

The image features two ceramic bonding capillaries. One is positioned at the top, inverted, showing a wide, flared upper section that tapers to a narrow, pointed tip. The other is at the bottom, upright, showing a wide, flared lower section that tapers to a narrow, pointed tip. Both are rendered in a light gray color with a subtle gradient and soft shadows, giving them a three-dimensional appearance. The text 'CERAMIC BONDING CAPILLARIES' is centered between the two.

CERAMIC BONDING CAPILLARIES

Orbray

Orbray create New Era for Bonding Capillary



We are the world leading share holder of Ferrule & Sleeve, the key parts for Optical Communication requiring submicron order accuracy.

Our unique and high precision process technology on Ferrule, Sleeve, and Ruby Capillary have been drawing high level of satisfaction and reputation from customers.

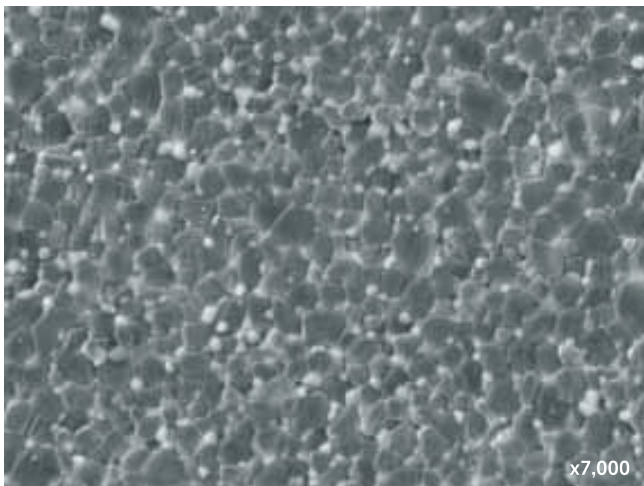
New Ceramic Bonding Capillary has been developed beyond the bounds of common sense utilizing the accumulated know-how and adopting Zirconia toughened Alumina ceramic as new material.

Significant increase of productivity for wire bonding process would be committed by the superior smoothness and the shape uniformity with our unique and high precision process technology, and the higher wear resistance with the addition of Zirconia.

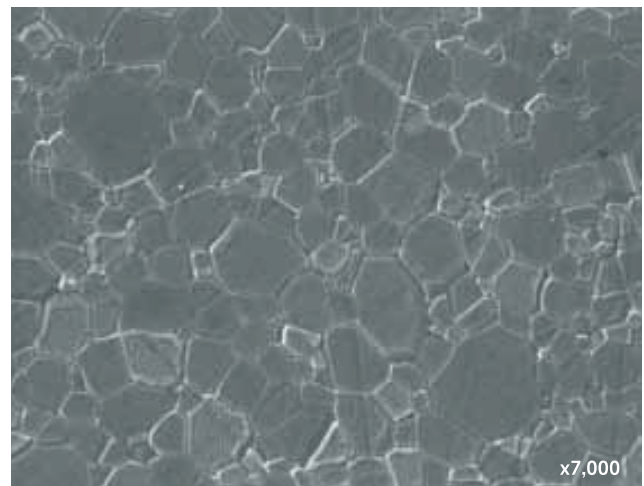
Material Characteristics

Longer Capillary life span, adopting Zirconia toughened Alumina ceramic

Longer Capillary life span and higher wear resistance have been achieved by Zirconia toughened Alumina ceramic with stronger hardness than the standard 99.99% Alumina ceramic, and our unique process to increase hardness.



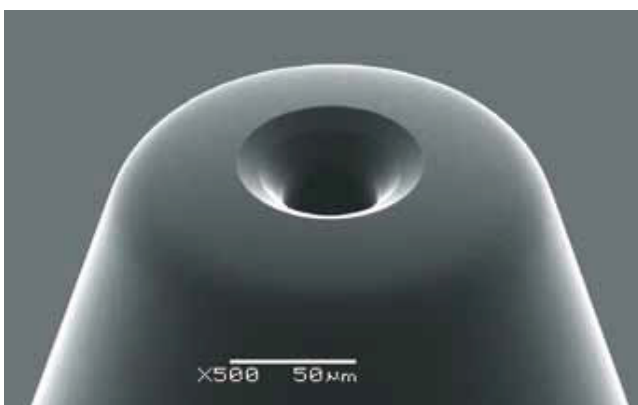
Zirconia toughened Alumina



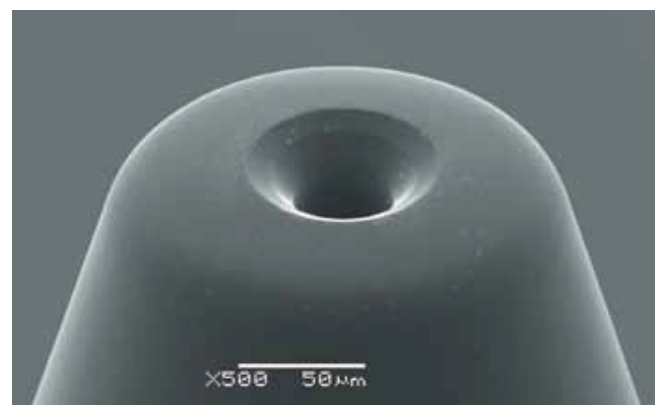
99.99% Alumina

Our strict quality control from the raw materials to the finished products allows cost reduction and competitiveness.

