



# HIGH-PRECISION ANGULAR-CONTACT BALL BEARINGS

ROBUSTSHOT SERIES



SUBSCRIBE TO NSK NEWSLETTER 

# High-precision angular-contact ball bearings





The requirements for the main spindles on modern machine tools continue to increase. For this reason, growing demands are also being made of the spindle bearings. A reliable, continuous supply of lubrication to the working surfaces of the bearing is a particular challenge; without this lubrication, bearing operation would be impossible.

The newly developed NSK angular-contact ball bearings in the ROBUSTSHOT series meet all of these requirements. Conventional oil-air lubrication methods attempt to inject the lubricant into the bearing from the side using a nozzle. The problem here, however, is the air vortex generated around the bearing by rotating parts such as the cage and the balls. The injection speed must be significantly higher than that of the air vortex for the lubricating oil to make it into the bearing at all.

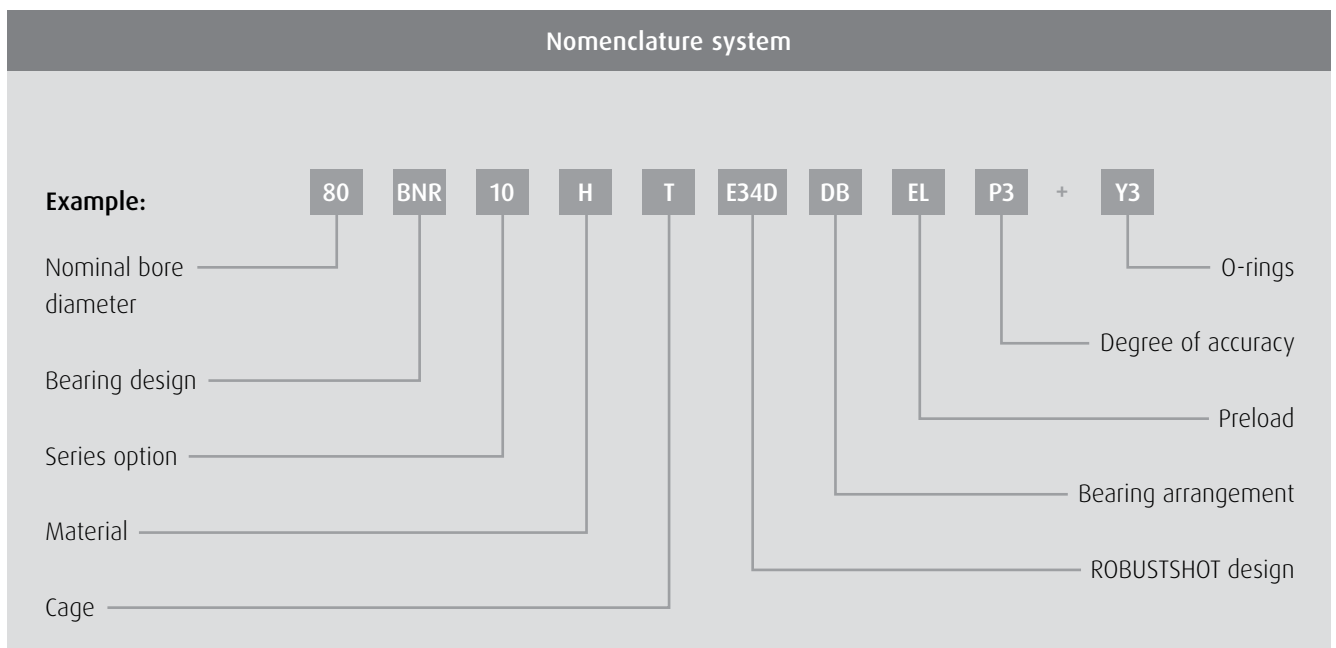
The ROBUSTSHOT series of bearings avoids this problem completely. The lubricating oil is routed straight to a point right by the working surfaces on the outer ring via a circular groove and a through-hole in the outer ring. This guarantees a reliable, even supply of lubricant, enabling rotational speeds of over 3 million  $d_m n$ .

In addition, two O-rings in the outer ring ensure that the through-hole in the housing is securely sealed. This means that any fit can be selected, depending on the application. Because there are no injection nozzles between the bearings, very compact spindles can be designed. As the ROBUSTSHOT angular-contact ball bearings have the same dimensions as grease-lubricated bearings, it is easier to use spindle components as modules for various spindle series. From a spindle manufacturer's perspective, this increases cost-effectiveness.

