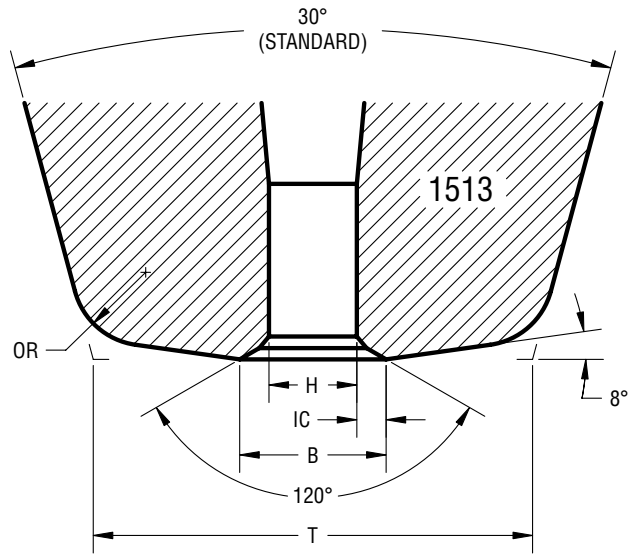
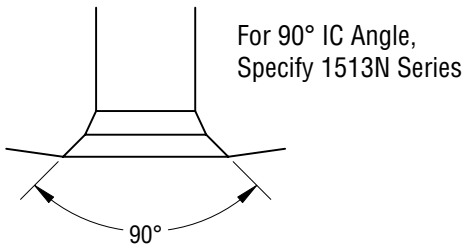


The 1513 series is an excellent general purpose capillary suitable for a wide range of applications on a variety of metalizations. This series employs the 120° double IC and 8° face angle architecture. The 120° IC provides maximum downward force for a strong 1st bond with high ball-shear strength and is not prone to cut-stitch on the 2nd bond. The 8° face angle is the most versatile for handling a variety of stitch-bond metalizations. Many different Hole and B and T size combinations are available in the different dash numbers of the 1513 series.

The 1513N may be specified for a 90° inside chamfer for improved 2nd bond tailing and a more compact ball bond on materials with good bondability.



**Specify:** Series - Dash Number - Length+Finish - Options  
**Example:** 1513-18-437GM-20D

Note: For Tungsten Carbide material, specify 1113 & 1113N series (1/16 in. diameter only). For 1/8 in. diameter ceramic, specify 1213 & 1213N series.

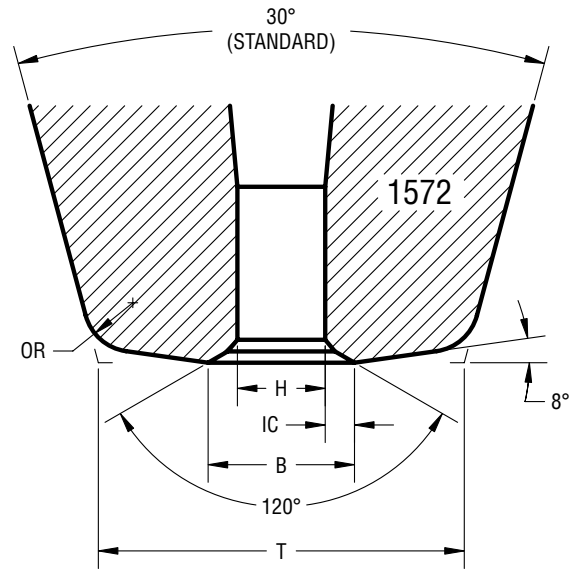
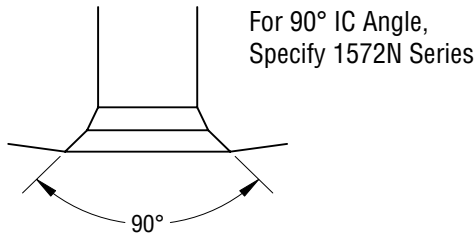
SERIES & DASH NO.	H* in. / μm ±0.0001 / 2.5	IC in. / μm (Ref)	B in. / μm See Note**	OR in. / μm ±0.0003 / 8	T (30° CONE) in. / μm ±0.0003 / 8	T (20° CONE) in. / μm ±0.0003 / 8	SUGGESTED WIRE DIAMETER in. / μm
1513-10	0.0010 / 25	0.0007 / 18	0.0024 / 61	0.0012 / 30	0.0065 / 165	0.0067 / 170	0.0005 / 13 to 0.0008 / 20
1513-10S	0.0010 / 25	0.0004 / 10	0.0018 / 46	0.0012 / 30	0.0065 / 165	0.0067 / 170	
1513-12	0.0012 / 30	0.0006 / 15	0.0024 / 61	0.0012 / 30	0.0065 / 165	0.0067 / 170	
1513-15	0.0015 / 38	0.0007 / 18	0.0029 / 74	0.0015 / 38	0.0080 / 203	0.0082 / 208	0.0007 / 18 to 0.0009 / 23
1513-17	0.0017 / 43	0.0007 / 18	0.0031 / 79	0.0015 / 38	0.0080 / 203	0.0082 / 208	0.0010 / 25 to 0.0013 / 33
1513-17M	0.0017 / 43	0.0006 / 15	0.0029 / 74	0.0015 / 38	0.0090 / 229	0.0093 / 236	
1513-18	0.0018 / 46	0.00085 / 22	0.0035 / 89	0.0015 / 38	0.0090 / 229	0.0093 / 236	
1513-18A	0.0018 / 46	0.0006 / 15	0.0030 / 76	0.0015 / 38	0.0080 / 203	0.0082 / 208	
1513-18M	0.0018 / 46	0.0006 / 15	0.0030 / 76	0.0015 / 38	0.0090 / 229	0.0093 / 236	
1513-18S	0.0018 / 46	0.0006 / 15	0.0030 / 76	0.0012 / 30	0.0065 / 165	0.0067 / 170	
1513-20A	0.0020 / 51	0.00045 / 11	0.0029 / 74	0.0015 / 38	0.0080 / 203	0.0082 / 208	
1513-20B	0.0020 / 51	0.00075 / 19	0.0035 / 89	0.0015 / 38	0.0090 / 229	0.0093 / 236	0.0013 / 33 to 0.0015 / 38
1513-20M	0.0020 / 51	0.00045 / 11	0.0029 / 74	0.0015 / 38	0.0090 / 229	0.0093 / 236	
1513-21	0.0021 / 51	0.00095 / 24	0.0040 / 102	0.0020 / 51	0.0100 / 254	0.0103 / 262	
1513-22	0.0022 / 56	0.0009 / 23	0.0040 / 102	0.0020 / 51	0.0100 / 254	0.0103 / 262	
1513-22A	0.0022 / 56	0.00065 / 17	0.0035 / 89	0.0015 / 38	0.0090 / 229	0.0093 / 236	
1513-22M	0.0022 / 56	0.0004 / 10	0.0030 / 76	0.0015 / 38	0.0090 / 229	0.0093 / 236	
1513-25	0.0025 / 64	0.00075 / 19	0.0040 / 102	0.0020 / 51	0.0100 / 254	0.0103 / 262	0.0015 / 38 to 0.0020 / 51
1513-27	0.0027 / 69	0.00115 / 29	0.0050 / 127	0.0025 / 64	0.0120 / 305	0.0124 / 315	0.0020 / 51
1513-33	0.0033 / 84	0.0011 / 28	0.0055 / 140	0.0030 / 76	0.0140 / 356	0.0145 / 368	0.0020 / 51 to 0.0025 / 64
1513-40	0.0040 / 102	0.0010 / 25	0.0060 / 152	0.0030 / 76	0.0160 / 406	0.0165 / 419	0.0030 / 76

\* For hole sizes 0.0025 through 0.0049, the tolerance is +0.0002/-0.0001. For hole sizes greater than 0.0049, the tolerance is +0.0003/-0.0002. Tighter tolerance available at additional charges.

\*\* If IC < 0.0005 and/or T < 0.0050, the B tolerance is +/-0.0001, otherwise B tolerance is +/-0.0002 (if B > 0.0040, B tolerance is +0.0003/-0.0002). Dimensions in inches unless otherwise specified.

