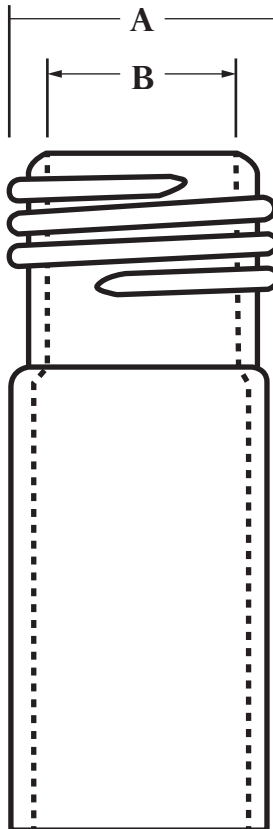
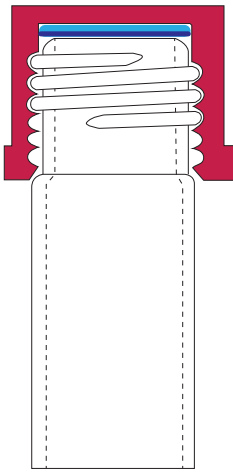


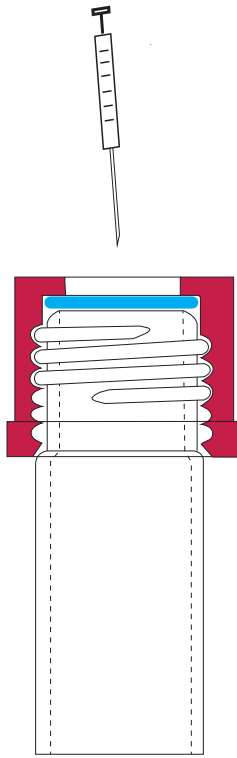
GLASS THREADS - GL STYLE



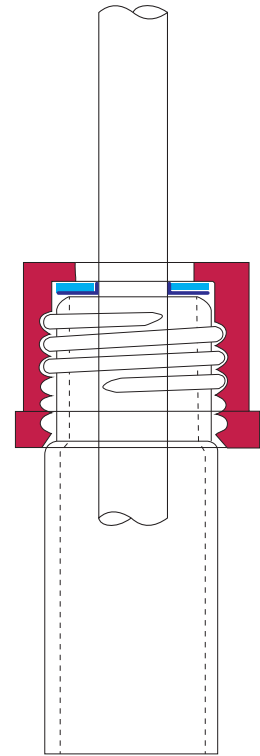
GL SIZE	*A* OUTSIDE THREAD DIA _{mm}	*B* INSIDE DIA, mm
14	13.75	8.45
18	17.5	11
25	24.5	18
32	31.5	23
45	44.5	34.5



