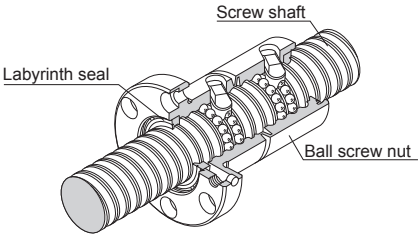
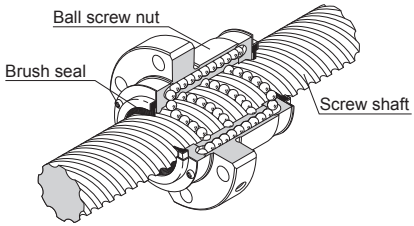
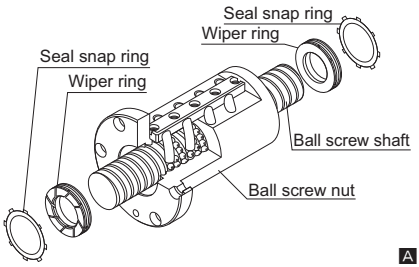
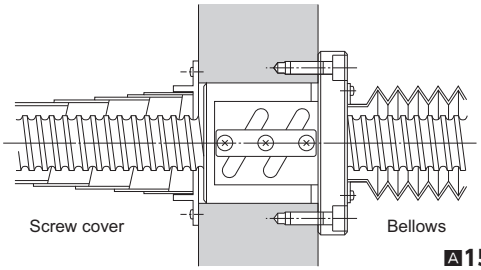
Ball Screw

# Options

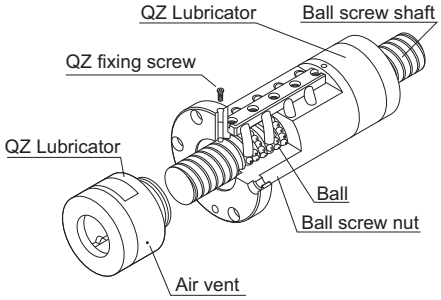
# Contaminaton Protection

Dust and foreign material that enter the Ball Screw may cause accelerated wear and breakage, as with roller bearings. Therefore, where contamination by dust or foreign material (e.g., cutting chips) is a possbility, screw shafts must always be completely covered by a contamination protection seal, contamination protection accessories (e.g., bellows, screw cover, wiper ring), or similar measures.

| | |
|---|---|
| Labyrinth seal<br>(Precision Ball Screw)<br>(Rolled Ball Screw Model JPF)<br>Symbol: RR |  <br>A15-354 |
| Brush seal<br>(Rolled Ball Screw)<br>Symbol: ZZ |  <br>A15-354 |
| Wiper ring<br>Symbol: WW |  <br>A15-355~ |
| Dust cover<br>Bellows<br>Screw cover |  <br>A15-357 |

# Lubrication

To maximize the performance of the Ball Screw, it is necessary to select a lubricant and a lubrication method according to the conditions.
For types of lubricants, characteristics of lubricants and lubrication methods, see the section on “Accessories for Lubrication” on A24-2.
Also, QZ Lubricator is available as an optional accessory that significantly increases the maintenance interval.




QZ Lubricator

A15-358～

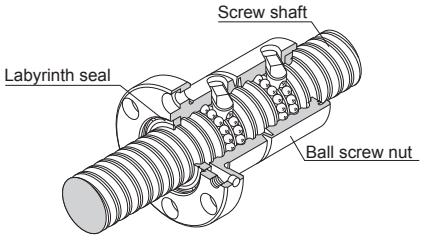
# Corrosion Resistance (Surface Treatment, etc.)

Depending on the service environment, the Ball Screw requires corrosion resistance treatment or a different material. For details of corrosion resistance treatment and material change, contact THK. (see B0-18)

# Contamination Protection Seal for Ball Screws

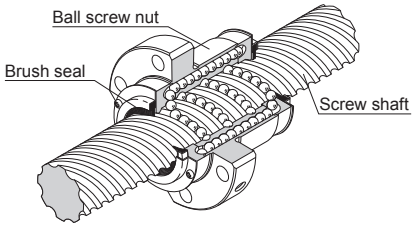
If the Ball Screw is used in an atmosphere free from foreign material but with suspended dust, a labyrinth seal (with symbol RR) and a brush seal (with symbol ZZ) can be used as contamination protection accessories.
The labyrinth seal is designed to maintain a slight clearance between the seal and the screw shaft raceway so that torque does not develop and no heat is generated, though its effect in contamination protection is limited.
With Ball Screws except the large lead and super lead types, there is no difference in nut dimensions between those with and without a seal.

Labyrinth seal
Symbol: RR (Precision Ball Screw)
(Rolled Ball Screw Model JPF)




Labyrinth seal

Brush seal
Symbol: ZZ (Rolled Ball Screw)

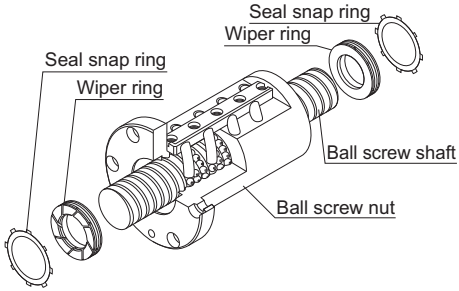



Brush seal

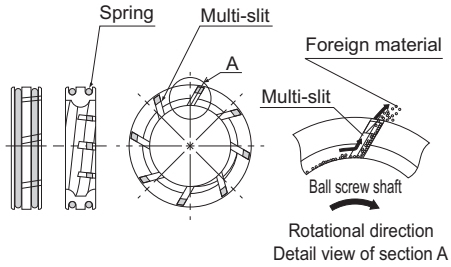
# Wiper Ring W

●For the supported models and the ball screw nut dimension with Wiper ring W attached, see A15-360 to A15-367.

With the wiper ring W, special resin with high wear resistance and low dust generation removes foreign material and prevents foreign material from entering the ball screw nut while elastically contacting the circumference of the ball screw shaft and the screw thread.




Appearance Drawing

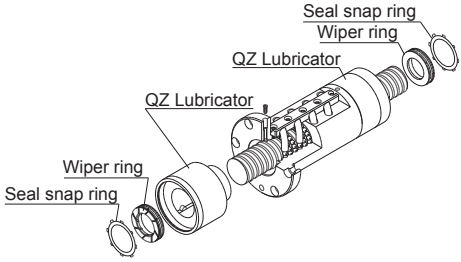



Structural Drawing

[Features]

- A total of eight slits on the circumference remove foreign materials in succession, and prevent entrance of foreign material.
- Contacts the ball screw shaft to reduce the flowing out of grease.
- Contacts the ball screw shaft at a constant pressure level using a spring, thus to minimize the heat generation.
- Since the material is highly resistant to the wear and the chemicals, its performance will not easily be deteriorated even if it is used over a long period.

Can be attached together with QZ Lubricator.
For the applicable models and the ball screw nut dimensions after wiper ring W is attached, see A15-360.




QZ Lubricator + Wiper ring

Model number coding

**BIF2505-5 QZ WW G0 +1000L C5**

QZ: With QZ Lubricator
WW: With wiper ring W

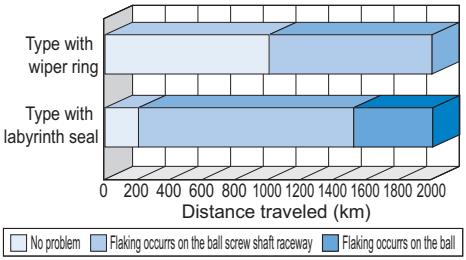
(*) See A15-360.

## ● Test in an environment exposed to contaminated environment

[Test conditions]

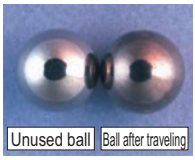
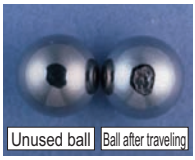
| Item | Description |
|---|---|
| Model No. | BIF3210–5G0+1500LC5 |
| Maximum rotational speed | 1000min$^{-1}$ |
| Maximum speed | 10m/min |
| Maximum circumferential speed | 1.8m/s |
| Time constant | 60ms |
| Dowel | 1s |
| Stroke | 900mm |
| Load (through internal load) | 1.31kN |
| Grease | THK AFG Grease 8cm$^3$ (Initial lubrication to the ball screw nut only.) |
| Foundry dust | FCD400 average particle diameter: 250μm |
| Volume of foreign material per shaft | 5g/h |

[Test result]

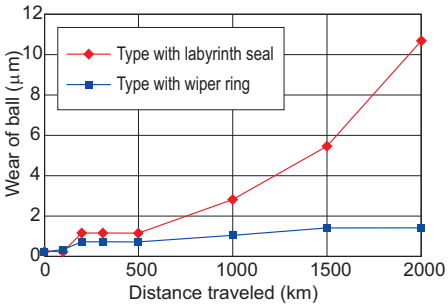



- Type with wiper ring
  Slight flaking occurred in the ball screw shaft at travel distant of 1,000 km.
- Type with labyrinth seal
  Flaking occurred throughout the circumference of the screw shaft raceway at travel distance of 200 km.
  Flaking occurred on the balls after traveling 1,500 km.

Change in the ball after traveling 2000 km

| (1) Type with wiper ring | (2) Type with labyrinth seal |
|---|---|
|  |  |
| ●Discolored, but no breakage | ●Flaking occurs |





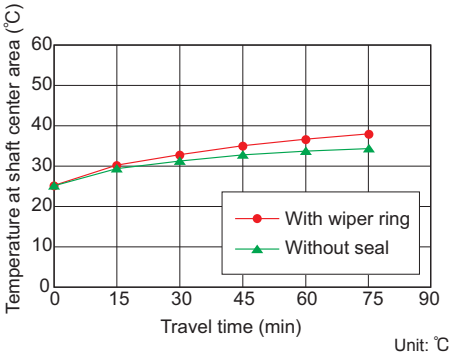

- Type with wiper ring
  Wear of balls at a travel distance of 2,000 km: 1.4 μm.
- Type with labyrinth seal
  Starts to be worn rapidly after 500 km, and the ball wear amount at the travel distance of 2,000 km: 11 μm.

