



Sealed Omni Cell Window unit GS02200 Series

User Manual

644-002



1. Introduction

The sealed Omni Cell has been designed to study liquid solutions for both dispersive and FTIR instruments at ambient temperatures and pressures. The Sealed Omni Cell is supplied in separate parts: cell body and sealed window unit for assembly by the user. The cell body accepts a standard gasket/window/spacer construction, which is contained between front and back anodised aluminium plates. The plates are of the standard 3" x 2" dimension allowing the cell to be held in all spectrometers mounting systems via the back plate.

2. Safety Considerations

With use of any spectroscopic accessory that involves the study of a wide range of chemical samples, the associated risk in handling may mostly be attributed to the specific sample type to be handled itself. You should follow the procedure for safe handling and containment of the type of sample to be used.

With respect to safety of use specifically for the range of Sealed Omni Cells P/N GS022XY (see 6.Catalogue Part Numbers), they use different window materials (see Table 2) for containment of a specific liquid sample type between two standard 3" x 2" aluminium plates. The Omni Cell's performance is only as good as the quality of the windows. Some are soft and can deform, others are hard and brittle. Care is needed while handling them.



Caution: *Out of the different window types proposed (see Table 2), ZnSe & BaF₂ are the most potentially hazardous material with respect to toxicity risk in use and handling (see the Safety Data Sheet provided with the product).*

NaCl, KBr and CaF₂ window materials can be considered relatively safe to use, although all of them may be harmful to the body if ingested in significant quantities. The general rule when working with any crystal material (and sample) is to always wear gloves and safety gear (e.g., safety spectacles and lab coat) when handling to obviate the risk of contact with the skin. For these window materials, as well as ZnSe and BaF₂, Safety Data Sheets can be downloaded from our website or provided on request.

Salt windows (NaCl and KBr) need to be kept in a dry environment as much as possible due to their high solubility and hygroscopic nature.

3. Checklist of Contents

The minimum configuration for the Sealed Omni Cell is as follows:

- **Sealed Omni Cell Window unit:**
 - o **GS022XY:** The appropriate Sealed Omni Cell supplied (see the paragraph about Catalogue Part Numbers).
- **GS01800:** Omni-Cell Body. The sealed window unit is used with an Omni-cell Body. If not already available, it needs to be purchased.

An additional packing spacer for thin windows (GS01893) is only required for ZnSe windows. Spares, such as syringes and other items can also be provided (see Table 3). It is highly recommended to use 2 syringes for filling and flushing windows (see 5. Filling the Liquid Cell).

An instruction manual will be provided on a USB stick for each order and will also be available online.

4. Operation

A typical Sealed Omni cell is constructed as shown in Figure 2. The sealed window unit is shown in Figure 1. The sealed window unit arrives pre-assembled. It is composed of a stainless-steel spacer (2), of thickness x (see Table 1) sandwiched between 2 windows (1 & 3). The list of optical window materials available is shown in Table 2. An adhesive (4) holds and seals the window unit together. The known chemical compatibility matrix is shown in the Appendix section (7.1).

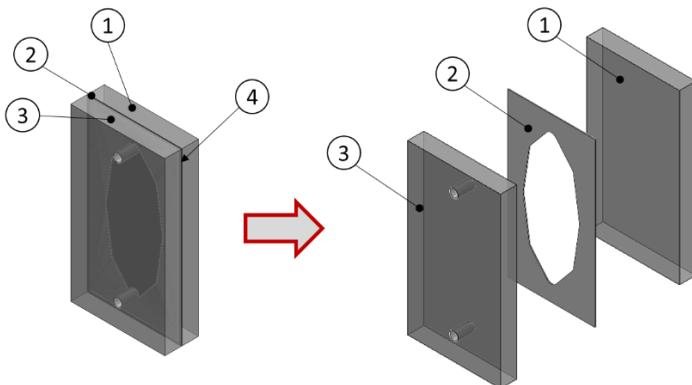


Figure 1: Sealed Window Assembly (assembled & exploded view) (GS022XY)

The sealed window unit (5) is to be used with an omni-cell mount (GS01800) as shown in Figure 2. The overall assembly is composed of a backplate (1), a cell nest (3), an optional spacer (2) sold as P/N GS01893 for ZnSe windows; for window thicknesses, see Table 2), a Neoprene gasket (4), a sealed window unit (5), and a gasket (6) attached to a front plate (8), as shown in Figure 2. The front plate has 2 Luer slip connectors (9) for filling and flushing samples into the cell. A Luer plug (11) is provided for each connector. FKM O-rings (7) are used to create the seal between the Luer slip connectors (9) and the front window ((3) in Figure 1). Quick-release nuts (10) are used to lock the cell together.

