

TCH-703 8-position Turret Micro Cell Holder

The TCH-703 eight-position turret micro-cell accessory is an attachment designed specifically for the V-630/630BIO instruments to provide a consistent measurement of eight samples with a minimum sample quantity of 4 μL .

It is a simple procedure to measure 8 samples as a maximum: pipette samples into the removable sample turret (Figure 1), set the turret cell into the holder (Figure 2), turn the knob to place a sample into the sample beam (Figure 3), and then press the start button. This attachment is very useful for the measurement of limited sample quantities for DNA and/or protein concentrations.



Figure 1



Figure 2



Figure 3

Accuracy of the cell

The sample turret is a round-shaped cell with 8 positions where samples are infused. The average pathlength of the 8 cell positions were measured by the UTS-200 Film Thickness Measurement System which provided a mean pathlength of 0.989 mm and a standard deviation of 0.22%. These results demonstrate that there are acceptable differences of the measurement accuracy and reproducibility for each cell in the sample turret.

Measurement accuracy

• Measurement accuracy of the 8 cells

To verify the measurement accuracy of the turret cells, analysis of DNA samples of raw bovine thymus was performed in the 8 cells at specific concentrations, measuring the quantity using the Warburg-Christian method. The CV's for these measurements were 2% when the DNA concentration was 50 $\mu\text{g/mL}$, 11% for 10 $\mu\text{g/mL}$, and 10% for 5 $\mu\text{g/mL}$.

• Reproducibility of the turret rotation

The same samples were measured while the turret was rotated to analyze the variation of the quantitative measurement in the same cell. The CV for these measurements was 0.3% when the DNA concentration was 50 $\mu\text{g/mL}$, 1.7% for a 10 $\mu\text{g/mL}$ concentration, and 3.5% for 5 $\mu\text{g/mL}$ (Table 1).

Table 1 Measurement accuracy of the cells and reproducibility of the turret rotation

	1st	2nd	3rd	Ave.	S.D.	C.V.
cell 1	42	41.9	42	41.97	0.058	0.14
cell 2	39.7	39.8	39.8	39.77	0.058	0.15
cell 3	41.3	41.5	41.7	41.5	0.2	0.48
cell 4	41	41	40.9	40.97	0.058	0.14
cell 5	40.9	41	41	40.97	0.058	0.14
cell 6	41.8	41.8	42.5	42.03	0.404	0.96
cell 7	41.9	42	41.9	41.93	0.058	0.14
cell 8	41.9	41.9	42	41.93	0.058	0.14
Ave.	41.31	41.36	41.48	41.38		
S.D.	0.781	0.746	0.861		0.765	
C.V.	1.89	1.8	2.08			1.85

DNA 50 µg/mL

	1st	2nd	3rd	Ave.	S.D.	C.V.
cell 1	8.3	8.3	8.6	8.4	0.173	2.06
cell 2	8.2	8.2	9.3	8.57	0.635	7.41
cell 3	11	11.1	10.9	11	0.1	0.91
cell 4	8.4	8.3	8.5	8.4	0.1	1.19
cell 5	9.4	9.5	9.4	9.43	0.058	0.61
cell 6	8.2	8.3	8.2	8.23	0.058	0.7
cell 7	10.3	10.3	10.3	10.3	0	0
cell 8	9.6	9.5	9.5	9.53	0.058	0.61
Ave.	9.18	9.19	9.34	9.23		
S.D.	1.075	1.097	0.921		0.991	
C.V.	11.72	11.94	9.86			10.73

DNA 10 µg/mL

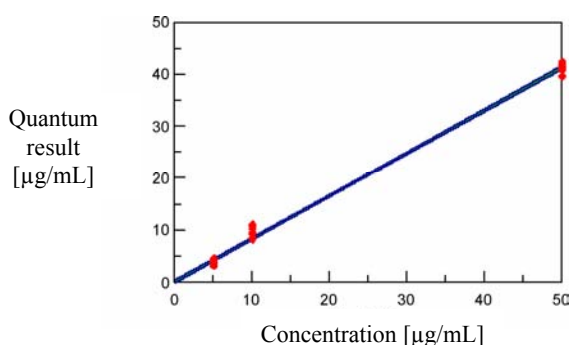
	1st	2nd	3rd	Ave.	S.D.	C.V.
cell 1	4.2	4.4	4.5	4.37	0.153	3.5
cell 2	3.4	3.5	3.5	3.47	0.058	1.67
cell 3	3.8	3.9	4.6	4.1	0.436	10.63
cell 4	3.7	3.9	3.8	3.8	0.1	2.63
cell 5	3.3	3.6	3.6	3.5	0.173	4.95
cell 6	3.2	3.3	3.3	3.27	0.058	1.77
cell 7	3.5	3.6	3.6	3.57	0.058	1.62
cell 8	3.7	3.8	3.8	3.77	0.058	1.53
Ave.	3.6	3.75	3.84	3.73		
S.D.	0.321	0.334	0.469		0.377	
C.V.	8.91	8.9	12.22			10.11

DNA 5 µg/mL

Detection limit and determination limit

The quantitative results outlined in Table 1 were used to create a calibration curve of the quantitative results vs. concentration (Figure 4). This calibration curve has a calculated detection limit of 0.38 µg/mL and a determination limit of 6.4 µg/mL.

The definition of the detection limit used here is “the concentration calculated from the calibration curve when the maximum quantitative value of the 95% confidence interval is read at a calculated concentration of 0 µg/mL”. The definition of the determination limit is “the concentration calculated from the calibration curve using some specific quantitative results that has a coefficient of variation of 10%”.



$$Y = A \times E + B$$

$A = 0.824697 \pm 0.010735$
 $B = 0.236037 \pm 0.311315$
 Correlation coefficient = 0.998451
 Standard error = 1.12974
 Detection limit = 0.37749
 Determination limit = 6.44095

Figure 4 Calibration curve of the quantitative results vs. concentration

Sample infusion

A round-shaped gel loading tip is the most appropriate pipette tip to load samples into the turret cells. Using the gel loading tip prevents air bubbles in the cells.

Cleaning the turret cell

A round-shaped gel loading tip is used for both sample infusion and cleaning the cell with a cleaning solvent such as water. To remove protein samples, commercial detergents for instrument cuvettes can be used. If the turret cells are heavily contaminated, a concentrated nitric acid solution can also be used. JASCO offers a washing device, the µWash, which is designed to clean the cell easily using water, methanol, ethanol, and other solvents.

µWash MW-2000 micro-cell washing accessory

Washing accessory for micro cells such as 8-position Turret Micro Cell Holder

- Insert the needle tip into the cell. Pushing the buttons on the syringe several times cleans the cell using a ‘fill and drain’ action.
- The Wash device can wash the cell with a small quantity of a washing solution.
- The MW-2000 is applicable to the sample volume less than 100 µL.



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Specification

Needle size	0.7 mm O.D. x Approx. 10 mm (taper type)
Maximum injection and suction	Approx. 100 µL
Bottle volume	10 mL
Materials	PTFE, PP, PE, EPDM, Silicone, Stainless
Cleaning solvent	Water, Methanol, Ethanol and other volatile solvents