● **Heat Generation Test**

[Test conditions]

| Item | Description |
|---|---|
| Model No. | BLK3232–3.6G0+1426LC5 |
| Maximum rotational speed | 1000min$^{-1}$ |
| Maximum speed | 32m/min |
| Maximum circumferential speed | 1.7m/s |
| Time constant | 100ms |
| Stroke | 1000mm |
| Load (through internal load) | 0.98kN |
| Grease | THK AFG Grease 5cm$^3$ (contained in the ball screw nut) |

[Test result]



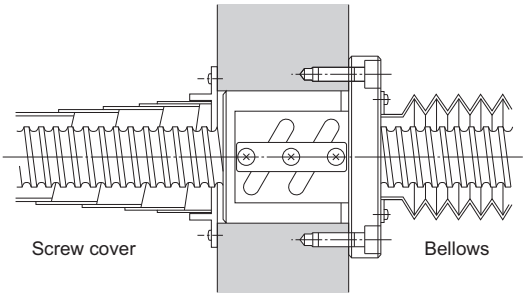

Unit: °C

| Item | With wiper ring | Without seal |
|---|---|---|
| Heat generation temperature | 37.1 | 34.5 |
| Temperature rise | 12.2 | 8.9 |

# Dust Cover for Ball Screws

## Bellows/Screw cover

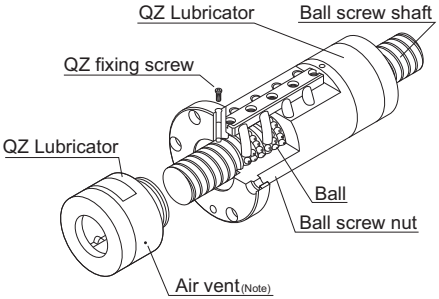
In the case of an environment with much dust and foreign material, be sure to prevent intrusion of foreign material by using bellows, a screw cover or the like. The contamination protection can be increased by also using a contamination protection seal. For details, contact THK. When conferring with us, please use the bellows specifications (**A15-368**).



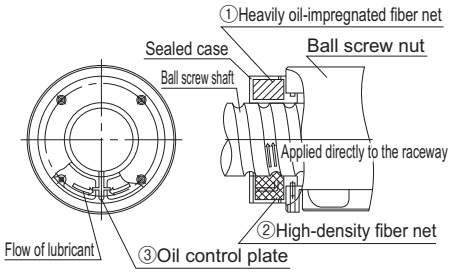
# QZ Lubricator

●For the supported models and the ball screw nut dimension with QZ attached, see A15-360 to A15-367.

QZ Lubricator feeds a right amount of lubricant to the raceway of the ball screw shaft. This allows an oil film to be constantly formed between the balls and the raceway, improves lubricity and significantly extends the lubrication maintenance interval.
The structure of QZ Lubricator consists of three major components: (1) a heavily oil-impregnated fiber net (stores the lubricant), (2) a high-density fiber net (applies the lubricant to the raceway) and (3) an oil-control plate (adjusts the oil flow). The lubricant contained in the QZ Lubricator is fed by the capillary phenomenon, which is used also in felt pens and many other products.



Appearance Drawing



Structural Drawing

**[Features]**

- Since it supplements an oil loss, the lubrication maintenance interval can be significantly extended.
- Since the right amount of lubricant is applied to the ball raceway, an environmentally friendly lubrication system that does not contaminate the surroundings is achieved.

Note) QZ Lubricator has a vent hole. Do not block the vent hole with grease or the like.

**Model number coding**

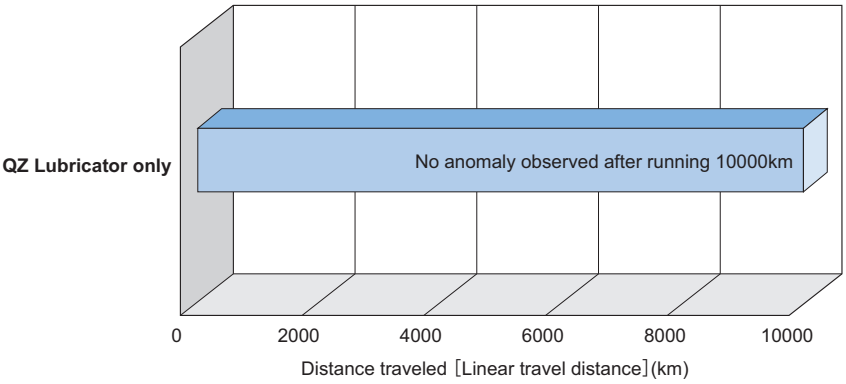
**BIF2505-5 QZ WW G0 +1000L C5**

QZ: With QZ Lubricator
WW: With wiper ring W

(*) See A15-360.

## ● Significantly extended maintenance interval

Since QZ Lubricator continuously feeds a lubricant over a long period, the maintenance interval can be significantly extended.

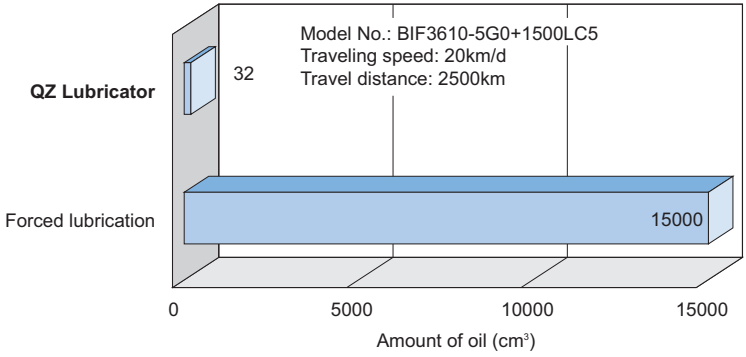



[Test conditions]

| Item | Description |
|---|---|
| Ball Screw | BIF2510 |
| Maximum rotational speed | 2500min$^{-1}$ |
| Maximum speed | 25m/min |
| Stroke | 500mm |
| Load | Internal preload only |

## ● Environmentally friendly lubrication system

Since QZ Lubricator feeds the right amount of lubricant directly to the raceway, the lubricant can effectively be used without waste.




**QZ Lubricator + THK AFA Grease**
**32cm³**
(QZ Lubricator attached to both ends of the ball screw nut)

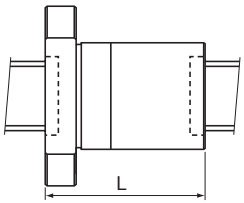
Compared

**Forced lubrication**
**0.25cm³/3min×24h×125d**
**=15000cm³**

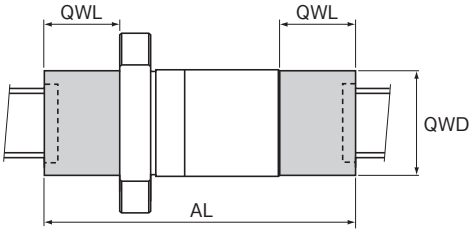
**Reduced to approx. $\frac{1}{470}$**

# Dimensions of Each Model with an Option Attached

## Dimensions of the Ball Screw Nut Attached with Wiper Ring W and QZ Lubricator




With WW (without QZ)




With QZ and WW

Unit: mm

| Model No. | | WW availability | QZ availability | Dimensions including WW | Length of protrusion with QZ attached | Outer diameter of protrusion with QZ attached | Dimensions including QZ and WW |
|---|---|---|---|---|---|---|---|
| | | | | L | QWL | QWD | AL |
| EBA EBB EBC DIN Standard | 1605-4 | ○ | ○ | 50 | 25 | 27 | 110 |
| | 2005-3 | ○ | ○ | 45 | 26.5 | 33 | 98 |
| | 2505-3 | ○ | ○ | 45 | 28 | 39 | 101 |
| | 2510-3 | ○ | ○ | 75 | 32 | 39 | 139 |
| | 2510-4 | ○ | ○ | 80 | 32 | 39 | 144 |
| | 3205-3 | ○ | ○ | 47 | 35 | 45 | 117 |
| | 3205-4 | ○ | ○ | 52 | 35 | 45 | 122 |
| | 3205-6 | ○ | ○ | 62 | 35 | 45 | 132 |
| | 3210-3 | ○ | ○ | 77 | 40 | 49 | 157 |
| | 3210-4 | ○ | ○ | 89 | 40 | 49 | 169 |
| | 4005-6 | ○ | ○ | 65 | 28.5 | 61 | 122 |
| | 4010-3 | ○ | ○ | 79 | 44 | 61 | 167 |
| | 4010-4 | ○ | ○ | 89 | 44 | 61 | 177 |
| | 4020-3 | ○ | ○ | 119 | 47 | 61 | 213 |
| | 5010-4 | ○ | ○ | 91 | 37 | 71 | 165 |
| | 5020-3 | ○ | ○ | 124 | 40 | 71 | 204 |
| | 6310-6 | ○ | ○ | 114 | 39 | 84 | 192 |
| | 6320-3 | ○ | ○ | 126 | 30.5 | 94 | 187 |
| EPA EPB EPC DIN Standard | 1605-6 | ○ | ○ | 60 | 25 | 27 | 115 |
| | 2005-6 | ○ | ○ | 61 | 26.5 | 33 | 114 |
| | 2505-6 | ○ | ○ | 61 | 28 | 39 | 117 |
| | 2510-4 | ○ | ○ | 80 | 32 | 39 | 144 |
| | 3205-6 | ○ | ○ | 62 | 35 | 45 | 132 |
| | 3205-8 | ○ | ○ | 73 | 35 | 45 | 143 |
| | 3210-6 | ○ | ○ | 107 | 40 | 49 | 187 |
| | 4005-6 | ○ | ○ | 65 | 28.5 | 61 | 122 |
| | 4010-6 | ○ | ○ | 109 | 44 | 61 | 197 |
| | 4010-8 | ○ | ○ | 133 | 44 | 61 | 221 |
| | 5010-8 | ○ | ○ | 135 | 37 | 71 | 209 |
| | 6310-8 | ○ | ○ | 137 | 39 | 84 | 215 |

