# SWS Bearings LTD

## ----- Your Reliable Bearings Factory









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SWS Bearings ltd is one of the most reliable bearings factories and exportersin China. We
mainly supply roller and ball bearings.

SWS was founded in 2007, located in Changzhou city,jiangsu Province It just takes around
2 hours from Changzhou to Shanghai by car, and very convenient transportation.

In 2009, SWS has invested three factories in Shandong, and Dalian city. Our products sell worldwide.

Our products and service include:

●Miniature and middle-large size deep groove ball bearing
●Double-row self-aligning roller bearing
●Four-row heavy type cylindrical roller bearing
●Self-aligning roller bearing
●Axial thrust ball bearing, thrust ball and roller bearing
●Single and double taper roller bearing
●Needle roller bearing
●High precision spindle bearing
●Pillow block bearing, bush, steel balls
●Technical support
●Maintenance
●Products training

Bore size range:3mm~6.5m
Weight range:10.5g~2.6ton

SWS bearings are widely used in railway, mining, mechanical equipment, automobile, ship, metallurgy, petrifaction, electric power, agriculture, textile and aviation, etc.

SWS products have sell to Europe, Asia, America, south-east Asia, which are our most important market. We have spent much time on developing new products, and also produce top quality products. We are very popular in domestic and abroad.

Welcome your inquiry and Look forward our cooperation in the future.

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Factory



Equipment



Workshop



Office



product



product

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## Angular contact bearing



Angular contact ball bearing can bear radial load and axial load at the same time. Able to work at higher speeds. The larger the contact angle is, the higher the axial bearing capacity is. High precision and high speed bearings usually take 15 degrees of contact angle. Under the action of axial force, the contact angle increases.

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## Cylindrical roller bearing

Double row cylindrical roller bearings are generally used for Thin-walled bearing machine tool spindle, rolling mill roll and printing machinery, etc.. For the use of machine tool spindle, bearing with tapered bore of the inner ring, the cone is installed in the shaft, through the inner pressure into the radial clearance volume adjustment.

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# Product



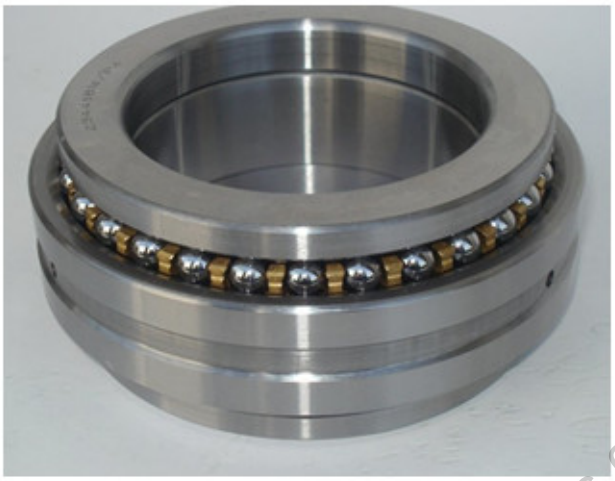






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# Equipment



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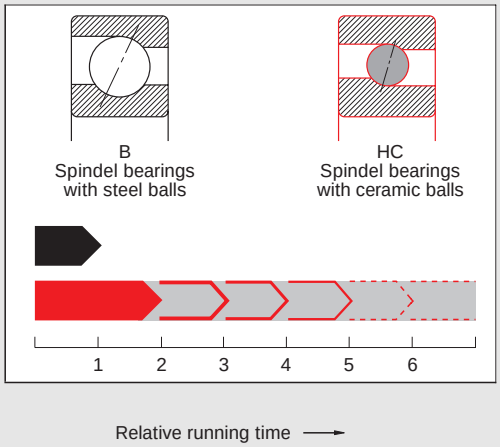
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# Super Precision Bearings



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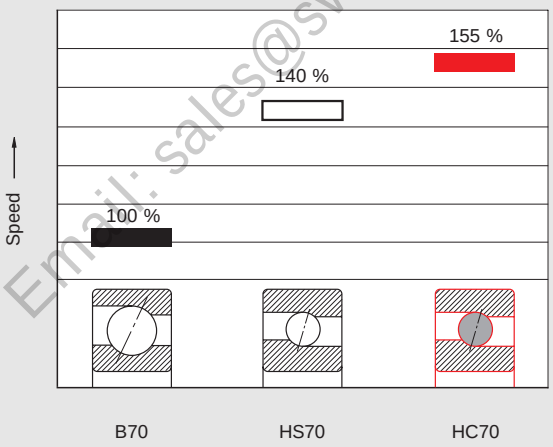
# Advantages of Hybrid Spindle Bearings




The service life of hybrid spindle bearings both with grease and with oil lubrication is several times that of the life reached by bearings with steel balls. Friction and adhesion between ceramic and steel, and consequently wear, are very low - specially at cold starts.

