

Capillary Tubing - for Single Cell Recording and Microinjection

- BOROSILICATE, FLINT, ALUMINOSILICATE GLASS STOCKED IN POPULAR SIZES
- THIN WALL (12%) AS WELL AS CONVENTIONAL WALL (25%) CONFIGURATIONS
- OMEGA DOT FIBER AVAILABLE TO PROMOTE RAPID FILLING BY CAPILLARY ACTION
- MULTIBARREL (2, 3, 4 AND - 7) CONFIGURATIONS AVAILABLE
- CUSTOM TUBING DIAMETERS, WALL THICKNESSES AND GLASS MATERIALS AVAILABLE AS SPECIALS

CAPILLARY TUBING

Omega Dot capillary tubing is a unique product which revolutionized micropipette filling. The tiny fiber (100 microns) extruded into the capillary lumen, promotes capillary action and eliminates the need for boiling or vacuum filling of the tip.

FHC offers single barrel capillaries with and without the Omega Dot fiber in three glass types:

Borosilicate (Pyrex®) is favored for most recording and injection applications because of its strength and chemical properties.

Flint glass is useful in applications when the tip is to be fire polished since it is low melting.

Aluminosilicate is very hard and chemically inert. Its melting point is 100 degrees centigrade higher than borosilicate and resistivity is ten times higher. It is more difficult to pull but stronger tips with better chemical isolation result. For ion specific microelectrodes, the advantages are worth the effort; better sealing at the cell membrane/tip interface during intracellular recording has also been reported.

Wall thickness is an important consideration; in general, thicker wall tubing can be pulled to finer tips. However, thin wall tubing yields lower tip resistance for a given tip diameter and is recommended for experiments where current is being injected.

Please refer to the list below which indicates the wide range of tubing that we offer:

- standard wall (25%) tubing catalog numbers end in digits from 1 to 7.
- thin wall tubing catalog numbers end in 0.
- most glass types and wall thicknesses are stocked in outside diameters of .75, 1.0, 1.2, 1.5 and 2.0mm.
- multi-barrel configurations are available with 25% wall and Omega Dot Fibers in sizes of 1.0, 1.2, and 1.5mm OD/barrel.

All single barrel tubing except Aluminosilicate is stocked in packages of 250 x 100mm lengths. Multi-barrel and Aluminosilicate tubing are stocked in packages of 100 x 100mm lengths. Other lengths are available with proportionate pricing.

We also offer 2 and 9-barrel configurations (Catalog numbers 30-34-2 and 34-34-9) with one barrel (no dot) large enough that a pipette or metal microelectrode for recording can be inserted and have its tip extend down through the end of the cluster; the other one or eight barrels can be used for injection.

Do you need a larger OD tubing, or a thin or thick walled configuration not offered in our stock? Please do not hesitate to contact us for more information about the special types of tubing we can provide to fit your specifications.

Easy-to-fill Omega Dot Capillaries



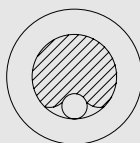
Omega Dot capillaries have revolutionized micropipette filling. The simple process is described below:

1. Suspend the shank of the pipette (NOT the tip) in electrolyte. The tip will fill to the shoulder in approximately one minute.
2. Backfill the shank using a microsyringe with a 28ga or smaller needle. The tip of the needle should extend to the shoulder of the pulled pipette.

Note: With practice, step 1 can be eliminated if the backfilling is done slowly being careful not to cause bubbles.

Omega Dot Fiber - how it works!

Standard capillary tubing drawn to tips less than about 5 microns cannot be filled without boiling or other extraordinary means because the surface tension of the electrolyte traps air in the thin lumen.



Omega Dot tubing includes a small rod extruded into the inner diameter of the capillary. The meniscus of the fluid does not extend completely into the small crevice formed by the rod and capillary wall. As a result, bubbles do not form and even the smallest tips fill by capillary action.

ORDERING INFORMATION Capillary Tubing

Standard length is 100mm (4"). Many types are also stocked in 75mm (3") lengths. Other lengths are also available; package quantity is adjusted for different lengths, e.g. a package of 333 pcs. x 75mm is the same price as a package of 250 pcs. x 100mm.

