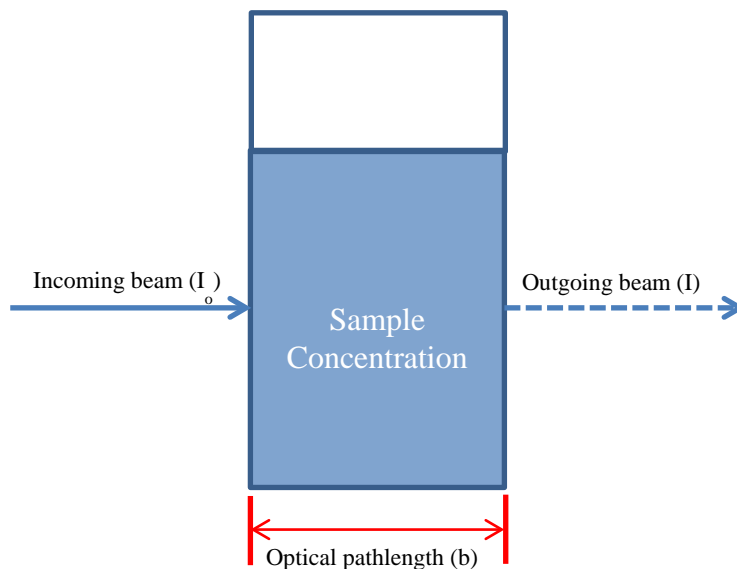


UV-VIS Spectrophotometers/Spectrofluorophotometer

Sample Cell Selection Guide for Spectroscopy Applications



Bouguer-Lambert-Beer's Law



Light incident on a sample (I_o) can be reflected, absorbed, or transmitted. The ratio of light transmitted through the sample to the light incident on the sample, I , is defined as the transmittance through the sample (T). Absorbance (A) can be calculated from transmittance using the following relationships:

$$T = \frac{I}{I_o} = 10^{-kcb} \text{ and } \%T = \frac{I}{I_o} * 100 \qquad A = -\log \frac{I}{I_o} = kcb$$

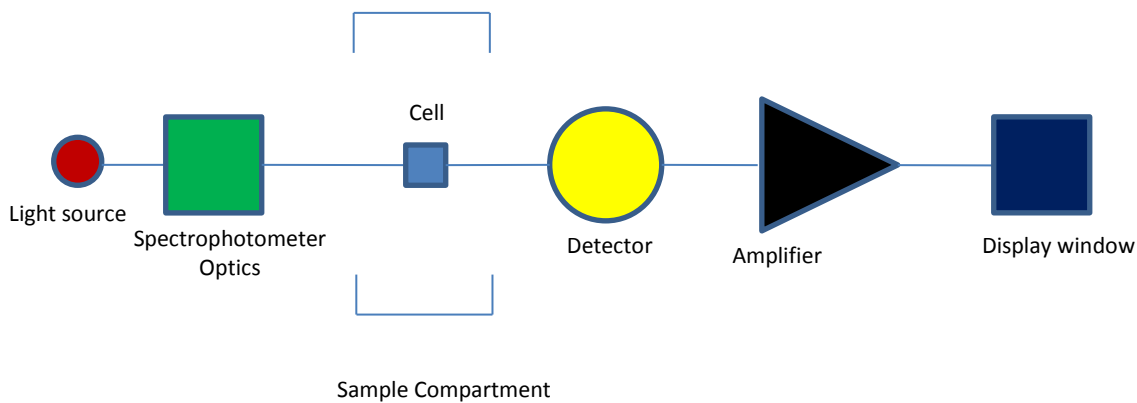
Samples are routinely measured in absorbance because absorbance is proportional to the concentration of the sample (Beer's law) and is proportional to the optical path length (Bouguer's law). The proportionality constant (k) is unique for every species. When the optical path length is 1 cm and the sample concentration is 1 mole/L, the proportionality constant (k) for a given species becomes the molar absorptivity (ϵ) yielding the more commonly seen equation relating absorbance and concentration:

$$A = \epsilon bc$$

For the Bouguer-Beer's law to remain valid, it is necessary to satisfy certain sampling conditions such as being free from stray light, emission, scattering, and reflection.

Single-beam Configuration

In a Single-Beam design, only one beam passes through the sample compartment. The Baseline and Reference are combined into one measurement and are measured first. Measurement of the baseline in a single beam unit may or may not include a cuvette with solvent depending on the user's preference. After the baseline is acquired, the sample is placed in the beam path and a sample acquisition is acquired. The transmittance is the ratio of the intensity of the sample against the intensity of the baseline/reference at any given wavelength.



