5% (1 pump stroke)		
Shelf Life	2 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

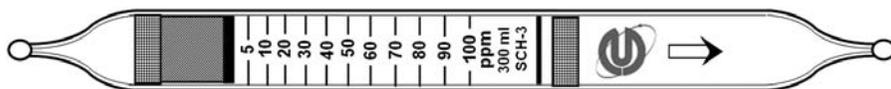
Compound	Concentration (%)	Interference	Colour Change / Comments
H ₂ S	0.01	No	No Effect
NH ₃	0.03	No	No Effect
CH ₄	2.50	No	No Effect
Hexane	0.12	No	Ring
Toluene	0.01	No	No Effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

Static gas dilution method.

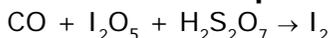


Performance:

Measurement Range	Extended	Standard	Extended
	Do not extend	5 – 100 ppm	Do not extend
No. of Pump Strokes		3 (300 ml)	
Volume Correction Factor (VCF)*		1.0	
Sampling Time	2.0 minutes per pump stroke (100 ml)		
Colour Change	White → Brownish Green		
Detection Limit	5 ppm (3 pump strokes)		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
H ₂	100%	No	No Effect
CO ₂		No	No Effect
H ₂ S		+	
NO ₂		+	
SO ₂		+	Diffuse

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

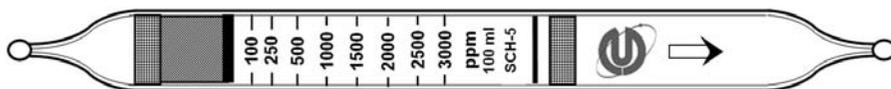
Calibration of the tube:

Static gas dilution method.

TWA (TLV): 25 ppm

STEL (TLV): NA

Flammable Range: 13–74%

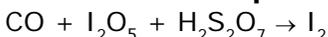


Performance:

Measurement Range	Extended	Standard	Extended
	Do not extend	100 – 3000 ppm	Do not extend
No. of Pump Strokes	1(100 ml)		
Volume Correction Factor (VCF)*	1.0		
Sampling Time	2.0 minutes per pump stroke (100 ml)		
Colour Change	White → Brownish green		
Detection Limit	100 ppm		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
H ₂	100%	No	No Effect
CO ₂	5%	No	No Effect
H ₂ S	100	No	No Effect
NO ₂	350	No	Ring
n-Hexane	100	+	

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

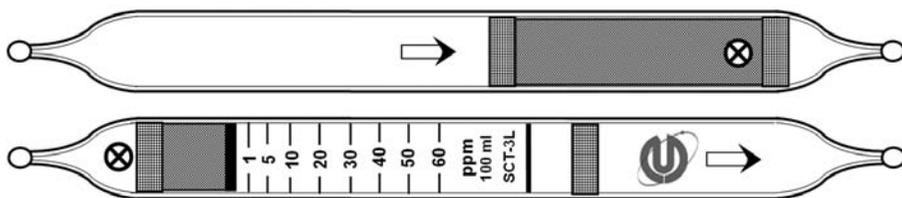
Calibration of the tube:

Static gas dilution method.

Carbon Tetrachloride

CCl₄

SCT-3L



Performance:

Measurement Range	Extended	Standard	Extended
	Do not extend	1 – 60 ppm	Do not extend
No. of Pump Strokes		1 (100 ml)	
Volume Correction Factor (VCF)*		1.0	
Sampling Time	2.5 minutes per pump stroke (100 ml)		
Colour Change	White → Pale red		
Detection Limit	1.0 ppm		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:

CCl₄ + Nitro-benzyl pyridine + benzyl aniline → Reaction product

Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
CH ₃ Br		+	Faint colour
Methylene Chloride	50	No	No Effect
Vinyl Chloride	50	No	No Effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40 °C (32 – 104 °F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

Static dilution method.

TWA (TLV): 5 ppm

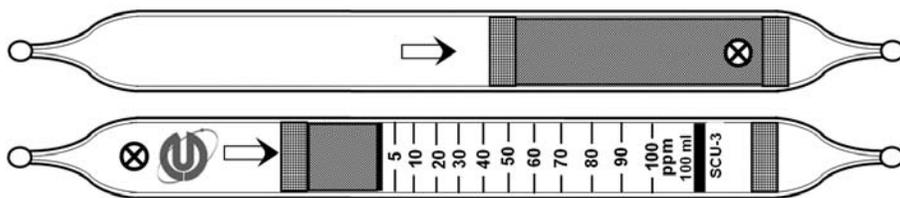
STEL (TLV): 10 ppm

Flammable Range: NA

Carbonyl Sulphide

cos

SCU-3

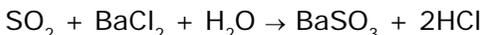


Performance:

Measurement Range	Extended	Standard	Extended
	2.5 – 50 ppm	5 – 100 ppm	10 – 200 ppm
No. of Pump Strokes	2 (200 ml)	1 (100 ml)	0.5 (50 ml)
Volume Correction Factor (VCF)*	0.5	1.0	2.0
Sampling Time	1 minute per pump stroke (100 ml)		
Colour Change	Blue → Yellow		
Detection Limit	2.5 ppm (2 pump strokes)		
Shelf Life	2 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Carbon disulphide		+	Blue to Yellow
Sulphur dioxide		+	Blue to Yellow

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

Static gas dilution method.

TWA (TLV): 5 ppm

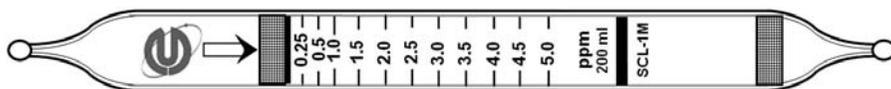
STEL (TLV): NA

Flammable Range: 12 – 19%

Chlorine



SCL-1M



Performance:

Measurement Range	Extended	Standard	Extended
	Do not extend	0.25–5.0 ppm	Do not extend
No. of Pump Strokes		2 (200 mℓ)	
Volume Correction Factor (VCF)*		1.0	
Sampling Time	1.5 minute per pump stroke (100 mℓ)		
Colour Change	White → Light orange with yellow top		
Detection Limit	0.25 ppm (2 pump strokes)		
Shelf Life	2 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:

$Cl_2 + o - \text{Tolidine} \rightarrow \text{Yellow reaction product}$

Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
ClO_2		+	White to Light orange with yellow top
NO_2		+	White to Light orange with yellow top
Br_2		+	White to Light orange with yellow top
I_2		+	White to Light orange with yellow top

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

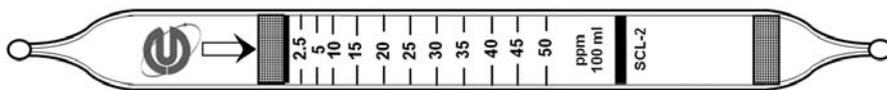
Calibration of the tube:

Gas generation kit.

TWA (TLV): 0.5 ppm

STEL (TLV): 1 ppm

Flammable Range: NA



Performance:

Measurement Range	Extended	Standard	Extended
	1.25 – 25 ppm	2.5 – 50 ppm	5 – 100 ppm
No. of Pump Strokes	2 (200 ml)	1 (100 ml)	0.5 (50 ml)
Volume Correction Factor (VCF)*	0.5	1.0	2.0
Sampling Time	1.5 minutes per pump stroke (100 ml)		
Colour Change	White → Yellow		
Detection Limit	1.25 ppm (2 pump strokes)		
Shelf Life	2 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:

Cl₂ + o – Tolidine → Yellow reaction product

Possible Interferences:

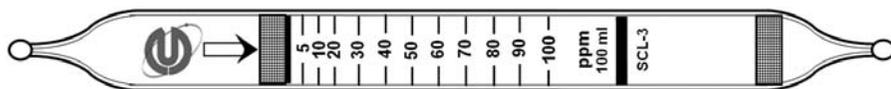
Compound	Concentration (ppm)	Interference	Colour Change / Comments
ClO ₂		+	White to Yellow
NO ₂		+	White to Yellow
Br ₂		+	White to Yellow
I ₂		+	White to Yellow

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40 °C (32 – 104 °F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

Gas generation kit.



Performance:

Measurement Range	Extended	Standard	Extended
	2.5–50 ppm	5–100 ppm	10–200 ppm
No. of Pump Strokes	2 (200 ml)	1 (100 ml)	0.5 (50 ml)
Volume Correction Factor (VCF)*	0.5	1.0	2.0
Sampling Time	1.5 minutes per pump stroke (100 ml)		
Colour Change	White → Orange with Yellow ring		
Detection Limit	2.5 ppm (2 pump strokes)		
Shelf Life	2 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:

Cl₂ + o – Tolidine → Orange – Yellow reaction product

Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
ClO ₂		+	White to Orange with Yellow ring
NO		+	Diffuse
NO ₂		+	White to Orange with Yellow ring
Br ₂		+	White to Orange with Yellow ring
I ₂		+	White to Orange with Yellow ring

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

Gas generation kit.

TWA (TLV): 0.5 ppm

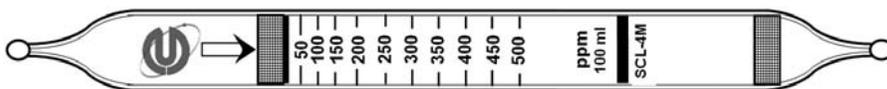
STEL (TLV): 1 ppm

Flammable Range: NA

Chlorine



SCL-4M

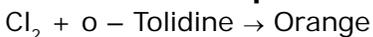


Performance:

Measurement Range	Extended	Standard	Extended
	25 – 250 ppm	50 – 500 ppm	100 – 1000 ppm
No. of Pump Strokes	2 (200 ml)	1 (100 ml)	0.5 (50 ml)
Volume Correction Factor (VCF)*	0.5	1.0	2.0
Sampling Time	2.5 minutes per pump stroke (100 ml)		
Colour Change	White → Orange		
Detection Limit	25 ppm (2 pump strokes)		
Shelf Life	2 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
ClO_2		+	White to Orange
NO_2		+	White to Orange
Br_2		+	White to Orange
I_2		+	White to Orange

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

Gas generation kit.

TWA (TLV): 0.5 ppm

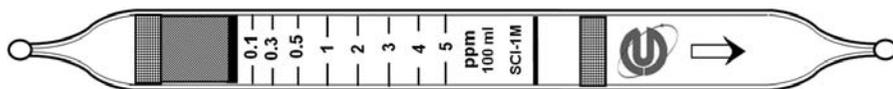
STEL (TLV): 1 ppm

Flammable Range: NA

Chlorine Dioxide



SCI-1M



Performance:

Measurement Range	Extended	Standard	Extended
	0.05 – 2.5 ppm	0.1– 5 ppm	0.2 – 10 ppm
No. of Pump Strokes	2(200 mℓ)	1(100 mℓ)	0.5 (50 mℓ)
Volume Correction Factor (VCF)*	0.5	1.0	2
Sampling Time	2.0 minutes per pump stroke (100 mℓ)		
Colour Change	White → Orange		
Detection Limit	0.05 ppm (2 pump strokes)		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:

$\text{ClO}_2 + \text{Tetramethyl benzidine} \rightarrow \text{Orange Reaction product.}$

Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Cl_2	8	No	No Effect
NO_2		+	White to Orange

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

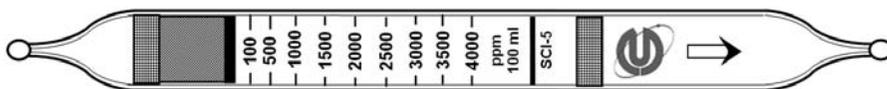
Calibration of the tube:

Static gas dilution method.

TWA (TLV): 0.1 ppm

STEL (TLV): 0.3 ppm

Flammable Range: NA



Performance:

Measurement Range	Extended	Standard	Extended
	50 – 2000 ppm	100 – 4000 ppm	200 – 8000 ppm
No. of Pump Strokes	2 (200 mℓ)	1 (100 mℓ)	0.5 (50 mℓ)
Volume Correction Factor (VCF)*	0.5	1.0	2
Sampling Time	2.5 minutes per pump stroke (100 mℓ)		
Colour Change	White → Orange		
Detection Limit	50 ppm (2 pump strokes)		
Shelf Life	2 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:

ClO₂ + O – Tolidine – Orange reaction product.

Possible Interferences:

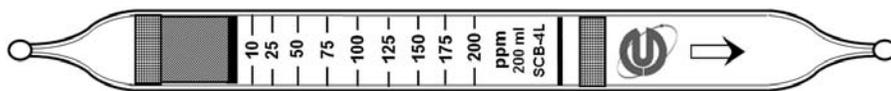
Compound	Concentration (ppm)	Interference	Colour Change / Comments
Cl ₂	>200	+	White to Orange
NO ₂	100	+	White to Orange
Bromine	70	+	White to Orange
Iodine	421	No	No change

Correction for Environmental Parameters:

Temperature (°C):	10	20	30	40
Temperature Correction Factor (TCF)*	1.22	1	0.86	0.83
Relative humidity	Not necessary between 10 – 90%.			

Calibration of the tube:

Static gas dilution method.

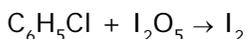


Performance:

Measurement Range	Extended	Standard	Extended
	5 – 100 ppm	10 – 200 ppm	20 – 400 ppm
No. of Pump Strokes	4 (400 ml)	2 (200 ml)	1 (100 ml)
Volume Correction Factor (VCF)*	2.0	1.0	0.5
Sampling Time	1.5 minutes per pump stroke (100 ml)		
Colour Change	White → Brown		
Detection Limit	5 ppm (4 pump strokes)		
Shelf Life	2 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

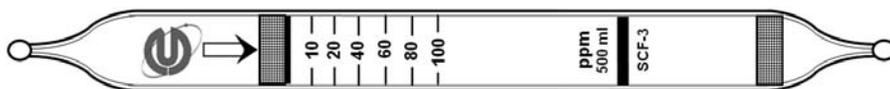
Compound	Concentration (ppm)	Interference	Colour Change / Comments
Diethyl ether		+	White to Brown
Ethyl benzene		+	White to Brown
Toluene		+	White to Brown
CO		+	White to Brown
n-Hexane		+	White to Brown

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

Static dilution method.

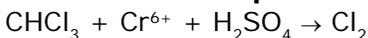


Performance:

Measurement Range	Extended	Standard	Extended
	Do not extend	10 – 100 ppm	Do not extend
No. of Pump Strokes		5 (500 ml)	
Volume Correction Factor (VCF)*		1.0	
Sampling Time	2.0 minutes per pump stroke (100 ml)		
Colour Change	White → Orange		
Detection Limit	10 ppm (5 pump strokes)		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Cl ₂		+	White to Orange
Br ₂		+	White to Orange
Saturated Halogenated Hydrocarbons		+	White to Orange

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40 °C (32 – 104 °F).
Relative humidity	Not necessary between 10 – 90%.

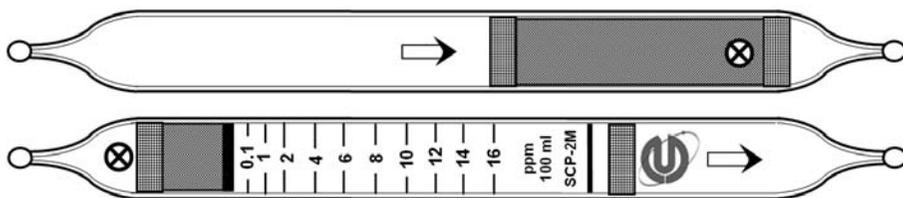
Calibration of the tube:

Static dilution method.

Chloropicrin



SCP-2M

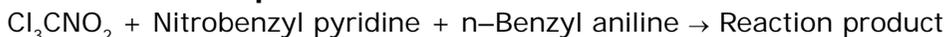


Performance:

Measurement Range	Extended	Standard	Extended
	Do not extend	0.1 – 16 ppm	Do not extend
No. of Pump Strokes		1 (100 ml)	
Volume Correction Factor (VCF)*		1.0	
Sampling Time	2.0 minutes per pump stroke (100 ml)		
Colour Change	White → Pink		
Detection Limit	0.1 ppm		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
CCl_4	10	+	Faint colour
HCl	100	No	No Effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

Static dilution method.

TWA (TLV): 0.1 ppm

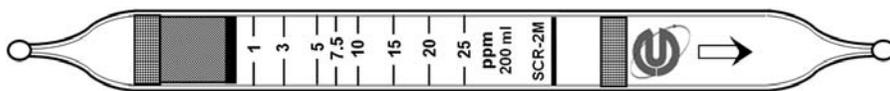
STEL (TLV): NA

Flammable Range: NA

O - Cresol



SCR-2M

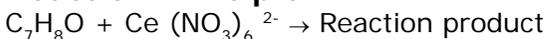


Performance:

Measurement Range	Extended	Standard	Extended
	0.5 – 12.5 ppm	1- 25 ppm	0.2 – 10 ppm
No. of Pump Strokes	4 (400 ml)	2 (200 ml)	1 (100 ml)
Volume Correction Factor (VCF)*	0.5	1.0	2.0
Sampling Time	1.5 minutes per pump stroke (100 ml)		
Colour Change	Greenish yellow → Pale gray		
Detection Limit	0.5 ppm (4 pump strokes)		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
NH ₃	300	No	No Effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

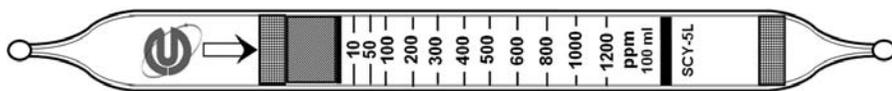
Calibration of the tube:

Static dilution method.

TWA (TLV): 5 ppm

STEL (TLV): NA

Flammable Range: 1.1% Or higher

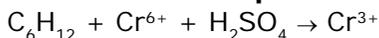


Performance:

Measurement Range	Extended	Standard	Extended
	Do not extend	10 – 1200 ppm	Do not extend
No. of Pump Strokes		1 (100 ml)	
Volume Correction Factor (VCF)*		1.0	
Sampling Time	1.0 minute per pump stroke (100 ml)		
Colour Change	Yellow → Pale green		
Detection Limit	10 ppm (1 pump stroke)		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

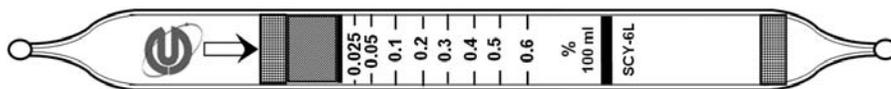
Compound	Concentration (ppm)	Interference	Colour Change / Comments
Organic vapours		+	Pale Green

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

Static dilution method.



Performance:

Measurement Range	Extended	Standard	Extended
		Do not extend	0.025 – 0.6%
No. of Pump Strokes		1 (100 mℓ)	
Volume Correction Factor (VCF)*		1.0	
Sampling Time	1.5 minute per pump stroke (100 mℓ)		
Colour Change	Orange → Brownish green		
Detection Limit	0.025%		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

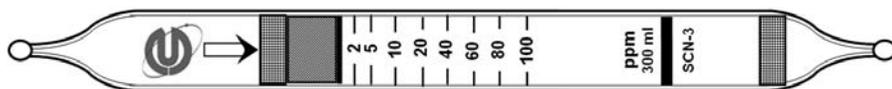
Compound	Concentration (ppm)	Interference	Colour Change / Comments
Organic vapours		+	Pale Green

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

Static dilution method.

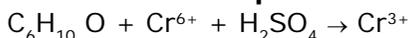


Performance:

Measurement Range	Extended	Standard	Extended
	Do not extend	2 – 100 ppm	Do not extend
No. of Pump Strokes		3 (300 ml)	
Volume Correction Factor (VCF)*		1.0	
Sampling Time	1.5 minute per pump stroke (100 ml)		
Colour Change	Yellow → Pale green		
Detection Limit	2 ppm (3 pump strokes)		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Alcohols		+	Yellow → Pale green
Esters		+	Yellow → Pale green
Ketones		+	Yellow → Pale green
Aromatic Hydrocarbons		+	Yellow → Pale green

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

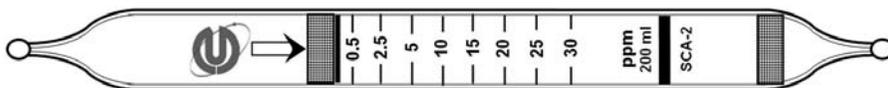
Calibration of the tube:

Static dilution method.

TWA (TLV): 20 ppm

STEL (TLV): 50 ppm

Flammable Range: 1.1 – 9.4%

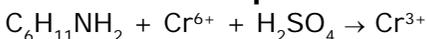


Performance:

Measurement Range	Extended	Standard	Extended
	Do not extend	0.5 – 30 ppm	Do not extend
No. of Pump Strokes	2 (200 ml)		
Volume Correction Factor (VCF)*	1.0		
Sampling Time	1.5 minute per pump stroke (100 ml)		
Colour Change	Yellow → Blue		
Detection Limit	0.5 ppm (2 pump strokes)		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
NH ₃		+	Yellow to Blue
Diethyl amine		+	Yellow to Blue
Dimethylamine		+	Yellow to Blue

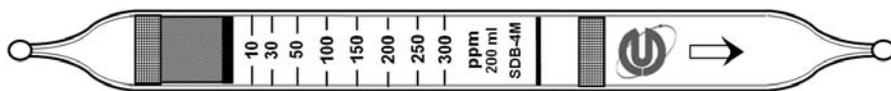
Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

Static dilution method.

1,2-Dichlorobenzene

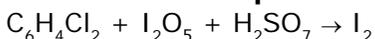
**SDB-4M**

Performance:

Measurement Range	Extended	Standard	Extended
	Do not extend	10 – 300 ppm	Do not extend
No. of Pump Strokes		2 (200 ml)	
Volume Correction Factor (VCF)*		1.0	
Sampling Time	1.5 minutes per pump stroke (100 ml)		
Colour Change	White → Brown		
Detection Limit	10 ppm (2 pump strokes)		
Shelf Life	2 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Benzene		+	White to Brown
Toluene		+	White to Brown
CO		+	White to Brown
Hexane	1100	No	No Effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

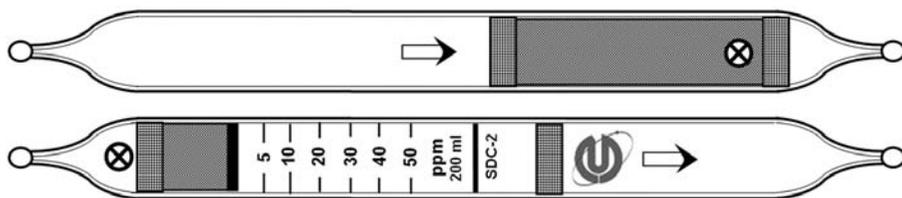
Static dilution method.

TWA (TLV): 25 ppm

STEL (TLV): 50 ppm

Flammable Range: 0.5-6%

1,2-Dichloroethane

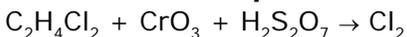
**SDC-2**

Performance:

Measurement Range	Extended	Standard	Extended
	Do not extend	5 – 50 ppm	Do not extend
No. of Pump Strokes		2 (200 ml)	
Volume Correction Factor (VCF)*		1.0	
Sampling Time	2.5 minutes per pump stroke (100 ml)		
Colour Change	White → Purple		
Detection Limit	5 ppm (2 pump strokes)		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Nitrogen Oxides		+	White to Purple
Halogens		+	White to Purple
Halogenated Hydrocarbons		+	White to Purple
Hexane	100	No	No Effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

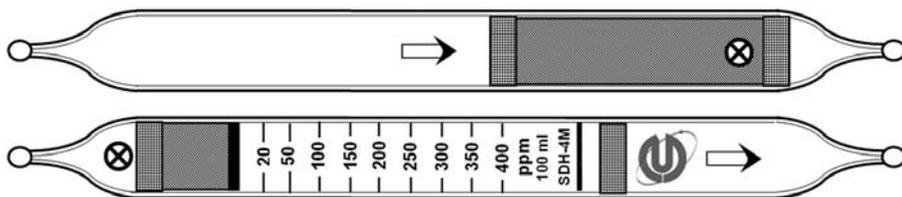
Static dilution method.

TWA (TLV): 10 ppm

STEL (TLV): 500 ppm

Flammable Range: 6.2 – 16.0%

1,2-Dichloroethylene

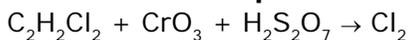
**SDH-4M**

Performance:

Measurement Range	Extended	Standard	Extended
	10 – 200 ppm	20 – 400 ppm	40 – 800 ppm
No. of Pump Strokes	2 (200 ml)	1 (100 ml)	0.5 (50 ml)
Volume Correction Factor (VCF)*	0.5	1.0	2.0
Sampling Time	2.0 minutes per pump stroke (100 ml)		
Colour Change	White → Orange		
Detection Limit	10 ppm (2 pump strokes)		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



$Cl_2 + o$ - Tolidine → Reaction product

Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Trichloroethylene		+	White to Orange
Cl_2		+	White to Orange
HCl		+	White to Orange

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

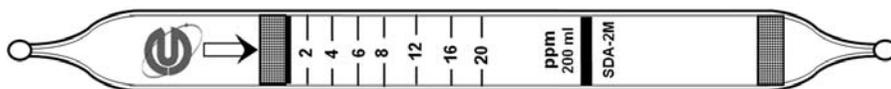
Static dilution method.

TWA (TLV): 200 ppm

STEL (TLV): NA

Flammable Range: 5.6 – 12.8%

Diethyl amine

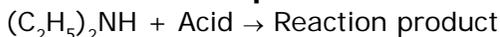
**SDA-2M**

Performance:

Measurement Range	Extended	Standard	Extended
	1 – 10 ppm	2 – 20 ppm	4 - 40 ppm
No. of Pump Strokes	4 (400 ml)	2 (200 ml)	0.5 (50 ml)
Volume Correction Factor (VCF)*	0.5	1.0	2.0
Sampling Time	1.5 minutes per pump stroke (100 ml)		
Colour Change	Yellow → Blue		
Detection Limit	1.0 ppm (4 pump strokes)		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Amines		+	Yellow to Blue
Ammonia		+	Yellow to Blue
Hydrazine		+	Yellow to Blue

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

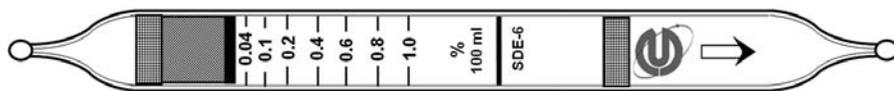
Calibration of the tube:

Static dilution method.

TWA (TLV): 5 ppm

STEL (TLV): 15 ppm

Flammable Range: 1.8 – 10.1%

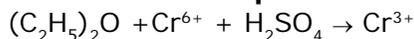


Performance:

Measurement Range	Extended Do not extend	Standard 0.04 – 1%	Extended Do not extend
No. of Pump Strokes		1 (100 ml)	
Volume Correction Factor (VCF)*		1.0	
Sampling Time	2.0 minute per pump stroke (100 ml)		
Colour Change	Yellow → Pale green		
Detection Limit	0.04%		
Shelf Life	2 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Alcohols		+	Yellow to Pale green
Esters		+	Yellow to Pale green
Ketones		+	Yellow to Pale green
Aromatic Hydrocarbons		+	Yellow to Pale green
Ethers		+	Yellow to Pale green
Furans		+	Yellow to Pale green

Other measurable compounds:

Compound	Correction Factor	No. of pump strokes	Measuring range
Isopropyl ether	0.34	3(300ml)	0.0136 – 0.34%

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

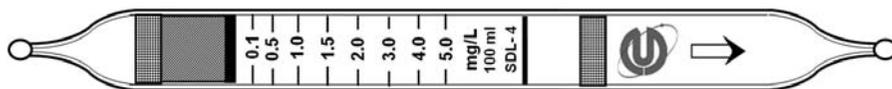
Calibration of the tube:

Static dilution method.

TWA (TLV): 400 ppm

STEL (TLV): 500 ppm

Flammable Range: 1.9 – 36%

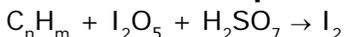


Performance:

Measurement Range	Extended Do not extend	Standard 0.1-5 mg/L	Extended Do not extend
No. of Pump Strokes		1 (100 ml)	
Volume Correction Factor (VCF)*		1.0	
Sampling Time	1.5 minute per pump stroke (100 ml)		
Colour Change	White → Brown with green top		
Detection Limit	0.1mg/L		
Shelf Life	2 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Gasoline	25	+	White to Brown with green top
Octane	5	+	White to Brown with green top
Toluene	25	+	White to Brown with green top
n-Hexane	25	+	White to Brown with green top
H ₂ S	60	+	Light Colour
Propane	100	No	No Effect
Acetone	50	No	No Effect
Benzene	25	No	No Effect

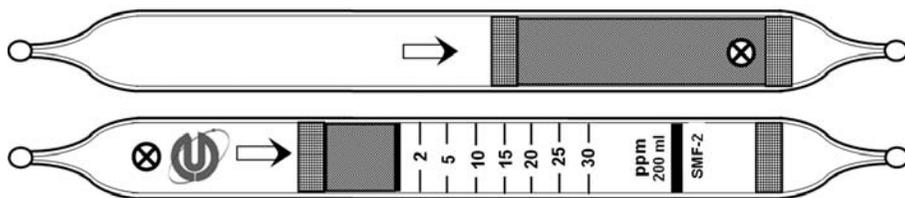
Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

Static dilution method.

Dimethylformamide

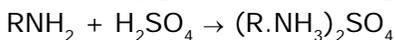
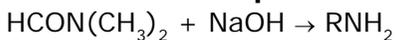
**SMF-2**

Performance:

Measurement Range	Extended	Standard	Extended
	Do not extend	2 – 30 ppm	Do not extend
No. of Pump Strokes		2 (200 ml)	
Volume Correction Factor (VCF)*		1.0	
Sampling Time	1.5 minutes per pump stroke (100 ml)		
Colour Change	Yellow → Blue		
Detection Limit	2 ppm (2 pump strokes)		
Shelf Life	2 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Amines		+	Yellow to Blue
Ammonia		+	Yellow to Blue
Hydrazine		+	Yellow to Blue

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40 °C (32 – 104 °F).
Relative humidity	Not necessary between 10 – 90%.

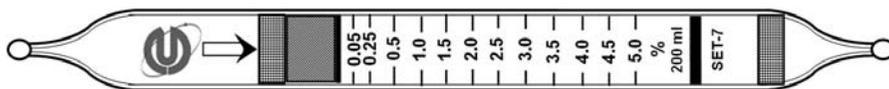
Calibration of the tube:

Static dilution method.

TWA (TLV): 10 ppm

STEL (TLV): NA

Flammable Range: 2.2-16%

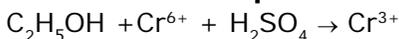


Performance:

Measurement Range	Extended	Standard	Extended
No. of Pump Strokes		0.05 - 5%	
Volume Correction Factor (VCF)*		2 (200 ml)	
Sampling Time	1.0		
Colour Change	1.5 minute per pump stroke (100 ml)		
Detection Limit	Yellow → Light green		
Shelf Life	0.05% (2 pump strokes)		
Relative standard deviation	2 year		
	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Alcohols		+	Yellow to Light green
Esters		+	Yellow to Light green
Ketones		+	Yellow to Light green
Aromatic Hydrocarbons		+	Yellow to Light green
H ₂ S		+	Diffuse
CO	1000	No	No Effect
CO ₂	5000	No	No Effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40 °C (32 – 104 °F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

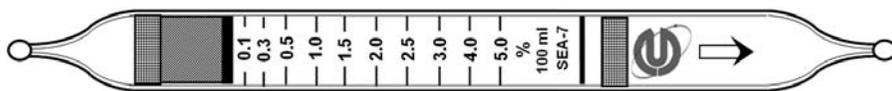
Static dilution method.

TWA (TLV): NA

STEL (TLV): 1000 ppm

Flammable Range: 3.3 – 19%

Ethyl Acetate

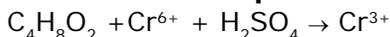
**SEA-7**

Performance:

Measurement Range	Extended	Standard	Extended
	Do not extend	0.1 – 5%	Do not extend
No. of Pump Strokes		1 (100 ml)	
Volume Correction Factor (VCF)*		1.0	
Sampling Time	2.5 minute per pump stroke (100 ml)		
Colour Change	Yellow → Pale green		
Detection Limit	0.1%		
Shelf Life	2 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Alcohols		+	Yellow to Pale green
Esters		+	Yellow to Pale green
Ketones		+	Yellow to Pale green
Aromatic Hydrocarbons		+	Yellow to Pale green
H ₂ S		+	Diffuse

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

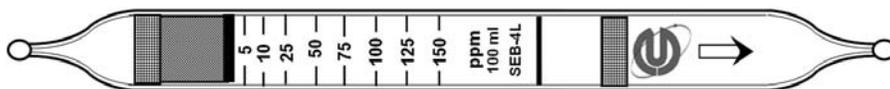
Static dilution method.

