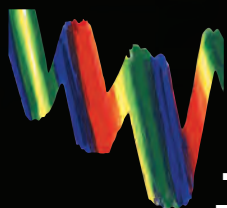


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... *the SOURCE* for all IR, FTIR, XRF, UV/VIS/NIR
Fluorescence & Raman Spectroscopy Requirements



Polished Crystal Optics

Crystal Optics



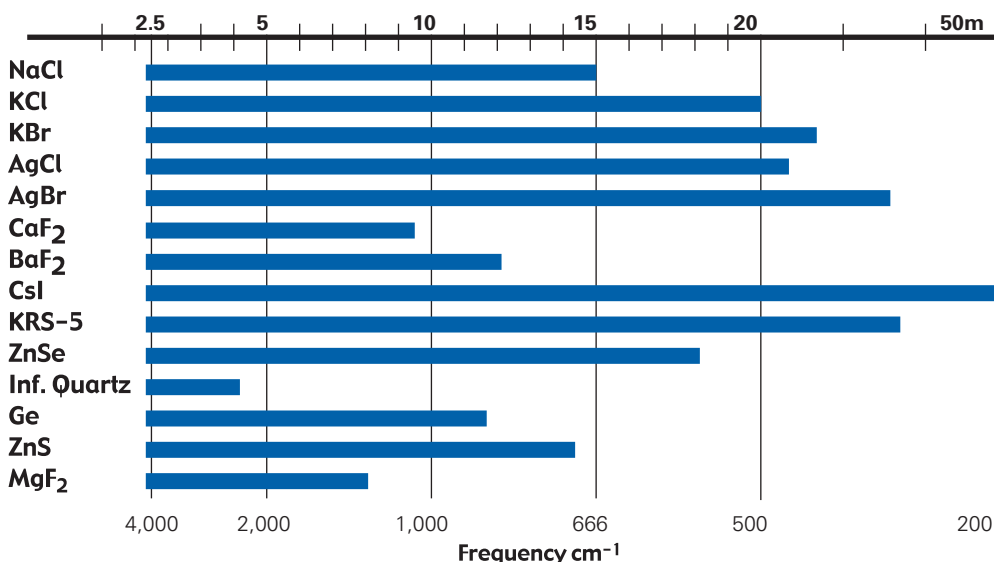
Call for ATR Prisms and Unpolished Blanks



ICL celebrated its 50th anniversary in 2012. We have produced quality crystal optics for spectroscopy and CO₂ lasers since 1962. ICL operates a vertically integrated crystal optics production plant. We grow our own crystals and we are the only U.S. producer of KBr crystals. We welcome the opportunity to quote on custom

sized optics, coated optics, crystal and other optical materials not listed and optical assemblies such as beam splitters. We can produce optics from crystal materials such as CdMnTe, CdMnHgTe, CdZnTe, CdMgTe, CdTe, Si, LiF, CsBr, AgBr, AgCl, MgF₂, as well as from glass and composite materials such as polyethylene, BK-7 and AMTIR.

WAVELENGTH RANGE FOR IR MATERIALS - MICRONS & CM⁻¹



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Real Crystal® IR Sample Cards & PTFE & Polyethylene IR Sample Cards

IR Sample Cards

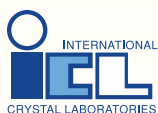


UV/VIS/NIR Cuvettes –
See page 30



Polyethylene and PTFE Sample Cards

US Patents No. 5,470,757
& 5,764,355 & 5,290,705



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For Spectra of Sample Card
Substrates—PTFE, Polyethylene,
KBr, KCl & NaCl

US Patent No. 7,932,095

UK Patent No. GB2372102



ICL's new Real Crystal® IR sample cards provide a conveniently mounted non-absorbing substrate for qualitative infrared analysis. They are ideal for liquids, mulls, film casting from solutions and pyrolysis samples. The 2" x 4" cards are available with 9.5mm, 15mm and 19mm clear apertures and they will fit in the universal slide mount of any spectrophotometer. Space is provided on the card to write on the card to identify the date of the analysis, the sample identity and the name of the analyst.

Real Crystal® IR cards do not exhibit strong absorbance peaks that limit the utility of PTFE and polyethylene sample cards. The alkali halide sample support substrates (KBr, KCl and NaCl) used in Real Crystal® IR sample cards exhibit very high energy throughput. (see www.internationalcrystal.net for spectra).

ICL has also brought back the 3M® card, which we manufacture under a license from Minnesota

Mining and Manufacturing Company. PTFE and polyethylene IR sample cards provide inexpensive disposable sample substrates for qualitative analysis. The 2" x 4" cards mount vertically in the universal slide mount in any spectrophotometer. The cards have a clear aperture of 19mm and space is provided to write on the card to identify the date of the analysis, the sample and the name of the analyst. The cards are sold in packages of 10, 25 and 50.

PTFE and Polyethylene cards exhibit absorbance bands in the 4400 to 400 CM⁻¹ spectral range. For absorbance spectra of the substrates in these cards see www.internationalcrystal.net.

Part No.	Description	Price
0000-7095	NaCl-Pack of 25, 9.5mm aperture	\$109.00
0000-7096	KBr-Pack of 25, 9.5mm aperture	\$135.00
0000-7097	KCl-Pack of 25, 9.5mm aperture	\$114.00
0000-7131	NaCl-Pack of 25, 15mm aperture	\$121.00
0000-7132	KBr-Pack of 25, 15mm aperture	\$145.00
0000-7133	KCl-Pack of 25, 15mm aperture	\$123.00
0000-7087	NaCl-Pack of 25, 19mm aperture	\$135.00
0000-7090	KBr-Pack of 25, 19mm aperture	\$159.00
0000-7091	KCl-Pack of 25, 19mm aperture	\$139.00
0000-7361	Pack of 10 PTFE IR Sample Cards	\$50.00
0000-7362	Pack of 25 PTFE IR Sample Cards	\$74.00
0000-7363	Pack of 50 PTFE IR Sample Cards	\$134.00
0000-7364	Pack of 10 Polyethylene IR Sample Cards	\$57.00
0000-7365	Pack of 25 Polyethylene IR Sample Cards	\$79.00
0000-7366	Pack of 50 Polyethylene IR Sample Cards	\$139.00

Precision Demountable Cells, SL-2 Demountable Cell Kit & Pres-N-Lok Demountable Cell



Demountable Cells



Sandwich cells available



Micro-Quik Cell AgCl Windows

Demountable Cells are ideal for mulls, capillary films, cast films and thin films of finely powdered solids in slurry form. The Precision Demountable Cell ("PDC") can also be used for liquid analysis with its luer syringe fittings. The PDC is constructed of stainless steel and is designed for easy assembly and disassembly for cleaning and changing the pathlength. The inside surfaces of the PDC are lapped optically flat to ensure leak free seals. It can be completely disassembled for cleaning simply by unscrewing the convenient thumb screws on the front plate of the cell. The pathlength can be changed simply by using a spacer with a different thickness between the windows or by using sandwich cells. The window size is 38.5mm x 19.5mm x 4mm.

ICL's Pres-N-Lok Cell enables the user to analyze mulls and smears without the use of clumsy springs, nuts, and bolts. The cell is assembled by placing the sample on one (1) of two (2) 25mm x 4mm crystal windows separated by a PTFE spacer, dropping them into the bore of the inner barrel, and pressing in the outer barrel.

The Demountable SL-2 is the same as the SL-2 sealed precision liquid cell (see page 5), except

that the amalgam seal has been replaced by a demountable PTFE spacer, and gasket. The window size is 32mm x 3mm. The Demountable SL-2 Cell Kit comes complete with the cell and cell holder assembly for FTIR or dispersive, one PTFE O-ring, two gaskets, one aluminum needle/pin plate with luer lock syringe ports, two PTFE plugs, one space compensator for use with 2mm thick optical windows and assorted 32mm spacers, but without windows. The cell holder and mounting plate can also be used with sealed sandwich cells if precision pathlengths are required.

The Micro Quik Cell kit comes with 6 pressed AgCl 13 x 1mm windows, which cold flow for good seals and can be used with wet samples. AgCl transmits through the full spectral range of most FTIR spectrophotometers. Each window has a 0.025mm circular depression in the middle, allowing windows to be positioned face to face for a 0.05mm pathlength, back to face for a 0.025mm pathlength and back to back for making mulls. The windows have flat rims with a bevel to assure sealing in the mount provided with the kit.

Part No.	Description	Price
0006-497	Dispersive (rectangular aperture) Precision Demountable Cell, without windows	\$153.00
0006-604	FTIR (circular aperture) Precision Demountable Cell, without windows	\$153.00
0006-5064	Thumbscrews (1pk/4) for 2mm thick windows	\$60.00
0006-2467	Pres-N-Lok Cell complete with assorted spacers, but without windows	\$133.00
0006-2090	Micro Quik Cell Kit with cell, 6 AgCl windows and slide holder	\$269.00
0006-4153	Demountable SL-2 Cell Kit for Dispersive Instrument, without windows	\$165.00
0006-4154	Demountable SL-2 Cell Kit for FTIR Instrument, without windows	\$165.00
0006-4122	Cell Holder for Dispersive Instrument without needle/pin plate	\$112.00
0006-4124	Cell Holder for FTIR Instrument without needle/pin plate	\$112.00



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Sealed IR Liquid Cells

Sealed Liquid Cells



Sandwich cells available



Variable Pathlength Cell



SL-3



SL-2



SL-4

SL-4P

NEW

2.5 micron, 5 micron, 7.5 micron & 10 micron pathlengths — RFQ

Sealed liquid cells are used for precision analysis. Pathlengths can be measured with accuracy to four decimal places, permitting interchangeable use and reproducibility of results. The metal surfaces of all ICL sealed cells are lapped optically flat to insure perfect leak free amalgam seals. The seals are created by mercury to lead or mercury to copper amalgams. The major differences between the models offered by ICL are in optics, durability and alternate functions.

The SL-4 is a heavy duty cell with machined 1/4" thick stainless steel front and back plates. The optics are 39.5 x 39.5 x 6.5mm hexagons. These cells are designed to permit reconditioning of halide windows without the need to replace them. The SL-4 is available in a configuration (the SL-4P) where the luer lock filling ports are mounted on the edge of the front plate, thereby permitting the optical path in the spectrophotometer to be permanently purged while the sample compartment is opened using a Constant Purge™ adapter.

The SL-3 is also stainless steel, but uses less expensive 38.5 x 19.5 x 4mm rectangular windows and sandwich cells are available to replace the optics and the spacers. The SL-3 filling ports are configured optimally for proper filling and draining of liquid samples. The SL-3 is the basic choice of

most labs and is highly recommended for short pathlength cells because of its durability and ease of filling using the proper techniques.

The SL-2 has an aluminum body with a black anodized back plate and it uses 32 x 3mm discs as optics. The main benefit of the SL-2 is that it can also be used as a demountable cell. The cell holder and the optics are not amalgamated together as in the case of the SL-3 and SL-4. Rather, the SL-2 has a sandwich cell containing its own luer lock hypodermic fittings inserted in an aluminum plate, often referred to as a needle plate or pin plate, to which the optics are amalgamated. The SL-2 sandwich cell drops into the holder to form a sealed cell, permitting the user to have a number of sandwich cells with different pathlengths that fit the same holder or to simply remove the sealed sandwich cell and use the holder for mulls with unsealed optics. The SL-2 is not recommended for short pathlengths (0.025 and 0.015mm).

Flow cells that are permanently sealed are also available. The SL-3 HPF and SL-4 HPF allow use of high pressures with cells made in the SL-3 and SL-4 configuration and the SL-5 provides compression fittings for flow cell tubing.