Screw Cap with PTFE/silicone gasket



Screw Cap with Aperature with silicone septa for use with syringe needles

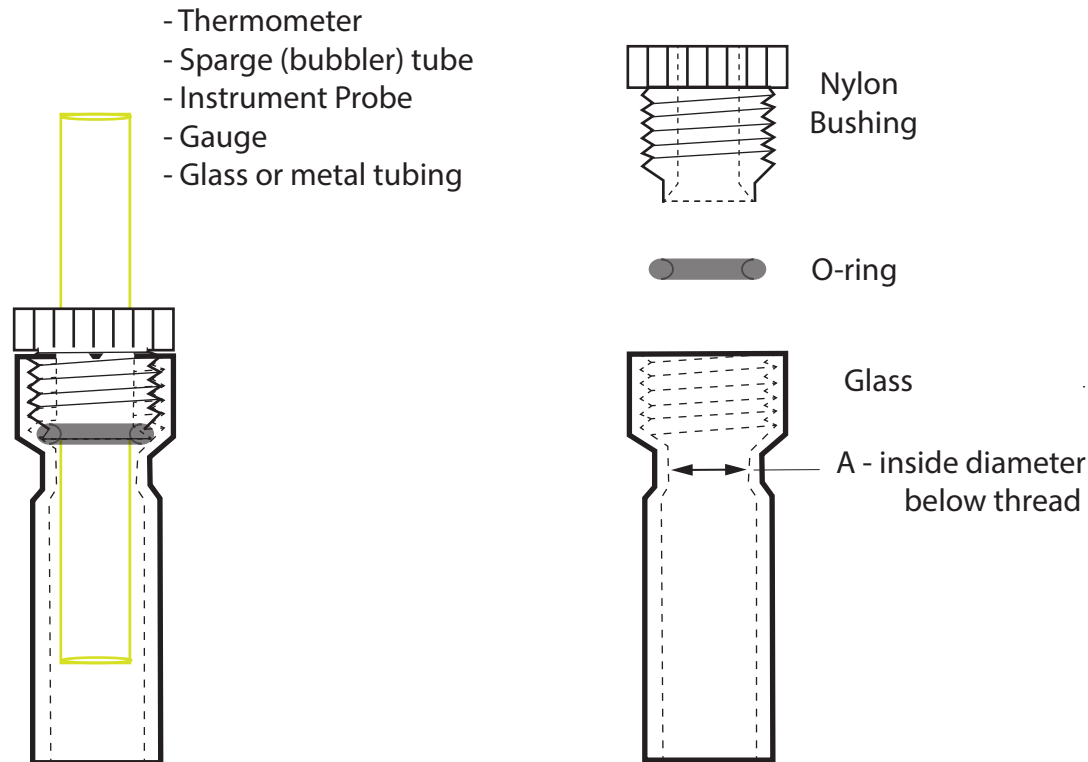


Screw Cap with Aperature with PTFE/silicone compression ring for sealing tubing through the GL opening.

Screw Cap w/ Aperature

GL SIZE	Aperature Opening, mm	Fits Tubing, mm
14	9.5	5.5 - 6.5
18	11	5.5 - 6.5 or 9 - 11
25	15	7.5 - 9 or 11 - 13
32	20	11 - 13
45	34	25 - 27

GLASS THREADS - ACE TYPE



ACE thread Size	A Inside Diameter, mm	Bushing, Accepts Tubing, mm
7	7	5-6.5
11	11	9-10.5
15	15	12.5-14
18	18	16-17
25	25	24-25
36	36	34-35
50	50	47-48
80	80	80

Capillary glass tubing with bushing and silicone-rubber septum allows for sealing small diameter probes

