

Tubing

We offer chromatography grade tubing in ODs of 360 μm , 1/32", 1/16", and 1/8". Tubing can be ordered in economical pre-cut standard lengths, or can be custom cut to meet your specific instrumentation requirements. All VICI metal tubing is chromatographic grade seamless drawn tubing of the highest available quality. Stainless tubing is 316 series.

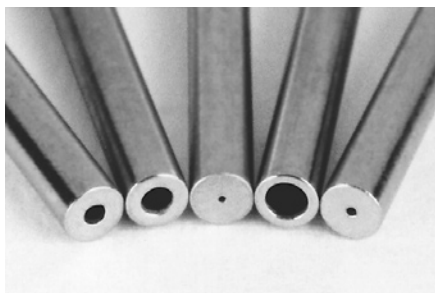
Cutting and Cleaning

The improper cutting and cleaning of metal tubing is the largest single cause of chromatographic problems and premature valve failure. The use of our precision cut and finished tubing with VICI fittings and valves maintains the flow uniformity and cleanliness that high performance systems require.

VICI's electrolytic cutting process yields polished tubing with flat ends, minimizing the potential for dead volumes or leaks caused by the uneven ends and burrs left by the tools common in the general laboratory environment – wire cutters, files, jewelers' saws, and most tubing

cutters. These non-precision cutters are likely to generate particulates and deform inner and outer diameters, which can introduce dead volume and flow anomalies.

Each piece of VICI pre-cut metal tubing is specially cleaned with micro-filtered steam from deionized water to remove both organic and inorganic contaminants, representing a major improvement over the common practice of using organic solvents to "clean" tubing. Our test reports have been confirmed by most of the major instrument suppliers: the VICI process provides analytically clean tubing.



Electrolytically cut and polished



File cut



Plier cut

TECH TIP

Forty years of Valco experience show that the particles left in poorly cut tubing are the number one cause of valve damage.

TECH TIP

For optimal zero dead volume connections, make sure your tubing meets the best industry standards—OD tolerance should be nominal dimension $\pm .002$ ".

Fractional dimension	Nominal dimension
1/32"	.031
1/16"	.062
1/8"	.125
1/4"	.250
3/8"	.375
1/2"	.500

CHROMalytic TECHNOlogy Pty Ltd AUSTRALIAN Distributors e-mail: sales@chromtech.net.au Tel: 03 9762 2034

Electroformed Nickel Tubing



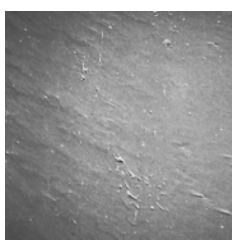
1/16" OD x .040" ID
1/32" OD x .004" ID
360 µm OD x .001" ID

Three sizes of electroformed nickel tubing

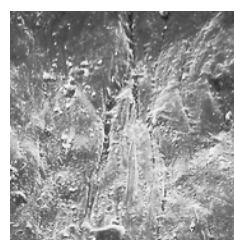
Our microbore EFNi tubing is made by electroplating nickel over a diamond-drawn mandrel in a continuous process. When the mandrel is removed, an internal surface with a mirror-like 1-2 microinch finish remains. The ductile nature of nickel allows the tubing to be easily manipulated. Unlike glass- or silica-lined stainless, EFNi can accept tight bends and cutting without heating, and does not release damaging glass fragments or silica particles.

A comparison of the interiors of commonly used tubing (below) shows the quality of the electroformed nickel tubing surface. (All photos are x500 magnification.) The rough interior surface of the mill-drawn Nickel 200 tubing has potential for carryover or cross contamination, and both the Nickel 200 and the stainless steel contain pits, voids, striations, and particles – problems which intensify as the ID decreases.

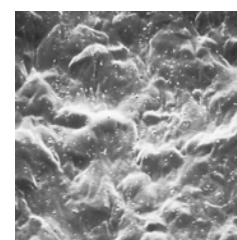
Custom IDs/ODs are available upon request.