	Zirconia toughened Alumina	99.99% Alumina
Bending Strength	1700(N/mm ²)	820(N/mm ²)
Hardness Vickers	1900(HV)	2000(HV)
Density	4.3(g/cm ³)	3.98(g/cm ³)
Average Grain Size	≤0.5μm	≤1.2μm
Color Apperance	White	White



Before

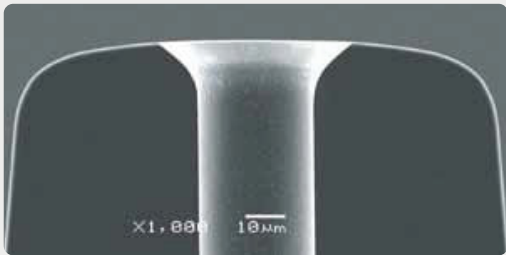
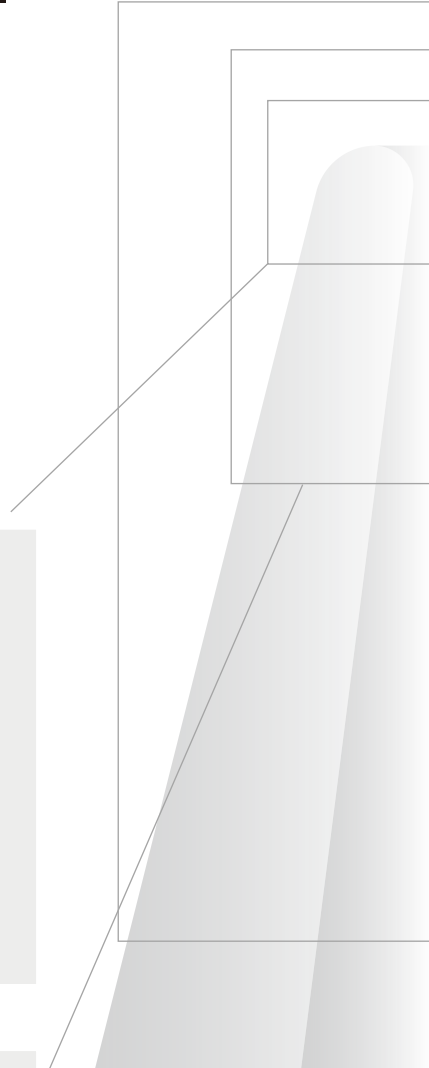


After 500k wire

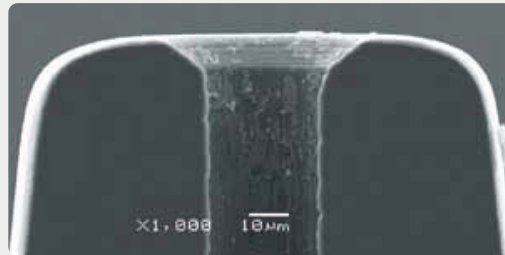
Capillary Shape

Reduce the damage to Gold wire, the rate of contamination accumulation and wire breaking, achieved by the untapered straight hole with smooth and homogeneous surface. And smooth geometry from Chamfer to Hole assures the stable bonding process.

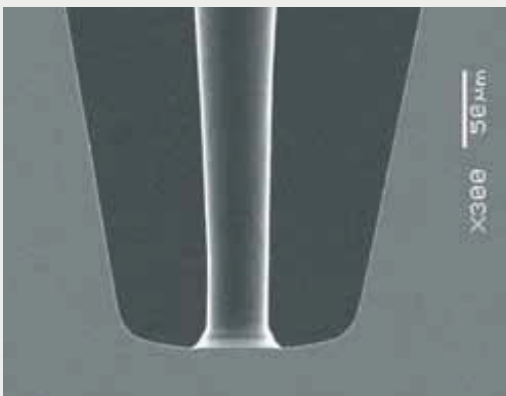
Conventional capillaries sometime have the tapered hole or rough surface, which causes the damage to the ball, the contamination accumulation and the wire breaking. Gentle transmutation from Hole to Tip through Chamfer made by fine polishing reduces the damage to the wire and enable the stable bonding process.