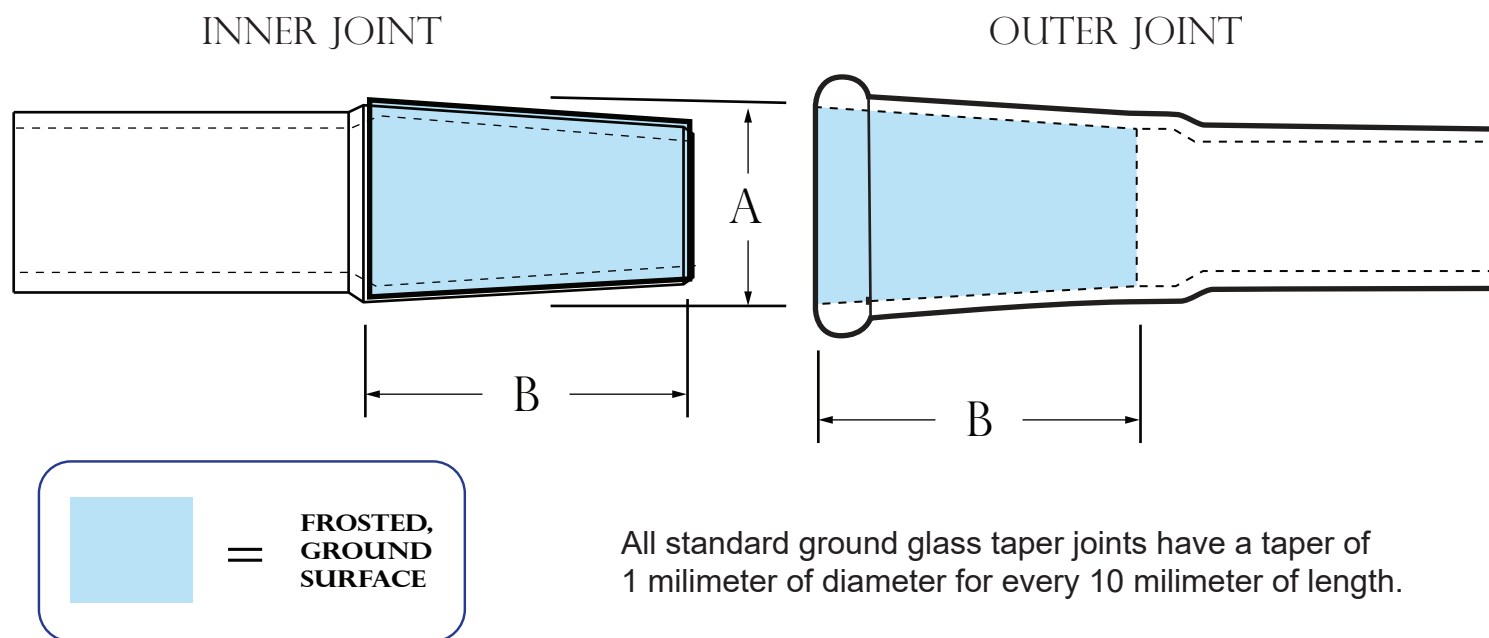
Capillary glass tubing, Inside Diameter, mm	Bushing, thru-hole size, mm
1.5-2	0.5
1.5-2	1.0
1.5-2	1.5
1.5-2	2.5

As you screw in the bushing, the O-ring compresses against the glass seat, and makes a vacuum-tight seal against the through tube.

NOTE: The bushing is sold separately from the glass threads

The capillary glass Ace thread can be an alternative to a glass-to-metal seal.

GROUND GLASS STANDARD TAPER, § JOINTS



§ is the symbol designating interchangeable joints, complying with ASTM standards. This means that for any given size, standard taper joints are interchangeable between manufacturers.

Standard taper joints are identified with a 2-part number after the § designation, and then whether it is an inner joint or outer joint. Example, § *A* / *B* inner joint.

A common example is a § 24/40 inner joint. 24 millimeters is the approximate diameter at the large end of the taper (A), and 40 millimeters is the axial length of the taper (B).

All ground standard taper joints have a taper of 1mm of diameter for every 10mm of length.

Note: Standard tapers come in Short, Medium and Long lengths.

Note: Any joint, regardless of length, will fit together provided the *A* dimensions are the same. For example, a § 14/35 inner joint will fit into a § 14/20 outer joint - with 15mm of taper protruding.

The 2 most common standard taper joints used in the chemistry department are § 14/20, and § 24/40. These, and other glassblowing components are available in the 5th floor research stockroom.

Ground glass surfaces require grease or a Teflon sleeve to prevent sticking. Use a grease such as Apiezon brand. Apiezon M for general vacuum applications.

Clips or springs can be used to secure the joints together. Keck is one brand name for a plastic clip.

Ground glass standard tapers are manufactured in accordance to **ASTM standard E676-02**.

Below are tables of available ground standard taper joints - including international standard tapers.