Electroformed nickel (EFNi)



Nickel 200 alloy



Type 316 stainless steel

PRICING PER FOOT

For pricing purposes, the length is rounded up to the next foot. For example, a 5" piece is charged as one foot; an 18" piece as two feet. The price per foot is based on the length of each piece, not the total quantity ordered. Cutting and cleaning charges are included in the price per foot for EFNi tubing.

0.05 mm = .002"
0.10 mm = .004"
0.12 mm = .005"

0.25 mm = .010"
0.50 mm = .020"
0.75 mm = .030"

1.0 mm = .040"
1.5 mm = .060"
2.0 mm = .080"

4.6 mm = .180"
6.0 mm = .236"
6.4 mm = .253"

7.0 mm = .275"
10.0 mm = .400"

27.0 mm = 1.08"

1/32" = 0.8 mm
1/16" = 1.6 mm
1/8" = 3.2 mm

1/4" = 6.4 mm
3/8" = 9.5 mm
1/2" = 12.7 mm

360 µm OD EFNi tubing

Custom lengths

Prices are per foot. See pricing note in box at left.

Tubing ID	Prod No	Max length	1-9 feet	10-24 feet	25-50 feet
.001"	TEFNI.101	1 foot			
.002"	TEFNI.102	2 feet			
.004"	TEFNI.104	20 feet			
.005"	TEFNI.105	30 feet			
.007"	TEFNI.110	50 feet			

1/32" OD EFNi tubing

Custom lengths

Prices are per foot. See pricing note in box at left.

Tubing ID	Prod No	Max length	1-9 feet	10-24 feet	25-50 feet
.002"	TEFNI.502	2 feet			
.004"	TEFNI.504	20 feet			
.005"	TEFNI.505	30 feet			
.007"	TEFNI.507	50 feet			
.010"	TEFNI.510	50 feet			
.012"	TEFNI.512	50 feet			
.015"	TEFNI.515	50 feet			
.020"	TEFNI.520	50 feet			

1/16" OD EFNi tubing

Custom lengths

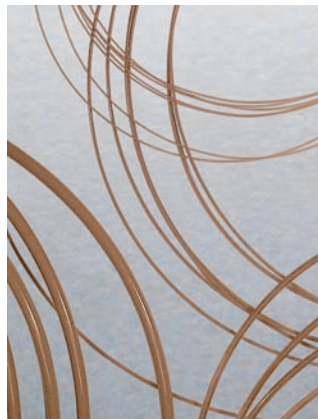
Prices are per foot. See pricing note in box at left.

Tubing ID	Prod No	Max length	1-9 feet	10-24 feet	25-50 feet
.020"	TEFNI120	50 feet			
.030"	TEFNI130	50 feet			
.040"	TEFNI140	50 feet			

PEEK Tubing – Natural

PEEK tubing has the strength required to withstand continuous use at HPLC pressure without swelling or bursting, and is not affected by halide salts, high strength buffers, or other aggressive mobile phases that corrode stainless steel. The polymer surface will not leach metal ions into the eluent or extract metal-sensitive components from the sample. Note however that dichloromethane, THF, and DMSO may cause swelling in PEEK, and concentrated nitric and sulphuric acid will attack PEEK.

OD and ID tolerances for our PEEK tubing are $\pm .0005''$ for 360 micron and 1/32" tubing; $\pm .0005''$ for 1/16" tubing with ID up to .010" and $\pm .001''$ for IDs above .010"; and $\pm .003''$ for 1/8".



360 µm PEEK tubing

Custom lengths

Custom-length 360 µm PEEK tubing is square-cut and ready to use. Specify the length required, in inches or feet. For pricing of custom length tubing, the length is rounded up to the next foot. For example, a 5" piece is charged as one foot; an 18" piece as two feet.

