

5 Series CiTiceLs®

Application Notes



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Health and Safety Guidelines

Electrochemical Gas Sensors

General

CiTiceL electrochemical gas sensors are supplied as sealed units and in normal usage represent no chemical hazard in the sense of the "Control of Substances Hazardous to Health (COSHH) Regulations" and the Health and Safety at Work Act 1974. Chemical hazard can however arise if CiTiceLs are misused or abused when leakage may occur. Leakage may also occur in the event of a manufacturing fault. In order to avoid potential problems the following notes should be observed on storage, usage, handling and the disposal of unwanted CiTiceLs.

Oxygen CiTiceLs

Oxygen CiTiceLs contain a 4-molar potassium acetate solution which is corrosive. Normally this material would only leak out as a result of either mechanical damage (crushing or piercing) or by electrical misuse for example by attempting to input electrical charge. These CiTiceLs also contain small amounts of lead, lead oxide, platinum, silver, carbon and antimony some of which are toxic and/or mutagenic. If the user comes into contact with the Oxygen CiTiceLs contents the affected area should be washed with a copious supply of water. Obtain medical advice.

As these sensors contain some highly toxic compounds, irrespective of physical condition they should be disposed of according to local waste management requirements and environmental legislation. They should not be burnt as they may evolve toxic fumes.

Toxic Gas CiTiceLs

The majority of Toxic Gas CiTiceLs contain sulphuric acid electrolyte and the chemical hazard is mainly related to the corrosive nature of this compound. These sensors also contain platinum, ruthenium, gold, silver, carbon some of which are toxic. Any skin or eye contact with the contents of these CiTiceLs should be washed immediately with copious amount of water. Obtain medical advice.

Design and Use

CiTiceLs are sealed units containing an aqueous electrolyte and a combination of other substances as detailed above. Provided these CiTiceLs are used only for their intended application they do not represent a chemical hazard.

CiTiceLs must not be exposed to temperatures outside the range -50°C to 60°C. Toxic gas CiTiceLs should not be exposed to organic vapours which may cause physical damage to the body of the sensor, for example 1, 2 dichloroethane.

Storage

For maximum shelf life CiTiceLs should be stored in the containers in which they are supplied in clean dry areas between 0°C and 20°C.

CiTiceLs must not be stored in areas containing organic solvents or in flammable liquid stores.

Carriage

CiTiceLs are classified under UN 2800 (Batteries - Wet non-spillable) and conform to the special provisions, section 4.5, paragraph A67 of the dangerous goods regulations. As such CiTiceLs are classed as non-dangerous and may be transported without special packing, labels, etc. It is, however, important to check any local regulations.

Damage

Should any CiTiceL be so severely damaged that leakage of the contents occurs then the following procedures should be adopted.

- a) Avoid skin contact with any liquid or internal component through use of protective gloves.
- b) Disconnect CiTiceL if it is attached to any equipment.
- c) Use copious amounts of clean water to wash away any spilt liquid. This is particularly important in equipment where the CiTiceL involved contains sulphuric acid or phosphoric acid because of the corrosive nature of these electrolytes.

Disposal

All CiTiceLs contain toxic compounds irrespective of physical condition. They should be disposed of according to local waste management requirements and environmental legislation. They should not be burnt since they may evolve toxic fumes.



Warranty

Statement of Warranty

City Technology products are warranted for a period of 12 months from date of despatch, against defects in workmanship, materials, and construction. A credit note will be raised against the appropriate account where a sensor has failed within these criteria. A summary of the procedure for Handling of Warranty Failures is set out below.