11 Erie Street
Garfield, NJ 07026 USA
Tel: (973) 478-8944
Fax: (973) 478-4201
www.internationalcrystal.net
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Sealed IR Liquid Cells

Pathlength – Rectangular Aperture – SL-2 Dispersive

MATERIAL	.015mm	.025mm	.05mm	0.1mm	0.2mm	0.5mm	1mm	PRICE
NaCl	0005A-2899	0005A-2900	0005A-2901	0005A-2902	0005A-2903	0005A-2904	0005A-2905	\$277.00
KCl	0005B-2906	0005B-2907	0005B-2908	0005B-2909	0005B-2910	0005B-2911	0005B-2912	\$294.00
KBr	0005C-2913	0005C-2914	0005C-2915	0005C-2916	0005C-2917	0005C-2918	0005C-2919	\$307.00
CaF2	0005D-2920	0005D-2921	0005D-2922	0005D-2923	0005D-2924	0005D-2925	0005D-2926	\$455.00
BaF2	0005E-2927	0005E-2928	0005E-2929	0005E-2930	0005E-2931	0005E-2932	0005E-2933	\$647.00
CSI	0005F-2941	0005F-2942	0005F-2943	0005F-2944	0005F-2945	0005F-2946	0005F-2947	RFP
KRS-5	0005G-2934	0005G-2935	0005G-2936	0005G-2937	0005G-2938	0005G-2939	0005G-2940	\$1389.00
INFRASIL QTZ.	0005H-4136	0005H-4137	0005H-4138	0005H-4139	0005H-4140	0005H-4141	0005H-4142	\$453.00
CLEARTRAN/ZnS	0005I-2948	0005I-2949	0005I-2950	0005I-2951	0005I-2952	0005I-2953	0005I-2954	\$909.00
ZnSe	0005J-2955	0005J-2956	0005J-2957	0005J-2958	0005J-2959	0005J-2960	0005J-2961	\$874.00
AgCl	0005K-2962	0005K-2963	0005K-2964	0005K-2965	0005K-2966	0005K-2967	0005K-2968	\$1759.00

Pathlength – Circular Aperture – SL-2 FTIR

MATERIAL	.015mm	.025mm	.05mm	0.1mm	0.2mm	0.5mm	1mm	PRICE
NaCl	0005A-2969	0005A-2970	0005A-2971	0005A-2972	0005A-2973	0005A-2974	0005A-2975	\$277.00
KCl	0005B-2976	0005B-2977	0005B-2978	0005B-2979	0005B-2980	0005B-2981	0005B-2982	\$294.00
KBr	0005C-2986	0005C-2987	0005C-2988	0005C-2989	0005C-2990	0005C-2991	0005C-2992	\$307.00
CaF2	0005D-2993	0005D-2994	0005D-2995	0005D-2996	0005D-2997	0005D-2998	0005D-2999	\$455.00
BaF2	0005E-3000	0005E-3001	0005E-3002	0005E-3003	0005E-3004	0005E-3005	0005E-3006	\$647.00
CSI	0005F-3014	0005F-3015	0005F-3016	0005F-3017	0005F-3018	0005F-3019	0005F-3020	RFP
KRS-5	0005G-3007	0005G-3008	0005G-3009	0005G-3010	0005G-3011	0005G-3012	0005G-3013	\$1389.00
INFRASIL QTZ.	0005H-4143	0005H-4144	0005H-4145	0005H-4146	0005H-4147	0005H-4148	0005H-4149	\$453.00
CLEARTRAN/ZnS	0005I-3021	0005I-3022	0005I-3023	0005I-3024	0005I-3025	0005I-3026	0005I-3027	\$909.00
ZnSe	0005J-3028	0005J-3029	0005J-3030	0005J-3031	0005J-4059	0005J-3032	0005J-3033	\$879.00
AgCl	0005K-3034	0005K-3035	0005K-3036	0005K-3037	0005K-3038	0005K-3039	0005K-3040	\$1759.00

*Note: Cells with pathlength of 2-4mm add \$35.00 to above prices. Pathlengths 5-10mm add \$69 to above prices. Add \$16.00 for cell calibration, \$36.00 each for cell matching and \$53.00 each for all matching of .015/.025/.03/.075 mm cells.

Pathlength – Rectangular Aperture – SL-3 Dispersive Pathlength – Spacer Thickness

MATERIAL	.015mm	.025mm	.05mm	0.1mm	0.2mm	0.5mm	1mm	PRICE
NaCl	0005A-590	0005A-591	0005A-592	0005A-593	0005A-594	0005A-595	0005A-596	\$249.00
KCl	0005B-783	0005B-784	0005B-785	0005B-786	0005B-787	0005B-788	0005B-789	\$259.00
KBr	0005C-2096	0005C-777	0005C-778	0005C-779	0005C-780	0005C-1448	0005C-782	\$269.00
CaF2	0005D-790	0005D-791	0005D-792	0005D-793	0005D-794	0005D-795	0005D-796	\$409.00
BaF2	0005E-797	0005E-798	0005E-799	0005E-800	0005E-801	0005E-802	0005E-803	\$499.00
CSI	0005F-804	0005F-805	0005F-806	0005F-807	0005F-808	0005F-809	0005F-810	\$1259.00
KRS-5	0005G-811	0005G-812	0005G-813	0005G-814	0005G-815	0005G-816	0005G-817	\$1259.00
INFRASIL QTZ.	0005H-824	0005H-826	0005H-827	0005H-828	0005H-829	0005H-830	0005H-831	\$439.00
CLEARTRAN/ZnS	0005I-818	0005I-819	0005I-820	0005I-821	0005I-822	0005I-1080	0005I-823	\$929.00
ZnSe	0005J-839	0005J-840	0005J-841	0005J-842	0005J-843	0005J-844	0005J-845	\$699.00
AgCl	0005K-832	0005K-833	0005K-834	0005K-835	0005K-836	0005K-837	0005K-838	\$1669.00

MATERIAL	.015mm	.025mm	.05mm	0.1mm	0.2mm	0.5mm	1mm	PRICE
NaCl	0005A-853	0005A-854	0005A-855	0005A-856	0005A-857	0005A-858	0005A-859	\$249.00
KCl	0005B-860	0005B-861	0005B-862	0005B-863	0005B-864	0005B-865	0005B-866	\$259.00
KBr	0005C-867	0005C-868	0005C-869	0005C-870	0005C-871	0005C-872	0005C-873	\$269.00
CaF2	0005D-1082	0005D-874	0005D-875	0005D-876	0005D-877	0005D-878	0005D-879	\$409.00
BaF2	0005E-880	0005E-881	0005E-882	0005E-883	0005E-884	0005E-885	0005E-886	\$499.00
CSI	0005F-887	0005F-888	0005F-889	0005F-890	0005F-891	0005F-892	0005F-893	\$1259.00
KRS-5	0005G-894	0005G-895	0005G-1081	0005G-896	0005G-897	0005G-898	0005G-899	\$1259.00
INFRASIL QTZ.	0005H-907	0005H-908	0005H-909	0005H-910	0005H-911	0005H-912	0005H-913	\$439.00
CLEARTRAN/ZnS	0005I-900	0005I-901	0005I-902	0005I-903	0005I-904	0005I-905	0005I-906	\$929.00
ZnSe	0005J-930	0005J-931	0005J-932	0005J-933	0005J-934	0005J-935	0005J-936	\$699.00
AgCl	0005K-923	0005K-924	0005K-925	0005K-926	0005K-927	0005K-928	0005K-929	\$1669.00

*Note: Cells with pathlength of 2-4mm add \$35.00 to above prices. Pathlengths 5-10mm add \$69 to above prices. Add \$16.00 for cell calibration, \$36.00 each for cell matching and \$47.00 each for all matching of .015/.025/.03/.075 mm cells.

Pathlength – Spacer Thickness – SL4

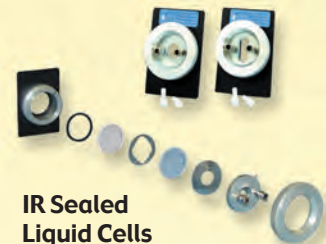
MATERIAL	.015mm	.025mm	.05mm	0.1mm	0.2mm	0.5mm	1mm	PRICE
NaCl	0005A-1965	0005A-1966	0005A-1967	0005A-1968	0005A-1969	0005A-1970	0005A-1971	\$511.00
KCl	0005B-1972	0005B-1973	0005B-1974	0005B-1975	0005B-1976	0005B-1977	0005B-1978	\$519.00
KBr	0005C-1979	0005C-1980	0005C-1981	0005C-1982	0005C-1983	0005C-1984	0005C-1985	\$539.00
CaF2	0005D-1986	0005D-1987	0005D-1988	0005D-1989	0005D-1990	0005D-1991	0005D-1992	\$793.00
BaF2	0005E-1993	0005E-1994	0005E-1995	0005E-1996	0005E-1997	0005E-1998	0005E-1999	\$1137.00
ZnSe	0005J-7435	0005J-7436	0005J-7437	0005J-7438	0005J-7439	0005J-7440	0005J-7441	\$1189.00

*Note: Cells with pathlength of 2-4mm add \$35.00 to above prices. Pathlengths 5-10mm add \$69.00 to above prices.

Calibration & Matching

0010-186	Calibration of cells	\$16.00
0010-185	Calibration & matching of cells	\$36.00
0010-4170	Calibration & matching of .015/.025/.03/.075 mm cells, except SL-2	\$49.00
0010-7901	Calibration & matching of .015/.025/.03/.075 mm SL-2 cells	\$56.00
0010-4169	Calibration of variable pathlength cell	\$179.00

Part No.	Variable Pathlength Cell	Price
0005B-2064	KCl	\$1879.00
0005C-2065	KBr	\$1933.00



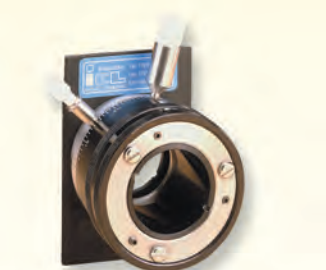
IR Sealed Liquid Cells SL-2



Sealed Liquid Cells SL-3



Sealed Liquid Cells SL-4



Variable Pathlength Cell



11 Erie Street
Garfield, NJ 07026 USA
Tel: (973) 478-8944
Fax: (973) 478-4201
www.internationalcrystal.net
iclmail@internationalcrystal.net



Cell Reconditioning

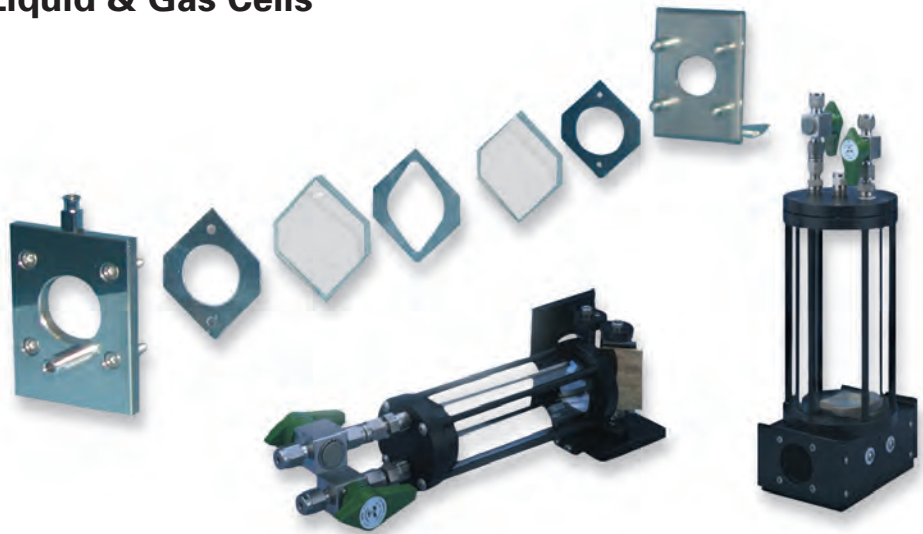


Varian, Digilab & Bio-Rad



Thermo Nicolet

Reconditioning of Liquid & Gas Cells



Infrared Liquid & Gas Cell Reconditioning

Part No.	Description	Price
0010-76	Disassembly and reassembly of liquid cell	\$46.00
0010-4167	Disassembly and reassembly of gas cell	\$63.00
0010-4528	Disassembly and reassembly of variable path mini gas cell and permanently aligned cell	RFP
0010-4168	Disassembly and reassembly of variable path liquid cell	\$309.00
0010-4169	Calibration of variable path liquid cell	\$179.00
0010-186	Calibration of cell	\$16.00
0010-185	Calibration and matching of cell	\$36.00
0010-4170	Calibration and matching of .015/.025/.03/.075 mm cells, except SL-2	\$49.00
0010-7901	Calibration and matching of .015/.025/.03/.075 mm SL-2 cells	\$56.00
0010-4297	Soldering of fitting	\$33.00
0010-XXXX	Recondition Long Path Gas Cell	RFP

Reconditioning of Oil Analyzer Flow Cells



Reconditioning of Oil Analyzer Flow Cells

ICL reconditions oil flow cells for the Thermo Nicolet Avatar 360, the Varian FT-IR Oil Analyser, the Bio-Rad Oil Analyzer and the Digilab Oil Analyzer. All reconditioned cells are calibrated and tested under pressure. If requested by customer, windows can be wedged to limit fringing. Contact ICL for pricing guidelines.



11 Erie Street
Garfield, NJ 07026 USA
Tel: (973) 478-8944
Fax: (973) 478-4201
www.internationalcrystal.net
iclmail@internationalcrystal.net

Gemini™ Gas Cell Solar System



Gas Cells



Gas cell configuration



ICL's Gemini™ Gas Cells comprise an entire system of gas cell configurations suited for FTIR and laser spectroscopy. Gemini™ Gas Cells are available in numerous standard configurations; and cells can be configured with virtually any custom path length, sample compartment material, seal composition, mirror or optic coating and inlet or outlet style. In summary, the Gemini™ Gas Cell solar system includes:

Mercury™ Gas Cells: **short path length single pass** Gemini™ Gas Cells with low volumes (100cc to 0.5 liter) from nickel plated stainless steel. Pathlengths range from 10cm to 2.5 meters. Vacuum rating 1×10^{-9} Torr.

Venus™ Gas Cells: **low volume** (0.5 to 1 liter) borosilicate glass and aluminum bodied long path gas cells with fixed and variable path lengths (1 to 6.5 meters), including our popular long path mini cells.

Earth™ Gas Cells: **moderate volume** (2 to 8 liter) borosilicate glass long path gas cells with fixed and variable path lengths (10 to 20 meters).

Mars™ Gas Cells: **rugged and robust** moderate volume (1 to 5 liter) **all metal** long path gas cells comprised of stainless steel (passivated or electropolished) or nickel plated aluminum bodies **for demanding or corrosive applications** requiring durability. Path lengths range from 1 to 20 meters and pressures range from vacuum (1×10^{-10} Torr) to 125 psi.

Saturn™ Gas Cells: **research grade ultra long path** gas cells (50 to 100 meters) with borosilicate or fused silica bodies with laser alignment.

The Gemini™ solar system combined with ICL's Basics Gas Cells offers a solution to every sample analysis problem and for every budget.

