

## Key Features & Benefits:

- ATEX, UL and CSA Approvals
- Withstands EN/IEC 60079-0 impact test
- Enhanced H<sub>2</sub>S and silicone poison resistance

## Performance Characteristics

### MEASUREMENT

<b>Operating Principle</b>	Catalytic Oxidation
<b>Gases Detected</b>	Combustible gases
<b>Suitable for</b>	Methane, ethane, propane, butane, pentane, hexane, carbon monoxide & hydrogen
<b>Unsuitable for</b>	Higher hydrocarbons, alcohols, ketones, esters, hydrogen sulfide and other sulfur containing compounds
<b>Range</b>	0-100% LEL
<b>Sensitivity</b>	24 ± 4 mV/%methane
<b>T90 Response Time</b>	<20 seconds (methane)
<b>Poison Resistance</b>	Resistance to H <sub>2</sub> S poisoning Superior silicone resistance
<b>H<sub>2</sub>S Filter Lifetime</b>	Typically 1000 ppm hr
<b>Linearity</b>	Linear up to 3% methane

### ELECTRICAL

<b>Operating Voltage</b>	3.0 VDC
<b>Detector Operating Current</b>	75 ± 7 mA
<b>Maximum Power Consumption</b>	263 mW
<b>Resolution</b>	Electronics dependant

### MECHANICAL

<b>Casing Material</b>	Stainless steel 316
<b>Pin Material</b>	Gold plated brass
<b>Weight</b>	24 g (nominal)
<b>Orientation Sensitivity</b>	None

### ENVIRONMENTAL

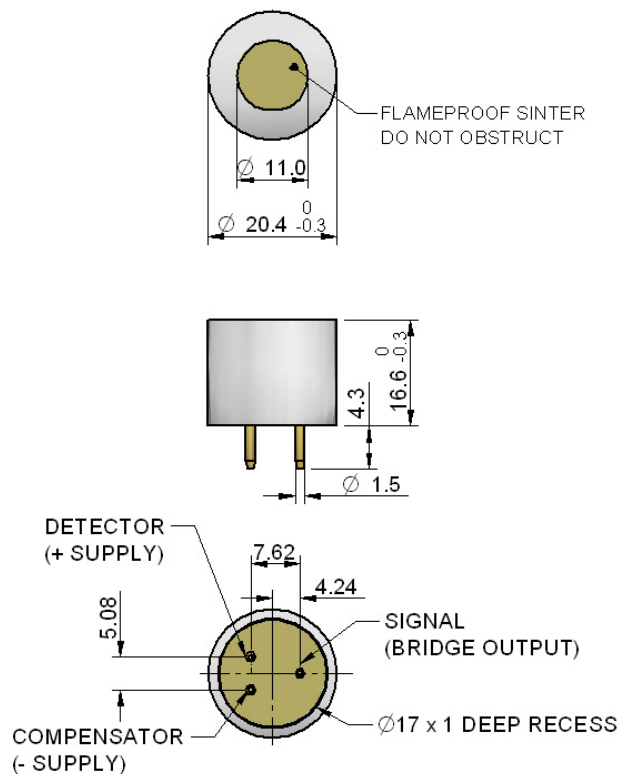
<b>Operating Temperature Range</b>	-20°C to +55°C
<b>Operating Pressure Range</b>	1 atm ± 20%
<b>Operating Humidity Range</b>	0-90% RH non-condensing