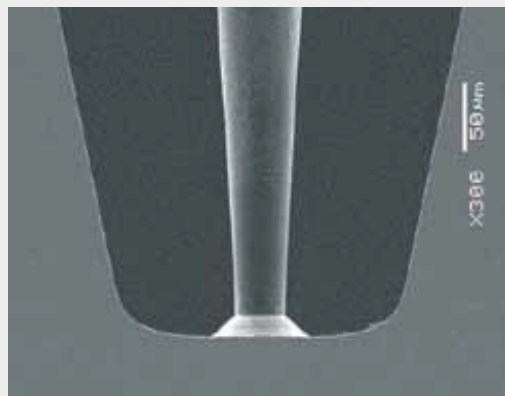
Orbray Capillary



Conventional Ceramic Capillary

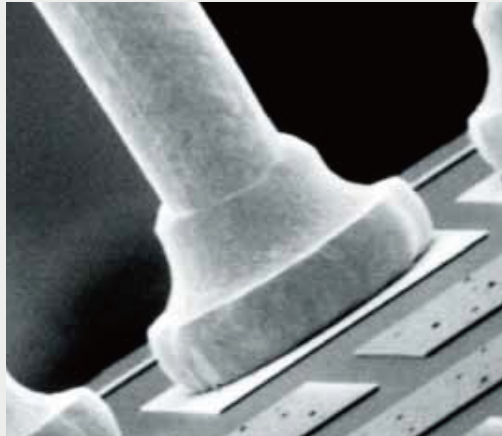


Orbray Capillary

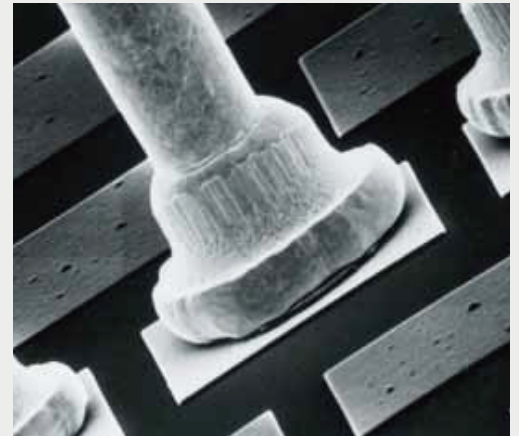


Conventional Ceramic Capillary

Create the ideal ball shape

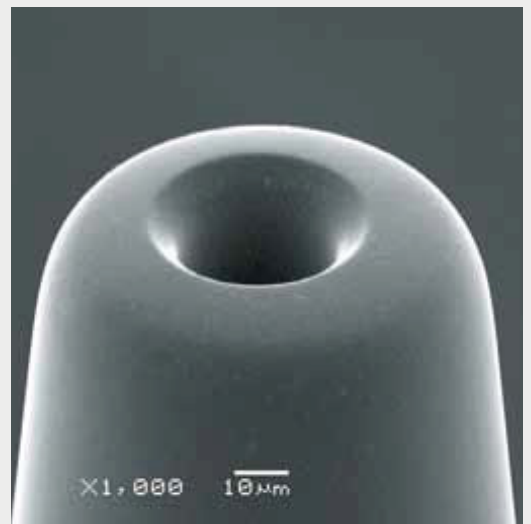
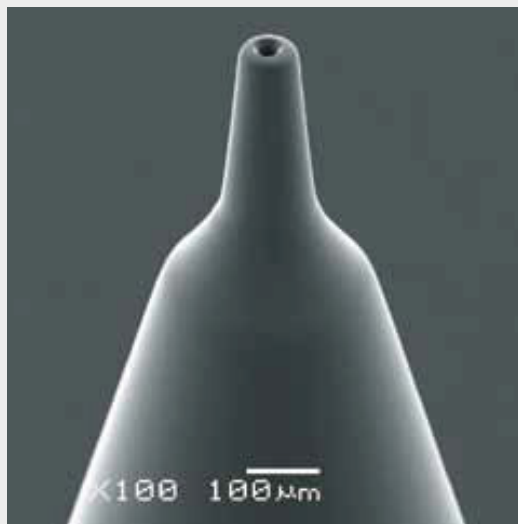


Orbray Capillary

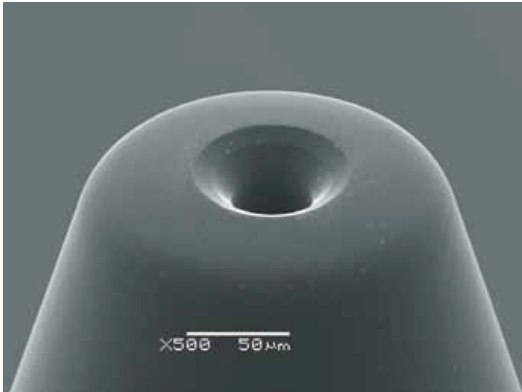


Conventional Ceramic Capillary

Increase capillary durability by polishing the peripheral area of Bottle Neck with our unique and high precision process technology.