Unit: mm

| Model No. | | WW availability | QZ availability | Dimensions including WW | Length of protrusion with QZ attached | Outer diameter of protrusion with QZ attached | Dimensions including QZ and WW |
|---|---|---|---|---|---|---|---|
| | | | | L | QWL | QWD | AL |
| SBN Retainer | 1604-5 | ○ | ○ | 53 | 29 | 31 | 111 |
| | 1605-5 | ○ | ○ | 56 | 29 | 31 | 114 |
| | 2004-5 | ○ | ○ | 53 | 27.5 | 39 | 108 |
| | 2005-5 | ○ | ○ | 56 | 27.5 | 43 | 111 |
| | 2504-5 | ○ | ○ | 48 | 32.5 | 45 | 113 |
| | 2505-5 | ○ | ○ | 55 | 32.5 | 45 | 120 |
| | 2506-5 | ○ | ○ | 62 | 33 | 45 | 128 |
| | 2805-5 | ○ | ○ | 59 | 22 | 54 | 103 |
| | 2806-5 | ○ | ○ | 63 | 23 | 54 | 109 |
| | 3205-5 | ○ | ○ | 56 | 32 | 57 | 120 |
| | 3206-5 | ○ | ○ | 63 | 32 | 57 | 127 |
| | 3210-7 | ○ | ○ | 120 | 31 | 73 | 182 |
| | 3212-5 | ○ | ○ | 117 | 33 | 73 | 183 |
| | 3610-7 | ○ | ○ | 123 | 33 | 64 | 189 |
| | 3612-7 | ○ | ○ | 140 | 35 | 64 | 210 |
| | 3616-5 | ○ | ○ | 140 | 32 | 64 | 204 |
| | 4012-5 | ○ | ○ | 119 | 38 | 66 | 195 |
| | 4016-5 | ○ | ○ | 144 | 42 | 66 | 228 |
| | 4512-5 | ○ | ○ | 119 | 35.5 | 79 | 190 |
| | 4516-5 | ○ | ○ | 140 | 35.5 | 79 | 211 |
| | 5012-5 | ○ | ○ | 119 | 38.5 | 79 | 196 |
| | 5016-5 | ○ | ○ | 143 | 38.5 | 79 | 220 |
| | 5020-5 | ○ | ○ | 169 | 40.5 | 79 | 250 |
| SBK Retainer | 1520-3.6 | △ | ○ | — | 22 | 31 | 98 |
| | 1616-3.6 | △ | × | — | — | — | — |
| | 2010-5.6 | △ | ○ | — | 27 | 36 | 99 |
| | 2020-3.6 | ○ | ○ | 54 | 27 | 36 | 108 |
| | 2030-3.6 | △ | ○ | — | 27 | 36 | 125 |
| | 2520-3.6 | ○ | ○ | 57 | 35.5 | 44 | 128 |
| | 2525-3.6 | ○ | ○ | 68 | 35.5 | 44 | 139 |
| | 3220-5.6 | ○ | ○ | 82 | 34.5 | 53 | 151 |
| | 3232-5.6 | △ | ○ | — | 34.5 | 53 | 187 |

○: available △: available per request ×: not available

Note) The L dimension indicates the length of the nut with WW.
For models BLW, BLK (precision and rolling), WGF, BNK1510 or larger (excluding BNK2010), WTF and CNF, fit a wiper ring to the outside of the nut.

## Options

### Dimensions of Each Model with an Option Attached

Unit: mm

| Model No. | | WW availability | QZ availability | Dimensions including WW | Length of protrusion with QZ attached | Outer diameter of protrusion with QZ attached | Dimensions including QZ and WW |
|---|---|---|---|---|---|---|---|
| | | | | L | QWL | QWD | AL |
| SBK Retainer | 3620-7.6 | ○ | ○ | 110 | 28 | 69 | 166 |
| | 3636-5.6 | ○ | ○ | 134 | 28 | 69 | 190 |
| | 4020-7.6 | ○ | ○ | 110 | 30.5 | 79 | 171 |
| | 4030-7.6 | ○ | ○ | 148 | 30.4 | 79 | 208.8 |
| | 4040-5.6 | ○ | ○ | 146 | 30.4 | 79 | 206.8 |
| | 5020-7.6 | ○ | ○ | 110 | 35 | 89 | 180 |
| | 5030-7.6 | ○ | ○ | 149 | 35 | 89 | 219 |
| | 5036-7.6 | ○ | ○ | 172 | 35 | 89 | 242 |
| | 5050-5.6 | ○ | ○ | 175 | 35 | 89 | 245 |
| | 5520-7.6 | ○ | ○ | 110 | 32 | 95 | 174 |
| | 5530-7.6 | ○ | ○ | 149 | 32 | 95 | 213 |
| | 5536-7.6 | ○ | ○ | 172 | 32 | 95 | 236 |
| SDA Retainer | 1510-2.8 | ○ | ○ | 43.3 | 28.5 | 27 | 92.3 |
| | 1520-3.6 | △ | ○ | — | 28.5 | 27 | 101.6 |
| | 1530-3.6 | × | ○ | — | 28.5 | 27 | 121.9 |
| | 1610-2.8 | ○ | ○ | 43.4 | 28.5 | 27 | 92.4 |
| | 1616-2.8 | ○ | ○ | 59.9 | 28.5 | 27 | 108.9 |
| | 2020-2.8 | ○ | ○ | 76.8 | 33 | 35 | 131.8 |
| | 2030-1.8 | × | ○ | — | 33 | 35 | 131.2 |
| | 2040-1.8 | × | ○ | — | 33 | 35 | 151.5 |
| | 2060-1.6 | × | ○ | — | 33 | 35 | 132.3 |
| | 2520-2.8 | ○ | ○ | 77.4 | 33 | 39 | 132.4 |
| | 2525-2.8 | ○ | ○ | 91.2 | 33 | 39 | 146.2 |
| | 2530-1.8 | × | ○ | — | 33 | 39 | 131.1 |
| | 2550-1.8 | × | ○ | — | 33 | 39 | 171.4 |
| HBN Retainer | 3210-5 | × | △ | — | — | — | — |
| | 3610-5 | × | △ | — | — | — | — |
| | 3612-5 | × | △ | — | — | — | — |
| | 4010-7.5 | × | △ | — | — | — | — |
| | 4012-7.5 | × | △ | — | — | — | — |
| | 5010-7.5 | × | △ | — | — | — | — |
| | 5012-7.5 | × | △ | — | — | — | — |
| | 5016-7.5 | × | △ | — | — | — | — |
| | 6316-7.5 | × | △ | — | — | — | — |
| | 6316-10.5 | × | △ | — | — | — | — |
| | 6320-7.5 | × | △ | — | — | — | — |
| SBKH Retainer | 6332-3.8 | × | △ | — | — | — | — |
| | 6340-7.6 | × | △ | — | — | — | — |
| | 8050-7.6 | × | △ | — | — | — | — |
| | 8060-7.6 | × | △ | — | — | — | — |
| | 10050-7.6 | × | △ | — | — | — | — |
| | 10060-7.6 | × | △ | — | — | — | — |
| | 12060-7.6 | × | △ | — | — | — | — |
| BNF | 1604-3 | ○ | ○ | 45 | 29 | 31 | 103 |
| | 1605-2.5 | ○ | ○ | 41 | 29 | 31 | 99 |
| | 1605-3 | ○ | ○ | 51 | 29 | 31 | 109 |
| | 1605-5 | ○ | ○ | 56 | 29 | 31 | 114 |
| | 1606-2.5 | ○ | ○ | 44 | 29 | 31 | 102 |
| | 1606-5 | ○ | ○ | 62 | 29 | 31 | 120 |
| | 1610-1.5 | ○ | ○ | 42 | 29 | 31 | 100 |