Likewise, the dimensions of the bearings in the ROBUSTSHOT series correspond with DIN ISO standards. They are also the same size as conventional bearings, which makes it easy to retrofit NSK bearings into existing designs.

# High-precision angular-contact ball bearings

## Nomenclature for angular-contact bearings with oil-air lubrication (ROBUSTSHOT series)





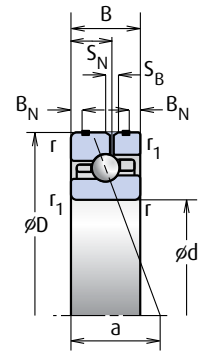
| Code | Definition             | Application example  |
|------|------------------------|--|
| 80   | Nominal bore diameter  | Bore diameter (mm)   |
| BNR  | Bearing design         | BNR: Contact angle 18°<br>BER: Contact angle 25°   |
| 10   | Series option          | 10 = ISO series 10, 19 = ISO series 19   |
| H    | Material               | Rings: Bearing steel (SUJ2)<br>Rolling elements: Ceramic (Si <sub>3</sub> N <sub>4</sub> )   |
| T    | Cage                   | T: Phenolic cage guided by the outer ring<br>Max. operating temperature 120 °C   |
| E34D | ROBUSTSHOT design seal | E34D: Lubrication groove with 2 oil through-holes and 2 grooves on the outer ring for the O-ring   |
| DB   | Arrangement            | SU: Universal design (single row)<br>DU: Universal design (double row)<br>DB: Back to back arrangement (O-arrangement)<br>DF: Face to face (X-arrangement)<br>DT: Tandem arrangement<br>DBD, DFD, DTD, DUD: Triplex sets<br>DBB, DFF, DBT, DFT, DTT, QU: Quadruplex sets |
| EL   | Preload                | EL: Extra light preload<br>L: Light preload<br>M: Medium preload   |
| P3   | Degree of accuracy     | P2: ISO class 2<br>P3: NSK standard (dimension accuracy according to ISO class 4, running accuracy according to ISO class 2)<br>P2F: NSK standard (through-hole and outside diameter according to NSK specifications. All other dimensions according to ISO class 2)     |
| Y3   | O-rings                | Y3: 2 O-rings mounted on the outer ring  |