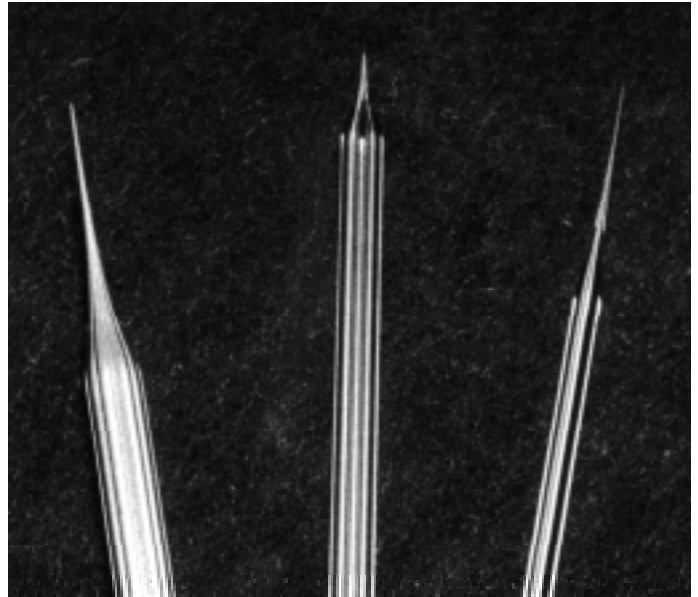
27-30-0	Borosil 1.0mm OD x 0.75mm ID	Pkg of 250
27-30-1	Borosil 1.0mm OD x 0.5mm ID	Pkg of 250
27-31-0	Borosil 1.2mm OD x 0.9mm ID	Pkg of 250
27-31-1	Borosil 1.2mm OD x 0.6mm ID	Pkg of 250
27-32-0	Borosil 1.5mm OD x 1.12mm ID	Pkg of 250
27-32-1	Borosil 1.5mm OD x 0.75mm ID	Pkg of 250
27-33-1	Borosil 2.0mm OD x 1.0mm ID	Pkg of 250
27-35-1	Flint 1.0mm OD x 0.5mm ID	Pkg of 250
27-36-1	Flint 1.2mm OD x 0.6mm ID	Pkg of 250
27-37-1	Flint 1.5mm OD x 0.75mm ID	Pkg of 250
27-38-1	Flint 2.0mm OD x 1.0mm ID	Pkg of 250
28-30-0	AlSil 1.0mm OD x 0.76mm ID	Pkg of 100
28-31-0	AlSil 1.2mm OD x 0.86mm ID	Pkg of 100
28-32-0	AlSil 1.5mm OD 1.08mm ID	Pkg of 100
29-30-0	AlSil 1.0mm OD x 0.76mm ID/Fiber	Pkg of 100
29-30-2	2 Barrel AlSil 1.00mm OD/Fiber	Pkg of 100
29-31-0	AlSil 1.2mm OD x 0.86mm ID/Fiber	Pkg of 100
29-32-0	AlSil 1.5mm OD x 1.08mm ID/Fiber	Pkg of 100
30-30-0	Borosil 1.0mm OD x 0.75mm ID/Fiber	Pkg of 250
30-30-1	Borosil 1.0mm OD x 0.5mm ID/Fiber	Pkg of 250

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30-30-2	2 Barrel Borosil 1.0mm OD/Fiber	Pkg of 100
30-30-3	3 Barrel Borosil 1.0mm OD/Fiber	Pkg of 100
30-30-4	4 Barrel Borosil 1.0mm OD/Fiber	Pkg of 100
30-30-7	7 Barrel Borosil 1.0mm OD/Fiber	Pkg of 100
30-31-0	Borosil 1.2mm OD x 0.9mm ID/Fiber	Pkg of 250
30-31-1	Borosil 1.2mm OD x 0.6mm ID/Fiber	Pkg of 250
30-31-1T	Borosil 1.2mm OD x .4mm ID/Fiber	Pkg of 250
30-31-2	2 Barrel Borosil 1.2mm OD/Fiber	Pkg of 100
30-31-3	3 Barrel Borosil 1.2mm OD/Fiber	Pkg of 100
30-31-4	4 Barrel Borosil 1.2mm OD/Fiber	Pkg of 100
30-31-7	7 Barrel Borosil 1.2mm OD/Fiber	Pkg of 100
30-32-0	Borosil 1.5mm OD x 1.12mm ID/Fiber	Pkg of 250
30-32-1	Borosil 1.5mm OD x 0.75mm ID/Fiber	Pkg of 250
30-32-2	2 Barrel Borosil 1.5mm OD/Fiber	Pkg of 100
30-32-3	3 Barrel Borosil 1.5mm OD/Fiber	Pkg of 100
30-32-4	4 Barrel Borosil 1.5mm OD/Fiber	Pkg of 100
30-32-7	7 Barrel Borosil 1.5mm OD/Fiber	Pkg of 100
30-33-0	Borosil 2.0mm OD x 1.5mm ID/Fiber	Pkg of 250
30-33-1	Borosil 2.0mm OD x 1.0mm ID/Fiber	Pkg of 250
30-33-1T	Borosil 2.0mm OD x 0.7mm ID/Fiber	Pkg of 250
30-34-2	2 Barrel Iontophoresis Tubing	Pkg of 100
	Sm.Barrel: 1.2mm OD w/Fiber; Lg Bar: 1.2mm ID/No Fbr	
30-34-9	9 Barrel Iontophoresis Tubing	Pkg of 100
	Sm.Barrels: 1.2mm OD w/Fiber; Lg Bar: 1.2mm ID/No Fbr	
30-50-2	Borosil .5mm OD x .25mm ID	Pkg of 250
30-50-3	Borosil .5mm OD x .25mm ID/Fiber	Pkg of 250
30-50-6	Borosil 0.7mm OD x 0.35mm ID/Fiber	Pkg of 250
30-50-8	Borosil 0.7mm OD x 0.35mm ID	Pkg of 250