Unit: mm

| Model No. | | WW availability | QZ availability | Dimensions including WW | Length of protrusion with QZ attached | Outer diameter of protrusion with QZ attached | Dimensions including QZ and WW |
|---|---|---|---|---|---|---|---|
| | | | | L | QWL | QWD | AL |
| BNF | 1810-2.5 | ○ | △ | 69 | — | — | — |
| | 1810-3 | ○ | △ | 75 | — | — | — |
| | 2004-2.5 | ○ | ○ | 37 | 27.5 | 39 | 92 |
| | 2004-5 | ○ | ○ | 49 | 27.5 | 39 | 104 |
| | 2005-2.5 | ○ | ○ | 41 | 27.5 | 43 | 96 |
| | 2005-3 | ○ | ○ | 52 | 27.5 | 43 | 107 |
| | 2005-3.5 | ○ | ○ | 45 | 27.5 | 43 | 100 |
| | 2005-5 | ○ | ○ | 56 | 27.5 | 43 | 111 |
| | 2006-2.5 | ○ | △ | 44 | — | — | — |
| | 2006-3 | ○ | △ | 56 | — | — | — |
| | 2006-3.5 | ○ | △ | 50 | — | — | — |
| | 2006-5 | ○ | △ | 62 | — | — | — |
| | 2008-2.5 | △ | △ | — | — | — | — |
| | 2010A-1.5 | ○ | ○ | 58 | 31.5 | 43 | 121 |
| | 2012-1.5 | △ | △ | — | — | — | — |
| | 2504-2.5 | ○ | ○ | 36 | 32.5 | 45 | 101 |
| | 2504-5 | ○ | ○ | 48 | 32.5 | 45 | 113 |
| | 2505-2.5 | ○ | ○ | 40 | 32.5 | 45 | 105 |
| | 2505-3 | ○ | ○ | 52 | 32.5 | 45 | 117 |
| | 2505-3.5 | ○ | ○ | 45 | 32.5 | 45 | 110 |
| | 2505-5 | ○ | ○ | 55 | 32.5 | 45 | 120 |
| | 2506-2.5 | ○ | ○ | 44 | 33 | 45 | 110 |
| | 2506-3 | ○ | ○ | 56 | 33 | 45 | 122 |
| | 2506-3.5 | ○ | ○ | 50 | 33 | 45 | 116 |
| | 2506-5 | ○ | ○ | 62 | 33 | 45 | 128 |
| | 2508-2.5 | ○ | ○ | 58 | 34 | 45 | 126 |
| | 2508-3 | ○ | ○ | 71 | 34 | 45 | 139 |
| | 2508-3.5 | ○ | ○ | 66 | 34 | 45 | 134 |
| | 2508-5 | ○ | ○ | 82 | 34 | 45 | 150 |
| | 2510A-2.5 | ○ | ○ | 70 | 37 | 45 | 144 |
| | 2512-2.5 | ○ | ○ | 60 | 33 | 45 | 126 |
| | 2516-1.5 | ○ | ○ | 60 | 35 | 45 | 130 |
| | 2805-2.5 | ○ | △ | 44 | — | — | — |
| | 2805-3 | ○ | △ | 54 | — | — | — |
| | 2805-3.5 | ○ | △ | 49 | — | — | — |
| | 2805-5 | ○ | △ | 59 | — | — | — |
| | 2805-7.5 | ○ | △ | 74 | — | — | — |
| | 2806-2.5 | ○ | △ | 50 | — | — | — |
| | 2806-3.5 | ○ | △ | 56 | — | — | — |
| | 2806-5 | ○ | △ | 68 | — | — | — |
| | 2806-7.5 | ○ | △ | 86 | — | — | — |
| | 2808-2.5 | ○ | △ | 68 | — | — | — |
| | 2808-3 | ○ | △ | 80 | — | — | — |
| | 2808-5 | ○ | △ | 92 | — | — | — |
| | 2810-2.5 | ○ | △ | 86 | — | — | — |
| | 3204-7.5 | △ | △ | — | — | — | — |
| | 3205-2.5 | ○ | ○ | 41 | 32 | 57 | 105 |
| | 3205-3 | ○ | ○ | 53 | 32 | 57 | 117 |
| | 3205-4.5 | ○ | ○ | 63 | 32 | 57 | 127 |
| | 3205-5 | ○ | ○ | 56 | 32 | 57 | 120 |

○: available △: available per request ×: not available

Unit: mm

| Model No. | | WW availability | QZ availability | Dimensions including WW | Length of protrusion with QZ attached | Outer diameter of protrusion with QZ attached | Dimensions including QZ and WW |
|---|---|---|---|---|---|---|---|
| | | | | L | QWL | QWD | AL |
| BNF | 3205-7.5 | ○ | ○ | 71 | 32 | 57 | 135 |
| | 3206-2.5 | ○ | ○ | 45 | 32 | 57 | 109 |
| | 3206-3 | ○ | ○ | 57 | 32 | 57 | 121 |
| | 3206-5 | ○ | ○ | 63 | 32 | 57 | 127 |
| | 3208A-2.5 | ○ | ○ | 58 | 34 | 57 | 126 |
| | 3208A-3 | ○ | ○ | 71 | 34 | 57 | 139 |
| | 3208A-4.5 | ○ | ○ | 87 | 34 | 57 | 155 |
| | 3208A-5 | ○ | ○ | 82 | 34 | 57 | 150 |
| | 3210A-2.5 | ○ | ○ | 70 | 31 | 73 | 132 |
| | 3210A-3 | ○ | ○ | 87 | 31 | 73 | 149 |
| | 3210A-3.5 | ○ | ○ | 80 | 31 | 73 | 142 |
| | 3210A-5 | ○ | ○ | 100 | 31 | 73 | 162 |
| | 3212-3.5 | ○ | ○ | 98 | 33 | 73 | 164 |
| | 3606-2.5 | ○ | ○ | 53 | 30 | 64 | 113 |
| | 3606-3 | ○ | ○ | 62 | 30 | 64 | 122 |
| | 3606-5 | ○ | ○ | 71 | 30 | 64 | 131 |
| | 3606-7.5 | ○ | ○ | 89 | 30 | 64 | 149 |
| | 3608-2.5 | ○ | ○ | 68 | 31 | 64 | 130 |
| | 3608-5 | ○ | ○ | 92 | 31 | 64 | 154 |
| | 3608-7.5 | ○ | ○ | 116 | 31 | 64 | 178 |
| | 3610-2.5 | ○ | ○ | 81 | 33 | 64 | 147 |
| | 3610-5 | ○ | ○ | 111 | 33 | 64 | 177 |
| | 3610-7.5 | ○ | ○ | 141 | 33 | 64 | 207 |
| | 3612-2.5 | ○ | ○ | 87 | 35 | 64 | 157 |
| | 3612-5 | ○ | ○ | 123 | 35 | 64 | 193 |
| | 3616-2.5 | ○ | ○ | 92 | 32 | 64 | 156 |
| | 3620-1.5 | ○ | ○ | 75 | 32 | 64 | 139 |
| | 4005-3 | ○ | ○ | 56 | 33 | 66 | 122 |
| | 4005-4.5 | ○ | ○ | 66 | 33 | 66 | 132 |
| | 4005-6 | ○ | ○ | 81 | 33 | 66 | 147 |
| | 4006-2.5 | ○ | ○ | 48 | 35 | 66 | 118 |
| | 4006-5 | ○ | ○ | 66 | 35 | 66 | 136 |
| | 4006-7.5 | ○ | ○ | 84 | 35 | 66 | 154 |
| | 4008-2.5 | ○ | ○ | 58 | 35 | 66 | 128 |
| | 4008-3 | ○ | ○ | 71 | 35 | 66 | 141 |
| | 4008-5 | ○ | ○ | 82 | 35 | 66 | 152 |
| | 4010-2.5 | ○ | ○ | 73 | 37 | 66 | 147 |
| | 4010-3 | ○ | ○ | 90 | 37 | 66 | 164 |
| | 4010-3.5 | ○ | ○ | 83 | 37 | 66 | 157 |
| | 4010-5 | ○ | ○ | 103 | 37 | 66 | 177 |
| | 4012-2.5 | ○ | ○ | 83 | 38 | 66 | 159 |
| | 4012-3.5 | ○ | ○ | 95 | 38 | 66 | 171 |
| | 4012-5 | ○ | ○ | 119 | 38 | 66 | 195 |
| | 4016-5 | ○ | ○ | 152 | 42 | 66 | 236 |
| | 4506A-2.5 | ○ | △ | 53 | — | — | — |
| | 4506A-5 | ○ | △ | 71 | — | — | — |
| | 4506A-7.5 | ○ | △ | 89 | — | — | — |
| | 4508-2.5 | ○ | △ | 68 | — | — | — |
| | 4508-5 | ○ | △ | 92 | — | — | — |
| | 4508-7.5 | ○ | △ | 116 | — | — | — |

Unit: mm

| Model No. | | WW availability | QZ availability | Dimensions including WW | Length of protrusion with QZ attached | Outer diameter of protrusion with QZ attached | Dimensions including QZ and WW |
|---|---|---|---|---|---|---|---|
| | | | | L | QWL | QWD | AL |
| BNF | 4510-2.5 | ○ | △ | 81 | — | — | — |
| | 4510-3 | ○ | △ | 94 | — | — | — |
| | 4510-5 | ○ | △ | 111 | — | — | — |
| | 4510-7.5 | ○ | △ | 141 | — | — | — |
| | 4512-5 | ○ | △ | 119 | — | — | — |
| | 4520-1.5 | ○ | △ | 95 | — | — | — |
| | 5005-4.5 | ○ | ○ | 68 | 35.5 | 79 | 139 |
| | 5008-2.5 | ○ | ○ | 61 | 36.5 | 79 | 134 |
| | 5008-5 | ○ | ○ | 85 | 36.5 | 79 | 158 |
| | 5008-7.5 | ○ | ○ | 109 | 36.5 | 79 | 182 |
| | 5010-2.5 | ○ | ○ | 73 | 37.5 | 79 | 148 |
| | 5010-3 | ○ | ○ | 90 | 37.5 | 79 | 165 |
| | 5010-3.5 | ○ | ○ | 83 | 37.5 | 79 | 158 |
| | 5010-5 | ○ | ○ | 103 | 37.5 | 79 | 178 |
| | 5010-7.5 | ○ | ○ | 133 | 37.5 | 79 | 208 |
| | 5012-2.5 | ○ | ○ | 87 | 38.5 | 79 | 164 |
| | 5012-3.5 | ○ | ○ | 99 | 38.5 | 79 | 176 |
| | 5012-5 | ○ | ○ | 123 | 38.5 | 79 | 200 |
| | 5016-2.5 | ○ | ○ | 116 | 38.5 | 79 | 193 |
| | 5016-5 | ○ | ○ | 164 | 38.5 | 79 | 241 |
| | 5020-2.5 | ○ | ○ | 141 | 40.5 | 79 | 222 |
| | 5510-2.5 | ○ | △ | 81 | — | — | — |
| | 5510-5 | ○ | △ | 111 | — | — | — |
| | 5510-7.5 | ○ | △ | 141 | — | — | — |
| | 5512-2.5 | ○ | △ | 93 | — | — | — |
| | 5512-3 | ○ | △ | 107 | — | — | — |
| | 5512-3.5 | ○ | △ | 105 | — | — | — |
| | 5512-5 | ○ | △ | 129 | — | — | — |
| | 5512-7.5 | ○ | △ | 165 | — | — | — |
| | 5516-2.5 | ○ | △ | 116 | — | — | — |
| | 5516-5 | ○ | △ | 164 | — | — | — |
| | 5520-2.5 | ○ | △ | 127 | — | — | — |
| | 5520-5 | ○ | △ | 187 | — | — | — |
| | 6310-2.5 | ○ | △ | 77 | — | — | — |
| | 6310-5 | ○ | △ | 107 | — | — | — |
| | 6310-7.5 | ○ | △ | 137 | — | — | — |
| | 6312A-2.5 | △ | △ | — | — | — | — |
| | 6312A-5 | △ | △ | — | — | — | — |
| | 6316-5 | △ | △ | — | — | — | — |
| | 6320-2.5 | ○ | △ | 127 | — | — | — |
| | 6320-5 | ○ | △ | 187 | — | — | — |
| | 7010-2.5 | △ | △ | — | — | — | — |
| | 7010-5 | △ | △ | — | — | — | — |
| | 7010-7.5 | △ | △ | — | — | — | — |
| | 7012-2.5 | △ | △ | — | — | — | — |
| | 7012-5 | △ | △ | — | — | — | — |
| | 7012-7.5 | △ | △ | — | — | — | — |
| | 7020-5 | △ | △ | — | — | — | — |
| | 8010-2.5 | △ | △ | — | — | — | — |
| | 8010-5 | △ | △ | — | — | — | — |