**High stability
temperature controller**
www.internationalcrystal.net

Gas Cell Selection Guide Applications & Configurations

	Heatable	Corrosive Sample	Glass Body	Metal Body	PTFE Body	Variable Path Length	Laser Alignment	Modest Cost	Short Path Length	Special Gases	Pure Gases	Sub PPM Gas	Vacuum Test
Cell Models	Mercury Mars ICL	Mercury Mars	Venus Earth Saturn ICL	Mercury Mars	ICL	Venus Earth Mars Saturn	Saturn	Venus ICL	Mercury ICL	Mercury Mars	Mercury Mars	Saturn Venus Mars Earth	Mercury Mars



11 Erie Street
Garfield, NJ 07026 USA
Tel: (973) 478-8944
Fax: (973) 478-4201
www.internationalcrystal.net
iclmail@internationalcrystal.net



Model G-2 Gas Cell — 5cm or 10cm

Gas Cells



Demountable Beta Gas Cell



The G-2 Gas Cell is for analysis of pure gases or gas mixtures in which component gases are present at concentrations of 5 percent or more. The G-2 Gas Cell has a fixed pathlength of either 5cm or 10cm. The windows of the cell are easy to remove for cleaning, making the G-2 ideal for working with wet or reactive gases that have a tendency to fog or attack the window material.

The G-2 cell comes completely assembled in a stainless steel universal 2" x 3" mount. It includes a Pyrex® glass body, silicon rubber or Viton® gaskets and a choice of optical materials.

The window size is 38mm x 6mm. The clear aperture of the cell is 32mm.

The G-2 is available in a variety of optical window materials, two pathlengths and a choice of ground tapered endings with 12/30 joints (**TPE**), plain endings joints (**PTE**) or ground semi-ball joints with 18/9 joints (**SBJ**). (See notes beneath table and Figure 1).

The Beta Gas Cell is an inexpensive demountable gas cell that uses 25 x 4mm windows and is available in 5 or 10cm versions.

TPE 12/30 joints

SBJ 18/9 joints



Figure 1.

Material	Catalog Number		Price
	Gas Connection	5 cm	
NaCl			
PTE	0008A-715	0008A-711	\$449.00
SBJ	0008A-716	0008A-712	\$449.00
TPE	0008A-714	0008A-710	\$449.00
KCl			
PTE	0008B-720	0008B-717	\$479.00
SBJ	0008B-721	0008B-718	\$479.00
TPE	0008B-719	0008B-713	\$479.00
KBr			
PTE	0008C-726	0008C-723	\$516.00
SBJ	0008C-727	0008C-724	\$516.00
TPE	0008C-725	0008C-722	\$516.00
CaF₂			
PTE	0008D-732	0008D-729	\$659.00
SBJ	0008D-733	0008D-730	\$659.00
TPE	0008D-731	0008D-728	\$659.00
BaF₂			
PTE	0008E-739	0008E-735	\$879.00
SBJ	0008E-740	0008E-736	\$879.00
TPE	0008E-737	0008E-734	\$879.00
INFRASIL QTZ			
PTE	0008H-5030	0008H-5031	\$649.00
SBJ	0008H-5032	0008H-5033	\$639.00
TPE	0008H-5034	0008H-5035	\$629.00
AgCl			
PTE	0008K-763	0008K-760	\$1049.00
SBJ	0008K-764	0008K-761	\$1049.00
TPE	0008K-762	0008K-759	\$1049.00
BETA GAS CELL	0008-505	0008-504	\$329.00

* PTE = Plain tubular endings. This is a straight tube, not ground.

SBJ = Semi ball ending with 18/9 joints. This is a ground joint, 18mm diameter at widest with 9mm hole.
TPE = Tapered ending with 12/30 joints. This is a ground joint, 12mm diameter at widest, 30mm in length.



11 Erie Street
Garfield, NJ 07026 USA
Tel: (973) 478-8944

Fax: (973) 478-4201

www.internationalcrystal.net

iclmail@internationalcrystal.net

Model G-2SS 10cm Stainless Steel Gas Cell



The G-2SS stainless steel gas cell is useful for qualitative analysis of pure gases and mixtures where one or more of the constituent gases are present in concentrations of at least 5 percent. It can be used in situations that make use of a glass cell impractical, such as applications involving high pressure or gases that etch a glass cell body. The only functional constraint on the pressure that can be applied to this cell is the window material selected. The clear aperture of the cell is 39mm and it uses 47mm x 6mm windows. Like the G-2, this cell uses a universal

2" x 3" slide mount that fits all spectrophotometers. There are inlet and outlet ports equipped with vacuum valves and hose barbs that are configured to also allow flowing gas through the cell. A 1/4 NPT port in the side of the cell allows the addition of a pressure gauge, a thermocouple and other probes. The cell comes with an assortment of silicon, nitrile, PTFE and viton "O" rings and gaskets. KBr and NaCl are the basic window material, but other materials are available upon request. Can be heated.

Part No.	Description	Price
0008-5160	G-2SS, NaCl windows	\$1169.00
0008-5161	G-2SS, KBr windows	\$1219.00
0008-5162	Cylindrical Cell Holder	\$165.00
0008-5584	Optional Pressure Gauge	\$369.00
0008-5804	PTFE Gaskets (1pk/4)	\$30.00
0008-5321	Nitrile "O" Rings (1pk/4)	\$28.00
0008-5805	PTFE "O" Rings (1pk/4)	\$30.00
0008-XXXX	Replacement 47 x 6mm windows, all materials	RFP
0008-7329	Heater Jacket and accessories	\$1199.00

G-3PTFE 10cm PTFE Gas Cell



All components of the G-3PTFE 10cm gas cell that contact the sample can be made entirely of PTFE, making the cell useful for any gas sample that might attack, or be contaminated by, glass or stainless steel gas cell components. The G-3PTFE is useful for analysis of pure gases and mixtures in which

the constituent gases are present in concentrations of 5% or more. The G-3PTFE has a clear aperture of 39mm and uses 47 x 6mm windows. Swagelok® SS valves are standard, but PFA valves are optional. A heated version is available. Requires a cell mount (Part No. 0008-5162).

Part No.	Description	Price
0008-7326	Model G-3 10cm PTFE gas cell, with NaCl windows, SS Swagelok® valve	\$1489.00
0008-7327	Model G-3 10cm PTFE gas cell, with KCl windows, SS Swagelok® valve	\$1519.00
0008-7328	Model G-3 10cm PTFE gas cell, with KBr windows, SS Swagelok® valve	\$1579.00
0008-5162	Cylindrical Cell Holder for 10cm PTFE gas cell	\$165.00

Gas Cells



Heated gas cell
See page 11



Long Path Mini Gas Cell
Variable 1 to 5 meters
See page 14



11 Erie Street
Garfield, NJ 07026 USA
Tel: (973) 478-8944
Fax: (973) 478-4201
www.internationalcrystal.net
iclmail@internationalcrystal.net

Gas Cells



Figure 2
Gas cell configuration
with Swagelok® valves



High stability
temperature controller
www.internationalcrystal.net

Heated Vapor Gas Multi-Sampler



This heated cell can be configured as a gas cell (Fig. 2) or for vaporizing samples that are normally solids or liquids at room temperature. Configured for gas sampling, the cell incorporates 2 valves, an inlet and an outlet, that enable flowing gas samples through the cell. In its solid and liquid vaporization configuration, the cell has an outlet needle valve from which a vacuum can be pulled and two (2) sample inlets.

One inlet is a needle septa injection port on the top of the cell which is similar to the type used in gas chromatography. There is a second inlet in the form of a side port for inserting solid samples, which also doubles as the thermocouple port. Using the side port eliminates the need to recheck vacuum seals whenever the cell is opened to insert solid samples. The heating jacket extends over the end of the cell so that both the cell body and the optics are heated, and allows operation at temperatures up to

200°C. Condensation on the optics is minimized by heating them to the same temperature as the sample chamber. A type J iron constantan thermocouple is provided with plugs which are compatible with the optional temperature controller. The cell body is type 304 stainless steel and an assortment of seals is provided – silicon, viton PTFE and nitrile.

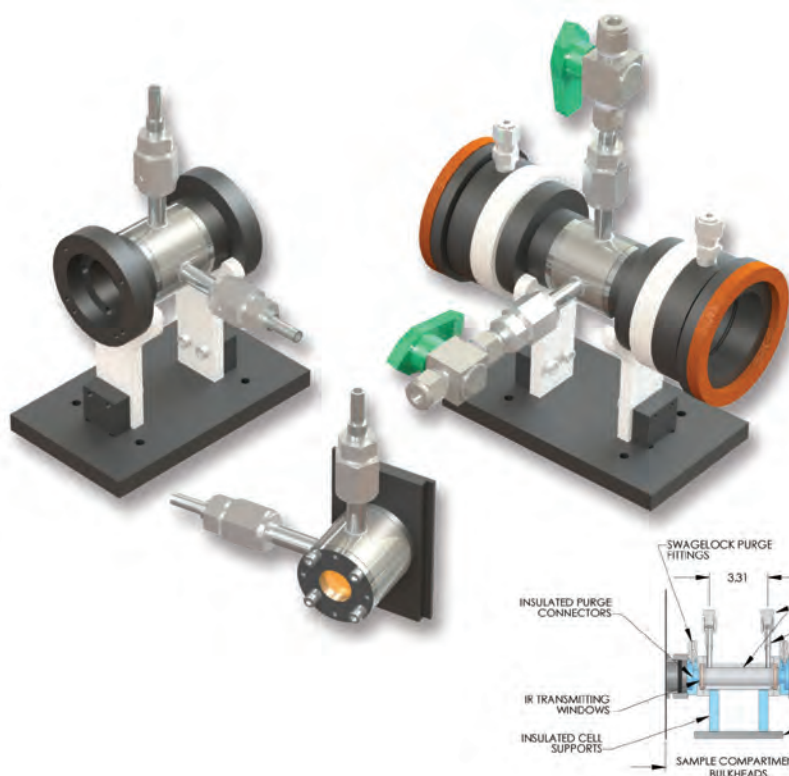
Cells are factory pretested for vacuum leaks using dummy windows and then new windows are shipped with the cell. The cell comes standard with 47 x 6mm KCl windows. The clear aperture is 39mm. Other window materials are available. An optional high stability temperature controller with RS-232 computer interface and Windows® compatible software is available. The temperature controller has ramp and soak cycles that can be programmed either on the keypad or from a PC using the provided software and the RS232 interface.

Part No.	Description	Price
0007-5546	10cm vapor gas multi-sampler with sheathed Iron Constantan 304SS type J thermocouple, 115v, 250w heater system, Swagelok® vacuum valve, thermocouple port, injection port heatable to 200 degrees C, heated windows to prevent fogging, KCl windows, 303SS body.	\$2,269.00
0007-5547	Same as 0007-5546 with KBr windows.	\$2,439.00
0017-5548	High Stability PID Temperature Controller for 0007-5546, 110v, RS-232 interface and Windows® based software for PC control, digital readout, keypad or PC programmable for ramp up, ramp down, set point, and soak (dwell) time as well as for temperature settings, digital readouts of all parameters. See www.internationalcrystal.net for more details.	\$1,199.00
0017-4804	Same as 0017-5548 but 230 volts	\$1,399.00
0008-5162	Cylindrical Cell Holder for 0007-5546 and 0007-5547	\$ 165.00
0007-7405	10cm heated gas cell, KCl windows, two Swagelok® valves, type J Iron Constantan thermocouple, 115v, 250w heater jacket. Requires temperature controller (Part no. 0017-5548) and cell mount (Part No. 0008-5162).	\$2,379.00
0007-7406	Same as 0007-7405 with KBr windows	\$2,449.00
0008-7329	Replacement Heater Jacket	\$1,199.00

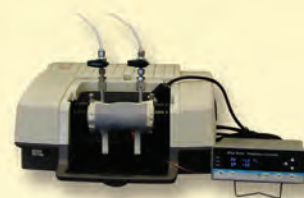


11 Erie Street
Garfield, NJ 07026 USA
Tel: (973) 478-8944
Fax: (973) 478-4201
www.internationalcrystal.net
iclmail@internationalcrystal.net

Mercury™ Single Pass Short Path Length Stainless Steel Specialty Gas Cells



Gas Cells



caption here

Short Path Gas cells are useful for pure gases and, generally speaking, for concentrations of not less than 100 ppm. Cell utility for various ppm concentrations is dependent not only on path length, but also on the absorbance characteristics of the sample. Feel free to consult with us on these and any other issues concerning selection of an appropriate gas cell.

ICL's Gemini™ gas cell line begins with our Mercury™ short path length single pass gas cells constructed of electropolished 316 Stainless Steel, available in standard path lengths of 1cm, 2cm, 3cm, 5cm, 10cm and 15cm. Custom path length cells for a variety of applications are also available.

These robustly constructed gas cells are ideal for specialty gas analysis, because they are leak tight and capable of high vacuum performance exceeding 1×10^{-8} Torr, and they also can be made pressure-safe with appropriate window material and thickness selection. Each Mercury™ cell is individually helium leak tested or hydrostatically tested and a test certificate can be supplied with any cell for \$299.00 (Part No. 0009-9281).

Mercury™ cell configurations include base plate mounted, slide

mounted and heated versions with temperature controllers. Purge maintaining connectors or couplers extending from the cell body to the sample compartment walls are standard on many base plate mounted models and purge gas connections are an available option. A wide variety of window materials can be used. Wedged windows are available to limit fringing. Instrument specific spectrophotometer interfaces are available.

Mercury™ cells feature high-vacuum welded gas fittings without valves comprising the sample inlet and outlet to maintain the leak-free integrity of the cell and assure high vacuum performance. Inlets and outlets comprise a Swagelok® VCR gland, a VCR female nut, a male VCR nut and a 1/4" Swagelok® adapter. Valve kits are available.