Standard Dimensions for **Full Length** Interchangeable Ground Glass Taper Joints

Joint Size Number	*A* Approximate Diameter At Large End of Taper, mm	*B* Approximate Length Of Ground Zone, mm	Approximate Diameter at Small End of Taper, mm
7/25	7.5	25	5.0
10/30	10.0	30	7.0
12/30	12.5	30	9.5
14/35	14.5	35	11.0
19/38	18.8	38	15.0
24/40	24.0	40	20.0
29/42	29.2	42	25.0
34/45	34.5	45	30.0
40/50	40.0	50	35.0
45/50	45.0	50	40.0
50/50	50.0	50	45.0
55/50	55.0	50	50.0
60/50	60.0	50	55.0
71/60	71.0	60	65.0
103/60	103.0	60	97.0

*

Standard Dimensions for **Medium Length** Interchangeable Ground Glass Taper Joints

Joint Size Number	*A* Approximate Diameter At Large End of Taper, mm	*B* Approximate Length Of Ground Zone, mm	Approximate Diameter at Small End of Taper, mm
5/12	5.0	12	3.8
7/15	7.5	15	6.0
10/18	10.0	18	8.2
12/18	12.5	18	10.7
14/20	14.5	20	12.5
19/22	18.8	22	16.6
24/25	24.0	25	21.5
29/26	29.2	26	26.6
34/28	34.5	28	31.7
40/35	40.0	35	36.5

*

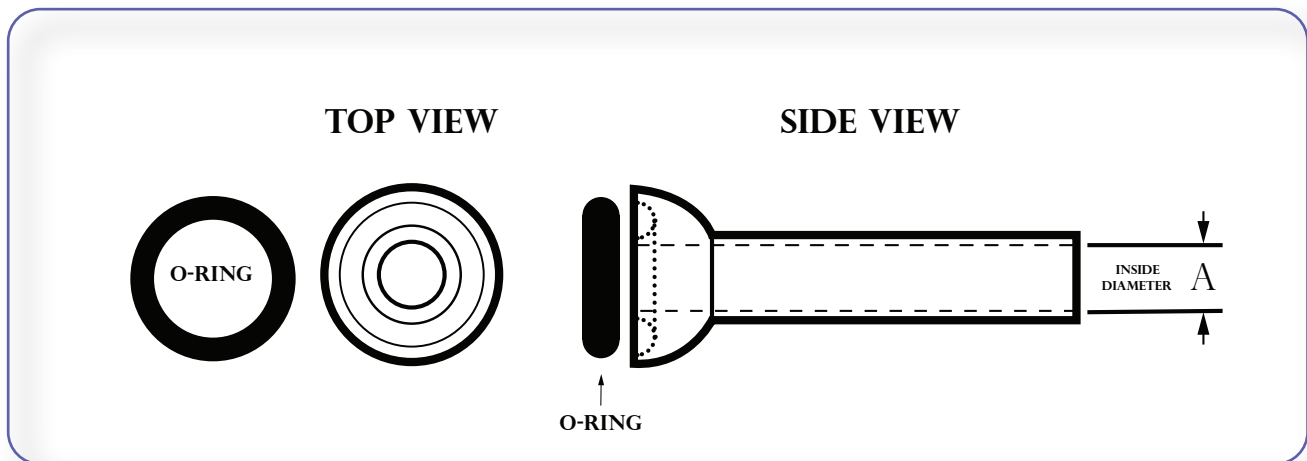
Standard Dimensions for **Short Length** Interchangeable Ground Glass Taper Joints

Joint Size Number	*A* Approximate Diameter At Large End of Taper, mm	*B* Approximate Length Of Ground Zone, mm	Approximate Diameter at Small End of Taper, mm
5/8	5.0	8	4.2
7/10	7.5	10	6.5
10/7	10.0	7	9.3
10/10	10.0	10	9.0
12/10	12.5	10	11.5
14/10	14.5	10	13.5
19/10	18.8	10	17.8
24/12	24.0	12	22.8
29/12	29.2	12	28.0
34/12	34.5	12	33.3
40/12	40.0	12	38.8
45/12	45.0	12	43.8
50/12	50.0	12	48.8
55/12	55.0	12	53.8
60/12	60.0	12	58.8
71/15	71.0	15	69.5