The high cleanliness standards in the area of rolling element contact is maintained with sealed bearings - preconditioned for a long bearing service life.

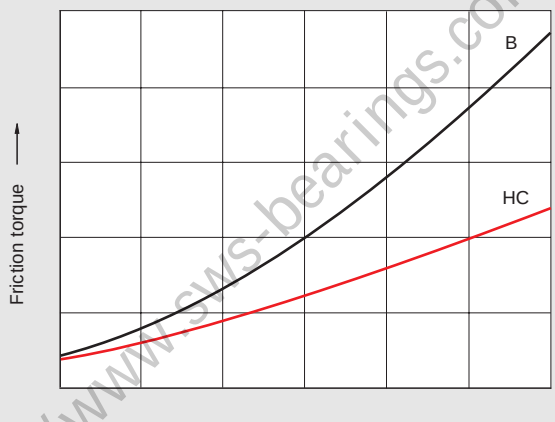
The sealing effect towards the inside and the outside retains the grease in the contact area. Contaminants cannot penetrate into the bearing. Additionally damaging air flow through the bearing is reduced.




The speed is about 55 percent higher than that of series B bearings and about 15 percent higher than that of the HS high-speed spindle bearings.

The small ball design of the HC bearings and the ceramic ball material being approximately 60% lighter than steel reduces centrifugal force and friction. The resulting excellent running properties are improved further by the advantageous running condition in the rolling contact zone.

This is also true of sealed designs because the seals are non-contacting.




Hybrid bearings are protected against seizure during starved lubrication or dry running conditions by their excellent emergency running properties of low adhesion and friction.

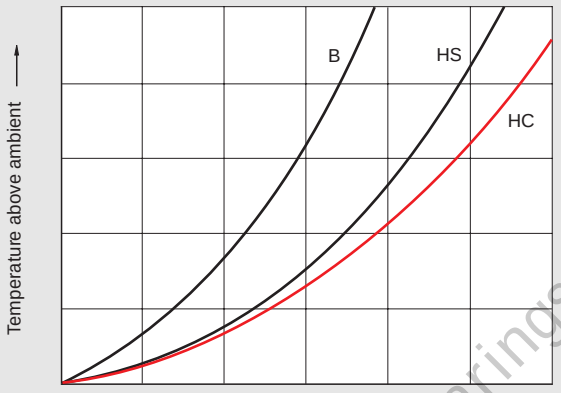
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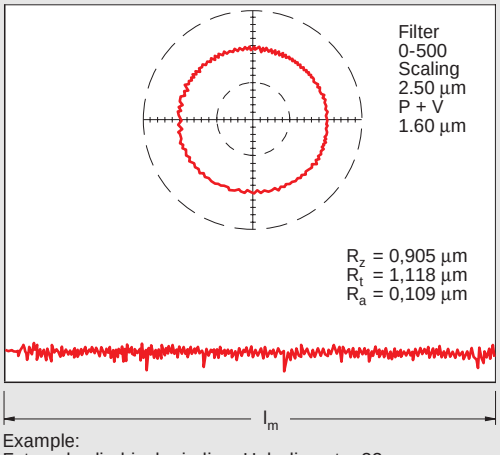
# Advantages of Hybrid Spindle Bearings

At the same speed the operating temperature is lower than that of bearings with steel balls.

Temperatures are increased by friction and friction is lower with the ceramic-steel combination.

Due to the low thermal conductivity of ceramic material the ball “keeps cool”. Thermal expansion and changes in preload and thus friction remain small.