TWA (TLV): 400 ppm

STEL (TLV): NA

Flammable Range: 2.0 – 11.5%

Ethyl benzene

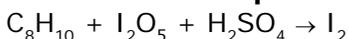
**SEB-4L**

Performance:

Measurement Range	Extended	Standard	Extended
	2.5 – 75 ppm	5 – 150 ppm	10 - 300 ppm
No. of Pump Strokes	2 (200 ml)	1 (100 ml)	0.5 (50 ml)
Volume Correction Factor (VCF)*	0.5	1.0	2.0
Sampling Time	1.5 minutes per pump stroke (100 ml)		
Colour Change	White → Brown		
Detection Limit	2.5 ppm (2 pump strokes)		
Shelf Life	2 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Benzene		+	White to Brown
Toluene		+	White to Brown
Xylene		+	White to Brown
n - Hexane	300	No	No Effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40 °C (32 – 104 °F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

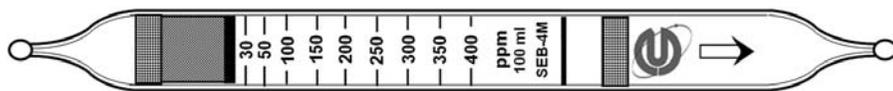
Static dilution method.

TWA (TLV): 20 ppm

STEL (TLV): NA

Flammable Range: 1- 6.7%

Ethyl benzene

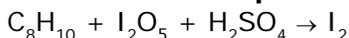
**SEB-4M**

Performance:

	Extended	Standard	Extended
Measurement Range		30 – 400 ppm	
No. of Pump Strokes		1 (100 ml)	
Volume Correction Factor (VCF)*		1.0	
Sampling Time	1.5 minutes per pump stroke (100 ml)		
Colour Change	White → Brown		
Detection Limit	30 ppm		
Shelf Life	2 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Benzene		+	White to Brown
Toluene		+	White to Brown
Xylene		+	White to Brown
n - Hexane	300	No	No Effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40 °C (32 – 104 °F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

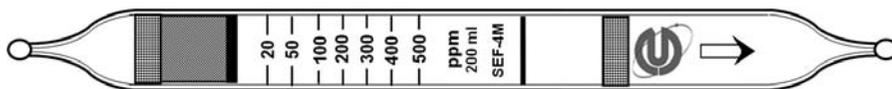
Static dilution method.

TWA (TLV): 20 ppm

STEL (TLV): NA

Flammable Range: 1- 6.7%

Ethyl Formate

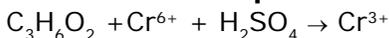
**SEF-4M**

Performance:

	Extended	Standard	Extended
Measurement Range		20 – 500 ppm	
No. of Pump Strokes		2 (200 ml)	
Volume Correction Factor (VCF)*		1.0	
Sampling Time	3.0 minutes per pump stroke (100 ml)		
Colour Change	Yellow → Pale Green		
Detection Limit	20 ppm (2 pump stroke)		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Alcohols		+	Yellow to Pale green
Esters		+	Yellow to Pale green
Ketones		+	Yellow to Pale green
Aromatic Hydrocarbons		+	Yellow to Pale green

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40 °C (32 – 104 °F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

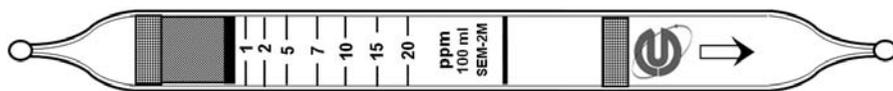
Static dilution method.

TWA (TLV): NA

STEL (TLV): 100 ppm

Flammable Range: 2.8 – 16%

Ethyl Mercaptan

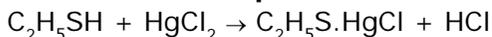
**SEM-2M**

Performance:

Measurement Range	Extended	Standard	Extended
	0.5-10 ppm	1 - 20 ppm	2-40 ppm
No. of Pump Strokes	2 (200 ml)	1 (100 ml)	0.5 (50 ml)
Volume Correction Factor (VCF)*	0.5	1.0	2.0
Sampling Time	2.0 minutes per pump stroke (100 ml)		
Colour Change	Yellow → Pink		
Detection Limit	0.5 ppm (2 pump strokes)		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Other Mercaptans		+	Yellow to Pink
PH ₃		+	Yellow to Pink
H ₂ S		+	Yellow to Pink
Arsine		+	Yellow to Pink
HClN		+	Yellow to Pink
NH ₃	100	No	No effect
SO ₂	30	No	No effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

Other measurable compounds:

Compound	Correction Factor	No. of pump strokes	Measuring range
Methyl Mercaptan	1	1	1 - 20 ppm
t-Butyl Mercaptan	1	1	1 - 20 ppm

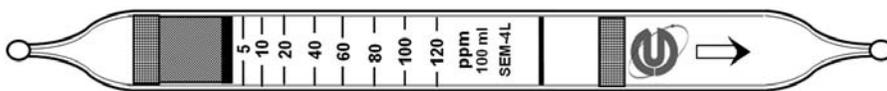
Calibration of the tube: Static dilution method.

TWA (TLV): 0.5 ppm

STEL (TLV): NA

Flammable Range: 3-18%

Ethyl Mercaptan

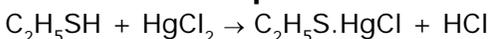
**SEM-4L**

Performance:

Measurement Range	Extended	Standard	Extended
	2.5- 60 ppm	5-120 ppm	10- 240 ppm
No. of Pump Strokes	2 (200 ml)	1 (100 ml)	0.5 (50 ml)
Volume Correction Factor (VCF)*	0.5	1.0	2.0
Sampling Time	1.5 minutes per pump stroke (100 ml)		
Colour Change	Yellow → Pink		
Detection Limit	2.5 ppm (2 pump strokes)		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Other Mercaptans		+	Yellow to Pink
PH ₃		+	Yellow to Pink
H ₂ S		+	Yellow to Pink
Arsine		+	Yellow to Pink
HCN		+	Yellow to Pink
NH ₃	100	No	No effect
SO ₂	30	No	No effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

Other measurable compounds:

Compound	Correction Factor	No. of pump strokes	Measuring range
Methyl Mercaptan	1	1	5 - 120 ppm
t-Butyl Mercaptan	1	1	5 - 120 ppm

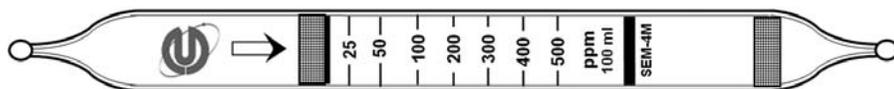
Calibration of the tube: Static dilution method.

TWA (TLV): 0.5 ppm

STEL (TLV): NA

Flammable Range: 3-18%

Ethyl Mercaptan

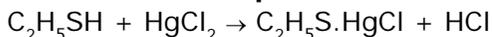
**SEM-4M**

Performance:

Measurement Range	Extended	Standard	Extended
	12.5 - 250 ppm	25 - 500 ppm	Do not extend
No. of Pump Strokes	2 (200 ml)	1 (100 ml)	
Volume Correction Factor (VCF)*	0.5	1.0	
Sampling Time	1.5 minutes per pump stroke (100 ml)		
Colour Change	Yellow → Red		
Detection Limit	12.5 ppm (2 pump strokes)		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Other Mercaptans		+	Yellow to Pink
PH ₃		+	Yellow to Pink
H ₂ S		+	Yellow to Pink
Arsine		+	Yellow to Pink
HClN		+	Yellow to Pink
NH ₃	100	No	No effect
SO ₂	30	No	No effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

Other measurable compounds:

Compound	Correction Factor	No. of pump strokes	Measuring range
Methyl Mercaptan	1	1	25 - 500 ppm
t-Butyl Mercaptan	1	1	25 - 500 ppm

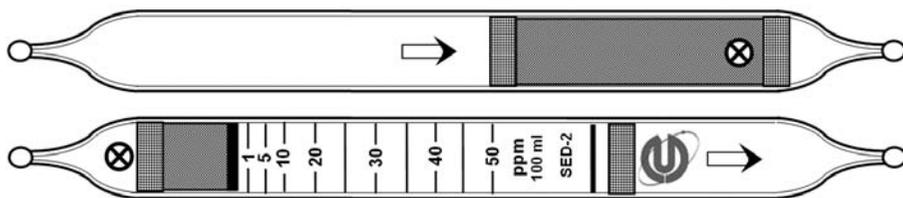
Calibration of the tube: Static dilution method.

TWA (TLV): 0.5 ppm

STEL (TLV): NA

Flammable Range: 3-18%

Ethylene Dibromide

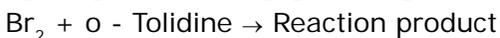
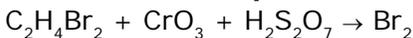
**SED-2**

Performance:

Measurement Range	Extended	Standard	Extended
	0.5 – 25 ppm	1 – 50 ppm	2 – 100 ppm
No. of Pump Strokes	2 (200 ml)	1 (100 ml)	0.5 (50 ml)
Volume Correction Factor (VCF)*	0.5	1.0	2.0
Sampling Time	2.0 minutes per pump stroke (100 ml)		
Colour Change	White → Yellow		
Detection Limit	0.5 ppm (2 pump strokes)		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Halogens		+	White to Yellow
Hexane	50	No	No Effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

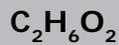
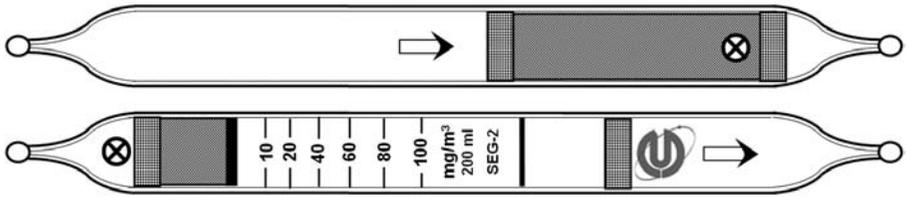
Static dilution method.

TWA (TLV): NA

STEL (TLV): NA

Flammable Range: 10-16%

Ethylene Glycol

**SEG-2**

Performance:

Measurement Range	Extended	Standard	Extended
			10 – 100 mg/m ³
No. of Pump Strokes		2 (200 ml)	
Volume Correction Factor (VCF)*		1.0	
Sampling Time	2.0 minutes per pump stroke (100 ml)		
Colour Change	Yellow → Pink		
Detection Limit	10 mg/m ³ (2 pump strokes)		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (mg/m ³)	Interference	Colour Change / Comments
Acetaldehydes		+	Yellow to Pink
Ketones		+	Yellow to Pink

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40 °C (32 – 104 °F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

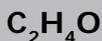
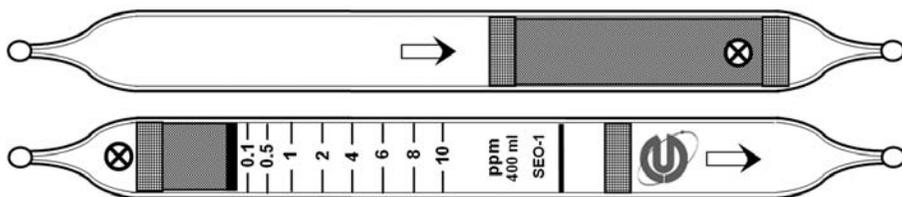
Vapour pressure method.

TWA (TLV): NA

STEL (TLV): C100 mg/m³

Flammable Range: 3.2 - 33%

Ethylene Oxide

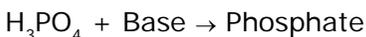
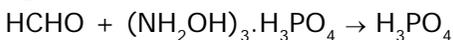
**SEO-1**

Performance:

Measurement Range	Extended	Standard	Extended
	Do not extend	0.1 – 10 ppm	Do not extend
No. of Pump Strokes		4 (400 ml)	
Volume Correction Factor (VCF)*		1.0	
Sampling Time	1.5 minutes per pump stroke (100 ml)		
Colour Change	Yellow → Pink		
Detection Limit	0.1 ppm (4 pump strokes)		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Aldehydes		+	Yellow to Pale pink
Ketones		+	Yellow to Pale pink

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

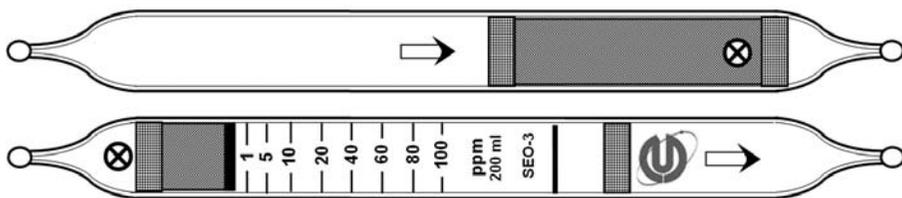
Static gas dilution method.

TWA (TLV): 1 ppm

STEL (TLV): NA

Flammable Range: 4-100%

Ethylene Oxide

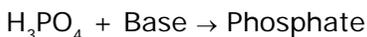
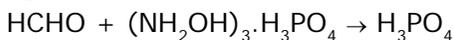
**SEO-3**

Performance:

Measurement Range	Extended	Standard	Extended
	Do not extend	1 – 100 ppm	Do not extend
No. of Pump Strokes		2 (200 ml)	
Volume Correction Factor (VCF)*		1.0	
Sampling Time	2.0 minutes per pump stroke (100 ml)		
Colour Change	Yellow → Pink		
Detection Limit	1 ppm (2 pump strokes)		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Aldehydes		+	Yellow to pink
Ketones		+	Yellow to Pink

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

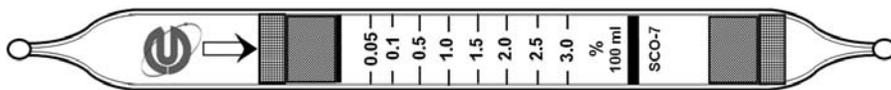
Calibration of the tube:

Static gas dilution method.

TWA (TLV): 1 ppm

STEL (TLV): NA

Flammable Range: 4-100%

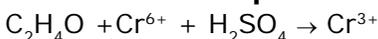


Performance:

Measurement Range	Extended	Standard	Extended
	0.025-1.5%	0.05-3.0%	0.1-6.0%
No. of Pump Strokes	2 (200 ml)	1 (100 ml)	0.5 (50 ml)
Volume Correction Factor (VCF)*	0.5	1.0	2.0
Sampling Time	2.0 minutes per pump stroke (100 ml)		
Colour Change	Orange → Brownish Green		
Detection Limit	0.025% (2 pump strokes)		
Shelf Life	2 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Alcohols		+	Orange to Brownish Green
Esters		+	Orange to Brownish Green
Ketones		+	Orange to Brownish Green
Aromatic Hydrocarbons		+	Orange to Brownish Green

Other measurable compounds:

Compound	Correction Factor	No. of pump strokes	Measuring range
1,4 Dioxane	1.3	1	0.07 – 4.0%

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40 °C (32 – 104 °F).
Relative humidity	Not necessary between 10 – 90%.

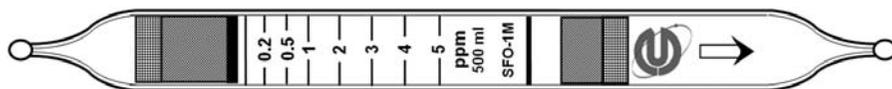
Calibration of the tube:

Static gas dilution method.

TWA (TLV): 1 ppm

STEL (TLV): NA

Flammable Range: 4-100%

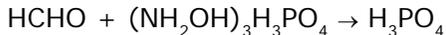


Performance:

Measurement Range	Extended	Standard	Extended
	Do not extend	0.1 – 5 ppm	Do not extend
No. of Pump Strokes		5 (500 ml)	
Volume Correction Factor (VCF)*		1.0	
Sampling Time	2 minutes per pump stroke (100 ml)		
Colour Change	Yellow → Pink		
Detection Limit	0.1 ppm (5 pump strokes)		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

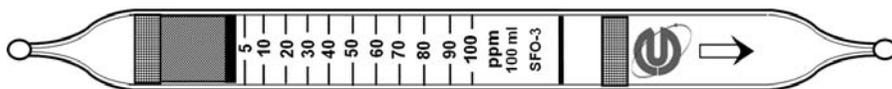
Compound	Concentration (ppm)	Interference	Colour Change / Comments
Aldehydes		+	Yellow to Pink
Ketones		+	Yellow to Pink

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

Diffusion tube method.

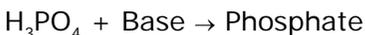
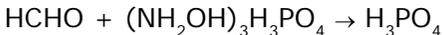


Performance:

Measurement Range	Extended	Standard	Extended
	2.5- 50 ppm	5-100 ppm	10- 200 ppm
No. of Pump Strokes	2 (200 ml)	1 (100 ml)	0.5 (50 ml)
Volume Correction Factor (VCF)*	0.5	1.0	2.0
Sampling Time	2.5 minutes per pump stroke (100 ml)		
Colour Change	Yellow → Pink		
Detection Limit	2.5 ppm (2 pump strokes)		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Aldehydes		+	Yellow to Pink
Ketones		+	Yellow to Pink
H ₂ S		+	Yellow to Light Pink

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

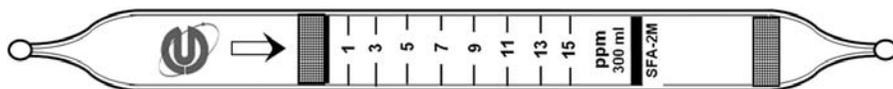
Calibration of the tube:

Diffusion tube method.

Formic Acid



SFA-2M

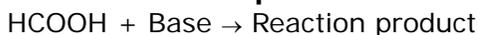


Performance:

Measurement Range	Extended	Standard	Extended
	Do not extend	1 - 15 ppm	Do not extend
No. of Pump Strokes		3 (300 ml)	
Volume Correction Factor (VCF)*		1.0	
Sampling Time	1.5 minute per pump stroke (100 ml)		
Colour Change	Purple → Yellow		
Detection Limit	1 ppm (3 pump strokes)		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Acetic Acid		+	Purple to Yellow
HCl		+	Purple to Yellow
Nitric Acid		+	Purple to Yellow
Cl_2		+	Purple to Yellow
Sulphur Dioxide		+	Purple to Yellow
Nitrogen Dioxide		+	Purple to Yellow

Correction for Environmental Parameters:

Temperature	Not necessary between 0 - 40°C (32 - 104°F).
Relative humidity	Not necessary between 10 - 90%.

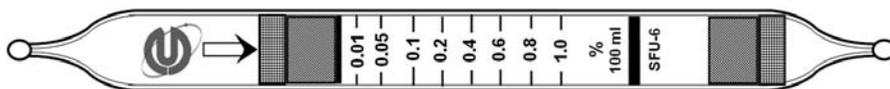
Calibration of the tube:

Static dilution method.

TWA (TLV): 5 ppm

STEL (TLV): 10 ppm

Flammable Range: NA

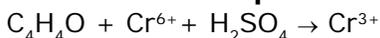


Performance:

Measurement Range	Extended	Standard	Extended
	Do not extend	0.01 – 1%	Do not extend
No. of Pump Strokes		1(100 ml)	
Volume Correction Factor (VCF)*		1.0	
Sampling Time	2 minutes per pump stroke (100 ml)		
Colour Change	Orange → Black		
Detection Limit	0.01% (1 pump stroke)		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Alcohols		+	Orange to Black
Esters		+	Orange to Black
Ketones		+	Orange to Black
Aromatic Hydrocarbons		+	Orange to Black

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

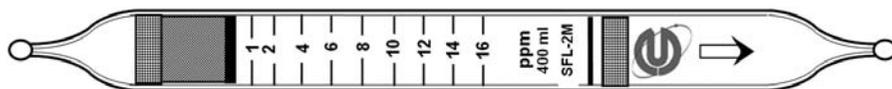
Calibration of the tube:

Static dilution method.

Furfural



SFL-2M



Performance:

Measurement Range	Extended	Standard	Extended
	Do not extend	1 - 16 ppm	Do not extend
No. of Pump Strokes		4 (400 ml)	
Volume Correction Factor (VCF)*		1.0	
Sampling Time	2 minutes per pump stroke (100 ml)		
Colour Change	Pale Yellow → Orange		
Detection Limit	1 ppm (4 pump strokes)		
Shelf Life	2 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Ketones		+	Yellow to Pale green

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

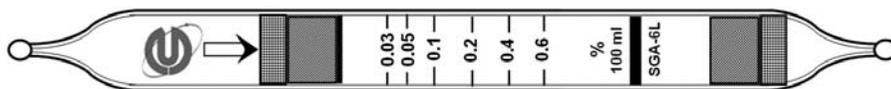
Calibration of the tube:

Static dilution method.

TWA (TLV): 2 ppm

STEL (TLV): NA

Flammable Range: 2.1 – 19.3%

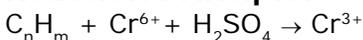


Performance:

Measurement Range	Extended	Standard	Extended
	Do not extend	0.03 – 0.6%	Do not extend
No. of Pump Strokes		1(100 ml)	
Volume Correction Factor (VCF)*		1.0	
Sampling Time	2.5 minutes per pump stroke (100 ml)		
Colour Change	Orange → Brownish green		
Detection Limit	0.03%		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
H ₂ S		+	Orange to Brownish green
Toluene		+	Orange to Brownish green
Acetone		+	Orange to Brownish green
Benzene		+	Diffuse
Ethanol		+	Orange to Brownish green
CO	500	No	Ring
CH ₄	2.5%	No	Ring
SO ₂	500	No	No Effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

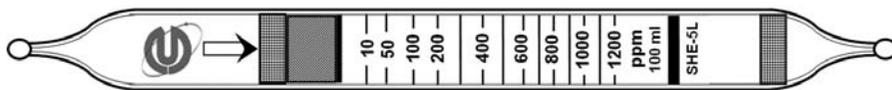
Static dilution method.

TWA (TLV): 300 ppm

STEL (TLV): 500 ppm

Flammable Range: 1.4 – 7.6%

General hydrocarbon (as Hexane) SHE-5L

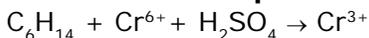


Performance:

Measurement Range	Extended	Standard	Extended
	Do not extend	10 – 1200 ppm	Do not extend
No. of Pump Strokes		1(100 ml)	
Volume Correction Factor (VCF)*		1.0	
Sampling Time	1.5 minutes per pump stroke (100 ml)		
Colour Change	Yellow → Pale green		
Detection Limit	10 ppm		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (%)	Interference	Colour Change / Comments
Organic vapours		+	Yellow to Pale green

Possible Interferences:

Compound	Correction Factor	No. of pump strokes	Measuring range
Hexane	1	1	10 – 1200 ppm
Cyclohexane	1.33	1	13.3 – 1596 ppm
n-Pentane	0.49	1	4.9 – 588 ppm
n-Octane	2.26	1	22.6 – 2712 ppm
n-Heptane	1.38	1	13.8 – 1656 ppm

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

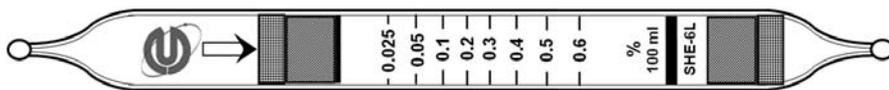
Static dilution method.

TWA (TLV): 50 ppm

STEL (TLV): NA

Flammable Range: 1.1 – 7.5%

General hydrocarbon (as Hexane) SHE-6L

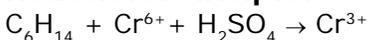


Performance:

Measurement Range	Extended	Standard	Extended
	Do not extend	0.025 – 0.6%	Do not extend
No. of Pump Strokes		1(100 ml)	
Volume Correction Factor (VCF) *		1.0	
Sampling Time	1.0 minutes per pump stroke (100 ml)		
Colour Change	Orange → Brownish green		
Detection Limit	0.025%		
Shelf Life	2 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (%)	Interference	Colour Change / Comments
Organic vapours		+	Orange to Brownish green

Other measurable compounds:

Compound	Correction Factor	No. of pump strokes	Measuring range
Hexane	1	1	0.025 – 0.6%
Cyclohexane	1.3	1	0.0325 – 0.78%
n-Pentane	0.34	1	0.0085 – 0.204%
n-Octane	3.8	1	0.095 – 2.28%
n-Heptane	2.35	1	0.05875 – 1.41%

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40 °C (32 – 104 °F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

Static dilution method.

TWA (TLV): 50 ppm

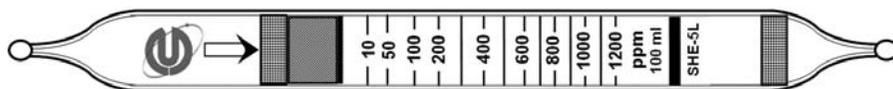
STEL (TLV): NA

Flammable Range: 1.1 – 7.5%

n-Hexane



SHE-5L

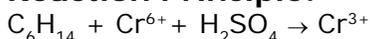


Performance:

Measurement Range	Extended	Standard	Extended
	Do not extend	10 – 1200 ppm	Do not extend
No. of Pump Strokes		1(100 ml)	
Volume Correction Factor (VCF)*		1.0	
Sampling Time	1.0 minutes per pump stroke (100 ml)		
Colour Change	Yellow → Pale green		
Detection Limit	10 ppm		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (%)	Interference	Colour Change / Comments
Organic vapours		+	Yellow to Pale green

Other measurable compounds:

Compound	Correction Factor	No. of pump strokes	Measuring range
n-Pentane	0.7	1	7 – 840 ppm
Cyclohexane	1.4	1	14 – 1680 ppm
n-Heptane	1.5	1	15 – 1800 ppm
n-Octane	2.3	1	23 – 2760 ppm

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40 °C (32 – 104 °F).
Relative humidity	Not necessary between 10 – 90%.

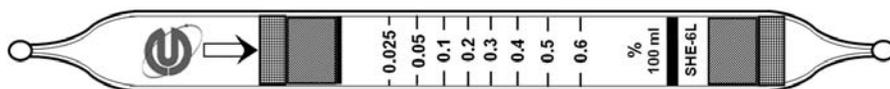
Calibration of the tube:

Static dilution method.

TWA (TLV): 50 ppm

STEL (TLV): NA

Flammable Range: 1.1 – 7.5%

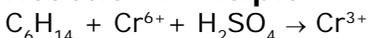


Performance:

Measurement Range	Extended	Standard	Extended
	Do not extend	0.025 – 0.6 %	Do not extend
No. of Pump Strokes		1(100 ml)	
Volume Correction Factor (VCF)*		1.0	
Sampling Time	1.0 minutes per pump stroke (100 ml)		
Colour Change	Orange → Brownish green		
Detection Limit	0.025 %		
Shelf Life	2 year		
Relative standard deviation	± 10 %		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (%)	Interference	Colour Change / Comments
Organic vapours		+	Orange to Brownish green

Other measurable compounds:

Compound	Correction Factor	No. of pump strokes	Measuring range
n-Pentane	0.34	1	0.0085 – 0.204 %
Cyclohexane	1.3	1	0.0325 – 0.78 %
n-Heptane	2.35	1	0.05875 – 1.41 %
n-Octane	3.8	1	0.095 – 2.28 %

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40 °C (32 – 104 °F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

Static dilution method.

TWA (TLV): 50 ppm

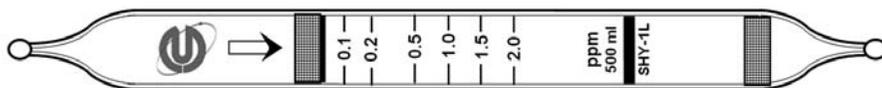
STEL (TLV): NA

Flammable Range: 1.1 – 7.5%

Hydrazine



SHY-1L



Performance:

Measurement Range	Extended	Standard	Extended
	Do not extend	0.1 - 2 ppm	Do not extend
No. of Pump Strokes		5 (500 ml)	
Volume Correction Factor (VCF)*		1.0	
Sampling Time	1 minute per pump stroke (100 ml)		
Colour Change	Yellow → Blue		
Detection Limit	0.1 ppm (5 pump strokes)		
Shelf Life	2 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Methylamine		+	Yellow to Blue
UDMH		+	Yellow to Blue
Ethylamine		+	Yellow to Blue

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40 °C (32 – 104 °F).
Relative humidity	Not necessary between 10 – 90%.

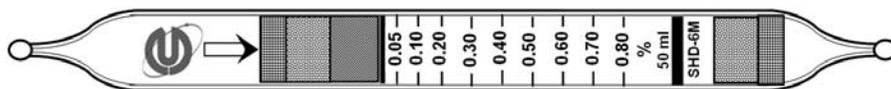
Calibration of the tube:

Static dilution method.

TWA (TLV): 0.01 ppm

STEL (TLV): NA

Flammable Range: 2.9 – 98%

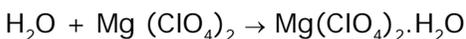


Performance:

Measurement Range	Extended	Standard	Extended
	Do not extend	0.05 – 0.8%	Do not extend
No. of Pump Strokes		0.5 (50 ml)	
Volume Correction Factor (VCF)*		1.0	
Sampling Time	0.5 minute per ½ pump stroke (50 ml)		
Colour Change	Yellow → Greenish blue		
Detection Limit	0.05% (½ pump stroke)		
Shelf Life	2 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

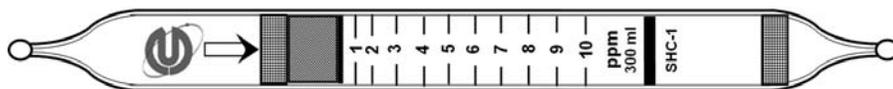
Compound	Concentration (%)	Interference	Colour Change / Comments
Methane	99.9	No	No effect
Methanol	0.005	No	No effect
Carbon monoxide	0.02	No	No effect
Water vapour	18 mg/l	No	No effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40 °C (32 – 104 °F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

Static gas dilution method.



Performance:

Measurement Range	Extended	Standard	Extended
	Do not extend	1-10 ppm	Do not extend
No. of Pump Strokes		3 (300 ml)	
Volume Correction Factor (VCF)*		1.0	
Sampling Time	1.0 minute per pump stroke (100 ml)		
Colour Change	Yellow → Light Pink		
Detection Limit	1 ppm (3 pump strokes)		
Shelf Life	2 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:

$\text{HCl} + \text{Base} \rightarrow \text{Reaction product}$

Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Cl_2		+	Yellow to Light pink
HF	27	No	No effect
NH_3	100	No	No effect
NO_2	200	No	No effect
H_2S	800	No	No effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40 °C (32 – 104 °F).
Relative humidity	Not necessary between 10 – 90%.

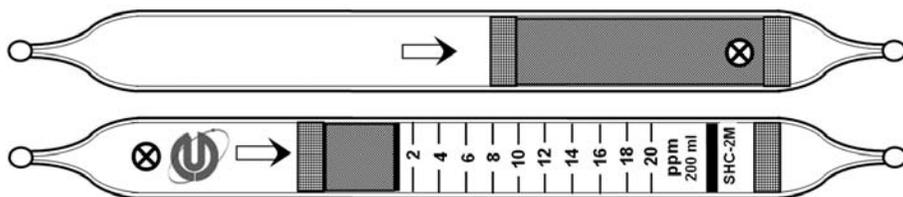
Calibration of the tube:

Diffusion tube method.

Hydrogen Chloride

HCl

SHC- 2M



Performance:

Measurement Range	Extended	Standard	Extended
	1 – 10 ppm	2 – 20 ppm	4 – 40 ppm
No. of Pump Strokes	4 (400 ml)	2 (200 ml)	1 (100 ml)
Volume Correction Factor (VCF)*	0.5	1.0	2.0
Sampling Time	1 minute per pump stroke (100 ml)		
Colour Change	Yellow → Pink		
Detection Limit	1 ppm (4 pump strokes)		
Shelf Life	2 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:

HCl + Base → Reaction product

Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
HF		+	Yellow → Pink
NH ₃	100	No	No effect
NO ₂	200	No	No effect
H ₂ S	800	No	No effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

Diffusion tube method.

(TLV): NA

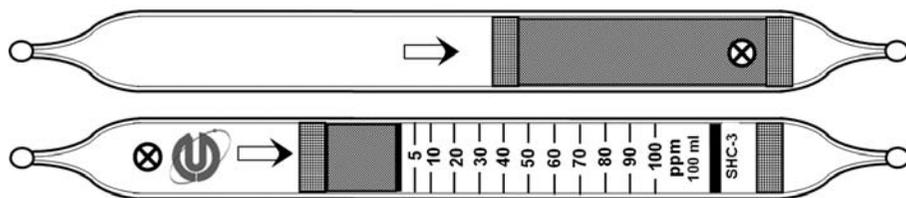
Ceiling (TLV): 2 ppm

Non Flammable

Hydrogen Chloride

HCl

SHC- 3



Performance:

Measurement Range	Extended	Standard	Extended
	2.5 – 50 ppm	5 – 100 ppm	10 – 200 ppm
No. of Pump Strokes	2 (200 ml)	1 (100 ml)	0.5 (50 ml)
Volume Correction Factor (VCF)*	0.5	1.0	2.0
Sampling Time	1 minute per pump stroke (100 ml)		
Colour Change	Yellow → Pink		
Detection Limit	2.5 ppm (2 pump strokes)		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:

HCl + Base → Reaction product

Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Cl ₂		+	Yellow to Pink
HF		+	Yellow to Diffused Pink
NH ₃	100	No	No effect
NO ₂	200	No	No effect
H ₂ S	100	No	No effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40 °C (32 – 104 °F).
Relative humidity	Not necessary between 10 – 90%.