○: available △: available per request ×: not available

## Dimensions of Each Model with an Option Attached

Unit: mm

| Model No. | | WW availability | QZ availability | Dimensions including WW | Length of protrusion with QZ attached | Outer diameter of protrusion with QZ attached | Dimensions including QZ and WW |
|---|---|---|---|---|---|---|---|
| | | | | L | QWL | QWD | AL |
| BNF | 8010-7.5 | △ | △ | — | — | — | — |
| | 8020A-2.5 | △ | △ | — | — | — | — |
| | 8020A-5 | △ | △ | — | — | — | — |
| | 8020A-7.5 | △ | △ | — | — | — | — |
| | 10020A-2.5 | ○ | △ | 131 | — | — | — |
| | 10020A-5 | ○ | △ | 191 | — | — | — |
| | 10020A-7.5 | ○ | △ | 251 | — | — | — |
| BNFN | 1605-3 | ○ | ○ | 96 | 29 | 31 | 154 |
| | 1605-5 | ○ | ○ | 106 | 29 | 31 | 164 |
| | 1810-2.5 | ○ | △ | 119 | — | — | — |
| | 1810-3 | ○ | △ | 135 | — | — | — |
| | 2006-3 | ○ | △ | 110 | — | — | — |
| | 2006-3.5 | ○ | △ | 98 | — | — | — |
| | 2006-5 | ○ | △ | 122 | — | — | — |
| | 2805-7.5 | ○ | △ | 134 | — | — | — |
| | 2806-7.5 | ○ | △ | 158 | — | — | — |
| | 2810-2.5 | ○ | △ | 146 | — | — | — |
| | 3205-7.5 | ○ | ○ | 136 | 32 | 57 | 200 |
| | 3606-7.5 | ○ | ○ | 161 | 30 | 64 | 221 |
| | 3608-7.5 | ○ | ○ | 212 | 31 | 64 | 274 |
| | 3610-7.5 | ○ | ○ | 261 | 33 | 64 | 327 |
| | 3616-5 | ○ | ○ | 268 | 32 | 64 | 332 |
| | 4005-6 | ○ | ○ | 156 | 33 | 66 | 222 |
| | 4006-7.5 | ○ | ○ | 162 | 35 | 66 | 232 |
| | 4016-5 | ○ | ○ | 280 | 42 | 66 | 364 |
| | 4506A-7.5 | ○ | △ | 161 | — | — | — |
| | 4508-7.5 | ○ | △ | 212 | — | — | — |
| | 4510-7.5 | ○ | △ | 261 | — | — | — |
| | 5008-7.5 | ○ | ○ | 205 | 36.5 | 79 | 278 |
| | 5010-7.5 | ○ | ○ | 253 | 37.5 | 79 | 328 |
| | 5510-2.5 | ○ | △ | 141 | — | — | — |
| | 5510-5 | ○ | △ | 201 | — | — | — |
| | 5510-7.5 | ○ | △ | 261 | — | — | — |
| | 5512-2.5 | ○ | △ | 165 | — | — | — |
| | 5512-3 | ○ | △ | 191 | — | — | — |
| | 5512-3.5 | ○ | △ | 189 | — | — | — |
| | 5512-5 | ○ | △ | 237 | — | — | — |
| | 5512-7.5 | ○ | △ | 309 | — | — | — |
| | 5516-2.5 | ○ | △ | 196 | — | — | — |
| | 5516-5 | ○ | △ | 292 | — | — | — |
| | 5520-2.5 | ○ | △ | 227 | — | — | — |
| | 5520-5 | ○ | △ | 347 | — | — | — |
| | 6310-2.5 | ○ | △ | 137 | — | — | — |
| | 6310-5 | ○ | △ | 197 | — | — | — |
| | 6310-7.5 | ○ | △ | 257 | — | — | — |
| | 6312A-2.5 | △ | △ | — | — | — | — |
| | 6312A-5 | △ | △ | — | — | — | — |
| | 6316-2.5 | △ | △ | — | — | — | — |
| | 6316-5 | △ | △ | — | — | — | — |
| | 6320-2.5 | ○ | △ | 227 | — | — | — |

Unit: mm

| Model No. | | WW availability | QZ availability | Dimensions including WW | Length of protrusion with QZ attached | Outer diameter of protrusion with QZ attached | Dimensions including QZ and WW |
|---|---|---|---|---|---|---|---|
| | | | | L | QWL | QWD | AL |
| | 6320-5 | ○ | △ | 347 | — | — | — |
| | 7010-2.5 | △ | △ | — | — | — | — |
| | 7010-5 | △ | △ | — | — | — | — |
| | 7010-7.5 | △ | △ | — | — | — | — |
| | 7012-2.5 | △ | △ | — | — | — | — |
| | 7012-5 | △ | △ | — | — | — | — |
| | 7012-7.5 | △ | △ | — | — | — | — |
| | 7020-5 | △ | △ | — | — | — | — |
| BNFN | 8010-2.5 | △ | △ | — | — | — | — |
| | 8010-5 | △ | △ | — | — | — | — |
| | 8010-7.5 | △ | △ | — | — | — | — |
| | 8012-5 | △ | △ | — | — | — | — |
| | 8020A-2.5 | △ | △ | — | — | — | — |
| | 8020A-5 | △ | △ | — | — | — | — |
| | 10020A-2.5 | ○ | △ | 231 | — | — | — |
| | 10020A-5 | ○ | △ | 351 | — | — | — |
| | 10020A-7.5 | ○ | △ | 471 | — | — | — |
| | 1604-6 | ○ | ○ | 65 | 29 | 31 | 123 |
| | 1605-5 | ○ | ○ | 56 | 29 | 31 | 114 |
| | 1606-5 | ○ | ○ | 62 | 29 | 31 | 120 |
| | 1610-3 | ○ | ○ | 62 | 29 | 31 | 120 |
| | 1810-3 | ○ | △ | 75 | — | — | — |
| | 2004-5 | ○ | △ | 53 | — | — | — |
| | 2004-10 | ○ | △ | 76 | — | — | — |
| | 2005-5 | ○ | △ | 56 | — | — | — |
| | 2005-6 | ○ | △ | 77 | — | — | — |
| | 2005-7 | ○ | △ | 65 | — | — | — |
| | 2005-10 | ○ | △ | 86 | — | — | — |
| | 2006-3 | ○ | △ | 56 | — | — | — |
| | 2006-5 | ○ | △ | 62 | — | — | — |
| | 2008-5 | △ | △ | — | — | — | — |
| | 2010A-3 | ○ | ○ | 78 | 31.5 | 43 | 141 |
| | 2012-3 | △ | △ | — | — | — | — |
| BIF | 2504-5 | ○ | ○ | 48 | 32.5 | 45 | 113 |
| | 2504-10 | ○ | ○ | 72 | 32.5 | 45 | 137 |
| | 2505-3 | ○ | ○ | 52 | 32.5 | 45 | 117 |
| | 2505-5 | ○ | ○ | 55 | 32.5 | 45 | 120 |
| | 2505-6 | ○ | ○ | 77 | 32.5 | 45 | 142 |
| | 2505-7 | ○ | ○ | 65 | 32.5 | 45 | 130 |
| | 2505-10 | ○ | ○ | 85 | 32.5 | 45 | 150 |
| | 2506-5 | ○ | ○ | 62 | 33 | 45 | 128 |
| | 2506-6 | ○ | ○ | 86 | 33 | 45 | 152 |
| | 2506-7 | ○ | ○ | 74 | 33 | 45 | 140 |
| | 2506-10 | ○ | ○ | 98 | 33 | 45 | 164 |
| | 2508-5 | ○ | ○ | 82 | 34 | 45 | 150 |
| | 2508-6 | ○ | ○ | 111 | 34 | 45 | 179 |
| | 2508-7 | ○ | ○ | 98 | 34 | 45 | 166 |
| | 2508-10 | ○ | ○ | 130 | 34 | 45 | 198 |
| | 2510A-5 | ○ | ○ | 100 | 37 | 45 | 174 |
| | 2512-5 | ○ | ○ | 96 | 33 | 45 | 162 |