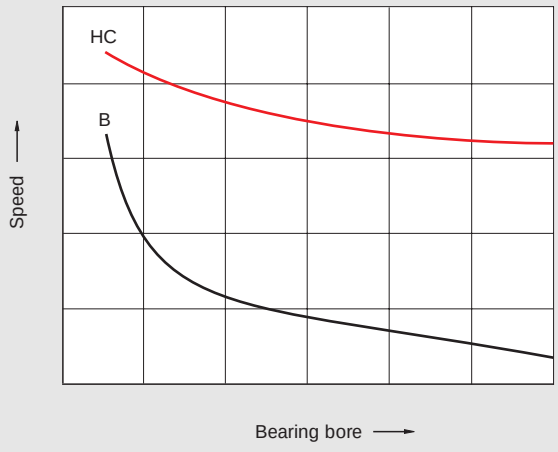

Example:
External cylindrical grinding, Hub diameter 32 mm

Surface quality and precision of the work-pieces are improved with hybrid bearings. The excellent results obtained with grinding machines confirms this statement. This can be explained by a number of reasons including the high modulus of elasticity of ceramic material and the large number of small balls which make the bearing very rigid.

The advantages of grease lubrication can be maintained up to high-speeds. Thus the high expense of a complex oil lubrication system can be saved.

This is made possible by “cool running” through excellent tribological properties of the ceramic material, and in particular the dissimilar materials in contact.

Experience shows that the working life of the grease is approx. 5 times longer, resulting in extended working life of the hybrid bearing.




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# Spindle Bearings



## Spindle Bearings

SWS Spindle bearings are single row
angular contact ball bearings of the highest precision. Advantages offered by the special design features of the contact angle, cage and internal geometry are
- higher rigidity
- optimum rotational accuracy
- excellent speedability
- low vibration output

In machine tools and textile machine construction and in many other areas of application the tendency is towards ever higher rotational speeds and ever greater precision.
Various types are available to suit a wide range of specific operating conditions. -
SWS spindle bearings from the B719, B70 and B72 series
- SWS high speed spindle bearings from the HS719 and HS70 series
- SWS hybrid spindle bearings from theHC719 and HC70 series.

All spindle bearings have a contact angle of 15° (type C) or 25° (type E) and are available either as a universal bearing or as a bearing set.

The envelope dimensions of high speed (HS) and hybrid spindle bearings (HC) are identical to the B series spindle bearings. The design characteristics allow extreme speeds, low friction and heat build-up, contributing to lower demands on the lubricant and a longer working life.

They are also available as sealed units (HSS or HCS spindle bearings).

All series are produced in high precision P4S quality (running accuracy to precision P2 and envelope dimensions to precision P4).

The relevant selection data and calculation for spindle bearings can be found on pages :

- Life Calculations
- Lubrication
- Tolerances
- Manufacturing Tolerances for Mating Parts
- Attainable Speeds
- Rigidity
- Preload

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# Spindle Bearings

B7008C.T.P4S.UL

**Type**

| | |
|---|---|
| B | Standard<br>OR relieved, IR symmetrical |
| HCB | Standard<br>OR relieved, IR symmetrical<br>Ceramic balls |
| HS | High speed small ball bearing<br>Double relieved |
| HSS | High speed bearing, sealed |
| HC | High speed ball bearing<br>Ceramic balls |
| HCS | High speed ball bearing<br>Ceramic balls, sealed |

**Series**

| | |
|---|---|
| 719 | Light series |
| 70 | Medium series |
| 72 | Heavy series |

**Bore Diameter**

| | |
|---|---|
| 00 | 10 mm |
| 01 | 12 mm |
| 02 | 15 mm |
| 03 | 17 mm |
| 04 | 4 · 5 = 20 mm |
| 05 | 5 · 5 = 25 mm |

**Contact Angle**

| | |
|---|---|
| C | 15° |
| E | 25° |

**Standard Preloads**

| | |
|---|---|
| L | Light |
| M | Medium |
| H | Heavy |

**Bearing Sets**

| | |
|---|---|
| U | Single bearing, Universal |
| DU | Duplex set,<br>Universal |
| TU | Triplex set,<br>Universal |
| QU | Quadruplex set,<br>Universal |
| PU | Pentaplex set,<br>Universal |
| DB | Duplex set,<br>Back to back |
| DF | Duplex set,<br>Face to face |
| DT | Duplex set,<br>Tandem |
| TBT | Triplex set,<br>Tandem, back to back |
| QBC | Quadruplex set,<br>Double tandem, back to back |