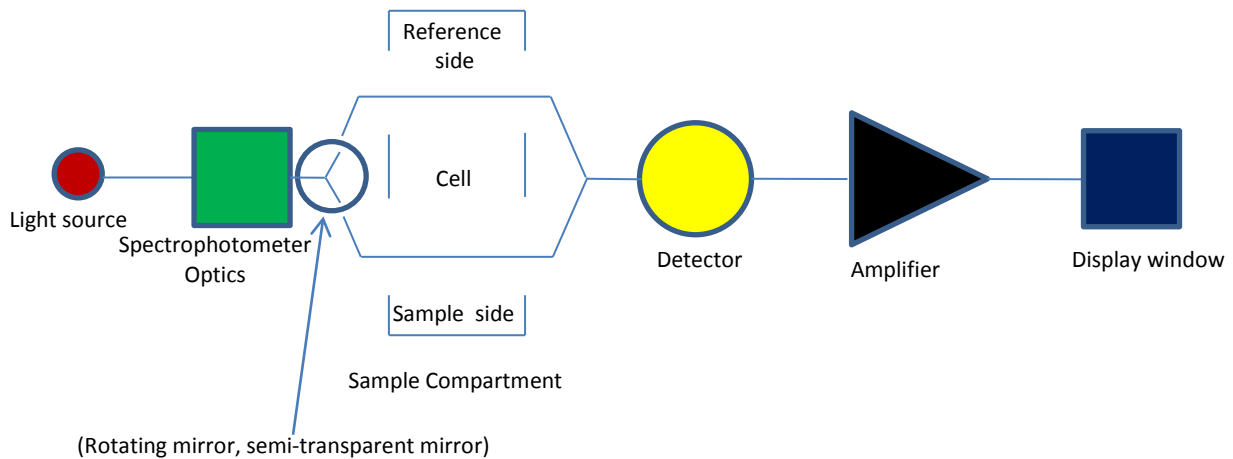
Basic Layout of a Single-Beam Spectrophotometer

$$\%T(\lambda) = \frac{I_{\text{Sample}(\lambda)}}{I_{\text{baseline}(\lambda)}} \times 100$$

Transmittance Equation for a Single-Beam Spectrophotometer

Double-beam Configuration (Single Detector)

In a Dual-Beam design, the monochromatic light coming from the monochromator is divided into two paths using either a rotating sector mirror or a semi-transparent beam-splitter. The split light beam is passed through the sample compartment in two paths, one passing through the sample cell and the other passing through a reference cell. After passing through the sample compartment the beams are focused onto the detector(s). Dual-Beam designs can have either a single detector (PMT; 190-900nm) or dual detectors (silicon diode; 190-1100nm). In a dual-beam system a baseline measurement is acquired prior to sample analysis, just like in a single-beam system. This is the spectral information that is ratioed against the sample beam to calculate transmittance. In addition, in a dual-beam system, the reference beam is also ratioed against the sample beam. This second comparison serves to compensate for any variation in temperature, voltage, or lamp intensity that may occur as the measurement is acquired. The result is a very accurate and stable acquisition of the sample spectrum over the full wavelength range.



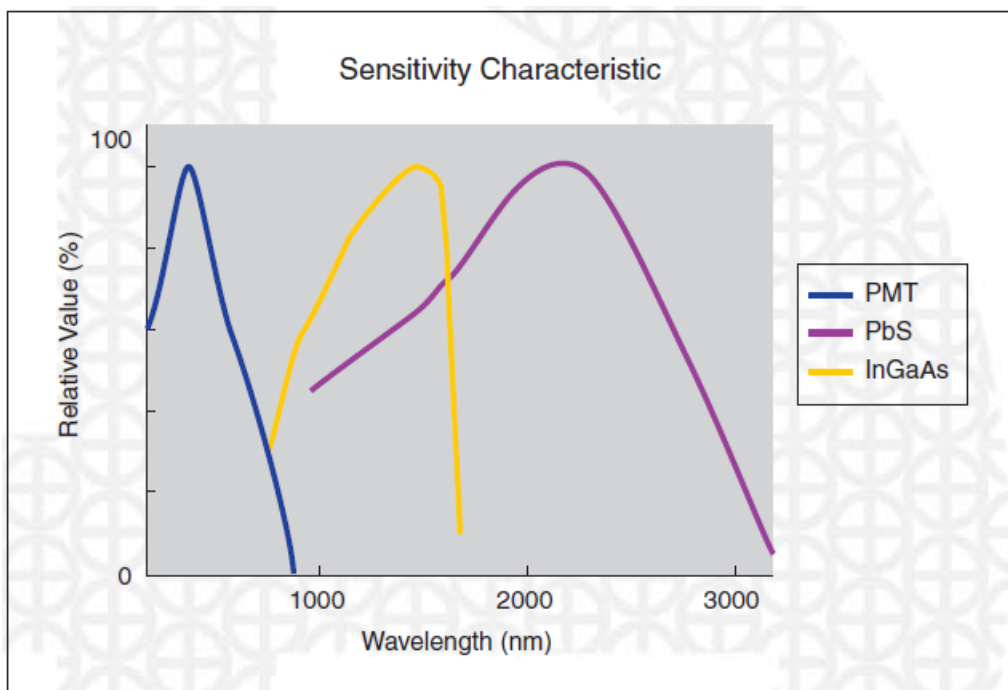
Basic Layout of a Double-Beam Spectrophotometer

$$\%T(\lambda) = \frac{\frac{I_{Sample(\lambda)}}{I_{Reference(\lambda)}}}{\frac{I_{Baseline\ sample(\lambda)}}{I_{Baseline\ reference(\lambda)}}} \times 100$$

Transmittance Equation for a Double-Beam Spectrophotometer

Detector Transition Wavelengths

Until recently, conventional spectrophotometers used a PMT (photomultiplier tube) for the ultraviolet and visible region and a PbS detector for the near-infrared region. Neither detector, however, is very sensitive near the detector-switchover region. This prevents high-sensitivity measurement in this range. The Shimadzu **UV-3600** makes it possible to take high-sensitivity measurements in the switchover range by using an InGaAs detector.