	.002" ID		.004" ID		.005" ID		.006" ID	
	Prod No	Price/ft	Prod No	Price/ft	Prod No	Price/ft	Prod No	Price/ft
Priced per foot	TPK.102		TPK.104		TPK.105		TPK.106	

1/32" OD PEEK tubing

Length	.0025" ID		.005" ID	.010" ID	.015" ID
	Prod No	Price	Prod No	Prod No	Prod No
10 feet	TPK.502-10FT		TPK.505-10FT	TPK.510-10FT	TPK.515-10FT
25 feet	TPK.502-25FT		TPK.505-25FT	TPK.510-25FT	TPK.515-25FT
100 feet	TPK.502-100FT		TPK.505-100FT	TPK.510-100FT	TPK.515-100FT

1/16" OD PEEK tubing

Length	.006" ID		.010" ID	.020" ID	.030" ID
	Prod No	Price	Prod No	Prod No	Prod No
10 feet	TPK106-10FT		TPK110-10FT	TPK120-10FT	TPK130-10FT
25 feet	TPK106-25FT		TPK110-25FT	TPK120-25FT	TPK130-25FT
100 feet	TPK106-100FT		TPK110-100FT	TPK120-100FT	TPK130-100FT

1/8" OD PEEK tubing

Length	.060" ID	
	Prod No	Price
10 feet	TPK260-10FT	
25 feet	TPK260-25FT	
100 feet	TPK260-100FT	

MORE INFORMATION

Polymeric tubing
 PTFE page 90
 FEP 90
 ETFE 90

CUSTOM PEEK TUBING

We offer PEEK tubing custom-manufactured to meet your specific OD, ID, and color requirements. The OD range is .014" (360 micron) to 1/8" with a minimum ID of .002" for tubing up to 1/16" OD. (Maximum ID varies according to the OD.) Color coding can be solid or striped.

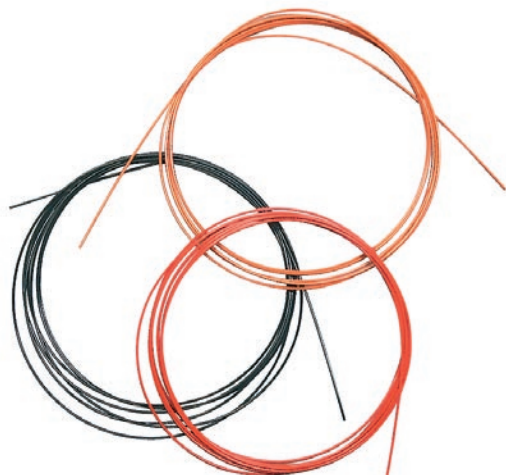
PEEK TUBING ELBOWS

Tubing elbows (90° and 180°) are ideal for routing 1/16" PEEK tubing through an LC system. These elbows are proportioned to bend PEEK tubing at the optimum radius for maximum chemical resistance and burst pressure. Installation is simple – just snap the tubing into the elbow.

Package of 5:	Prod No
90° elbow	JR-357090-5
180° elbow	JR-357180-5



PEEK Tubing – Color-coded



Color-coded tubing helps you identify the ID of your PEEK tubing – each ID is coded with a different color. Use this tubing where maximum chemical resistance and biocompatibility are required.

NEW 1/16" OD dual layer color-coded PEEK tubing *Custom lengths*

Our dual layer PEEK tubing eliminates any concern that a critical sample stream could be contaminated by pigments used to color code the tubing. It looks like any other color-coded tubing at first glance, but a closer look reveals that the pigmented layer* surrounds a separate but integrally-bonded inner layer of natural PEEK.

Tubing ID	Color	bar	psi	Prod No	Price per foot
.004"	Black	460	6700	JR-TD-5804	
.005"	Red	420	6100	JR-TD-6007	
.007"	Yellow	400	5800	JR-TD-6008	
.010"	Blue	386	5600	JR-TD-6009	
.020"	Orange	350	4500	JR-TD-6010	
.030"	Green	240	3500	JR-TD-6011	



1/16" OD striped color-coded PEEK tubing *Custom lengths*

A stripe* is added to the outside, so dye never contacts the fluid stream.

Specify the length required, in inches or feet. For pricing custom tubing, the length is rounded up to the next foot. For example, a 5" piece is charged as one foot; an 18" piece as two feet.