**Precision**

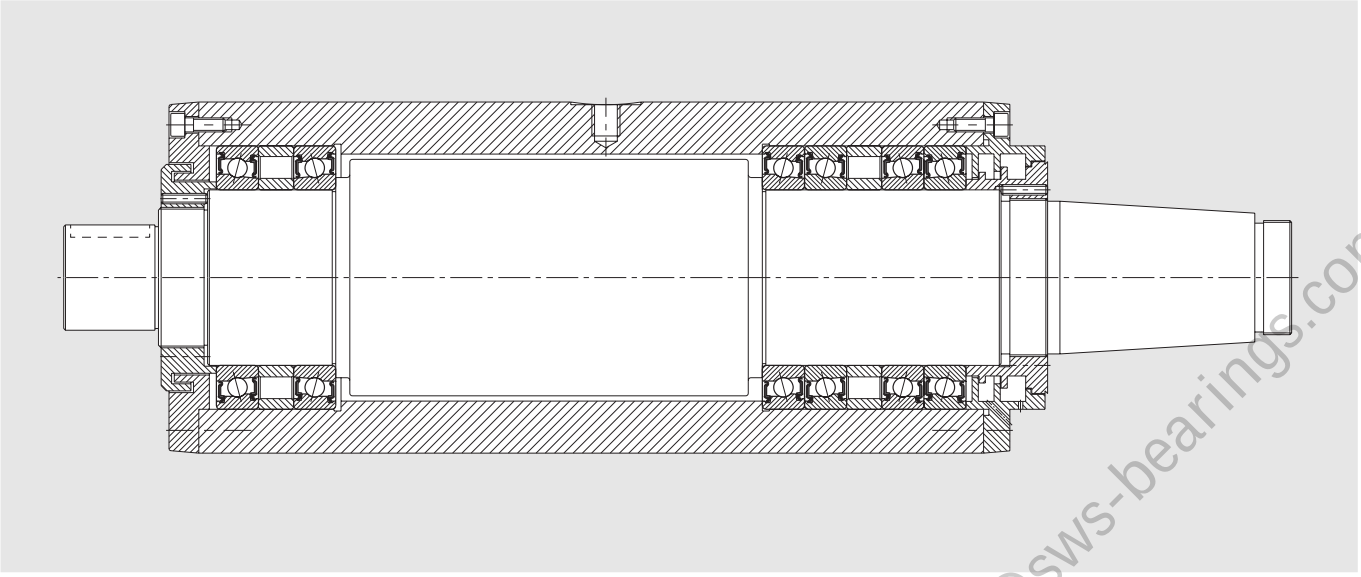
| | |
|---|---|
| P4S | SWS tolerance, better than ISO P4 |

**Cage**

| | |
|---|---|
| T | Phenolic, OR riding |

IR = Inner Ring
OR = Outer Ring

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## Cylindrical Grinding Spindle

**Technical Data**

Motor power: 11 kW
Speed: n = 7500 rpm

**Bearing Selection**

Cylindrical grinding demands high cutting efficiency for rough grinding as well as accurate form and surface finish quality for fine finish grinding. Essential criteria for the bearings are high stiffness and rotational accuracy whilst achieving a suitable speedability and good damping.

Working end: 1 spindle bearing set SWS HSS 7020C.T.P4S.QBCL in a double tandem, back to back arrangement, fully clamped.

Drive end: 1 spindle bearing set SWS HSS 7020C.T.P4S.DBL in a back to back arrangement, floating.

**Bearing Dimensions**

The size of the bearing is determined from the requisite spindle diameter or predetermined outer housing diameter. The contact angle of 15° is favourable for a high radial rigidity. By means of the 4 bearing arrangement on the work side the damping and rotational accuracy is improved.

**Preload**

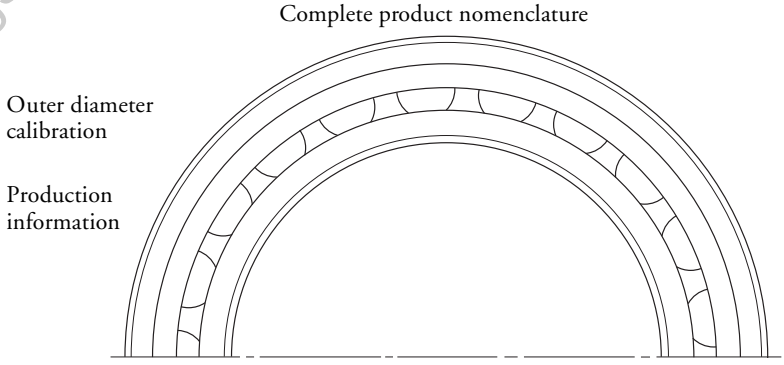
Both bearing sets have a light preload. The two spacers are of identical widths. Their purpose is to reduce the thermal effects through separation.