The 1572 series is an excellent general purpose capillary suitable for a wide range of applications on a variety of metalizations. This series employs the 120° double IC and 8° face angle architecture. The 120° IC provides maximum downward force for a strong 1st bond with high ball-shear strength and is not prone to cut-stitch on the 2nd bond. The 8° face angle is the most versatile for handling a variety of stitch-bond metalizations. Many different Hole and B and T size combinations are available in the different dash numbers of the 1572 series. In general, the 1572 series will have smaller feature sizes for a given dash number.

The 1572N may be specified for a 90° inside chamfer for improved 2nd bond tailing and a more compact ball bond on materials with good bondability.



**Specify:** Series - Dash Number - Length + Finish - Options  
**Example:** 1572-18-437GM

Note: For Tungsten Carbide material, specify 1172 & 1172N series (1/16 in. diameter only). For 1/8 in. diameter ceramic, specify 1272 & 1272N series.

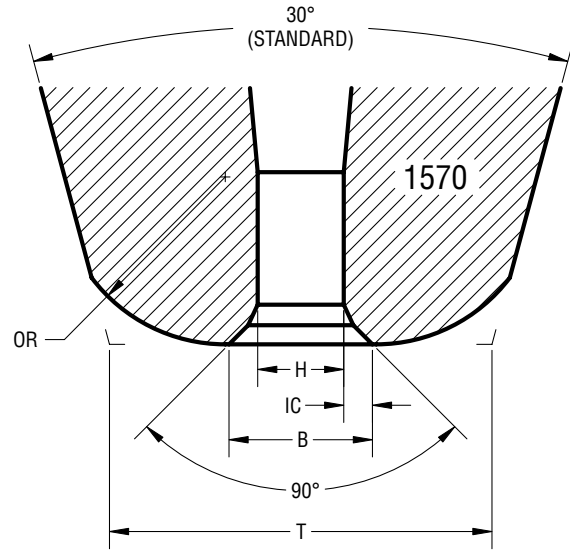
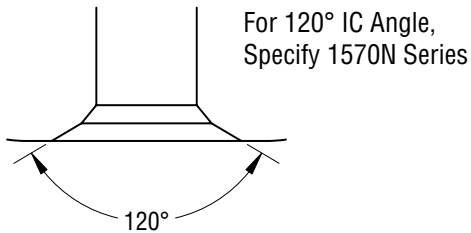
SERIES & DASH NO.	H* in. / μm ±0.0001 / 2.5	IC in. / μm (Ref)	B in. / μm See Note**	OR in. / μm ±0.0003 / 8	T (30° CONE) in. / μm ±0.0003 / 8	T (20° CONE) in. / μm ±0.0003 / 8	SUGGESTED WIRE DIAMETER in. / μm
1572-10	0.0010 / 25	0.0007 / 18	0.0024 / 61	0.0008 / 20	0.0055 / 140	0.0056 / 142	0.0005 / 13 to 0.0008 / 20
1572-10S	0.0010 / 25	0.0004 / 10	0.0018 / 46	0.0008 / 20	0.0055 / 140	0.0056 / 142	
1572-12	0.0012 / 30	0.0006 / 15	0.0024 / 61	0.0008 / 20	0.0055 / 140	0.0056 / 142	0.0007 / 18 to 0.0009 / 23
1572-13	0.0013 / 33	0.0006 / 15	0.0025 / 64	0.0008 / 20	0.0055 / 140	0.0056 / 142	
1572-13S	0.0013 / 33	0.0004 / 10	0.0021 / 53	0.0008 / 20	0.0055 / 140	0.0056 / 142	0.0008 / 20 to 0.0010 / 25
1572-15	0.0015 / 38	0.0007 / 18	0.0029 / 74	0.0010 / 25	0.0065 / 165	0.0067 / 170	
1572-15S	0.0015 / 38	0.0006 / 15	0.0027 / 69	0.0008 / 20	0.0055 / 140	0.0056 / 142	0.0009 / 23 to 0.0011 / 28
1572-17	0.0017 / 43	0.0006 / 15	0.0029 / 74	0.0010 / 25	0.0090 / 229	0.0092 / 234	
1572-17S	0.0017 / 43	0.0006 / 15	0.0029 / 74	0.0010 / 25	0.0065 / 165	0.0067 / 170	0.0010 / 25 to 0.0013 / 33
1572-18	0.0018 / 46	0.0006 / 15	0.0030 / 76	0.0010 / 25	0.0090 / 229	0.0092 / 234	
1572-20	0.0020 / 51	0.0010 / 25	0.0040 / 102	0.0015 / 38	0.0090 / 229	0.0093 / 236	0.0013 / 33 to 0.0015 / 38
1572-22	0.0022 / 56	0.0009 / 23	0.0040 / 102	0.0015 / 38	0.0090 / 229	0.0093 / 236	
1572-25	0.0025 / 64	0.0013 / 33	0.0051 / 130	0.0020 / 51	0.0115 / 292	0.0118 / 300	0.0015 / 38 to 0.0020 / 51
1572-30	0.0030 / 76	0.0013 / 33	0.0056 / 142	0.0025 / 64	0.0130 / 330	0.0134 / 340	0.0020 / 51
1572-35	0.0035 / 89	0.0010 / 25	0.0055 / 140	0.0030 / 76	0.0140 / 356	0.0145 / 368	0.0020 / 51 to 0.0025 / 64
1572-40	0.0040 / 102	0.0010 / 25	0.0060 / 152	0.0030 / 76	0.0140 / 356	0.0145 / 368	0.0030 / 76
1572-50	0.0050 / 127	0.0013 / 33	0.0076 / 193	0.0030 / 76	0.0160 / 406	0.0165 / 419	0.0040 / 102
1572-70	0.0070 / 178	0.0015 / 38	0.0100 / 254	0.0050 / 127	0.0280 / 711	0.0288 / 732	0.0050 / 127
1572-100	0.0100 / 254	0.0020 / 51	0.0140 / 356	0.0070 / 178	0.0380 / 965	0.0391 / 993	0.0060 / 152

\* For hole sizes 0.0025 through 0.0049, the tolerance is +0.0002/-0.0001. For hole sizes greater than 0.0049, the tolerance is +0.0003/-0.0002. Tighter tolerance available at additional charges.

\*\* If IC < 0.0005 and/or T < 0.0050, the B tolerance is +/-0.0001, otherwise B tolerance is +/-0.0002 (if B > 0.0040, B tolerance is +0.0003/-0.0002). Dimensions in inches unless otherwise specified.

The 1570 series features a very large value outside radius (OR) and 90° double IC architecture. The oversize OR performs well with uneven metalizations or in applications where the 2nd bond or stitch-bond surface has problems with flatness or planarity. The 90° IC allows for a taller, more compact ball bond. An optional 120° IC may be specified for increased downward force on the ball bond.

The 1570N may be specified for a 120° inside chamfer for applications with poor 1st bond bondability.



**Specify:** Series - Dash Number - Length+Finish - Options  
**Example:** 1570-18-437GM-20D

Note: For Tungsten Carbide material, specify 1170 & 1170N series (1/16 in. diameter only). For 1/8 in. diameter ceramic, specify 1270 & 1270N series.