Spectral Range of a Photomultiplier Tube (PMT), Indium Gallium Arsenide (InGaAs) and Lead Sulfide (PbS) Detectors

Absorption Bands for Common Functional Groups*

Chromophore	System	λ_{\max} (nm)	ϵ_{\max}
Aldehyde	-CHO	210	strong
		280-300	11-18
Amine	-NH ₂	195	2800
Bromide	-Br	208	300
Carbonyl	>C=O	195	1000
		270-285	18-30
Carboxyl	-COOH	200-210	50-70
Disulfide	-S-S-	194	5500
		255	400
Ester	-COOR	205	50
Ether	-O-	185	1000
Ethylene	-C=C-	190	8000
Iodide	-I	260	400
Nitrate	-ONO ₂	270 (shoulder)	12
Nitrile	-C≡N	160	-
Nitrite	-ONO	220-230	1000-2000
		300-400	10
Nitro	-NO ₂	210	strong
Nitroso	-NO	302	100
Sulfoxide	>S=O	210	1500
Benzene		184	46700
		204	6900
		255	170
Diphenyl		246	20,000

*Adapted from Lange's Handbook of Chemistry by James A. Dean, 14th Edition, McGraw Hill

UV Cutoff for Common UV/Vis Solvents⁺

Solvent	Wavelength - Lower Limit (nm)
Acetone	330
Acetonitrile	190
Benzene	280
Chloroform (stabilized with ethanol)*	245
Dichloromethane	280
Dimethyl sulfoxide*	265
Ethanol	210
Glycerol*	207
Heptane*	197
Hexadecane*	200
Hexane	210
Methanol	210
Pentane*	210
Toluene	286
Water	191

⁺Adapted from Lange's Handbook of Chemistry by James A. Dean, 14th Edition, McGraw Hill.

UV-VIS

Standard Cells

Part No.	Material	Pathlength	Special Holder or Spacer Needed	Volume	Wavelength Range	Exterior (LxWxH)	Details
220-92910-01	Quartz	10 mm	NO	3.5 mL	200 - 2500 nm	12.5x12.5x45 mm	PTFE lid
220-92910-02	Quartz 2	10 mm	NO	3.5 mL	200 - 3500 nm	12.5x12.5x45 mm	PTFE lid
220-92910-03	Glass	10 mm	NO	3.5 mL	200 - 2500 nm	12.5x12.5x46 mm	PTFE lid
220-92910-04	Quartz	10 mm	NO	3.5 mL	320 - 2500 nm	12.5x12.5x45 mm	PTFE Stopper
220-92910-05	Glass	10 mm	NO	3.5 mL	320 - 2500 nm	12.5x12.5x46 mm	PTFE Stopper



220-92910-01

220-92910-02

220-92910-03

220-92910-04

220-92910-05

Semi-Micro Cells

Part No.	Material	Pathlength	Special Holder or Spacer Needed	Volume	Wavelength Range	Exterior (LxWxH)	Details
220-92910-15	Quartz	10 mm	NO	1.4 mL	200 - 2500 nm	12.5x12.5x45 mm	PTFE lid, Black mask Inside width = 4 mm
220-92910-16	Quartz	10 mm	NO	1.0 mL	200 - 2500 nm	12.5x12.5x45 mm	PTFE lid, Black mask Inside width = 4 mm
220-92910-17	Quartz	10 mm	NO	1.4 mL	200-2500 nm	12.5x12.5x45 mm	PTFE stopper Black mask Inside width = 4 mm



220-92910-15



220-92910-16



220-92910-17

Rectangular Long Pathlength Cells

Part No.	Material	Pathlength	Special Holder or Spacer Needed	Volume	Wavelength Range	Exterior (LxWxH)	Details
220-92910-21	Quartz 2	20 mm	YES Part number: 204-27208-00	7 mL	200 - 3500 nm	22.5x12.5x45 mm	PTFE lid
220-92910-23	Quartz 2	50 mm	YES Part number: 204-27208-00	17.5 mL	200 - 3500 nm	52.5x12.5x45 mm	PTFE lid
220-92910-25	Quartz 2	100 mm	YES Part number: 204-27208-00	35.0 mL	200 - 3500 nm	102.5x12.5x45 mm	PTFE lid Cannot be used with the UVmini Series
220-92910-22	Glass	20 mm	YES Part number: 204-27208-00	7 mL	320 - 2500 nm	22.5x12.5x45 mm	PTFE lid
220-92910-24	Glass	50 mm	YES Part number: 204-27208-00	17.5 mL	320 - 2500 nm	52.5x12.5x45 mm	PTFE lid
220-92910-26	Glass	100 mm	YES Part number: 204-27208-00	35.0 mL	320-2500 nm	102.5x12.5x45 mm	PTFE lid Cannot be used with the UVmini Series