Warranty Failures

The Quality Department has computerised the handling and control of warranty failures. Part of this process requires the support of our customers in implementing the following guidelines:

1. Should a product fail to meet the performance requirements set out in this handbook or exhibit other defects please contact in the first instance, a member of City Technology's technical staff or the Quality Returns Technician.
2. Subject to a discussion with CTL staff, return of sensors to CTL for evaluation may be authorised. Receipt of sensors by CTL is not an admission of liability.
3. Once a warranty failure is received at City Technology, a unique reference number will be issued and an acknowledgement containing this number will be faxed within 24 hours. Thereafter the defect is fully investigated and reported on to the customer by letter with, where appropriate, a credit note for the defective product.
4. The sensing and referencing electrodes of biased operation CiTiceLs must not be shorted together when returned. **All other** toxic gas CiTiceL types must have their sensing and reference electrodes shorted out.
5. Please identify clearly why each sensor failed **or** why it is being returned. Only those within the warranty period should be despatched.
6. Please wrap each sensor individually to prevent any damage in transit. This is most important because failure to protect each cell may cause damage to the critical capillary mechanism during transit.
7. Products containing PCB interface electronics should be stored and transported in anti-static bags.
8. When returning goods under warranty all accompanying documentation should clearly state that they are defective goods and of 'no commercial value'.

Appendix 3

Mounting Sockets

Under no circumstances should 5-Series CiTiceL pins be soldered to, as this can cause leakage of electrolyte. Connection should be made via a PCB mounting socket. **WARNING: SOLDERING TO PINS WILL RENDER YOUR WARRANTY VOID.**

Details of recommended sockets are given below:-

Supplier:

Wearnes Cambion Ltd.

Peveril House

Mill Bridge

Castleton

Hope Valley

S33 8WR

Tel: +44 1433 621555

Fax: +44 1433 621290

e-mail: cambionsales@cambion.co.uk

<http://www.cambion.co.uk>

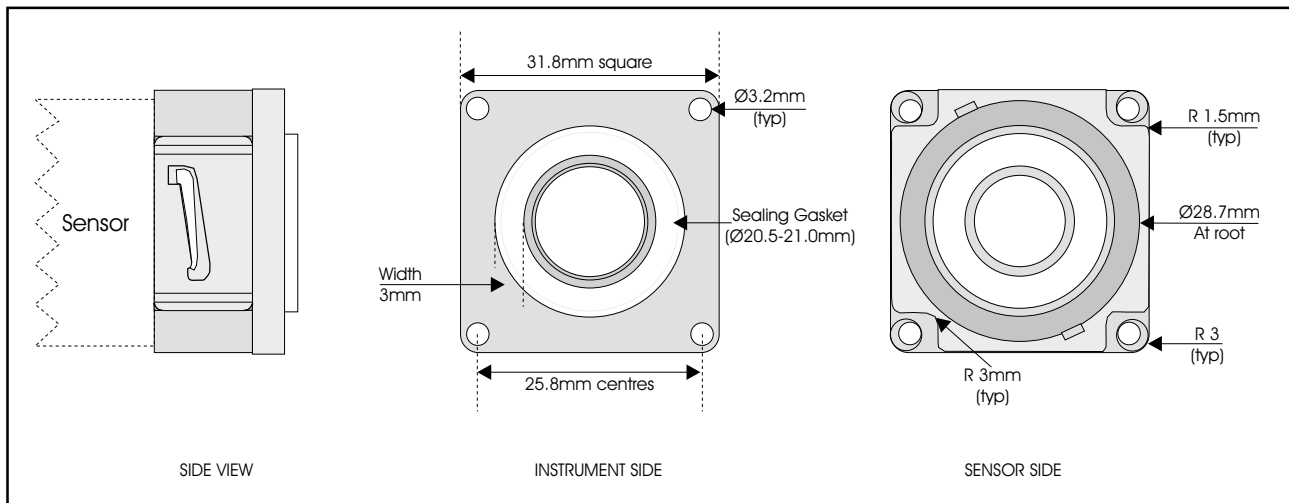
Order Code

450-3326-01-xx-00

Bayonet Connections

5-Series CiTiceL Bayonet Connection

The 5-Series CiTiceL features a bayonet mounting system, enabling solid mounting and a gas tight interface in any sample drawing instrument. Bayonet mounting is made possible by the bayonet block mounting accessory, details of which are shown below.