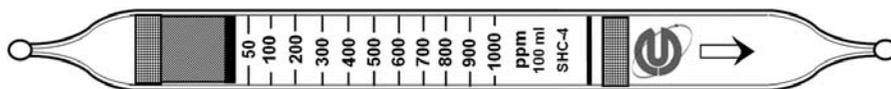
Calibration of the tube:

Diffusion tube method.

(TLV): NA

Ceiling (TLV): 2 ppm

Non Flammable



Performance:

Measurement Range	Extended	Standard	Extended
	25 - 500 ppm	50 -1000 ppm	100 - 2000 ppm
No. of Pump Strokes	2 (200 ml)	1 (100 ml)	0.5 (50 ml)
Volume Correction Factor (VCF)*	0.5	1.0	2
Sampling Time	1 minute per pump stroke (100 ml)		
Colour Change	Yellow → Pink		
Detection Limit	25 ppm (2 pump strokes)		
Shelf Life	2 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:

HCl + Base → Reaction product

Possible Interferences:

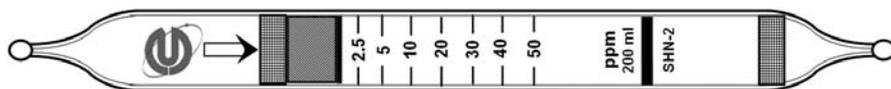
Compound	Concentration (ppm)	Interference	Colour Change / Comments
Cl ₂		+	Yellow to White
HF		+	Diffuse
NH ₃	100	No	No effect
NO ₂	200	No	No effect
H ₂ S	100	No	No effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40 °C (32 – 104 °F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

Diffusion tube method.

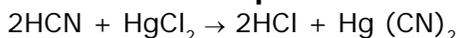


Performance:

Measurement Range	Extended	Standard	Extended
	1.25 - 25 ppm	2.5 - 50 ppm	5 - 100 ppm
No. of Pump Strokes	4 (400 ml)	2 (200 ml)	1 (100 ml)
Volume Correction Factor (VCF)*	0.5	1.0	2.0
Sampling Time	1 minute per pump stroke (100 ml)		
Colour Change	Yellow → Red		
Detection Limit	1.25 ppm (4 pump strokes)		
Shelf Life	2 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



HCl + Base → Chloride

Possible Interferences:

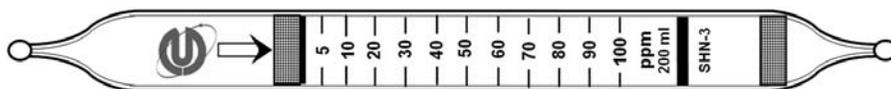
Compound	Concentration (ppm)	Interference	Colour Change / Comments
SO ₂		+	Yellow to Red
HCl		+	Yellow to Red
H ₂ S		+	Yellow to Red

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

Static gas dilution method.

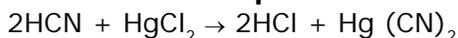


Performance:

Measurement Range	Extended 2.5 - 50 ppm	Standard 5 - 100 ppm	Extended 10 - 200 ppm
No. of Pump Strokes	4 (400 ml)	2 (200 ml)	1 (100 ml)
Volume Correction Factor (VCF) *	0.5	1.0	2.0
Sampling Time	1.5 minutes per pump stroke (100 ml)		
Colour Change	Yellow → Red		
Detection Limit	2.5 ppm (4 pump strokes)		
Shelf Life	2 year		
Relative standard deviation	± 10 %		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



HCl + Base → Chloride

Possible Interferences:

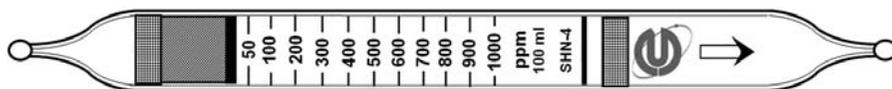
Compound	Concentration (ppm)	Interference	Colour Change / Comments
SO ₂		+	Yellow to Red
HCl		+	Yellow to Red
H ₂ S		+	Yellow to Red
CH ₄	25000	No	No Effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40 °C (32 – 104 °F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

Static gas dilution method.

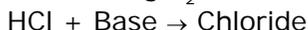
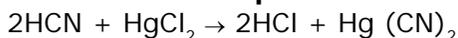


Performance:

Measurement Range	Extended	Standard	Extended
	Do not extend	50 - 1000 ppm	Do not extend
No. of Pump Strokes		1 (100 ml)	
Volume Correction Factor (VCF)*		1.0	
Sampling Time	1 minute per pump stroke (100 ml)		
Colour Change	Yellow → Red		
Detection Limit	50 ppm		
Shelf Life	2 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

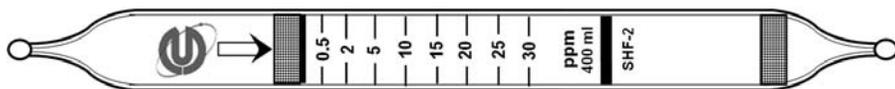
Compound	Concentration (ppm)	Interference	Colour Change / Comments
SO ₂		+	Yellow to Red
HCl		+	Yellow to Red
H ₂ S		+	Yellow to Red
CH ₄	25000	No	No Effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

Static gas dilution method.



Performance:

Measurement Range	Extended	Standard	Extended
	Do not extend	0.5 - 30 ppm	1 - 60 ppm
No. of Pump Strokes		4 (400 ml)	2 (200 ml)
Volume Correction Factor (VCF)*		1.0	2.0
Sampling Time	1 minute per pump stroke (100 ml)		
Colour Change	Pale green → Purple		
Detection Limit	0.5 ppm (4 pump strokes)		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:

HF + Base → Reaction product

Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
HCl		+	Pale green to Purple
Cl ₂		+	Pale green to Purple
H ₂ S	800	No	No effect
SO ₂	200	No	No effect

Correction for Environmental Parameters:

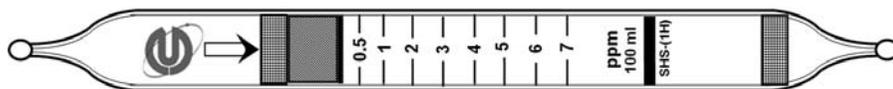
Temperature	Not necessary between 0 - 40°C (32 - 104°F).				
Relative Humidity at 20°C:	30%	40%	50%	60%	80%
Correction Factor (HCF)*:	0.5	0.7	1.0	1.2	1.7

*Multiply the observed reading by the correction factors (VCF x HCF) to obtain the true concentration.

Calibration of the tube:

Static gas dilution method.

Hydrogen Sulfide in Natural Gas SHS-(1H)

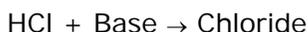
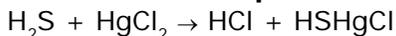


Performance:

Measurement Range	Extended	Standard	Extended
	0.25- 3.5 ppm	0.5 - 7 ppm	1- 14 ppm
No. of Pump Strokes	2 (200 ml)	1 (100 ml)	0.5 (50 ml)
Volume Correction Factor (VCF)*	0.5	1.0	2.0
Sampling Time	2.0 minutes per pump stroke (100 ml)		
Colour Change	Yellow → Pink		
Detection Limit	0.25 ppm (2 pump strokes)		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
H ₂ S in Air		+	Yellow to Pink
NH ₃	100	No	No effect
NO ₂	3	No	No effect
SO ₂	20	No	No effect
Mercaptan		+	Yellow to Pink

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

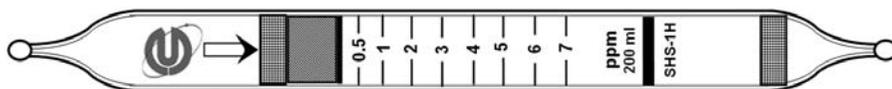
Calibration of the tube:

Static gas dilution method.

TWA (TLV): 1 ppm

STEL (TLV): 5 ppm

Flammable Range: 4-44%

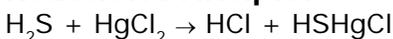


Performance:

Measurement Range	Extended	Standard	Extended
	0.25- 3.5 ppm	0.5 - 7 ppm	1- 14 ppm
No. of Pump Strokes	4 (400 ml)	2 (200 ml)	1 (100 ml)
Volume Correction Factor (VCF) *	0.5	1.0	2.0
Sampling Time	2.0 minutes per pump stroke (100 ml)		
Colour Change	Yellow → Pink		
Detection Limit	0.25 ppm (4 pump strokes)		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
H ₂ S in CNG		+	Yellow to Pink
NH ₃	100	No	No effect
NO ₂	5	No	No effect
SO ₂	30	No	No effect
Mercaptan		+	Yellow to Pink

Correction for Environmental Parameters:

Temperature	Not necessary between 0 - 40°C (32 - 104°F).				
Relative Humidity (%RH):	<10	30	50	70	90
Humidity Correction Factor at 20°C (HCF)*:	0.7	1.0	1.0	1.15	1.3

*Multiply the observed reading by the correction factor (VCF x HCF) to obtain the true concentration.

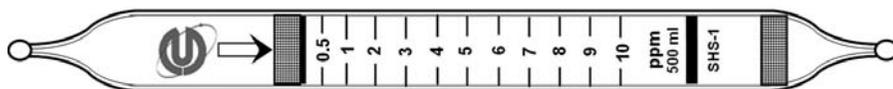
Calibration of the tube:

Static gas dilution method.

TWA (TLV): 1 ppm

STEL (TLV): 5 ppm

Flammable Range: 4-44%

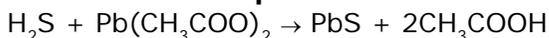


Performance:

Measurement Range	Extended	Standard	Extended
	Do not extend	0.5-10 ppm	1 - 60 ppm
No. of Pump Strokes		5 (500 ml)	2 (200 ml)
Volume Correction Factor (VCF)*		1.0	2.0
Sampling Time	1.5 minutes per pump stroke (100 ml)		
Colour Change	White → Brown		
Detection Limit	0.5 ppm (5 pump strokes)		
Shelf Life	2 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

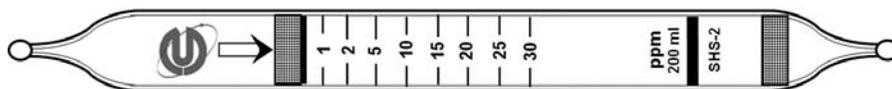
Compound	Concentration (ppm)	Interference	Colour Change / Comments
Mercaptans	100	No	No effect
SO ₂	100	No	No effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

Static gas dilution method.

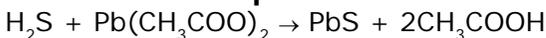


Performance:

Measurement Range	Extended	Standard	Extended
	0.5 - 15 ppm	1 - 30 ppm	2 - 60 ppm
No. of Pump Strokes	4 (400 ml)	2 (200 ml)	1 (100 ml)
Volume Correction Factor (VCF)*	0.5	1.0	2.0
Sampling Time	1.5 minutes per pump stroke (100 ml)		
Colour Change	White → Light brown		
Detection Limit	0.5 ppm (4 pump strokes)		
Shelf Life	2 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Mercaptans	100	No	No effect
SO ₂	100	No	No effect

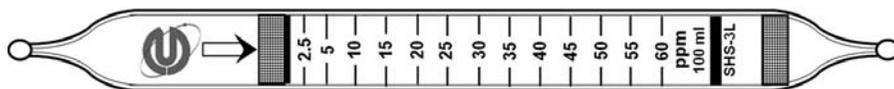
Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

Static gas dilution method.

Hydrogen Sulfide

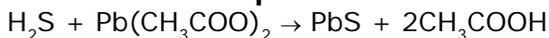
**SHS-3L**

Performance:

Measurement Range	Extended	Standard	Extended
	1.25-30 ppm	2.5-60 ppm	5-120 ppm
No. of Pump Strokes	2 (200 ml)	1 (100 ml)	0.5 (50 ml)
Volume Correction Factor (VCF)*	0.5	1.0	2.0
Sampling Time	1.5 minutes per pump stroke (100 ml)		
Colour Change	White → Brown		
Detection Limit	1.25 ppm (2 pump strokes)		
Shelf Life	2 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Mercaptans	100	No	No effect
SO ₂	100	No	No effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40 °C (32 – 104 °F).
Relative humidity	Not necessary between 10 – 90%.

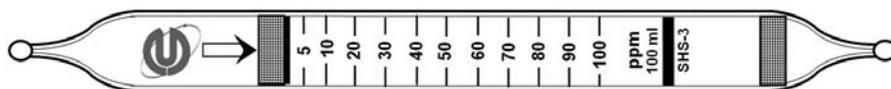
Calibration of the tube:

Static gas dilution method.

TWA (TLV): 1 ppm

STEL (TLV): 5 ppm

Flammable Range: 4-44%

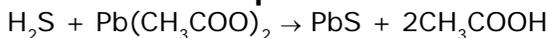


Performance:

Measurement Range	Extended	Standard	Extended
	2.5 - 50 ppm	5 - 100 ppm	10 - 200 ppm
No. of Pump Strokes	2 (200 ml)	1 (100 ml)	0.5 (50 ml)
Volume Correction Factor (VCF)*	0.5	1.0	2.0
Sampling Time	1.5 minutes per pump stroke (100 ml)		
Colour Change	White → Brown		
Detection Limit	2.5 ppm (2 pump strokes)		
Shelf Life	2 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Mercaptans	100	No	No effect
SO ₂	100	No	No effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40 °C (32 – 104 °F).
Relative humidity	Not necessary between 10 – 90%.

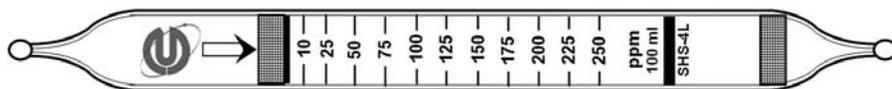
Calibration of the tube:

Static gas dilution method.

Hydrogen Sulfide

H₂S

SHS-4L

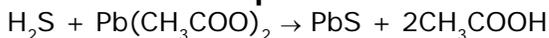


Performance:

Measurement Range	Extended	Standard	Extended
	5-125 ppm	10-250 ppm	20-500 ppm
No. of Pump Strokes	2 (200 ml)	1 (100 ml)	0.5 (50 ml)
Volume Correction Factor (VCF)*	0.5	1.0	2.0
Sampling Time	1.0 minutes per pump stroke (100 ml)		
Colour Change	White → Brown		
Detection Limit	5 ppm (2 pump strokes)		
Shelf Life	2 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Mercaptans	100	No	No effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

Static gas dilution method.

TWA (TLV): 1 ppm

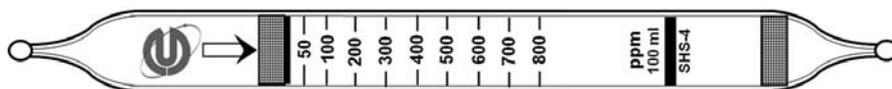
STEL (TLV): 5 ppm

Flammable Range: 4-44%

Hydrogen Sulfide

H₂S

SHS-4

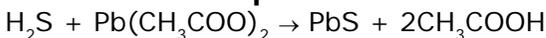


Performance:

Measurement Range	Extended	Standard	Extended
	25 - 400 ppm	50 - 800 ppm	100 - 1600 ppm
No. of Pump Strokes	2 (200 ml)	1 (100 ml)	0.5 (50 ml)
Volume Correction Factor (VCF) *	0.5	1.0	2.0
Sampling Time	2.5 minutes per pump stroke (100 ml)		
Colour Change	White → Brown		
Detection Limit	25 ppm (2 pump strokes)		
Shelf Life	2 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Mercaptans	100	No	No effect
SO ₂	100	No	No effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40 °C (32 – 104 °F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

Static gas dilution method.

TWA (TLV): 1 ppm

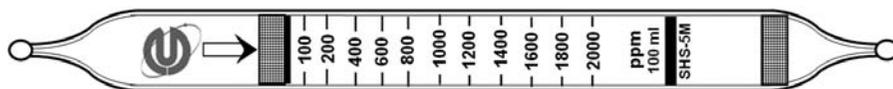
STEL (TLV): 5 ppm

Flammable Range: 4-44%

Hydrogen Sulfide

H₂S

SHS-5M

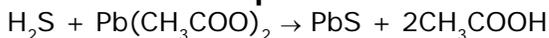


Performance:

Measurement Range	Extended	Standard	Extended
	50-1000 ppm	100-2000 ppm	200-4000 ppm
No. of Pump Strokes	2 (200 ml)	1 (100 ml)	0.5 (50 ml)
Volume Correction Factor (VCF)*	0.5	1.0	2.0
Sampling Time	1.5 minutes per pump stroke (100 ml)		
Colour Change	White → Brown		
Detection Limit	50 ppm (2 pump strokes)		
Shelf Life	2 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Mercaptans	500	No	No effect
NO ₂	200	No	No effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40 °C (32 – 104 °F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

Static gas dilution method.

TWA (TLV): 1 ppm

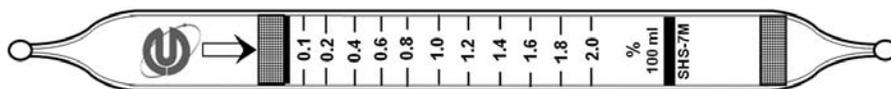
STEL (TLV): 5 ppm

Flammable Range: 4-44%

Hydrogen Sulfide

H₂S

SHS-7M

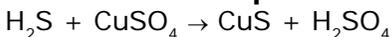


Performance:

Measurement Range	Extended	Standard	Extended
	0.05 - 1.0%	0.1 - 2.0%	0.2 - 4.0%
No. of Pump Strokes	2 (200 ml)	1 (100 ml)	0.5 (50 ml)
Volume Correction Factor (VCF)*	0.5	1.0	2.0
Sampling Time	2.5 minutes per pump stroke (100 ml)		
Colour Change	Light Blue → Dark Brown		
Detection Limit	0.05% (2 pump strokes)		
Shelf Life	2 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (%)	Interference	Colour Change / Comments
Mercaptans		+	Light Blue to Greenish Yellow
NH ₃	0.03	No	No effect
NO ₂	0.02	No	No effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

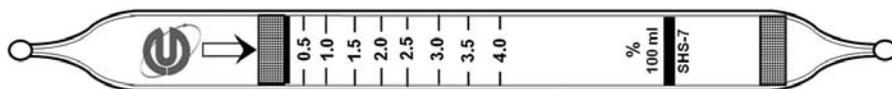
Calibration of the tube:

Static gas dilution method.

TWA (TLV): 1 ppm

STEL (TLV): 5 ppm

Flammable Range: 4-44%

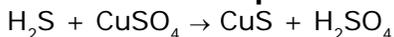


Performance:

Measurement Range	Extended 0.25 – 2%	Standard 0.5 - 4.0%	Extended 1 - 8.0%
No. of Pump Strokes	2 (200 ml)	1 (100 ml)	0.5 (50 ml)
Volume Correction Factor (VCF)*	0.5	1.0	2.0
Sampling Time	1.5 minutes per pump stroke (100 ml)		
Colour Change	Light Blue → Dark Brown		
Detection Limit	0.25% (2 pump strokes)		
Shelf Life	2 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (%)	Interference	Colour Change / Comments
Mercaptans		+	Light Blue to Greenish Yellow
NH ₃	0.03	No	No effect
NO ₂	0.02	No	No effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40 °C (32 – 104 °F).
Relative humidity	Not necessary between 10 – 90%.

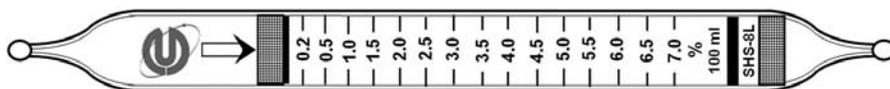
Calibration of the tube:

Static gas dilution method.

Hydrogen Sulfide

H₂S

SHS-8L

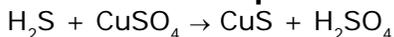


Performance:

Measurement Range	Extended	Standard	Extended
	0.1-3.5%	0.2-7.0%	0.4-14%
No. of Pump Strokes	2 (200 ml)	1 (100 ml)	0.5 (50 ml)
Volume Correction Factor (VCF)*	0.5	1.0	2.0
Sampling Time	1.5 minutes per pump stroke (100 ml)		
Colour Change	Light Blue → Dark Brown		
Detection Limit	0.1% (2 pump strokes)		
Shelf Life	2 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (%)	Interference	Colour Change / Comments
Mercaptans		+	Light Blue to Greenish Yellow
NH ₃	0.03	No	No effect
NO ₂	0.02	No	No effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

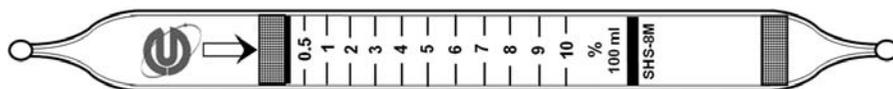
Calibration of the tube:

Static gas dilution method.

TWA (TLV): 1 ppm

STEL (TLV): 5 ppm

Flammable Range: 4-44%

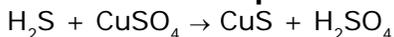


Performance:

Measurement Range	Extended 0.25 - 5%	Standard 0.5 - 10%	Extended 1 - 20%
No. of Pump Strokes	2 (200 ml)	1 (100 ml)	0.5 (50 ml)
Volume Correction Factor (VCF)*	0.5	1.0	2.0
Sampling Time	2.5 minutes per pump stroke (100 ml)		
Colour Change	Light Blue → Dark Brown		
Detection Limit	0.25% (2 pump strokes)		
Shelf Life	2 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

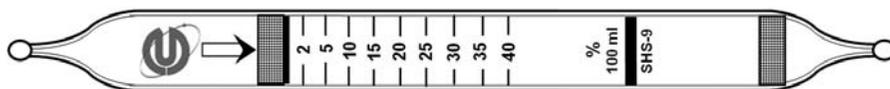
Compound	Concentration (%)	Interference	Colour Change / Comments
Mercaptans		+	Light Blue to Greenish Yellow
NH ₃	0.03	No	No effect
NO ₂	0.02	No	No effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40 °C (32 – 104 °F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

Static gas dilution method.

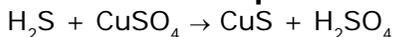


Performance:

Measurement Range	Extended	Standard	Extended
	1 - 20%	2 - 40%	Do not extend
No. of Pump Strokes	1 (100 ml)	0.5 (50 ml)	
Volume Correction Factor (VCF)*	0.5	1.0	
Sampling Time	3.5 minutes per ½ pump stroke (50 ml)		
Colour Change	Light Blue → Black		
Detection Limit	1% (1 pump stroke)		
Shelf Life	2 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

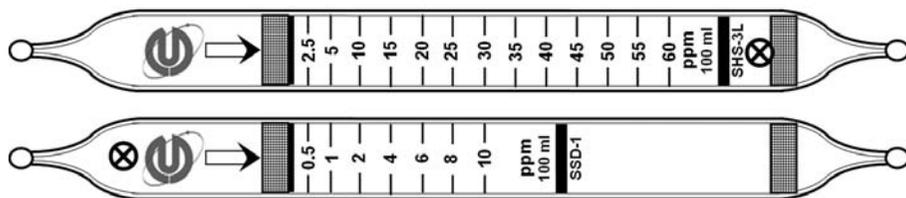
Compound	Concentration (%)	Interference	Colour Change / Comments
Mercaptans		+	Light Blue → Black
NH ₃	0.03	No	No effect
NO ₂	0.02	No	No effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40 °C (32 – 104 °F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

Static gas dilution method.

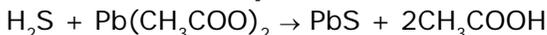


Performance:

	Extended	Standard	Extended
Measurement Range (H ₂ S)	Do not extend	2.5-60 ppm	Do not extend
Measurement Range (SO ₂)	Do not extend	0.5-10 ppm	Do not extend
No. of Pump Strokes		1 (100 ml)	
Volume Correction Factor (VCF)*		1.0	
Sampling Time	2 minutes per pump stroke (100 ml)		
Colour Change	H ₂ S: White → Brown ; SO ₂ : Purple → Yellow		
Detection Limit	H ₂ S: 2.5 ppm; SO ₂ : 0.5 ppm		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences: (For Both H₂S & SO₂)

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Toluene	100	No	No effect
CO	250	No	No effect
NH ₃	100	No	No effect
Isobutylene	106	No	No effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

Static gas dilution method.

H₂S: TWA (TLV): 1 ppm

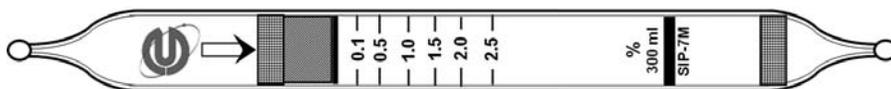
STEL (TLV): 5 ppm

Flammable Range: 4-44%

SO₂: TWA (TLV): 2 ppm

STEL (TLV): 5 ppm

Flammable Range: NA

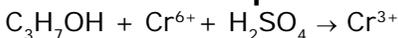


Performance:

Measurement Range	Extended	Standard	Extended
	Do not extend	0.1 – 2.5%	Do not extend
No. of Pump Strokes		3(300 ml)	
Volume Correction Factor (VCF)*		1.0	
Sampling Time	1.5 minutes per pump stroke (100 ml)		
Colour Change	Orange → Brownish green with brown top		
Detection Limit	0.1% (3 pump strokes)		
Shelf Life	2 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Alcohols		+	Orange to Brownish green
Esters		+	Orange to Brownish green
Ketones		+	Orange to Brownish green
Aromatic Hydrocarbons		+	Orange to Brownish green
H ₂ S		+	Orange to Brownish green
CO	15000	No	No Effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

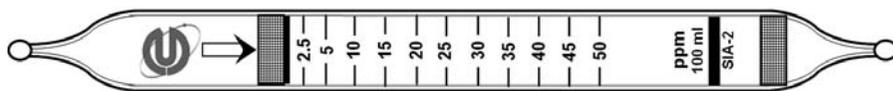
Calibration of the tube:

Static dilution method.

TWA (TLV): 200 ppm

STEL (TLV): 400 ppm

Flammable Range: 2 – 12.7%

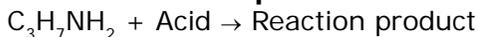


Performance:

Measurement Range	Extended	Standard	Extended
	Do not extend	2.5 – 50 ppm	Do not extend
No. of Pump Strokes		1 (100 ml)	
Volume Correction Factor (VCF)*		1.0	
Sampling Time	1.5 minutes per pump stroke (100 ml)		
Colour Change	Yellow → Blue		
Detection Limit	2.5 ppm		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

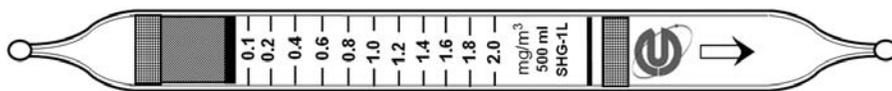
Compound	Concentration (ppm)	Interference	Colour Change / Comments
Amines		+	Yellow to Blue
NH ₃		+	Yellow to Blue

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40 °C (32 – 104 °F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

Static dilution method.



Performance:

Measurement Range	Extended	Standard	Extended
	Do not extend	0.1- 2 mg/m ³	0.35 – 7 mg/m ³
No. of Pump Strokes		5 (500 ml)	1 (100 ml)
Volume Correction Factor (VCF) *		1	3.5
Sampling Time	2.0 minutes per pump stroke (100 ml)		
Colour Change	White → Pale orange		
Detection Limit	0.1 mg/m ³ (5 pump strokes)		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

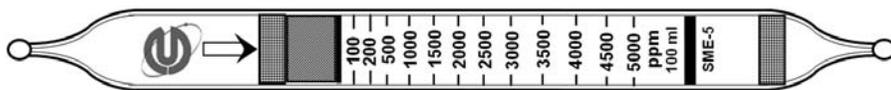
Compound	Concentration (ppm)	Interference	Colour Change / Comments
H ₂ S		+	White to Pale orange
CO ₂	5000	No	No Effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40 °C (32 – 104 °F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

Vapour pressure method.

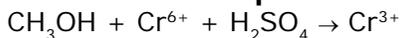


Performance:

Measurement Range	Extended	Standard	Extended
	Do not extend	100 – 5000 ppm	Do not extend
No. of Pump Strokes		1 (100 ml)	
Volume Correction Factor (VCF)*		1.0	
Sampling Time	1.5 minutes per pump stroke (100ml)		
Colour Change	Yellow → Light green		
Detection Limit	100 ppm		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

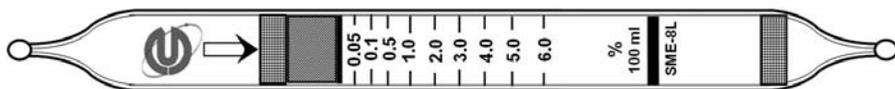
Compound	Concentration (ppm)	Interference	Colour Change / Comments
Alcohols		+	Yellow to Light green
CO ₂	10 %	No	No Effect
CO	1000	No	No Effect
SO ₂		No	No Effect
Acetone	1%	No	No Effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40 °C (32 – 104 °F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

Static dilution method.

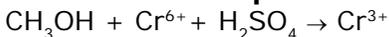


Performance:

Measurement Range	Extended	Standard	Extended
	Do not extend	0.05- 6%	0.1- 12%
No. of Pump Strokes		1 (100 ml)	0.5 (50 ml)
Volume Correction Factor (VCF)*		1	2
Sampling Time	2.0 minutes per pump stroke (100 ml)		
Colour Change	Orange → Green with brown top		
Detection Limit	0.05%		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Alcohols		+	Orange to Green with brown top
CO	1000	No	No Effect
CO ₂	10%	No	No Effect
SO ₂		No	No Effect

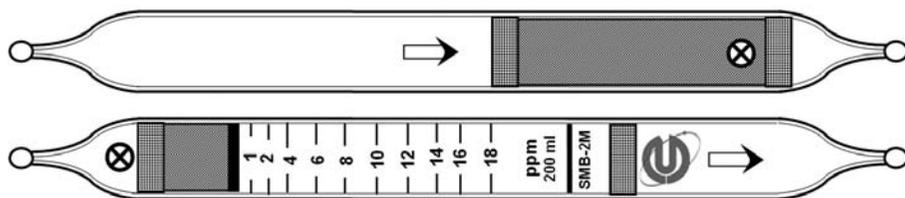
Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40 °C (32 – 104 °F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

Static dilution method.

Methyl Bromide

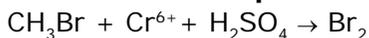
**SMB-2M**

Performance:

Measurement Range	Extended	Standard	Extended	Extended
	0.5-1 ppm	1-18 ppm	2-36 ppm	5-80 ppm
No. of Pump Strokes	3 (300 ml)	2 (200 ml)	1 (100 ml)	0.5 (50 ml)
Volume Correction Factor (VCF)*	0.5	1.0	2.0	4.5
Sampling Time	2.5 minutes per pump stroke (100 ml)			
Colour Change	White → Yellow			
Detection Limit	0.5 ppm (3 pump strokes)			
Shelf Life	1 year			
Relative standard deviation	± 10%			

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



$Br_2 + o$ - Tolidine → Yellow reaction product

Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Halogens		+	White to Yellow
Tetrachloroethylene		+	White to Yellow
Trichloroethylene		+	White to Yellow
1,2-Dichloroethane	200	No	No Effect
1,1,1-Trichloroethane	50	No	No Effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40 °C (32 – 104 °F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

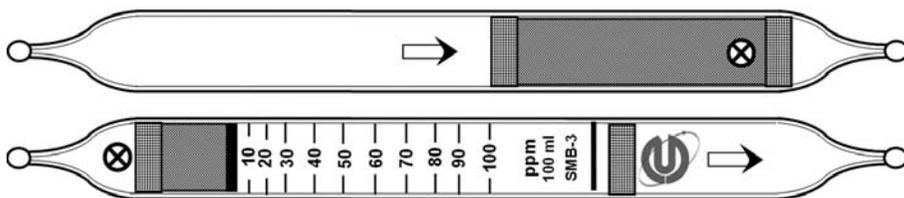
Static gas dilution method.

