

VESSEL FLOW RECORDING – APPENDIX I (UNIT CONVERSIONS)

IonWizard's FloAcq acquisition module performs several calculations based on raw inputs (typically generated by a flow meter and pressure interface) and vessel dimension outputs (such as our VesAcq dimensioning module). Input units need to be converted first to intermediate units and then to output units. The following unit conversions example is given for water at 37°C for the flow calculations. Input units will be determined by either the hardware attached or the task set up in the software. For example, all units of length will most likely be input as micrometers in the vessel dimensioning task. The output units were taken from a survey of the primary literature. The selection of intermediate units is personal preference. In this example, I've chosen "cgs" units (*i.e.*, centimeters, grams and seconds) as the intermediate units as most of the output values taken from the literature use cgs standards, such as dynes.

VESSEL FLOW RECORDING TASK

Intermediate units

Length: cm	Mass: g	Time: s
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Solution presets constants

Density: 9.937e-1 g/cm ³	Viscosity: 6.904e-4 g/(cm x s)
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UNIT CONVERSIONS

Input Units to Intermediate Units Conversions

	<i>Input Units</i>	<i>Slope</i>	<i>Inter. Units</i>
Volume Flow (Q)	µl/min	1.667e-5	cm ³ /s
Inner Diameter (Di)	µm	1.000e-4	cm
Inner Area (Ai)	µm ²	1.000e-8	cm ²
Inlet Pressure (Pin)	mm Hg	1.333e3	g/(cm*s ²)
Outlet Pressure (Pout)	mm Hg	1.333e3	g/(cm*s ²)

Intermediate Units to Output Units Conversions

	<i>Inter. Units</i>	<i>Slope</i>	<i>Output Units</i>
Flow Velocity	cm/s	1	cm/s
Mean/Diff. Pressure	g/(cm*s ²)	7.501e-4	mm Hg
Vascular Resistance***	g/(cm ⁴ *s)	1	(dyne*s)/cm ⁵
Vascular Resistance***	g/(cm ⁴ *s)	0.100	(MPa*s)/m ³
Shear Stress	g/(cm*s ²)	1	dyne/cm ²

***Vascular Resistance is commonly reported in either (dyne*s)/cm⁵ or (MPa*s)/m³.