220-92910-21



220-92910-23



220-92910-25



220-92910-22



220-92910-24



220-92910-26



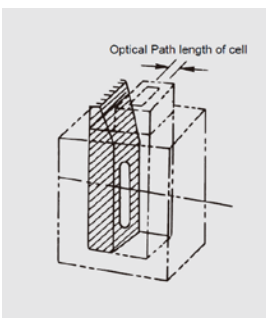
204-27208-00

Short Pathlength Cells

Part No.	Material	Pathlength	Special Holder or Spacer Needed	Volume	Wavelength Range	Exterior (LxWxH)	Details
220-92910-41	Quartz	1 mm	YES Part number: 204-21473-03	350 μ L	200 - 2500 nm	3.5x12.5x45 mm	PTFE lid
220-92910-43	Quartz	2 mm	YES Part number: 204-21473-01	700 μ L	200 - 2500 nm	4.5x12.5x45 mm	PTFE lid
220-92910-45	Quartz	5 mm	YES Part number: 204-21473-02	1.75 mL	200 - 2500 nm	7.5x12.5x45 mm	PTFE lid
220-92910-42	Glass	1 mm	YES Part number: 204-21473-03	350 μ L	200 - 2500 nm	3.5x12.5x45 mm	PTFE lid
220-92910-44	Glass	2 mm	YES Part number: 204-21473-01	700 μ L	200 - 2500 nm	4.5x12.5x45 mm	PTFE lid
220-92910-46	Glass	5 mm	YES Part number: 204-21473-02	1.75 mL	200 - 2500 nm	7.5x12.5x45 mm	PTFE lid



220-92910-41 220-92910-43 220-92910-45 220-92910-42 220-92910-44 220-92910-46



204-21473-xx

Micro Cells

Part No.	Material	Pathlength	Special Holder or Spacer Needed	Volume	Wavelength Range	Exterior (LxWxH)	Details
220-92910-11	Quartz	10 mm	YES Part number: 220-92950-00 or 206-55050-91	300 μ L	200 - 2500 nm	12.5x12.5x25 mm	PTFE Lid Aperture width = 2 mm
220-92910-14	Quartz	10 mm	NO	400 μ L	200 - 2500 nm	12.5x12.5x40 mm	PTFE Stopper
220-92910-13	Quartz	10 mm	NO	500 μ L	200 - 2500 nm	12.5x12.5x45 mm	PTFE Lid Aperture width = 2 mm Base thickness = 9 mm
220-92910-12	Quartz	10 mm	NO	700 μ L	200 - 2500 nm	12.5x12.5x45mm	PTFE Stopper Aperture width = 2 mm Base thickness = 3.2 mm



220-92910-11



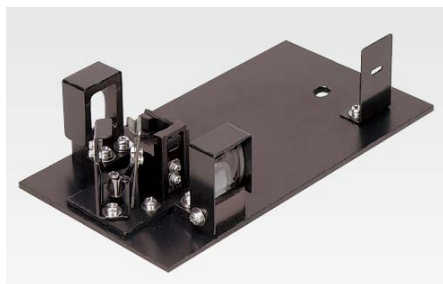
220-92910-14



220-92910-13



220-92910-12



206-55050-91



220-92950-00

Ultra Micro Cells

Part No.	Material	Pathlength	Special Holder or Spacer Needed	Volume	Wavelength Range	Exterior (LxWxH)	Details
220-92910-20	Quartz	5 mm	NO	5 μ L	200 - 2500 nm	12.5x12.5x40 mm	Pipette tips at the top to dispense solution into cell Aperture Diam. = 0.8 mm
220-92910-19	Quartz	10 mm	NO	10 μ L	200 - 2500 nm	12.5x12.5x45 mm	Pipette tips at the top to dispense solution into cell Aperture Diam. = 1.5 mm
220-92910-18	Quartz	10 mm	NO	50 μ L	200 - 2500 nm	12.5x12.5x45 mm	PE Stopper Aperture Diam. = 2.5 mm
220-92910-27	Quartz	10 mm	NO	50 μ L	200 - 2500 nm	12.5x12.5x45 mm	PE Stopper Aperture = 2.5x2 mm
220-92931-00	Quartz	10 mm	YES Part number: 220-92950-00 or 206-55050-91	50 μ L	200 - 2500 nm	12.5x12.5x25 mm	Black Masked, 2 mm width



