SELL SHEET

Glass Capillaries

Quality Glass for Microinjection/Microelectrodes

FEATURES

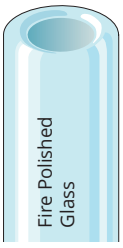
- Quality borosilicate glass capillaries
- Large variety available, including fire polished, filaments, thin wall, specialty glass and multi-barrel

BENEFITS

- Superior pricing
- Most glass orders ship within 48 hours

APPLICATIONS

- Microinjection
- Electrophysiology
- Patch clamp
- Fluid Handling



FIre Polishing

Fire-Polished glass capillaries are easier to insert into microelectrode holders without damaging the gasket. More importantly, fire-polished glass won't scratch the chloridized wire used in a recording electrode. Fire-polishing does not affect the glass's mechanical or electrical properties.

Making Uniform, Reproducable Microelectrodes

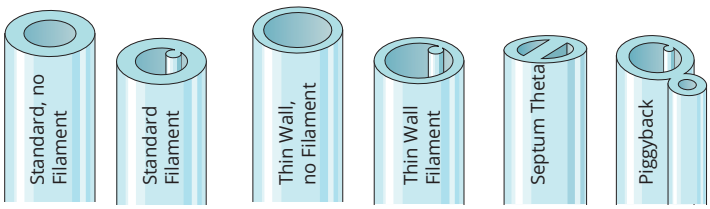
Borosilicate glass capillaries: Close dimensional tolerances assure microelectrode uniformity and reproducibility. Capillaries are available in 1, 2, 3, 5 and 7-barrel configurations, complete range of single barrel thin-wall sizes and a variety of special configurations. Capillaries with filaments contain a solid filament fused to the inner wall, which speeds filling of electrodes. Capillaries with or without inner filaments are available for making microelectrodes in a wide range of diameters.

Filament Glass Capillaries

Single Barrel standard wall thickness capillaries are offered either with or without inner filaments for quick filling in a variety of lengths and diameters.

Thin Wall Glass Capillaries

Thin Wall single barrel capillaries are offered both with or without inner filaments.



PHYSICAL PROPERTIES OF WPI GLASS CAPILLARIES

The physical properties of glass depend upon the chemical composition of the glass, as well as how the glass was manufactured. Glass has no set melting point, but four temperatures are of primary importance when discussing glass production.

- Working Point is the temperature that the glass is soft enough to work. At this temperature, the glass viscosity is 10^4 poises.
- Softening Point - At this temperature, glass deforms easily, even by forces of gravity. The glass viscosity is $10^{7.6}$ poises.
- Annealing Point - When glass reaches the annealing point and remains for a few minutes, many of the internal stresses of the glass formation are obviated. During the annealing process, the glass is heated to the annealing temperature and then allowed to cool at a controlled rate. Glass that is not annealed is prone to crack or shatter with minor temperature fluctuations or mechanical shocks.
- Strain Point - When glass temperature remains at the strain point for several hours, the internal stresses are relieved. Stresses that remain in the glass after maintaining the strain point for a few hours are permanent.

WPI sells glass from multiple suppliers. In the tables below, we detail some of common glass specifications.

	Duran® Schott 8250	Duran® Schott 0010	Duran® Schott 8330	Corning 7800	Kimble N51A
WPI Usage	·Pulled Glass PG-52151, PG-52165 ·Patch clamp glass capillaries	·Patch clamp glass capillaries	·WPI thin wall glass capillaries ·Pre-pulled micropettes with TW in the Part #	·Multi-barrel capillaries ·Septum theta ·Piggyback capillaries ·Glass rods	·Single barrel glass tubing (Part #: 1Bxxxx)
Density ρ	2.28 g/cm^3		2.23 ± 0.02 g/cm^3	2.33 g/cm^3	2.33 g/cm^3
Working Point - 10^4 dPa·s	1055°C		1260 ± 20°C		1140°C
Softening Point - $10^{7.6}$ dPa·s	720°C	625°C	820 ± 10°C	789°C	785°C
Annealing Point - 10^{13} dPa·s	500°C		560 ± 10°C	565°C	570°C
Strain Point	490°C		510°C	517°C	530°C
Relative dielectric constant tan δ at 1 MHz and 25 °C	4.9	6.7	4.6 10^{-4} 37 10^{-4}		
Thermal expansion (0–300°C)	5.0x10^{-6}/K		33x10^{-7} cm/cm/°C	55x10^{-7} cm/cm/°C	55x10^{-7} cm/cm/°C
Young's Modulus	64x10^3 N/mm^2		6.4x10^3 kg/mm^2	7.2x10^3 kg/mm^2	10.4x10^6 PSI
Poisson's Ratio	0.21		0.20		
Dielectric Constant	4.9		4.6		5.8
Loss Factor 1 MHz 25°C	22x10^{-4}		2.6%		4.9%
Refractive Index	1.487		1.473 mm²/N	1.490 mm²/N	1.490 mm²/N
Temperature Limits				460°C (extreme service) 200°C (normal service)	
Max. Thermal Shock				115°C	
Visible Light Transmission 2 mm thickness					91%
Specific Heat 25–175°C					0.204 g. cals/g. deg.
Thermal Conductivity	1.2 W/m/K (at 90°C)				0.0026 cals/cm/cm^2/sec/°C

	Corning 7800	Duran® Schott 8330
SiO_2	73%	81.0%
B_2O_3	10%	13%
Na_2O	2%	~2.0%
Al_2O_3	7%	2.0%
K_2O	2%	~2.0%
BaO	<0.1%	
CaO	0.7%	

Corning 7800 glass is a type I, class B borosilicate glass that conforms to federal specification DD-G54lb and ASTM E-438. This glass has the composition shown in the table (left).

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