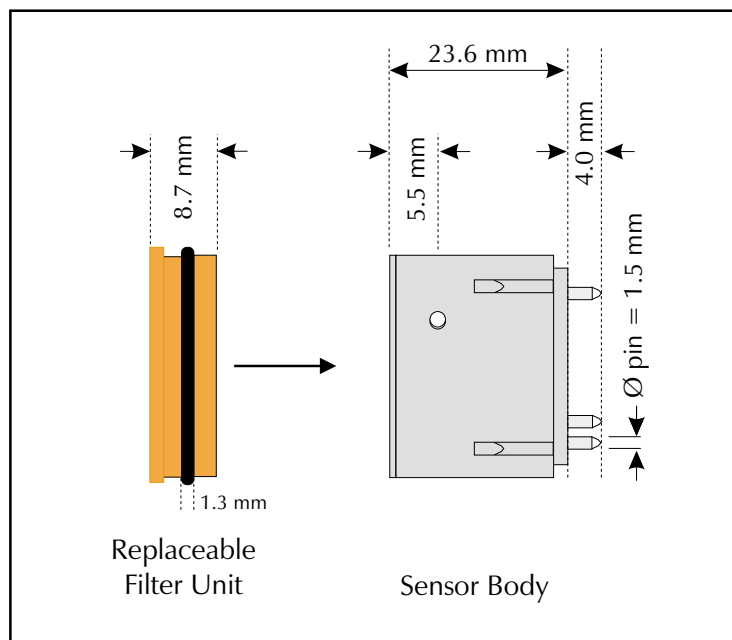
Order Code

Bayonet Block B505

Replaceable Filter Unit

5F, 5NF, A5F and 5MF CiTiceL

These 5-series CiTiceLs come with replaceable filter units. The bayonet fitting locks the replaceable filter unit into the front of the sensor, making both the filter and the sensor easy to change.



Order Code

5F	B501
A5F	B502
5NF	B503
5MF	B506

Appendix 6

Cross-sensitivity details

The data sheets include tables of the cross-sensitivity of each CiTiceL to gases other than their target gas. A summary of all sensors and their cross-sensitivities is shown below. Each figure represents the reaction of the sensor to 100ppm of gas, so providing a percentage sensitivity to that gas relative to its target gas.

CiTiceLs can be assumed to respond linearly to cross-interfering gases. Although the tables provide a guide they do not dictate the behaviour of any particular sensor, and any sensor could easily exhibit a cross-sensitivity 10-15% above or below the stated figure. Sensors may also behave differently with changes in ambient conditions.

CiTiceL®	5F	A5F	5MF	5NF	5SF	5ND
CO	100	100	100	0	<5	<-1
H ₂ S	0	0	0	0	≈200	≈-25
SO ₂	0	0	0	0	100	≈-3
NO	0	0	0	100	0	<1
NO ₂	0	0	0	0	≈-125	100
Cl ₂	0	0	0	0	≈-80	n/d
H ₂	<60	<1	<60	0	<3	<-1
HCN	0	0	0	0	≈30	n/d
HCl	0	0	0	0	≈15	<-1
C ₂ H ₄	<10	≈35	<10	0	<50	<1

Colour Coding for Toxic Gas CiTiceLs

Toxic Gas CiTiceLs can be identified by a coloured band. The colour of this band denotes the gas measured, with a different colour used for each gas. This additional feature allows easier identification of the sensors without affecting the performance characteristics or overall dimensions of the sensors.

The range of colours used with the 5-Series CiTiceL are as follows:

Carbon monoxide (CO)	-	Red
Nitric oxide (NO)	-	Orange
Sulphur dioxide (SO ₂)	-	Green
Nitrogen dioxide (NO ₂)	-	Black

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