Several common Mercury™ cell configurations are shown, but custom configurations are available upon request. Prices do not include windows, which can be selected from our transmission window price list. RFQ for wedged windows. Cell mounting and other hardware, exclusive of the cell body material and valves, is black anodized aluminum. See www.internationalcrystal.net for more information.

Part Number	Cell Body Material	Pathlength	Vol.	Temp. Range	Temp. Controller	Heater	Spectrophotometer-Specific Interface	Pressure Range	Window Size	Price w/o windows
0008-9272	316 SS electropolished	15cm	0.15L	ambient–200°C	Optional 0017-XXXX	Optional 0008-9278	Optional 0008-9279	Vacuum – 45psi*	37.5 x 4	\$3,699.00
0008-9273	316 SS electropolished	10cm	0.1L	ambient–200°C	Optional 0017-XXXX	Optional 0008-9278	Optional 0008-9279	Vacuum – 45psi*	37.5 x 4	\$2,999.00
0008-9274	316 SS electropolished	5cm	0.05L	ambient–200°C	Optional 0017-XXXX	Optional 0008-9278	Optional 0008-9279	Vacuum – 45psi*	37.5 x 4	\$2,999.00
0008-9275	316 SS electropolished	1cm	0.01L	ambient–200°C	Optional 0017-XXXX	Optional 0008-9278	Optional 0008-9279	Vacuum – 45psi*	25 x 4	\$2,799.00
0008-9276	316 SS electropolished slide mounted	1cm	0.01L	ambient–200°C	Optional 0017-XXXX	Optional 0008-9278	Optional 0008-9279	Vacuum – 45psi*		\$2,399.00
0008-9277	316 SS electropolished slide mounted	5cm	0.05L	ambient–200°C	Optional 0017-XXXX	Optional 0008-9278	Optional 0008-9279	Vacuum – 45psi*		\$2,599.00
0008-9278	Heater Jacket									\$1,099.00
0017-5548	Temp. Controller, 115v									\$1,199.00
0017-4804	Temp. Controller, 230v									\$1,399.00
0008-9279	Spectrophotometer Interface									RFQ
0008-9280	Valve Kit									\$ 499.00

*Window-dependent; KBr should be used only to 15psi.



11 Erie Street
Garfield, NJ 07026 USA
Tel: (973) 478-8944
Fax: (973) 478-4201
www.internationalcrystal.net
iclmail@internationalcrystal.net

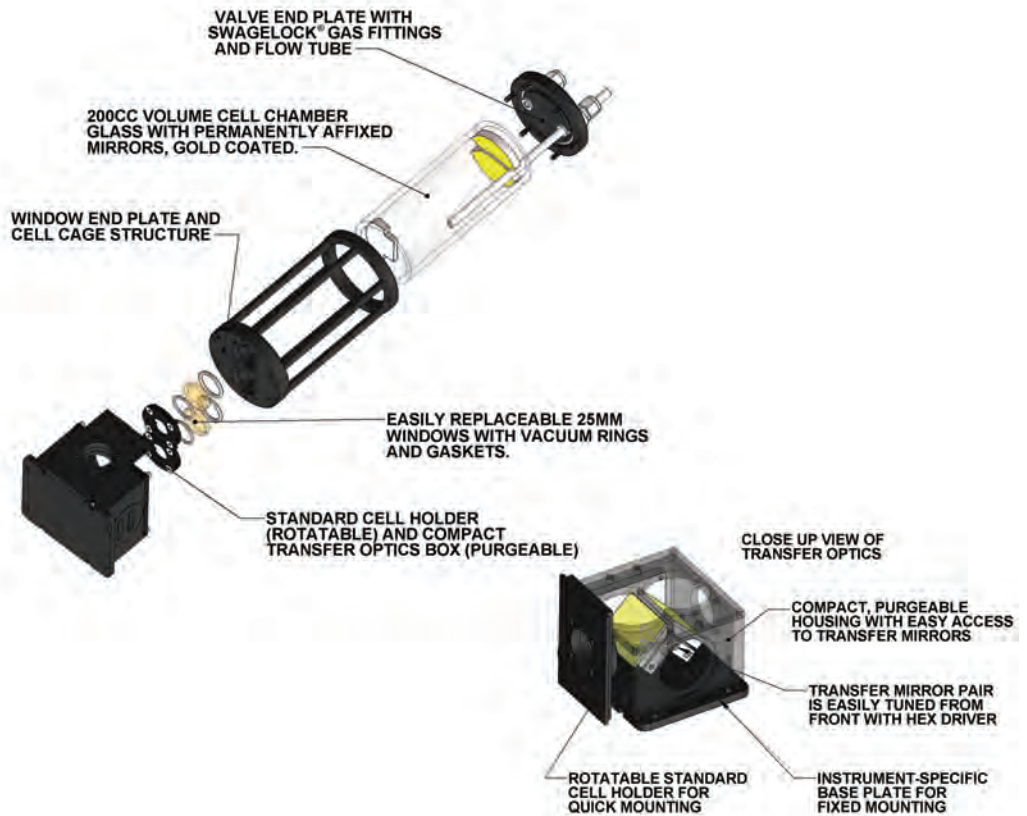


Venus™ Glass Bodied Long Path Gas Cells

Gas Cells



Venus 6.4M



Gemini™ Venus™ Glass bodied long path gas cells are classic Hanst cells, first made commercially available by Dr. Phil Hanst, who started producing them after a long career at NASA and the EPA. Hanst cells are in our bloodline at ICL, since we were Phil's first outlet for his product and Phil's son Steve, who worked with Phil designing gas cells for 20 years, is now a major shareholder in ICL as well as its Executive Vice President.

Venus™ cells are small to moderate volume long path gas cells designed for all purpose use in industrial and research applications. The cell design has improved significantly over the years with such advances as multilayer proprietary gold mirror coatings, improved purgeable transfer optics, and instrument specific base plate mountings. All Venus cells are fitted with Swagelok® 1/4" or 1/8" tube fittings to which valves, hose barbs or compression fittings can be attached. SS Swagelok® Valves are standard on the models listed.

Venus™ cell configurations include ICL's popular Ultra Mini Cell which measures 3" x 3" x 8" (1 to 5 meters fixed path length, 200cc volume), the Long Path Mini Cell (variable path length to 5 meters, 0.5L volume) and fixed and variable path length cells ranging from 4.8 to 8 meters. Heatable, laser aligned, base plate mounted and other custom configurations of Venus™ cells are available. Instrument specific interfaces are available for base plate mounted cell configurations.

Several common Venus™ cell configurations are shown, but custom configurations are available upon request. Prices do include KBr windows, but optional windows can be selected from our transmission window price list. RFQ for wedged windows to limit fringing a/k/a channeling. Cell mounting and other hardware, exclusive of the cell body material and valves, is black anodized aluminum. Fittings and Valves are SS Swagelok®. All cell bodies are borosilicate glass. Mirrors are GemGold™ multi-layer gold coated, removable and easily serviced. See www.internationalcrystal.net for more information.



11 Erie Street
 Garfield, NJ 07026 USA
 Tel: (973) 478-8944
 Fax: (973) 478-4201
www.internationalcrystal.net
iclmail@internationalcrystal.net

Venus™ Glass Bodied Long Path Gas Cells



3 Meter Ultra Mini Cell (1/2 scale)

Part Number	Mounting	Pathlength	Vol.	Temp. Range	Temp. Controller	Heater	Spectrophotometer-Specific	Pressure Range	Window Size	Price w/ KBr windows
0008-9292	Slide Mounted	3.0 M	200cc	ambient	N/A	N/A	N/A	vacuum-ambient	37.5 x 4	\$4,199.00
0008-9293	Slide Mounted	variable 1 to 5M	0.5L	ambient – 100°C	Optional 0017-XXXX	Optional 0008-9278	N/A	vacuum-ambient	25 x 4	\$6,999.00
0008-9294	Slide Mounted	4.8M	0.5L	ambient – 100°C	Optional 0017-XXXX	Optional 0008-9278	Available Mounted			\$5,399.00
0008-9295	Slide Mounted	6.4M	0.5L	ambient – 100°C	Optional 0017-XXXX	Optional 0008-9278	Available Base Mounted	vacuum-ambient	25 x 4	\$5,999.00
0008-9296	Slide Mounted	variable 1.6 to 8M	0.75L	ambient – 100°C	Optional	Optional	Available Base Mounted	vacuum-ambient	25 x 4	\$7,999.00
0008-9278	Heater Jacket									\$1,099.00
0017-5548	Temp. Controller 115v									\$1,199.00
0017-4804	Temp. Controller 230v									\$1,399.00
0008-9279	Spectrophotometer Specific Interface									RFQ
0008-9280	Replacement Valve Kit									\$ 499.00



Gas Cells



Heated 3 Meter Mars™ Cell



High stability temperature controller
www.internationalcrystal.net

For applications that demand high performance, durability, reliability, simplicity, dependability and serviceability, Gemini™ Mars™ gas cells are the solution. Mars™ long path cells address the most demanding gas sampling requirements of industrial and field deployed FTIR and IR instrumentation with a robust series of metal bodied gas cells with electro-polished stainless steel or electro-less nickel plated aluminum bodies that outperform any gas cell on the market.

A key factor ensuring the durability and serviceability of each Mars™ cell is the use of stainless steel mirrors. These mirrors are extremely durable and they can be reconditioned many times at modest cost, thereby extending the service life of each Mars™ cell for many years. All mirrors are coated with our proprietary Gemgold™ multilayer gold coatings to insure the highest possible performance in demanding environments. Stainless steel optics are inherently superior to diamond turned aluminum mirrors, from the standpoint of longevity and serviceability. While 316 stainless steel tends to resist the corrosive effects of reactive gases, aluminum tends to react with many gases making aluminum subject to corrosion and therefore an inferior optical substrate. A more effective low cost option to aluminum mirrors is gold coated glass mirrors, which can be special ordered on Mars™ at a discount to the prices of cells with stainless steel mirrors.

Mars™ cells feature modular designs with interchangeable and reconditionable components, enabling us to deliver gas cells that are both versatile and serviceable. Metal bodies and cell hardware can be constructed from many materials. Cells from materials such as stainless steel (passivated or electro polished), pure nickel, nickel coated aluminum, black anodized aluminum, and FEP or PTFE coated aluminum are all available and can be configured to user specifications.

Mars™ gas cells can be configured for high vacuum exceeding 1×10^{-9} Torr and high pressure applications. Each Mars™ cell is individually helium leak tested or hydrostatically tested and a helium leak test certificate can be supplied with any cell for \$299.00 (Part No. 0009-9281). See www.internationalcrystal.net for a sample vacuum test certification.

Mars Cells can be configured with heating jackets and with user programmable temperature and pressure control and monitoring options.

Several common Mars™ cell configurations are shown, but custom configurations are available upon request. Prices include KBr windows, but other materials can be selected from our transmission window price list. RFQ for wedged windows to limit fringing. All Mars™ cells use 25 x 4mm windows. Cell mounting and other hardware, exclusive of the cell body material and valves, is black anodized aluminum. See www.internationalcrystal.net for more information.



11 Erie Street
Garfield, NJ 07026 USA
Tel: (973) 478-8944
Fax: (973) 478-4201
www.internationalcrystal.net
iclmail@internationalcrystal.net

Mars™ Long Path Gas Cells



Field-deployed Gas Analysis System

Part Number	Cell Body Hardware Material/Plating	Pathlength	Vol.	Temp. Range	Temp. Controller	Heater	Instrument Interface	Pressure Specific Range	Price w/ KBr windows
0008-9282	Aluminum Electroless Nickel	2M	0.2L	ambient – 200°C	Optional 0017-XXXX	Optional 0008-7684	Optional 0008-9279	Vacuum – 45psi*	\$9,999.00
0008-9283	316 SS electropolished	2M	0.2L	ambient – 200°C	Optional 0017-XXXX	Optional 0008-7684	Optional 0008-9279	Vacuum – 45psi*	\$11,999.00
0008-7681	Aluminum Electroless Nickel	3M	0.375L	ambient – 200°C	Optional 0017-XXXX	Optional 0008-7684	Optional 0008-9279	Vacuum – 45psi*	\$11,999.00
0008-9284	316 SS electropolished	3M	0.375L	ambient – 200°C	Optional 0017-XXXX	Optional 0008-7684	Optional 0008-9279	Vacuum – 45psi*	\$13,999.00
0008-9285	316 SS electropolished	4.8M	0.5L	ambient – 200°C	Optional 0017-XXXX	Optional 0008-7684	Optional 0008-9279	Vacuum – 45psi*	\$15,999.00
0008-7682	Aluminum Electroless Nickel	6.4M	0.75L	ambient – 200°C	Optional 0017-XXXX	Optional 0008-7684	Optional 0008-9279	Vacuum – 45psi*	\$13,999.00
0008-7679	316 SS electropolished	6.4M	0.75L	ambient – 200°C	Optional 0017-XXXX	Optional 0008-7684	Optional 0008-9279	Vacuum – 45psi*	\$15,999.00
0008-9287	Aluminum Electroless Nickel	1.6 to 6.4M variable	0.75L	ambient – 200°C	Optional 0017-XXXX	Optional 0008-7684	Optional 0008-9279	Vacuum – 45psi*	\$15,199.00
0008-9288	316 SS electropolished	1.6 to 6.4M variable	0.75L	ambient – 200°C	Optional 0017-XXXX	Optional 0008-7684	Optional 0008-9279	Vacuum – 45psi*	\$17,199.00
0008-9289	Aluminum Electroless Nickel	10M	2L	ambient – 200°C	Optional 0017-XXXX	Optional 0008-7684	Optional 0008-9279	Vacuum – 45psi*	\$14,999.00
0008-9290	316 SS electropolished	10M	2L	ambient – 200°C	Optional 0017-XXXX	Optional 0008-7684	Optional 0008-9279	Vacuum – 45psi*	\$16,999.00
0008-9291	316 SS electropolished	12 to 48M variable	8L	ambient – 200°C	Optional 0017-XXXX	Optional 0008-7684	Optional 0008-9279	Vacuum – 45psi*	\$23,999.00
0008-7684	Heater Jacket								\$ 1,699.00
0017-5548	Temp. Controller 115v								\$ 1,199.00
0017-4804	Temp. Controller 230v								\$ 1,399.00
0008-9279	Spectrophotometer Specific Interface								RFQ
0008-9280	Valve Kit								\$ 499.00

Specify spectrophotometer manufacturer and model when ordering.