SERIES & DASH NO.	H* in. / $\mu\text{m}$ $\pm 0.0001 / 2.5$	IC in. / $\mu\text{m}$ (Ref)	B in. / $\mu\text{m}$ See Note**	OR*** in. / $\mu\text{m}$ $\pm 0.0003 / 8$	T (30° CONE) in. / $\mu\text{m}$ $\pm 0.0003 / 8$	T (20° CONE) in. / $\mu\text{m}$ $\pm 0.0003 / 8$	SUGGESTED WIRE DIAMETER in. / $\mu\text{m}$
1570-10	0.0010 / 25	0.0003 / 8	0.0016 / 41	0.0020 / 51	0.0050 / 127	0.0051 / 130	0.0005 / 13 to 0.0008 / 20
1570-12	0.0012 / 30	0.0003 / 8	0.0018 / 46	0.0020 / 51	0.0050 / 127	0.0051 / 130	0.0007 / 18 to 0.0009 / 23
1570-13	0.0013 / 33	0.0004 / 10	0.0021 / 53	0.0025 / 64	0.0060 / 152	0.0062 / 157	0.0008 / 20 to 0.0010 / 25
1570-15	0.0015 / 38	0.0005 / 13	0.0025 / 64	0.0030 / 76	0.0070 / 178	0.0072 / 183	0.0009 / 23 to 0.0011 / 28
1570-17	0.0017 / 43	0.0006 / 15	0.0029 / 74	0.0035 / 89	0.0080 / 203	0.0083 / 211	0.0010 / 25 to 0.0013 / 33
1570-18	0.0018 / 46	0.0006 / 15	0.0030 / 76	0.0035 / 89	0.0080 / 203	0.0083 / 211	
1570-20	0.0020 / 51	0.0007 / 18	0.0034 / 86	0.0040 / 102	0.0090 / 229	0.0093 / 236	0.0013 / 33 to 0.0015 / 38
1570-22	0.0022 / 56	0.0007 / 18	0.0036 / 91	0.0040 / 102	0.0090 / 229	0.0093 / 236	
1570-25	0.0025 / 64	0.0008 / 20	0.0041 / 104	0.0050 / 127	0.0115 / 292	0.0119 / 302	0.0015 / 38 to 0.0020 / 51
1570-30	0.0030 / 76	0.0009 / 23	0.0048 / 122	0.0060 / 152	0.0140 / 356	0.0144 / 366	0.0020 / 51
1570-35	0.0035 / 89	0.0011 / 28	0.0057 / 145	0.0070 / 178	0.0165 / 419	0.0170 / 432	
1570-40	0.0040 / 102	0.0013 / 33	0.0066 / 168	0.0080 / 203	0.0190 / 483	0.0196 / 498	0.0030 / 76
1570-45	0.0045 / 114	0.0014 / 36	0.0073 / 185	0.0090 / 229	0.0211 / 536	0.0218 / 554	
1570-50	0.0050 / 127	0.0015 / 38	0.0080 / 203	0.0100 / 254	0.0240 / 610	0.0247 / 627	0.0040 / 102
1570-60	0.0060 / 152	0.0018 / 46	0.0096 / 244	0.0120 / 305	0.0290 / 737	0.0299 / 759	0.0050 / 127
1570-70	0.0070 / 178	0.0021 / 53	0.0112 / 284	0.0140 / 356	0.0350 / 889	0.0360 / 914	

\* For hole sizes 0.0025 through 0.0049, the tolerance is +0.0002/-0.0001. For hole sizes greater than 0.0049, the tolerance is +0.0003/-0.0002.

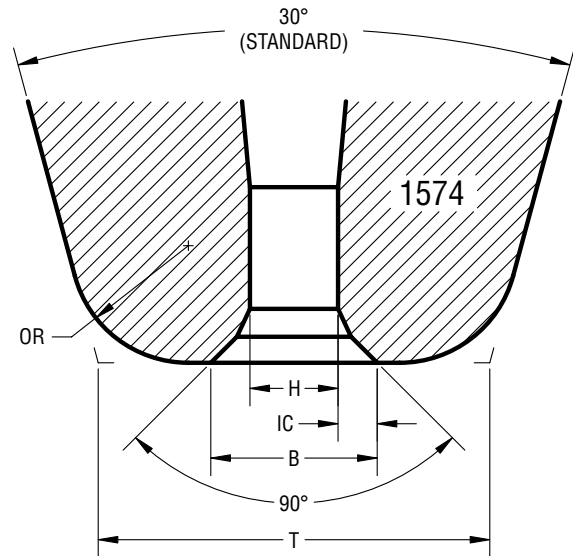
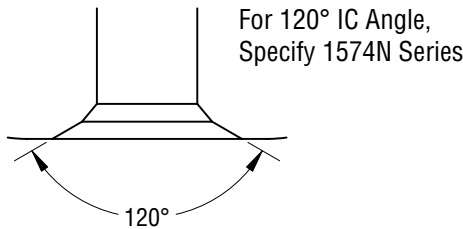
\*\* If IC < 0.0005 and/or T < 0.0050, the B tolerance is +/-0.0001, otherwise B tolerance is +/-0.0002 (if B > 0.0040, B tolerance is +0.0003/-0.0002).

\*\*\*OR tolerance  $\pm 0.0003$  for OR less than or equal to 0.0030; for OR greater than 0.0030, tolerance is  $\pm 10\%$ .

Tighter tolerance available at additional charges.  
Dimensions in inches unless otherwise specified.

The 1574 series utilizes a flat-face design combined with 90° double IC architecture. This series can be configured for making relatively smaller ball bonds by specifying the dash numbers with the smaller IC sizes and adjusting the free-air ball accordingly. This series is designed for applications with good overall bondability, equivalent to the old 40470 series.

The 1574N may be specified for a 120° inside chamfer for surfaces with poor 1st bond bondability.



**Specify:** Series - Dash Number - Length+Finish - Options  
**Example:** 1574-18-437GM-20D

Note: For Tungsten Carbide material, specify 1174 & 1174N series (1/16 in. diameter only). For 1/8 in. diameter ceramic, specify 1274 & 1274N series.

SERIES & DASH NO.	H* in. / $\mu\text{m}$ $\pm 0.0001 / 2.5$	IC in. / $\mu\text{m}$ (Ref)	B in. / $\mu\text{m}$ See Note**	OR*** in. / $\mu\text{m}$ $\pm 0.0003/8$	T (30° CONE) in. / $\mu\text{m}$ $\pm 0.0003 / 8$	T (20° CONE) in. / $\mu\text{m}$ $\pm 0.0003 / 8$	SUGGESTED WIRE DIAMETER in. / $\mu\text{m}$
1574-10	0.0010 / 25	0.0002 / 5	0.0014 / 36	0.0025 / 64	0.0065 / 165	0.0068 / 174	0.0005 / 13 to 0.0008 / 20
1574-12	0.0012 / 30	0.0002 / 5	0.0016 / 41	0.0025 / 64	0.0065 / 165	0.0068 / 174	0.0007 / 18 to 0.0009 / 23
1574-13	0.0013 / 33	0.0003 / 8	0.0019 / 48	0.0025 / 64	0.0065 / 165	0.0068 / 174	0.0008 / 20 to 0.0010 / 25
1574-15S	0.0015 / 38	0.0003 / 8	0.0021 / 53	0.0035 / 89	0.0080 / 203	0.0085 / 216	0.0009 / 23 to 0.0011 / 28
1574-17	0.0017 / 43	0.0007 / 18	0.0031 / 79	0.0024 / 61	0.0080 / 203	0.0083 / 211	0.0010 / 25 to .00013 / 33
1574-17S	0.0017 / 43	0.0002 / 5	0.0021 / 53	0.0035 / 89	0.0080 / 203	0.0085 / 216	
1574-18	0.0018 / 46	0.0008 / 20	0.0034 / 86	0.0024 / 61	0.0080 / 203	0.0083 / 211	
1574-18M	0.0018 / 46	0.00055 / 14	0.0029 / 74	0.0024 / 61	0.0080 / 203	0.0083 / 211	
1574-18S	0.0018 / 46	0.0002 / 5	0.0022 / 56	0.0035 / 89	0.0080 / 203	0.0085 / 216	0.0013 / 33 to 0.0015 / 38
1574-20	0.0020 / 51	0.0007 / 18	0.0034 / 86	0.0024 / 61	0.0080 / 203	0.0083 / 211	
1574-20M	0.0020 / 51	0.00045 / 11	0.0029 / 74	0.0024 / 61	0.0080 / 203	0.0083 / 211	
1574-22	0.0022 / 56	0.0006 / 15	0.0034 / 86	0.0024 / 61	0.0080 / 203	0.0083 / 211	
1574-22M	0.0022 / 56	0.00035 / 9	0.0029 / 74	0.0024 / 61	0.0080 / 203	0.0083 / 211	0.0015 / 38 to 0.0020 / 51
1574-25	0.0025 / 64	0.0005 / 13	0.0035 / 89	0.0024 / 61	0.0080 / 203	0.0083 / 211	
1574-30	0.0030 / 76	0.0010 / 25	0.0050 / 127	0.0055 / 140	0.0165 / 419	0.0172 / 437	0.0020 / 51
1574-35	0.0035 / 89	0.0008 / 20	0.0051 / 130	0.0065 / 165	0.0165 / 419	0.0174 / 442	0.0020 / 51 to 0.0025 / 64
1574-35S	0.0035 / 89	0.0008 / 20	0.0051 / 130	0.0055 / 140	0.0165 / 419	0.0172 / 437	
1574-40	0.0040 / 102	0.0010 / 25	0.0060 / 152	0.0065 / 165	0.0165 / 419	0.0174 / 442	0.0030 / 76
1574-50	0.0050 / 127	0.0012 / 30	0.0074 / 188	0.0070 / 178	0.0190 / 483	0.0200 / 508	0.0040 / 102

\* For hole sizes 0.0025 through 0.0049, the tolerance is +0.0002/-0.0001. For hole sizes greater than 0.0049, the tolerance is +0.0003/-0.0002.

