

The Ultimate in Micro Sampling Techniques for UV-Vis Applications

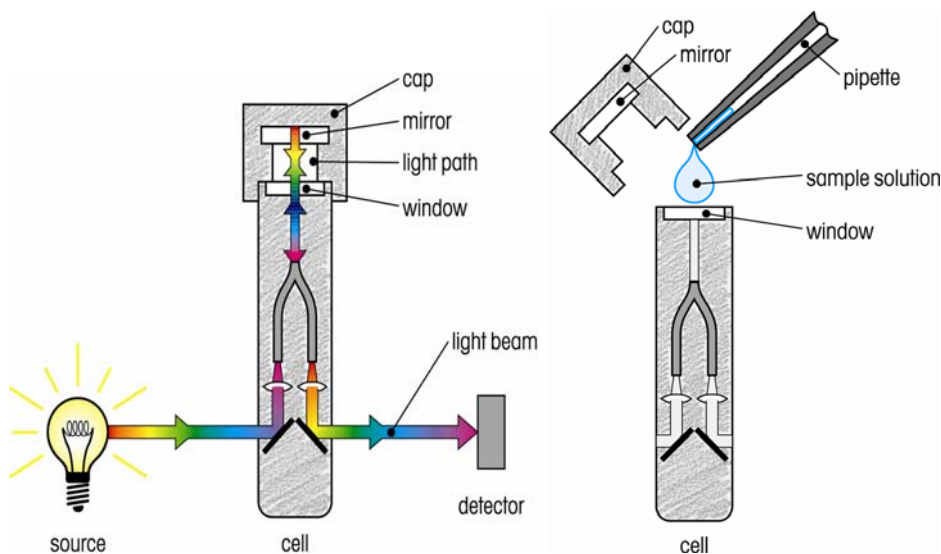
The Tray Cell is designed for measurements e.g. of DNA/RNA or protein samples and enables highly accurate analysis of extremely small samples with remarkable reproducibility.

The dimensions of the Tray Cell are equivalent to a standard cuvette in order to work in most spectrophotometers. 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 μl to 5 μl and for the 0.2 mm cap 0.7 μl to 4 μl . With the Tray Cell the average dynamic range for dsDNA is between 2 $\text{ng}/\mu\text{l}$ and 5,000 $\text{ng}/\mu\text{l}$. The mean dynamic range depends strongly on the type of photometer used.

Due to the integrated beam deflection and the use of fiber-optic cables it is possible to measure the sample directly on the surface of the optical window. The cap with mirror provides a well-defined optical light path and prevents the sample from drying up. The measurement remains reproducible because the sample will not be enriched by evaporation of the solvent. During filling and cleaning stages, the cell remains in the photometer. This guarantees a continuously identical position of the aperture in the light beam and no variation in comparison to the reference measurement.



Simple and Efficient Measurements



1. Position the Tray Cell inside the cell holder of the spectrophotometer, taking care that the light path is in the correct direction.
2. Pipette sample onto the center of the measuring window.
3. Fit the cap of choice (either 1mm or 0.2mm pathlength) for the measurement and begin measurement on spectrophotometer.
4. Remove cap, retrieve the sample with a pipette, if desired, or clean cell and cap.
5. Clean well with a lint free swab or a lint free wipe. Remove sample residues from the mirror by utilizing a lint free swab and, if necessary, pressurized clean and dry air. The cell remains in the cell holder for cleaning, only the cap is removed.
6. Pipette sample onto the center of the measuring window, fit cap for the measurement, start measurement on the spectrophotometer for the next sample.

Application Example:

Quantification of Nucleic Acids

To determine the nucleic acid concentration in solutions the absorbance at wavelength 260 nm (A₂₆₀) is used. The following function, derived from Lambert-Beer's Law, is applied:

$$\text{Concentration [ng/}\mu\text{l]} = \text{Absorbance (260 nm)} \times \text{Factor}$$

(with Factor = Sample Specific Factor x Virtual Dilution Factor)

The Sample Specific Factor represents the specific absorbance for example of a sample of 50 ng/μl dsDNA that gives a reading of 1 Abs (A₂₆₀), measured with an optical light path of 10 mm inside a standard cuvette. Due to the optical light paths of the Tray Cell of 0.2 mm or 1 mm, additionally, a Virtual Dilution Factor (DF) of 50 or 10 must be taken into account.

For the different types of nucleic acid solutions, the average dynamic range of the absorbance relating to the concentration (ng/μl) results as follows (depending on the pathlength of the cap):

	Sample Dependent Factor	1 mm Cap (10x DF) [ng/μl]	0.2 mm Cap (50x DF) [ng/μl]
dsDNA	50	25 - 850	125 - 4,250
ssDNA	37	18 - 630	90 - 3,150
ssRNA	40	20 - 680	100 - 3,400
Oligo	30	15 - 510	75 - 2,550

Detection limits are dependent on pathlength (cap) and spectrophotometer used.

Results shown here are typical results from an average spectrophotometer.

To learn more about Shimadzu's UV product line, including the Tray Cell, call 1 (800)-477-1227 or visit us at:

www.ssi.shimadzu.com

Order consumables and accessories on-line at
<http://store.shimadzu.com>

Shimadzu Scientific Instruments Inc.
7102 Riverwood Dr.
Columbia, MD 21046, USA
1-800-477-1227