# High-precision angular-contact ball bearings

## Size option 19

| Code      | Main dimensions |     |    |     |      |     |          |                       |
|-----------|-----------------|-----|----|-----|------|-----|----------|-----------------------|
|           | d               | D   | B  | BN  | SN   | SB  | r (min.) | r <sub>1</sub> (min.) |
| 30BNR19H  | 30              | 47  | 9  | 1.1 | 5.6  | 1.4 | 0.3      | 0.15                  |
| 30BER19H  | 30              | 47  | 9  | 1.1 | 5.6  | 1.4 | 0.3      | 0.15                  |
| 35BNR19H  | 35              | 55  | 10 | 1.6 | 6.1  | 1.4 | 0.6      | 0.30                  |
| 35BER19H  | 35              | 55  | 10 | 1.6 | 6.1  | 1.4 | 0.6      | 0.30                  |
| 40BNR19H  | 40              | 62  | 12 | 2.2 | 7.0  | 1.4 | 0.6      | 0.30                  |
| 40BER19H  | 40              | 62  | 12 | 2.2 | 7.0  | 1.4 | 0.6      | 0.30                  |
| 45BNR19H  | 45              | 68  | 12 | 2.2 | 7.0  | 1.4 | 0.6      | 0.30                  |
| 45BER19H  | 45              | 68  | 12 | 2.2 | 7.0  | 1.4 | 0.6      | 0.30                  |
| 50BNR19H  | 50              | 72  | 12 | 2.2 | 7.0  | 1.4 | 0.6      | 0.30                  |
| 50BER19H  | 50              | 72  | 12 | 2.2 | 7.0  | 1.4 | 0.6      | 0.30                  |
| 55BNR19H  | 55              | 80  | 13 | 2.8 | 7.5  | 1.4 | 1.0      | 0.60                  |
| 55BER19H  | 55              | 80  | 13 | 2.8 | 7.5  | 1.4 | 1.0      | 0.60                  |
| 60BNR19H  | 60              | 85  | 13 | 2.8 | 7.5  | 1.4 | 1.0      | 0.60                  |
| 60BER19H  | 60              | 85  | 13 | 2.8 | 7.5  | 1.4 | 1.0      | 0.60                  |
| 65BNR19H  | 65              | 90  | 13 | 2.8 | 7.5  | 1.4 | 1.0      | 0.60                  |
| 65BER19H  | 65              | 90  | 13 | 2.8 | 7.5  | 1.4 | 1.0      | 0.60                  |
| 70BNR19H  | 70              | 100 | 16 | 3.1 | 9.3  | 1.4 | 1.0      | 0.60                  |
| 70BER19H  | 70              | 100 | 16 | 3.1 | 9.3  | 1.4 | 1.0      | 0.60                  |
| 75BNR19H  | 75              | 105 | 16 | 3.1 | 9.3  | 1.4 | 1.0      | 0.60                  |
| 75BER19H  | 75              | 105 | 16 | 3.1 | 9.3  | 1.4 | 1.0      | 0.60                  |
| 80BNR19H  | 80              | 110 | 16 | 3.1 | 9.3  | 1.4 | 1.0      | 0.60                  |
| 80BER19H  | 80              | 110 | 16 | 3.1 | 9.3  | 1.4 | 1.0      | 0.60                  |
| 85BNR19H  | 85              | 120 | 18 | 4.0 | 10.4 | 2.2 | 1.1      | 0.60                  |
| 85BER19H  | 85              | 120 | 18 | 4.0 | 10.4 | 2.2 | 1.1      | 0.60                  |
| 90BNR19H  | 90              | 125 | 18 | 4.0 | 10.4 | 2.2 | 1.1      | 0.60                  |
| 90BER19H  | 90              | 125 | 18 | 4.0 | 10.4 | 2.2 | 1.1      | 0.60                  |
| 95BNR19H  | 95              | 130 | 18 | 4.0 | 10.4 | 2.2 | 1.1      | 0.60                  |
| 95BER19H  | 95              | 130 | 18 | 4.0 | 10.4 | 2.2 | 1.1      | 0.60                  |
| 100BNR19H | 100             | 140 | 20 | 4.0 | 12.0 | 2.2 | 1.1      | 0.60                  |
| 100BER19H | 100             | 140 | 20 | 4.0 | 12.0 | 2.2 | 1.1      | 0.60                  |
| 110BNR19H | 110             | 150 | 20 | 4.0 | 12.0 | 2.2 | 1.1      | 0.60                  |
| 110BER19H | 110             | 150 | 20 | 4.0 | 12.0 | 2.2 | 1.1      | 0.60                  |