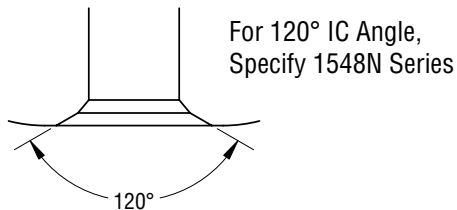
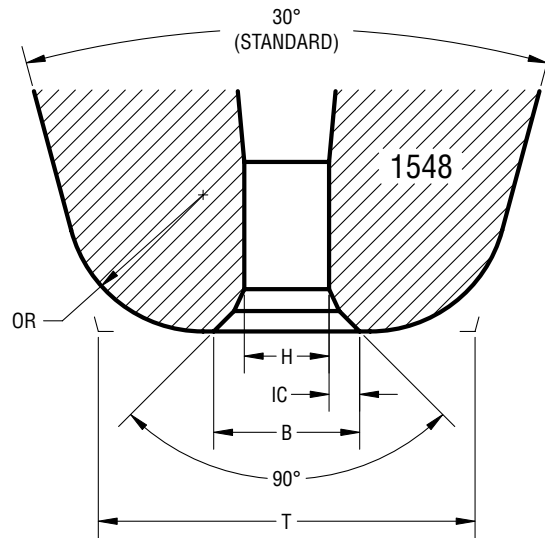
\*\* If IC < 0.0005 and/or T < 0.0050, the B tolerance is +/-0.0001, otherwise B tolerance is +/-0.0002 (if B > 0.0040, B tolerance is +0.0003/-0.0002).

\*\*\*OR tolerance  $\pm 0.0003$  for OR less than or equal to 0.0030; for OR greater than 0.0030, tolerance is  $\pm 10\%$ .

Tighter tolerance available at additional charges. Dimensions in inches unless otherwise specified.

The 1548 series utilizes a flat-face design combined with 90° double IC architecture. This series is the equivalent to the old 41480 series and is suitable for applications with good bondability. An optional 120° IC may be specified for increased downward force on the ball bond.

The 1548N may be specified for a 120° inside chamfer for applications with poor 1st bond bondability.



**Specify:** Series - Dash Number - Length+Finish - Options  
**Example:** 1548-18-437P

Note: For Tungsten Carbide material, specify 1148 & 1148N series (1/16 in. diameter only). For 1/8 in. diameter ceramic, specify 1248 & 1248N series.

SERIES & DASH NO.	H* in. / $\mu\text{m}$ $\pm 0.0001 / 2.5$	IC in. / $\mu\text{m}$ (Ref)	B in. / $\mu\text{m}$ See Note**	OR*** in. / $\mu\text{m}$ $\pm 0.0003 / 8$	T (30° CONE) in. / $\mu\text{m}$ $\pm 0.0003 / 8$	T (20° CONE) in. / $\mu\text{m}$ $\pm 0.0003 / 8$	SUGGESTED WIRE DIAMETER in. / $\mu\text{m}$
1548-10	0.0010 / 25	0.0004 / 10	0.0018 / 46	0.0018 / 46	0.0050 / 127	0.0052 / 132	0.0005 / 13 to 0.0008 / 20
1548-12	0.0012 / 30	0.00035 / 9	0.0019 / 48	0.0018 / 46	0.0050 / 127	0.0052 / 132	0.0007 / 18 to 0.0009 / 23
1548-13	0.0013 / 33	0.0004 / 10	0.0021 / 53	0.0021 / 53	0.0060 / 152	0.0063 / 160	0.0008 / 20 to 0.0010 / 25
1548-15	0.0015 / 38	0.0005 / 13	0.0025 / 64	0.0025 / 64	0.0070 / 178	0.0073 / 185	0.0009 / 23 to 0.0011 / 28
1548-17	0.0017 / 43	0.0006 / 15	0.0029 / 74	0.0029 / 74	0.0080 / 203	0.0084 / 213	0.0010 / 25 to 0.0013 / 33
1548-18	0.0018 / 46	0.00065 / 17	0.0031 / 79	0.0029 / 74	0.0080 / 203	0.0084 / 213	
1548-20	0.0020 / 51	0.0007 / 18	0.0034 / 86	0.0032 / 81	0.0090 / 229	0.0094 / 239	0.0013 / 33 to 0.0015 / 38
1548-22	0.0022 / 56	0.0007 / 18	0.0036 / 91	0.0032 / 81	0.0090 / 229	0.0094 / 239	
1548-30	0.0030 / 76	0.0009 / 23	0.0048 / 122	0.0048 / 122	0.0140 / 356	0.0147 / 373	0.0020 / 51
1548-35	0.0035 / 89	0.0009 / 23	0.0053 / 135	0.0065 / 165	0.0165 / 419	0.0174 / 442	0.0020 / 51 to 0.0025 / 64
1548-40	0.0040 / 102	0.00125 / 32	0.0065 / 165	0.0065 / 165	0.0185 / 470	0.0194 / 493	0.0030 / 76

\* For hole sizes 0.0025 through 0.0049, the tolerance is +0.0002/-0.0001. For hole sizes greater than 0.0049, the tolerance is +0.0003/-0.0002.

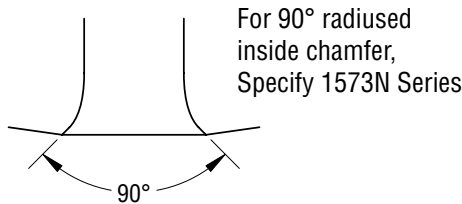
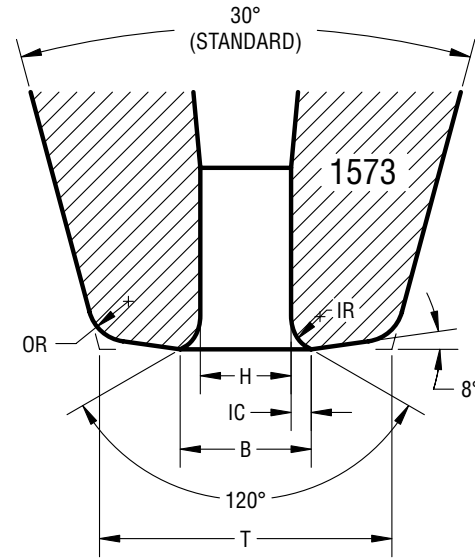
\*\* If IC < 0.0005 and/or T < 0.0050, the B tolerance is +/-0.0001, otherwise B tolerance is +/-0.0002 (if B > 0.0040, B tolerance is +0.0003/-0.0002).

\*\*\*OR tolerance  $\pm 0.0003$  for OR less than or equal to 0.0030; for OR greater than 0.0030, tolerance is  $\pm 10\%$ .

Tighter tolerance available at additional charges. Dimensions in inches unless otherwise specified.

The 1573 series is the original “fine-pitch”, small-T capillary, designed before the 100µm barrier had been broken and before the angle bottleneck feature became commonplace for fine-pitch bonds. This series is typically equipped with a 15° or 20° cone and is designed for pitches above 100µm. The IC size is configured for making a small ball bond as well as having a radiused inside chamfer design for good looping characteristics in an automatic bonder. For bond pad pitches below 100µm, refer to the fine pitch section of the catalog.

The 1573N may be specified for a 90° radiused inside chamfer for a more compact ball bond on materials with good bondability.