**Lubrication and Sealing.**

The sealed SWS HSS spindle bearings are maintenance free and lubricated for life with SWS Arcanol L74 bearing grease.

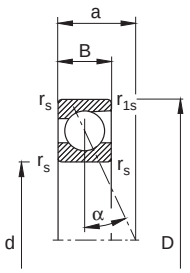
A labyrinth with defined axial clearance of between 0.3...0.8 mm serves as an additional seal on the grinding wheel side. A simple labyrinth seal suffices on the drive side.

**Spindle Bearing Marking**




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# Spindle Bearings




## B719C., B70C., B72C.
Contact angle α = 15°

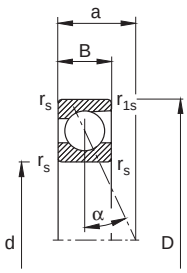
## B719E., B70E., B72E.
Contact angle α = 25°

| Bearing Number | Dimensions | | | | | | Load Rating | | Attainable Speed | | Weight ≈ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | d | D | B | $r_{smin}$ | $r_{1smin}$ | a ≈ | dyn. C | stat. $C_0$ | Grease | Oil minimal | |
| SWS | mm | | | | | | kN | | rpm | | kg |
| B706C.T.P4S. | **6** | 17 | 6 | 0.30 | 0.30 | 4 | 2.36 | 0.97 | 95000 | 160000 | 0.005 |
| B706E.T.P4S. | | 17 | 6 | 0.30 | 0.30 | 4 | 2.28 | 0.93 | 85000 | 140000 | 0.005 |
| B707C.T.P4S. | **7** | 19 | 6 | 0.30 | 0.30 | 5 | 2.60 | 1.14 | 85000 | 140000 | 0.008 |
| B707E.T.P4S. | | 19 | 6 | 0.30 | 0.30 | 5 | 2.50 | 1.10 | 75000 | 120000 | 0.008 |
| B708C.T.P4S. | **8** | 22 | 7 | 0.30 | 0.30 | 5 | 3.80 | 1.73 | 75000 | 120000 | 0.01 |
| B708E.T.P4S. | | 22 | 7 | 0.30 | 0.30 | 5 | 3.75 | 1.66 | 67000 | 100000 | 0.01 |
| B709C.T.P4S. | **9** | 24 | 7 | 0.30 | 0.30 | 6 | 5.20 | 2.40 | 67000 | 100000 | 0.015 |
| B709E.T.P4S. | | 24 | 7 | 0.30 | 0.30 | 6 | 5.10 | 2.32 | 60000 | 90000 | 0.015 |
| B71900C.T.P4S. | **10** | 22 | 6 | 0.30 | 0.15 | 5 | 3.90 | 1.80 | 70000 | 110000 | 0.01 |
| B71900E.T.P4S. | | 22 | 6 | 0.30 | 0.15 | 7 | 3.75 | 1.73 | 63000 | 95000 | 0.01 |
| B7000C.T.P4S. | | 26 | 8 | 0.30 | 0.30 | 6 | 5.30 | 2.50 | 60000 | 90000 | 0.02 |
| B7000E.T.P4S. | | 26 | 8 | 0.30 | 0.30 | 8 | 5.10 | 2.40 | 56000 | 85000 | 0.02 |
| B7200C.T.P4S. | | 30 | 9 | 0.60 | 0.60 | 7 | 6.95 | 3.35 | 56000 | 85000 | 0.03 |
| B7200E.T.P4S. | | 30 | 9 | 0.60 | 0.60 | 9 | 6.80 | 3.25 | 50000 | 75000 | 0.03 |
| B71901C.T.P4S. | **12** | 24 | 6 | 0.30 | 0.15 | 5 | 4.50 | 2.28 | 60000 | 90000 | 0.01 |
| B71901E.T.P4S. | | 24 | 6 | 0.30 | 0.15 | 7 | 4.30 | 2.20 | 56000 | 85000 | 0.01 |
| B7001C.T.P4S. | | 28 | 8 | 0.30 | 0.30 | 7 | 5.85 | 2.90 | 53000 | 80000 | 0.02 |