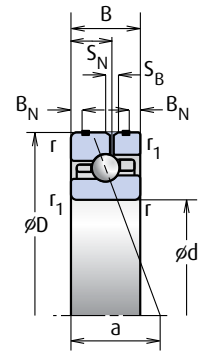
| Code      | Load rating (kN) |             | Permissible axial load (kN) | Effective load centre (mm) a | Weight (kg) (approx.) | Speed limit (min <sup>-1</sup> ) |
|-----------|------------------|-------------|-----------------------------|------------------------------|-----------------------|----------------------------------|
|           | Cr (dyn.)        | COr (stat.) |                             |                              |                       | Oil                              |
| 30BNR19H  | 6.30             | 4.05        | 3.80                        | 10.8                         | 0.043                 | 72,800                           |
| 30BER19H  | 6.00             | 3.90        | 4.60                        | 13.5                         | 0.043                 | 65,000                           |
| 35BNR19H  | 9.20             | 6.00        | 5.60                        | 12.3                         | 0.063                 | 62,300                           |
| 35BER19H  | 8.80             | 5.75        | 6.80                        | 15.5                         | 0.063                 | 55,600                           |
| 40BNR19H  | 11.50            | 7.65        | 7.10                        | 14.3                         | 0.092                 | 55,000                           |
| 40BER19H  | 11.00            | 7.35        | 8.65                        | 17.9                         | 0.092                 | 49,100                           |
| 45BNR19H  | 12.10            | 8.70        | 8.10                        | 15.2                         | 0.111                 | 49,600                           |
| 45BER19H  | 11.60            | 8.35        | 9.85                        | 19.2                         | 0.111                 | 44,300                           |
| 50BNR19H  | 12.80            | 9.75        | 9.10                        | 15.9                         | 0.111                 | 46,000                           |
| 50BER19H  | 12.30            | 9.35        | 11.00                       | 20.2                         | 0.111                 | 41,000                           |
| 55BNR19H  | 14.40            | 11.40       | 10.60                       | 17.5                         | 0.158                 | 41,500                           |
| 55BER19H  | 13.80            | 10.90       | 12.90                       | 22.2                         | 0.158                 | 37,100                           |
| 60BNR19H  | 14.60            | 12.00       | 11.20                       | 18.3                         | 0.170                 | 38,700                           |
| 60BER19H  | 14.00            | 11.50       | 13.60                       | 23.4                         | 0.170                 | 34,500                           |
| 65BNR19H  | 15.20            | 13.20       | 12.30                       | 19.1                         | 0.181                 | 36,200                           |
| 65BER19H  | 14.50            | 12.60       | 14.90                       | 24.6                         | 0.181                 | 32,300                           |
| 70BNR19H  | 21.30            | 18.10       | 17.10                       | 21.8                         | 0.292                 | 33,000                           |
| 70BER19H  | 20.40            | 17.30       | 20.70                       | 27.8                         | 0.292                 | 29,500                           |
| 75BNR19H  | 21.60            | 19.00       | 18.00                       | 22.6                         | 0.310                 | 31,200                           |
| 75BER19H  | 20.70            | 18.20       | 21.70                       | 29.0                         | 0.310                 | 27,800                           |
| 80BNR19H  | 22.00            | 19.90       | 18.90                       | 23.4                         | 0.326                 | 29,500                           |
| 80BER19H  | 21.00            | 19.10       | 22.80                       | 30.1                         | 0.326                 | 26,400                           |
| 85BNR19H  | 29.40            | 26.30       | 24.80                       | 25.7                         | 0.456                 | 27,400                           |
| 85BER19H  | 28.10            | 25.20       | 30.00                       | 32.9                         | 0.456                 | 24,400                           |
| 90BNR19H  | 31.50            | 29.70       | 28.10                       | 26.5                         | 0.480                 | 26,100                           |
| 90BER19H  | 30.00            | 28.50       | 34.00                       | 34.1                         | 0.480                 | 23,300                           |
| 95BNR19H  | 32.00            | 31.00       | 32.50                       | 28.3                         | 0.497                 | 24,900                           |
| 95BER19H  | 30.50            | 29.70       | 39.50                       | 36.7                         | 0.497                 | 22,300                           |
| 100BNR19H | 38.00            | 35.00       | 33.00                       | 29.5                         | 0.673                 | 23,400                           |
| 100BER19H | 36.00            | 33.50       | 40.00                       | 38.0                         | 0.673                 | 20,900                           |
| 110BNR19H | 39.00            | 38.00       | 42.00                       | 31.1                         | 0.733                 | 21,600                           |
| 110BER19H | 37.50            | 36.50       | 44.00                       | 40.3                         | 0.733                 | 19,300                           |