**Specify:** Series - Dash Number - Length+Finish - Options  
**Example:** 1573-18-437GM-20D

Note: For Tungsten Carbide material, specify 1173 & 1173N series (1/16 in. diameter only). For 1/8 in. diameter ceramic, specify 1273 & 1273N series.

SERIES & DASH NO.	H* in. / µm ±0.0001 / 2.5	IR in. / µm (Ref)	B in. / µm See Note**	OR*** in. / µm ±0.0003 / 8	T (30° CONE) in. / µm ±0.0003 / 8	T (20° CONE) in. / µm ±0.0003 / 8	SUGGESTED WIRE DIAMETER in. / µm
1573-11	0.0011 / 28	0.0004 / 10	0.0019 / 48	0.0008 / 20	0.0054 / 137	0.0055 / 140	0.0005 / 13 to 0.0008 / 20
1573-12	0.0012 / 30	0.0004 / 10	0.0020 / 51	0.0008 / 20	0.0054 / 137	0.0055 / 140	0.0007 / 18 to 0.0009 / 23
1573-13	0.0013 / 33	0.0004 / 10	0.0021 / 53	0.0008 / 20	0.0054 / 137	0.0055 / 140	0.0008 / 20 to 0.0010 / 25
1573-14	0.0014 / 36	0.0004 / 10	0.0022 / 56	0.0008 / 20	0.0054 / 137	0.0055 / 140	
1573-15	0.0015 / 38	0.0004 / 10	0.0023 / 58	0.0008 / 20	0.0054 / 137	0.0055 / 140	0.0009 / 23 to 0.0011 / 28
1573-17	0.0017 / 43	0.0004 / 10	0.0025 / 64	0.0008 / 20	0.0058 / 147	0.0059 / 150	0.0010 / 25 to 0.0013 / 33
1573-18	0.0018 / 46	0.0004 / 10	0.0026 / 66	0.0008 / 20	0.0058 / 147	0.0059 / 150	
1573-19	0.0019 / 48	0.0006 / 15	0.0031 / 79	0.0010 / 25	0.0063 / 160	0.0065 / 165	0.0011 / 28 to 0.0013 / 33
1573-21	0.0021 / 53	0.0006 / 15	0.0033 / 83	0.0010 / 25	0.0063 / 160	0.0065 / 165	0.0013 / 33 to 0.0015 / 38
1573-22	0.0022 / 56	0.0006 / 15	0.0034 / 86	0.0010 / 25	0.0063 / 160	0.0065 / 165	

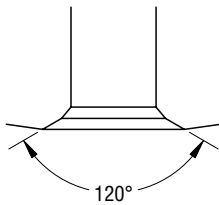
\* For hole sizes 0.0025 through 0.0049, the tolerance is +0.0002/-0.0001. For hole sizes greater than 0.0049, the tolerance is +0.0003/-0.0002.

\*\* If IC < 0.0005 and/or T < 0.0050, the B tolerance is +/-0.0001, otherwise B tolerance is +/-0.0002 (if B > 0.0040, B tolerance is +0.0003/-0.0002).

\*\*\*OR tolerance ±0.0003 for OR less than or equal to 0.0030; for OR greater than 0.0030, tolerance is ±10%.

Tighter tolerance available at additional charges. Dimensions in inches unless otherwise specified.

The 1551 series allows the user to specify all dimensions of the capillary within the part number and should be used when an existing catalog series will not meet the requirements of an application. This series comes standard with a 90° double inside chamfer, but may be specified with a 120° or other chamfer angles.

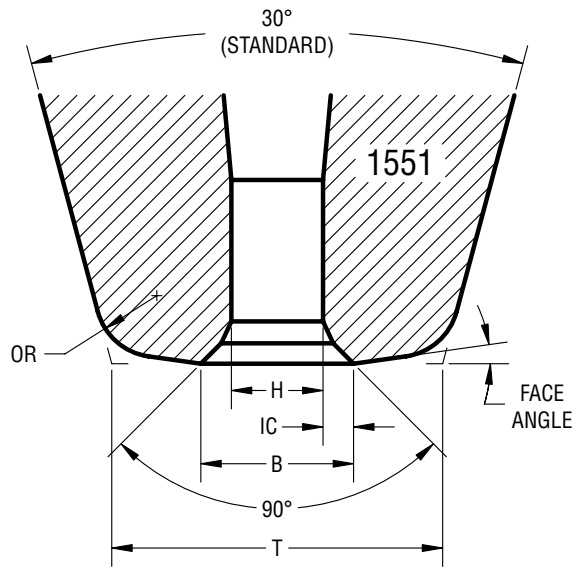


For 120° IC angle, specify "x120D" in part number. Other angle options also apply.

For single IC angle, specify as 1553 series. Standard angle is 90° unless otherwise specified.

**Example:**

- 1551-15-437GM-60(3x120D-8D-10)
- 1551-18-437GM-80(3x70D-8D-15)
- 1553-17-375GM-55(4x100D-4D-12)



The 1520 series also allows the user to specify all dimensions of the capillary but is designed with a standard 120° full radiused inside chamfer. This design is optimized for use in high-speed, automated bonders and provides improved looping and wire control. The 1520 series helps to reduce sagging and wavy-wire problems making the 1520 ideal for long-loop and low-loop bonding.

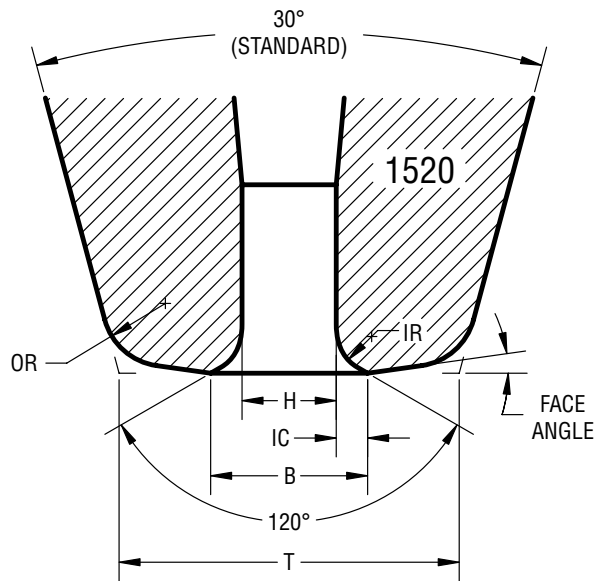
For smaller IC sizes, consider the 1553 and 1554 single IC series.

**Specify:**

Series - H - Length+Finish - T(IC - Face Angle - OR)Options

**Example:**

- 1551-18-437GM-60(3-8D-10)20D
- 1520-18-437GM-60(3-8D-10)
- 1551-18-437GM-60(3-F-10)20D-AB10x12-BLIC



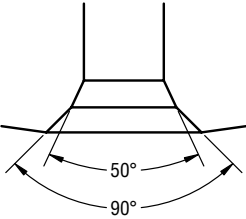
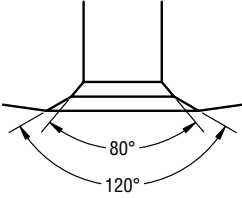
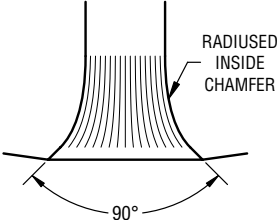
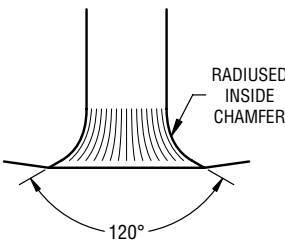
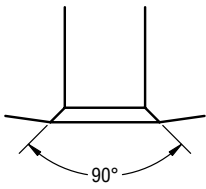
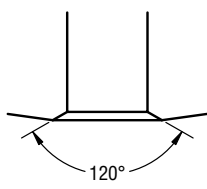
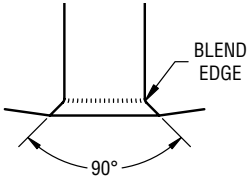
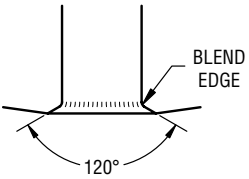
Note: A flat face 1551 or 1520 may be specified by a "-F" or by the actual numerical value in the part number.