*Window-dependent: KBr should be used only to 15psi.

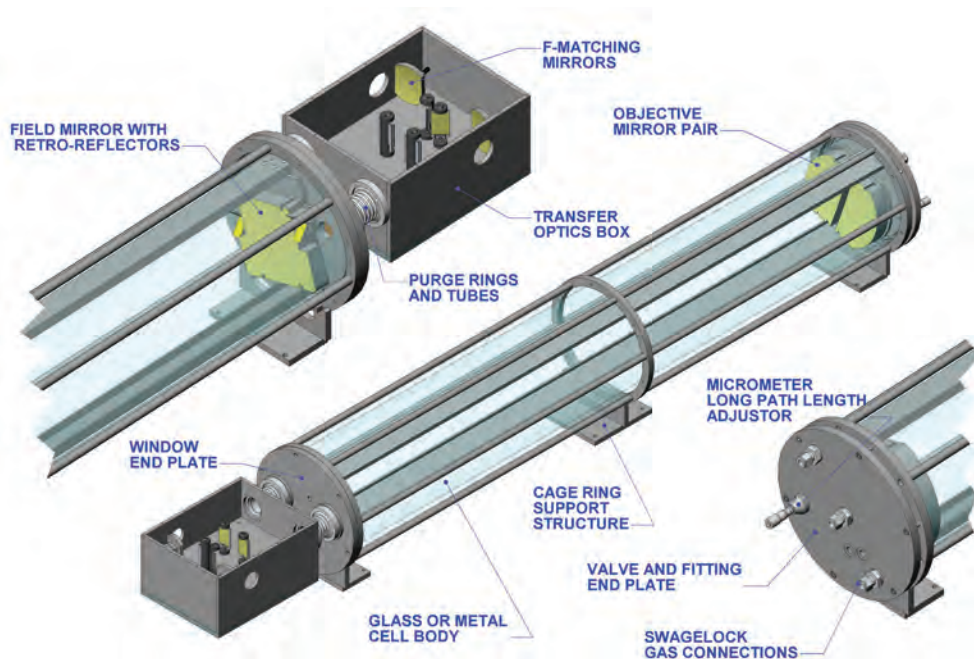


Earth™ and Saturn™ Glass Bodied Long Path Gas Cells

Gas Cells



632nm Laser alignment footprint on Saturn™ cell mirrors



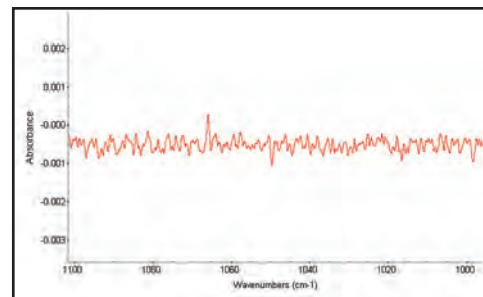
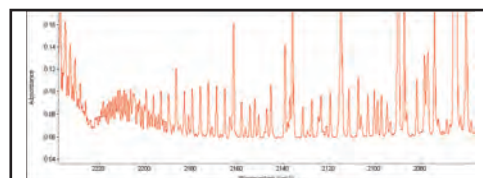
Features of Saturn 50L/200V

Gemini™ Earth™ glass bodied long path gas cells are, like Venus™ cells, classic Hanst cells, but with larger volumes and longer path lengths. Pathlengths range from 10 to 20 meters and volumes range from 2 to 8 liters.

For applications requiring ultra long path lengths we offer our Saturn™ series multi-pass gas cells that range from 50 to 200 meters. These cells employ an innovative advancement in White cell configuration that effectively triples the operational range of the cell within a moderate size cell volume, thereby providing path lengths in excess of 100 meters that still produce strong signal throughput to enable part per billion (ppb) trace level detection sensitivity in ambient conditions and when sampling gas mixtures.

The following figures show excellent signal to noise performance at 0.5cm⁻¹ resolution in a 160 meter path length cell in a few minutes of elapsed observation time.

All Earth and Saturn cells feature SS Swagelok® valves, multilayer gold coated mirrors, borosilicate glass bodies, transfer optics and base plate configurations to fit most spectrophotometers, and black anodized aluminum hardware. Earth™ cells use 1/4" SS flow tubes and Swagelok® connections and Saturn cells use 3/8" SS flow tubes and Swagelok® connections. All variable path length cells incorporate a laser alignment device with a 6 volt DC power supply for path length verification based on the number of passes made through the cell.



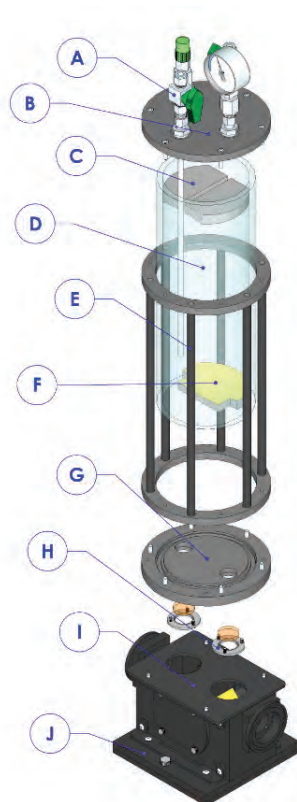
Several typical Earth™ and Saturn™ cell configurations are shown, but custom configurations are available upon request. Prices do include KBr windows, but optional windows can be selected from our transmission window price list. RFQ for wedged windows to limit fringing a/k/a channeling. Cell mounting and other hardware, exclusive of the cell body material and valves, is black anodized aluminum. Fittings and Valves are SS Swagelok®. All cell bodies are borosilicate glass. Mirrors are removable and easily serviced. See www.internationalcrystal.net for more information.



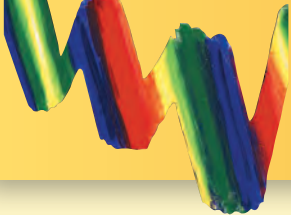
11 Erie Street
Garfield, NJ 07026 USA
Tel: (973) 478-8944
Fax: (973) 478-4201
www.internationalcrystal.net
iclmail@internationalcrystal.net

Earth™ and Saturn™ Glass Bodied Long Path Gas Cells

- A. Swagelok and Nupro Valves and Fittings
- B. Valve and Fitting Bulkhead
- C. Precision Aligned Objective Mirror Pair
- D. "Cell Rack"
- E. Cell Body
- F. Field Mirror
- G. Windows Endplate
- H. Window Retaining Rings
- I. Transfer Optics Box
- J. Base Plate



Part Number	Cell	Pathlength	Vol.	Temp. Range	Controller	Temp. Heater	Laser Alignment	Pressure Range	Window Size	Price w/ KBr windows
0008-9298	Earth	10M	2L	ambient – 100°C	Optional 0017-XXXX	Optional 0008-7684		vacuum-ambient	25 x 4	\$ 8,499.00
0008-9299	Earth	variable 1 to 10M	2L	ambient – 100°C	Optional 0017-XXXX	Optional 0008-7684	Yes	vacuum-ambient	25 x 4	\$10,999.00
0008-9300	Earth	20M	8L	ambient – 100°C	Optional 0017-XXXX	Optional 0008-7684			25 x 4	\$10,999.00
0008-9301	Earth	variable 2 to 30M	8L	ambient – 100°C	Optional 0017-XXXX	Optional 0008-7684	Yes	vacuum-ambient	25 x 4	\$17,999.00
0008-9302	Saturn	variable 8 to 80M	18L	ambient			Yes	vacuum-ambient	37.5 x 4	\$21,999.00
0008-9303	Saturn	variable 10 to 100M	25L	ambient			Yes	vacuum-ambient	37.5 x 4	\$23,999.00
0008-9304	Saturn	variable 20 to 200M	50L	ambient			Yes	vacuum-ambient	37.5 x 4	\$28,999.00
0008-7684	Heater Jacket									\$ 1,699.00
0017-5548	Temp. Controller 115v									\$ 1,199.00
0017-4804	Temp. Controller 230v									\$ 1,399.00
0008-9279	Spectrophotometer specific Interface									RFQ
0008-9280	Replacement Valve Kit									\$ 499.00



Solid Sampling & KBr Presses

Presses

Quick Press KBr Pellet Kit & Port-A-Press™ KBr Pellet Kit



Little Press™ KBr Pellet Die Kit



Evacuatable Little Press™

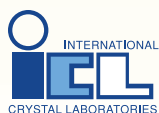


ICL's Port-A-Press™ and QuickPress are the most economical, full-scale, KBr pellet presses on the market, and each produces pellets that are as transparent as those made with a 12 ton hydraulic press. The Port-A-Press™ uses a torque wrench to permit the user to apply the same amount of pressure from pellet to pellet thereby facilitating reproducibility of results. The square frame of the Port-A-Press™ can either be inserted in a bench mounted vise or in the channel shaped holder provided with the press (shown in photo) which can be mounted to a work bench. The torque wrench easily generates 20 foot pounds of torque without the use of excessive strength, which is sufficient to

produce 16,000 lbs/in² of pressure on the die set. This is the equivalent of 8 tons of pressure and forms a very clear pellet.

The Quick Press is a hand press for making transparent KBr pellets (discs) with diameters of 7mm, 4mm or 2mm. The Quick Press uses the principle of toggle action to apply very high pressure with minimal force. The KBr pellet is formed using only the pressure of a firm handshake applied steadily to the handle. The anvils of the 7mm die sets are hardened with optically polished faces and use aerospace grade of nickel based alloy. The die sets are interchangeable for both the Port-A-Press™ and the Quick Press.

Part No.	Description	Price
0012-188	KBr Port-A- Press™ Kit, complete with 7mm die set, torque wrench, channel holder and pellet press	\$649.00
0012-189	Die Set—7mm	\$157.00
0012-191	Die Set—4mm	\$179.00
0012-190	Die Set—2mm	\$179.00
0012-4706	10 pack of 7mm collars/KBr pellet mounts	\$419.00
0012-4607	Sample Holder to mount collars containing pellets in spectrophotometer	\$132.00
0012-4586	KBr Quick Press Kit, complete with 7mm die set and holder	\$849.00
0012-4977	KBr Quick Press Handle Only w/o Die Set	\$699.00
0012-193	Little-Press™ Kit, including press body, two type 316 stainless steel bolt style anvils and sample holder	\$129.00
0012-6680	Evacuatable Little-Press™ Kit, same as 0012-193 but evacuatable	\$183.00
0012-624	Assortment of ten Little-Press bodies (Nuts) with twenty bolt style 316SS anvils	\$569.00
0009-489	35mm OD Agate Mortar & Pestle (See page 27 for other sizes)	\$109.00



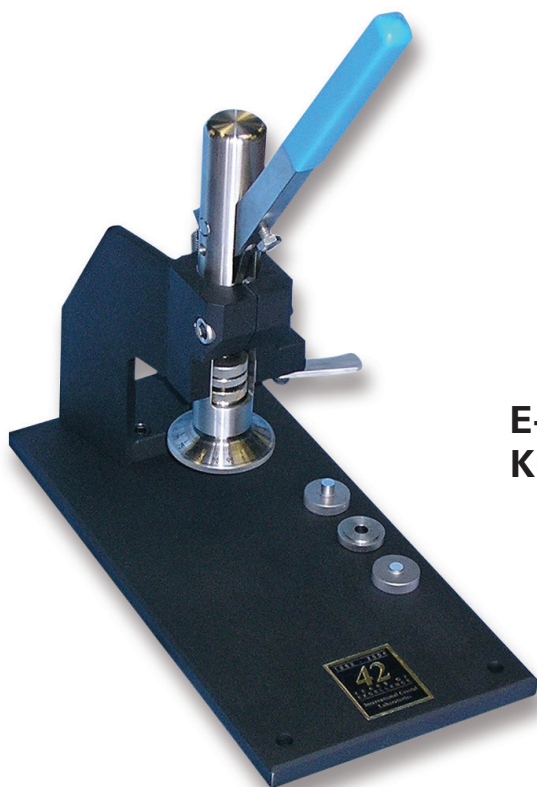
11 Erie Street
Garfield, NJ 07026 USA
Tel: (973) 478-8944

Fax: (973) 478-4201

www.internationalcrystal.net

iclmail@internationalcrystal.net

Solid Sampling & KBr Presses



E-Z™ Quick Table Top KBr Pellet Press

The E-Z™ Quick Table Top Press operates on the same toggle action principle as our Quick Press. By mounting the press vertically and providing a table top mounting platform, we have made it easier to compress a KBr pellet and easier to open the press and remove the pellet. Vertical mounting enables the use of body weight and shoulder muscles, so the E-Z™ Quick requires minimal strength to operate. When the base is attached to a bench it is easier to open

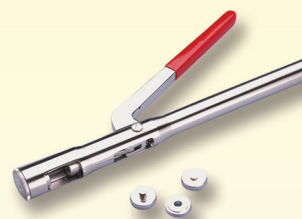
then a hand press, and pushing a small lever ejects the die set. There is a dial indicator to enable reproduction of force settings from pellet to pellet. The press is constructed from Stainless Steel, chrome plated steel and anodized aluminum for long corrosion-free service. The E-Z™ Quick Press uses the same 7mm, 4mm and 2mm die sets that are used in ICL's Quick Press and Port-A-Press™.