# High-precision angular-contact ball bearings

## Size option 10

| Code      | Main dimensions |     |    |     |      |     |          |                       |
|-----------|-----------------|-----|----|-----|------|-----|----------|-----------------------|
|           | d               | D   | B  | BN  | SN   | SB  | r (min.) | r <sub>i</sub> (min.) |
| 30BNR10H  | 30              | 55  | 13 | 2.8 | 7.5  | 1.4 | 1.0      | 0.6                   |
| 30BER10H  | 30              | 55  | 13 | 2.8 | 7.5  | 1.4 | 1.0      | 0.6                   |
| 35BNR10H  | 35              | 62  | 14 | 2.8 | 8.3  | 1.4 | 1.0      | 0.6                   |
| 35BER10H  | 35              | 62  | 14 | 2.8 | 8.3  | 1.4 | 1.0      | 0.6                   |
| 40BNR10H  | 40              | 68  | 15 | 2.8 | 8.8  | 1.4 | 1.0      | 0.6                   |
| 40BER10H  | 40              | 68  | 15 | 2.8 | 8.8  | 1.4 | 1.0      | 0.6                   |
| 45BNR10H  | 45              | 75  | 16 | 3.4 | 9.3  | 1.4 | 1.0      | 0.6                   |
| 45BER10H  | 45              | 75  | 16 | 3.4 | 9.3  | 1.4 | 1.0      | 0.6                   |
| 50BNR10H  | 50              | 80  | 16 | 3.4 | 9.3  | 1.4 | 1.0      | 0.6                   |
| 50BER10H  | 50              | 80  | 16 | 3.4 | 9.3  | 1.4 | 1.0      | 0.6                   |
| 55BNR10H  | 55              | 90  | 18 | 4.3 | 10.0 | 1.4 | 1.1      | 0.6                   |
| 55BER10H  | 55              | 90  | 18 | 4.3 | 10.0 | 1.4 | 1.1      | 0.6                   |
| 60BNR10H  | 60              | 95  | 18 | 4.3 | 10.0 | 1.4 | 1.1      | 0.6                   |
| 60BER10H  | 60              | 95  | 18 | 4.3 | 10.0 | 1.4 | 1.1      | 0.6                   |
| 65BNR10H  | 65              | 100 | 18 | 4.0 | 10.4 | 1.4 | 1.1      | 0.6                   |
| 65BER10H  | 65              | 100 | 18 | 4.0 | 10.4 | 1.4 | 1.1      | 0.6                   |
| 70BNR10H  | 70              | 110 | 20 | 4.0 | 11.6 | 1.4 | 1.1      | 0.6                   |
| 70BER10H  | 70              | 110 | 20 | 4.0 | 11.6 | 1.4 | 1.1      | 0.6                   |
| 75BNR10H  | 75              | 115 | 20 | 4.0 | 11.6 | 1.4 | 1.1      | 0.6                   |
| 75BER10H  | 75              | 115 | 20 | 4.0 | 11.6 | 1.4 | 1.1      | 0.6                   |
| 80BNR10H  | 80              | 125 | 22 | 4.7 | 12.2 | 2.2 | 1.1      | 0.6                   |
| 80BER10H  | 80              | 125 | 22 | 4.7 | 12.2 | 2.2 | 1.1      | 0.6                   |
| 85BNR10H  | 85              | 130 | 22 | 4.7 | 12.2 | 2.2 | 1.1      | 0.6                   |
| 85BER10H  | 85              | 130 | 22 | 4.7 | 12.2 | 2.2 | 1.1      | 0.6                   |
| 90BNR10H  | 90              | 140 | 24 | 5.5 | 14.5 | 2.2 | 1.5      | 1.0                   |
| 90BER10H  | 90              | 140 | 24 | 5.5 | 14.5 | 2.2 | 1.5      | 1.0                   |
| 95BNR10H  | 95              | 145 | 24 | 5.5 | 14.5 | 2.2 | 1.5      | 1.0                   |
| 95BER10H  | 95              | 145 | 24 | 5.5 | 14.5 | 2.2 | 1.5      | 1.0                   |
| 100BNR10H | 100             | 150 | 24 | 5.5 | 14.5 | 2.2 | 1.5      | 1.0                   |
| 100BER10H | 100             | 150 | 24 | 5.5 | 14.5 | 2.2 | 1.5      | 1.0                   |
| 105BNR10H | 105             | 160 | 26 | 6.0 | 15.2 | 2.2 | 2.0      | 1.0                   |
| 105BER10H | 105             | 160 | 26 | 6.0 | 15.2 | 2.2 | 2.0      | 1.0                   |
| 110BNR10H | 110             | 170 | 28 | 6.0 | 16.2 | 2.2 | 2.0      | 1.0                   |
| 110BER10H | 110             | 170 | 28 | 6.0 | 16.2 | 2.2 | 2.0      | 1.0                   |
| 120BNR10H | 120             | 180 | 28 | 6.0 | 16.2 | 2.2 | 2.0      | 1.0                   |
| 120BER10H | 120             | 180 | 28 | 6.0 | 16.2 | 2.2 | 2.0      | 1.0                   |