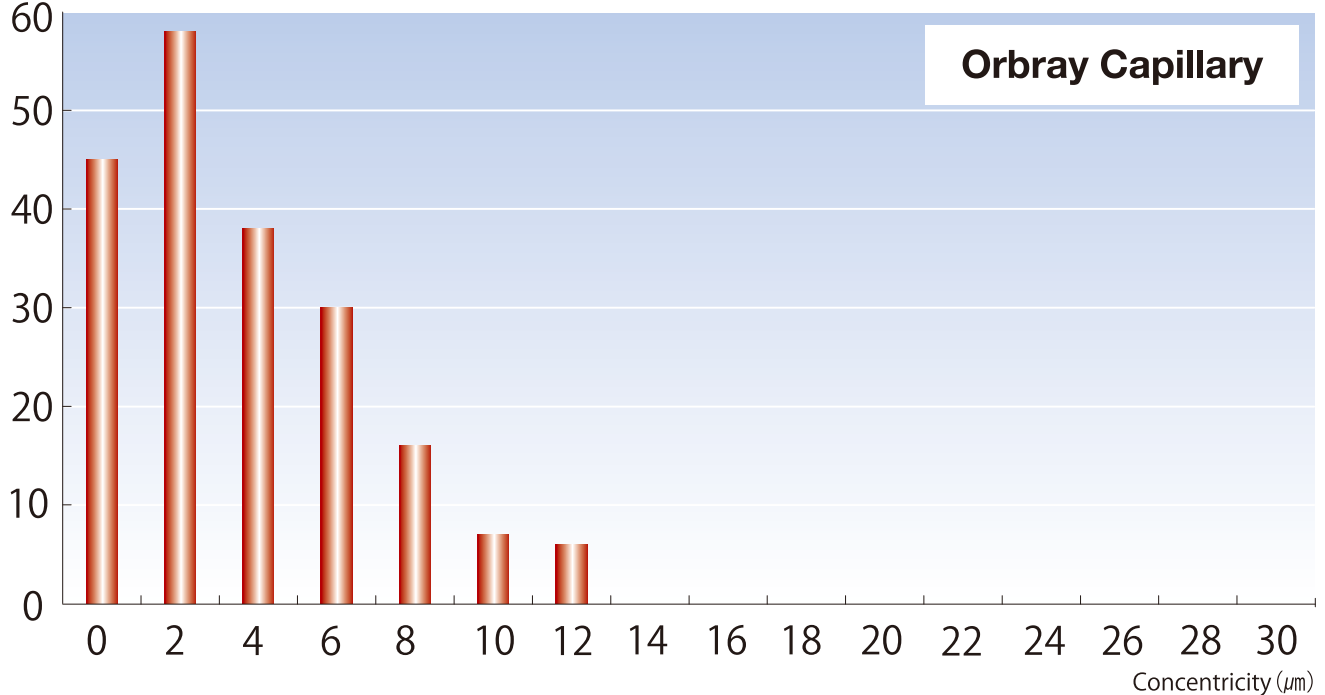
Concentricity



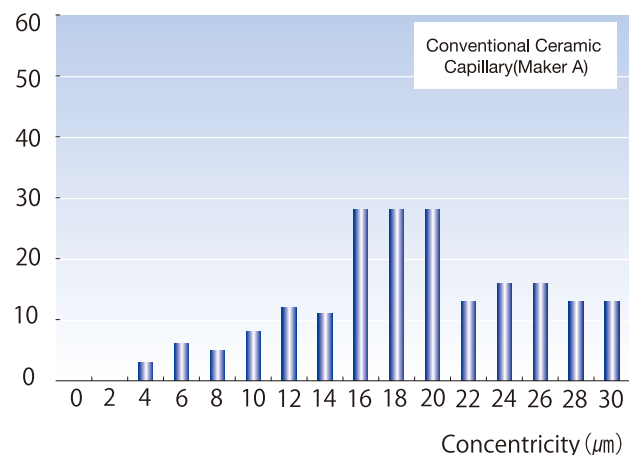
Excellent Hole Concentricity enables easy replacement procedure

With our unique precision process technology cultivated by the production of Ferrule for Optical Communication, the excellent concentricity property has been achieved, which reduces the hours of operation significantly at the time of replacement due to the elimination of alignment process.