TWA (TLV): 1 ppm

STEL (TLV): NA

Flammable Range: 10-16%

Methyl Bromide

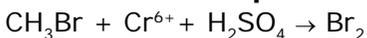
**SMB-3**

Performance:

Measurement Range	Extended	Standard	Extended
	5 – 50 ppm	10 – 100 ppm	20 – 200 ppm
No. of Pump Strokes	2 (200 ml)	1 (100 ml)	0.5 (50 ml)
Volume Correction Factor (VCF)*	0.5	1.0	2.0
Sampling Time	2.0 minutes per pump stroke (100 ml)		
Colour Change	White → Yellow		
Detection Limit	5 ppm (2 pump strokes)		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



$\text{Br}_2 + \text{o-Tolidine} \rightarrow \text{Yellow reaction product}$

Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Halogens		+	White to Yellow
Tetrachloroethylene		+	White to Yellow
Trichloroethylene		+	White to Yellow
1,2-Dichloroethane	200	No	No Effect
1,1,1-Trichloroethane	50	No	No Effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

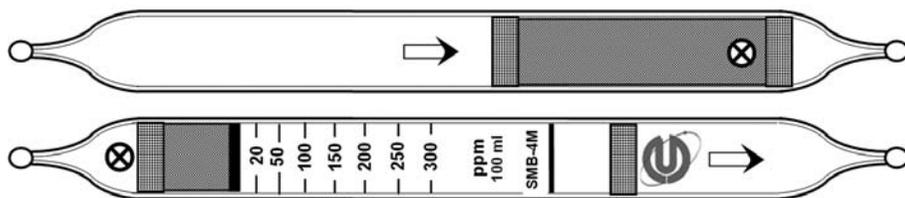
Static gas dilution method.

TWA (TLV): 1 ppm

STEL (TLV): NA

Flammable Range: 10-16%

Methyl Bromide

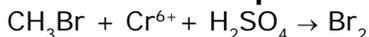
**SMB-4M**

Performance:

Measurement Range	Extended	Standard	Extended
	10 – 150 ppm	20 – 300 ppm	40 – 600 ppm
No. of Pump Strokes	2 (200 ml)	1 (100 ml)	0.5 (50 ml)
Volume Correction Factor (VCF)*	0.5	1.0	2.0
Sampling Time	1.5 minutes per pump stroke (100 ml)		
Colour Change	White → Yellow		
Detection Limit	10 ppm (2 pump strokes)		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Halogens		+	White to Yellow
Tetrachloroethylene		+	White to Yellow
Trichloroethylene		+	White to Yellow
1,2-Dichloroethane	200	No	No Effect
1,1,1-Trichloroethane	50	No	No Effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

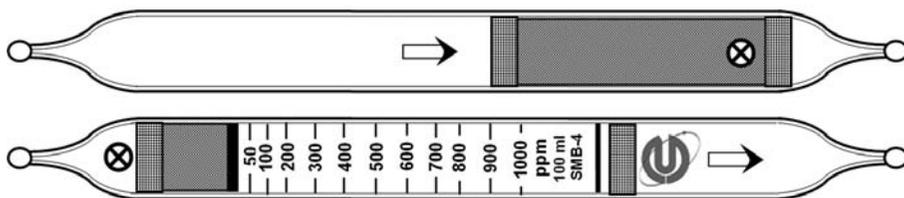
Static gas dilution method.

TWA (TLV): 1 ppm

STEL (TLV): NA

Flammable Range: 10-16%

Methyl Bromide

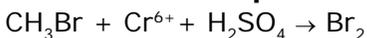
**SMB-4**

Performance:

Measurement Range	Extended	Standard	Extended
	25 – 500 ppm	50 – 1000 ppm	100 – 2000 ppm
No. of Pump Strokes	2 (200 ml)	1 (100 ml)	0.5 (50 ml)
Volume Correction Factor (VCF)*	0.5	1.0	2.0
Sampling Time	2.5 minutes per pump stroke (100 ml)		
Colour Change	White → Greenish brown		
Detection Limit	25 ppm (2 pump strokes)		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



$\text{Br}_2 + o\text{-Tolidine} \rightarrow \text{Greenish brown reaction product}$

Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Halogens		+	White → Greenish brown
Tetrachloroethylene		+	White → Greenish brown
Trichloroethylene		+	White → Greenish brown
1,2-Dichloroethane	200	No	No Effect
1,1,1-Trichloroethane	50	No	No Effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

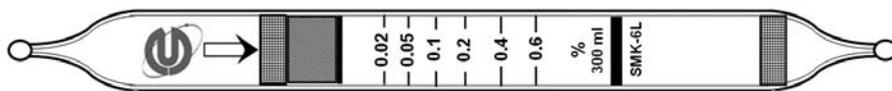
Static gas dilution method.

TWA (TLV): 1 ppm

STEL (TLV): NA

Flammable Range: 10-16%

Methyl Ethyl Ketone

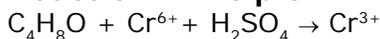
**SMK-6L**

Performance:

Measurement Range	Extended	Standard	Extended
	Do not extend	0.02-0.6%	Do not extend
No. of Pump Strokes		3 (300 ml)	
Volume Correction Factor (VCF)*		1	
Sampling Time	1.5 minutes per pump stroke (100 ml)		
Colour Change	Orange → Brownish green		
Detection Limit	0.02% (3 pump stroke)		
Shelf Life	2 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Alcohols		+	Orange to Brownish green
Esters		+	Orange to Brownish green
Ketones		+	Orange to Brownish green
Aromatic Hydrocarbons		+	Orange to Brownish green
NH ₃		+	Orange to Brownish green
H ₂ S		+	Orange to Brownish green

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

Static dilution method.

TWA (TLV): 200 ppm

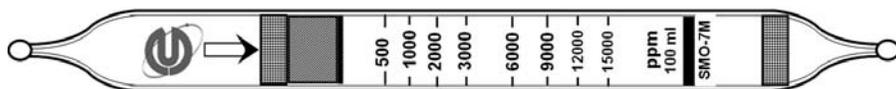
STEL (TLV): 300 ppm

Flammable Range: 1.7- 11.4%

Methyl Iodide



SMO-7M

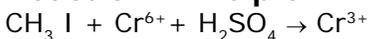


Performance:

Measurement Range	Extended	Standard	Extended
	Do not extend	500 - 15000 ppm	Do not extend
No. of Pump Strokes		1 (100 ml)	
Volume Correction Factor (VCF)*		1.0	
Sampling Time	1 minutes per pump stroke (100 ml)		
Colour Change	Orange → Greenish brown		
Detection Limit	500 ppm		
Shelf Life	2 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (%)	Interference	Colour Change / Comments
n-Hexane	1	+	Orange to Brown
CO_2	60	No	No effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

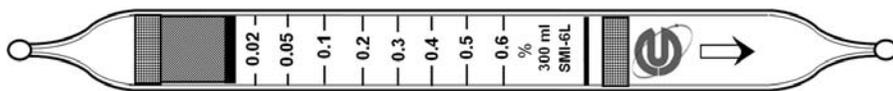
Static dilution method.

TWA (TLV): 2 ppm

STEL (TLV): NA

Nonflammable

Methyl Isobutyl Ketone

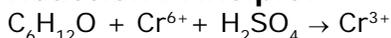

SMI-6L


Performance:

Measurement Range	Extended	Standard	Extended
	Do not extend	0.02- 0.6%	Do not extend
No. of Pump Strokes		3 (300 ml)	
Volume Correction Factor (VCF)*		1	
Sampling Time	1.5 minutes per pump stroke (100 ml)		
Colour Change	Orange → Brown green		
Detection Limit	0.02% (3 pump strokes)		
Shelf Life	2 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Alcohols		+	Orange to Brownish green
Esters		+	Orange to Brownish green
Ketones		+	Orange to Brownish green
Aromatic Hydrocarbons		+	Orange to Brownish green
NH ₃		+	Orange to Brownish green
H ₂ S		+	Orange to Brownish green
CO	15000	No	No Effect
CH ₄	2.5%	No	No Effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

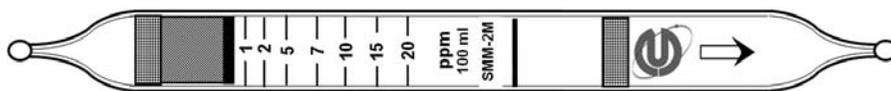
Static dilution method.

TWA (TLV): 20 ppm

STEL (TLV): 75 ppm

Flammable Range: 1.2 – 8%

Methyl Mercaptan

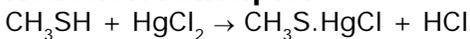
**SMM-2M**

Performance:

Measurement Range	Extended	Standard	Extended
	0.5-10 ppm	1-20 ppm	2-40 ppm
No. of Pump Strokes	2 (200 ml)	1 (100 ml)	0.5 (50 ml)
Volume Correction Factor (VCF)*	0.5	1.0	2.0
Sampling Time	1.5 minutes per pump stroke (100 ml)		
Colour Change	Yellow → Pink		
Detection Limit	0.5 ppm (2 pump strokes)		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Other Mercaptans		+	Yellow to Pink
PH_3		+	Yellow to Pink
H_2S		+	Yellow to Pink
Arsine		+	Yellow to Pink
HCN		+	Yellow to Pink
NH_3	100	No	No effect
SO_2	30	No	No effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

Other measurable compounds:

Compound	Correction Factor	No. of pump strokes	Measuring range
Ethyl Mercaptan	1	1	1 - 20 ppm
t-Butyl Mercaptan	1	1	1 - 20 ppm

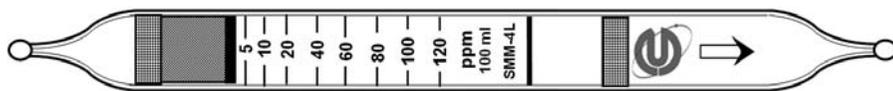
Calibration of the tube: Static dilution method.

(TLV): 0.5 ppm

STEL (TLV): NA

Flammable Range: 4-22%

Methyl Mercaptan

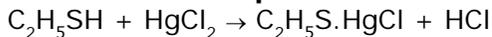
**SMM-4L**

Performance:

Measurement Range	Extended	Standard	Extended
	2.5- 60 ppm	5-120 ppm	10- 240 ppm
No. of Pump Strokes	2 (200 ml)	1 (100 ml)	0.5 (50 ml)
Volume Correction Factor (VCF)*	0.5	1.0	2.0
Sampling Time	1.5 minutes per pump stroke (100 ml)		
Colour Change	Yellow → Pink		
Detection Limit	2.5 ppm (2 pump strokes)		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Other Mercaptans		+	Yellow to Pink
PH_3		+	Yellow to Pink
H_2S		+	Yellow to Pink
Arsine		+	Yellow to Pink
HCN		+	Yellow to Pink
NH_3	100	No	No effect
SO_2	30	No	No effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

Other measurable compounds:

Compound	Correction Factor	No. of pump strokes	Measuring range
Ethyl Mercaptan	1	1	1 - 20 ppm
t-Butyl Mercaptan	1	1	1 - 20 ppm

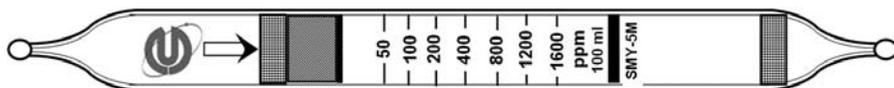
Calibration of the tube: Static dilution method.

TWA (TLV): 0.5 ppm

STEL (TLV): NA

Flammable Range: 4-22%

Methylcyclohexane

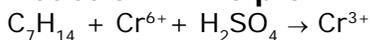
**SMY-5M**

Performance:

Measurement Range	Extended	Standard	Extended
	Do not extend	50 – 1600 ppm	Do not extend
No. of Pump Strokes		1 (100 ml)	
Volume Correction Factor (VCF)*		1.0	
Sampling Time	2.5 minutes per pump stroke (100 ml)		
Colour Change	Orange → Yellowish green		
Detection Limit	50 ppm		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Organic vapours		+	Yellowish green

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

Static dilution method.

TWA (TLV): 400 ppm

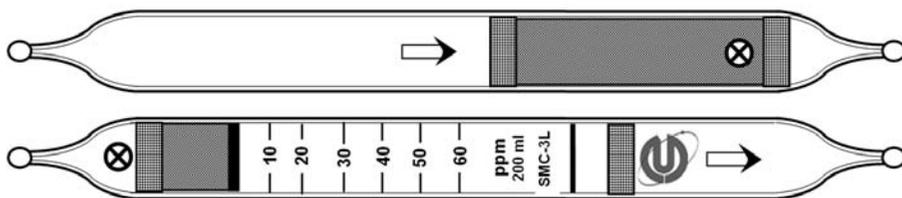
STEL (TLV): NA

Flammable Range: 1.2 – 6.7%

Methylene Chloride



SMC-3L

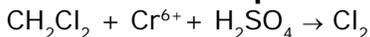


Performance:

Measurement Range	Extended	Standard	Extended
	Do not extend	10 – 60 ppm	Do not extend
No. of Pump Strokes		2 (200 mℓ)	
Volume Correction Factor (VCF)*		1.0	
Sampling Time	2.0 minutes per pump stroke (100 mℓ)		
Colour Change	White → Pale Pink		
Detection Limit	10 ppm (2 pump strokes)		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



$\text{Cl}_2 + 3,3',5,5'$ - Tertamethylbenzidine → Pale Pink reaction product

Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Cl_2		+	White to Pale Pink
Br_2		+	White to Pale Pink
I_2		+	White to Pale Pink
Chlorobenzene		+	White to Pale Pink
N – Hexane		+	White to Pale Pink
1,2 Dichloroethane		+	
1,1,1-Trichloroethane	50	No	No Effect
CH_3Br	18	No	No Effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

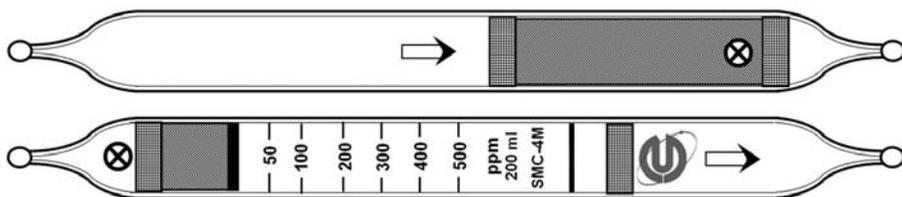
Calibration of the tube: Static gas dilution method.

TWA (TLV): 50 ppm

STEL (TLV): NA

Flammable Range: 15.5 -66.9%

Methylene Chloride


SMC-4M


Performance:

Measurement Range	Extended	Standard	Extended
	Do not extend	50 – 500 ppm	Do not extend
No. of Pump Strokes		2 (200 ml)	
Volume Correction Factor (VCF)*		1.0	
Sampling Time	2.0 minutes per pump stroke (100 ml)		
Colour Change	White → Yellow		
Detection Limit	50 ppm (2 pump strokes)		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Cl_2		+	White to Yellow
Br_2		+	
I_2		+	
Chlorobenzene		+	
N – Hexane		+	White to Pale Yellow
1,2 Dichloroethane		+	
1,1,1-Trichloroethane	50	No	No Effect
CH_3Br	18	No	No Effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

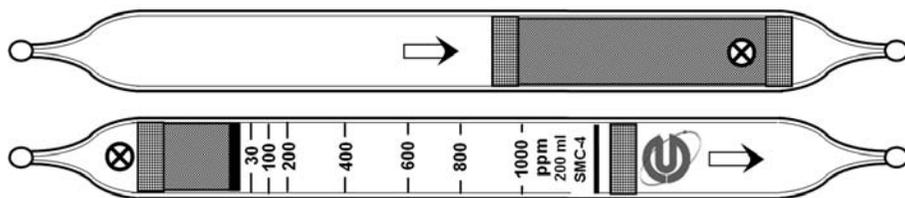
Static gas dilution method.

TWA (TLV): 50 ppm

STEL (TLV): NA

Flammable Range: 15.5 - 66.9%

Methylene Chloride

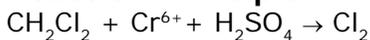
**SMC-4**

Performance:

Measurement Range	Extended	Standard	Extended
	Do not extend	30 – 1000 ppm	Do not extend
No. of Pump Strokes		2 (200 ml)	
Volume Correction Factor (VCF)*		1.0	
Sampling Time	2.5 minutes per pump stroke (100 ml)		
Colour Change	White → Orange		
Detection Limit	30 ppm (2 pump strokes)		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Chlorine	15	+	White to Yellow
Chlorobenzene	65	+	White to Yellow
n – Hexane	1345	+	White to Pale Yellow
1,2 Dichloroethane	85	+	White to Yellow

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

Static gas dilution method.

TWA (TLV): 50 ppm

STEL (TLV): NA

Flammable Range: 15.5 -66.9%

Multigas Detector Tube

SMG-1



Performance:

Measurement Range	Qualitative
No. of Pump Strokes	1 (100 ml)
Sampling Time	1.5 minutes per pump stroke (100ml)
Colour Change	Refer chart given below
Shelf Life	1 year
Relative standard deviation	± 10%

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Chart for gas concentration level versus colour change of multigas detector tube:

Compound	Concentration (ppm)	Indicating Layer	Colour change / Comments
Ammonia	40	A	Yellow to Blue
	5	A	Yellow to Blue
Amines	50	A	Yellow to Blue
	5	A	Yellow to Blue
SO ₂	20	B	Blue to Yellow
	2	B	Blue to Yellow
Acetic Acid	50	B	Blue to Yellow
HCl	300	B	Blue to Yellow
Cl ₂	20	B	Blue to Yellow
	5	B	Blue to Yellow
NO ₂	20	B	Blue to Violet
	5	C	White to Yellow
H ₂ S	20	D	White to Brown
	10	D	White to Brown
CO	50	E	Whole layer changes Yellow to brown
	10	E	Whole layer changes Yellow to light brown
PH ₃	30	E	Yellow to Black
	2	E	Yellow to Black
Acetylene	600	E	Whole layer changes Yellow to dark brown
	100	E	Yellow to Dark brown
CH ₃ SH	10	E	Yellow to Dark brown

Interferences:

This tube is not specific to any one particular gas. If gases with similar chemical property are present along with the gases listed in the chart it can produce colour change due to their interference.

Correction for Environmental Parameters:

Temperature	Not necessary between 0 - 40°C (32 - 104°F).
Relative humidity	Not necessary between 10 - 90 %.

TWA (TLV): NA

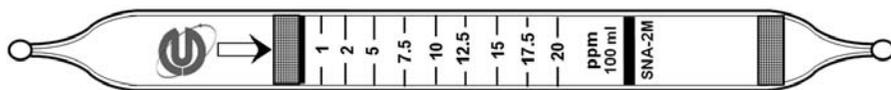
STEL (TLV): NA

Flammable Range: NA

Nitric Acid



SNA-2M



Performance:

Measurement Range	Extended	Standard	Extended
	0.5 – 10 ppm	1 – 20 ppm	2 – 40 ppm
No. of Pump Strokes	2 (200 ml)	1 (100 ml)	0.5 (50 ml)
Volume Correction Factor (VCF)*	0.5	1.0	2.0
Sampling Time	1 minute per pump stroke (100 ml)		
Colour Change	Greenish yellow → Purple		
Detection Limit	0.5 ppm (2 pump strokes)		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
HCl		+	Greenish yellow to Purple
Cl ₂		+	Greenish yellow to Purple
CO	10	No	No Effect
NO ₂	10	No	No Effect
Methanol	100	No	No Effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 - 40°C (32 - 104°F).				
Relative Humidity (mg/l):	6	8	10	12	16
Correction Factor (HCF)*:	0.53	0.72	1.0	1.2	1.41

* Multiply the observed reading by the correction factors (VCF x HCF) to obtain the true concentration.

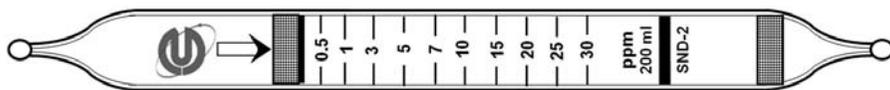
Calibration of the tube:

Static dilution method.

TWA (TLV): 2 ppm

Ceiling (TLV): 4 ppm

Flammable Range: NA



Performance:

Measurement Range	Extended	Standard	Extended
	Do not extend	0.5 - 30 ppm	Do not extend
No. of Pump Strokes		2 (200 ml)	
Volume Correction Factor (VCF)*		1.0	
Sampling Time	2.0 minute per pump stroke (100 ml)		
Colour Change	White → Orange		
Detection Limit	0.5 ppm (2 pump strokes)		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:

NO₂ + o - Tolidine → Orange reaction product

Possible Interferences:

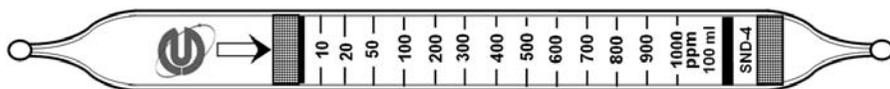
Compound	Concentration (ppm)	Interference	Colour Change / Comments
Cl ₂		+	White to Orange
Br ₂		+	White to Orange
CO	3000	No	No Effect
SO ₂	200	No	No Effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40 °C (32 – 104 °F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

Static gas dilution method.



Performance:

Measurement Range	Extended	Standard	Extended
	Do not extend	10 - 1000 ppm	Do not extend
No. of Pump Strokes		1 (100 ml)	
Volume Correction Factor (VCF)*		1.0	
Sampling Time	1.5 minute per pump stroke (100 ml)		
Colour Change	White → Pale yellow		
Detection Limit	10 ppm		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:

NO₂ + o - Tolidine → yellow reaction product

Possible Interferences:

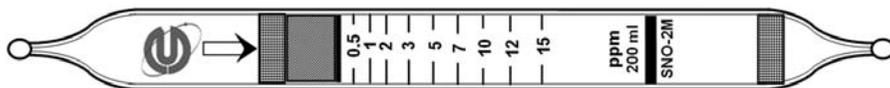
Compound	Concentration (ppm)	Interference	Colour Change / Comments
Cl ₂		+	White to Pale yellow
Br ₂		+	White to Pale yellow
CO	3000	No	No Effect
CO ₂	17000	No	No Effect
SO ₂	200	No	No Effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

Static gas dilution method.

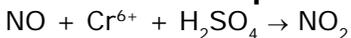


Performance:

Measurement Range	Extended	Standard	Extended
	Do not extend	0.5 - 15 ppm	Do not extend
No. of Pump Strokes		2 (200 ml)	
Volume Correction Factor (VCF)*		1.0	
Sampling Time	1.5 minutes per pump stroke (100 ml)		
Colour Change	White → Orange		
Detection Limit	0.5 ppm (2 pump strokes)		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



NO₂ + o - Tolidine → Orange reaction product

Possible Interferences:

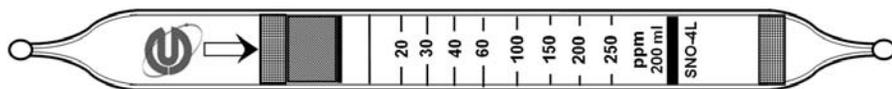
Compound	Concentration (ppm)	Interference	Colour Change / Comments
Cl ₂		+	White to Orange
Br ₂		+	White to Orange
H ₂ S	100	No	No Effect
SO ₂	200	No	No Effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

Standard gas cylinder method.

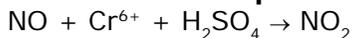


Performance:

Measurement Range	Extended	Standard	Extended
	Do not extend	(10) - 250 ppm	Do not extend
No. of Pump Strokes		2 (200 ml)	
Volume Correction Factor (VCF)*		1.0	
Sampling Time	1.5 minutes per pump stroke (100 ml)		
Colour Change	White → Yellowish orange		
Detection Limit	10 ppm (2 pump strokes)		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



NO₂ + o - Tolidine → Yellowish orange reaction product

Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Cl ₂		+	White to Yellowish orange
Br ₂		+	White to Yellowish orange
H ₂ S	100	No	No Effect
SO ₂	200	No	No Effect

Correction for Environmental Parameters:

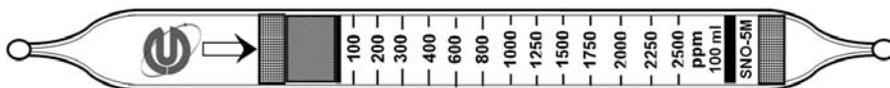
Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

Standard gas cylinder method.

TWA (TLV): 0.2 ppm (NO₂) & 50 ppm (NO)

Flammable Range: NA%

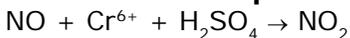


Performance:

Measurement Range	Extended	Standard	Extended
	Do not extend	100 - 2500 ppm	Do not extend
No. of Pump Strokes		1 (100 ml)	
Volume Correction Factor (VCF)*		1.0	
Sampling Time	1.5 minutes per pump stroke (100 ml)		
Colour Change	White → Yellow with orange top		
Detection Limit	100 ppm		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



NO₂ + o - Tolidine → Yellow reaction product

Possible Interferences:

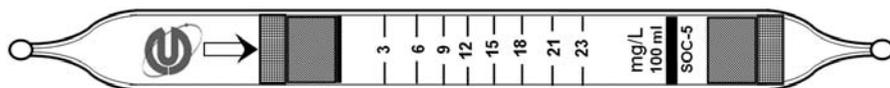
Compound	Concentration (ppm)	Interference	Colour Change / Comments
Cl ₂		+	White to Yellow with orange top
Br ₂		+	White to Yellow with orange top
H ₂ S	100	No	No Effect
SO ₂	200	No	No Effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

Standard gas cylinder method.

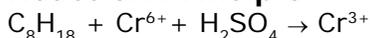


Performance:

Measurement Range	Extended	Standard	Extended
	Do not extend	3 – 23 mg/L	Do not extend
No. of Pump Strokes		1 (100 ml)	
Volume Correction Factor (VCF)*		1.0	
Sampling Time	1.5 minutes per pump stroke (100 ml)		
Colour Change	Orange → Brownish green		
Detection Limit	3 mg/L		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (%)	Interference	Colour Change / Comments
Organic vapours		+	Brownish Green

Other measurable compounds:

Compound	Correction Factor	No. of pump strokes	Measuring range
n –Hexane	0.19	1	0.57 to 4.37 mg/L
Cyclohexane	0.22	1	0.66 to 5.06 mg/L
n – Heptane	0.47	1	1.41 to 10.81 mg/L

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

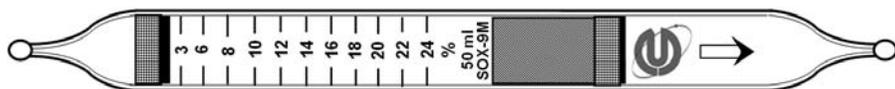
Calibration of the tube:

Static dilution method.

Oxygen



SOX-9M

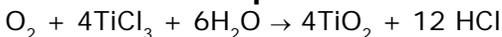


Performance:

Measurement Range	Extended	Standard	Extended
	Do not extend	3 - 24%	Do not extend
No. of Pump Strokes		0.5 (50 ml)	
Volume Correction Factor (VCF)*		1.0	
Sampling Time	2 minutes per ½ pump stroke (50 ml)		
Colour Change	Dark violet → White		
Detection Limit	3% (½ pump stroke)		
Shelf Life	2 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Carbon dioxide	20	No	No Effect
Hydrogen sulphide	4.7	No	No Effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

Static gas dilution method.

TWA (TLV): NA

STEL (TLV): NA

Flammable Range: NA

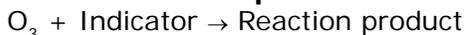


Performance:

Measurement Range	Extended	Standard	Extended
	2.5 – 50 ppm	5 – 100 ppm	10 – 200 ppm
No. of Pump Strokes	2 (200 ml)	1 (100 ml)	0.5 (50 ml)
Volume Correction Factor (VCF)*	0.5	1.0	2.0
Sampling Time	1.5 minutes per pump stroke (100 ml)		
Colour Change	Blue → White		
Detection Limit	2.5 ppm (2 pump strokes)		
Shelf Life	2 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

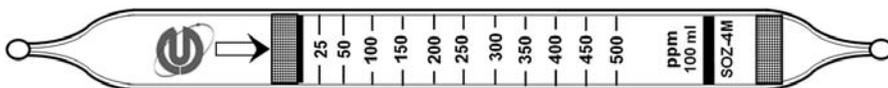
Compound	Concentration (ppm)	Interference	Colour Change / Comments
Cl ₂		+	Blue to Pale red
NO ₂		+	Blue to Light blue
SO ₂	100	No	No Effect
CO		+	Ring
H ₂ S		+	Blue to Light blue

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

Static gas dilution method.

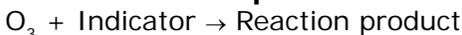


Performance:

Measurement Range	Extended	Standard	Extended
	12.5 – 250 ppm	25 – 500 ppm	50 – 1000 ppm
No. of Pump Strokes	2 (200 ml)	1 (100 ml)	0.5 (50 ml)
Volume Correction Factor (VCF)*	0.5	1.0	2.0
Sampling Time	1.5 minutes per pump stroke (100 ml)		
Colour Change	Blue → White		
Detection Limit	12.5 ppm (2 pump strokes)		
Shelf Life	2 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Cl ₂		+	Blue to Pale red
NO ₂		+	Blue to Light blue
SO ₂	100	No	No Effect
CO		+	Ring
H ₂ S		+	Blue to Light blue

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

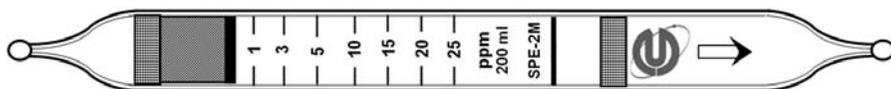
Calibration of the tube:

Static gas dilution method.

Phenol



SPE-2M

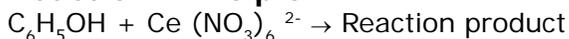


Performance:

Measurement Range	Extended	Standard	Extended
	0.5 – 12.5 ppm	1 - 25 ppm	2 - 50 ppm
No. of Pump Strokes	4 (400 ml)	2 (200 ml)	1 (100 ml)
Volume Correction Factor (VCF)*	0.5	1.0	2.0
Sampling Time	2.0 minutes per pump stroke (100 ml)		
Colour Change	Yellow → Gray		
Detection Limit	0.5 ppm (4 pump strokes)		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Arsine		+	Yellow to Gray
SO ₂	200	No	No Effect
H ₂ S		+	Yellow to Gray

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40 °C (32 – 104 °F).
Relative humidity	Not necessary between 10 – 90%.

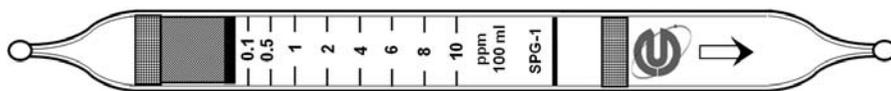
Calibration of the tube:

Static dilution method.

TWA (TLV): 5 ppm

STEL (TLV): NA

Flammable Range: 3 - 10%



Performance:

Measurement Range	Extended	Standard	Extended
	Do not extend	0.1 - 10 ppm	0.2 - 20 ppm
No. of Pump Strokes		1 (100 ml)	0.5 (50 ml)
Volume Correction Factor (VCF) *		1.0	2.0
Sampling Time	2.0 minutes per pump stroke (100 ml)		
Colour Change	White → Pale red.		
Detection Limit	0.1 ppm		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:

COCl₂ + Nitro-benzyl pyridine + benzyl aniline → Reaction product

Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Cl ₂	5	No	No Effect
HCl	10	No	No Effect
SO ₂	100	No	No Effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40 °C (32 – 104 °F).
Relative humidity	Not necessary between 10 – 90%.

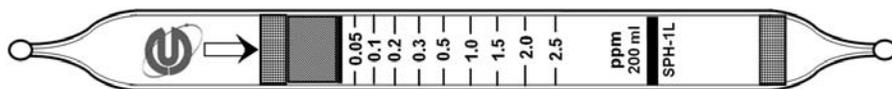
Calibration of the tube:

Static dilution method.

Phosphine



SPH-1L

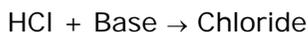
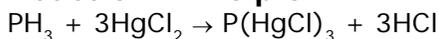


Performance:

Measurement Range	Extended	Standard	Extended
	Do not extend	0.05 – 2.5 ppm	0.1 – 5 ppm
No. of Pump Strokes		2 (200 ml)	1 (100 ml)
Volume Correction Factor (VCF)*		1.0	2.0
Sampling Time	2.0 minutes per pump stroke (100 ml)		
Colour Change	Yellow → Pink		
Detection Limit	0.05 ppm (2 pump strokes)		
Shelf Life	2 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Arsine		+	Yellow to Pink
SO ₂	200	No	No Effect
H ₂ S		+	Yellow to Pink

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

Static gas dilution method.