A mathematical relationship exists between the various dimensions at the capillary tip. When designing a part number or when simply changing the cone angle, you may wish to contact a Gaiser Sales Engineer.

If a radiused inside chamfer is desired in a 90° IC 1551, specify "-BLIC" at the end of the part number.

If a radiused inside chamfer is desired in a 120° IC 1551, use the 1520 series.

For the 1553 series, a radiused inside chamfer is not available.

SERIES	90° ARCHITECTURE	120° ARCHITECTURE	DEFINITIONS
1551 Double IC Architecture	90°/50° Standard 	120°/80° and other IC angles optional 	1551 Series utilizes the Gaiser Double IC architecture. 90°/50° Double IC is standard unless otherwise specified.
1551 With BLIC (Blended Inside Chamfer)	1551 with BLIC 90° unless otherwise specified 	N/A (see 1520)	BLIC adds a Radiused/Blended Inside Chamfer to 90° Double IC and other 1551 capillaries. For 120° BLIC, use 1520 Series.
1520 Full Radius Series (120° Blended Inside Chamfer)	N/A (see 1551 with BLIC)	120° Double IC architecture with BLIC 	1520 Series utilizes the 120° Gaiser Double IC architecture with Radiused/Blended Inside Chamfer. For angle other than 120°, use BLIC.
1553 Single IC Architecture			1553 Series utilizes the basic Single IC angle design. Consider specifying when IC size is too small for Double IC.
1554 Single IC Architecture with Blend Edge			1554 Series is the same as the 1553 Single IC Series except that a very tiny edge break is applied to the transition from IC angle to the Hole.

capillaries

wedges

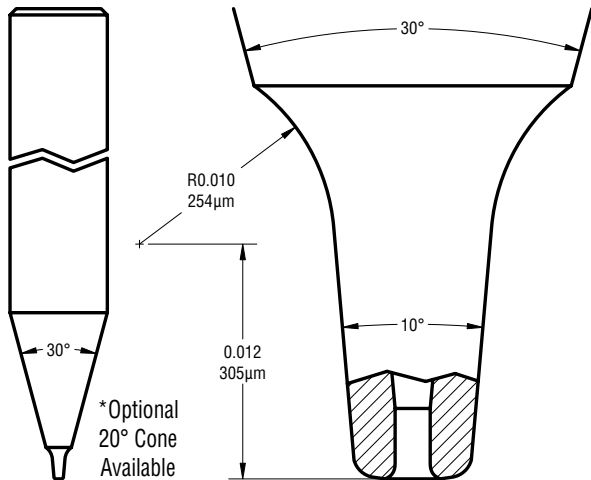
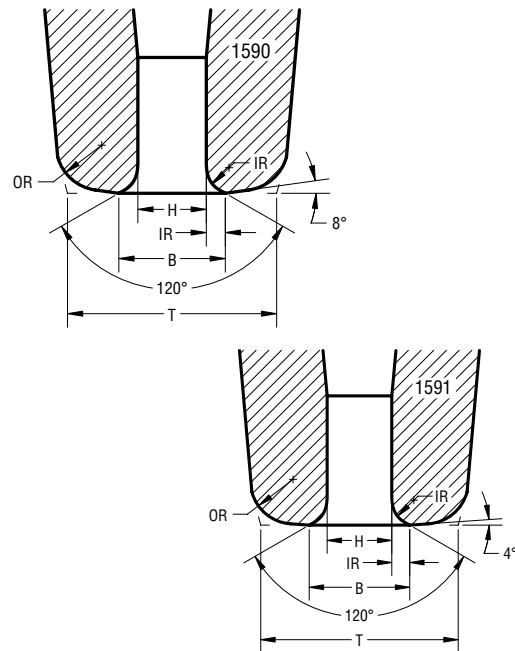
tab tools

die attach

other



The 1590 and 1591 series are designed for pitches of 100µm and above. The angle bottleneck design provides clearance for adjacent loops and the IC is configured for making a small ball bond. The 1590 and 1591 series utilize 120° full radius architecture for maximum downward force on the ball bond for the highest ball shear and for good looping. For a taller more compact ball bond, the 1592 & 1593 series utilize 90° radiused inside chamfer architecture. Both 8° and 4° face angles are available.



**Specify:** Series - Dash Number - Length+Finish - Options  
**Example:** 1590-18E-437GM-20D

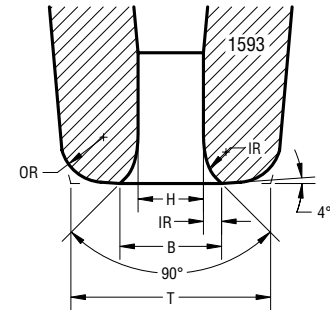
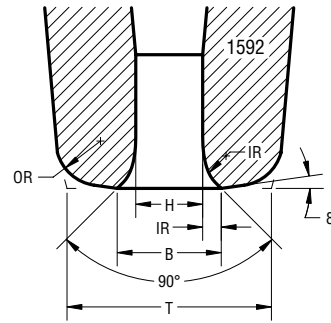
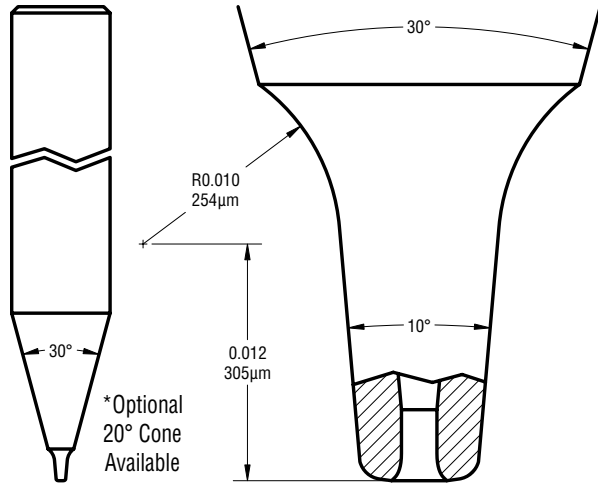
Note: A 10° by 0.012 in. (305µm) high angle bottleneck is standard in the 1590/1591 series. Other angle bottleneck configurations may be specified at the end of the part number.

SERIES & DASH NO.	H* in. / µm ±0.0001 / 2.5	IR in. / µm (Ref)	B in. / µm See Note**	OR in. / µm ±0.0003 / 8	T (30° CONE) in. / µm ±0.0003 / 8	T (10° ABTNK) in. / µm ±0.0003 / 8	SUGGESTED WIRE DIAMETER in. / µm
159X-15C	0.0015 / 38	0.0004 / 10	0.0023 / 58	0.0012 / 30	0.0050 / 127	0.0054 / 137	0.0009 / 23 to 0.0011 / 28
159X-15D	0.0015 / 38	0.0004 / 10	0.0023 / 58	0.0012 / 30	0.0055 / 140	0.0059 / 150	
159X-15E	0.0015 / 38	0.0005 / 13	0.0025 / 64	0.0015 / 38	0.0060 / 152	0.0065 / 165	
159X-15F	0.0015 / 38	0.0005 / 13	0.0025 / 64	0.0015 / 38	0.0065 / 165	0.0070 / 178	
159X-15G	0.0015 / 38	0.0005 / 13	0.0025 / 64	0.0015 / 38	0.0070 / 178	0.0075 / 191	
159X-17C	0.0017 / 43	0.0004 / 10	0.0025 / 64	0.0012 / 30	0.0050 / 127	0.0054 / 137	0.0010 / 25 to 0.0013 / 33
159X-17D	0.0017 / 43	0.0004 / 10	0.0025 / 64	0.0012 / 30	0.0055 / 140	0.0059 / 150	
159X-17E	0.0017 / 43	0.0005 / 13	0.0027 / 69	0.0015 / 38	0.0060 / 152	0.0065 / 165	
159X-17F	0.0017 / 43	0.0005 / 13	0.0027 / 69	0.0015 / 38	0.0065 / 165	0.0070 / 178	
159X-17G	0.0017 / 43	0.0005 / 13	0.0027 / 69	0.0015 / 38	0.0070 / 178	0.0075 / 191	
159X-17H	0.0017 / 43	0.0005 / 13	0.0027 / 69	0.0015 / 38	0.0075 / 191	0.0080 / 203	
159X-17J	0.0017 / 43	0.0005 / 13	0.0027 / 69	0.0015 / 38	0.0080 / 203	0.0085 / 216	
159X-18D	0.0018 / 46	0.0005 / 13	0.0028 / 71	0.0012 / 30	0.0055 / 140	0.0059 / 150	
159X-18E	0.0018 / 46	0.0005 / 13	0.0028 / 71	0.0015 / 38	0.0060 / 152	0.0065 / 165	
159X-18F	0.0018 / 46	0.0005 / 13	0.0028 / 71	0.0015 / 38	0.0065 / 165	0.0070 / 178	
159X-18G	0.0018 / 46	0.0006 / 15	0.0030 / 76	0.0015 / 38	0.0070 / 178	0.0075 / 191	
159X-18H	0.0018 / 46	0.0006 / 15	0.0030 / 76	0.0015 / 38	0.0075 / 191	0.0080 / 203	
159X-18J	0.0018 / 46	0.0006 / 15	0.0030 / 76	0.0015 / 38	0.0080 / 203	0.0085 / 216	