220-92910-20



220-92910-19



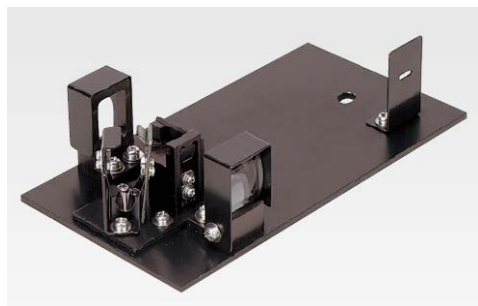
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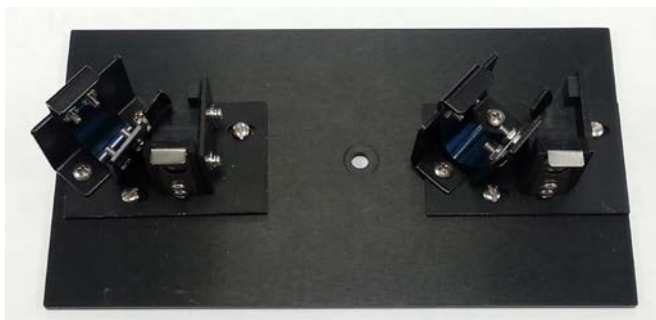
220-92910-27



220-92931-00



206-55050-91



220-92950-00

Cylindrical Cells

Part No.	Material	Pathlength	Special Holder or Spacer Needed	Volume	Wavelength Range	Length	Details
220-92910-31	Quartz	10 mm	YES P/N: 204-06216-03 Alternate sample compartment (206-60184-07) needed for UVmini-1240	2.8 mL	200 - 2500 nm	12.5 mm	1 port, PTFE stopper, Inner diameter = 19 mm Outer diameter = 22 mm
220-92910-33	Quartz	20 mm	YES P/N: 204-06216-03 Alternate sample compartment (206-60184-07) needed for UVmini-1240	5.6 mL	200 - 2500 nm	25 mm	1 port, PTFE stopper, Inner diameter = 19 mm Outer diameter = 22 mm
220-92910-35	Quartz	50 mm	YES P/N: 204-06216-03 Alternate sample compartment (206-60184-07) needed for UVmini-1240	14 mL	200 - 2500 nm	62.5 mm	2 ports, PTFE stopper, Inner diameter = 19 mm Outer diameter = 22 mm
220-92910-37	Quartz	100 mm	YES P/N: 204-06216-03 Alternate sample compartment (206-60184-07) needed for UVmini-1240	28 mL	200 - 2500 nm	125 mm	2 ports, PTFE stopper, Inner diameter = 19 mm Outer diameter = 22 mm
220-92910-32	Glass	10 mm	YES P/N: 204-06216-03 Alternate sample compartment (206-60184-07) needed for UVmini-1240	2.8 mL	200 - 2500 nm	12.5 mm	1 port, PTFE stopper, Inner diameter = 19 mm Outer diameter = 22 mm
220-92910-34	Glass	20 mm	YES P/N: 204-06216-03 Alternate sample compartment (206-60184-07) needed for UVmini-1240	5.6 mL	200 - 2500 nm	25 mm	1 port, PTFE stopper, Inner diameter = 19 mm Outer diameter = 22 mm
220-92910-36	Glass	50 mm	YES P/N: 204-06216-03 Alternate sample compartment (206-60184-07) needed for UVmini-1240	14 mL	200 - 2500 nm	62.5 mm	2 ports, PTFE stopper, Inner diameter = 19 mm Outer diameter = 22 mm
220-92910-38	Glass	100 mm	YES P/N: 204-06216-03 Alternate sample compartment (206-60184-07) needed for UVmini-1240	28 mL	200 - 2500 nm	125 mm	2 ports, PTFE stopper, Inner diameter = 19 mm Outer diameter = 22 mm



220-92910-31



220-92910-33



220-92910-35



220-92910-37



220-92910-32



220-92910-34



220-92910-36



220-92910-38



204-06216-03

Flow Cells

Part No.	Material	Pathlength	Special Holder or Spacer Needed	Volume	Wavelength Range	Exterior (LxWxH)	Details
220-92910-61	Quartz	0.1 mm	NO	6.2 μ L	200 - 2500 nm	12.5x12.5x35 mm	Aperture dim. 17.5 x 3.5 mm
220-92910-62	Quartz	0.2 mm	NO	12.4 μ L	200 - 2500 nm	12.5x12.5x35 mm	Aperture dim. 17.5 x 3.5 mm
220-92910-63	Quartz	0.5 mm	NO	31 μ L	200 - 2500 nm	12.5x12.5x35 mm	Aperture dim. 17.5 x 3.5 mm
220-92910-64	Quartz	1.0 mm	NO	62 μ L	200 - 2500 nm	12.5x12.5x35 mm	Aperture dim. 17.5 x 3.5 mm
220-92910-65	Quartz	2.0 mm	NO	124 μ L	200 - 2500 nm	12.5x12.5x35 mm	Aperture dim. 17.5 x 3.5 mm
220-92910-71	Quartz	5 mm	NO	195 μ L	200 - 2500 nm	12.5x12.5x35 mm	Aperture dim. 11.5 x 3.5 mm
220-92910-78	Quartz	10 mm	NO	30 μ L	200 - 2500 nm	12.5x12.5x35 mm	Aperture dia. 2 mm
220-92910-74	Quartz	10 mm	NO	80 μ L	200 - 2500 nm	12.5x12.5x35 mm	Aperture dia. 3 mm
220-92910-75	Glass	10 mm	NO	80 μ L	320 - 2500 nm	12.5x12.5x35 mm	Aperture dia. 3 mm
220-92910-72	Quartz	10 mm	NO	390 μ L	200 - 2500 nm	12.5x12.5x35 mm	Aperture dim. 11.5 x 3.5 mm
220-92910-76	Quartz	50 mm	NO	370 μ L	200 - 2500 nm	12.5x12.5x35 mm	Aperture dia. 3 mm
220-92910-73	Quartz	50 mm	NO	1.95 mL	200 - 2500 nm	12.5x12.5x35 mm	Aperture dim. 11.5 x 3.5 mm