TWA (TLV): 0.3 ppm

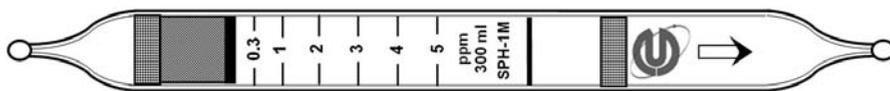
STEL (TLV): 1 ppm

Flammable Range: ~1.8 - 100%

Phosphine



SPH-1M



Performance:

Measurement Range	Extended	Standard	Extended
	Do not extend	0.3 – 5 ppm	Do not extend
No. of Pump Strokes		3 (300 ml)	
Volume Correction Factor (VCF)*		1.0	
Sampling Time	2.0 minutes per pump stroke (100 ml)		
Colour Change	Off White → Purple		
Detection Limit	0.3 ppm (3 pump strokes)		
Shelf Life	2 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Arsine		+	Off White → Purple
H ₂ S		+	Off White → Purple
H ₂ Se		+	Off White → Purple

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40 °C (32 – 104 °F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

Static gas dilution method.

TWA (TLV): 0.3 ppm

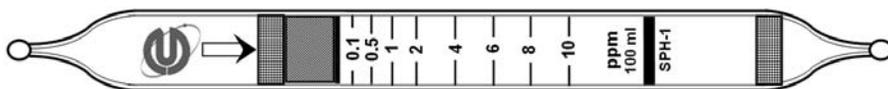
STEL (TLV): 1 ppm

Flammable Range: ~1.8 - 100%

Phosphine



SPH-1

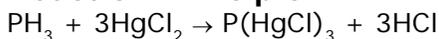


Performance:

Measurement Range	Extended	Standard	Extended
	0.05 – 5 ppm	0.1–10 ppm	0.2 – 20 ppm
No. of Pump Strokes	2 (200 ml)	1 (100 ml)	1/2 (50 ml)
Volume Correction Factor (VCF)*	0.5	1.0	2.0
Sampling Time	1.5 minutes per pump stroke (100 ml)		
Colour Change	Yellow → Pink		
Detection Limit	0.05 ppm (2 pump strokes)		
Shelf Life	2 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Arsine		+	Yellow to Pink
SO ₂	20	No	No Effect
H ₂ S		+	Yellow to Pink

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

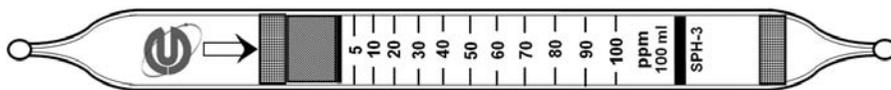
Calibration of the tube:

Static gas dilution method.

TWA (TLV): 0.3 ppm

STEL (TLV): 1 ppm

Flammable Range: ~1.8 - 100%



Performance:

Measurement Range	Extended	Standard	Extended
	2.5 – 50 ppm	5 -100 ppm	10 - 200 ppm
No. of Pump Strokes	2 (200 ml)	1 (100 ml)	0.5 (50 ml)
Volume Correction Factor (VCF)*	0.5	1.0	2.0
Sampling Time	1.5 minutes per pump stroke (100 ml)		
Colour Change	Off white → Dark brown		
Detection Limit	2.5 ppm (2 pump strokes)		
Shelf Life	2 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:

PH₃ + Gold compound → Reaction product

Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Arsine		+	Off white to Dark brown
SO ₂	200	No	No Effect
H ₂ S		+	Off white to Dark brown

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40 °C (32 – 104 °F).
Relative humidity	Not necessary between 10 – 90%.

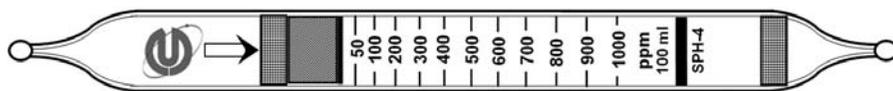
Calibration of the tube:

Static gas dilution method.

Phosphine



SPH-4



Performance:

Measurement Range	Extended	Standard	Extended
	25 - 500 ppm	50-1000 ppm	100 – 2000 ppm
No. of Pump Strokes	2 (200 ml)	1 (100 ml)	0.5 (50 ml)
Volume Correction Factor (VCF)*	0.5	1.0	2.0
Sampling Time	1 minute per stroke (100 ml)		
Colour Change	Yellow → Black		
Detection Limit	25 ppm (2 pump strokes)		
Shelf Life	2 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Arsine		+	Yellow to Black
SO ₂	1000	No	No Effect
H ₂ S		+	Yellow to Black

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40 °C (32 – 104 °F).
Relative humidity	Not necessary between 10 – 90%.

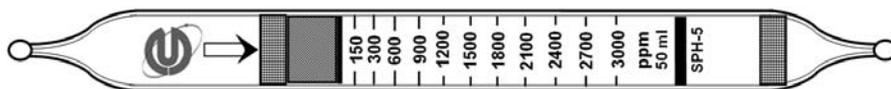
Calibration of the tube:

Static gas dilution method.

TWA (TLV): 0.3 ppm

STEL (TLV): 1 ppm

Flammable Range: ~1.8 - 100%



Performance:

Measurement Range	Extended	Standard	Extended
	75 - 1500 ppm	150 - 3000 ppm	Do not extend
No. of Pump Strokes	1 (100 ml)	0.5 (50 ml)	
Volume Correction Factor (VCF)*	0.5	1.0	
Sampling Time	1 minute per ½ pump stroke (50 ml)		
Colour Change	Yellow → Black		
Detection Limit	75 ppm (1 pump stroke)		
Shelf Life	2 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:

PH₃ + Gold compound → Reaction product

Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Arsine		+	Yellow to Black
SO ₂	3000	No	No Effect
H ₂ S		+	Yellow to Black

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40 °C (32 – 104 °F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

Static gas dilution method.

TWA (TLV): 0.3 ppm

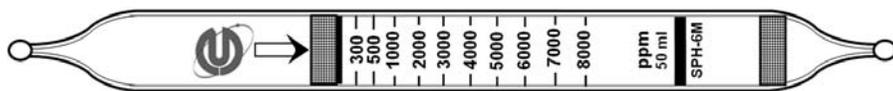
STEL (TLV): 1 ppm

Flammable Range: ~1.8 - 100%

Phosphine



SPH-6M



Performance:

Measurement Range	Extended	Standard	Extended
	Do not extend	300 - 8000 ppm	Do not extend
No. of Pump Strokes		0.5 (50 ml)	
Volume Correction Factor (VCF)*		1.0	
Sampling Time	0.5 minute per pump ½ stroke (50 ml)		
Colour Change	Yellow → Black		
Detection Limit	300 ppm (½ pump stroke)		
Shelf Life	2 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:

$\text{PH}_3 + \text{Gold compound} \rightarrow \text{Reaction product}$

Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Arsine		+	Yellow to Black
SO_2	3000	No	No Effect
H_2S		+	Yellow to Black

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40 °C (32 – 104 °F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

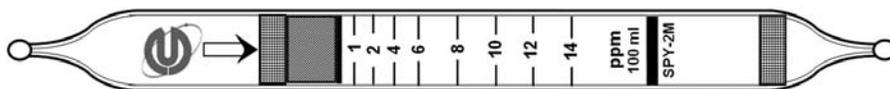
Static gas dilution method.

TWA (TLV): 0.3 ppm

STEL (TLV): 1 ppm

Flammable Range: ~1.8 - 100%

Pyridine

**SPY-2M**

Performance:

Measurement Range	Extended	Standard	Extended
	Do Not Extend	1 - 14 ppm	Do Not Extend
No. of Pump Strokes		1 (100 ml)	
Volume Correction Factor (VCF)*		1.0	
Sampling Time	1.5 minutes per pump stroke (100 ml)		
Colour Change	Purple → Pale Yellow		
Detection Limit	1 ppm		
Shelf Life	2 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Amines		+	Purple to Pale Yellow
Ammonia		+	Purple to Pale Yellow

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40 °C (32 – 104 °F).
Relative humidity	Not necessary between 10 – 90%.

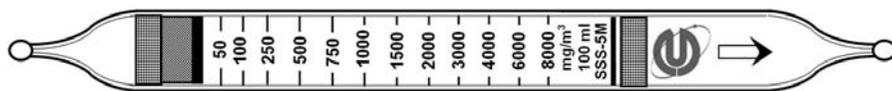
Calibration of the tube:

Static dilution method.

TWA (TLV): 1.0 ppm

STEL (TLV): NA

Flammable Range: 1.8-12.4%

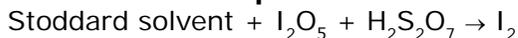


Performance:

Measurement Range	Extended	Standard	Extended
	Do not extend	50 - 8000 mg/m ³	Do not extend
No. of Pump Strokes		1 (100 ml)	
Volume Correction Factor (VCF)*		1.0	
Sampling Time	1 minute per pump stroke (100 ml)		
Colour Change	White → Brownish green		
Detection Limit	50 mg/m ³		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

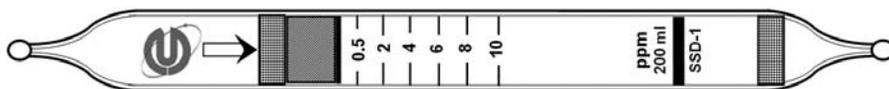
Compound	Concentration (ppm)	Interference	Colour Change / Comments
Hexane		+	Brownish green (Whole layer)
CO	1000	No	No Effect
Acetone	1500	No	No Effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

Static dilution method.



Performance:

Measurement Range	Extended	Standard	Extended
	0.25-5	0.5-10 ppm	1-20 ppm
No. of Pump Strokes	4 (400 ml)	2 (200 ml)	1 (100 ml)
Volume Correction Factor (VCF)*	0.5	1.0	2
Sampling Time	1.5 minutes per pump stroke (100 ml)		
Colour Change	Pink → Yellow		
Detection Limit	0.25 ppm (4 pump stroke)		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

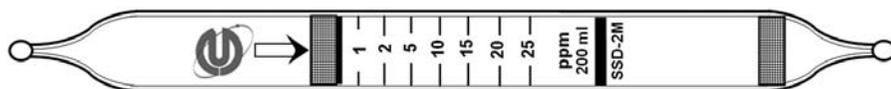
Compound	Concentration (ppm)	Interference	Colour Change / Comments
NH ₃	100	No	No effect
H ₂ S	2000	No	No effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

Static gas dilution method.

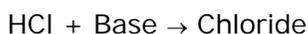
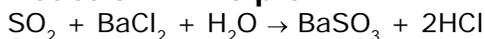


Performance:

Measurement Range	Extended 0.5 – 12.5	Standard 1 - 25 ppm	Extended 2 - 50 ppm
No. of Pump Strokes	4 (400 ml)	2 (200 ml)	1 (200 ml)
Volume Correction Factor (VCF)*	0.5	1.0	2
Sampling Time	1.5 minutes per pump stroke (100 ml)		
Colour Change	Light blue → Yellow		
Detection Limit	0.5 ppm (4 pump strokes)		
Shelf Life	2 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

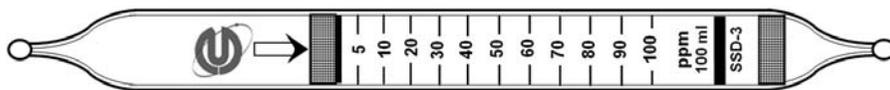
Compound	Concentration (ppm)	Interference	Colour Change / Comments
H ₂ S		+	Beige colour
HF		+	Ring
NO		+	Diffuse
CO	100	No	No effect
NH ₃	50	No	No effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

Static gas dilution method.

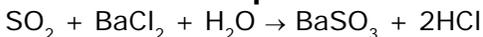


Performance:

Measurement Range	Extended	Standard	Extended
	2.5 – 50	5 - 100 ppm	10 - 200 ppm
No. of Pump Strokes	2 (200 ml)	1 (100 ml)	0.5 (50 ml)
Volume Correction Factor (VCF)*	0.5	1.0	2
Sampling Time	2.0 minutes per pump stroke (100 ml)		
Colour Change	Blue → Yellow		
Detection Limit	2.5 ppm (2 pump strokes)		
Shelf Life	2 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
H ₂ S		+	Beige colour
HF		+	Ring
NO		+	Diffuse
CO	3000	No	No effect
NH ₃	300	No	No effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

Static gas dilution method.

(TLV): NA

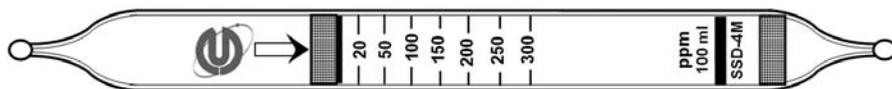
STEL (TLV): 0.25 ppm

Flammable Range: NA

Sulphur Dioxide

SO₂

SSD-4M

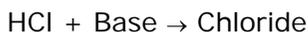
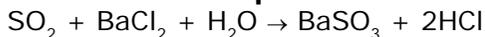


Performance:

Measurement Range	Extended	Standard	Extended
	10 – 150	20 - 300 ppm	40 - 600 ppm
No. of Pump Strokes	2 (200 ml)	1 (100 ml)	0.5 (50 ml)
Volume Correction Factor (VCF)*	0.5	1.0	2
Sampling Time	1.5 minutes per pump stroke (100 ml)		
Colour Change	Blue → Yellow		
Detection Limit	10 ppm (2 pump strokes)		
Shelf Life	2 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
H ₂ S		+	Beige colour
HF		+	Ring
NO		+	Diffuse
CO	3000	No	No effect
NH ₃	300	No	No effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

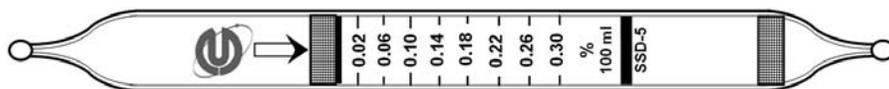
Calibration of the tube:

Static gas dilution method.

(TLV): NA

STEL (TLV): 0.25 ppm

Flammable Range: NA

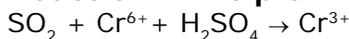


Performance:

Measurement Range	Extended	Standard	Extended
	Do not extend	0.02 – 0.3 %	Do not extend
No. of Pump Strokes		1 (100 ml)	
Volume Correction Factor (VCF)*		1.0	
Sampling Time	1 minute per pump stroke (100 ml)		
Colour Change	Yellow → Pale blue		
Detection Limit	0.02%		
Shelf Life	2 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
H ₂ S		+	Slight ring
CO		+	Slight colour change
CO ₂	0.3%	No	No Effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40 °C (32 – 104 °F).
Relative humidity	Not necessary between 10 – 90%.

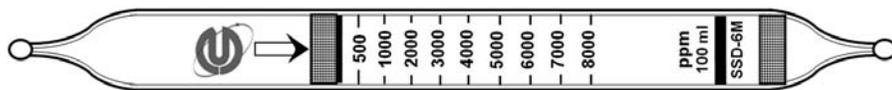
Calibration of the tube:

Static gas dilution method.

Sulphur Dioxide

SO₂

SSD-6M

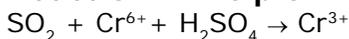


Performance:

Measurement Range	Extended	Standard	Extended
	250 – 4000	500 - 8000 ppm	1000 - 16000 ppm
No. of Pump Strokes	2 (200 ml)	1 (100 ml)	0.5 (50 ml)
Volume Correction Factor (VCF)*	0.5	1.0	2
Sampling Time	1.5 minutes per pump stroke (100 ml)		
Colour Change	Yellow → Green		
Detection Limit	250 ppm (2 pump strokes)		
Shelf Life	2 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
H ₂ S		+	Slight ring
CO		+	Slight colour change
CO ₂	0.3%	No	No Effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40 °C (32 – 104 °F).
Relative humidity	Not necessary between 10 – 90%.

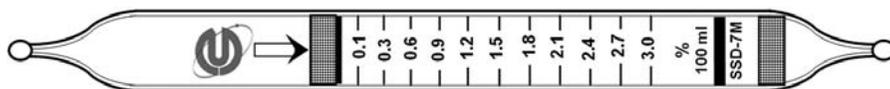
Calibration of the tube:

Static gas dilution method.

(TLV): NA

STEL (TLV): 0.25 ppm

Flammable Range: NA

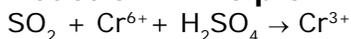


Performance:

Measurement Range	Extended 0.05 - 1.5 %	Standard 0.1 – 3 %	Extended 0.2 – 6%
No. of Pump Strokes	2 (200 ml)	1 (100 ml)	0.5 (50 ml)
Volume Correction Factor (VCF)*	0.5	1.0	2.0
Sampling Time	1 minute per pump stroke (100 ml)		
Colour Change	Yellow → Green		
Detection Limit	0.05 % (2 pump strokes)		
Shelf Life	2 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

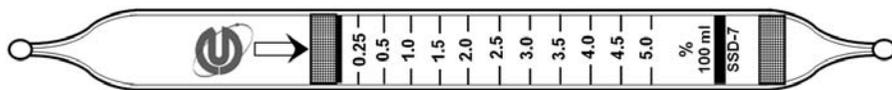
Compound	Concentration (ppm)	Interference	Colour Change / Comments
H ₂ S		+	Slight ring
CO		+	Slight colour change
CO ₂	3%	No	No Effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40 °C (32 – 104 °F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

Static gas dilution method.

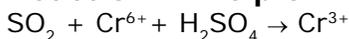


Performance:

Measurement Range	Extended	Standard	Extended
	0.125 - 2.5 %	0.25 - 5 %	0.5 - 10%
No. of Pump Strokes	2 (200 ml)	1 (100 ml)	0.5 (50 ml)
Volume Correction Factor (VCF)*	0.5	1.0	2.0
Sampling Time	1 minute per pump stroke (100 ml)		
Colour Change	Orange → Pale blue		
Detection Limit	0.125% (2 pump strokes)		
Shelf Life	2 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
H ₂ S		+	Slight ring
CO		+	Slight colour change
CO ₂	5%	No	No Effect
NH ₃		+	Orange to Pale blue
NO ₂	1500	No	No Effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 - 40 °C (32 - 104 °F).
Relative humidity	Not necessary between 10 - 90%.

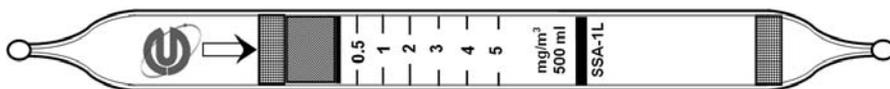
Calibration of the tube:

Static gas dilution method.

Sulphuric Acid



SSA-1L

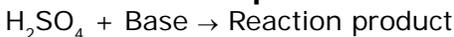


Performance:

Measurement Range	Extended	Standard	Extended
	Do not extend	0.5-5.0 mg/m ³	Do not extend
No. of Pump Strokes		5 (500 ml)	
Volume Correction Factor (VCF)*		1.0	
Sampling Time	3 minute per pump stroke (100 ml)		
Colour Change	Violet → Yellow		
Detection Limit	0.5 mg/m ³ (5 pump strokes)		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
HCl		+	Violet to Yellow
H ₂ S		+	Beige colour
HF		+	Violet to Yellow
CO	100	No	No Effect
NH ₃	50	No	No Effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40 °C (32 – 104 °F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

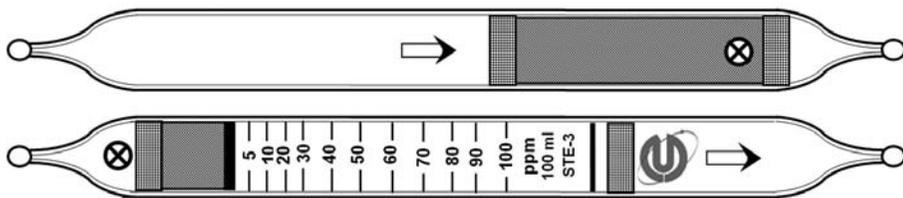
Static gas dilution method.

TWA (TLV): 0.2 mg/m³

STEL (TLV): NA

Non Flammable

Tetrachloroethylene

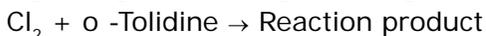
**STE-3**

Performance:

Measurement Range	Extended	Standard	Extended
	2.5 – 50 ppm	5 – 100 ppm	10 – 200 ppm
No. of Pump Strokes	2 (200 ml)	1 (100 ml)	0.5 (50 ml)
Volume Correction Factor (VCF)*	0.5	1.0	2.0
Sampling Time	1.5 minutes per pump stroke (100 ml)		
Colour Change	White → Yellow		
Detection Limit	2.5 ppm (2 pump strokes)		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
1,2 Dichloroethylene		+	White to Yellow
Cl_2		+	White to Yellow
HCl		+	White to Yellow

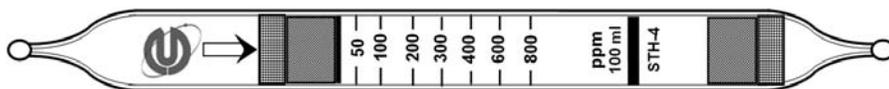
Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

Static dilution method.

TWA (TLV): 25 ppm STEL (TLV): 100 Flammable Range: 10.8 to 54.5 (in oxygen)



Performance:

Measurement Range	Extended	Standard	Extended
	Do not extend	50 - 800 ppm	Do not extend
No. of Pump Strokes		1(100 ml)	
Volume Correction Factor (VCF)*		1.0	
Sampling Time	3.5 minutes per pump stroke (100 ml)		
Colour Change	Yellow → Green		
Detection Limit	50 ppm (1 pump stroke)		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

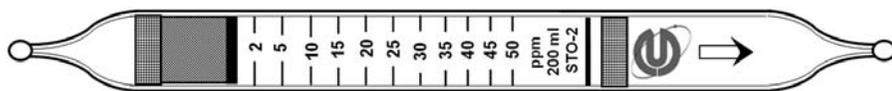
Compound	Concentration (ppm)	Interference	Colour Change / Comments
Methanol		+	Yellow to Green
Ethanol		+	Yellow to Green

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40 °C (32 – 104 °F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

Static dilution method.

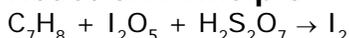


Performance:

Measurement Range	Extended	Standard	Extended
	Do not extend	2-50 ppm	Do not extend
No. of Pump Strokes		2 (200 ml)	
Volume Correction Factor (VCF)*		1.0	
Sampling Time	2 minutes per pump stroke (100 ml)		
Colour Change	White → Brown		
Detection Limit	2 ppm (2 pump strokes)		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



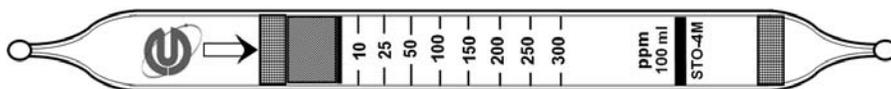
Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Isobutylene		+	White to Very pale brown
Xylene		+	White to Brown
CO		+	Faint beige entire tube
Styrene		+	White to Very pale brown
NH ₃	1000	No	No effect
SO ₂	30	No	No effect
n-Hexane	50	No	No effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40 °C (32 – 104 °F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube: Static dilution method.

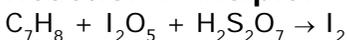


Performance:

Measurement Range	Extended	Standard	Extended
	Do not extend	10 - 300 ppm	Do not extend
No. of Pump Strokes		1 (100 ml)	
Volume Correction Factor (VCF)*		1.0	
Sampling Time	1.5 minutes per pump stroke (100 ml)		
Colour Change	White → Brown		
Detection Limit	10 ppm		
Shelf Life	2 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
H ₂ S		+	Faint ring
CO		+	Faint ring
n – Hexane		+	Ring
Xylene		+	White to Brown
NH ₃	50000	No	No effect
CO ₂	15000	No	No effect
CH ₄	25000	No	No effect
SO ₂	2000	No	No effect
Isobutylene	106	No	No effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40 °C (32 – 104 °F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube: Static dilution method.

(TLV): 20 ppm

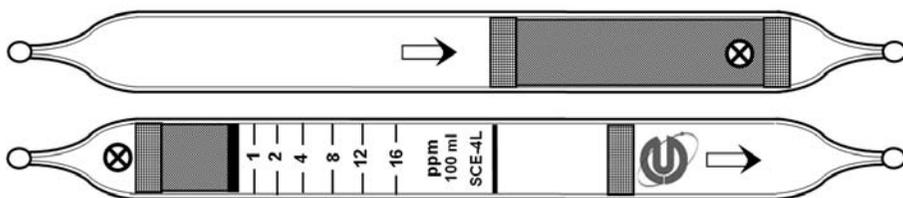
STEL (TLV): NA

Flammable Range: 1-7%

Trichloroethylene

Cl₂C:CHCl

SCE-2M

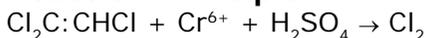


Performance:

Measurement Range	Extended	Standard	Extended
	0.5 – 8 ppm	1 – 16 ppm	2 – 32 ppm
No. of Pump Strokes	2 (200 ml)	1 (100 ml)	0.5 (50 ml)
Volume Correction Factor (VCF)*	0.5	1.0	2.0
Sampling Time	3.0 minutes per pump stroke (100 ml)		
Colour Change	White → Light violet		
Detection Limit	0.5 ppm (2 pump strokes)		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Nitrogen Oxides		+	White to Light violet
Halogens		+	White to Light violet
Halogenated Hydrocarbons		+	White to Light violet
Hexane	100	No	No Effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube: Static dilution method.

TWA (TLV): 10 ppm

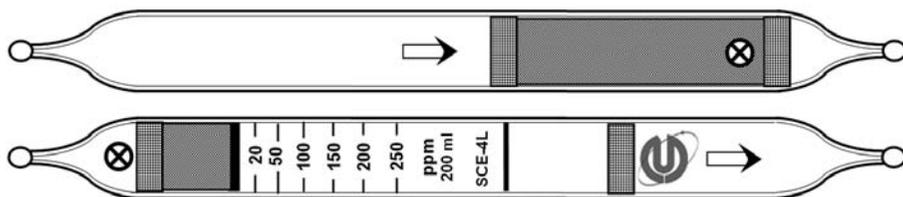
STEL (TLV): 25 ppm

Flammable Range: NA

Trichloroethylene

Cl₂C: CHCl

SCE-4L

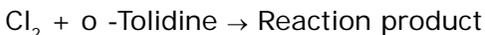
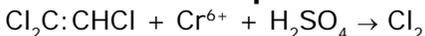


Performance:

Measurement Range	Extended	Standard	Extended
	Do not extend	20 – 250 ppm	Do not extend
No. of Pump Strokes		2 (200 ml)	
Volume Correction Factor (VCF)*		1.0	
Sampling Time	1.5 minutes per pump stroke (100 ml)		
Colour Change	White → Yellow		
Detection Limit	20 ppm (2 pump strokes)		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
1,2 Dichloroethylene		+	White to Yellow
Cl ₂		+	White to Yellow
HCl		+	White to Yellow

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40 °C (32 – 104 °F).
Relative humidity	Not necessary between 10 – 90%.

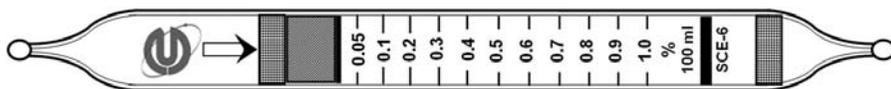
Calibration of the tube:

Static dilution method.

TWA (TLV): 10 ppm

STEL (TLV): 25 ppm

Flammable Range: NA

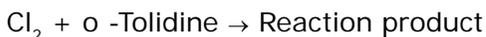
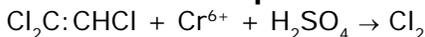


Performance:

Measurement Range	Extended	Standard	Extended
	Do not extend	0.05 – 1%	Do not extend
No. of Pump Strokes		1 (100 ml)	
Volume Correction Factor (VCF)*		1.0	
Sampling Time	1.5 minutes per pump stroke (100 ml)		
Colour Change	White → Yellowish brown		
Detection Limit	0.05%		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Acetylene		+	White to Brown
CO		+	White to Brown
Tetrachloroethylene		+	White to Yellowish brown
1,1,1 Trichloroethylene		+	White to Yellowish brown
Toluene		+	Brown

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

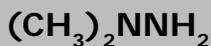
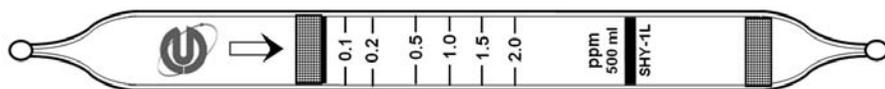
Calibration of the tube:

Static dilution method.

(TLV): 10 ppm

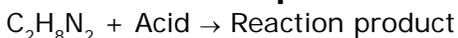
STEL (TLV): 25 ppm

Flammable Range: NA

UDMH**SHY-1L****Performance:**

Measurement Range	Extended	Standard	Extended
	Do not extend	0.1 – 2 ppm	Do not extend
No. of Pump Strokes		5 (500 ml)	
Volume Correction Factor (VCF)*		1.0	
Sampling Time	1 minute per pump stroke (100 ml)		
Colour Change	Yellow → Blue		
Detection Limit	0.1 ppm (5 pump strokes)		
Shelf Life	2 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:**Possible Interferences:**

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Methylamine		+	Yellow to Blue
Hydrazine		+	Yellow to Blue
Ethylamine		+	Yellow to Blue

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

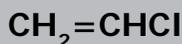
Static dilution method.

TWA (TLV): 0.01 ppm

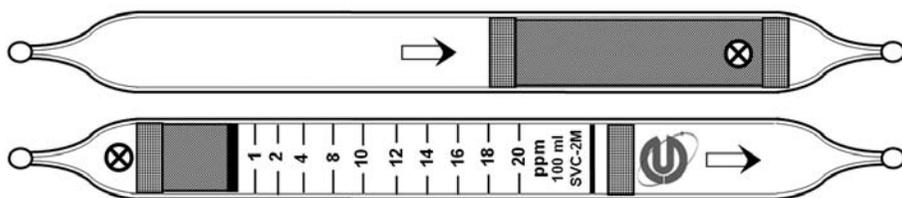
STEL (TLV): NA

Flammable Range: 2 – 45%

Vinyl Chloride



SVC-2M

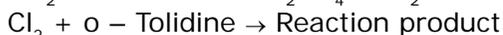
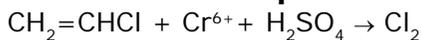


Performance:

Measurement Range	Extended	Standard	Extended
	Do not extend	1 – 20 ppm	Do not extend
No. of Pump Strokes		1 (100 ml)	
Volume Correction Factor (VCF)*		1.0	
Sampling Time	2 minute per pump stroke (100 ml)		
Colour Change	White → Yellow		
Detection Limit	1.0 ppm		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Trichloroethylene		+	White to Yellow
Tetrachloroethane		+	White to Yellow
Ethylene	1000	No	No Effect
Benzene	600	No	No Effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

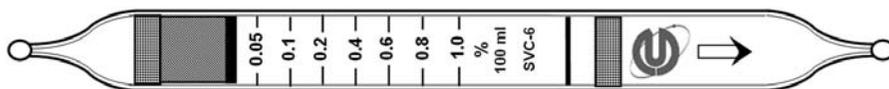
Calibration of the tube:

Static gas dilution method.

TWA (TLV): 1 ppm

STEL (TLV): NA

Flammable Range: 3.6 – 23%

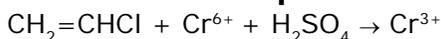


Performance:

Measurement Range	Extended	Standard	Extended
	Do not extend	0.05 – 1%	Do not extend
No. of Pump Strokes		1 (100 ml)	
Volume Correction Factor (VCF)*		1.0	
Sampling Time	1 minute per pump stroke (100 ml)		
Colour Change	Orange → Brown		
Detection Limit	0.05%		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

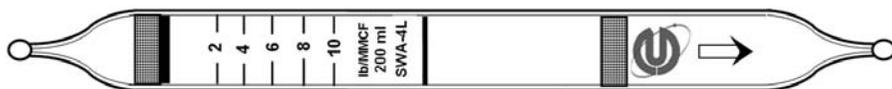
Compound	Concentration (ppm)	Interference	Colour Change / Comments
Organic Solvents		+	Orange to brownish green

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

Static gas dilution method.

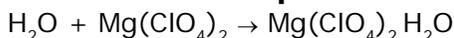


Performance:

Measurement Range	Extended	Standard	Extended
	1 – 5 lb/MMCF	2 – 10 lb/MMCF	4 – 20 lb/MMCF
No. of Pump Strokes	4 (400 ml)	2 (200 ml)	1 (100 ml)
Volume Correction Factor (VCF)*	0.5	1.0	2.0
Sampling Time	1.5 minute per pump stroke (100 ml)		
Colour Change	Yellow → Pale Blue		
Detection Limit	1 lb/MMCF (4 pump strokes)		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

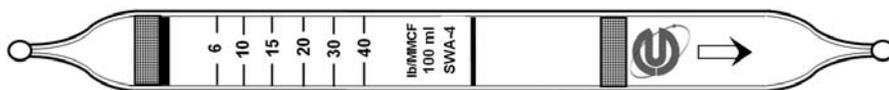
Compound	Concentration (ppm)	Interference	Colour Change / Comments
CH ₄	99.9%	No effect	No effect
H ₂ S	2000	No effect	No effect
Methanol	50	No effect	No effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40 °C (32 – 104 °F).
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Calibration of the tube:

Static dilution method.