Tubing ID	Color	bar	psi	Prod No	Price per foot
.004"	Black	460	6700	JR-T-5804	
.005"	Red	420	6100	JR-T-5999	
.007"	Yellow	400	5800	JR-T-6000	
.010"	Blue	386	5600	JR-T-6001	
.020"	Orange	350	4500	JR-T-6002	
.030"	Green	240	3500	JR-T-6003	
.040"	Grey	165	2400	JR-T-60031	

10 ft	=	3.05 m
25 ft	=	7.62 m
100 ft	=	30.48 m

50 µm	=	.002"
100 µm	=	.004"
125µm	=	.005"
150 µm	=	.006"
0.25 mm	=	.010"
0.50 mm	=	.020"
0.75 mm	=	.030"
1.0 mm	=	.040"
1.5 mm	=	.060"
2.0 mm	=	.080"
4.6 mm	=	.180"
6.0 mm	=	.236"
6.4 mm	=	.253"
7.0 mm	=	.275"
10.0 mm	=	.400"
27.0 mm	=	1.08"
1/32"	=	0.8 mm
1/16"	=	1.6 mm
1/8"	=	3.2 mm
1/4"	=	6.4 mm
3/8"	=	9.5 mm
1/2"	=	12.7 mm

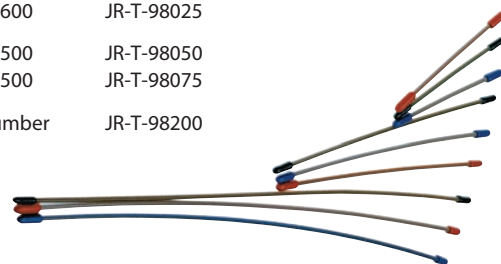
1/16" OD striped color-coded PEEK tubing *Pre-cut kits*

A stripe* is added to the outside, so dye never contacts the fluid stream.

Includes 15 pieces of tubing; 5 each of 5 cm, 10 cm, and 20 cm pre-cut lengths.

Tubing ID	Color	bar	psi	Prod No	Price
.005"	Red	420	6100	JR-T-98013	
.007"	Yellow	400	5800	JR-T-98017	
.010"	Blue	386	5600	JR-T-98025	
.020"	Orange	350	4500	JR-T-98050	
.030"	Green	240	3500	JR-T-98075	

Super kit, one of each above product number (75 pieces total) JR-T-98200



*All colorants used in the manufacture of this tubing are RoHS-compliant (Reduction of Hazardous Substances)

Polymeric Tubing

Polymeric tubing is square cut and ready to use. Each package of polymeric tubing contains one piece of the specified length.

See also PEEK tubing, pages 88-89.



1/16" OD polymeric tubing

	.006" ID		.010" ID		.015" ID		.020" ID		.030" ID	
	<i>Prod No</i>	<i>Price</i>	<i>Prod No</i>	<i>Price</i>	<i>Prod No</i>	<i>Price</i>	<i>Prod No</i>	<i>Price</i>	<i>Prod No</i>	<i>Price</i>
PTFE										
10 feet	TTF106-10FT		TTF110-10FT	\$15	TTF115-10FT		TTF120-10FT		TTF130-10FT	
25 feet	TTF106-25FT		TTF110-25FT	35	TTF115-25FT		TTF120-25FT		TTF130-25FT	
100 feet	TTF106-100FT		TTF110-100FT	130	TTF115-100FT		TTF120-100FT		TTF130-100FT	
FEP										
10 feet	-		TFEP110-10FT	16	-		TFEP120-10FT		TFEP130-10FT	
25 feet	-		TFEP110-25FT	39	-		TFEP120-25FT		TFEP130-25FT	
100 feet	-		TFEP110-100FT	156	-		TFEP120-100FT		TFEP130-100FT	
ETFE										
10 feet	-		TTZ110-10FT	25	-		TTZ120-10FT		TTZ130-10FT	
25 feet	-		TTZ110-25FT	57	-		TTZ120-25FT		TTZ130-25FT	
100 feet	-		TTZ110-100FT	210	-		TTZ120-100FT		TTZ130-100FT	