Part No.	Description	Price
0012-8076	E-Z™ Quick Table Top Press, w/o die set	\$1299.00
0012-8211	E-Z™ Quick Table Top Press, w/ 7mm die set	\$1399.00
0012-8212	E-Z™ Quick Table Top Press, w/ 2mm,4mm and 7mm die sets	\$1599.00
0012-189	7mm die set	\$157.00
0012-191	Die Set - 4mm	\$179.00
0012-190	Die Set - 2mm	\$179.00
0012-4706	10 Pack of 7mm collars/KBr pellet mounts	\$419.00
0012-6678	20 Pack of 7mm collars/KBr pellet mounts	\$649.00
0012-6679	30 Pack of 7mm collars/KBr pellet mounts	\$749.00
0012-4607	Sample Holder to mount collars containing pellets in 2"x3" slide mount of spectrophotometer	\$132.00
0011-8966	Premium Grade FTIR SpectroGrade™ KBr Powder, 100 grams	\$99.00
0011-4541	KBr XL Ultra Pure SpectroGrade™ Powder 99.999% pure, 100 grams	\$150.00
0009-489	35mm OD Agate Mortar & Pestle	\$109.00

Presses



KBr powder
& random cuttings
See page 26



Quick Press
See page 19



11 Erie Street
Garfield, NJ 07026 USA
Tel: (973) 478-8944
Fax: (973) 478-4201
www.internationalcrystal.net
iclmail@internationalcrystal.net

Presses

E-Z Press™ 12, 15, 20, 30 & 40 Ton Hydraulic Presses

U.S. Patents No. 5,701,814 & 5,787,564



**KBr powder
& random cuttings**
See page 26



Agate mortars & pestles
See page 27



**12, 15 & 20 Ton
E-Z Press™**



**30 & 40 Ton
High Profile
E-Z Press™**

ICL's new patented E-Z Press™ hydraulic lab presses feature a unique lightweight ergonomic design. All E-Z Press™ models weigh less than 155 pounds due to ICL's patented unibody construction. **The 12 ton E-Z Press™ weighs a mere 51 pounds!** The E-Z Press™ will handle a variety of lab applications, including pressing KBr pellets for FTIR spectroscopy and briquetting samples for XRF spectroscopy.

Ports in the walls of the press frame allow access for vacuum lines and electrical cords, enabling use of the press with evacuable dies and heated platens. The 15 and 20 ton E-Z Press™ can also be used for making thin films with ICL's Precision Thickness Film Maker.

All E-Z Presses™ feature built in polycarbonate safety shields with solid brass hardware. There are die centering depressions in the round bottom platens. Each press comes with a standard

stainless steel filling disc to flatten the platen. The bottom platen of the 12 ton E-Z Press™ automatically centers ICL's 13mm Macro-Micro die. The bottom platen of the 15 and 20 ton E-Z Press™ has a 4" diameter depression and optional donut shaped inserts are available to automatically center ICL's 13mm, 20mm, 32mm, 35mm and 40mm die sets. Optional extra long handles are also available for all presses for extra leverage.

Features

- Built in Polycarbonate Safety Shields
- Adjustable Overhead Lead Screw
- Access Ports for Vacuum and Electrical Lines
- Lightweight
- Unibody Construction
- Ergonomic Design
- Automatic Die Centering

Part No.	Description	Price
0012-5859	12 ton E-Z Press™, with safety shields shipping weight approx. 57 pounds, CE marked	\$2299.00
0012-7418	15 ton E-Z Press™, with safety shields shipping weight approx. 90 pounds, CE marked	\$2549.00
0012-6306	20 ton E-Z Press™, with safety shields shipping weight approx. 90 pounds, CE marked	\$2599.00
0012-4608	Precision Thickness Film Maker with 15, 25, 50 100, 250 & 500 micron spacers, cooling jacket and foil inserts	\$3499.00
0012-5908	KBr Pellet Kit with 13mm die set (0012-2477) & 12 ton E-Z Press™ (0012-5859)	\$2698.00
0012-6549	30 ton E-Z Press™, with safety shields, high profile with 8 1/4" daylight, weight 151 pounds, CE marked	\$5199.00
0012-6630	40 ton E-Z Press™, with safety shields, high profile with 8 1/4" daylight, weight 153 pounds, CE marked	\$5599.00
0012-2477	13mm KBr die set (See page 27)	\$469.00
0012-6633	32mm die set with 2 SS anvils	\$1649.00
0012-6664	Water cooled 4" dia. Heated Platens (See page 25)	\$3259.00
0012-6636	Die Centering Disc with 3.65" (92.7mm) aperture and 4" OD, centers ICL 20 - 40mm die sets	\$69.00



11 Erie Street
Garfield, NJ 07026 USA
Tel: (973) 478-8944

Fax: (973) 478-4201

www.internationalcrystal.net

iclmail@internationalcrystal.net

Solid Sampling & KBr Presses



1 & 2 Ton E-Z™ Presses

ICL's 1 & 2 Ton E-Z™ Presses feature the same unibody construction and other features common to our E-Z™ Press line, but we have redesigned these presses to maximize the sensitivity of the press for **exact reproducibility of applied force**. Normally, hydraulic presses use a pump to apply pressure to the piston of the hydraulic cylinder. The hydraulic fluid pump found in standard press designs increases the pressure of the hydraulic fluid in spurts which causes the force being applied by the press to jump in increments which are difficult to control with precision. In addition, there is some backflow of hydraulic fluid during the pumping process which amplifies the lack of reproducibility of force levels.

Many applications for low pressure presses such as intrinsic ingredients dissolution analysis require the application of highly reproducible force levels, and 12 ton hydraulic presses are inherently unsuited to these applications. By removing the pump and sealing the hydraulic cylinder, we have created a press which

enables application of very small increments of force levels which can be reproduced with a high degree of precision from sample to sample and without pressure drops. The force is applied to the sealed cylinder by turning the lead screw assembly against the platen on which the die is seated, similar to the manner that a wine press operates. Since the force levels are very low, very little effort is required to turn the lead screw.

These presses are equipped with clamps which allow them to be anchored to any bench top and easily moved to different locations within the lab and they can also be bolted to a lab bench using the fixtures provided with the press. When used with ICL's intrinsic dissolution analysis dies (see www.internationalcrystal.net), the dies are automatically centered in the press. The 1 and 2 Ton E-Z™ Press can also be used with ICL's 2mm, 4mm and 7mm die sets and die centering inserts are available for the smaller die sets.

Part No.	Description	Price
0012-7417	2 Ton E-Z™ Press with safety shields. Daylight opening 2.5", Shipping weight approximately 60 pounds.	\$3109.00
0012-7760	1 Ton E-Z™ Press with safety shields. Daylight opening 2.5", Shipping weight approximately 60 pounds.	\$3099.00
0012-7825	Intrinsic dissolution die sets with 6 dies and 6 flat bottom beakers	\$5899.00
0012-8092	Intrinsic dissolution die sets with 2 dies and 2 flat bottom beakers	\$3459.00
0012-8093	Die centering insert for 2mm, 4mm and 7mm die sets	\$103.00
0012-191	Die Set - 4mm	\$179.00
0012-189	Die Set - 7mm	\$157.00

Presses



Intrinsic Dissolution
Apparatus – see
www.internationalcrystal.net



11 Erie Street
Garfield, NJ 07026 USA
Tel: (973) 478-8944
Fax: (973) 478-4201
www.internationalcrystal.net
iclmail@internationalcrystal.net



Solid Sampling & KBr Presses

Presses



Precision Thickness Film Maker



Pellet and Briquetting Die Sets
See page 27

Air-EZ™ 15, 20, 30 & 40 Ton Automated Presses

U.S. Patents No. 5,701,814 & 5,787,564



15 & 20 Ton AIR-EZ™ Press



30 & 40 Ton High Profile AIR-EZ™ Press

The Air-EZ™ Press adds automation to the patented unibody design that enables ICL to make the E-Z Press™ so light and ergonomic. The press is driven by an elegant and quiet pneumatic motor that runs off of your lab's compressed air supply or most commercially available air compressors. **No physical effort whatsoever is required.** The press jacks up to its rated capacity of 15, 20, 30 or 40 tons in a mere 5 seconds. Ports in the walls of the press frame allow access for vacuum lines and electrical cords to the area between the platens, which enables use of the press with evacuable dies or heated platens. The Air-EZ™ Press is suitable for many lab applications, including KBr pellets and XRF briquettes. It has a small footprint and weighs between 130 pounds and 155 pounds. **If you dread pumping up a manual press or crave lab space, this is the solution.** The press is available with heated platens and our PrecisionThickness Film Maker as a Film Maker Kit.

Air-EZ™ Presses feature built in polycarbonate safety shields with polished brass hardware and a die centering depression in the round stainless steel bottom platen. The press comes with a standard 4" diameter stainless steel filling disc to flatten the platen. Optional donut shaped inserts are available to automatically center die sets with a variety of base diameters.

Features

- Automated – propelled by lab compressed air
- No strength required
- Lightweight
- Built-in Polycarbonate Safety Shields
- Small Footprint
- Ergonomic Design
- Unibody Construction
- Access Ports for Vacuum and Electrical Lines
- Adjustable Overhead Lead Screw
- CE Marked

Part No.	Description	Price
0012-7419	15 ton Air-EZ™ Press, with safety shields, shipping weight approx. 130 pounds, requires 100–115 psi, 7cfm, compressed air supply	\$3999.00
0012-6486	20 ton Air-EZ™ Press, with safety shields, shipping weight approx. 130 pounds, requires 100–115 psi, 7cfm, compressed air supply	\$4179.00
0012-4608	Precision Thickness Film Maker with 15, 25, 50 100, 250 & 500 micron spacers, cooling jacket and foil inserts	\$3499.00
0012-6906	KBr Pellet Kit with 13mm die set (0012-2477) & 20 ton Air-EZ™	\$4549.00
0012-2477	13mm KBr die set (See page 27)	\$469.00
0012-6633	32mm die set (See page 27)	\$1649.00
0012-6625	30 ton Air-EZ™, with safety shields, high profile with 8 1/4" daylight, weight approx. 152 pounds, CE marked	\$6299.00
0012-6628	40 ton Air-EZ™, with safety shields, high profile with 8 1/4" daylight, weight approx. 155 pounds, CE marked	\$6599.00
0012-6664	Water cooled 4" dia. Heated Platens (See page 25)	\$3149.00



11 Erie Street
Garfield, NJ 07026 USA
Tel: (973) 478-8944
Fax: (973) 478-4201
www.internationalcrystal.net
iclmail@internationalcrystal.net

Solid Sampling & KBr Presses

Precision Thickness Film Maker & Thin Film Making Kits For Polymers



The ICL Precision Thickness Film Maker is available with several filmmaking kits and as a stand alone accessory for use with other lab presses. It is designed to hot press polymer films to precise thicknesses of 15, 25, 50, 100, 250 & 500 microns. It can be used in conjunction with either ICL's 6" x 6" thermostat controlled heated platens (0012-4612; see www.internationalcrystal.net) or the temperature controlled, water cooled heated platens with digital temperature controller (0012-6664). The Precision Thickness Film Maker and the heated platens can be combined as complete kits with the 20 ton E-Z Press™, the 20 ton Air-EZ™ and the 12 ton Mini "C" Column press.

The Precision Thickness Film Maker produces thin films which are highly reproducible from

sample to sample using hardened steel spacers to separate the two (2) mirror finish optically polished surfaces of the special anvils. The entire assembly and the sample are placed between heated platens, heated to close to the softening point and pressed with a hydraulic press to form the film. By using matte finished foil inserts between the anvils, interference fringes can be avoided. Excess sample runs off into a trough to prevent interference with the formation of the film. A water cooled chamber is provided into which the entire assembly with the film can be inserted for cooling after the film has been pressed.

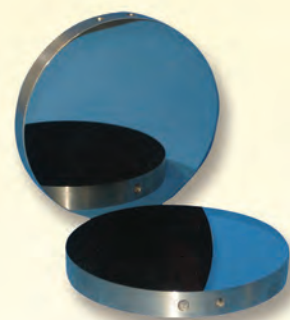
For those making films from soluble polymers, we urge you to take a look at the Roto-Film™ (see page 25).