○: available △: available per request ×: not available

Unit: mm

| Model No. | | WW availability | QZ availability | Dimensions including WW | Length of protrusion with QZ attached | Outer diameter of protrusion with QZ attached | Dimensions including QZ and WW |
|---|---|---|---|---|---|---|---|
| | | | | L | QWL | QWD | AL |
| BIF | 2516-3 | ○ | ○ | 92 | 35 | 45 | 162 |
| | 2805-5 | ○ | △ | 59 | — | — | — |
| | 2805-6 | ○ | △ | 79 | — | — | — |
| | 2805-7 | ○ | △ | 69 | — | — | — |
| | 2805-10 | ○ | △ | 89 | — | — | — |
| | 2806-5 | ○ | △ | 68 | — | — | — |
| | 2806-7 | ○ | △ | 80 | — | — | — |
| | 2806-10 | ○ | △ | 104 | — | — | — |
| | 2808-5 | ○ | △ | 92 | — | — | — |
| | 2808-6 | ○ | △ | 120 | — | — | — |
| | 2808-10 | ○ | △ | 140 | — | — | — |
| | 2810-3 | ○ | △ | 88 | — | — | — |
| | 3204-10 | △ | △ | — | — | — | — |
| | 3205-5 | ○ | ○ | 56 | 32 | 57 | 120 |
| | 3205-6 | ○ | ○ | 78 | 32 | 57 | 142 |
| | 3205-9 | ○ | ○ | 98 | 32 | 57 | 162 |
| | 3205-10 | ○ | ○ | 86 | 32 | 57 | 150 |
| | 3206-5 | ○ | ○ | 63 | 32 | 57 | 127 |
| | 3206-6 | ○ | ○ | 87 | 32 | 57 | 151 |
| | 3206-7 | ○ | ○ | 75 | 32 | 57 | 139 |
| | 3206-10 | ○ | ○ | 99 | 32 | 57 | 163 |
| | 3208A-5 | ○ | ○ | 82 | 34 | 57 | 150 |
| | 3208A-6 | ○ | ○ | 111 | 34 | 57 | 179 |
| | 3208A-7 | ○ | ○ | 98 | 34 | 57 | 166 |
| | 3208A-9 | ○ | ○ | 143 | 34 | 57 | 211 |
| | 3208A-10 | ○ | ○ | 130 | 34 | 57 | 198 |
| | 3210A-5 | ○ | ○ | 100 | 31 | 73 | 162 |
| | 3210A-6 | ○ | ○ | 137 | 31 | 73 | 199 |
| | 3210A-7 | ○ | ○ | 120 | 31 | 73 | 182 |
| | 3210A-10 | ○ | ○ | 160 | 31 | 73 | 222 |
| | 3212-7 | ○ | ○ | 146 | 33 | 73 | 212 |
| | 3606-5 | ○ | ○ | 71 | 30 | 64 | 131 |
| | 3606-6 | ○ | ○ | 92 | 30 | 64 | 152 |
| | 3606-10 | ○ | ○ | 107 | 30 | 64 | 167 |
| | 3608-5 | ○ | ○ | 92 | 31 | 64 | 154 |
| | 3608-10 | ○ | ○ | 140 | 31 | 64 | 202 |
| | 3610-5 | ○ | ○ | 111 | 33 | 64 | 177 |
| | 3610-10 | ○ | ○ | 171 | 33 | 64 | 237 |
| | 3612-5 | ○ | ○ | 123 | 35 | 64 | 193 |
| | 3612-10 | ○ | ○ | 195 | 35 | 64 | 265 |
| | 3616-5 | ○ | ○ | 140 | 32 | 64 | 204 |
| | 3620-3 | ○ | ○ | 115 | 32 | 64 | 179 |
| | 4005-6 | ○ | ○ | 81 | 33 | 66 | 147 |
| | 4005-9 | ○ | ○ | 101 | 33 | 66 | 167 |
| | 4005-10 | ○ | ○ | 89 | 33 | 66 | 155 |
| | 4006-5 | ○ | ○ | 66 | 35 | 66 | 136 |
| | 4006-10 | ○ | ○ | 102 | 35 | 66 | 172 |
| | 4008-5 | ○ | ○ | 82 | 35 | 66 | 152 |
| | 4008-6 | ○ | ○ | 111 | 35 | 66 | 181 |
| | 4008-10 | ○ | ○ | 130 | 35 | 66 | 200 |

Unit: mm

| Model No. | | WW availability | QZ availability | Dimensions including WW | Length of protrusion with QZ attached | Outer diameter of protrusion with QZ attached | Dimensions including QZ and WW |
|---|---|---|---|---|---|---|---|
| | | | | L | QWL | QWD | AL |
| BIF | 4010-5 | ○ | ○ | 103 | 37 | 66 | 177 |
| | 4010-6 | ○ | ○ | 140 | 37 | 66 | 214 |
| | 4010-7 | ○ | ○ | 123 | 37 | 66 | 197 |
| | 4010-10 | ○ | ○ | 163 | 37 | 66 | 237 |
| | 4012-5 | ○ | ○ | 119 | 38 | 66 | 195 |
| | 4012-7 | ○ | ○ | 143 | 38 | 66 | 219 |
| | 4012-10 | ○ | ○ | 191 | 38 | 66 | 267 |
| | 4506A-5 | ○ | △ | 71 | — | — | — |
| | 4506A-10 | ○ | △ | 107 | — | — | — |
| | 4508-5 | ○ | △ | 92 | — | — | — |
| | 4508-10 | ○ | △ | 140 | — | — | — |
| | 4510-5 | ○ | △ | 111 | — | — | — |
| | 4510-6 | ○ | △ | 144 | — | — | — |
| | 4510-10 | ○ | △ | 171 | — | — | — |
| | 4512-10 | ○ | △ | 191 | — | — | — |
| | 4520-3 | ○ | △ | 135 | — | — | — |
| | 5005-6 | ○ | ○ | 83 | 35.5 | 79 | 154 |
| | 5005-9 | ○ | ○ | 103 | 35.5 | 79 | 174 |
| | 5008-5 | ○ | ○ | 85 | 36.5 | 79 | 158 |
| | 5008-10 | ○ | ○ | 133 | 36.5 | 79 | 206 |
| | 5010-5 | ○ | ○ | 103 | 37.5 | 79 | 178 |
| | 5010-6 | ○ | ○ | 140 | 37.5 | 79 | 215 |
| | 5010-7 | ○ | ○ | 123 | 37.5 | 79 | 198 |
| | 5010-10 | ○ | ○ | 163 | 37.5 | 79 | 238 |
| | 5012-5 | ○ | ○ | 123 | 38.5 | 79 | 200 |
| | 5012-7 | ○ | ○ | 147 | 38.5 | 79 | 224 |
| | 5012-10 | ○ | ○ | 195 | 38.5 | 79 | 272 |
| | 5016-5 | ○ | ○ | 164 | 38.5 | 79 | 241 |
| | 5016-10 | ○ | ○ | 260 | 38.5 | 79 | 337 |
| | 5020-5 | ○ | ○ | 201 | 40.5 | 79 | 282 |
| DIK | 1404-4 | △ | × | — | — | — | — |
| | 1404-6 | △ | × | — | — | — | — |
| | 1605-6 | ○ | △ | 60 | — | — | — |
| | 2004-6 | ○ | × | 62 | — | — | — |
| | 2004-8 | ○ | × | 70 | — | — | — |
| | 2005-6 | ○ | △ | 61 | — | — | — |
| | 2006-6 | △ | △ | — | — | — | — |
| | 2008-4 | △ | △ | — | — | — | — |
| | 2504-6 | ○ | △ | 63 | — | — | — |
| | 2504-8 | ○ | △ | 71 | — | — | — |
| | 2505-6 | ○ | △ | 61 | — | — | — |
| | 2506-4 | ○ | △ | 60 | — | — | — |
| | 2506-6 | ○ | △ | 72 | — | — | — |
| | 2508-4 | ○ | △ | 71 | — | — | — |
| | 2508-6 | ○ | △ | 94 | — | — | — |
| | 2510-4 | ○ | △ | 85 | — | — | — |
| | 2805-6 | ○ | △ | 69 | — | — | — |
| | 2805-8 | ○ | △ | 79 | — | — | — |
| | 2806-6 | ○ | △ | 73 | — | — | — |
| | 2810-4 | ○ | △ | 84 | — | — | — |

○: available △: available per request ×: not available

## Dimensions of Each Model with an Option Attached

Unit: mm

| Model No. | | WW availability | QZ availability | Dimensions including WW | Length of protrusion with QZ attached | Outer diameter of protrusion with QZ attached | Dimensions including QZ and WW |
|---|---|---|---|---|---|---|---|
| | | | | L | QWL | QWD | AL |
| DIK | 3204-6 | ○ | △ | 64 | — | — | — |
| | 3204-8 | ○ | △ | 72 | — | — | — |
| | 3204-10 | ○ | △ | 80 | — | — | — |
| | 3205-6 | ○ | △ | 62 | — | — | — |
| | 3205-8 | ○ | △ | 73 | — | — | — |
| | 3206-6 | ○ | △ | 73 | — | — | — |
| | 3206-8 | ○ | △ | 87 | — | — | — |
| | 3210-6 | ○ | △ | 110 | — | — | — |
| | 3212-4 | ○ | △ | 98 | — | — | — |
| | 3610-6 | ○ | △ | 122 | — | — | — |
| | 3610-8 | ○ | △ | 143 | — | — | — |
| | 3610-10 | ○ | △ | 164 | — | — | — |
| | 4010-6 | ○ | ○ | 113 | 44 | 61 | 201 |
| | 4010-8 | ○ | ○ | 137 | 44 | 61 | 225 |
| | 4012-6 | ○ | ○ | 138 | 44 | 61 | 226 |
| | 4012-8 | ○ | ○ | 163 | 44 | 61 | 251 |
| | 4016-4 | ○ | ○ | 120 | 44 | 61 | 208 |
| | 5010-6 | ○ | △ | 114 | — | — | — |
| | 5010-8 | ○ | △ | 137 | — | — | — |
| | 5010-10 | ○ | △ | 160 | — | — | — |
| | 5012-6 | ○ | △ | 145 | — | — | — |
| | 5012-8 | ○ | △ | 170 | — | — | — |
| | 5016-4 | ○ | △ | 129 | — | — | — |
| | 5016-6 | ○ | △ | 175 | — | — | — |
| | 6310-8 | △ | △ | — | — | — | — |
| | 6312-6 | △ | △ | — | — | — | — |
| | 6312-8 | △ | △ | — | — | — | — |
| DK | 1404-4 | △ | × | — | — | — | — |
| | 1404-6 | △ | × | — | — | — | — |
| | 1605-3 | ○ | △ | 45 | — | — | — |
| | 1605-4 | ○ | △ | 50 | — | — | — |
| | 2004-3 | ○ | × | 42 | — | — | — |
| | 2004-4 | ○ | × | 46 | — | — | — |
| | 2005-3 | ○ | △ | 46 | — | — | — |
| | 2005-4 | ○ | △ | 51 | — | — | — |
| | 2006-3 | △ | △ | — | — | — | — |
| | 2006-4 | △ | △ | — | — | — | — |
| | 2008-4 | △ | △ | — | — | — | — |
| | 2504-3 | ○ | △ | 43 | — | — | — |
| | 2504-4 | ○ | △ | 47 | — | — | — |
| | 2505-3 | ○ | △ | 46 | — | — | — |
| | 2505-4 | ○ | △ | 51 | — | — | — |
| | 2506-3 | ○ | △ | 52 | — | — | — |
| | 2506-4 | ○ | △ | 60 | — | — | — |
| | 2508-3 | ○ | △ | 62 | — | — | — |
| | 2508-4 | ○ | △ | 71 | — | — | — |
| | 2510-3 | ○ | △ | 80 | — | — | — |
| | 2510-4 | ○ | △ | 85 | — | — | — |
| | 2805-3 | ○ | △ | 49 | — | — | — |
| | 2805-4 | ○ | △ | 54 | — | — | — |