1/8" OD polymeric tubing

	.030" ID		.060" ID		.085" ID	
	<i>Prod No</i>	<i>Price</i>	<i>Prod No</i>	<i>Price</i>	<i>Prod No</i>	<i>Price</i>
PTFE						
10 feet	TTF230-10FT		TTF260-10FT		TTF285-10FT	
25 feet	TTF230-25FT		TTF260-25FT		TTF285-25FT	
100 feet	TTF230-100FT		TTF260-100FT		TTF285-100FT	
FEP						
10 feet	-		TFEP260-10FT		-	
25 feet	-		TFEP260-25FT		-	
100 feet	-		TFEP260-100FT		-	
ETFE						
10 feet	-		TTZ260-10FT		-	
25 feet	-		TTZ260-25FT		-	
100 feet	-		TTZ260-100FT		-	

- Not available

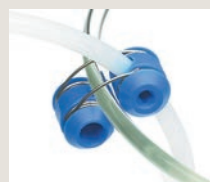
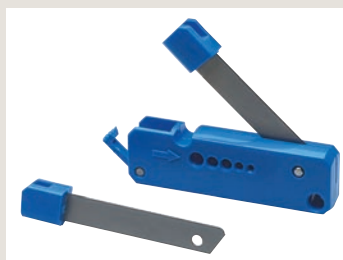
MORE INFORMATION

PEEK tubing
 Natural page 88
 Color-coded 89
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CLEAN-CUT POLYMER TUBING CUTTER

For leak-free tubing connections in an LC system, right angles and clean cuts are essential. The Clean-Cut makes burr-free perpendicular cuts on polymeric tubing without distorting the outside diameter or closing the inside diameter. The handy pocket-sized tool features a unique safety locking mechanism to secure the blade when not in use.

	<i>Prod No</i>
Clean-Cut tubing cutter	JR-797
Replacement blade	JR-798



TUBING CLIP – THE LC TUBING ORGANIZER

The tubing clip holds 1/16" and 1/8" polymer tubing precisely where you want them in your beakers, flasks, bottles, etc. up to 4 mm wall thickness. The stainless steel spring ensures a long lifetime.

Package of 5:	<i>Prod No</i>
Tubing clip	JR-9001-5

TUBING POLYMERS

PTFE Inert; very soft, easily cold flows. Produced as Teflon®

FEP Chemically resistant like PTFE, but lower creep and higher friction. More transparent than PTFE.

ETFE Resistant to most chemical attack; some chlorinated solvents will cause tubing to swell. Produced as Tefzel®

10 ft	=	3.05 m
25 ft	=	7.62 m
100 ft	=	30.48 m

Metal Tubing – Custom Lengths

Metal tubing is electrolytically cut and deburred, and steam cleaned. Specify the length required, in inches or feet. For pricing of custom length tubing, the length is rounded up to the next foot. For example, a 5" piece is charged as one foot; an 18" piece as two feet. Add \$2 cutting/cleaning charge for each length.

316 stainless

Custom lengths

Tubing ID	1/32" OD		1/16" OD		1/8" OD
	Prod No	Price/ft	Prod No	Price/ft	Prod No
.005"	TSS.505		TSS105		-
.007"	TSS.507		-		-
.010"	TSS.510		TSS110		-
.015"	-		TSS115		-
.020"	TSS.520		TSS120		-
.026"	-		TSS126		-
.030"	-		TSS130		TSS230
.040"	-		TSS140		TSS240
.060"	-		-		TSS260
.070"	-		-		TSS267
.085"	-		-		TSS285

Nickel 200

Custom lengths

Tubing ID	1/32" OD		1/16" OD		1/8" OD
	Prod No		Prod No		Prod No
.005"	-		TNI105		-
.010"	TNI.510		-		-
.020"	TNI.520		TNI120		-
.030"	-		TNI130		-
.040"	-		TNI140		-
.085"	-		-		TNI285

Hastelloy C

Custom lengths

Tubing ID	1/32" OD		1/16" OD		1/8" OD
	Prod No		Prod No		Prod No
.030"	-		THC130		-
.070"	-		-		THC270