| Code      | Load rating (kN) |                         | Permissible axial load (kN) | Effective load centre (mm) a | Weight (kg) (approx.) | Speed limit (min <sup>-1</sup> ) |
|-----------|------------------|-------------------------|-----------------------------|------------------------------|-----------------------|----------------------------------|
|           | Cr (dyn.)        | CO <sub>r</sub> (stat.) |                             |                              |                       | Oil                              |
| 30BNR10H  | 8.65             | 5.75                    | 5.35                        | 13.3                         | 0.116                 | 65,900                           |
| 30BER10H  | 8.30             | 5.50                    | 6.50                        | 16.3                         | 0.116                 | 58,900                           |
| 35BNR10H  | 10.10            | 7.10                    | 6.70                        | 14.8                         | 0.154                 | 57,800                           |
| 35BER10H  | 9.70             | 6.85                    | 8.10                        | 18.2                         | 0.154                 | 51,600                           |
| 40BNR10H  | 10.60            | 7.95                    | 7.50                        | 16.2                         | 0.193                 | 51,900                           |
| 40BER10H  | 10.10            | 7.65                    | 9.10                        | 19.9                         | 0.193                 | 46,300                           |
| 45BNR10H  | 11.70            | 9.00                    | 8.35                        | 17.6                         | 0.246                 | 46,700                           |
| 45BER10H  | 11.20            | 8.60                    | 10.10                       | 21.8                         | 0.246                 | 41,700                           |
| 50BNR10H  | 12.20            | 9.90                    | 9.20                        | 18.4                         | 0.266                 | 43,100                           |
| 50BER10H  | 11.60            | 9.50                    | 11.10                       | 23.0                         | 0.266                 | 38,500                           |
| 55BNR10H  | 15.10            | 12.50                   | 11.70                       | 20.6                         | 0.393                 | 38,700                           |
| 55BER10H  | 14.40            | 12.00                   | 14.10                       | 25.7                         | 0.393                 | 34,500                           |
| 60BNR10H  | 15.60            | 13.70                   | 12.80                       | 21.5                         | 0.419                 | 36,200                           |
| 60BER10H  | 15.00            | 13.10                   | 15.50                       | 26.9                         | 0.419                 | 32,300                           |
| 65BNR10H  | 16.20            | 14.80                   | 13.90                       | 22.3                         | 0.447                 | 34,000                           |
| 65BER10H  | 15.50            | 14.20                   | 16.80                       | 28.0                         | 0.447                 | 30,400                           |
| 70BNR10H  | 22.30            | 19.80                   | 18.80                       | 24.5                         | 0.605                 | 31,200                           |
| 70BER10H  | 21.30            | 18.90                   | 22.60                       | 30.8                         | 0.605                 | 27,800                           |
| 75BNR10H  | 22.60            | 20.70                   | 19.70                       | 25.3                         | 0.638                 | 29,500                           |
| 75BER10H  | 21.60            | 19.80                   | 23.70                       | 31.9                         | 0.638                 | 26,400                           |
| 80BNR10H  | 26.50            | 24.50                   | 23.40                       | 27.5                         | 0.867                 | 27,400                           |
| 80BER10H  | 25.30            | 23.50                   | 28.20                       | 34.6                         | 0.867                 | 24,400                           |
| 85BNR10H  | 26.80            | 25.70                   | 24.50                       | 28.4                         | 0.906                 | 26,100                           |
| 85BER10H  | 25.60            | 24.60                   | 29.50                       | 36.1                         | 0.906                 | 23,300                           |
| 90BNR10H  | 35.00            | 33.00                   | 31.50                       | 30.7                         | 1.155                 | 24,400                           |
| 90BER10H  | 33.50            | 31.50                   | 38.00                       | 38.8                         | 1.155                 | 21,800                           |
| 95BNR10H  | 35.50            | 34.50                   | 32.50                       | 31.3                         | 1.209                 | 23,400                           |
| 95BER10H  | 34.00            | 33.00                   | 39.50                       | 39.7                         | 1.209                 | 20,900                           |
| 100BNR10H | 36.00            | 36.00                   | 34.00                       | 32.3                         | 1.253                 | 22,400                           |
| 100BER10H | 34.50            | 34.50                   | 41.00                       | 41.2                         | 1.253                 | 20,000                           |
| 105BNR10H | 41.00            | 41.00                   | 39.00                       | 34.5                         | 1.585                 | 21,200                           |
| 105BER10H | 39.00            | 39.50                   | 47.50                       | 43.9                         | 1.585                 | 18,900                           |
| 110BNR10H | 46.00            | 47.00                   | 44.50                       | 36.7                         | 1.996                 | 20,000                           |
| 110BER10H | 44.00            | 45.00                   | 54.00                       | 46.7                         | 1.996                 | 17,900                           |
| 120BNR10H | 47.50            | 50.50                   | 48.00                       | 38.4                         | 2.139                 | 18,700                           |
| 120BER10H | 45.50            | 48.50                   | 58.00                       | 49.0                         | 2.139                 | 16,700                           |



## NSK AMERICAS

### Argentina

NSK Argentina SRL  
Buenos Aires  
54.11.4762.6556

### Brazil

NSK Brasil Ltda.  
Sao Paulo SP  
55.11.3269.4700

### Canada

NSK Canada Inc.  
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### Latin America

NSK Latin America Inc.  
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1.305.477.0605

### Mexico

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52.55.3682.2900

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1.888.446.5675

Website: [www.nskamericas.com](http://www.nskamericas.com)

NSK Global: [www.nsk.com](http://www.nsk.com)

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