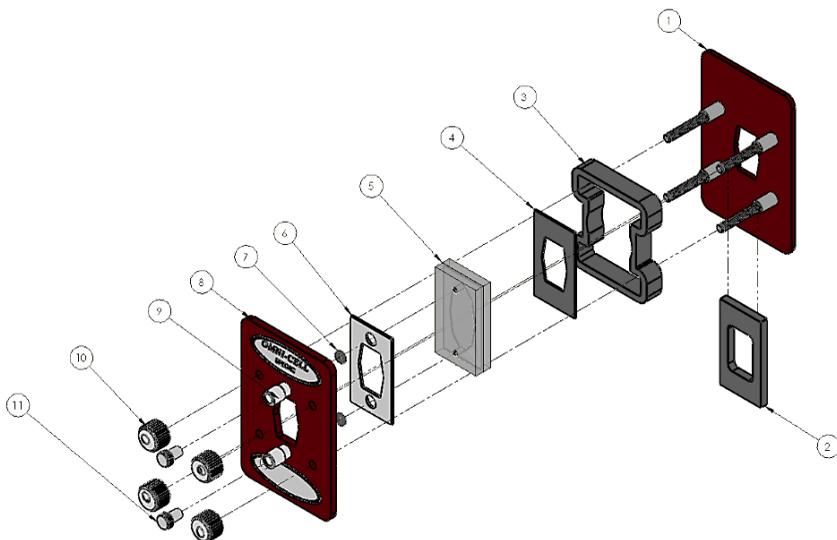


Figure 2: Omni-Cell Assembly (GS01800+GS022XY) exploded view.

The 4 quick release nuts (2) are tightened to provide a sufficient seal between all the components but not over-tightened such that the windows could break. Window materials (see Table 2) have their own physical characteristics; some are soft and can deform, others are hard and brittle. It is a matter of practice and familiarity with the cells and specific window material that determines the ideal sealing conditions. **Although these cells can be demounted, it is highly recommended to not dismantle them to maintain accuracy and precision of measurements.**

A recommended method for assembly is to place the back plate onto a flat surface. Build up the cell components as shown in Figure 2, but before fixing the quick-release nuts, hold the front plate centrally and apply even pressure over the whole assembly. Slip on the quick-release nuts and tighten until just holding. The nuts can then be tightened further but do so in a diagonal sequence.

5. Filling the Liquid Cell

Two Luer syringes P/N GS01110 can be used to introduce a solution into the Omni Liquid Cell via the Luer fittings. Lay the Omni Cell on a flat surface and remove the PTFE plugs and fit the syringes into the Luer ports. One syringe should be empty while the other is filled with the liquid analyte sample. Pull the sample through the cell with suction by drawing on the empty syringe, allowing the cell to be filled with the sample without over-pressurisation. When the cell is filled, remove one syringe, and seal the Luer port with a Luer plug before repeating the same step for the other Luer port. Any seepage around the Luer ports when fitting the Luer plugs can be wiped away with a tissue.

Note: Care must be taken when filling so that there are no trapped pockets of air in the cell. Any cell not filled completely will show a fringing pattern in the spectrum. Any trapped air pockets can usually be removed by suction. Avoid over-pressurisation by pushing the liquid sample into the cell (with just one syringe), which could result in leaks.