### LIFETIME

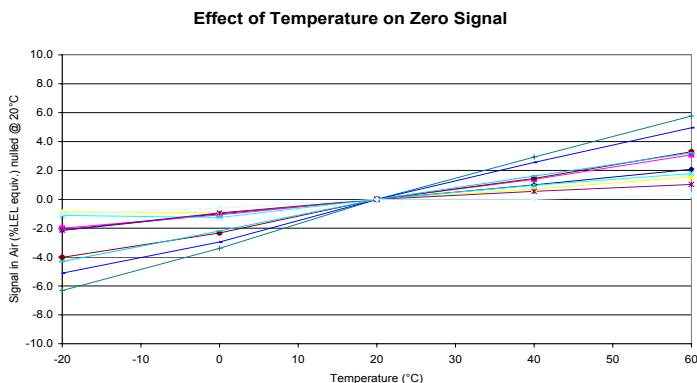
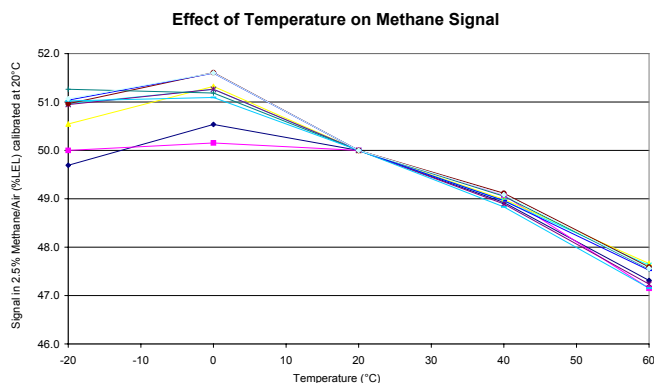
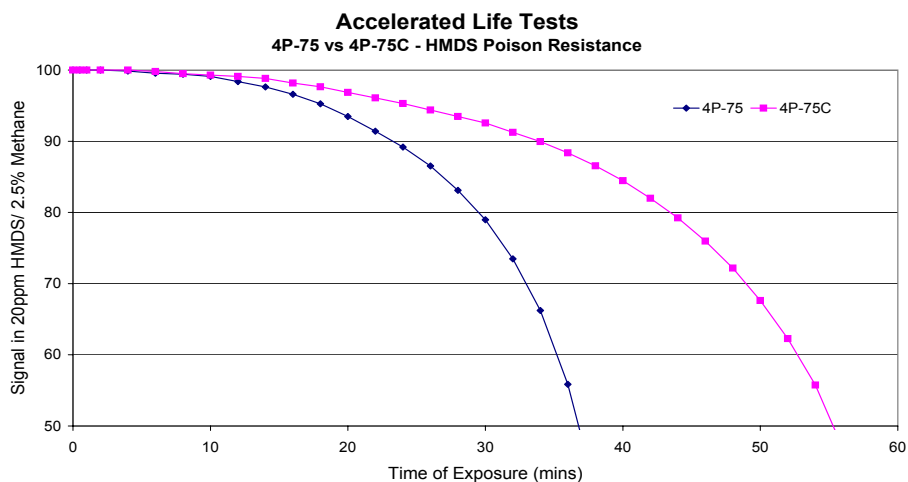
<b>Long Term Span Drift</b>	<5% signal/month
<b>Long Term Zero Drift</b>	<5% LEL <sub>methane</sub> /month
<b>Recommended Storage Temp</b>	0°C to 20°C
<b>Shelf life</b>	6 months in sealed container
<b>Warranty</b>	12 months from date of despatch

N.B. Flow rate of 300 ml/min. Conditions at 20°C, 50% RH, and 1013 mbar unless otherwise noted.

## Product Dimensions



All dimensions in mm  
All tolerances ±0.15 mm unless otherwise stated



**Note: Temperature and Poison resistance data is supplied for guidance only.**

## Relative Sensitivity

The table below shows the variation in response of the CiTiPeL on exposure to a range of gases and vapours at the same %LEL concentration. The figures are experimentally derived and expressed relative to the methane signal (=100). Testing was performed using 50%LEL CH<sub>4</sub> (based on 100%LEL CH<sub>4</sub> = 5%vol.)

**Note:** The results are intended for guidance only. For the most accurate measurements, an instrument should be calibrated using the gas under investigation.

Gas / Vapour	Relative Sensitivity*	Gas / Vapour	Relative Sensitivity*
Methane	100	Carbon monoxide	120
Propane	65	Hydrogen	110
n-Butane	65	Ammonia **	140
n-Pentane	55	Cyclohexane	50
n-Hexane	50	Ethylene	95
Acetylene	90	1, 3-Butadiene	60

\* Each sensitivity has been rounded to the nearest 5%  
\*\* T<sub>90</sub> for ammonia has been extended. Contact City Technology for further details.

## Product Approval



**Approval Body:** CANADIAN STANDARDS ASSOCIATION  
**Test Standard:** CSA Std C22.2 No 30-M1986  
Explosion-Proof Enclosures for Use in Class 1 Hazardous Locations  
**Product Categories:** CSA has evaluated the flame propagation characteristics only of the device for Class I, Division 1, Groups A,B, C and D.  
**Certificate Number:** CA 103143



**Approval Body:** UNDERWRITERS LABORATORIES INC.®  
**Test Standard:** UL 913  
**Product Categories:** Class 1, Groups A, B, C, D.  
**Certificate Number:** E 180262



**Approval Body:** SIRA CERTIFICATION SERVICE  
**Test Standard:** EN 60079-0: 2006, General Requirements  
EN 60079-1: 2007, Flameproof Enclosures 'd'  
**Product Categories:** ExdIICT6 Gb, ExII2G, CE0518  
**Certificate Number:** 01 ATEX1205X

### The 4P is also certified under the IECEx Scheme as follows:

**Test Standard:** IEC 60079-0: 5th Edition 2007, General Requirements  
IEC 60079-1: 6th Edition 2007, Flameproof Enclosures 'd'  
**Product Categories:** ExdIIC T6 Gb  
**Certificate Number:** IECEx SIR 04.0013X

### **Instructions specific to hazardous area installations (reference European ATEX Directive 94 / 9/ EC, Annex II, 1.0.6.)**

The following instructions apply to equipment covered by certificate numbers Sira 01ATEX1205X and SIR 04.0013X;

1. The equipment may be used with flammable gases and vapours with apparatus groups IIA, IIB and IIC and with temperature classifications T1, T2, T3, T4, T5 and T6.
2. The equipment is certified for use in ambient temperatures of -20°C to +40°C.
3. The equipment has not been assessed as a safety related device (as referred to by Directive 94 / 9 / EC Annex II, clause 1.5).
4. Installation of the equipment shall be carried out by suitably trained personnel in accordance with the applicable code of practice (e.g. EN/IEC 60079-14)
5. Inspection and maintenance of this equipment shall be carried out by suitably trained personnel in accordance with the applicable code of practice (e.g. EN/IEC 60079-17).
6. Repair of this equipment shall be carried out by suitably trained personnel in accordance with the applicable code of practice (e.g. EN/IEC 60079-19).