Unit: mm

| Model No. | | WW availability | QZ availability | Dimensions including WW | Length of protrusion with QZ attached | Outer diameter of protrusion with QZ attached | Dimensions including QZ and WW |
|---|---|---|---|---|---|---|---|
| | | | | L | QWL | QWD | AL |
| DK | 2806-3 | ○ | △ | 53 | — | — | — |
| | 2806-4 | ○ | △ | 61 | — | — | — |
| | 2810-4 | ○ | △ | 84 | — | — | — |
| | 3204-3 | ○ | △ | 44 | — | — | — |
| | 3204-4 | ○ | △ | 48 | — | — | — |
| | 3205-3 | ○ | △ | 47 | — | — | — |
| | 3205-4 | ○ | △ | 52 | — | — | — |
| | 3205-6 | ○ | △ | 62 | — | — | — |
| | 3206-3 | ○ | △ | 53 | — | — | — |
| | 3206-4 | ○ | △ | 61 | — | — | — |
| | 3210-3 | ○ | △ | 80 | — | — | — |
| | 3210-4 | ○ | △ | 90 | — | — | — |
| | 3212-4 | ○ | △ | 98 | — | — | — |
| | 3610-3 | ○ | △ | 82 | — | — | — |
| | 3610-4 | ○ | △ | 93 | — | — | — |
| | 4010-3 | ○ | ○ | 83 | 44 | 61 | 171 |
| | 4010-4 | ○ | ○ | 93 | 44 | 61 | 181 |
| | 4012-3 | ○ | ○ | 90 | 44 | 61 | 178 |
| | 4012-4 | ○ | ○ | 103 | 44 | 61 | 191 |
| | 4016-4 | ○ | ○ | 120 | 44 | 61 | 208 |
| | 4020-3 | ○ | ○ | 123 | 47 | 61 | 217 |
| | 5010-3 | ○ | △ | 83 | — | — | — |
| | 5010-4 | ○ | △ | 93 | — | — | — |
| | 5010-6 | ○ | △ | 114 | — | — | — |
| | 5012-3 | ○ | △ | 97 | — | — | — |
| | 5012-4 | ○ | △ | 110 | — | — | — |
| | 5016-3 | ○ | △ | 111 | — | — | — |
| | 5016-4 | ○ | △ | 129 | — | — | — |
| | 5020-3 | ○ | △ | 136 | — | — | — |
| | 6310-4 | △ | △ | — | — | — | — |
| | 6310-6 | △ | △ | — | — | — | — |
| | 6312-3 | △ | △ | — | — | — | — |
| | 6312-4 | △ | △ | — | — | — | — |
| | 6320-3 | △ | △ | — | — | — | — |
| DKN | 4020-3 | ○ | ○ | 223 | 47 | 61 | 317 |
| | 5020-3 | ○ | △ | 243 | — | — | — |
| | 6320-3 | △ | △ | — | — | — | — |
| BLW | 1510-5.6 | ○ | ○ | 96 | 25.5 | 31 | 140 |
| | 1616-3.6 | △ | ○ | — | 25.5 | 31 | (135.5) |
| | 2020-3.6 | ○ | △ | 112 | — | — | — |
| | 2525-3.6 | ○ | △ | 131.5 | — | — | — |
| | 3232-3.6 | ○ | ○ | 162.6 | 37.5 | 53 | 230 |
| | 3636-3.6 | ○ | △ | 191 | — | — | — |
| | 4040-3.6 | ○ | △ | 201.8 | — | — | — |
| | 5050-3.6 | ○ | △ | 255.8 | — | — | — |
| WHF (Precision) | 1530-3.4 | × | ○ | — | 25.5 | 31 | 115.5 |
| | 1540-3.4 | × | ○ | — | 25.5 | 31 | 132.6 |
| | 2020-3.4 | × | △ | — | — | — | — |
| | 2025-3.4 | × | △ | — | — | — | — |
| | 2030-3.4 | × | △ | — | — | — | — |

○: available △: available per request ×: not available

( ) indicates the dimensions with QZ but without WW.

Unit: mm

| Model No. | | WW availability | QZ availability | Dimensions including WW | Length of protrusion with QZ attached | Outer diameter of protrusion with QZ attached | Dimensions including QZ and WW |
|---|---|---|---|---|---|---|---|
| | | | | L | QWL | QWD | AL |
| WHF (Precision) | 2040-3.4 | × | △ | — | — | — | — |
| | 2525-3.4 | × | △ | — | — | — | — |
| | 2550-3.4 | × | △ | — | — | — | — |
| BLK (Precision) | 1510-5.6 | ○ | ○ | 51 | 25.5 | 31 | 95 |
| | 1616-2.8 | △ | ○ | — | 29 | 31 | (112) |
| | 1616-3.6 | △ | ○ | — | 29 | 31 | (96) |
| | 2020-2.8 | ○ | △ | 72 | — | — | — |
| | 2020-3.6 | ○ | △ | 52 | — | — | — |
| | 2525-2.8 | ○ | △ | 87 | — | — | — |
| | 2525-3.6 | ○ | △ | 62 | — | — | — |
| | 3232-2.8 | ○ | ○ | 109.6 | 37.5 | 53 | 177 |
| | 3232-3.6 | ○ | ○ | 77.6 | 37.5 | 53 | 145 |
| | 3620-5.6 | ○ | △ | 88 | — | — | — |
| | 3624-5.6 | △ | △ | — | — | — | — |
| | 3636-2.8 | ○ | △ | 123 | — | — | — |
| | 3636-3.6 | ○ | △ | 87 | — | — | — |
| | 4040-2.8 | ○ | △ | 135.8 | — | — | — |
| | 4040-3.6 | ○ | △ | 95.8 | — | — | — |
| | 5050-2.8 | ○ | △ | 166.8 | — | — | — |
| | 5050-3.6 | ○ | △ | 116.8 | — | — | — |
| WGF | 0812-3 | × | × | — | — | — | — |
| | 1015-3 | × | × | — | — | — | — |
| | 1320-3 | × | × | — | — | — | — |
| | 1520-1.5 | ○ | ○ | 52 | 25.5 | 31 | 96 |
| | 1520-3 | ○ | ○ | 52 | 25.5 | 31 | 96 |
| | 1530-1 | × | ○ | — | 25.5 | 31 | (84) |
| | 1530-3 | × | ○ | — | 25.5 | 31 | (114) |
| | 1540-1.5 | × | ○ | — | 25.5 | 31 | (93) |
| | 2040-1 | × | △ | — | — | — | — |
| | 2040-3 | × | △ | — | — | — | — |
| | 2060-1.5 | × | △ | — | — | — | — |
| | 2550-1 | × | △ | — | — | — | — |
| | 2550-3 | × | △ | — | — | — | — |
| | 3060-1 | × | ○ | — | 37.5 | 53 | (137) |
| | 3060-3 | × | ○ | — | 37.5 | 53 | (197) |
| | 3090-1.5 | × | ○ | — | 37.5 | 53 | (167) |
| | 4080-1 | × | △ | — | — | — | — |
| | 4080-3 | × | △ | — | — | — | — |
| | 50100-1 | × | △ | — | — | — | — |
| | 50100-3 | × | △ | — | — | — | — |
| BNK | 0401-3 | × | × | — | — | — | — |
| | 0501-3 | × | × | — | — | — | — |
| | 0601-3 | × | × | — | — | — | — |
| | 0801-3 | × | × | — | — | — | — |
| | 0802-3 | × | × | — | — | — | — |
| | 0810-3 | × | × | — | — | — | — |
| | 1002-3 | × | × | — | — | — | — |
| | 1004-2.5 | × | × | — | — | — | — |
| | 1010-1.5 | × | × | — | — | — | — |
| | 1205-2.5 | × | × | — | — | — | — |