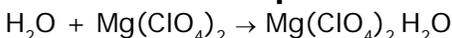


Performance:

Measurement Range	Extended	Standard	Extended
	3 – 20 lb/MMCF	6 – 40 lb/MMCF	12 – 80 lb/MMCF
No. of Pump Strokes	2 (200 ml)	1 (100 ml)	0.5 (50 ml)
Volume Correction Factor (VCF)*	0.5	1.0	2.0
Sampling Time	1.5 minutes per pump stroke (100 ml)		
Colour Change	Yellow → Dark green		
Detection Limit	3 lb/MMCF (2 pump strokes)		
Shelf Life	1 year		
Relative standard deviation	± 10%		

* Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

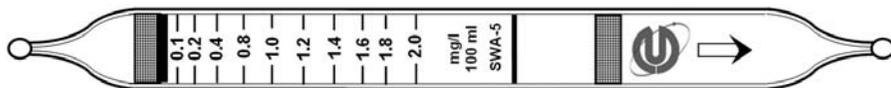
Compound	Concentration (ppm)	Interference	Colour Change / Comments
CH ₄	99.9%	No effect	No effect
H ₂ S	2000	No effect	No effect
Methanol	50	No effect	No effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
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Calibration of the tube:

Static dilution method.

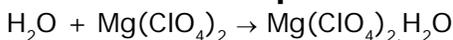


Performance:

Measurement Range	Extended	Standard	Extended
	Do not extend	0.1 – 2 mg/l	Do not extend
No. of Pump Strokes		1 (100 ml)	
Volume Correction Factor (VCF)*		1.0	
Sampling Time	1 minute per pump stroke (100 ml)		
Colour Change	Yellow → Greenish Blue		
Detection Limit	0.1 mg/l		
Shelf Life	1 year		
Relative standard deviation	± 10%		

* Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

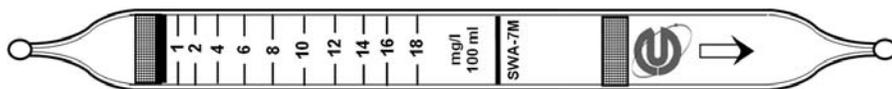
Compound	Concentration (ppm)	Interference	Colour Change / Comments
CH ₄	99.9%	No	No effect
H ₂ S	2000	No	No effect
Methanol	50	No	No effect
Hexane	3000	No	No effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40 °C (32 – 104 °F).
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Calibration of the tube:

Static dilution method.

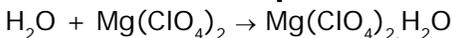


Performance:

Measurement Range	Extended	Standard	Extended
	Do not extend	1 – 18 mg/l	Do not extend
No. of Pump Strokes		1 (100 ml)	
Volume Correction Factor (VCF)*		1.0	
Sampling Time	1 minute per pump stroke (100 ml)		
Colour Change	Yellow → Blue		
Detection Limit	1 mg/l		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

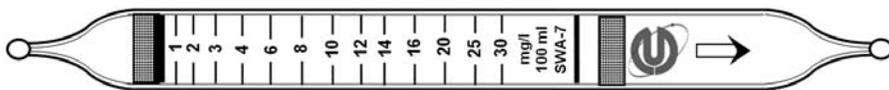
Compound	Concentration (ppm)	Interference	Colour Change / Comments
CH ₄	99.9%	No	No effect
H ₂ S	2000	No	No effect
Methanol	50	No	No effect
Hexane	3000	No	No effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40 °C (32 – 104 °F).
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Calibration of the tube:

Static dilution method.

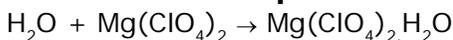


Performance:

Measurement Range	Extended	Standard	Extended
	Do not extend	1 – 30 mg/l	Do not extend
No. of Pump Strokes		1 (100 ml)	
Volume Correction Factor (VCF)*		1.0	
Sampling Time	1 minute per pump stroke (100 ml)		
Colour Change	Yellow → Blue		
Detection Limit	1 mg/l		
Shelf Life	1 year		
Relative standard deviation	± 10%		

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
CH ₄	99.9%	No	No effect
H ₂ S	2000	No	No effect
Methanol	50	No	No effect
Hexane	3000	No	No effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40 °C (32 – 104 °F).
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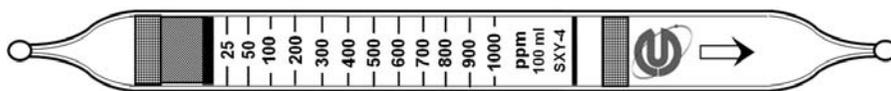
Calibration of the tube:

Static dilution method.

Xylene



SXY-4

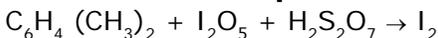


Performance:

Measurement Range	Extended	Standard	Extended
	Do not extend	25 – 1000 ppm	50 – 2000 ppm
No. of Pump Strokes		1 (100 ml)	0.5 (50 ml)
Volume Correction Factor (VCF)*		1.0	2.0
Sampling Time	2.5 minutes per pump stroke (100 ml)		
Colour Change	White → Brown		
Detection Limit	25 ppm		
Shelf Life	2 year		
Relative standard deviation	± 10%		

* Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour Change / Comments
Benzene		+	Faint colour change
Toluene		+	White to Brown
CO	250	No	No effect
Hexane	100	No	No effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

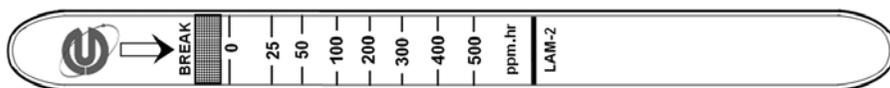
Static dilution method.

TWA (TLV): 100 ppm

STEL (TLV): 150 ppm

Flammable Range: 1 – 7%

**Uniphos Long Term Detector Tubes
Dosimeter Tubes**



Performance:

Measurement Range	3.1 – 1000 ppm
Scale Range	25 – 500 ppm.hr
Sampling Method	Diffusion
Colour Change	Yellow → Blue
Sampling time	0.5 to 8 hours
Shelf Life	2 years
Relative standard deviation	± 10%

Reaction Principle:



Calculation:

$$\text{TWA value (ppm)} = \frac{\text{Dosimeter tube reading (ppm.hr)}}{\text{Actual sampling time (hour)}}$$

Possible Interferences:

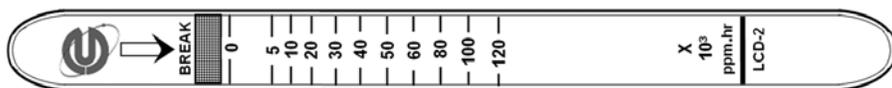
Compound	Concentration (ppm)	Interference	Colour change / Comments
Amines		+	Yellow to Blue
Hydrazine		+	Yellow to Blue

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

Calibrated by exposing the dosimeter tubes for one hour at different concentrations ranging from 25 ppm to 500 ppm and finding out the stain length. The concentration time product is marked on the scale.



Performance:

Measurement Range	(5-120) X 10 ³ ppm.hr
Sampling Method	Diffusion
Colour Change	Blue → Off White
Shelf Life	2 years
Relative standard deviation	± 10%

Reaction Principle:

CO₂ + Alkali → Reaction product

Calculation:

Carbon dioxide dose = Time (*read on the tube*) x 10³ ppm.hr

Average concentration of exposure = $\frac{\text{CO}_2 \text{ dose (ppm.hr.)}}{\text{Actual sampling time (hr.)}}$

Possible Interferences:

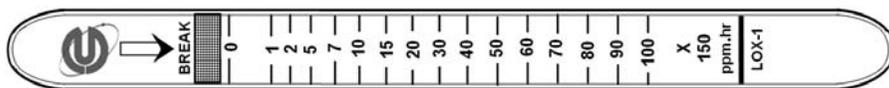
Compound	Concentration (%)	Interference	Colour change / Comments
CO	0.30	No	No effect
NH ₃	5.00	No	No effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

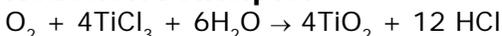
Calibration of dosimeter tube was done by exposing 1000 ppm of CO₂ for varying period of time ranging from 10 hr. to 120 hr. and finding out the stain length. The time is marked on the tube. The concentration time product or the dose in ppm. hr. = Time on the scale X 1000 ppm hr.



Performance:

Measurement Range	(1-100) X 150 ppm.hr
Sampling Method	Diffusion
Colour Change	Violet → White
Shelf Life	2 years
Relative standard deviation	± 10%

Reaction Principle:



Calculation:

Oxygen dose = Time (*read on the tube*) x 150 ppm.hr

Average concentration of exposure = $\frac{\text{O}_2 \text{ dose (ppm.hr.)}}{\text{Actual sampling time (hr.)}}$

Possible Interferences:

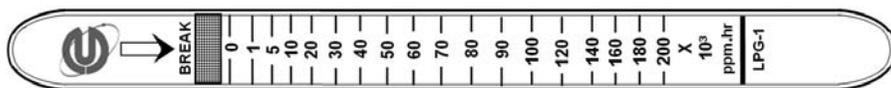
Compound	Concentration (ppm)	Interference	Colour change / Comments
CO ₂		No	No Effect
H ₂ S		No	No Effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

Calibration of dosimeter tube was done by exposing 150 ppm of O₂ for varying period of 100 hr. and finding out the stain length. The time is marked on the tube. The concentration time product or the dose in ppm.hr. = Time on the scale X 150 ppm hr.



Performance:

Measurement Range	(1-200) X 10 ³ ppm.hr
Sampling Method	Diffusion
Colour Change	Yellow → Black
Shelf Life	2 years
Relative standard deviation	± 10%

Reaction Principle:

PH₃ + Gold compound → Reaction product

Calculation:

Phosphine dose = Time (*read on the tube*) x 10³ ppm.hr

Average concentration of exposure = $\frac{\text{Phosphine dose (ppm.hr.)}}{\text{Actual sampling time (hr.)}}$

Possible Interferences:

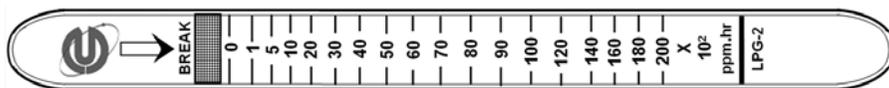
Compound	Concentration (ppm)	Interference	Colour change / Comments
Arsine		+	Yellow to Black
NH ₃		No	No Effect
H ₂ S		+	Yellow to Black

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40 °C (32 – 104 °F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

Calibration of dosimeter tube was done by exposing 1000 ppm of Phosphine for varying period of time ranging from 10 hr. to 200 hr. and finding out the stain length. The time is marked on the tube. The concentration time product or the dose in ppm. hr. = Time on the scale X 1000 ppm hr.



Performance:

Measurement Range	(1-200) X 10 ² ppm.hr
Sampling Method	Diffusion
Colour Change	Yellow → Black
Shelf Life	2 years
Relative standard deviation	± 10 %

Reaction Principle:

PH₃ + Gold compound → Reaction product

Calculation:

Phosphine dose = Time (*read on the tube*) x 10² ppm.hr

Average concentration of exposure = $\frac{\text{Phosphine dose (ppm.hr.)}}{\text{Actual sampling time (hr.)}}$

Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour change / Comments
Arsine		+	Yellow to Black
NH ₃		No	No Effect
H ₂ S		+	Yellow to Black

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40 °C (32 – 104 °F).
Relative humidity	Not necessary between 10 – 90%.

Calibration of the tube:

Calibration of dosimeter tube was done by exposing 100 ppm of Phosphine for varying period of time ranging from 10 hr. to 200 hr. and finding out the stain length. The time is marked on the tube. The concentration time product or the dose in ppm. hr. = Time on the scale X 100 ppm hr.

TWA (TLV): 0.3 ppm

STEL (TLV): 1 ppm

Flammable Range: ~1.8 - 100%

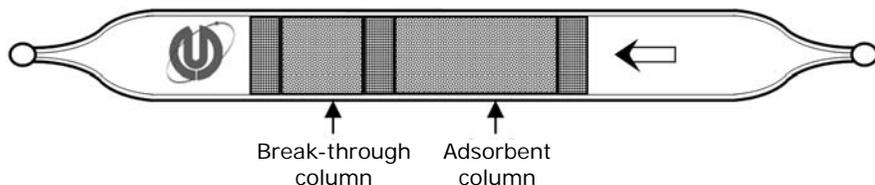
**Uniphos Long Term Detector Tubes
Charcoal Tubes**

Charcoal Tube

Standard

LCT- 100

Type: Flame sealed tube



Specification:

Adsorbate	Organic compounds which can be adsorbed on activated charcoal
Sorption agent	Coconut shell charcoal
Adsorption column	100 mg of sorption agent
Breakthrough column	50 mg of sorption agent
Recommended flow rate	0.01 – 0.2 L/min.
Length of charcoal tube	70 ± 1.0 mm
Outer diameter of charcoal tube	6.0 ± 0.5 mm
Adsorption capacity	20 mg (For Toluene)

Description:

- 1.The "Uniphos charcoal tube - standard" is used for the measurement of time weighted average (TWA) concentration of some of the organic solvent vapours of non polar compounds like benzene, xylene, toluene etc. present in the working environment/ ambient air.
- 2.Breaking both ends of the tube the sample air containing the organic vapour is drawn through the tube with the flow rate ranging from 0.01 to 0.2 liter per minutes. It should be ensured that the air flow is maintained in the direction of arrow marked on the charcoal tube. At the end of the sampling, the tubes are capped and taken to the laboratory for GC analysis.
- 3.While sampling, the organic vapour in the sample air gets adsorbed on the charcoal tube. The second column viz. breakthrough column helps to verify (after Gas Chromatographic analysis) that no solvent vapours escape the tube during the sampling.
- 4.Knowing the total volume of air which has passed through the charcoal tube, the concentration of the organic vapour in the air can be determined. This is done by desorbing the adsorbed analyte vapour in a suitable solvent of known volume and known desorption efficiency and Gas Chromatographically determining the concentration.

Gases that can be analyzed:

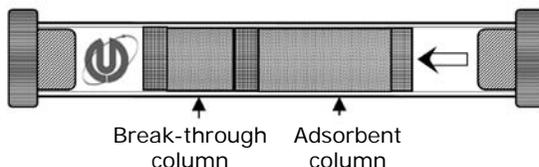
Benzene, Toluene, Xylene, Naphthalene, Cumene, Styrene, Ethyl Benzene, p- tert - Butyltoluene, alpha Methyl Styrene, Vinyltoluene etc

Recommended method of analysis:.

NIOSH manual of Analytical methods for aromatic Hydrocarbon - 1501.

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Type: Plastic cap sealed tube



Specification:

Adsorbate	Organic compounds which can be adsorbed on activated charcoal
Sorption agent	Coconut shell charcoal
Adsorption column	100 mg of sorption agent
Breakthrough column	50 mg of sorption agent
Recommended flow rate	0.01 – 0.2 L/min.
Length of charcoal tube	70 ± 1.0 mm
Outer diameter of charcoal tube	6.0 ± 0.5 mm
Adsorption capacity	20 mg (For Toluene)

Description:

1. The "Uniphos charcoal tube - standard" is used for the measurement of time weighted average (TWA) concentration of some of the organic solvent vapours of non polar compounds like benzene, xylene, toluene etc. present in the working environment/ ambient air.
2. Breaking both ends of the tube the sample air containing the organic vapour is drawn through the tube with the flow rate ranging from 0.01 to 0.2 liter per minutes. It should be ensured that the air flow is maintained in the direction of arrow marked on the charcoal tube. At the end of the sampling, the tubes are capped and taken to the laboratory for GC analysis.
3. While sampling, the organic vapour in the sample air gets adsorbed on the charcoal tube. The second column viz. breakthrough column helps to verify (after Gas Chromatographic analysis) that no solvent vapours escape the tube during the sampling.
4. Knowing the total volume of air which has passed through the charcoal tube, the concentration of the organic vapour in the air can be determined. This is done by desorbing the adsorbed analyte vapour in a suitable solvent of known volume and known desorption efficiency and Gas Chromatographically determining the concentration.

Gases that can be analyzed:

Benzene, Toluene, Xylene, Naphthalene, Cumene, Styrene, Ethyl Benzene, p- tert - Butyltoluene, alpha Methyl Styrene, Vinyltoluene etc.

Recommended method of analysis:

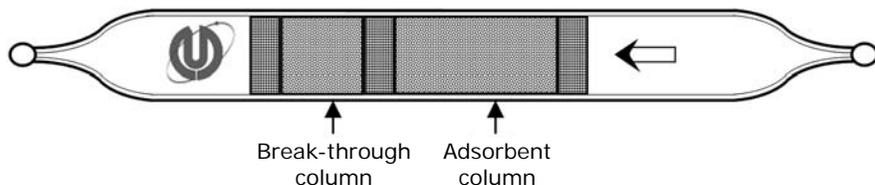
NIOSH manual of Analytical methods for aromatic Hydrocarbon - 1501.

Charcoal Tube

Large

LCT- 400

Type: Flame sealed tube



Specification:

Adsorbate	Organic compounds which can be adsorbed on activated charcoal
Sorption agent	Coconut shell charcoal
Adsorption column	400 mg of sorption agent
Breakthrough column	200 mg of sorption agent
Recommended flow rate	0.01 – 1.0 L/min.
Length of charcoal tube	110 ± 2.0 mm
Outer diameter of charcoal tube	8.0 ± 0.5 mm
Adsorption capacity	80 mg (For Toluene)

Description:

- 1.The "Uniphos charcoal tube - Large" is used for the measurement of time weighted average (TWA) concentration of some of the organic solvent vapours of non polar compounds like benzene, xylene, toluene etc. present in the working environment/ ambient air.
- 2.Breaking both ends of the tube the sample air containing the organic vapour is drawn through the tube with the flow rate ranging from 0.01 to1.0 liter per minutes. It should be ensured that the air flow is maintained in the direction of arrow marked on the charcoal tube. At the end of the sampling, the tubes are capped and taken to the laboratory for GC analysis.
- 3.While sampling, the organic vapour in the sample air gets adsorbed on the charcoal tube. The second column viz. breakthrough column helps to verify (after Gas Chromatographic analysis) that no solvent vapours escape the tube during the sampling.
- 4.Knowing the total volume of air which has passed through the charcoal tube, the concentration of the organic vapour in the air can be determined. This is done by desorbing the adsorbed analyte vapour in a suitable solvent of known volume and known desorption efficiency and Gas Chromatographically determining the concentration.

Gases that can be analyzed:

Benzene, Toluene, Xylene, Naphthalene, Cumene, Styrene, Ethyl Benzene, p- tert - Butyltoluene, alpha Methyl Styrene, Vinyltoluene etc.

Recommended method of analysis:

NIOSH manual of Analytical methods for aromatic Hydrocarbon - 1501.

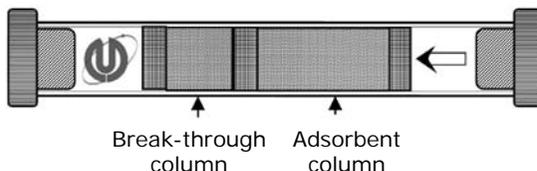
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Charcoal Tube

Large

LCT- 401

Type: Plastic cap sealed tube



Specification:

Adsorbate	Organic compounds which can be adsorbed on activated charcoal
Sorption agent	Coconut shell charcoal
Adsorption column	400 mg of sorption agent
Breakthrough column	200 mg of sorption agent
Recommended flow rate	0.01 – 1.0 L/min.
Length of charcoal tube	110 ± 2.0 mm
Outer diameter of charcoal tube	8.0 ± 0.5 mm
Adsorption capacity	80 mg (For Toluene)

Description:

1. The "Uniphos charcoal tube - Large" is used for the measurement of time weighted average (TWA) concentration of some of the organic solvent vapours of non polar compounds like benzene, xylene, toluene etc. present in the working environment/ ambient air.
2. Breaking both ends of the tube the sample air containing the organic vapour is drawn through the tube with the flow rate ranging from 0.01 to 1.0 liter per minutes. It should be ensured that the air flow is maintained in the direction of arrow marked on the charcoal tube. At the end of the sampling, the tubes are capped and taken to the laboratory for GC analysis.
3. While sampling, the organic vapour in the sample air gets adsorbed on the charcoal tube. The second column viz. breakthrough column helps to verify (after Gas Chromatographic analysis) that no solvent vapours escape the tube during the sampling.
4. Knowing the total volume of air which has passed through the charcoal tube, the concentration of the organic vapour in the air can be determined. This is done by desorbing the adsorbed analyte vapour in a suitable solvent of known volume and known desorption efficiency and Gas Chromatographically determining the concentration.

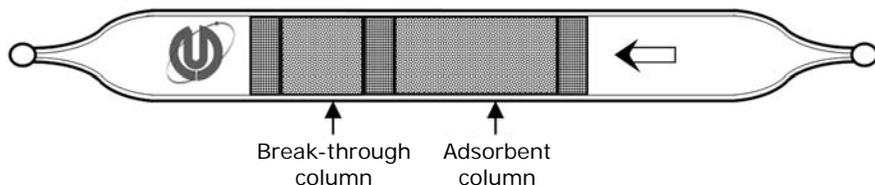
Gases that can be analyzed:

Benzene, Toluene, Xylene, Naphthalene, Cumene, Styrene, Ethyl Benzene, p- tert - Butyltoluene, alpha Methyl Styrene, Vinyltoluene etc.

Recommended method of analysis:.

NIOSH manual of Analytical methods for aromatic Hydrocarbon - 1501.

Type: Flame sealed tube



Specification:

Adsorbate	Organic compounds which can be adsorbed on activated charcoal
Sorption agent	Coconut shell charcoal
Adsorption column	800 mg of sorption agent
Breakthrough column	200 mg of sorption agent
Recommended flow rate	0.01 – 1.5 L/min.
Length of charcoal tube	110 ± 2.0 mm
Outer diameter of charcoal tube	10.0 ± 0.5 mm
Adsorption capacity	160 mg (For Toluene)

Description:

1. The "Uniphos charcoal tube - Jumbo" is used for the measurement of time weighted average (TWA) concentration of some of the organic solvent vapours of non polar compounds like benzene, xylene, toluene etc. present in the working environment/ ambient air.
2. Breaking both ends of the tube the sample air containing the organic vapour is drawn through the tube with the flow rate ranging from 0.01 to 1.5 liter per minutes. It should be ensured that the air flow is maintained in the direction of arrow marked on the charcoal tube. At the end of the sampling, the tubes are capped and taken to the laboratory for GC analysis.
3. While sampling, the organic vapour in the sample air gets adsorbed on the charcoal tube. The second column viz. breakthrough column helps to verify (after Gas Chromatographic analysis) that no solvent vapours escape the tube during the sampling.
4. Knowing the total volume of air which has passed through the charcoal tube, the concentration of the organic vapour in the air can be determined. This is done by desorbing the adsorbed analyte vapour in a suitable solvent of known volume and known desorption efficiency and Gas Chromatographically determining the concentration.

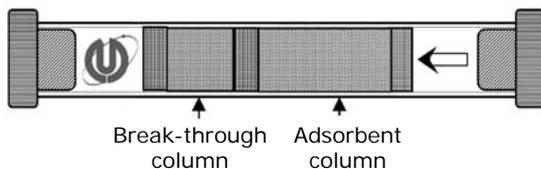
Gases that can be analyzed:

Benzene, Toluene, Xylene, Naphthalene, Cumene, Styrene, Ethyl Benzene, p- tert - Butyltoluene, alpha Methyl Styrene, Vinyltoluene etc.

Recommended method of analysis:

NIOSH manual of Analytical methods for aromatic Hydrocarbon - 1501.

Type: Plasticcap sealed tube



Specification:

Adsorbate	Organic compounds which can be adsorbed on activated charcoal
Sorption agent	Coconut shell charcoal
Adsorption column	800 mg of sorption agent
Breakthrough column	200 mg of sorption agent
Recommended flow rate	0.01 – 1.5 L/min.
Length of charcoal tube	110 ± 2.0 mm
Outer diameter of charcoal tube	10.0 ± 0.5 mm
Adsorption capacity	160 mg (For Toluene)

Description:

1. The "Uniphos charcoal tube - Jumbo" is used for the measurement of time weighted average (TWA) concentration of some of the organic solvent vapours of non polar compounds like benzene, xylene, toluene etc. present in the working environment/ ambient air.
2. Breaking both ends of the tube the sample air containing the organic vapour is drawn through the tube with the flow rate ranging from 0.01 to 1.5 liter per minutes. It should be ensured that the air flow is maintained in the direction of arrow marked on the charcoal tube. At the end of the sampling, the tubes are capped and taken to the laboratory for GC analysis.
3. While sampling, the organic vapour in the sample air gets adsorbed on the charcoal tube. The second column viz. breakthrough column helps to verify (after Gas Chromatographic analysis) that no solvent vapours escape the tube during the sampling.
4. Knowing the total volume of air which has passed through the charcoal tube, the concentration of the organic vapour in the air can be determined. This is done by desorbing the adsorbed analyte vapour in a suitable solvent of known volume and known desorption efficiency and Gas Chromatographically determining the concentration.

Gases that can be analyzed:

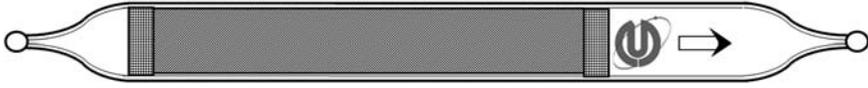
Benzene, Toluene, Xylene, Naphthalene, Cumene, Styrene, Ethyl Benzene, p- tert - Butyltoluene, alpha Methyl Styrene, Vinyltoluene etc.

Recommended method of analysis:

NIOSH manual of Analytical methods for aromatic Hydrocarbon - 1501.

Other Products

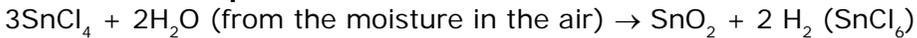
Air Flow Indicator Tube



Performance:

Physical Dimensions of the tube	
Length	140 ± 1.0 mm
Outer diameter	7.0 ± 0.5 mm

Reaction Principle:



Description:

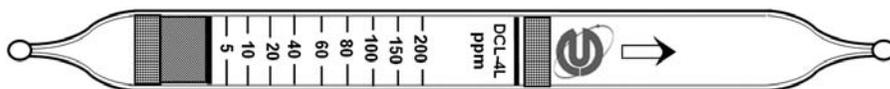
The detection of air current with their direction and velocity is important in many situations in mines and industries. This information is necessary for the selection of gas sampling points, the distribution of toxic gases at work places etc. The Uniphos Air flow indicator tube (smoke generation tube) is designed for this application.

It contains a chemical impregnated in a suitable support material. For producing the smoke both ends of the tubes are cut and with the help of a rubber bulb air is pumped through the tube. A white smoke is generated and comes out in the form of a cloud. Its movements follows the wind flow direction. It can also be used to know the approximate speed of wind.

Application Area:

1. For the selection of gas sampling points with respect to wind flow direction for leak detection application.
2. For testing the performance of ventilation system
3. Respirator fit testing (OSHA protocol).
4. Finding out wind direction and approximate wind speed.

Uniphos Dissolved Substance Detector Tubes



Performance:

Measurement Range	5 – 200 ppm
Sampling Time	3 minutes
Colour Change	Brown → White
Detection Limit	5 ppm
Sample water pH Range	4- 12
Shelf Life	2 year
Relative standard deviation	± 10%

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Conc. (ppm)	Tube Reading (ppm)	Colour change
Bromide ion	10	2.5	Brown → White
Iodide ion	50	10	Brown → White
Sulphate ion	1000	2.5	Brown → White
Iron ion	200	5	Brown → White

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
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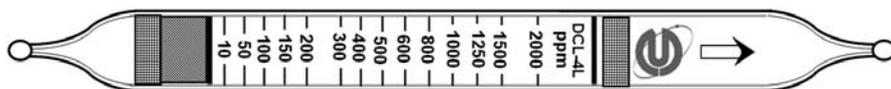
Calibration of the tube:

Potassium chloride standard solution method.

Chloride Ion

Cl⁻

DCL-5M



Performance:

Measurement Range	10 – 2000 ppm
Sampling Time	2 minutes
Colour Change	Brown → White
Detection Limit	10 ppm
Sample water pH Range	4- 12
Shelf Life	2 year
Relative standard deviation	± 10 %

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Conc. (ppm)	Tube Reading (ppm)	Colour change
Bromide ion	10	2.5	Brown → White
Iodide ion	50	10	Brown → White
Sulphate ion	1000	2.5	Brown → White
Iron ion	200	5	Brown → White

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
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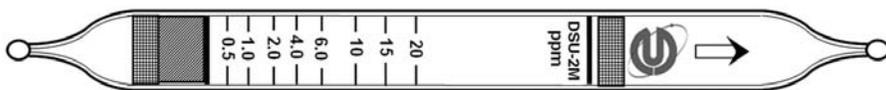
Calibration of the tube:

Potassium chloride standard solution method.

Sulfide Ion

S²⁻

DSU-2M

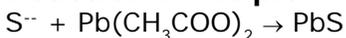


Performance:

Measurement Range	0.5 – 20 ppm
Sampling Time	3 minutes
Colour Change	White → Brown
Detection Limit	0.5 ppm
Sample water pH Range	4- 12
Shelf Life	2 year
Relative standard deviation	± 10 %

* Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Correction for Environmental Parameters:

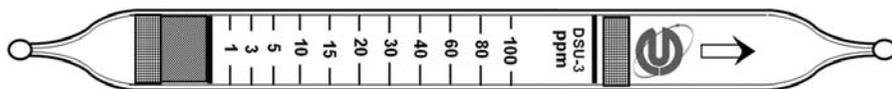
Compound	Concentration (ppm)	Interference	Colour change / Comments
Chloride ion	1500	No	No Effect
Carbonate ion	1000	No	No Effect
Iron ion	1000	No	No Effect
Copper ion	1000	No	No Effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
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Calibration of the tube:

Sodium sulphide standard solution method.

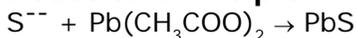


Performance:

Measurement Range	1 – 100 ppm
Sampling Time	3 minutes
Colour Change	White → Dark brown
Detection Limit	1.0 ppm
Sample water pH Range	4- 12
Shelf Life	2 year
Relative standard deviation	± 10%

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour change / Comments
Chloride ion	1500	No	No Effect
Carbonate ion	1000	No	No Effect
Iron ion	1000	No	No Effect
Copper ion	1000	No	No Effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
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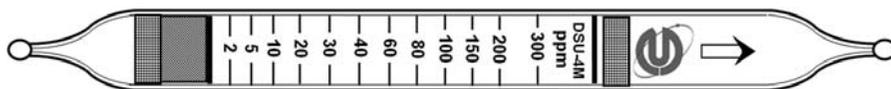
Calibration of the tube:

Sodium sulphide standard solution method.

Sulfide Ion

S²⁻

DSU-4M

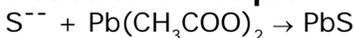


Performance:

Measurement Range	2 – 300 ppm
Sampling Time	3 minutes
Colour Change	White → Black
Detection Limit	2.0 ppm
Sample water pH Range	4- 12
Shelf Life	2 year
Relative standard deviation	± 10%

*Multiply the observed reading by the correction factor (VCF) to obtain the true concentration.

Reaction Principle:



Possible Interferences:

Compound	Concentration (ppm)	Interference	Colour change / Comments
Chloride ion	1500	No	No Effect
Carbonate ion	1000	No	No Effect
Iron ion	1000	No	No Effect
Copper ion	1000	No	No Effect

Correction for Environmental Parameters:

Temperature	Not necessary between 0 – 40°C (32 – 104°F).
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Calibration of the tube:

Sodium sulphide standard solution method.

**Physical and Chemical Properties of
The Substances That Can Be
Measured with Uniphos Tubes**

Substance name	Acetaldehyde	Acetic Acid
Chemical formula	CH ₃ CHO	CH ₃ CO ₂ H
Features	Colourless liquid; pungent odour in high concentration; soluble in water	Colourless liquid; highly soluble in water, ethanol and ether
Molecular weight	44.1	60.1
Specific gravity	0.85	1.05
Relative vapour density	1.5	2.1
Vapour pressure (mm Hg)	755.49 (at 20 °C)	11.4 mmHg (at 20 °C)
Boiling point (°C)	20.2	117.8
Flash point (°C)	- 39	39
Ignition temp. (°C)	140	485
Explosive range (%)	4.0 to 60%	4.0 to 19.9%
Smelling point ppm (approx.)	0.2	1
Conversion factors	--	--
1m ^l /m ³ (ppm) = mg/m ³	1.83	2.5
1mg/m ³ = m ^l /m ³ (ppm)	0.55	0.4
TLVs (TWA,STEL,C) ppm	25 (C)	10 ppm (TWA), 15 ppm (STEL)
Hazardous properties	<ol style="list-style-type: none"> 1. Acetaldehyde in liquid form & its high concentration in vapour form will irritate and corrode mucous membranes, eyes and skin. 2. It may cause drowsiness, sluggishness and bronchitis. 	<ol style="list-style-type: none"> 1. Acetic acid will cause serious burns when contacted with skin. 2. Even diluted solutions when contacted repeatedly will damage skin. 3. Its high concentration vapour will damage the mucous membranes, causing conjunctivitis or bronchitis.