## 7. Special conditions for safe use

### 7.1. Matrix of limitations

	DW30	CW2248
0.5W	✓	✓
1W	✓	✓

7.2. The 4P Series Sensing Head is designed to be connected to a gas detector which shall provide an intrinsically safe supply and having a maximum output power ( $P_o$ ) not greater than the wattage detailed in the matrix above.

8. It is recommended that confirmation of adequate sensor performance be conducted on a regular basis by means of a defined, sensor calibration procedure. The calibration frequency will depend upon the environment in which the sensor is operated and on the perceived level of risk from the build up of flammable atmospheres.

9. The certification of this equipment relies upon the following materials used in its construction;

Enclosure material: 316 stainless steel, which contains less than 6% magnesium.

Sinter: 316 stainless steel 316L

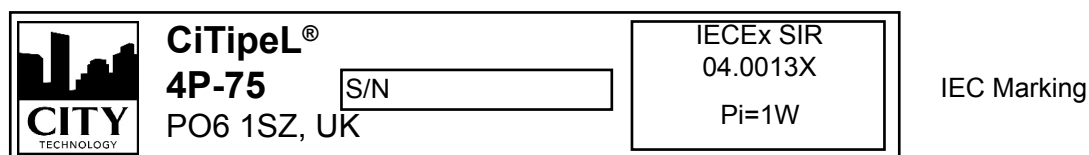
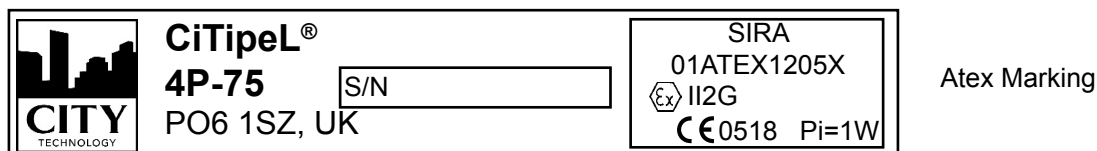
Cement:	DW30	CW2248/HY956EN
Manufacturer	Flogates & Hikle	Ciba-Geigy
Type of compound	Ceramic cement	Epoxy resin
Colour	Off white	Beige (natural)
Filler type and %	40% silica	55.2% trihydrated $Al_2O_3$
Other additives	25% MgO 35% $MgSO_4$	8.3%
Surface treatments	None	None
Temperature index	Stable to 475°C	170°C
City Tech reference	RM 462	RM 497

If the equipment is likely to come into contact with aggressive substances, then it is the responsibility of the user to take suitable precautions that prevent it from being adversely affected, thus ensuring that the type of protection is not compromised.

Aggressive substances: e.g. acidic liquids or gases that may attack metals, or solvents that may affect polymeric materials.

Suitable precautions: regular checks as part of routine inspections or establishing from the material's data sheet that it is resistant to specific chemicals.

10. The 4P Series Gas Sensing Head is available in several formats depending upon the operating voltage of the sensing elements. The Certification marking is shown below using the 4P-75 Gas Sensing Head as an example:



11. Certain substances are known to have a detrimental effect on catalytic elements as used in the 4P Series Gas Sensing Head.

**Poisoning:** some compounds will decompose on the catalyst and form a solid barrier over the catalyst surface. This action is cumulative and prolonged exposure will result in an irreversible decrease in sensitivity. The most common of these substances are: lead or sulphur containing compounds; silicones; phosphates.

**Inhibition:** certain other compounds, especially hydrogen sulphide and halogenated hydrocarbons, are absorbed or form compounds that are absorbed by the catalyst. The resultant loss of sensitivity is temporary and in most cases a sensor will recover after a period of operation in clean air.

In applications where it is suspected that poisons or inhibitors may be present, suitable protection for the 4P Series Gas Sensing Head should be provided.

## SAFETY NOTE

This sensor is designed to be used in safety critical applications. To ensure that the sensor and/or instrument in which it is used, are operating properly, it is a requirement that the function of the device is confirmed by exposure to target gas (bump check) before each use of the sensor and/or instrument. Failure to carry out such tests may jeopardize the safety of people and property.

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Performance characteristics on this data sheet outline the performance of newly supplied sensors. Output signal can drift below the lower limit over time.