Part No.	Description	Price*
0012-4608	Precision Thickness Film Maker with 15, 25, 50, 100, 250 & 500 micron spacers, cooling jacket and 200 foil inserts	\$3499.00
0012-4611	Replacement foil discs, pk/200	\$269.00
0009-610	Magnetic Film Holder for mounting films in a spectrophotometer	\$89.00
0012-4609	Replacement Polished Top Platen	\$829.00
0012-4610	Replacement Polished Bottom Platen	\$829.00
0012-8486	Mirror Finish Polished 4" dia. 316 SS plates for making polymer films, threaded for optional handle with drilled thermocouple port, set of 2	\$1099.00
0012-8803	PTFE 4" Diameter Platens for quick release of thin films made with heated platens; set of 2 with matte finish for diminished fringing. 3/8" thick.	\$429.00
0012-8806	PTFE 30mm Diameter Platens for quick release of thin films made with heated platens; pack of 4 with matte finish for diminished fringing. 1/8" thick.	\$119.00
0012-6664	Heated Platens, 4" dia. water cooled aluminum with digital PID temperature controller	\$3259.00
0012-6631	Film Maker Kit, with film maker (0012-4608) 20 ton E-Z press™ (0012-6306), digital temperature controller and water cooled 4" dia. aluminum heated platens (0012-6664)	\$8599.00
0012-6681	Auto Film Maker Kit, with film maker (0012-4608) 20 ton Air E-Z™ press (0012-6486), digital temperature controller and water cooled 4" dia. aluminum heated platens (0012-6664)	\$9399.00
0014-6031	Roto-Film™ Film Maker (See page 25)	\$4999.00

Presses



Heated platens
See page 25



Mirror Finish
Polished Plates



11 Erie Street
Garfield, NJ 07026 USA
Tel: (973) 478-8944
Fax: (973) 478-4201
www.internationalcrystal.net
iclmail@internationalcrystal.net

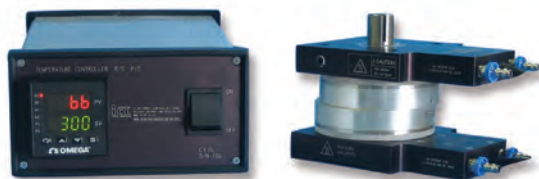


Presses



Precision Thickness film maker for polymers
See page 24

Heated Platens with Temperature Controller



The water cooled heated platens have a 4" (100mm) diameter aluminum pressing surface that will heat a sample from ambient to 400°C in less than 15 minutes. The heated platens are controlled by a stable ($\pm 1^\circ\text{C}$) CE marked digital PID temperature controller. The integral water cooling facility reduces cooling times. A removable thermocouple monitors temperature close to the surface of the platens. This accessory is compatible with ICL's 20 ton E-Z Press™ and

20 ton Air-EZ™ and is available as part of polymer film maker kits with those presses (0012-6631 and 0012-6681), and the Precision Thickness Film Maker (0012-4608). The heated platens can also be used with ICL's 2 ton High Profile E-Z Press™ (0012-8393) and the 5000 pound load cell E-Z Press™ (0012-8379). When ordering for use with an existing ICL Press, order a special lead screw assembly (0012-6665) for raising and lowering the top platen.

Part No.	Description	Price
0012-6664	Water Cooled 4" dia. Heated Platens with CE marked Digital Temperature Controller, (Specify 120 v, 60Hz; or 220v, 50Hz, CE marked, European RoHS Power Cord)	\$3259.00
0012-6665	Lead Screw assembly for attaching the heated platens (0012-6664) to the lead screw of an ICL 20 ton E-Z Press™ or an ICL 20 ton Air-EZ™ lab press for raising and lowering the top platen with the hand wheel	\$429.00
0012-8486	Mirror finish polished 4" dia. 316SS plates for making polymer films, threaded for optional handle with drilled thermocouple port, set of 2 (See photo on page 24)	\$1099.00
0012-8803	PTFE 4" Diameter Platens for quick release of thin films made with heated platens; set of 2 with matte finish for diminished fringing. $\frac{3}{8}$ " thick.	\$429.00

Roto-Film™ Rotational Casting™ Polymer Film Maker



For making thin films from polymers that can be dissolved into solutions, the Roto-Film™ is an excellent alternative. Films are spin cast on a rapidly turning polished platen, Real Crystal® IR Cards or on a KBr window. The film is complete within 60 seconds. If the film is cast on a KBr window, the window is simply mounted in a spectrophotometer for analysis. The Roto-Film™ is also designed to allow films to be cast on standard aluminum weighing dishes, which are disposable. The Roto-Film™ produces films which are extraordinarily consistent from film to film. The accessory employs a programmable positive feedback micro-processor controlled motion controller and a programmable timer to precisely

reproduce cycle time, rotation speed and ramp up and ramp down from run to run.

Films cast by rotational casting on KBr windows or Real Crystal® IR Cards are free of interference fringes. Rotational casting produces films with radial symmetry, which means that the film molecules radiate from a central point like spokes on a wheel rather than exhibiting the monodirectional orientation typical of extruded films. Extruded films will exhibit different absorbance peak intensities depending upon how the film is oriented when it is placed in a spectrophotometer, but radially symmetric films cast on the Roto-Film™ will exhibit the same peak intensities regardless of orientation.

Part No.	Description	Price
0014-6031	Roto-Film™ film maker with disposable film casting platens, crystal casting platen, digital microprocessor motion controller, programmable cycle timer, 110 v, 60Hz	\$4999.00
0014-6909	Roto-Film™ for use in countries with 220v, 50 Hz power, same as above unit with CE marked transformer & country specific power cord & plug set	\$5599.00
0014-6273	Concave platen	\$429.00
0014-6276	Microscope slide platen	\$499.00
0014-7451	Real Crystal® IR Card platen	\$499.00



11 Erie Street
Garfield, NJ 07026 USA
Tel: (973) 478-8944
Fax: (973) 478-4201
www.internationalcrystal.net
iclmail@internationalcrystal.net

Chemicals, Solvents & Random Cuttings

Random Cuttings & Spectroscopic Powders



KBr powder is graded solely by purity standards that are relevant to infrared spectroscopy. In the industry, the highest specification for transmission optics is beam splitter grade material which is generally specified by FTIR spectrophotometer OEMs as material having absorption bands due to impurities of less than 1% measured at 4 wave resolution between 4400cm⁻¹ and 450cm⁻¹. The cut off for commercial grade KBr crystal optics at ICL is material having absorption bands due to impurities of less than 2% at 4 cm⁻¹ resolution.

Most of the KBr now produced by ICL has absorption bands due to impurities of less than 1.5% at 4cm⁻¹ resolution. Accordingly, lower grade KBr powder may not be available.

FTIR Grade SpectroGrade™ KBr powder is made from KBr crystal boules that are not quite beam

splitter grade material and is defined as material that does not have any absorbance peaks in excess of 1.5%. FTIR Premium SpectroGrade™ is the equivalent of beam splitter grade material, and it is made from a blend of KBr crystal boules in which peaks range from 0.9% to 1.1%. XL Ultrapure SpectroGrade™ is a blend of material from rare boules that exhibit absorbance bands under 0.8% and the impurity range goes down to 0.2%. Please call ICL for current availability.

KBr and KCl sold as random cuttings can be ground finely immediately prior to being mixed with the sample for either diffuse reflection or transmission pellets. Random cuttings ground into powder a short time before being mixed with a sample will contain less water than pre-made powders.

Part No.	Description	Price
0011-5078	XL Ultra Pure SpectroGrade™ KBr Powder 99.999% pure 25gms	\$123.00
0011-4541	XL Ultra Pure Spectrograde™ KBr Powder 100gms	\$150.00
0011-8966	Premium Grade FTIR SpectroGrade™ KBr Powder 100gms	\$99.00
0011-8967	Premium Grade FTIR SpectroGrade™ KBr Powder 25gms	\$79.00
0002-2498	KBr Random Cuttings - one pound	\$369.00
0002-2499	KCl Random Cuttings - one pound	\$279.00
0002-4539	KBr Random Cuttings - 100 grams	\$115.00
0002-4538	KCl Random Cuttings - 100 grams	\$101.00

Paper Inserts, Econo Cards & Magnetic Pellet Holders

Part No.	Description	Price
0009-4450	13mm Magnetic pellet holder holds 13mm diameter pellets & pellets in paper inserts	\$94.00
0012-2478	Econo Cards, 9.5mm aperture, for mounting 13mm pellets and micro pellets pressed into paper inserts, fits standard 3" x 2" (76.2mm x 50.8mm) spectrophotometer slide mount (1pk/100)	\$93.00
0012-6903	Econo Cards, 19mm aperture (1pk/100)	\$93.00
0012-2479	Paper inserts for 13mm die set 1.5mm dia hole (1 pk/200)	\$159.00
0012-2480	Paper inserts for 13mm die set 3.0mm dia hole (1pk/200)	\$159.00
0012-2481	Paper inserts for 13mm die set 5.0mm dia hole (1pk/200)	\$109.00
0012-2482	Paper inserts for 13mm die set 11.0mm dia hole (1pk/200)	\$109.00
0012-2483	Paper inserts for 13mm die set 1.5 x 9mm hole (1pk/200)	\$119.00

Fluorolube® & Nujol®

Part No.	Description	Price
0011-2474	Fluorolube® 30ml	\$79.00
0011-2475	Nujol® 60ml	\$33.00

Chemicals & Solvents



Fluorolube® and Nujol® for mull samples



Econo cards for KBr pellets



11 Erie Street
Garfield, NJ 07026 USA
Tel: (973) 478-8944
Fax: (973) 478-4201
www.internationalcrystal.net
iclmail@internationalcrystal.net



Presses



Water Jacketed Dies For Heating and Cooling See

www.internationalcrystal.net

Evacuatable KBr & Briquetting Pellet Dies



13mm Die Set



32mm Die Set

Hardened aerospace grade stainless steel is used to produce all of ICL's die sets. The 3mm to 19mm dies are used primarily for KBr pellets for transmission analysis by IR spectroscopy, while the larger dies are most commonly used for producing briquettes for XRF spectroscopy. The 13mm Macro-Micro die is chosen by most spectroscopists for KBr pellets, and it is available with paper inserts with a variety of small apertures (1.5, 3, 5, & 11mm) that enable the user to make micro-pellets with a 13mm die set and also provide a useful frame for mounting and storing the pellets.

All ICL dies have an upper and lower stainless steel section for ease of disassembly and they are sealed with viton seals. For ease of use, the weight was reduced in all die sets in the 10mm to 45mm range by adding an outer shield of aluminum. This feature makes them much easier to handle than 2 piece dies made completely from stainless steel due to their lighter weight, but without sacrificing strength or durability. The dies

can be evacuated with a vacuum pump to reduce the moisture in the sample. 13mm and 20mm dies are typically used with 12 to 20 ton presses, while the larger size dies are used with 20 to 40 ton presses and are most commonly used for briquetting samples for XRF analysis.

To enable preparation of the finest quality pellets and briquettes, anvils are optically polished to a mirror finish and are free from scratches or digs. All die sets in the 13mm to 45mm size range are available with optional extremely hard tungsten carbide polished anvils for use with abrasive samples.

Die sets with water jackets that allow heating and cooling of solid samples while under pressure are now available in 20mm, 25mm, 32mm, 35mm and 40mm. Please visit www.internationalcrystal.net for more information.

Features

- Aerospace Grade Hardened Stainless Steel
- Optically Polished Anvils
- Evacuatable



Agate Mortar & Pestle Sets

Evacuatable KBr & Briquetting Pellet Dies

Part No.	Description	Price
0012-6646	3mm KBr die set	\$949.00
0012-6647	5mm KBr die set	\$949.00
0012-6648	10mm KBr die set	\$849.00
0012-2477	13mm KBr die set with 2 SS anvils & assorted paper inserts for micro samples	\$469.00
0012-6649	16mm KBr die Set with 2 SS anvils	\$869.00
0012-8777	19mm die Set with 2 SS anvils	\$899.00
0012-5223	20mm die set with 2 SS anvils	\$1551.00
0012-6653	25mm die set with 2 SS anvils	\$1599.00
0012-6633	32mm die set with 2 SS anvils	\$1649.00
0012-6634	35mm die set with 2 SS anvils	\$1999.00
0012-6635	40mm die set with 2 SS anvils	\$2149.00
0012-8990	45mm die set with 2 SS anvils	\$2699.00

Agate Mortars And Pestles

ICL's agate mortars and pestles are the ideal tool for grinding a matrix of a solid sample with KBr powder in preparation for making a transparent pellet free from spurious absorption peaks.

Pure agate is non-absorbing in an infrared spectrophotometer. Mortar and pestle sets are available in custom sizes ranging from 25mm to 200mm diameter as well as standard 35mm, 50mm, 65mm and 95mm diameters.

Part No.	Description	Price
0009-489	35mm OD Agate Mortar & Pestle	\$109.00
0009-7339	50mm OD Agate Mortar & Pestle	\$131.00
0009-501	65mm OD Agate Mortar & Pestle	\$153.00
0009-491	95mm OD Agate Mortar & Pestle	\$339.00



11 Erie Street
Garfield, NJ 07026 USA
Tel: (973) 478-8944
Fax: (973) 478-4201
www.internationalcrystal.net
iclmail@internationalcrystal.net

Laboratory Grinding Mills

Wig-L-Bug Grinding Mill



Digital Wig-L-Bug



The Wig-L-Bug is an invaluable accessory for the spectroscopy laboratory. It is ideal for mixing and pulverizing samples for use in a KBr matrix that will be pressed into a pellet and for mulling and diffuse reflection (DRIFT) techniques. Sample preparation is reproducible

from sample to sample by replicating the cycle time, which is controlled by a 60 second timer. Most samples can be prepared in 10 seconds. Agate, metal and plastic sample vials are available.