Standard Dimensions for **International Length** Interchangeable Ground Glass Taper Joints

Joint Size Number	*A* Approximate Diameter At Large End of Taper, mm	*B* Approximate Length Of Ground Zone, mm	Approximate Diameter at Small End of Taper, mm
5/13	5.0	13	3.7
7/16	7.5	16	5.9
10/19	10.0	19	8.1
12/21	12.5	21	10.4
14/23	14.5	23	12.2
19/26	18.8	26	16.2
21/28	21.5	28	18.7
24/29	24.0	29	21.1
29/32	29.2	32	26.0
34/35	34.5	35	31.0
40/38	40.0	38	36.2
45/40	45.0	40	41.0
50/42	50.0	42	45.8
60/46	60.0	46	55.4
71/51	71.0	51	65.9
85/55	85.0	55	79.5
100/60	100.0	60	94.0

O - RING JOINT

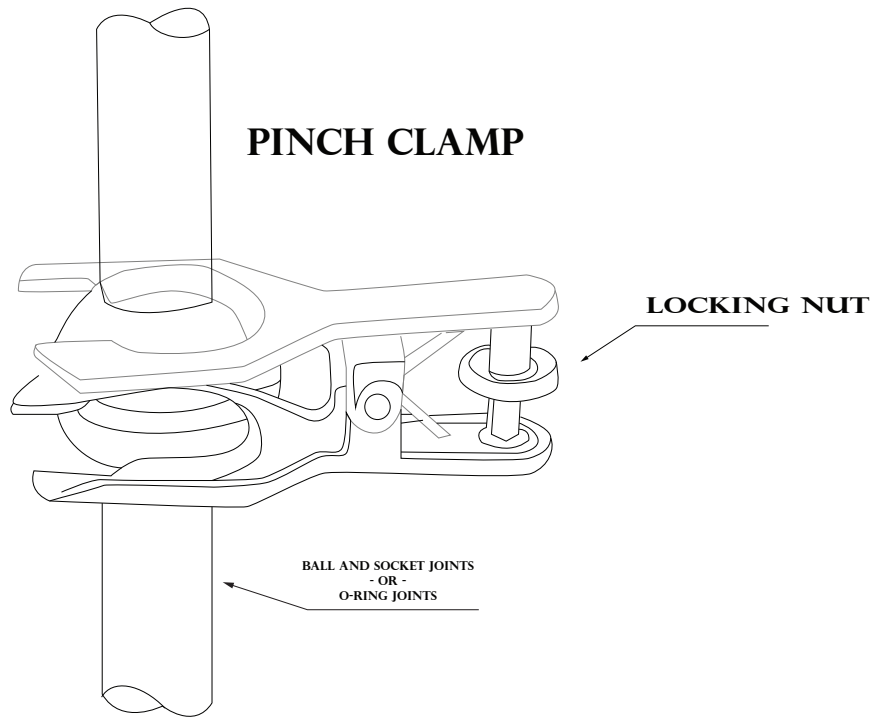


O - RING JOINT

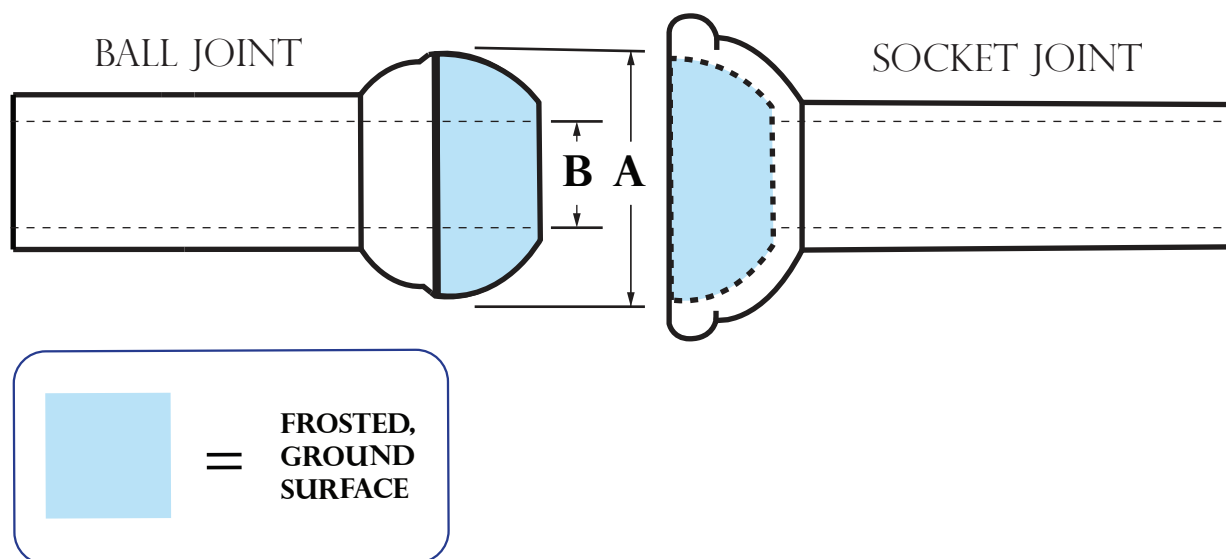
JOINT SIZE	*A* INSIDE DIAMETER, mm	PINCH CLAMP SIZE	O-RING SIZE
5	5	12	110
7	7	18	111
9	9	18	112
15	15	28	116
20	20	35	214
25	25	35	217
30	30	50	223
40	40	65	226
50	50	75	229
75	75	102	341

O-rings joints are best suited to applications using a vertical orientation, for example, a cold trap.

O-ring joints are held together with a pinch clamp.



SPHERICAL GROUND GLASS BALL AND SOCKET, § JOINTS



§ is the symbol designating interchangeable Spherical Joints, complying with ASTM standards. This means that for any given size, standard Spherical Joints are interchangeable between manufacturers.

Standard Spherical Joints are identified with a 2-part number after the § designation, and then whether it is a ball or socket joint.