\* For hole sizes 0.0025 through 0.0049, the tolerance is +0.0002/-0.0001. For hole sizes greater than 0.0049, the tolerance is +0.0003/-0.0002. Tighter tolerance available at additional charges.

\*\* If IC < 0.0005 and/or T < 0.0050, the B tolerance is +/-0.0001, otherwise B tolerance is +/-0.0002 (if B > 0.0040, B tolerance is +0.0003/-0.0002). Dimensions in inches unless otherwise specified.

The 1592 and 1593 series are designed for pitches of 90µm and above. The angle-bottleneck design provides clearance for adjacent loops and the IC is configured for making a small ball bond. The 1592 and 1593 series utilize 90° radiused inside chamfer architecture for small ball bond size and improved looping. Both 8° and 4° face angles are available. For bond pitches less than 90µm, see the Process 1800 series.



**Specify:** Series - Dash Number - Length+Finish - Options  
**Example:** 1592-18E-437GM-20D

Note: A 10° by 0.012 in. (305µm) high angle bottleneck is standard in the 1592/1593 series. Other angle bottleneck configurations may be specified at the end of the part number.

SERIES & DASH NO.	H* in. / µm ±0.0001/2.5	IR in. / µm (Ref)	B in. / µm See Note**	OR in. / µm ±0.0003/8	T (30° CONE) in. / µm ±0.0003 / 8	T (10° ABTNK) in. / µm ±0.0003 / 8	SUGGESTED WIRE DIAMETER in. / µm
159X-15A	0.0015 / 38	0.0003 / 8	0.0021 / 53	0.0010 / 25	0.0040 / 102	0.0043 / 109	0.0009 / 23 to 0.0011 / 28
159X-15B	0.0015 / 38	0.0003 / 8	0.0021 / 53	0.0010 / 25	0.0045 / 114	0.0048 / 122	
159X-15C	0.0015 / 38	0.0004 / 10	0.0023 / 58	0.0012 / 30	0.0050 / 127	0.0054 / 137	
159X-15D	0.0015 / 38	0.0004 / 10	0.0023 / 58	0.0012 / 30	0.0055 / 140	0.0059 / 150	
159X-15E	0.0015 / 38	0.0005 / 13	0.0025 / 64	0.0015 / 38	0.0060 / 152	0.0065 / 165	
159X-15F	0.0015 / 38	0.0005 / 13	0.0025 / 64	0.0015 / 38	0.0065 / 165	0.0070 / 178	
159X-15G	0.0015 / 38	0.0005 / 13	0.0025 / 64	0.0015 / 38	0.0070 / 178	0.0075 / 191	
159X-17C	0.0017 / 43	0.0004 / 10	0.0025 / 64	0.0012 / 30	0.0050 / 127	0.0054 / 137	
159X-17D	0.0017 / 43	0.0004 / 10	0.0025 / 64	0.0012 / 30	0.0055 / 140	0.0059 / 150	
159X-17E	0.0017 / 43	0.0005 / 13	0.0027 / 69	0.0015 / 38	0.0060 / 152	0.0065 / 165	
159X-17F	0.0017 / 43	0.0005 / 13	0.0027 / 69	0.0015 / 38	0.0065 / 165	0.0070 / 178	
159X-17G	0.0017 / 43	0.0005 / 13	0.0027 / 69	0.0015 / 38	0.0070 / 178	0.0075 / 191	
159X-17H	0.0017 / 43	0.0005 / 13	0.0027 / 69	0.0015 / 38	0.0075 / 191	0.0080 / 203	
159X-17J	0.0017 / 43	0.0005 / 13	0.0027 / 69	0.0015 / 38	0.0080 / 203	0.0085 / 216	
159X-18D	0.0018 / 46	0.0005 / 13	0.0028 / 71	0.0012 / 30	0.0055 / 140	0.0059 / 150	
159X-18E	0.0018 / 46	0.0005 / 13	0.0028 / 71	0.0015 / 38	0.0060 / 152	0.0065 / 165	
159X-18F	0.0018 / 46	0.0005 / 13	0.0028 / 71	0.0015 / 38	0.0065 / 165	0.0070 / 178	
159X-18G	0.0018 / 46	0.0006 / 15	0.0030 / 76	0.0015 / 38	0.0070 / 178	0.0075 / 191	
159X-18H	0.0018 / 46	0.0006 / 15	0.0030 / 76	0.0015 / 38	0.0075 / 191	0.0080 / 203	
159X-18J	0.0018 / 46	0.0006 / 15	0.0030 / 76	0.0015 / 38	0.0080 / 203	0.0085 / 216	

\* For hole sizes 0.0025 through 0.0049, the tolerance is +0.0002/-0.0001. For hole sizes greater than 0.0049, the tolerance is +0.0003/-0.0002. Tighter tolerance available at additional charges.

\*\* If IC < 0.0005 and/or T < 0.0050, the B tolerance is +/-0.0001, otherwise B tolerance is +/-0.0002 (if B > 0.0040, B tolerance is +0.0003/-0.0002). Dimensions in inches unless otherwise specified.

The 1732 and 1733 series capillaries are designed for applications where only a ball bond is required. The user-friendly part number allows the hole and the “B” dimensions to be specified for various wire diameters, bond pad sizes, and bond pad pitches.

The “T” dimension is automatically minimized for fine pitch applications unless otherwise specified. A flat and polished tool face is standard. Both the 1732 and 1733 are made of ceramic material unless otherwise specified as Tungsten Carbide (“-WC” in the part number).

CLEARANCE TABLE	
BALL BOND PITCH in. / $\mu\text{m}$	MAXIMUM RECOMMENDED “B” DIMENSION in. / $\mu\text{m}$ See Note*
0.00350 / 89	0.0022 / 56
0.00375 / 95	0.0024 / 61
0.00400 / 102	0.0026 / 66
0.00425 / 108	0.0028 / 71
0.00450 / 114	0.0030 / 76
0.00475 / 121	0.0031 / 79
0.00500 / 127	0.0033 / 84
0.00525 / 133	0.0035 / 89
0.00550 / 140	0.0037 / 94
0.00575 / 146	0.0039 / 99
0.00600 / 152	0.0041 / 104
0.00650 / 165	0.0044 / 112
0.00700 / 178	0.0048 / 122
0.00750 / 190	0.0052 / 132
0.00800 / 203	0.0056 / 142
0.00850 / 216	0.0059 / 150
0.00900 / 229	0.0063 / 160
0.01000 / 254	0.0070 / 178

**Note:**

For hole sizes 0.0025 through 0.0049, the tolerance is +0.0002/-0.0001.