Part No.	Description	Price
0013-2485	Wig-L-Bug™ grinding mill with vial adapter and 60 second timer	\$969.00
0013-7357	Digital Wig-L-Bug™, 120 v, 60 Hz with polymer vial and ball pestle	\$969.00
Wig-L-Bug Accessories*		
0013-2487	Adapter for 1" x 1/2" diameter vials, 1.0ml capacity	\$97.00
0013-2489	Stainless Steel Vial (1" h. x 1/2" dia.) with stainless steel ball pestle (1/4" dia)	\$109.00
0013-2495	Agate Vial Assembly comprised of a 2-part white Delrin® outer shell and a 3-part inner liner consisting of an agate vial, agate cap and a 6mm ball pestle. Capacity of inner liner is 1ml.	\$429.00
0013-5506	Agate Ball Pestle 1/4" diameter	\$108.00
0013-5531	PTFE Vial Assembly with Agate ball pestle (6mm dia)	\$309.00
0013-2488	Polystyrene Vial with polyethylene slip-on cap (1" h. x 1/2 dia.), pk/100	\$97.00
0013-2490	Ball Pestle, polycarbonate, 3/8" dia., pk/100	\$89.00
0013-2492	Adapter for 2" h. x 1/2" dia. vials (2.5 ml capacity)	\$109.00
0013-2494	Ball Pestle, polycarbonate, 1/8" dia, pk/100	\$97.00
0013-8005	Wig-L-Bug Arm Assembly with Spoon Arms and Braces	\$97.00
0013-5022	Bearing Strap	\$151.00



Grinding Mills



13mm KBr die set
See page 27



KBr powder & random cuttings
See page 26

* Most accessories listed above are not compatible with the Digital Wig-L-Bug. See www.internationalcrystal.net for Digital Wig-L-Bug accessories.



11 Erie Street
Garfield, NJ 07026 USA
Tel: (973) 478-8944
Fax: (973) 478-4201
www.internationalcrystal.net
iclmail@internationalcrystal.net



Films



Square Cuvette Holder
See page 30



Cylindrical Cell Holders
See page 30

Polystyrene Calibration Films



ICL produces calibration films for IR and FTIR spectrophotometers that are certified to be traceable to NIST 1921b Standard Reference Material (SRM), European Pharmacopeia 2.2.24-1 (PhEur 2.2.24-1) and Japan Pharmacopeia 2.25 (PhJap 2.25). In addition, ICL produces polystyrene calibration films cast on KBr substrates, Boron doped KBr and calibration films of various thickness useful for ordinate calibrations. These calibration materials are described in detail at www.internationalcrystal.net. Summary descriptions of all available calibration materials appear below in the part number list.

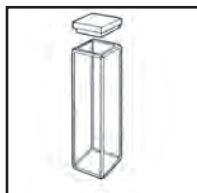
Part No.	Description	Price
0009-2500	Polystyrene Test Film - 38 microns thick	\$33.00
0009-8181	Polystyrene Test Film - 76 microns thick	\$97.00
0009-8182	Pair of polystyrene calibration films of different thickness. One film is 38 microns and is provided with certification of traceability to five (5) NIST 1921b frequencies. The second film is 76 microns and is provided without certification. Both films are mounted on 2" x 3" card stock holder with a 19mm aperture for mounting in the universal slide holder in all instruments. Includes instructions for two (2) film ordinate calibration and storage case.	\$219.00
0009-8487	Same as 0009-8182 but with PhEur 2.2.24 certification	\$219.00
0009-7676	NIST traceable Polystyrene Test film, certificate of traceability to five (5) NIST 1921b frequencies, set of 2 films each mounted to 2" x 4" card stock holder	\$215.00
0009-7393	Pair of polystyrene films of different thickness, both with NIST traceability certification. Kit also includes a pair of standard polystyrene films, but without NIST traceability certification. One NIST traceable film is mounted on 2" x 4" card stock, which enables mounting in the standard universal slide mount found in all spectrophotometers, and is the same thickness as an NIST 1921 standard film (38 microns). The second thinner NIST traceable film is cast on KBr and includes holder and mounting device. Kit includes certification of traceability to five (5) NIST 1921 frequencies, radial symmetry certification for film cast on KBr and storage cases for all films.	\$339.00
0009-7394	Pair of polystyrene calibration films of different thickness cast on KBr, radial symmetry certification, summary of NIST standard 1921 with frequency locations, certification of traceability to five (5) NIST 1921 frequencies, instructions for two (2) film ordinate calibration, slide mount holder. Kit also includes a pair of standard polystyrene films, without NIST traceability certification, mounted on 2" x 4" card stock which enables mounting in the standard universal slide mount found in all spectrophotometers. Storage case provided.	\$549.00
0009-7395	Single Boron doped KBr Crystal calibration standard with slide mount holder and storage case. (U.S. Patent No. 6,594,008)	RFP
0009-7396	Pair of matched Boron doped KBr windows. (U.S. Patent No. 6,594,008)	RFP
0009-8157	Polystyrene calibration film for PhEur 2.2.24 calibration of IR and FTIR instruments, certified to 7 wave numbers and certified as to absorption minima and maxima differentials at 2870 cm ⁻¹ and 2849.5cm ⁻¹ and at 1589 cm ⁻¹ and 1583 cm ⁻¹	\$149.00
0009-8158	Pair of PhEur 2.2.24 certified polystyrene calibration films, same as 0009-8157 but with 2 certified films	\$229.00
0009-8559	Polystyrene Calibration film for PhJap 2.25 calibration of IR and FTIR instruments, certified to 7 wave numbers, mounted on 2" x 4" card stock	\$149.00
0009-8558	Pair of PhJap 2.25 certified polystyrene calibration films, same as 0009-8559 but with 2 certified Films	\$227.00
0009-8560	Polystyrene calibration film, certificate of traceability to 7 NIST frequencies (wave numbers) and certified as to absorption minima and maxima differentials at 2870cm ⁻¹ and 2849.5cm ⁻¹ and 1589cm ⁻¹ and 1583cm ⁻¹ as required by PhEur 2.2.24	\$173.00
0009-8448	Same as 0009-8560 but also certified to PhJap 2.25	\$207.00
0009-8437	Pair of films same as 0009-8448	\$309.00



11 Erie Street
Garfield, NJ 07026 USA
Tel: (973) 478-8944
Fax: (973) 478-4201
www.internationalcrystal.net
iclmail@internationalcrystal.net

UV-VIS, NEAR IR, RAMAN & FLUORIMETER CELLS

Standard Cell



TYPE 1

Cell with fitted PTFE cover. Satin finish on two sides. Lightpaths: 1, 2, 5, 10, 20, 40, 50 and 100 mm. Outside dimensions: 45 mm high, 12.5 mm wide.

Standard Cell Screw Cap



TYPE 1SC

Same as Type 1 but with screw cap. Lightpath 10 mm only.

Standard Fluorimeter Cell



TYPE 3

Cell with fitted PTFE cover for fluorimetry. All 4 sides and bottom polished. Lightpaths: 2, 5, 10, 20, 40 and 50 mm. Outside dimensions: 45 mm high x 12.5 mm wide.

Semi-Micro Cell



TYPE 9

Semi-micro cell with fitted PTFE cover. Satin finish on two sides. Inside width 4mm. Lightpaths: 5, 10, 20 and 40 mm. Outside Dimensions: 45 mm high x 12.5 mm wide.

Adjustable Cuvette Holder



CELL TYPE	LIGHTPATH in mm	Q SILICA UV GRADE	I SILICA IR GRADE	OG FUSED SILICA	G OPTICAL GLASS	VOLUME ml
Type 1 Standard Cell	1mm	0023Q-289 \$107.00	0023R-401 \$124.00	0023S-572 \$99.00	0023T-571 RFP	.4
	2mm	0023Q-413 \$105.00	0023R-353 \$123.00	N/A	0023T-2314 RFP	.7
	5mm	0023Q-284 \$103.00	0023R-243 \$114.00	N/A	0023T-2315 \$51.00	1.7
	10mm	0023Q-236 \$91.00	0023R-355 \$99.00	N/A	0023T-256 \$39.00	3.5
	20mm	0023Q-2316 \$119.00	0023R-2317 \$123.00	N/A	0023T-2319 \$47.00	7.0
	30mm	0023Q-5010 \$117.00	0023R-7488 \$121.00	N/A	0023T-7490 \$47.00	10.5
	40mm	0023Q-273 \$147.00	0023R-2320 \$166.00	N/A	0023T-288 \$62.00	14.0
	50mm	0023Q-412 \$172.00	0023R-429 \$187.00	N/A	0023T-2985 \$94.00	17.5
	100mm	0023Q-440 \$284.00	0023R-545 \$331.00	0023S-2321 \$239.00	0023T-2322 \$139.00	35.0
	Type 1 SC Screw Top Standard Cell	10mm	0023Q-7491 \$215.00	0023R-7492 RFP	N/A	N/A
Type 3 Fluorimeter Cell	10mm	0023Q-274 \$149.00	0023R-2327 \$159.00	0023S-2332 \$143.00	0023T-382 \$69.00	3.5
	20mm	0023Q-2324 \$167.00	0023R-2328 \$199.00	0023S-2333 \$143.00	0023T-2337 \$75.00	7.0
	40mm	0023Q-663 \$199.00	0023R-2329 \$239.00	N/A	0023T-2338 \$99.00	14.0
	50mm	0023Q-7497 \$239.00	0023R-7498 \$256.00	N/A	0023T-7500 \$115.00	14.0
Type 9 Semi Micro Cell	5mm	0023Q-2339 \$131.00	0023R-2342 \$149.00	N/A	0023T-2348 \$63.00	.7
	10mm	0023Q-301 \$127.00	0023R-566 \$149.00	0023S-1382 RFP	0023T-251 \$61.00	1.4
	20mm	0023Q-2340 \$153.00	0023R-2343 \$164.00	0023S-2346 \$114.00	0023T-2349 \$75.00	2.8
	40mm	0023Q-2341 \$189.00	0023R-2344 \$214.00	0023S-2347 \$149.00	0023T-2350 \$79.00	5.6
Type 21 Standard Cell	1mm	0023Q-319 \$135.00	0023R-367 \$145.00	0023S-586 \$114.00	0023T-570 RFP	1.4
	2mm	0023Q-579 \$133.00	0023R-368 \$145.00	N/A	0023T-2370 RFP	.7
	5mm	0023Q-349 \$138.00	0023R-2365 \$144.00	0023S-627 \$105.00	0023T-2371 \$81.00	1.7
	10mm	0023Q-261 \$129.00	0023R-414 \$131.00	N/A	0023T-307 \$79.00	3.5
	20mm	0023Q-2364 \$137.00	0023R-2366 \$145.00	0023S-2368 \$122.00	0023T-581 \$89.00	7.0
	40mm	0023Q-580 \$159.00	0023R-2367 \$171.00	0023S-2369 \$134.00	0023T-2372 \$95.00	14.0
Type 32 Cylindrical Cell	2mm	0023Q-452 \$224.00	0023R-454 \$239.00	N/A	N/A	.7
	5mm	0023Q-439 \$227.00	0023R-2409 RFP	0023S-2410 RFP	N/A	1.5
	10mm	0023Q-302 \$144.00	0023R-360 \$132.00	N/A	0023T-583 \$85.00	3.1
	20mm	0023Q-260 \$154.00	0023R-417 \$155.00	0023S-2411 \$129.00	0023T-541 \$84.00	6.3
Type 34 Cylindrical Cell	50mm	0023Q-331 \$179.00	0023R-281 \$177.00	0023S-356 \$159.00	0023T-557 \$97.00	15.7
	100mm	0023Q-292 \$189.00	0023R-461 \$199.00	0023S-409 \$169.00	0023T-530 \$103.00	31.4
Type 34 SC Screw Top Cylindrical Cell	50mm	0023Q-7612 \$287.00	0023R-7613 \$303.00	0023S-7614 \$293.00	N/A	14.1
	100mm	0023Q-7616 \$309.00	0023R-7617 RFP	0023S-7618 RFP	N/A	28.2

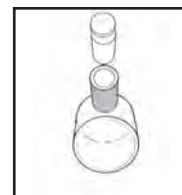
Standard Cell



TYPE 21

Same as Type 1, but with tapered PTFE stopper.

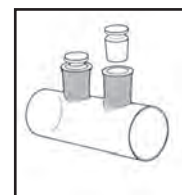
Cylindrical Cell



TYPE 32

Cylindrical cell with one PTFE stopper. Lightpaths: 2, 5, 10 and 20mm.. Outside diameter: 22 mm. Use IR Grade for hydrocarbon analysis.

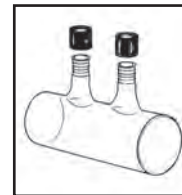
Cylindrical Cell



TYPE 34

Cylindrical cell with two PTFE stoppers. Lightpaths: 50 and 100 mm. Outside diameter: 22 mm. Use IR Grade for hydrocarbon analysis.

Cylindrical Cell Screw Cap



TYPE 34 SC

Cylindrical cell with screw caps. Lightpaths: 50 and 100 mm. Outside-diameter: 22 mm. Use IR Grade for hydrocarbon analysis.

Part No.	Description	Price
0023-503	Square Cuvette Holder — see photo on page 29	\$149.00
0023-4607	Cylindrical Cell Holder (10mm) — see photo on page 29	\$127.00
0023-2984	Cylindrical Cell Holder (50mm) — see photo on page 29	\$129.00
0023-502	Cylindrical Cell Holder (100mm) — see photo on page 29	\$124.00
0023-2466	Adjustable Cuvette Holder	\$274.00



11 Erie Street, Garfield, N.J. 07026
Telephone: (973) 478-8944 • Fax: (973) 478-4201
www.internationalcrystal.net
icmail@internationalcrystal.net

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