Substance name	Acetone	Acetylene
Chemical formula	CH ₃ COCH ₃	HC≡CH
Features	Colourless liquid; aromatic odor, soluble in water	Colourless gas; garlicky odor; hardly soluble in water
Molecular weight	58.1	26.0
Specific gravity	0.79	—
Relative vapour density	2.0	0.9(gas)
Vapour pressure (mm Hg)	180 mmHg (at 20°C)	—
Boiling point (°C)	56.3	-81.8
Flash point (°C)	-20	—
Ignition temp. (°C)	540	305
Explosive range (%)	2.1 to 13.0%	2.5 to 81.0%
Smelling point ppm (approx.)	100	670 mg/m ³
Conversion factors	--	--
1m ^l /m ³ (ppm) = mg/m ³	2.41	1.08
1mg/m ³ = m ^l /m ³ (ppm)	0.41	0.92
TLVs(TWA,STEL,C) ppm	500 ppm(TWA), 750 ppm (STEL)	—
Hazardous properties	<ol style="list-style-type: none"> 1. Inhaling its vapor will cause headache, dizziness, vomiting. 2. Inhaling high concentration vapor will cause unconsciousness by its narcotic action. 3. Repeated contacts with the eyes and the mucous membranes of the nasal passages and throat will cause inflammation. 	<ol style="list-style-type: none"> 1. Will slightly induce drowsiness 2. Will be suffocating

Substance name	Acrolein	Acrylonitrile
Chemical formula	CH ₂ :CHCHO	CH ₂ :CHCN
Features	Light yellow liquid; offensive pungent odor; soluble in water; highly polymerizable.	Colourless liquid; Sweetish odour; Slightly Soluble in Water.
Molecular weight	56.1	53.1
Specific gravity	0.84	0.81
Relative vapour density	1.9	1.8
Vapour pressure (mm Hg)	250 mmHg (at 23°C)	100 mmHg(at 22.8° c)
Boiling point (°C)	52.7	77.6
Flash point (°C)	-26	-1
Ignition temp. (°C)	278	480
Explosive range (%)	2.8 to 31.0%	3.0 to 17.0
Smelling point ppm (approx.)	0.1	20
Conversion factors	--	--
1m ^l /m ³ (ppm) = mg/m ³	2.33	2.21
1mg/m ³ = m ^l /m ³ (ppm)	0.43	0.45
TLVs(TWA,STEL,C) ppm	0.1 ppm (C)	2 (TWA)
Hazardous properties	<ol style="list-style-type: none"> 1. Its vapor will acutely irritate the eyes and the mucous membranes of the nasal passages, causing lacrimation. 2. Inhaling the vapour will cause bronchitis. 3. Skin contact with the liquid will cause serious inflammation. 4. When a flame is applied, acrolein will be decomposed to generate a highly toxic smoke. 	<ol style="list-style-type: none"> 1. It will be absorbed through the skin and mucous membrane. 2. Within the body, it decomposes into hydrogen cyanide, which will damage the skin, and mucous membrane, causing troubles in the nervous, respiratory or digestive system. 3. High concentration will cause unconsciousness, respiratory arrest or death. Also, may cause cancers.

Substance name	Ammonia	Aniline
Chemical formula	NH ₃	C ₆ H ₅ NH ₂
Features	Colourless gas; soluble in water; suffocating pungent odour.	Colourless liquid; aminic odor; slightly soluble in water
Molecular weight	17.0	93.1
Specific gravity	-	1.02
Relative vapour density	0.6	3.2
Vapour pressure (mm Hg)	6431.1(at 20°C)	15 (at 77°C)
Boiling point (°C)	-33.4	184.6
Flash point (°C)	-	70
Ignition temp. (°C)	630	530
Explosive range (%)	16.0 to 25.0	1.3 to 11.0
Smelling point ppm (approx.)	5	0.5
Conversion factors	--	--
1m ^l /m ³ (ppm) = mg/m ³	0.71	3.87
1mg/m ³ = m ^l /m ³ (ppm)	1.41	0.26
TLVs(TWA,STEL,C) ppm	25(TWA), 35 (STEL)	2 ppm (TWA)
Hazardous properties	<ol style="list-style-type: none"> 1. Will acutely irritate and corrode the skin and mucous membranes and be liable to affect surface of tissues. 2. Inhaling the high concentration of ammonia will cause pulmonary edema and respiratory arrest. Also may cause visual impairment if it gets into the eyes. 	<ol style="list-style-type: none"> 1. Will be absorbed through the skin. 2. Inhaling its vapor will cause acute or chronic poisoning. 3. Mild exposures will cause cyanosis at the lips or earlobes. 4. Severe exposure will develop severe cyanosis, weakness, dizziness, headache, nausea, or even unconsciousness or death.

Substance name	Arsine	Aviation oil
Chemical formula	AsH ₃	C _n H _m
Features	Colourless gas; slightly garlicky odour; soluble in water.	Liquid
Molecular weight	77.9	--
Specific gravity	-	--
Relative vapour density	2.69	--
Vapour pressure (mm Hg)	12003.9 (at 20°C)	--
Boiling point (°C)	-55	--
Flash point (°C)	-	--
Ignition temp. (°C)	-	210
Explosive range (%)	4.5 to 100	0.7 to 5.0%
Smelling point ppm (approx.)	-	--
Conversion factors	--	--
1m ^l /m ³ (ppm) = mg/m ³	3.24	
1mg/m ³ = m ^l /m ³ (ppm)	0.31	
TLVs(TWA,STEL,C) ppm	0.005(TWA)	0.2 mg/l (TWA)
Hazardous properties	<ol style="list-style-type: none"> 1. Will be absorbed through the skin. 2. Inhaling its Vapour will irritate the throat, causing pulmonary edema. 3. Death from poisoning has been reported. 	<ol style="list-style-type: none"> 1. May cause dizziness and drowsiness. 2. May cause eye & skin irritation. 3. Long term, repeated exposure may cause skin cancer.

Substance name	Benzene	Bromine
Chemical formula	C ₆ H ₆	Br ₂
Features	Colourless liquid; characteristic aromatic odour; insoluble in water; soluble in ethanol & ether	Dark reddish-brown liquid; characteristic pungent odour; hardly soluble in water.
Molecular weight	78.1	159.8
Specific gravity	0.88	3.10
Relative vapour density	2.8	5.5
Vapour pressure (mm Hg)	75 (at 20°C)	175 (at 21°C)
Boiling point (°C)	80.1	58.5
Flash point (°C)	-11	-
Ignition temp. (°C)	555	-
Explosive range (%)	1.3 to 7.1	-
Smelling point ppm (approx.)	5	<0.01
Conversion factors	--	--
1m ^l /m ³ (ppm) = mg/m ³	3.25	6.62
1mg/m ³ = m ^l /m ³ (ppm)	0.31	0.15
TLVs(TWA,STEL,C) ppm	0.5(TWA),2.5 (STEL)	0.1(TWA),0.2(STEL)
Hazardous properties	<ol style="list-style-type: none"> Concentrations more than 100 ppm will cause the loss of appetite, lassitude, headache or vertigo. Chronic poisoning will cause abnormal hematogenesis, anemia or leukemia. 	<ol style="list-style-type: none"> Skin contact will cause ulcers, if the liquid gets into the eyes it will burn the eyes. Its vapour in high concentration will irritate the mucous membranes causing lacrimation, coughing, nose bleeding, vertigo headache, and few hours later, abdominal pain, diarrhea or rashes.

Substance name	1,3 Butadiene	n - Butane
Chemical formula	$\text{CH}_2=\text{CHCH}=\text{CH}_2$	C_4H_{10}
Features	Colourless gas; aromatic odour; hardly soluble in water; soluble in ethanol and ether.	Colourless gas; characteristic odour; hardly soluble in water.
Molecular weight	54.1	58.1
Specific gravity	0.62	0.6 (gas)
Relative vapour density	--	2.0
Vapour pressure (mm Hg)	1838 (at 20°C)	1823 (at 25°C)
Boiling point (°C)	- 4.4	- 0.5
Flash point (°C)		- 72
Ignition temp. (°C)	415	365
Explosive range (%)	2.0 to 12%	1.6 to 8.5%
Smelling point ppm (approx.)	--	1.5
Conversion factors	--	--
$1\text{m}\ell/\text{m}^3$ (ppm) = mg/m^3	2.25	2.42
$1\text{mg}/\text{m}^3$ = $\text{m}\ell/\text{m}^3$ (ppm)	0.44	0.41
TLVs(TWA,STEL,C) ppm	2 (TWA)	1000 (STEL)
Hazardous properties	<ol style="list-style-type: none"> 1. High concentration will induce drowsiness. 2. It will irritate and inflame the skin, eyes, and the mucous membranes of the nasal passages. 	<ol style="list-style-type: none"> 1. Will be suffocating and narcotic. 2. Inhaling air mixtures for half-an-hour will cause depression or neurosis.

Substance name	1 - Butanol	2 – Butanol
Chemical formula	CH ₃ CH ₂ CH ₂ CH ₂ OH	CH ₃ CH ₂ CH(OH)CH ₃
Features	Colourless liquid; characteristic pungent odour; soluble in water	Colourless liquid; characteristic odour; slightly soluble in water; soluble in organic solvents.
Molecular weight	74.1	74.1
Specific gravity	0.81	0.81
Relative vapour density	2.6	2.6
Vapour pressure (mm Hg)	5.5 (at 20°C)	15 (at 22.5°C)
Boiling point (°C)	117.3	99.5
Flash point (°C)	29	24
Ignition temp. (°C)	340	
Explosive range (%)	1.4 to 11.2%	1.7 to 9.8%
Smelling point ppm (approx.)	25	--
Conversion factors	--	--
1m ^l /m ³ (ppm) = mg/m ³	3.08	3.08
1mg/m ³ = m ^l /m ³ (ppm)	0.33	0.33
TLVs(TWA,STEL,C) ppm	20 (TWA)	100 (TWA)
Hazardous properties	<ol style="list-style-type: none"> Its vapour will be perceptible above 15 ppm, irritating the eyes and mucous membranes of the nasal passages and throat. The high concentration vapour will irritate the conjunctivas and respiratory mucous membranes. 	<ol style="list-style-type: none"> It will get absorbed through the skin. Its vapour will be irritating and narcotic. Toxic symptoms are similar to methanol.

Substance name	Butyl acetate	Butyl acrylate
Chemical formula	$\text{CH}_3\text{CO}_2(\text{CH}_2)_3\text{CH}_3$	$\text{CH}_2=\text{CHCO}_2(\text{CH}_2)_3\text{CH}_3$
Features	Colourless liquid; fruity aroma; soluble in water; highly soluble in organic solvents.	Colourless liquid; soluble in water.
Molecular weight	116.2	128.1
Specific gravity	0.88	0.89
Relative vapour density	4.0	-
Vapour pressure (mm Hg)	15 (at 25°C)	-
Boiling point (°C)	126.3	145
Flash point (°C)	22	-
Ignition temp. (°C)	--	-
Explosive range (%)	1.7 to 7.6	-
Smelling point ppm (approx.)		-
Conversion factors	--	--
$1\text{m}\ell/\text{m}^3$ (ppm) = mg/m^3	-	
$1\text{mg}/\text{m}^3$ = $\text{m}\ell/\text{m}^3$ (ppm)	-	
TLVs(TWA,STEL,C) ppm	150(TWA) 200 (STEL)	2 (TWA)
Hazardous properties	<ol style="list-style-type: none"> 1. Its vapor will irritate the eyes, mucous membranes of the nasal passages and throat. 2. Inhaling the vapour will cause narcotic action, high concentration will cause unconsciousness. 3. Repeated skin contact with the liquid will damage the skin. 	<ol style="list-style-type: none"> 1. It can be absorbed through the skin causing skin irritation. 2. Exposure to high concentration vapors may cause lung disease. 3. Its vapour may affect central nervous system and cause headache, drowsiness and dizziness.

Substance name	Carbon dioxide	Carbon disulphide
Chemical formula	CO ₂	CS ₂
Features	Colourless and odorless gas; sublimable; soluble in water.	Colourless to light yellow liquid; slightly soluble in water; soluble in ethanol ether.
Molecular weight	44	76.1
Specific gravity	-	1.26
Relative vapour density	1.53	2.6
Vapour pressure (mm Hg)	43001(at 20°C)	300 (at 21.5 °C)
Boiling point (°C)	-78.5	46.3
Flash point (°C)	Incombustible	-30
Ignition temp. (°C)	-	95
Explosive range (%)	-	1.3 to 50
Smelling point ppm (approx.)	odorless	<1
Conversion factors	--	--
1m ^l /m ³ (ppm) = mg/m ³	1.83	3.16
1mg/m ³ = m ^l /m ³ (ppm)	0.55	0.32
TLVs(TWA,STEL,C) ppm	5000(TWA),30000 (STEL)	1 (TWA)
Hazardous properties	<ol style="list-style-type: none"> 1. No effect for 6-hour exposure to 0.55% concentration. 2. 1to 2% concentration will cause unpleasantness. 3. 3 to 4 concentrations will cause tachypnea, palpitation rushing up of the blood pressure, headache or vertigo. 4. 6% concentration will cause dyspnea. 5. 7 to 10% concentration will cause unconsciousness, cyanosis and death in a few minutes. 	<ol style="list-style-type: none"> 1. It will be absorbed through skin. 2. Its vapour will strongly irritate the skin, eyes and mucous membranes of the nasal passages, causing narcotic action as an acute poisoning symptom. 3. Chronic poisoning will cause headache, vertigo, nausea, or affect the nervous system. 4. May cause gastrointestinal disturbance or damage the brain vessels with accompanying retinitis.

Substance name	Carbon monoxide	Carbon tetrachloride
Chemical formula	CO	CCl ₄
Features	Colourless and odorless gas; hardly soluble in water; soluble in alkaline water solution and ethanol.	Colourless liquid; chloroform odor; hardly soluble in water; highly soluble in ethanol and ether.
Molecular weight	28	153.8
Specific gravity	-	1.59
Relative vapour density	0.97	5.3
Vapour pressure (mm Hg)	-	90 (at 21.5 °C)
Boiling point (°C)	-191.5	76.7
Flash point (°C)	-	Incombustible
Ignition temp. (°C)	605	> 982
Explosive range (%)	12.5 to 74	--
Smelling point ppm (approx.)	odorless	70
Conversion factors	--	--
1m ³ /m ³ (ppm) = mg/m ³	1.16	6.39
1mg/m ³ = m ³ /m ³ (ppm)	0.86	0.16
TLVs(TWA,STEL,C) ppm	25(TWA)	5 (TWA), 10 (STEL)
Hazardous properties	<ol style="list-style-type: none"> 1. It will combine with the hemoglobin of the blood, which will impede its oxygen carrying capacity, causing toxic symptoms. 2. Symptoms include headache, nausea, vertigo, dizziness, ringing in the ears, perspiration, pain in limbs, lassitude and forgetfulness. 	<ol style="list-style-type: none"> 1. Will be absorbed through the skin. 2. Absorbing the liquid or inhaling its vapour will damage the liver, kidney, heart, lungs, skin, digestive system and nervous system. 3. Exposure to high concentration vapour will cause headache, fatigue, nausea, vomiting and vertigo.

Substance name	Chlorine	Chlorine dioxide
Chemical formula	Cl ₂	ClO ₂
Features	Yellow green gas; strong pungent odor; hardly soluble in water ; liquefied under 5 atmospheric pressure	Orange Colour gas, pungent odor, highly soluble in water; decomposed by heat or light
Molecular weight	70.9	67.5
Specific gravity	-	1.64
Relative vapour density	2.5	-
Vapour pressure (mm Hg)	5049.9 (at 20 °C)	490 (at 0 °C)
Boiling point (°C)	-34	11.0
Flash point (°C)	-	130
Ignition temp. (°C)	-	
Explosive range (%)	-	-
Smelling point ppm (approx.)	0.02	
Conversion factors	--	--
1m ^l /m ³ (ppm) = mg/m ³	2.95	
1mg/m ³ = m ^l /m ³ (ppm)	0.34	
TLVs(TWA,STEL,C) ppm	0.5(TWA), 1(STEL)	0.1 ppm (TWA). 0.3 ppm(STEL)
Hazardous properties	<ol style="list-style-type: none"> 1. Skin contact will cause inflammation. 2. Inhaling will cause coughing, dyspnea, or death may result. 3. Chronic symptoms include bronchitis, inflammation of the nasal mucous membranes. 	<ol style="list-style-type: none"> 1. It will cause perceptible irritation from 5 ppm concentration. 2. Death due to exposure to 19 ppm concentration has been reported. 3. Respiratory irritations or digestive system troubles due to prolonged exposure have been reported.

Substance name	Chlorobenzene	Chloroform
Chemical formula	C ₆ H ₅ Cl	CHCl ₃
Features	Colourless liquid; almond odor; insoluble in water; highly soluble in ethanol and ether.	Colourless liquid; sweetish pungent odor; hardly soluble in water; highly soluble in ethanol and ether
Molecular weight	112.6	119.4
Specific gravity	1.11	1.50
Relative vapour density	3.9	4.1
Vapour pressure (mm Hg)	8.7 (at 20 °C)	100 (at 10.4 °C)
Boiling point (°C)	132	61.2
Flash point (°C)	29	--
Ignition temp. (°C)	590	982
Explosive range (%)	1.3 to 9.6	Incombustible
Smelling point ppm (approx.)	0.2	200
Conversion factors	--	--
1m ^l /m ³ (ppm) = mg/m ³	4.68	4.962
1mg/m ³ = m ^l /m ³ (ppm)	0.21	0.202
TLVs(TWA,STEL,C) ppm	10(TWA)	10 (TWA)
Hazardous properties	<ol style="list-style-type: none"> 1. Its vapour will irritate the eyes and mucous membranes of the nasal passage. 2. Inhaling the vapour will cause narcotic action. 3. Chronic symptoms include renal or hepatic damage. 	<ol style="list-style-type: none"> 1. It will be highly narcotic, may poison the tissues of the liver, renal tubules or heart. 2. Inhaling its high concentration vapour will cause excitement, loss of reflex action, anesthetic, unconsciousness, respiratory arrest, or death may result.

Substance name	Chloropicrin	O – Cresol
Chemical formula	Cl ₃ CNO ₂	C ₆ H ₄ (CH ₃)OH
Features	Colourless or light yellow oily liquid; pungent odor; slightly soluble in water	Colourless or pink liquid or solid; Carboic acid odor; soluble in water and ethanol.
Molecular weight	164.4	108.1
Specific gravity	1.67	1.05
Relative vapour density	5.7	3.8
Vapour pressure (mm Hg)	40 (at 33.8 °C)	1 (at 38 °C)
Boiling point (°C)	112	191 (375 °F)
Flash point (°C)	-	- 1 (33.8 °F)
Ignition temp. (°C)		--
Explosive range (%)	-	1.1% or higher
Smelling point ppm (approx.)		--
Conversion factors	--	--
1m ^l /m ³ (ppm) = mg/m ³		4.49
1mg/m ³ = m ^l /m ³ (ppm)		0.22
TLVs(TWA,STEL,C) ppm	0.1 ppm(TWA)	5 (TWA)
Hazardous properties	<ol style="list-style-type: none"> 1. Its vapor will irritate the mucous membranes, causing lacrimation or conjunctivitis. 2. Inhaling the vapour will cause nausea, coughing, dyspnea or pulmonary edema. May be fatal in 10 minutes in 50 ppm or higher concentration, or in 2 minutes in 250 ppm or higher concentration. 	<ol style="list-style-type: none"> 1. Will be absorbed through the skin. Contact with the skin or eyes will cause serious burns. 2. Inhaling its vapour will cause lassitude, vomiting, insomnia, central nerve disorder or hepatic or renal damage. Death may result.

Substance name	Cyclohexane	Cyclohexanone
Chemical formula	C ₆ H ₁₂	C ₆ H ₁₀ O
Features	Colourless Liquid; Pungent odor; insoluble in water; highly soluble in ethanol and ether.	Colourless or light yellow oily liquid; odor of acetone; hardly soluble in water; soluble in ether.
Molecular weight	84.2	98.1
Specific gravity	0.78	0.95
Relative vapour density	2.9	3.4
Vapour pressure (mm Hg)	78.02 (at 20 °c)	3.4(at 20 ° c)
Boiling point (°C)	80.7	156
Flash point (°C)	-20	44
Ignition temp. (°C)	260	-
Explosive range (%)	1.3 to 8.3	1.1 to 9.4
Smelling point ppm (approx.)	-	-
Conversion factors	--	--
1m ^l /m ³ (ppm) = mg/m ³	3.52	-
1mg/m ³ = m ^l /m ³ (ppm)	0.28	-
TLVs(TWA,STEL,C) ppm	100 (TWA)	50 (STEL)
Hazardous properties	<ol style="list-style-type: none"> 1. Repeated skin contact with the liquid will cause skin damage. 2. Contact with the eyes will cause irritation. 3. Inhaling its vapors will cause headache, dizziness, and nausea. High concentration vapour will induce drowsiness and cause unconsciousness. 	<ol style="list-style-type: none"> 1. From 50 ppm, its vapour will irritate the mucous membranes of the throat, causing unpleasantness. 2. From 70 ppm, the vapour will irritate the eyes and mucous membranes of the nasal passages.

Substance name	Cyclohexylamine	1,2-Dichlorobenzene
Chemical formula	$C_6H_{11}NH_2$	$C_6H_4Cl_2$
Features	Liquid; strong fishy odour.	Liquid, insoluble in water. Miscible with alcohol, ether, benzene.
Molecular weight	99.18	147
Specific gravity	--	
Relative vapour density	3.43	5.08
Vapour pressure (mm Hg)	10.69 (at 20 °C)	0.98 (at 20 °C)
Boiling point (°C)	134.5	180.5
Flash point (°C)	--	66
Ignition temp. (°C)	290	640
Explosive range (%)	1.6 to 9.4	1.2 to 12
Smelling point ppm (approx.)	--	2
Conversion factors	--	--
1m ^l /m ³ (ppm) = mg/m ³	4.12	6.11
1mg/m ³ = m ^l /m ³ (ppm)	0.24	0.16
TLVs (TWA,STEL,C) ppm	10 (TWA)	25 (TWA), 50 (STEL)
Hazardous properties	<ol style="list-style-type: none"> 1. Can cause irritation & sensitization. 2. High conc. can cause nausea & narcotic effect. 	<ol style="list-style-type: none"> 1. Potential symptoms of overexposure are irritation of nose and eyes; liver and kidney damage; skin blisters.

Substance name	1,2 Dichloroethane	1,2-Dichloroethylene
Chemical formula	$\text{ClCH}_2\text{CH}_2\text{Cl}$	$\text{ClCH}=\text{CHCl}$
Features	Colourless liquid; slightly soluble in water; highly soluble in ethanol & ether.	Colourless liquid; aromatic odor; slightly soluble in water; highly soluble in organic solvents
Molecular weight	99	96.9
Specific gravity	1.25	1.26
Relative vapour density	3.4	3.34
Vapour pressure (mm Hg)	63 (at 20 °C)	250 (at 19 °C)
Boiling point (°C)	83.4	47.5
Flash point (°C)	13	6
Ignition temp. (°C)	--	
Explosive range (%)	6.2 to 16	5.6 to 12.8
Smelling point ppm (approx.)	--	--
Conversion factors	--	--
$1\text{m}\ell/\text{m}^3$ (ppm) = mg/m^3	4.11	--
$1\text{mg}/\text{m}^3 = \text{m}\ell/\text{m}^3$ (ppm)	0.24	--
TLVs(TWA,STEL,C) ppm	10 (TWA)	200 ppm (TWA)
Hazardous properties	<ol style="list-style-type: none"> Repeated contact with the skin and mucous membranes may cause skin damage and conjunctivitis. Animal experiments have shown that 100 ppm or higher concentration would damage the liver, increasing the mortality rate. 	<ol style="list-style-type: none"> It will be absorbed through the skin, causing acute irritation to the skin, eyes and mucous membranes. Inhaling its vapor will cause transient narcosis, central nervous system disorder and liver damage.

Substance name	Diethylamine	Diesel
Chemical formula	(C ₂ H ₅) ₂ NH	C _n H _m
Features	Colourless liquid; ammoniac odor; highly soluble in water; soluble in ethanol and ether.	Clear colourless or dyed liquid;
Molecular weight	73.1	--
Specific gravity	0.71	0.775-0.840
Relative vapour density	2.5	>4.5
Vapour pressure (mm Hg)	400 (at 38 °C)	< 1 (at 20 °C)
Boiling point (°C)	56	> 149
Flash point (°C)	-23	> 52
Ignition temp. (°C)		210 °C
Explosive range (%)	1.8 to 10.1	0.7 to 7.0%
Smelling point ppm (approx.)	--	--
1m ^l /m ³ (ppm) = mg/m ³	--	--
1mg/m ³ = m ^l /m ³ (ppm)	--	--
TLVs(TWA,STEL,C) ppm	5 ppm (TWA), 15 ppm (STEL)	0.1 mg/l (TWA)
Hazardous properties	<ol style="list-style-type: none"> 1. It will acutely irritate the skin and mucous membranes. 2. Inhaling its high concentration vapour will cause dyspnea. Death may result. 	<ol style="list-style-type: none"> 1. Respiratory and skin irritant. 2. The product may contain polycyclic aromatic hydrocarbons which may be carcinogenic.

Substance name	N,N-Dimethyl Formamide	1,4 Dioxane
Chemical formula	HCON(CH ₃) ₂	C ₄ H ₈ O ₂
Features	Colourless liquid; faint aminic odor; soluble in water and organic solvent.	Colourless liquid, faint aroma; highly soluble in water, ethanol and ether
Molecular weight	73.1	88.1
Specific gravity	0.94	1.03
Relative vapour density	2.5	3.0
Vapour pressure (mm Hg)	3.7 (at 25 ° c)	-
Boiling point (°C)	153	101.4
Flash point (°C)	58	12
Ignition temp. (°C)	440	
Explosive range (%)	2.2 to15.2	1.97 to 22.2
Smelling point ppm (approx.)	100	--
1m ^l /m ³ (ppm) = mg/m ³	3.04	--
1mg/m ³ = m ^l /m ³ (ppm)	0.33	--
TLVs(TWA,STEL,C) ppm	10 (TWA)	20 ppm (TWA)
Hazardous properties	<ol style="list-style-type: none"> 1. It will be absorbed through the skin. 2. It will acutely irritate the skin, eyes and mucous membranes. 3. Inhaling its vapors will cause nausea, or repeated exposure may damage stomach, liver and kidneys. 	<ol style="list-style-type: none"> 1. It will be absorbed through the skin 2. Inhaling its vapor will irritate the eyes and mucous membranes of the nasal passages and throat, causing hypnosis, vertigo, headache, loss of appetite or nausea. White cells will rise. 3. Inhaling the high concentration vapor will cause liver damage, hemorrhagic nephritis or hematuria, and death will result.

Substance name	Dimethyl Sulphide	Ethanol
Chemical formula	$(\text{CH}_3)_2\text{S}$	$\text{C}_2\text{H}_5\text{OH}$
Features		Colourless Liquid; aromatic odor; highly soluble in water.
Molecular weight	62.14	46.1
Specific gravity	--	0.79
Relative vapour density	2.15	1.6
Vapour pressure (mm Hg)	420 (at 20 °C)	40 (at 19 °C)
Boiling point (°C)	37.3	78.3
Flash point (°C)	--	13
Ignition temp. (°C)	215	-
Explosive range (%)	2.2 to 19.7	3.3 to 19
Smelling point ppm (approx.)	0.001	-
Conversion factors	--	--
1ml/m ³ (ppm) = mg/m ³	2.58	-
1mg/m ³ = ml/m ³ (ppm)	0.39	-
TLVs(TWA,STEL,C) ppm	--	1000(TWA)
Hazardous properties		<ol style="list-style-type: none"> Swallowing the liquid or inhaling its high concentration vapour will cause poisoning. Contact with the skin will cause irritation. Repeated contact with the eyes and mucous membranes of the nasal passages and throat will cause inflammation.

Substance name	Ethyl acetate	Ethyl Benzene
Chemical formula	$\text{CH}_3\text{CO}_2\text{C}_2\text{H}_5$	$\text{C}_6\text{H}_5\text{C}_2\text{H}_5$
Features	Colourless Liquid; Aromatic odor; soluble in water, highly soluble in organic solvent.	Colourless liquid; slightly soluble in water, highly soluble in benzene, ethanol and ether.
Molecular weight	88.1	106.2
Specific gravity	0.90	0.87
Relative vapour density	3.0	3.7
Vapour pressure (mm Hg)	100 (at 27 °c)	6.97
Boiling point (°C)	76.8	136.2
Flash point (°C)	-4	15
Ignition temp. (°C)	460	430
Explosive range (%)	2.0 to 11.5	1.0 to 6.7
Smelling point ppm (approx.)	50	25
1m ^l /m ³ (ppm) = mg/m ³	3.66	4.41
1mg/m ³ = m ^l /m ³ (ppm)	0.27	0.23
TLVs(TWA,STEL,C) ppm	400 (TWA)	20 (TWA)
Hazardous properties	<ol style="list-style-type: none"> 1. Its vapour will irritate the eyes and mucous membranes of the nasal passages and throat. 2. Inhaling its vapors will induce drowsiness. Prolonged inhaling may cause acute pulmonary edema. 	<ol style="list-style-type: none"> 1. It will irritate the skin more acutely than toluene or xylene. The liquid and its vapour will irritate the eyes and respiratory mucous membranes. 2. It will stimulate the central nervous system before causing narcotic action. 3. It will acutely irritate the eyes and skin in 1000 ppm or higher concentration.

Substance name	Ethyl ether	Ethyl Formate
Chemical formula	$(C_2H_5)_2O$	$HCOOCH_3CH_2$
Features	Colourless Liquid; Sweetish, pungent odor; hardly soluble in water.	Water white liquid, aromatic odor.
Molecular weight	74.1	74.08
Specific gravity	0.72	0.921
Relative vapour density	2.6	2.55
Vapour pressure (mm Hg)	442 (at 20 ° c)	194 (at 20 °C)
Boiling point (°C)	34.5	53 (127.4 °F)
Flash point (°C)	-45	--
Ignition temp. (°C)	180	--
Explosive range (%)	1.9 to 36	2.8 to 16%
Smelling point ppm (approx.)	100	--
1m ^l /m ³ (ppm) = mg/m ³	3.08	3.07
1mg/m ³ = m ^l /m ³ (ppm)	0.33	0.33
TLVs(TWA,STEL,C) ppm	400 (TWA), 500 (STEL)	100 STEL
Hazardous properties	<ol style="list-style-type: none"> 1. Its vapour will be narcotic. 2. Contact with skin or eyes will cause irritation. 3. Will cause vertigo in 2000 ppm or higher concentration. 4. Unconsciousness in 3.5% or higher concentration, or respiratory paralysis or death in 10% or higher concentration. 5. Chronic poisoning will cause vertigo, headache, fatigue, loss of appetite, and insomnia. 	<ol style="list-style-type: none"> 1. It is toxic to the nervous system, upper respiratory tract. 2. Repeated or prolonged exposure to the substance can produce target organs damage.

Substance name	Ethyl Mercaptan	Ethylene Dibromide
Chemical formula	C ₂ H ₅ SH	C ₂ H ₄ Br ₂
Features	Colourless Liquid; garlicky odor; slightly soluble in water, soluble in ethanol and ether.	Heavy liquid, Chloroform odor, soluble in 250 parts of water, misc with alcohol, ether.
Molecular weight	62.1	187.86
Specific gravity	0.84	--
Relative vapour density	2.1	--
Vapour pressure (mm Hg)	438.8	8.47 (at 20 °C)
Boiling point (°C)	34.7	131.6
Flash point (°C)	27	--
Ignition temp. (°C)	295	--
Explosive range (%)	2.8 to 18.2	--
Smelling point ppm (approx.)	0.001	--
1mℓ/m ³ (ppm) = mg/m ³	2.59	7.80
1mg/m ³ = mℓ/m ³ (ppm)	0.39	0.13
TLVs(TWA,STEL,C) ppm	0.5 (TWA)	--
Hazardous properties	<ol style="list-style-type: none"> 1. It will cause hypnosis, or high concentration will paralyze the central nervous system. 2. Strong pungent odor will cause headache, vomiting, or in high concentration cause cyanosis, cool limbs, rapid pulsation, irritation of respiratory tissues, unconsciousness, or in serious cases, may develop pulmonary edema. 	Potential symptoms of overexposure are irritation of respiratory system and eyes, dermatitis with vesiculation.