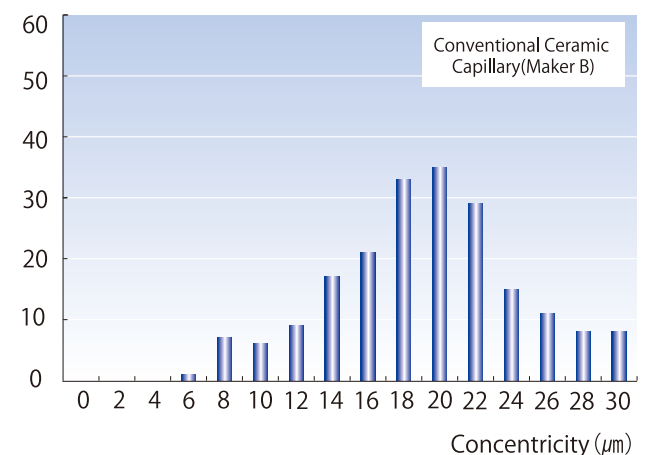
(pcs) **Concentricity Distribution**



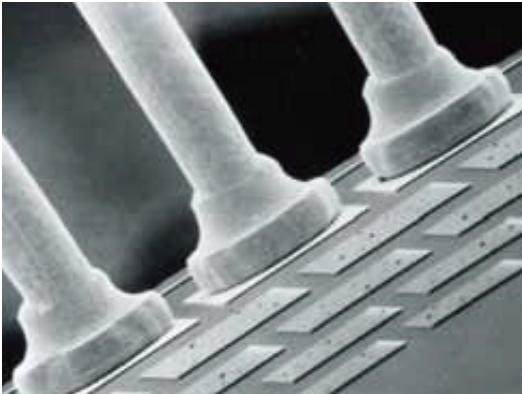
(pcs) **Concentricity Distribution**



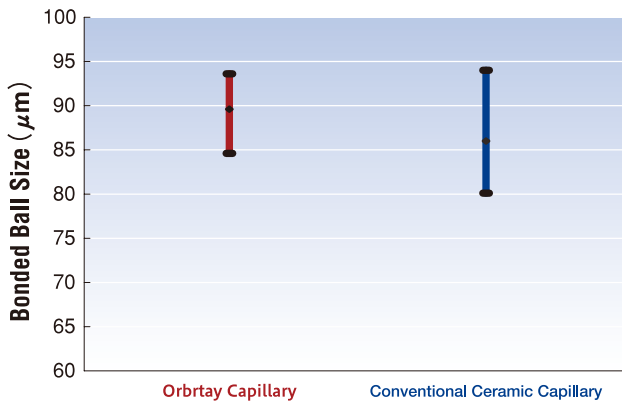
(pcs) **Concentricity Distribution**



Bonding Characteristics

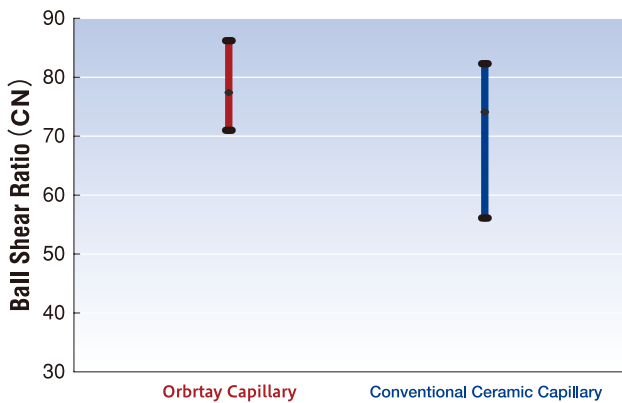


Superior bonding characteristics are derived from the smooth and stable ball shape



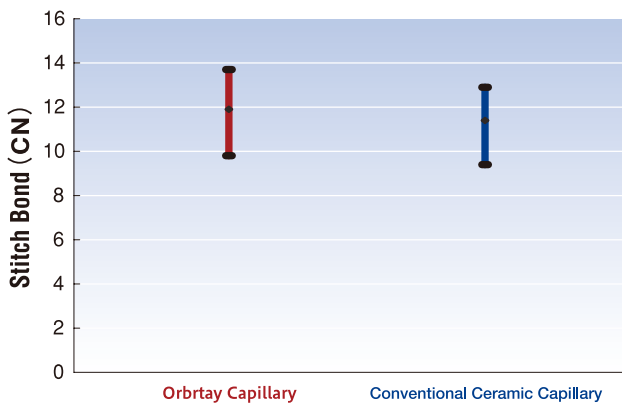
Bonded Ball Size

Bonded ball size is affected by Wire Diameter(WD), Hole(H) and Chamfer Diameter(CD). The uniform and stable ball shape is possible with the accuracy of the smooth chamfer geometry and the excellent hole concentricity.