| B7001E.T.P4S. | | 28 | 8 | 0.30 | 0.30 | 9 | 5.60 | 2.80 | 50000 | 75000 | 0.02 |
| B7201C.T.P4S. | | 32 | 10 | 0.60 | 0.60 | 8 | 8.00 | 3.90 | 50000 | 75000 | 0.04 |
| B7201E.T.P4S. | | 32 | 10 | 0.60 | 0.60 | 10 | 7.65 | 3.75 | 45000 | 67000 | 0.04 |
| B71902C.T.P4S. | **15** | 28 | 7 | 0.30 | 0.15 | 6 | 5.00 | 2.90 | 50000 | 75000 | 0.02 |
| B71902E.T.P4S. | | 28 | 7 | 0.30 | 0.15 | 9 | 4.80 | 2.75 | 45000 | 67000 | 0.02 |
| B7002C.T.P4S. | | 32 | 9 | 0.30 | 0.30 | 8 | 6.20 | 3.40 | 48000 | 70000 | 0.03 |
| B7002E.T.P4S. | | 32 | 9 | 0.30 | 0.30 | 10 | 6.00 | 3.25 | 43000 | 63000 | 0.03 |
| B7202C.T.P4S. | | 35 | 11 | 0.60 | 0.60 | 9 | 9.65 | 5.00 | 45000 | 67000 | 0.04 |
| B7202E.T.P4S. | | 35 | 11 | 0.60 | 0.60 | 11 | 9.30 | 4.80 | 40000 | 60000 | 0.04 |
| B71903C.T.P4S. | **17** | 30 | 7 | 0.30 | 0.15 | 7 | 5.30 | 3.15 | 48000 | 70000 | 0.02 |
| B71903E.T.P4S. | | 30 | 7 | 0.30 | 0.15 | 9 | 5.00 | 3.00 | 43000 | 63000 | 0.02 |
| B7003C.T.P4S. | | 35 | 10 | 0.30 | 0.30 | 8 | 8.65 | 4.90 | 43000 | 63000 | 0.04 |
| B7003E.T.P4S. | | 35 | 10 | 0.30 | 0.30 | 11 | 8.30 | 4.75 | 38000 | 56000 | 0.04 |
| B7203C.T.P4S. | | 40 | 12 | 0.60 | 0.60 | 10 | 10.80 | 5.85 | 38000 | 56000 | 0.06 |
| B7203E.T.P4S. | | 40 | 12 | 0.60 | 0.60 | 13 | 10.40 | 5.60 | 36000 | 53000 | 0.06 |
| B71904C.T.P4S. | **20** | 37 | 9 | 0.30 | 0.15 | 8 | 9.15 | 5.50 | 38000 | 56000 | 0.03 |
| B71904E.T.P4S. | | 37 | 9 | 0.30 | 0.15 | 11 | 8.80 | 5.30 | 36000 | 53000 | 0.03 |
| B7004C.T.P4S. | | 42 | 12 | 0.60 | 0.60 | 10 | 10.40 | 6.00 | 36000 | 53000 | 0.07 |
| B7004E.T.P4S. | | 42 | 12 | 0.60 | 0.60 | 13 | 10.00 | 5.70 | 32000 | 48000 | 0.07 |
| B7204C.T.P4S. | | 47 | 14 | 1.00 | 1.00 | 12 | 14.60 | 8.15 | 32000 | 48000 | 0.10 |
| B7204E.T.P4S. | | 47 | 14 | 1.00 | 1.00 | 15 | 14.00 | 7.80 | 30000 | 45000 | 0.10 |
| B71905C.T.P4S. | **25** | 42 | 9 | 0.30 | 0.15 | 9 | 10.00 | 6.70 | 32000 | 48000 | 0.04 |
| B71905E.T.P4S. | | 42 | 9 | 0.30 | 0.15 | 12 | 9.50 | 6.40 | 30000 | 45000 | 0.04 |
| B7005C.T.P4S. | | 47 | 12 | 0.60 | 0.60 | 11 | 14.60 | 9.15 | 30000 | 45000 | 0.08 |
| B7005E.T.P4S. | | 47 | 12 | 0.60 | 0.60 | 14 | 13.70 | 8.65 | 28000 | 43000 | 0.08 |
| B7205C.T.P4S. | | 52 | 15 | 1.00 | 1.00 | 13 | 15.60 | 9.30 | 28000 | 43000 | 0.12 |
| B7205E.T.P4S. | | 52 | 15 | 1.00 | 1.00 | 16 | 15.00 | 9.00 | 26000 | 40000 | 0.12 |