220-92910-61

220-92910-62

220-92910-63

220-92910-64

220-92910-65

220-92910-71



220-92910-78



220-92910-74



220-92910-75



220-92910-72



220-92910-73



220-92910-76

Stirrer Cells

Part No.	Material	Pathlength	Special Holder or Spacer Needed	Volume	Wavelength Range	Exterior (LxWxH)	Details
220-92910-51	Quartz	10 mm	NO	1.5 mL	200 - 2500 nm	12.5x12.5x45 mm	PTFE lid, magnetic base Inside width = 4 mm One stirrer bar included
220-92910-52	Quartz	10 mm	NO	3.5 mL	200 - 2500 nm	12.5x12.5x45 mm	PTFE lid, magnetic base Inside width = 9.5 mm One stirrer bar included
220-92910-53	Quartz	10 mm	NO	3.5 mL	200 - 2500 nm	12.5x12.5x49.5 mm	PTFE stopper , magnetic base Inside width = 9.5 mm One stirrer bar included



220-92910-51



220-92910-52



220-92910-53



Stirrer Assembly (220-92280-00)

A single bottom stirrer that sits under the standard cuvette is also available. The assembly includes a motor to drive the stirrer connected by a ribbon. Stirrs bar are not provided.

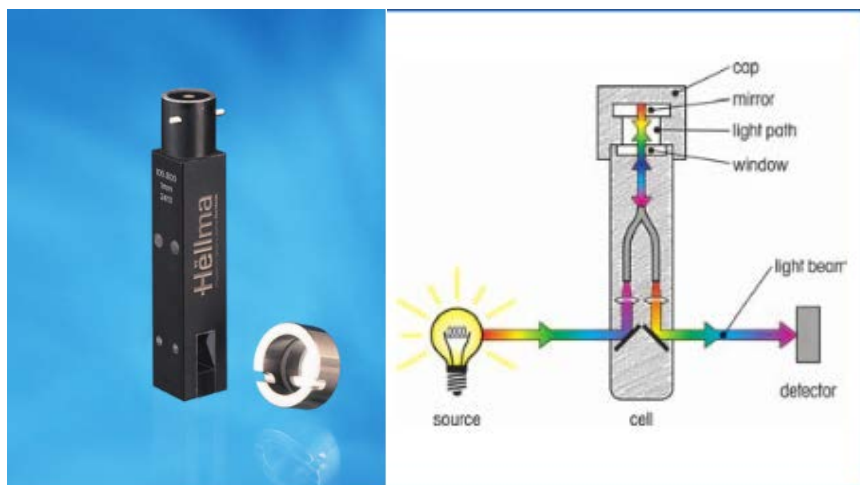
Special UV/Vis Cells

Tray Cell

The Hellma Tray Cell is designed for measurements e.g. of DNA/RNA or protein samples and enables highly accurate analysis of extremely small samples with remarkable reproducibility. Using the 1 mm or 0.2 mm cap creates a defined optical light path of 1 mm and 0.2 mm, respectively. This generates virtual dilution factors of 1:10 or 1:50 in comparison to a measurement with a standard 10 mm cuvette. This feature saves time and avoids dilution errors. If desired, samples can be retrieved after the measurement for further processing. The required sample volume for the 1 mm cap is 3 μ L to 5 μ L, and for the 0.2 mm cap 0.7 μ L to 4 μ L.

Part No.	Material	Pathlength	Special Holder or Spacer Needed	Volume	Wavelength Range	Exterior (LxWxH)	Details
220-92788-00	Quartz	1 mm or 0.2mm	NO	3-5 μ L for 1 mm cap 0.7 to 4 μ L for 0.2mm cap	200-900 nm	12.5x12.5x69.5 mm	Contains fiber optic cables thus reducing the wavelength range of quartz

1 mm cap: 220-92788-01
0.2 mm cap: 220-92788-02



220-92788-00

Starna DMV-Bio Demountable Micro-Volume Cell

The Starna Demountable Micro-Volume (DMV) Bio Cell uses advanced precision micro-machining techniques and materials to produce a patented high energy optical system which ensures that sufficient energy is available to measure low volume samples accurately and reproducibly across a wide absorbance range. The cell is ideal for biological applications where DNA and proteins measurements are routinely performed and allows for measurements of sample volumes as low as 0.6 μL . The patented cell design utilizes a magnetic closure mechanism to facilitate rapid filling/emptying plus easy cleaning of the cell for convenience and to prevent carryover. This cell combined with the **Shimadzu UV-1800** is an excellent choice for biological laboratories needing routine analysis of micro-volume samples.

