Sealed Liquid Cells
Characteristics, Filling & Use

SEALED LIQUID CELLS comprise two IR transmission windows separated by a lead spacer which is amalgamated to the windows with mercury. This construction creates a seal which is perfect for infrared spectroscopy as it is virtually impervious to solvents and does not contain anything that could create spurious absorbances. In most cases sealed cells are sold with a metal front plate containing 2 Luer fittings for filling and a back plate for mounting, such as ICL's SL-3 and SL-4 sealed cells. In the case of ICL sealed cells, there is also an amalgam seal to the front plate of the cell which we lap optically flat to enhance the quality of seal. These cells are also available simply as sandwich cells which comprise just 2 windows (one drilled) and a mercury amalgamated spacer. The SL-2 sandwich cell contains 2 windows, 1 mercury amalgamated spacer and 1 lead gasket which is amalgamated to a front plate containing Luer fittings. Sandwich cells can be used to replace the optics in complete sealed cells such as the SL-3 and SL-4 or with demountable cell bodies such as ICL's Precision Demountable Cell (0006-497) or SL-2 (0006-4153).

Fig. 1

SEALED CELLS are available in a variety of precise path lengths ranging from 0.015mm to 10mm. The path lengths can be calibrated to 4 decimal places and matched from cell to cell for consistent results. The availability of precise path lengths makes sealed cells the tool of choice for quantitative analysis of liquids. Sealed cells can also be reconditioned at modest cost, which makes them relatively inexpensive. ICL provides a cell reconditioning service.

ALTHOUGH THE MERCURY to lead amalgams used to seal these cells have ideal characteristics for infrared spectroscopy, the seal will break if too much pressure is applied to it. Since the volumes and path lengths of these cells are small, the simple act of injecting the sample into the cell with a luer syringe can create enough pressure to rupture the seal, particularly for cells with path lengths of less than .05mm. For flow cell applications where pressure is contemplated, try one of our high pressure flow

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cells. ICL's high pressure sealed liquid flow cells are rated for constant and pulsed pressures up to 1000 psi

THE PROPER METHOD for filling a sealed liquid cell is to create a low pressure area in the cavity of the cell using an empty luer syringe while using a second luer syringe to fill the cell. See Fig. 1. After the empty luer syringe is attached to the cell, the plunger is drawn back, thereby creating a low pressure area which will cause the sample to flow into the cell from the other luer syringe without the need to depress the plunger of the sample syringe. To remove the sample, use an empty syringe and simply pull the plunger out slowly or use a cell cleaning accessory to create a partial vacuum. See Fig. 2. It is preferable to both fill and empty the cell from the lower Luer fitting. ICL's SL-3 and SL-4 cells are designed with this filling technique in mind. The placement of one of the luer fittings on top of the cell leaves more space between the 2 syringes making it easy to pull a partial vacuum with one syringe while filling the cell with the other syringe. See Fig. 1. The design also discourages filling the cell from the top which frequently results in the sample being spilled on the cell windows while it also facilitates simply turning the cell upside down and dumping the cell contents out of the top port without spilling the sample contents on the window.

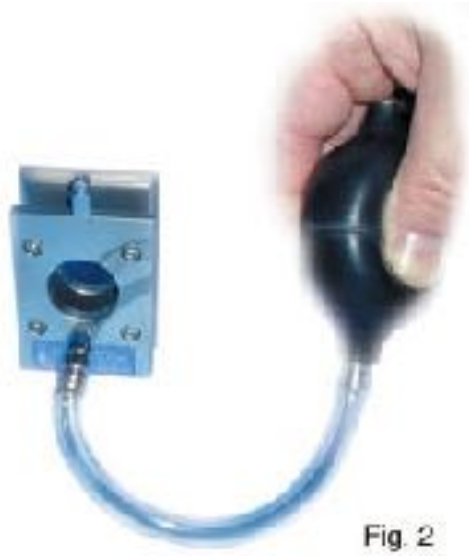

Fig. 2

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