Ball Shear Ratio

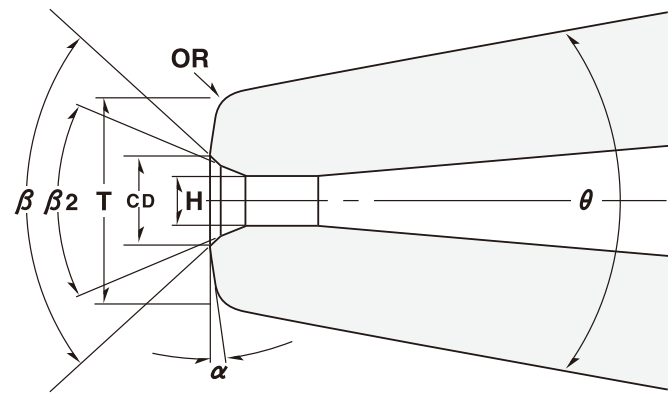
This parameter is affected by Wire Diameter(WD), Chamfer Diameter (CD), pad substrate, mashed ball diameter and ball contact area. The satisfactory level of force and strength is committed by the stable geometry of chamfer.



Stitch Bond

Important Parameters affecting stitch bond are Tip diameter(T), Outer Radius(OR) and Face Angle(FA). Sufficient stitch bond on normal Wire Diameter(WD) is achieved by the stable tip geometry, the tighter hole concentricity to T and the gentle OR.

Standard Type



AZR-A

Series
BPP:150 μm

Part NO.	WD	H	T	CD	OR	α	θ	CA
AZR-A-1	38/1.5	51/2.0	229/9.0	102/4.0	38/1.5	8°	30°	120°
AZR-A-2	38/1.5	51/2.0	152/6.0	66/2.6	10/0.4	0°	30°	90°
AZR-A-3	38/1.5	51/2.0	229/9.0	86/3.4	102/4.0	0°	30°	90°
AZR-A-4	38/1.5	51/2.0	203/8.0	86/3.4	61/2.4	0°	30°	90°
AZR-A-5	38/1.5	56/2.2	239/9.4	102/4.0	38/1.5	8°	30°	120°
AZR-A-6	38/1.5	56/2.2	229/9.0	96/3.8	102/4.0	0°	30°	90°
AZR-A-7	38/1.5	56/2.2	203/8.0	86/3.4	61/2.4	0°	30°	90°
AZR-A-8	38/1.5	64/2.5	239/9.4	102/4.0	38/1.5	8°	30°	120°
AZR-A-9	38/1.5	64/2.5	203/8.0	89/3.5	61/2.4	0°	30°	90°
AZR-A-10	51/2.0	64/2.5	191/7.5	81/3.2	8/0.3	0°	30°	90°
AZR-A-11	51/2.0	64/2.5	292/11.5	102/4.0	127/5.0	0°	30°	90°
AZR-A-12	51/2.0	76/3.0	356/14.0	122/4.8	152/6.0	0°	30°	90°
AZR-A-13	51/2.0	89/3.5	419/16.5	135/5.3	178/7.0	0°	30°	90°
AZR-A-14	51.64/2.0,2.5	76/3.0	330/13.0	140/5.5	64/2.5	8°	30°	120°
AZR-A-15	64,76/2.5,3.0	89/3.5	330/13.0	127/5.0	64/2.5	8°	30°	120°
AZR-A-16	64,76/2.5,3.0	102/4.0	330/13.0	140/5.5	64/2.5	8°	30°	120°
AZR-A-17	76/3.0	102/4.0	483/19.0	168/6.6	203/8.0	0°	30°	90°

($\mu\text{m}/\text{mil}$)

AZR-B

Series
BPP:140 μm

Part NO.	WD	H	T	CD	OR	α	θ	CA
AZR-B-1	22/0.9	33/1.3	140/5.5	64/2.5	20/0.8	8°	30°	120°
AZR-B-2	25/1.0	38/1.5	165/6.5	74/2.9	25/1.0	8°	30°	120°
AZR-B-3	25/1.0	38/1.5	89/3.5	53/2.1	8/0.3	0°	30°	90°
AZR-B-4	25/1.0	38/1.5	114/4.5	53/2.1	8/0.3	0°	30°	90°
AZR-B-5	25/1.0	38/1.5	178/7.0	64/2.5	76/3.0	0°	30°	90°
AZR-B-6	25/1.0	38/1.5	203/8.0	53/2.1	89/3.5	0°	30°	90°
AZR-B-7	25/1.0	43/1.7	165/6.5	74/2.9	25/1.0	8°	30°	120°
AZR-B-8	25/1.0	43/1.7	203/8.0	53/2.1	89/3.5	0°	30°	90°
AZR-B-9	25.30/1.0,1.2	43/1.7	229/9.0	74/2.9	30/1.2	8°	30°	120°
AZR-B-10	25.30/1.0,1.2	43/1.7	152/6.0	59/2.3	8/0.3	8°	30°	120°
AZR-B-11	25.30/1.0,1.2	43/1.7	203/8.0	74/2.9	89/3.5	0°	30°	90°
AZR-B-12	25.30/1.0,1.2	46/1.8	229/9.0	74/2.9	38/1.5	8°	30°	120°
AZR-B-13	30/1.2	46/1.8	203/8.0	76/3.0	89/3.5	0°	30°	90°