Part No.	Material	Pathlength	Special Holder or Spacer Needed	Volume	Wavelength Range	Exterior (LxWxH)
220-93619-01	Quartz	0.5 mm	NO	2.5 μL	200-900 nm	12.5x12.5x61.0 mm
220-93619-02	Quartz	0.2 mm	NO	1 μL	200-900 nm	12.5x12.5x61.0 mm
220-93619-03	Quartz	0.125 mm	NO	0.6 μL	200-900 nm	12.5x12.5x61.0 mm



220-93619-xx

BioSpec-nano 5mm pathlength Cuvette

This is a quartz cell with for use with the micro-volume BioSpec-nano spectrophotometer (5mm pathlength option).



Part No.	Material	Pathlength	Special Adapter Needed	Volume	Wavelength Range	Exterior (LxWxH)
220-92671-00	Quartz	5 mm	YES Part Number: 206-26513-00	1.75 mL	200 - 2500 nm	12.5x7.5x46 mm

Fluorescence

Standard Cells

Part No.	Material	Pathlength	Special Holder or Spacer Needed	Volume	Wavelength Range	Exterior (LxWxH)	Details
220-92910-81	Quartz	10x10 mm	NO	3.5 mL	200 - 2500 nm	12.5x12.5x45 mm	PTFE lid
220-92910-82	Quartz	10x10 mm	NO	3.5 mL	200 - 2500 nm	12.5x12.5x45 mm	PTFE stopper
220-92910-88	Quartz	10x10 mm	NO	3.5 mL	200 - 2500 nm	12.5x12.5x45 mm	PTFE lid, Mirror coated outer surfaces



220-92910-81



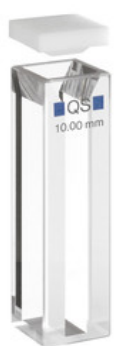
220-92910-82



220-92910-88

Semi Micro Cells

Part No.	Material	Pathlength	Special Holder or Spacer Needed	Volume	Wavelength Range	Exterior (LxWxH)	Details
220-92910-83	Quartz	10x4 mm	NO	1.4 mL	200 - 2500 nm	12.5x12.5x45 mm	PTFE lid
220-92910-84	Quartz	10x4 mm	NO	1.4 mL	200 - 2500 nm	12.5x12.5x45 mm	PTFE stopper
220-92910-85	Quartz	3x3 mm	NO	45 μ L	200 - 2500 nm	12.5x12.5x45 mm	PE threaded stopper, Only 3 windows polished



220-92910-83



220-92910-84



220-92910-85

Stirrer Cells

These cells are often used when measurements must be taken from a sample being stirred. Note: Each cell includes one magnetic stirrer.

Part No.	Material	Pathlength	Special Holder or Spacer Needed	Volume	Wavelength Range	Exterior (LxWxH)	Details
220-92910-86	Quartz	10x10 mm	NO	3.5 mL	200 - 2500 nm	12.5x12.5x45 mm	PTFE lid, magnetic base Inside width = 10 mm
220-92910-87	Quartz	10x4 mm	NO	1.5 mL	200 - 2500 nm	12.5x12.5x45 mm	PTFE lid, magnetic base Inside width = 4 mm One stirrer bar included



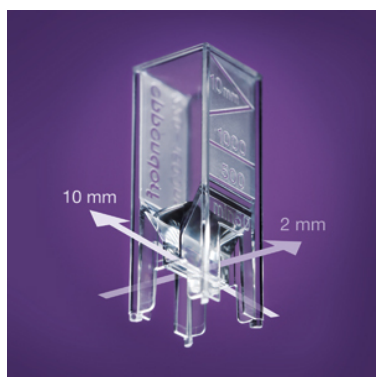
220-92910-86



220-92910-87

Disposable Cuvettes

Part No.	Material	Pathlength	Special Holder or Spacer Needed	Volume	Wavelength Range	Exterior (LxWxH)	Details
220-92957-02 Eppendorf Uvette	UV transparent plastic	10 mm or 2mm	YES: For 70 μ L or lower use 220-92957-01 For volumes above 70 μ L, no holder is needed	50 μ L – 2 ml	220 – 1600 nm	12.5x12.5x36 mm	Available as pack of 80
220-92787-00	Polystyrene	10 mm	NO	3.5 mL	Cutoff – 340 nm	12.5x12.5x45 mm	Available as pack of 100
220-92787-01	Polymethyl methacrylate (PMMA or "acrylic")	10 mm	NO	3.5 mL	Cutoff – 300 nm	12.5x12.5x45 mm	Available as pack of 100



220-92957-02



220-92957-01

Capillary Cell Kits

Provides a cuvette set for use in Hoescht Dye and Ethidium Bromide assays. Set consists of capillary cell holder, set of quartz capillary cells, Allen wrench, and Critoseal. The adapter fits in the standard cell holder.