○: available △:available on request ×: not supported

Unit: mm

| Model No. | | WW availability | QZ availability | Dimensions including WW | Length of protrusion with QZ attached | Outer diameter of protrusion with QZ attached | Dimensions including QZ and WW |
|---|---|---|---|---|---|---|---|
| | | | | L | QWL | QWD | AL |
| BNK | 1402-3 | × | × | — | — | — | — |
| | 1404-3 | △ | × | — | — | — | — |
| | 1408-2.5 | △ | △ | — | — | — | — |
| | 1510-5.6 | ○ | ○ | 51 | 25.5 | 31 | 95 |
| | 1520-3 | △ | ○ | — | 25.5 | 31 | (96) |
| | 1616-3.6 | △ | ○ | — | 25.5 | 31 | (93) |
| | 2010-2.5 | ○ | △ | 54 | — | — | — |
| | 2020-3.6 | ○ | △ | 59 | — | — | — |
| | 2520-3.6 | △ | △ | — | — | — | — |
| BNT (both Precision and Rolled) | 1404-3.6 | △ | × | — | — | — | — |
| | 1405-2.6 | △ | × | 35 | — | — | — |
| | 1605-2.6 | △ | △ | 36 | 29 | 31 | 94 |
| | 1808-3.6 | △ | △ | — | — | — | — |
| | 2005-2.6 | △ | △ | 35 | — | — | — |
| | 2010-2.6 | △ | △ | 58 | — | — | — |
| | 2505-2.6 | △ | △ | 35 | — | — | — |
| | 2510-5.3 | △ | △ | 94 | — | — | — |
| | 2806-2.6 | △ | △ | 42 | — | — | — |
| | 2806-5.3 | △ | △ | 67 | — | — | — |
| | 3210-2.6 | △ | △ | 64 | — | — | — |
| | 3210-5.3 | △ | △ | 94 | — | — | — |
| | 3610-2.6 | △ | △ | 64 | — | — | — |
| | 3610-5.3 | △ | △ | 96 | — | — | — |
| | 4512-5.3 | △ | △ | 115 | — | — | — |
| WHF (Rolled) | 1530-3.4 | × | ○ | — | 25.5 | 31 | 115.5 |
| | 2020-3.4 | × | △ | — | — | — | — |
| | 2040-3.4 | × | △ | — | — | — | — |
| | 2525-3.4 | × | △ | — | — | — | — |
| | 2550-3.4 | × | △ | — | — | — | — |
| BLK (Rolled) | 1510-5.6 | ○ | ○ | 51 | 25.5 | 31 | 95 |
| | 1616-3.6 | △ | ○ | — | 25.5 | 31 | (89) |
| | 1616-7.2 | △ | ○ | — | 25.5 | 31 | (89) |
| | 2020-3.6 | ○ | △ | 52 | — | — | — |
| | 2020-7.2 | ○ | △ | 52 | — | — | — |
| | 2525-3.6 | ○ | △ | 62 | — | — | — |
| | 2525-7.2 | ○ | △ | 62 | — | — | — |
| | 3232-3.6 | ○ | ○ | 77.6 | 37.5 | 53 | 145 |
| | 3232-7.2 | ○ | ○ | 77.6 | 37.5 | 53 | 145 |
| | 3620-5.6 | ○ | △ | 88 | — | — | — |
| | 3624-5.6 | ○ | △ | 104 | — | — | — |
| | 3636-3.6 | △ | △ | — | — | — | — |
| | 3636-7.2 | △ | △ | — | — | — | — |
| | 4040-3.6 | △ | △ | — | — | — | — |
| | 4040-7.2 | △ | △ | — | — | — | — |
| | 5050-3.6 | △ | △ | — | — | — | — |
| | 5050-7.2 | △ | △ | — | — | — | — |
| WTF | 1520-3 | ○ | ○ | 52 | 25.5 | 31 | 96 |
| | 1520-6 | ○ | ○ | 52 | 25.5 | 31 | 96 |
| | 1530-2 | × | ○ | — | 25.5 | 31 | (84) |
| | 1530-3 | × | ○ | — | 25.5 | 31 | (114) |

( ) indicates the dimensions with QZ but without WW.

## Options

### Dimensions of Each Model with an Option Attached

Unit: mm

| Model No. | | WW availability | QZ availability | Dimensions including WW | Length of protrusion with QZ attached | Outer diameter of protrusion with QZ attached | Dimensions including QZ and WW |
|---|---|---|---|---|---|---|---|
| | | | | L | QWL | QWD | AL |
| WTF | 2040-2 | × | △ | — | — | — | — |
| | 2040-3 | × | △ | — | — | — | — |
| | 2550-2 | × | △ | — | — | — | — |
| | 2550-3 | × | △ | — | — | — | — |
| | 3060-2 | × | ○ | — | 37.5 | 53 | (137.5) |
| | 3060-3 | × | ○ | — | 37.5 | 53 | (197.5) |
| | 4080-2 | × | △ | — | — | — | — |
| | 4080-3 | × | △ | — | — | — | — |
| | 50100-2 | × | △ | — | — | — | — |
| | 50100-3 | × | △ | — | — | — | — |
| CNF | 1530-6 | × | ○ | — | 25.5 | 31 | (114) |
| | 2040-6 | × | △ | — | — | — | — |
| | 2550-6 | × | △ | — | — | — | — |
| | 3060-6 | × | ○ | — | 37.5 | 53 | (197) |
| MBF | 0401-3.7 | × | × | — | — | — | — |
| | 0601-3.7 | × | × | — | — | — | — |
| | 0802-3.7 | × | × | — | — | — | — |
| | 1002-3.7 | × | × | — | — | — | — |
| | 1202-3.7 | × | × | — | — | — | — |
| | 1402-3.7 | △ | × | — | — | — | — |
| | 1404-3.7 | △ | × | — | — | — | — |
| BTK | 1006-2.6 | × | △ | — | — | — | — |
| | 1208-2.6 | × | △ | — | — | — | — |
| | 1404-3.6 | △ | △ | — | — | — | — |
| | 1405-2.6 | ○ | △ | 40 | — | — | — |
| | 1605-2.6 | ○ | △ | 40 | — | — | — |

Unit: mm

| Model No. | | WW availability | QZ availability | Dimensions including WW | Length of protrusion with QZ attached | Outer diameter of protrusion with QZ attached | Dimensions including QZ and WW |
|---|---|---|---|---|---|---|---|
| | | | | L | QWL | QWD | AL |
| BTK | 1808-3.6 | △ | △ | — | — | — | — |
| | 2005-2.6 | ○ | △ | 40 | — | — | — |
| | 2010-2.6 | ○ | △ | 61 | — | — | — |
| | 2505-2.6 | ○ | △ | 40 | — | — | — |
| | 2510-5.3 | ○ | ○ | 98 | 32.5 | 45 | 163 |
| | 2806-2.6 | ○ | △ | 47 | — | — | — |
| | 2806-5.3 | ○ | △ | 65 | — | — | — |
| | 3210-2.6 | ○ | ○ | 68 | 32 | 57 | 132 |
| | 3210-5.3 | ○ | ○ | 98 | 32 | 57 | 162 |
| | 3610-2.6 | ○ | ○ | 70 | 31 | 64 | 132 |
| | 3610-5.3 | ○ | ○ | 100 | 31 | 64 | 162 |
| | 4010-5.3 | ○ | ○ | 100 | 34 | 66 | 168 |
| | 4512-5.3 | △ | △ | — | — | — | — |
| | 5016-5.3 | ○ | ○ | 145 | 35 | 79 | 215 |
| JPF | 1404-4 | △ | × | — | — | — | — |
| | 1405-4 | △ | × | — | — | — | — |
| | 1605-4 | ○ | × | 60 | — | — | — |
| | 2005-6 | ○ | × | 80 | — | — | — |
| | 2505-6 | ○ | × | 80 | — | — | — |
| | 2510-4 | ○ | × | 112 | — | — | — |
| | 2805-6 | ○ | × | 80 | — | — | — |
| | 2806-6 | ○ | × | 90 | — | — | — |
| | 3210-6 | ○ | × | 135 | — | — | — |
| | 3610-6 | ○ | × | 138 | — | — | — |
| | 4010-6 | ○ | × | 138 | — | — | — |

○: available △:available on request ×: not supported

( ) indicates the dimensions with QZ but without WW.

**Model number coding**

**BIF2505-5 QZ WW G0 +1000L C5**

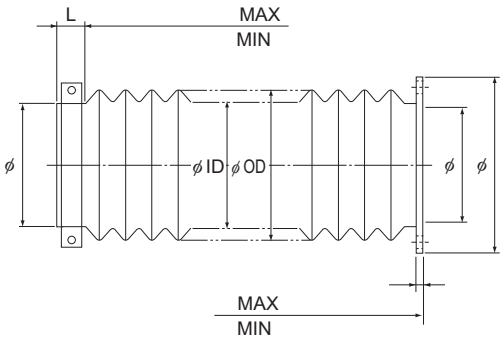
- BIF2505-5: Model number
- QZ: With QZ Lubricator
- WW: With wiper ring W
- G0: Symbol for clearance in the axial direction (*1)
- +1000L: Overall screw shaft length (in mm)
- C5: Accuracy symbol (*2)

(*1) See A15-19. (*2) See A15-12.

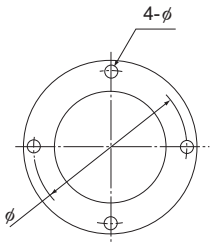
Note) QZ Lubricator and wiper ring W are not sold alone.

## Specifications of the Bellows

Bellows are available as a contamination protection accessory. Use this specification sheet.




(Band type)




(Flange type)

### Specifications of the Bellows

**Supported Ball Screw models:**

**Dimensions of the Bellows**

**Stroke:** ( ) **mm** **MAX:** ( ) **mm** **MIN:** ( ) **mm**
**Permissible outer diameter:** ( ϕ **OD** ) **Desired inner diameter:** ( ϕ **ID** )

**How It Is Used**

**Installation direction:** (horizontal, vertical, slant) **Speed:** ( ) **mm/sec. mm/min.**
**Motion:** (reciprocation, vibration)

**Conditions**

**Resistance to oil and water:** (necessary, unnecessary) **Oil name** ( )
**Chemical resistance: Name** ( ) × ( ) %
**Location:** (indoor, outdoor)

**Remarks:**

**Number of Units To Be Manufactured:**