($\mu\text{m}/\text{mil}$)

Fine Pitch Series

AZR-C

Series
BPP:100 μm

Part NO.	WD	H	T	CD	OR	α	θ	CA
AZR-C-1	25/1.0	38/1.5	130/5.1	53/2.1	30/1.2	11°	30°	90°
AZR-C-2	30/1.2	38/1.5	130/5.1	56/2.2	30/1.2	11°	30°	90°
AZR-C-3	30/1.2	38/1.5	130/5.1	56/2.2	30/1.2	8°	30°	90°
AZR-C-4	30/1.2	38/1.5	130/5.1	56/2.2	30/1.2	4°	30°	90°
AZR-C-5	30/1.2	41/1.6	130/5.1	59/2.3	30/1.2	11°	30°	90°

($\mu\text{m}/\text{mil}$)

AZR-D

Series
BPP:90 μm

Part NO.	WD	H	T	CD	OR	α	θ	CA
AZR-D-1	25/1.0	33/1.3	109/4.3	51/2.0	13/0.5	11°	30°	90°
AZR-D-2	25/1.0	33/1.3	109/4.3	51/2.0	13/0.5	8°	30°	90°
AZR-D-3	25/1.0	33/1.3	109/4.3	51/2.0	13/0.5	4°	30°	90°
AZR-D-4	25/1.0	35/1.4	109/4.3	51/2.0	20/0.8	11°	30°	90°
AZR-D-5	30/1.2	38/1.5	109/4.3	51/2.0	20/0.8	11°	30°	90°
AZR-D-6	30/1.2	38/1.5	109/4.3	53/2.1	13/0.5	8°	30°	90°
AZR-D-7	30/1.2	38/1.5	109/4.3	53/2.1	13/0.5	4°	30°	90°

($\mu\text{m}/\text{mil}$)

AZR-E

Series
BPP:80 μm

Part NO.	WD	H	T	CD	OR	α	θ	CA
AZR-E-1	25/1.0	33/1.3	99/3.9	48/1.9	13/0.5	4°	30°	90°
AZR-E-2	25/1.0	33/1.3	99/3.9	48/1.9	13/0.5	8°	30°	90°
AZR-E-3	25/1.0	33/1.3	99/3.9	48/1.9	13/0.5	11°	30°	90°
AZR-E-4	25/1.0	35/1.4	99/3.9	46/1.8	13/0.5	11°	30°	90°
AZR-E-5	30/1.2	38/1.5	99/3.9	51/2.0	13/0.5	4°	30°	90°
AZR-E-6	30/1.2	38/1.5	99/3.9	51/2.0	13/0.5	8°	30°	90°

($\mu\text{m}/\text{mil}$)

AZR-F

Series
BPP:70 μm

Part NO.	WD	H	T	CD	OR	α	θ	CA
AZR-F-1	25/1.0	30/1.2	91/3.6	43/1.7	10/0.4	8°	30°	90°
AZR-F-2	25/1.0	30/1.2	91/3.6	43/1.7	10/0.4	4°	30°	90°
AZR-F-3	25/1.0	33/1.3	91/3.6	43/1.7	13/0.5	11°	30°	90°

($\mu\text{m}/\text{mil}$)

AZR-G

Series
BPP:60 μm

Part NO.	WD	H	T	CD	OR	α	θ	CA
AZR-G-1	23/0.9	28/1.1	81/3.2	35/1.4	13/0.5	11°	30°	90°
AZR-G-2	25/1.0	30/1.2	81/3.2	35/1.4	13/0.5	11°	30°	90°

($\mu\text{m}/\text{mil}$)

Ultra Fine Pitch Series

AZR-H

Series
BPP:50 μm

Part NO.	WD	H	T	CD	OR	α	θ	CA
AZR-H-1	18/0.7	23/0.9	64/2.5	28/1.1	10/0.4	11°	30°	90°
AZR-H-2	20/0.8	25/1.0	64/2.5	30/1.2	10/0.4	11°	30°	90°
AZR-H-3	23/0.9	28/1.1	64/2.5	33/1.3	10/0.4	11°	30°	90°

($\mu\text{m}/\text{mil}$)

AZR-I

Series
BPP:45 μm

Part NO.	WD	H	T	CD	OR	α	θ	CA
AZR-I-1	18/0.7	23/0.9	56/2.2	28/1.1	8/0.3	11°	30°	90°
AZR-I-2	20/0.8	25/1.0	56/2.2	30/1.2	8/0.3	11°	30°	90°

($\mu\text{m}/\text{mil}$)

AZR-J

Series
BPP:40 μm

Part NO.	WD	H	T	CD	OR	α	θ	CA
AZR-J-1	15/0.6	18/0.7	51/2.0	25/1.0	8/0.3	11°	30°	90°
AZR-J-2	18/0.7	23/0.9	51/2.0	28/1.1	8/0.3	11°	30°	90°