Inconel 600

Custom lengths

Tubing ID	1/32" OD		1/16" OD		1/8" OD
	Prod No		Prod No		Prod No
.061"	-		-		TINCO261
.082"	-		-		TINCO282

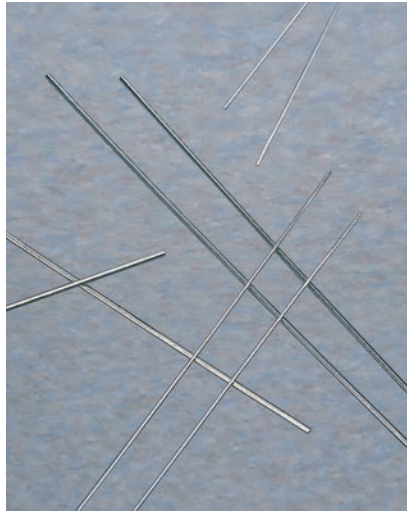
- Not normally available

- 50 µm = .002"
- 100 µm = .004"
- 125µm = .005"
- 150 µm = .006"
- 0.25 mm = .010"
- 0.50 mm = .020"
- 0.75 mm = .030"
- 1.0 mm = .040"
- 1.5 mm = .060"
- 2.0 mm = .080"
- 4.6 mm = .180"
- 6.0 mm = .236"
- 6.4 mm = .253"
- 7.0 mm = .275"
- 10.0 mm = .400"
- 27.0 mm = 1.08"
- 1/32" = 0.8 mm
- 1/16" = 1.6 mm
- 1/8" = 3.2 mm
- 1/4" = 6.4 mm
- 3/8" = 9.5 mm
- 1/2" = 12.7 mm

Stainless Steel Tubing – Pre-cut Lengths

These packages of pre-cut Type 316 stainless tubing provide an economical solution to the problems that are caused by “seat-of-the-pants” cutting in the lab or field. They are priced to give a savings over the \$2 per cut charge for custom-cut tubing.

All tubing is electrolytically cut and specially steam-cleaned with micro-filtered steam from deionized water, which removes both organic and inorganic contaminants.



1/32" OD stainless tubing

Pre-cut lengths

Length	.005" ID Prod No	.010" ID Prod No	.020" ID Prod No
<i>2 pieces per package</i>			
5 cm	T5N5D	T5N10D	T5N20D
10 cm	T10N5D	T10N10D	T10N20D
20 cm	T20N5D	T20N10D	T20N20D
30 cm	T30N5D	T30N10D	T30N20D
50 cm	T50N5D	T50N10D	T50N20D
100 cm	-	T100N10D	T100N20D
<i>10 pieces per package</i>			
5 cm	T5N5-10	T5N10-10	T5N20-10
10 cm	T10N5-10	T10N10-10	T10N20-10
20 cm	T20N5-10	T20N10-10	T20N20-10
30 cm	T30N5-10	T30N10-10	T30N20-10
50 cm	T50N5-10	T50N10-10	T50N20-10
100 cm	-	T100N10-10	T100N20-10
<i>50 pieces per package</i>			
5 cm	T5N5-50	T5N10-50	T5N20-50
10 cm	T10N5-50	T10N10-50	T10N20-50
20 cm	T20N5-50	T20N10-50	T20N20-50
30 cm	T30N5-50	T30N10-50	T30N20-50
50 cm	T50N5-50	T50N10-50	T50N20-50
100 cm	-	T100N10-50	T100N20-50
<i>100 pieces per package</i>			
5 cm	T5N5-100	T5N10-100	T5N20-100
10 cm	T10N5-100	T10N10-100	T10N20-100
20 cm	T20N5-100	T20N10-100	T20N20-100
30 cm	T30N5-100	T30N10-100	T30N20-100
50 cm	T50N5-100	T50N10-100	T50N20-100
100 cm	-	T100N10-100	T100N20-100

TECH TIP

Forty years of Valco experience show that the particles left in poorly cut tubing are the number one cause of valve damage.