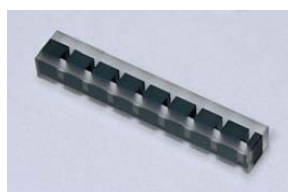
Part No.	Material	Pathlength	Special Holder or Spacer Needed	Volume (theoretical)	Wavelength Range	Details
220-92209-01	Quartz	Effective optical path length is typically about 1/20 of 10mm square cell.	No. Holder is supplied as part of kit.	3 μ L with tube closure used.	200 - 2500 nm	For fluorescence only. Has single holder. Supplied with 100 capillaries (made of quartz) and a tube closure
220-92209-02	Quartz	Effective optical path length is typically about 1/20 of 10mm square cell.	No. Holder is supplied as part of kit.	3 μ L with tube closure used.	200 - 2500 nm	For UV/vis only. Has dual holder. Supplied with 100 capillaries (made of quartz) and a tube closure
220-92209-00	Quartz	Effective optical path length is typically about 1/20 of 10mm square cell.	No. Holder is supplied as part of kit.	3 μ L with tube closure used.	200 - 2500 nm	For UV/vis only. Has single holder. Supplied with 100 capillaries (made of quartz) and a tube closure



Capillary Cell Kits (220-92209-01, 220-92209-02, 220-92209-00)

Multicells

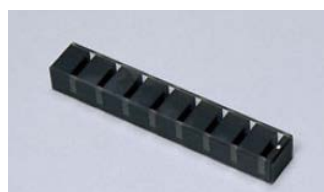
Part No.	Material	Pathlength	Special Holder or Spacer Needed	Volume	Wavelength Range	Number of Channels	Details
208-92086-00	Quartz	5 mm	YES: 206-23680-91 Or 206-23690-91 where temperature control is used.	50 μ l	200 - 2500 nm	8	Reference side of holder cannot be used for the UVmini-1240
208-92085-00	Quartz	5 mm	YES: 206-23680-91 Or 206-23690-91 where temperature control is used.	50 μ l	200 - 2500 nm	16	Reference side of holder cannot be used for the UVmini-1240
220-92404-00	Quartz	10 mm	YES: 206-23680-91 Or 206-23690-91 where temperature control is used.	100 μ l	200 - 2500 nm	8	Reference side cannot be used for the UVmini-1240
220-92403-00	Quartz	10 mm	YES: 206-23680-91 Or 206-23690-91 where temperature control is used.	100 μ l	200 - 2500 nm	16	Reference side of holder cannot be used for the UVmini-1240
208-92097-11	Quartz	10mm	YES: For use with the TMSPC-8 thermal melt system only (206-24350-91)	100 μ l	200 - 2500 nm	8	Reference side of holder cannot be used for the UVmini-1240



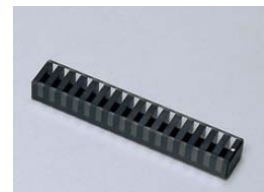
220-92404-00



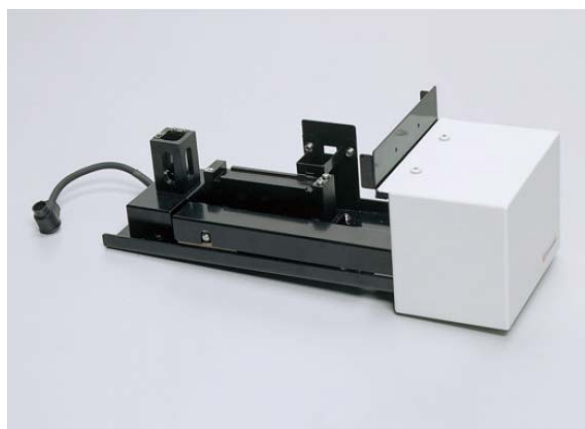
220-92403-00



208-92086-00



208-92085-00



8/16 Series Micro Multi-Cell Holder
(206-23690-91)

Hellmanex III - Cleaning Solution

Liquid concentrate low in phosphates. All organic active cleaning ingredients are over 80 % biodegradable according to the OECD guideline 302 B. This product therefore complies with the most recent requirements for the reduction of environmental pollution. Highly corrosive and etching substances such as potassium hydroxide and chlorine were specifically replaced with cleaning agents which are gentle on materials and skin. 1.3kg (1L) in PE bottle. **(P/N: 220-92910-95)**

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Lange's Handbook of Chemistry by James A. Dean, 14th Edition, McGraw Hill

**SHIMADZU CORPORATION, International Marketing Division**

3. Kanda-Nishikicho 1-chome, Chiyoda-ku, Tokyo 101-8448, Japan

Phone: 81(3)3219-5641, Fax: 81(3)3219-5710

URL: www.shimadzu.com

SHIMADZU SCIENTIFIC INSTRUMENTS

7102 Riverwood Drive, Columbia, Maryland 21046, U.S.A.

Phone: 800-477-1227/410-381-1227, Fax: 410-381-1222

URL: www.ssi.shimadzu.com

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