Substance name	Ethylene Glycol	Ethylene oxide
Chemical formula	HOCH ₂ CH ₂ OH	C ₂ H ₄ O
Features	Colourless liquid; sweetish, pungent odor; highly soluble in water, ethanol and ether	Colourless gas; sweetish, pungent odor; hardly soluble in water.
Molecular weight	62.1	44.1
Specific gravity	1.11	0.89
Relative vapour density	2.14	1.5
Vapour pressure (mm Hg)	-	--
Boiling point (°C)	197.2	10.7 (51.3 °F)
Flash point (°C)	116	-17.8 (- 0.04 °F)
Ignition temp. (°C)		440
Explosive range (%)	3.2 or higher	3.6 to 100%
Smelling point ppm (approx.)		--
Conversion factors	--	--
1m ^l /m ³ (ppm) = mg/m ³		1.83
1mg/m ³ = m ^l /m ³ (ppm)		0.55
TLVs(TWA,STEL,C) ppm	100 mg/m ³ (C)	1 (TWA)
Hazardous properties	Contact with the skin or mucus membranes will be less hazardous than ingestion which can cause serious poisoning.	<ol style="list-style-type: none"> 1. Skin contact with high concentration liquid will cause blisters, or getting it into the eyes may cause corneal damage. 2. Inhaling its low concentration vapour will irritate the eyes, skin and mucous membranes. 3. Inhaling a large quantity of the gas or vapour will cause narcotic action, and death may result.

Substance name	Formaldehyde	Formic Acid
Chemical formula	HCHO	HCOOH
Features	Colourless liquid (water solution); strong pungent odor; soluble in water, ethanol and ether.	Colourless liquid; pungent odour; highly soluble in water, soluble in ethanol and in ether.
Molecular weight	30	46.0
Specific gravity	-	1.22
Relative vapour density	1.0	1.6
Vapour pressure (mm Hg)	-	40 (at 23.5 °C)
Boiling point (°C)	-19.2	100.8
Flash point (°C)	85	68.9
Ignition temp. (°C)	300	520
Explosive range (%)	7.0 to 73	10 to 45.5
Smelling point ppm (approx.)	< 1	20
1ml/m ³ (ppm) = mg/m ³	1.25	1.91
1mg/m ³ = ml/m ³ (ppm)	0.80	0.52
TLVs(TWA,STEL,C) ppm	0.3 (c)	5 (TWA) ,10 (STEL)
Hazardous properties	<ol style="list-style-type: none"> 1. It will irritate the skin by contact, causing chaps or ulcer. 2. Its vapour will be lacrimatory 3. Inhaling the vapour will irritate the mucous membranes, causing coughing. 4. Chronic symptoms include renal or hepatic damage. 	<ol style="list-style-type: none"> 1. Skin contact will cause inflammation. 2. It will irritate and corrode most acutely among fatty acids. Soluble in lipid and will be absorbed through the skin. 3. It will irritate the skin and mucous membranes more acutely than acetic acid.

Substance name	Furfural	Furan
Chemical formula	C ₅ H ₄ O ₂	C ₄ H ₄ O
Features	Colourless liquid; benzaldehyde odor; slightly soluble in water; soluble in ethanol & ether.	Colourless liquid; insoluble in water; freely soluble in ether & alcohol.
Molecular weight	96.1	68.08
Specific gravity	1.16	0.93
Relative vapour density	3.3	--
Vapour pressure (mm Hg)	-	493 (at 20 °C)
Boiling point (°C)	161.7	32 (89.6 °F)
Flash point (°C)	60	- 35 (- 31 °F)
Ignition temp. (°C)	-	--
Explosive range (%)	2.1 to 19.3	2.3 to 14.3%
Smelling point ppm (approx.)	-	--
1m ^l /m ³ (ppm) = mg/m ³	-	2.83
1mg/m ³ = m ^l /m ³ (ppm)	-	0.35
TLVs(TWA,STEL,C) ppm	2 (TWA)	--
Hazardous properties	<ol style="list-style-type: none"> 1. It will be absorbed through the skin. 2. It will acutely irritate the mucous membranes, causing lacrimation. 3. High concentration will cause pulmonary edema or convulsions, or paralyze the central nervous system. 	<ol style="list-style-type: none"> 1. The vapors are anesthetic can be absorbed through skin.

Substance name	Gasoline	Hexane
Chemical formula	C_nH_m	$CH_3(CH_2)_4CH_3$
Features	Colourless liquid; petrolic odour; insoluble in water.	Colourless liquid; petrolic odour; insoluble in water, soluble in ethanol and ether.
Molecular weight	--	86.2
Specific gravity	0.67 to 0.8	0.67
Relative vapour density	3 to 4	3.0
Vapour pressure (mm Hg)	--	155 (at 20 °C)
Boiling point (°C)	--	68.7
Flash point (°C)	- 43 (- 45 °F)	-22
Ignition temp. (°C)	--	240
Explosive range (%)	1.4 to 7.6%	1.1 to 7.5
Smelling point ppm (approx.)	--	-
Conversion factors	--	--
$1\text{m}\ell/\text{m}^3 \text{ (ppm)} = \text{mg}/\text{m}^3$	--	3.58
$1\text{mg}/\text{m}^3 = \text{m}\ell/\text{m}^3 \text{ (ppm)}$	--	0.28
TLVs(TWA,STEL,C) ppm	300(TWA), 500 (STEL)	50 (TWA)
Hazardous properties	<ol style="list-style-type: none"> Inhaling its vapour will cause neurosis. Swallowing the liquid will cause nausea, convulsions, palpitation or dyspnea. 	<ol style="list-style-type: none"> Inhaling its vapour will cause vertigo, quadriplegia, difficulty in walking or other polyneuritis. Industrial hexane contains impurities, making it more hazardous and is liable to cause chronic poisoning.

Substance name	Hydrazine	Hydrogen
Chemical formula	N_2H_4	H_2
Features	Colourless liquid, ammoniac odor; fuming; soluble in water and ethanol.	Colourless & odorless gas; slightly soluble in water.
Molecular weight	32	2
Specific gravity	1.01	0.07 (gas)
Relative vapour density	1.11	--
Vapour pressure (mm Hg)	15.8	--
Boiling point (°C)	113.5	- 252 (- 422 °F)
Flash point (°C)	52.5	--
Ignition temp. (°C)	270	560
Explosive range (%)	2.9 to 98	4.0 to 75%
Smelling point ppm (approx.)	3	Odor less
$1\text{m}\ell/\text{m}^3$ (ppm) = mg/m^3	1.33	0.084
$1\text{mg}/\text{m}^3$ = $\text{m}\ell/\text{m}^3$ (ppm)	0.75	11.94
TLVs(TWA,STEL,C) ppm	0.01 (TWA)	--
Hazardous properties	<ol style="list-style-type: none"> It will be absorbed through the skin. Its strong alkalinity will corrode the skin and mucous membranes. Suspected carcinogen. 	<ol style="list-style-type: none"> Innocuous by itself, but in a closed place, it will lower oxygen conc. in the air, causing hypoxia.

Substance name	Hydrogen chloride	Hydrogen Cyanide
Chemical formula	HCl	HCN
Features	Colourless gas; strong pungent odor; fuming; soluble in water.	Colourless liquid; bitter almond odor; soluble in water; soluble in ethanol and ether.
Molecular weight	36.5	27
Specific gravity	-	0.69
Relative vapour density	1.3	0.9
Vapour pressure (mm Hg)	31960.5	807.2 (27.2 ° C)
Boiling point (°C)	-85	25.7
Flash point (°C)	-	-17.8
Ignition temp. (°C)	-	535
Explosive range (%)	-	5.6 to 40
Smelling point ppm (approx.)	-	2
1mℓ/m ³ (ppm) = mg/m ³	1.52	1.12
1mg/m ³ = mℓ/m ³ (ppm)	0.66	0.89
TLVs(TWA,STEL,C) ppm	2 (C)	4.7 (C)
Hazardous properties	<ol style="list-style-type: none"> Contact with skin or eyes will cause inflammation. Inhaling will irritate the mucous membranes of the nasal passage and throat, causing, coughing. Inhaling a large quantity will cause pulmonary edema and death will result. 	<ol style="list-style-type: none"> Concentrations around 25 ppm will cause mild poisoning. Concentrations around 50 ppm will be endurable for 0.5 to 1 hour. Concentrations around 100 ppm will be fatal in 0.5 to 1 hour. Concentrations around 200 ppm will be fatal in 10 minutes. Concentrations around 275 ppm will be fatal immediately.

Substance name	Hydrogen fluoride	Hydrogen sulphide
Chemical formula	HF	H ₂ S
Features	colourless liquid; pungent odor; fuming; highly soluble in water	Colourless gas; odour of rotten eggs; soluble in water; soluble in methanol and carbon disulphide.
Molecular weight	20	34.1
Specific gravity	1.0	-
Relative vapour density	0.7	1.2
Vapour pressure (mm Hg)	750.2	13579.4 (at 20 °C)
Boiling point (°C)	19.5	-60.4
Flash point (°C)	-	-
Ignition temp. (°C)	-	270
Explosive range (%)	-	4.0 to 44
Smelling point ppm (approx.)	-	-
1m ^l /m ³ (ppm) = mg/m ³	0.83	1.42
1mg/m ³ = m ^l /m ³ (ppm)	1.20	0.72
TLVs(TWA,STEL,C) ppm	0.5 (TWA), 2 (C)	1 (TWA), 5 (STEL)
Hazardous properties	<ol style="list-style-type: none"> 1. It will irritate the eyes and the mucous membranes of the nasal passages and throat. Inhaling its vapour will cause pulmonary edema or bronchitis. 2. Chronic poisoning will inflame the respiratory tract or cause erosion of bones and dental enamel. 	<ol style="list-style-type: none"> 1. Conc. around 0.05 ppm will give first perceptible odor. 2. Offensive odour will come at 5 ppm. 3. Conc. around 75 ppm will irritate the respiratory tract or cause conjunctivitis. 4. Conc. around 250 ppm will cause subacute intoxication in an hour. 5. Conc. above 1000 ppm will be fatal immediately.

Substance name	Isopropyl alcohol	Isopropyl amine
Chemical formula	CH ₃ CH(OH)CH ₃	(CH ₃) ₂ CHNH ₂
Features	Colourless liquid; aromatic odor; soluble in water.	Colourless liquid; strong ammoniac odor ; soluble in water, ethanol and ether
Molecular weight	60.1	59.1
Specific gravity	0.79	0.69
Relative vapour density	2.1	2.0
Vapour pressure (mm Hg)	32 (at 20 °C)	223 (at 4.5 °C)
Boiling point (°C)	82.4	33 (91 °F)
Flash point (°C)	12	-37.2 (-35 °F)
Ignition temp. (°C)		
Explosive range (%)	2.0 to 12.7	2.0 to 10.4%
Smelling point ppm (approx.)	-	-
1m ^l /m ³ (ppm) = mg/m ³	-	-
1mg/m ³ = m ^l /m ³ (ppm)	-	-
TLVs(TWA,STEL,C) ppm	200 (TWA), 400 (STEL)	5(TWA), 10(STEL)
Hazardous properties	<ol style="list-style-type: none"> Inhaling its vapour will irritate the mucous membranes and cause narcotic action. contact with the eyes will damage the cornea and may cause visual impairment. 	<ol style="list-style-type: none"> The liquid and its vapor will cause acute local irritations. 5 ppm concentrations will give first perceptible ammoniac odor, and the odor is strongest in 10 to 20 ppm concentration irritating the mucous membranes of the nasal passage and throat by short term exposure. It will irritate the respiratory tissues and serious causes may cause pulmonary edema.

Substance name	Isopropyl ether	Maliec Anhydride
Chemical formula	C ₆ H ₁₄ O	C ₄ H ₂ O ₃
Features	Liquid; slightly soluble in water.	Solid, soluble in water.
Molecular weight	102.18	98.06
Specific gravity	0.73	1.48
Relative vapour density	--	--
Vapour pressure (mm Hg)	158 (at 20 °C)	--
Boiling point (°C)	68 (154.4 °F)	202 (395.6 °F)
Flash point (°C)	--	--
Ignition temp. (°C)	--	--
Explosive range (%)	--	--
Smelling point ppm (approx.)	--	--
Conversion factors	--	--
1m ^l /m ³ (ppm) = mg/m ³	4.25	4.07
1mg/m ³ = m ^l /m ³ (ppm)	0.24	0.25
TLVs(TWA,STEL,C) ppm	250 (TWA), 310 (STEL)	0.1 (TWA)
Hazardous properties	1. Potential symptoms of over exposure are irritation of eyes and nose; respiratory discomfort; dermatitis.	1. Potential symptoms of over exposure are conjunctivitis; photophobia; double vision; nasal and upper respiratory irritation; bronchial asthma; dermatitis.

Substance name	Mercury vapour	Methanol
Chemical formula	Hg	CH ₃ OH
Features	Silver white liquid (only common metal existing as a liquid at ordinary temperatures); odorless; can generate amalgams.	Colourless liquid; aromatic odor; highly soluble in water.
Molecular weight	200.6	32
Specific gravity	13.6	0.79
Relative vapour density	6.93	1.1
Vapour pressure (mm Hg)	0.0012 (at 20 ° c)	95 (at 20 ° c)
Boiling point (°C)	356.7	64.7
Flash point (°C)	-	11
Ignition temp. (°C)	-	455
Explosive range (%)	-	6.0 to 36.5
Smelling point ppm (approx.)	odorless	5
Conversion factors	--	--
1m ^l /m ³ (ppm) = mg/m ³	8.34	1.33
1mg/m ³ = m ^l /m ³ (ppm)	0.12	0.75
TLVs(TWA,STEL,C) ppm	0.01 mg/m ³ (TWA), 0.03 mg/m ³ (STEL)	200(TWA) 250(STEL)
Hazardous properties	<ol style="list-style-type: none"> 1. It will be absorbed through the skin. 2. Inhaling its vapour will cause loss of appetite, headache, lassitude, mild shivers, insomnia and other mental disturbances. 	<ol style="list-style-type: none"> 1. It will be absorbed through the skin. Repeated skin contact with the liquid will cause dermatitis. 2. Swallowing the liquid or inhaling its vapour will cause headache, vertigo, nausea, visual impairment. 3. Consumption of around 20 ml will cause blindness. 4. Consumption above 50 ml will be fatal.

Substance name	Methyl Bromide	Methyl Ethyl Ketone
Chemical formula	CH ₃ Br	CH ₃ COC ₂ H ₅
Features	Colourless Gas; Chloroform odor; hardly soluble in water; soluble in organic solvent.	Colourless to light yellow liquid; aromatic odour; soluble in water.
Molecular weight	94.9	72.1
Specific gravity	1.73	0.83
Relative vapour density	3.3	2.5
Vapour pressure (mm Hg)	1418	71.2 (at 20 °C)
Boiling point (°C)	3.6	79.5 (175.1 °F)
Flash point (°C)	-	- 9 (16 °F)
Ignition temp. (°C)	535	505
Explosive range (%)	10.0 to 15.0	1.7 to 11.4%
Smelling point ppm (approx.)	odorless	<25
1m ^l /m ³ (ppm) = mg/m ³	3.95	3
1mg/m ³ = m ^l /m ³ (ppm)	0.25	0.33
TLVs(TWA,STEL,C) ppm	1 (TWA)	200(TWA), 300 (STEL)
Hazardous properties	<ol style="list-style-type: none"> 1. It will be absorbed through the skin. 2. Inhaling its vapour will cause headache, vertigo, or a few days later nerve disorders such as convulsions or visual impairment. 3. It will cause serious troubles in the nervous system, kidney or tongue. 	<ol style="list-style-type: none"> 1. Repeated skin contact with the liquid will cause dermatitis 2. Its high concentration vapour will irritate the eyes and mucous membranes of the nasal passages and throat. 3. Inhaling the vapour will cause narcotic action, headache, vertigo, nausea or unconsciousness.

Substance name	Methyl Isobutyl Ketone	Methylene chloride
Chemical formula	$(\text{CH}_3)_2\text{CHCH}_2\text{COCH}_3$	CH_2Cl_2
Features	Colourless liquid; faint ketonic odor; hardly soluble in water.	Colourless liquid; chloroform odour; slightly soluble in water; highly soluble in ethanol and ether.
Molecular weight	100.2	84.9
Specific gravity	0.80	1.33
Relative vapour density	3.45	2.9
Vapour pressure (mm Hg)	16 (at 20 °C)	440 (at 25 °C)
Boiling point (°C)	116.7	40.2 (104.4 °F)
Flash point (°C)	18	--
Ignition temp. (°C)	475	605
Explosive range (%)	1.2 to 8.0	15.5 to 66.9%
Smelling point ppm (approx.)	0.5	180
Conversion factors	--	--
$1\text{m}\ell/\text{m}^3$ (ppm) = mg/m^3	4.16	5.53
$1\text{mg}/\text{m}^3$ = $\text{m}\ell/\text{m}^3$ (ppm)	0.24	0.28
TLVs(TWA,STEL,C) ppm	20 (TWA) 75 (STEL)	50 (TWA)
Hazardous properties	<ol style="list-style-type: none"> 1. Its vapour will be irritating and narcotic. 2. 100 ppm concentration will give first perceptible dour. 3. 200 ppm will irritate the eyes. 4. 400 ppm concentration will irritate the mucous membranes of the nasal passages and throat. Endurable limit for short – term exposure. 	<ol style="list-style-type: none"> 1. It will irritate the skin & mucous, membranes. 2. Inhaling its vapour will cause headache, vertigo, nausea, vomiting or anemia.

Substance name	Methyl Mercaptan	Nitric Acid
Chemical formula	CH ₃ SH	HNO ₃
Features	Colourless gas; offensive odor; slightly soluble in water soluble ethanol and petroleum naphtha.	Colourless or lightly yellow liquid (water solution) pungent odor highly soluble in water.
Molecular weight	48.1	63.0
Specific gravity	0.90	1.50
Relative vapour density	1.7	2.18
Vapour pressure (mm Hg)	1275	43 (at 25 °C)
Boiling point (°C)	6.0	86
Flash point (°C)	Lower than 0	-
Ignition temp. (°C)	-	-
Explosive range (%)	3.9 to 21.8	-
Smelling point ppm (approx.)	0.002	-
1m ^l /m ³ (ppm) = mg/m ³	2.0	-
1mg/m ³ = m ^l /m ³ (ppm)	0.5	-
TLVs(TWA,STEL,C) ppm	0.5 (TWA)	2 (TWA),4 (STEL)
Hazardous properties	<ol style="list-style-type: none"> 1. It will be absorbed through the skin. Prolonged continuous contact will develop skin cancer. 2. It will be narcotic and paralyze the central nervous system. 3. High concentration will cause conjunctivitis or cornea opacity. 	<ol style="list-style-type: none"> 1. The liquid and its vapour will inflame the eyes, skin and mucous membranes. 2. It will cause erosion of dental enamel. 3. Inhaling the vapour will irritate the respiratory tissues, causing pulmonary edema.

Substance name	Nitrogen dioxide	n - Octane
Chemical formula	NO ₂	C ₈ H ₁₈
Features	Dark reddish-brown gas, strong pungent odour; soluble in water and organic solvent.	Flammable liquid, insoluble in water; slightly soluble in alcohol; soluble in ether.
Molecular weight	46.0	114.23
Specific gravity	-	--
Relative vapour density	1.59	3.95
Vapour pressure (mm Hg)	400(25 °c or 77 F°)	10.5 (at 20 °C)
Boiling point (°C)	21.3	125.6 (258 °F)
Flash point (°C)	-	--
Ignition temp. (°C)	-	210
Explosive range (%)	-	0.8 to 6.5%
Smelling point ppm (approx.)	0.5	--
Conversion factors	--	--
1m ^l /m ³ (ppm) = mg/m ³	1.91	4.75
1mg/m ³ = m ^l /m ³ (ppm)	0.52	0.21
TLVs(TWA,STEL,C) ppm	0.2 (TWA)	300 (TWA)
Hazardous properties	<ol style="list-style-type: none"> 1. High concentration will acutely irritate the eyes and the mucous membranes of the nasal passage and throat, causing coughing, vertigo, headache or nausea. 2. Inhaling a large quantity will cause cyanosis or pulmonary edema. 3. chronic symptoms include bronchitis, gastrointestinal disturbance Or erosion of dental enamel. 	<ol style="list-style-type: none"> 1. Potential symptoms of overexposure are irritation of eyes and nose; drowsiness; dermatitis; chemical pneumonia.

Substance name	Oxygen	Ozone
Chemical formula	O ₂	O ₃
Features	Colourless and odorless gas; hardly soluble in water.	Gaseous at ordinary temperatures; liquid is blue characteristic pungent odor; soluble in water and oils.
Molecular weight	32.0	48.0
Specific gravity	-	--
Relative vapour density	1.11	1.66
Vapour pressure (mm Hg)	-	--
Boiling point (°C)	-182.96	-111.9
Flash point (°C)	-	--
Ignition temp. (°C)	-	--
Explosive range (%)	-	-
Smelling point ppm (approx.)	-	0.015
Conversion factors	--	--
1m ^l /m ³ (ppm) = mg/m ³	1.33	2.0
1mg/m ³ = m ^l /m ³ (ppm)	0.75	0.50
TLVs(TWA,STEL,C) ppm	-	0.2 (TWA 2 hours)
Hazardous properties	<ol style="list-style-type: none"> 1. Concentrations around 14% will cause deep breathing; palpitation or difficulty in working. 2. Concentrations around 10% will cause dyspnea, drowsiness or slowness in action. 3. Concentrations around 6% will cause the loss of senses. 4. Concentrations below 4% will cause anesthesia or fainting in 40 seconds. 	<ol style="list-style-type: none"> 1. Skin contact with 10-30% concentration liquid will inflame the skin. 2. Expouser to 0.1- ppm concentration gas for two hours or more will decrease the lung capacity by 20%. 3. Expouser to 1-ppm concentration gas for six hours or more will cause headache or bronchitis.

Substance name	Phenol	Phosphine
Chemical formula	C ₆ H ₅ OH	PH ₃
Features	White to light vermilion solid; aromatic odor; soluble in water, ethanol ether & chloroform.	Colourless gas; garlicky odour; slightly soluble in water; soluble in ethanol and ether.
Molecular weight	94.1	34.0
Specific gravity	1.07	-
Relative vapour density	3.24	1.2
Vapour pressure (mm Hg)	1 (at 40 °C)	25959 (at 20 °C)
Boiling point (°C)	181.8	-84.7
Flash point (°C)	79	-
Ignition temp. (°C)	595	100
Explosive range (%)	3 to 10%	-
Smelling point ppm (approx.)	0.05	0.02
Conversion factors	--	--
1m ^l /m ³ (ppm) = mg/m ³	3.91	1.41
1mg/m ³ = m ^l /m ³ (ppm)	0.26	0.71
TLVs(TWA,STEL,C) ppm	5 (TWA)	0.3 (TWA),1(STEL)
Hazardous properties	<ol style="list-style-type: none"> 1. It will be absorbed through the skin. 2. Skin contact will cause inflammation. 3. Inhaling its vapour or absorbing it through the skin will cause lassitude, vomiting or insomnia. 4. Ingesting it will cause nausea, acute abdominal pain, or death may result. 	<ol style="list-style-type: none"> 1. It will give offensive odour causing acute toxic symptom such as headache, pain in the chest vomiting, feeling of coldness, or pain in region of diaphragm. 2. It will cause dyspnea, bronchitis, or edema of the respiratory track, or difficulty in walking. 3. It will cause a coma, and death may result.

Substance name	Phosgene	Pyridine
Chemical formula	COCl ₂	C ₅ H ₅ N
Features	Colourless gas; odour of new mown hay; highly toxic; soluble in benzene & toluene.	Colourless to light yellow liquid; hygroscopic; offensive odor; highly soluble in water
Molecular weight	98.92	79.1
Specific gravity	1.39	0.98
Relative vapour density	3.5	2.7
Vapour pressure (mm Hg)	1175 (at 20 °C)	10 (at 13.2 °C)
Boiling point (°C)	8 (46 °F)	115.5
Flash point (°C)	--	20
Ignition temp. (°C)	--	550
Explosive range (%)	--	1.8 to 12.4
Smelling point ppm (approx.)	0.5	Intolerable above 30 ppm
Conversion factors	--	--
1m ^l /m ³ (ppm) = mg/m ³	4.11	3.28
1mg/m ³ = m ^l /m ³ (ppm)	0.24	0.30
TLVs(TWA,STEL,C) ppm	0.1 (TWA)	1 ppm (TWA)
Hazardous properties	<ol style="list-style-type: none"> 1. Conc. of 1 ppm. is the endurable limit for prolonged exposure. 2. Conc. of 4 ppm. will irritate the eyes and the mucous membranes of the throat. 3. Conc. of 10 ppm or above. will cause pulmonary troubles in 30 – 60 minutes. 4. Exposure to 20 ppm or above. Will be fatal in 30 minutes. 	<ol style="list-style-type: none"> 1. Skin contact with the liquid will cause dermatitis. 2. Inhaling its vapor will cause coughing, headache or nausea, and develop hepatic or renal damage.

Substance name	Sulphur dioxide	Stoddard solvent
Chemical formula	SO ₂	--
Features	Colourless gas; offensive, pungent odour; soluble in water.	Colourless liquid; characteristic odour; insoluble in water; soluble in ethanol and ether.
Molecular weight	64.1	--
Specific gravity	-	0.8
Relative vapour density	2.3	3.9
Vapour pressure (mm Hg)	2480 (at 20 °C)	--
Boiling point (°C)	-10	149 (300 °F)
Flash point (°C)	-	40 (104 °F)
Ignition temp. (°C)	-	--
Explosive range (%)	-	0.8% to higher
Smelling point ppm (approx.)	0.5	--
Conversion factors	--	--
1m ^l /m ³ (ppm) = mg/m ³	2.66	--
1mg/m ³ = m ^l /m ³ (ppm)	0.37	--
TLVs(TWA,STEL,C) ppm	0.25 (STEL)	100 (TWA)
Hazardous properties	<ol style="list-style-type: none"> 1. Conc. around 1 ppm will give first perceptible odor. 2. Conc. above 5 ppm will irritate the mucous membranes of the nasal passages and throat, causing coughing. 3. Exposure to 30 ppm will cause dyspnea. 4. Exposure to 400 ppm or above will be fatal in a short time. 	<ol style="list-style-type: none"> 1. It will irritate the skin & mucous membranes and may cause dermatitis. 2. Inhaling its vapour will cause narcotic action or other nerve disorders.

Substance name	Styrene	Tetrachloroethylene
Chemical formula	$C_6H_5CH:CH_2$	$Cl_2C:CCl_2$
Features	Colourless liquid; slightly soluble in water; highly soluble ethanol and ether.	Colourless liquid; ethereal odor; hardly soluble in water; highly soluble in ethanol and ether
Molecular weight	104.2	165.8
Specific gravity	0.91	1.62
Relative vapour density	3.6	5.8
Vapour pressure (mm Hg)	5 (at 20 °C)	15.8 at 22 °C
Boiling point (°C)	145.2	121
Flash point (°C)	32	--
Ignition temp. (°C)	-	--
Explosive range (%)	1.1 to 1.6%	10.8 to 54.5 (in oxygen)
Smelling point ppm (approx.)	-	--
1m ^l /m ³ (ppm) = mg/m ³	-	6.88
1mg/m ³ = m ^l /m ³ (ppm)	-	0.15
TLVs(TWA,STEL,C) ppm	20 (TWA) 40 (STEL)	25 ppm (TWA); 100 ppm (STEL)
Hazardous properties	<ol style="list-style-type: none"> 1. Repeated skin contact with the liquid will inflame the skin. 2. Its vapour will irritate the eyes and the mucous membranes, causing lacrimation. 3. The higher concentration vapour will be narcotic and cause polyneuritis. 	<ol style="list-style-type: none"> 1. Skin contact with the liquid will cause cutaneous lesions 2. Its high concentration vapor will irritate the eyes and the mucous membranes of the nasal passages and throat, causing narcotic action, headache, vertigo, nausea or unconsciousness.

Substance name	Tetrahydrofuran	Toluene
Chemical formula	C ₄ H ₈ O	C ₆ H ₅ CH ₃
Features	Colourless liquid; ethereal odour; highly soluble in water, ethanol and ether.	Colourless liquid; aromatic odour; soluble in water; highly soluble in organic solvent.
Molecular weight	72.1	92.1
Specific gravity	0.89	0.87
Relative vapour density	2.5	3.1
Vapour pressure (mm Hg)	114 (at 15 °C)	36.7 (at 30 °C)
Boiling point (°C)	66 (151°F)	110.6
Flash point (°C)	-14 (-6.8 °F)	4
Ignition temp. (°C)	--	535
Explosive range (%)	2.0 to 11.8%	1.4 to 6.7%
Smelling point ppm (approx.)	--	< 5
Conversion factors	--	--
1m ^l /m ³ (ppm) = mg/m ³	3.0	3.83
1mg/m ³ = m ^l /m ³ (ppm)	0.33	0.26
TLVs(TWA,STEL,C) ppm	50 (TWA), 100 (STEL)	20 (TWA)
Hazardous properties	<ol style="list-style-type: none"> 1. The liquid and its vapour will irritate the skin, eyes and the mucous membranes of the nasal passages and throat. 2. Inhaling the vapour will cause nausea, vertigo or headache. 	<ol style="list-style-type: none"> 1. The liquid and its vapour will irritate the skin, eyes and the mucous membranes of the throat. 2. Contact with the skin will remove natural oils from the skin. 3. It will cause headache, vertigo fatigue, or the loss of balance. 4. High concentration will cause narcotic action, or death may result.

Substance name	Trichloroethylene	Triethylamine
Chemical formula	Cl ₂ C:CHCl	(C ₂ H ₅) ₃ N
Features	Colourless liquid; slightly soluble in water; highly soluble in ethanol and ether.	Colourless liquid; ammoniac odor; miscible with water at low temperatures
Molecular weight	131.4	101.2
Specific gravity	1.46	0.73
Relative vapour density	4.5	3.5
Vapour pressure (mm Hg)	100 (32 ° C)	50
Boiling point (°C)	86.6	89.4
Flash point (°C)	-	-6.7
Ignition temp. (°C)	410	230
Explosive range (%)	-	1.2 to 8.0
Smelling point ppm (approx.)	20	--
Conversion factors	--	--
1m ^l /m ³ (ppm) = mg/m ³	5.46	4.21
1mg/m ³ = m ^l /m ³ (ppm)	0.18	0.24
TLVs(TWA,STEL,C) ppm	10 (TWA), 25 (STEL)	1 ppm (TWA); 3 ppm (STEL)
Hazardous properties	<ol style="list-style-type: none"> 1. The liquid and its vapour will irritate the eyes and the mucous membranes of the nasal passage and throat. 2. Repeated skin contact will cause dermatitis. 3. Inhaling the vapour will cause headache, vertigo, nausea, anemia or hepatic damage. 	<ol style="list-style-type: none"> 1. The liquid and its vapor will irritate the skin and mucous membranes. 2. Chronic poisoning may cause hepatic or renal damage.

Substance name	Vinyl chloride	Xylene
Chemical formula	CH ₂ :CHCl	C ₆ H ₄ (CH ₃) ₂
Features	Colourless gas; odour like chloroform.	Colourless liquid; pungent odour; insoluble in water; highly soluble in ethanol and ether.
Molecular weight	62.5	106.2
Specific gravity	--	0.88
Relative vapour density	2.2	3.7
Vapour pressure (mm Hg)	2555	10(32 ° c)
Boiling point (°C)	-13.7 (7.3 °F)	138 to 142
Flash point (°C)	-78 (- 108 °F)	27 to 32
Ignition temp. (°C)	415	465 to 525
Explosive range (%)	3.6 to 23%	1.0 to 7.0%
Smelling point ppm (approx.)	--	4
Conversion factors	--	--
1m ^l /m ³ (ppm) = mg/m ³	2.6	4.41
1mg/m ³ = m ^l /m ³ (ppm)	0.38	0.23
TLVs(TWA,STEL,C) ppm	1(TWA)	100 (TWA) , 150 (STEL)
Hazardous properties	<ol style="list-style-type: none"> 1. Exposure to high concentration will cause narcotic action. 2. Exposure to 250 ppm will cause hepatic depression, coetaneous lesions, symptoms similar to Raynaud's disease, or bone aplasia. 3. Fatalities have been reported 	<ol style="list-style-type: none"> 1. The liquid and its vapour will irritate the eyes and the mucous membranes of the throat. 2. Repeated skin contact will cause dermatitis. 3. Inhaling the high concentration will cause excitements, narcotic action, and death. 4. Chronic symptoms in clued marrow depression.

Disclaimer

All the information provided in this handbook has been prepared from the latest available data.

As we are continuously working on the development of new detector tubes and improvement on the existing products, we reserve the right to change specifications without any prior notice. Users are requested to refer the instruction sheet in the box of detector tubes prior to use.

The data on Physical and chemical properties and other information for substances that can be measured using Uniphos detector tubes is intended to serve as a convenient reference source. The information has been compiled from relevant technical publications; however Uniphos is not responsible for any use or misuse of the information.

The Threshold Limit Values are taken from the American conference of Governmental Industrial Hygienists (ACGIH) 2013.

Notes