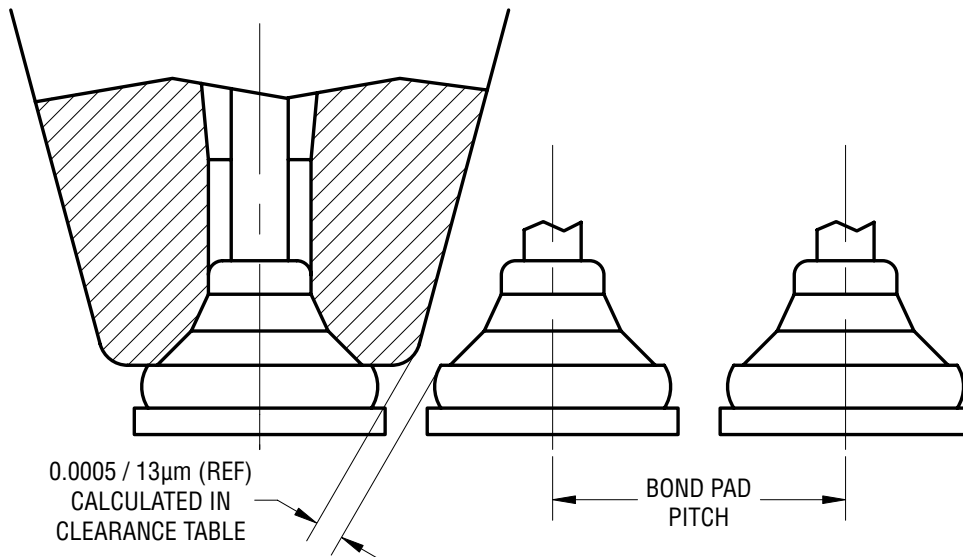
For hole sizes greater than 0.0049, the tolerance is +0.0003/-0.0002.

Tighter tolerance available at additional charges.

\* If IC < 0.0005 and/or T < 0.0050, the B tolerance is +/-0.0001, otherwise

B tolerance is +/-0.0002 (if B > 0.0040, B tolerance is +0.0003/-0.0002).

Dimensions in inches unless otherwise specified.



**1732 Series Features:**

The 90° double inside chamfer forms a tall, compact ball bond on surfaces with good to fair bondability.

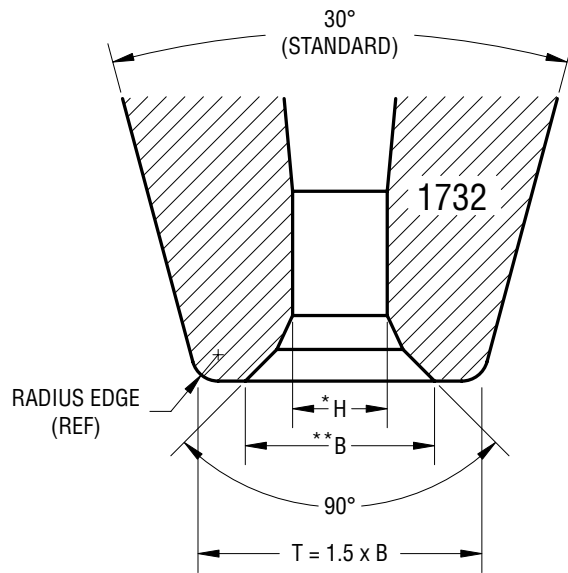
**Specify:**

Series - H - B - Tool Length - Options

**Example:**

- 1732-18-36-437
- 1732-20-38-375-20D-WC
- 1732-17-35-437-T=90

Note: Optional T dimension must be greater than 1.5 x B dimension



**1733 Series Features:**

The 120° double inside provides maximum downward force on the ball bond for use on surfaces with difficult bondability. The 1733 series tool will form a shorter, wider ball bond than the 1732.

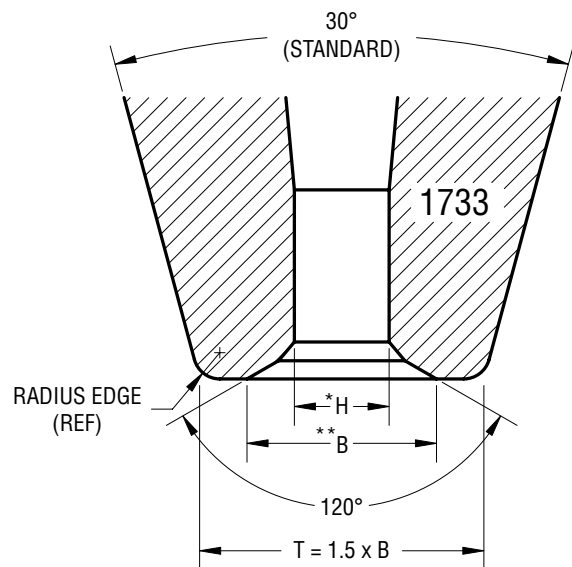
**Specify:**

Series - H - B - Tool Length - Options

**Example:**

- 1733-15-25-437
- 1733-17-31-437-AB10x12

Note: Optional T dimension must be greater than 1.5 x B dimension



**Dimensions are specified as follows:**

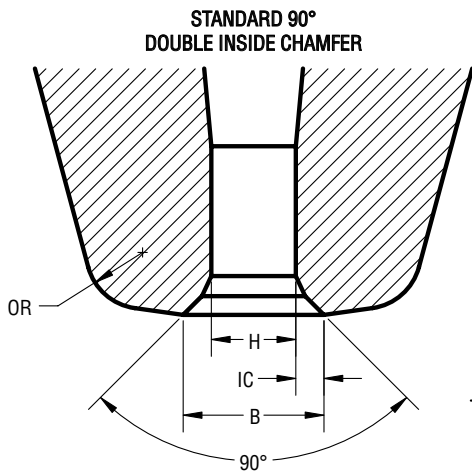
- XX = 0.00XX inch
- 18 = 0.0018 inch

\* For hole sizes 0.0025 through 0.0049, the tolerance is +0.0002/-0.0001. For hole sizes greater than 0.0049, the tolerance is +0.0003/-0.0002. Tighter tolerance available at additional charges.

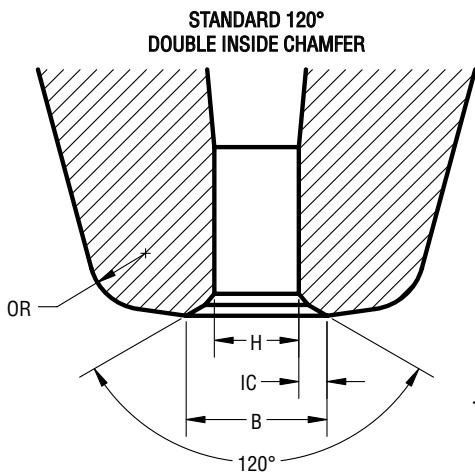
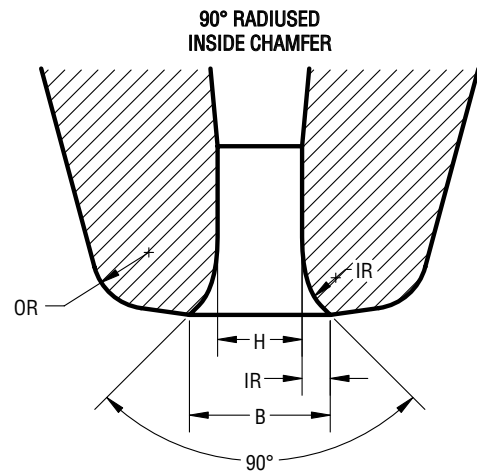
\*\* If IC < 0.0005 and/or T < 0.0050, the B tolerance is +/-0.0001, otherwise B tolerance is +/-0.0002 (if B > 0.0040, B tolerance is +0.0003/-0.0002). Dimensions in inches unless otherwise specified.

The standard 90° and 120° double inside chamfer capillaries are also available with an optional radiused inside chamfer at a moderate additional cost. The inside radius enhances wire control and looping characteristics.

The inside radius also helps to alleviate sagging and wavy wires in long-loop, low-loop, high-speed-automated, and fine-pitch bonding applications. This is the same radiused inside chamfer design featured in the 1520 and 1590 fine-pitch series.



STANDARD SERIES	INSIDE RADIUS (IR) EQUIVALENTS
1513N	1523N
1572N	1522N
1574	1524
1570	1521



STANDARD SERIES	INSIDE RADIUS (IR) EQUIVALENTS
1513	1523
1572	1522
1574N	1524N
1570N	1521N