5 cm	=	1.97"
10 cm	=	3.94"
20 cm	=	7.87"
30 cm	=	11.82"
50 cm	=	19.68"
100 cm	=	39.37"
0.12 mm	=	.005"
0.25 mm	=	.010"
0.50 mm	=	.020"
0.75 mm	=	.030"
1.0 mm	=	.040"
1.5 mm	=	.060"
2.0 mm	=	.080"
4.6 mm	=	.180"
6.0 mm	=	.236"
6.4 mm	=	.253"
7.0 mm	=	.275"
10.0 mm	=	.400"
27.0 mm	=	1.08"
1/32"	=	0.8 mm
1/16"	=	1.6 mm
1/8"	=	3.2 mm
1/4"	=	6.4 mm
3/8"	=	9.5 mm
1/2"	=	12.7 mm

Stainless Steel Tubing – Pre-Cut Lengths

1/16" OD stainless tubing

Pre-cut lengths

Length	.005" ID		.010" ID		.020" ID		.030" ID		.040" ID	
	Prod No		Prod No		Prod No		Prod No		Prod No	
<i>2 pieces per package</i>										
5 cm	T5C5D		T5C10D		T5C20D		T5C30D		T5C40D	
10 cm	T10C5D		T10C10D		T10C20D		T10C30D		T10C40D	
20 cm	T20C5D		T20C10D		T20C20D		T20C30D		T20C40D	
30 cm	T30C5D		T30C10D		T30C20D		T30C30D		T30C40D	
50 cm	T50C5D		T50C10D		T50C20D		T50C30D		T50C40D	
100 cm	-		T100C10D		T100C20D		T100C30D		T100C40D	
<i>10 pieces per package</i>										
5 cm	T5C5-10		T5C10-10		T5C20-10		T5C30-10		T5C40-10	
10 cm	T10C5-10		T10C10-10		T10C20-10		T10C30-10		T10C40-10	
20 cm	T20C5-10		T20C10-10		T20C20-10		T20C30-10		T20C40-10	
30 cm	T30C5-10		T30C10-10		T30C20-10		T30C30-10		T30C40-10	
50 cm	T50C5-10		T50C10-10		T50C20-10		T50C30-10		T50C40-10	
100 cm	-		T100C10-10		T100C20-10		T100C30-10		T100C40-10	
<i>50 pieces per package</i>										
5 cm	T5C5-50		T5C10-50		T5C20-50		T5C30-50		T5C40-50	
10 cm	T10C5-50		T10C10-50		T10C20-50		T10C30-50		T10C40-50	
20 cm	T20C5-50		T20C10-50		T20C20-50		T20C30-50		T20C40-50	
30 cm	T30C5-50		T30C10-50		T30C20-50		T30C30-50		T30C40-50	
50 cm	T50C5-50		T50C10-50		T50C20-50		T50C30-50		T50C40-50	
100 cm	-		T100C10-50		T100C20-50		T100C30-50		T100C40-50	
<i>100 pieces per package</i>										
5 cm	T5C5-100		T5C10-100		T5C20-100		T5C30-100		T5C40-100	
10 cm	T10C5-100		T10C10-100		T10C20-100		T10C30-100		T10C40-100	
20 cm	T20C5-100		T20C10-100		T20C20-100		T20C30-100		T20C40-100	
30 cm	T30C5-100		T30C10-100		T30C20-100		T30C30-100		T30C40-100	
50 cm	T50C5-100		T50C10-100		T50C20-100		T50C30-100		T50C40-100	
100 cm	-		T100C10-100		T100C20-100		T100C30-100		T100C40-100	

VOLUME CHART

Tubing ID	Volume		Tubing ID	Volume	
	µl/cm	µl/in		µl/cm	µl/in
.005"	0.13	0.32	.030"	4.56	11.58
.010"	0.51	1.29	.040"	8.11	20.59
.015"	1.14	2.90	.060"	18.24	46.33
.020"	2.03	5.15	.070"	24.83	63.06
.025"	3.17	8.04	.085"	36.61	92.99

Typical ID tolerances for our tubing are ±.001". This is much tighter than normal commercial grades of tubing; however, it is enough to result in noticeable error if exact volumes are not measured.