A generic example based on the drawing above is §*A* / *B* ball joint, or, §*A* / *B* socket joint.

A common example is a §18/9 Ball joint. 18 millimeters is the approximate diameter of the outer ball (A) and the approximate inside diameter of the tube is 9mm (B).

Note: Any ball or socket is interchangeable if the dimension *A* is the same. So, a 12/1 ball joint will fit into a 12/1, 12/2, 12/3, or 12/5 socket joint - since all of their outside ball dimensions are the same.

The 2 most common ball and socket joints used in the chemistry department are §18/9, and §28/15. These, and other glassblowing components are available in the 5th floor research stockroom.

Ground glass surfaces require grease to prevent sticking. Use a grease such as Apiezon brand.

A pinch clamp is used to hold the ball and socket joints together.

Ground glass spherical ball/socket joints are manufactured in accordance to ASTM standard E677-94.

Below is a table of standard dimensions for interchangeable spherical ground ball and socket joints.

Standard Dimensions for Interchangeable Ground **Ball/Socket** Joints

Joint Size Number	*A* Approximate Diameter of Ball, mm	*B* Approximate Internal Tube Diameter, mm	Pinch Clamp Size
7/1	7	1	-
12/1	12	1	12
12/2	12	2	12
12/3	12	3	12
12/5	12	5	12
18/7	18	7	18
18/8	18	8	18
28/12	28	12	28
28/15	28	15	28
35/20	35	20	35
35/25	35	25	35
40/25	40	25	40
50/30	50	30	50
65/40	65	40	65
75/50	75	50	75
102/75	102	75	102

PINCH CLAMP