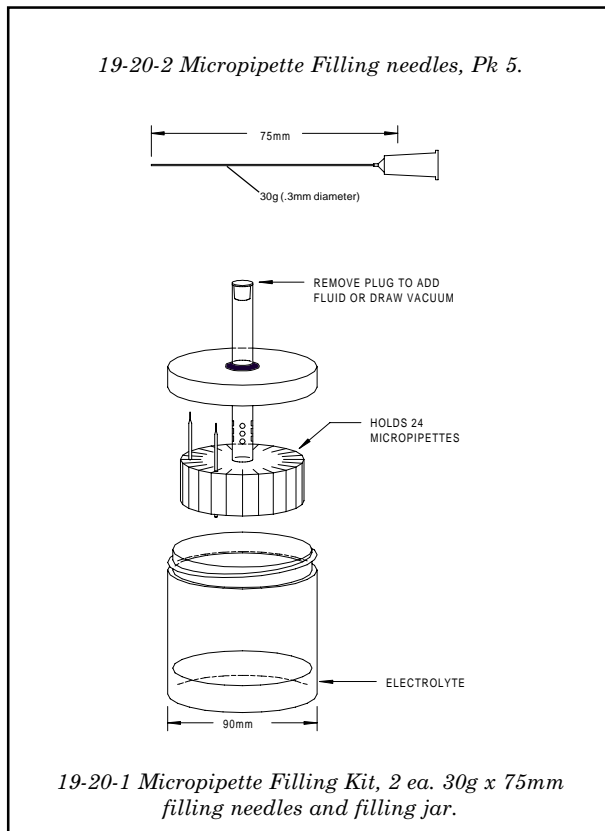
Micropipettes / Needles (single or multibarrel) Holding Pipettes



ACCESSORY PRODUCTS

FHC offers 75mm 30ga (.3mm diameter) needles to facilitate filling (Cat. #19-20-2, PK5).

Two needles and a convenient filling jar which holds 24 pipettes are included with the 19-20-1 Filling Kit.



- SINGLE AND MULTIBARREL CONFIGURATIONS
- WIDE VARIETY OF SHANK SIZES AND TIP PROFILES
- TIPS CAN BE CUSTOM CONFIGURED FOR YOUR APPLICATION

Please refer to the list below (Catalog numbers beginning with 10 through 17) for a complete offering of standard **micropipettes**.

FHC offers a complete range of single and multibarrel micropipettes for intra- and extracellular recording as well as microinjection by pressure or iontophoresis.

Our standard single barrel pipettes (1.0, 1.2, 1.5 and 2.0mm OD) are pulled with tip diameters less than one micron (resistance of approximately 20 Megohms) with 3M KCl. Each pipette is microscopically checked and a representative sample is filled and checked for resistance in our lab.

All single and multibarrel pipettes are available in three taper lengths: short, medium and long.

2, 3, 4 and 7 barrel pipettes (with OD of each barrel equal to 1.0, 1.2, 1.5mm OD) are also available. The standard multibarrel configuration has tip sizes so the resistance of each barrel is 3-5 Megohms when filled with 3M KCl.

We are set up to pull pipettes with special electrical or physical characteristics, including high or low resistance and long taper profiles for injection. For tip sizes larger than one micron OD a tip modification (Catalog # TIP-MOD) charge will be added. Please contact us for a quotation and to arrange delivery.

Fine tipped (<1 micron) micropipettes have a shelf life of 6-8 weeks. To prevent "aging", we can schedule deliveries so that your micropipettes arrive when you need them.