($\mu\text{m}/\text{mil}$)

Custom-made

Tolerances

	H	T	CD	OR	α	θ	L	β	θB	BNH
High Spec	+2/0 μm +0.08/0mil	$\pm 3\mu\text{m}$ $\pm 0.12\text{mil}$	+2/0 μm +0.08/0mil	$\pm 5\mu\text{m}$ $\pm 0.2\text{mil}$						
Standard	$\pm 2\mu\text{m}$ $\pm 0.08\text{mil}$	$\pm 5\mu\text{m}$ $\pm 0.2\text{mil}$	$\pm 5\mu\text{m}$ $\pm 0.2\text{mil}$	$\pm 5\mu\text{m}$ $\pm 0.2\text{mil}$	$\pm 1^\circ$	$\pm 1^\circ$	$\pm 100\mu\text{m}$ —	$\pm 1^\circ$	$\pm 1^\circ$	+50/0 μm —

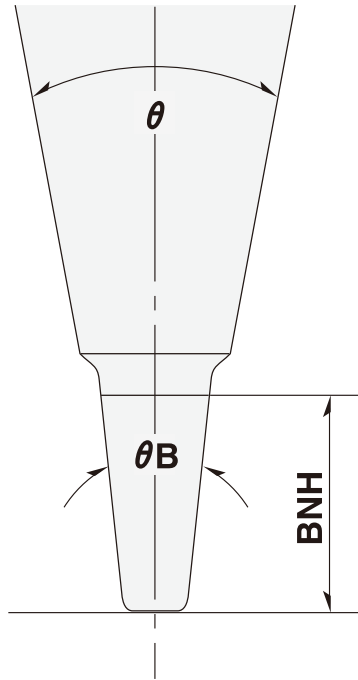
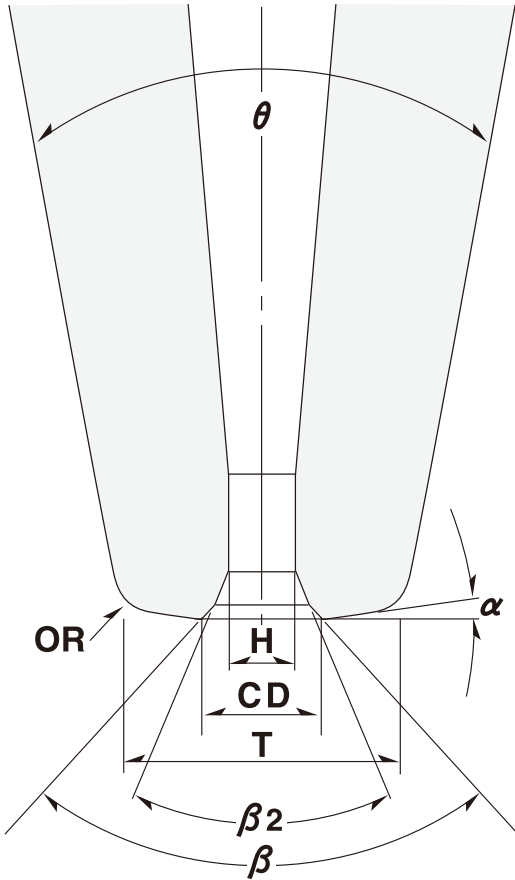
Example1

Material	H	T	CD	OR	α	θ	L	Type	Finish	β	θB	BNH	Tolerances
Ceramic	33 μm 1.3mil	91 μm 3.6mil	41 μm 1.6mil	13 μm 0.5mil	8°	20°	11100 μm 437mil	Bottle	Matte	90°	10°	203 μm 8.0mil	High Spec

Example1

Material	H	T	CD	OR	α	θ	L	Type	Finish	β	θB	BNH	Tolerances
Ceramic	43 μm 1.7mil	150 μm 5.9mil	71 μm 2.8mil	33 μm 1.3mil	4°	18°	11100 μm 437mil	Standard	Polish	90°			Standard

Custom-made Order Sheet



- H** ... Hole Diameter
- T** ... Tip Diameter
- CD** ... Chamfer Diameter
- OR** ... Outer Radius
- α ... Face Angle
- θ ... Cone Angle
- L** ... Tool Length

Type ... Standard or Bottleneck

Finish ... Polish or Matte

β ... Chamfer Angle

θB ... Bottleneck Angle

BNH ... Bottle Neck Height

Tolerances ... Standard or High Spec

Material ... Ruby or Ceramic

Please describe a size.

Material	H	T	CD	OR	α	θ	L	Type	Finish	β	θB	BNH	Tolerances	Option

Customer	
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Specifications and product design subject to change without notice.

Adamant Namiki Precision Jewel Co., Ltd., has changed its name to Orbray Co., Ltd., effective January 1, 2023.