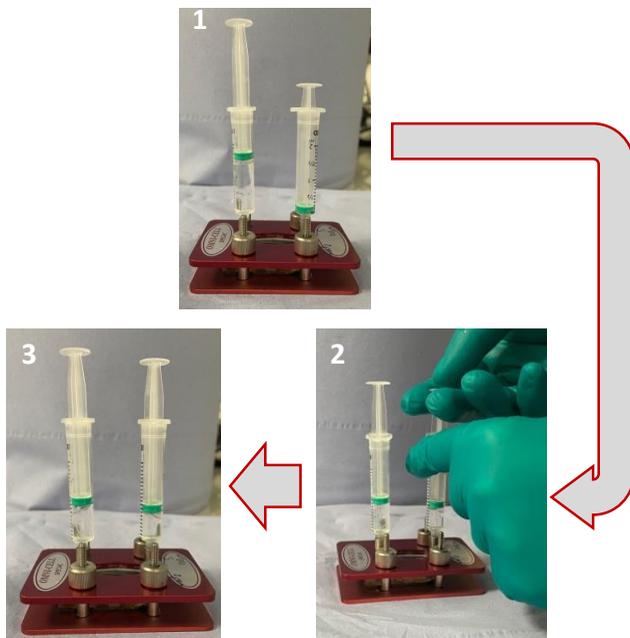


Figure 3: Filling & Flushing the Omni-Cell: (1) In one side, syringe with liquid. In the other, an empty syringe, (2) Pull on the empty syringe, to make the liquid pass from the filled syringe into the Omni Cell, (3) With the liquid in both syringes and in the Omni Cell, remove the syringes and put on Luer plugs.

6. Catalogue Part Numbers

P/N for sealed window units:

GS022XY

The standard pathlengths proposed go from 25µm to 1mm (see Table 1)

Pathlengths (mm)	0.025	0.05	0.1	0.2	0.5	1
X	1	2	3	4	5	6

Table 1: Pathlengths X number

Most of the Omni Cell windows are 4mm thick except for 1 material, which has 2mm thick windows (see Table 2). These thinner windows require the use of an additional spacer (P/N GS01893).

Material		Y	Thickness of each window (mm)
NaCl	Sodium Chloride	1	4
KBr	Potassium Bromide	2	4
CaF2	Calcium Fluoride	3	4
BaF2	Barium Fluoride	4	4
ZnSe	Zinc Selenide	5	2

Table 2: Materials Y number

P/N	Details
GS01800	Omni Cell body mount assembly complete
GS01890	Rear neoprene gaskets (Packet of 2).
GS01891	Quick release nuts (Packet of 4)
GS01892	Luer port PTFE filling plugs (Packet of 2)
GS01893	Additional packing spacer for thin windows (1).
GS01894	FKM O rings 2.5mm ID x 1.5mm section (Packet of 2)
GS01110	Luer syringe at 2ml volume (1)

Table 3: Spares

7. Appendix

1. Known Compatibility Matrix

Compatibility List*		
Acetic Acid (5%)	Hydrofluoric Acid (20%)	Sodium Hydroxide (10%)
Acetic Acid (10%)	Methanol	Sodium Hydroxide (20%)
Acetone	Methyl Ethyl Ketone	Sodium Hydroxide (50%)
Acetonitrile	Nitric Acid (10%)	Sulfuric Acid (10%)
Butyl Cellosolve	Nitric Acid (15%)	Sulfuric Acid (3%)
Distilled Water	Nitric Acid (20%)	Sulfuric Acid (30%)
Dimethyl Sulphoxide	Phenol (4%)	Sulfuric Acid (50%)
Ethanol	Phenol (10%)	Sulfuric Acid (70%)
Hydrochloric Acid (10%)	Phosphoric Acid (10%, 20%, 30%)	Sulfuric Acid (96-98%)
Hydrochloric Acid (20%)	Potassium Hydroxide (45 - 50%)	Toluene
Hydrochloric Acid (25%)	Skydrol	Tetrahydrofuran
Hydrofluoric Acid (10%)	Sodium Hydroxide (1%)	Xylene
<i>*The list of chemicals provided above were tested by the manufacturer of the adhesive used during the manufacturing of the sealed Omni-cell unit. No information was available for chemicals not listed here at the time of writing.</i>		

Brilliant Spectroscopy™

www.specac.com

SPECAC INC.

414 Commerce Drive
Suite 175,
Fort Washington,
PA 19034, USA
Tel: 215 793 4044
Fax: 215 793 4011

SPECAC LTD.

Unit 12, Science & Innovation Centre,
Halo Business Park
Orpington
Kent BR5 3FQ
Tel: +44 (0) 1689 873134
Registered No. 1008689 England