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## B719C., B70C., B72C.
Contact angle α = 15°

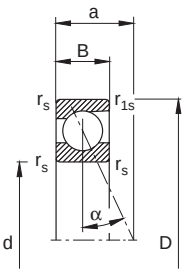
## B719E., B70E., B72E.
Contact angle α = 25°




| Bearing Number | Dimensions | | | | | | Load Rating | | Attainable Speed | | Weight ≈ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | d | D | B | $r_{smin}$ | $r_{1smin}$ | a ≈ | dyn. C | stat. $C_0$ | Grease | Oil minimal | |
| SWS | mm | | | | | | kN | | rpm | | kg |
| B71906C.T.P4S. | **30** | 47 | 9 | 0.30 | 0.15 | 10 | 10.80 | 7.80 | 28000 | 43000 | 0.05 |
| B71906E.T.P4S. | | 47 | 9 | 0.30 | 0.15 | 13 | 10.20 | 7.35 | 26000 | 40000 | 0.05 |
| B7006C.T.P4S. | | 55 | 13 | 1.00 | 1.00 | 12 | 15.00 | 10.20 | 26000 | 40000 | 0.11 |
| B7006E.T.P4S. | | 55 | 13 | 1.00 | 1.00 | 17 | 14.30 | 9.80 | 24000 | 38000 | 0.11 |
| B7206C.T.P4S. | | 62 | 16 | 1.00 | 1.00 | 14 | 23.20 | 14.60 | 24000 | 38000 | 0.19 |
| B7206E.T.P4S. | | 62 | 16 | 1.00 | 1.00 | 19 | 22.00 | 14.00 | 22000 | 36000 | 0.19 |
| B71907C.T.P4S. | **35** | 55 | 10 | 0.60 | 0.30 | 11 | 14.30 | 10.80 | 24000 | 38000 | 0.07 |
| B71907E.T.P4S. | | 55 | 10 | 0.60 | 0.30 | 16 | 13.40 | 10.40 | 22000 | 36000 | 0.07 |
| B7007C.T.P4S. | | 62 | 14 | 1.00 | 1.00 | 13 | 19.00 | 13.70 | 22000 | 36000 | 0.15 |
| B7007E.T.P4S. | | 62 | 14 | 1.00 | 1.00 | 18 | 18.30 | 12.90 | 20000 | 34000 | 0.15 |
| B7207C.T.P4S. | | 72 | 17 | 1.10 | 1.10 | 16 | 30.50 | 20.00 | 20000 | 34000 | 0.28 |
| B7207E.T.P4S. | | 72 | 17 | 1.10 | 1.10 | 21 | 29.00 | 19.00 | 19000 | 32000 | 0.28 |
| B71908C.T.P4S. | **40** | 62 | 12 | 0.60 | 0.30 | 13 | 17.60 | 13.70 | 22000 | 36000 | 0.11 |
| B71908E.T.P4S. | | 62 | 12 | 0.60 | 0.30 | 18 | 16.60 | 13.20 | 20000 | 34000 | 0.11 |
| B7008C.T.P4S. | | 68 | 15 | 1.00 | 1.00 | 15 | 20.40 | 16.00 | 20000 | 34000 | 0.19 |
| B7008E.T.P4S. | | 68 | 15 | 1.00 | 1.00 | 20 | 19.60 | 15.00 | 19000 | 32000 | 0.19 |
| B7208C.T.P4S. | | 80 | 18 | 1.10 | 1.10 | 17 | 32.00 | 22.40 | 18000 | 30000 | 0.37 |
| B7208E.T.P4S. | | 80 | 18 | 1.10 | 1.10 | 23 | 30.50 | 21.60 | 17000 | 28000 | 0.37 |
| B71909C.T.P4S. | **45** | 68 | 12 | 0.60 | 0.30 | 14 | 18.60 | 15.60 | 19000 | 32000 | 0.13 |
| B71909E.T.P4S. | | 68 | 12 | 0.60 | 0.30 | 19 | 17.60 | 15.00 | 18000 | 30000 | 0.13 |
| B7009C.T.P4S. | | 75 | 16 | 1.00 | 1.00 | 16 | 27.50 | 21.20 | 18000 | 30000 | 0.23 |
| B7009E.T.P4S. | | 75 | 16 | 1.00 | 1.00 | 22 | 26.50 | 20.00 | 17000 | 28000 | 0.23 |
| B7209C.T.P4S. | | 85 | 19 | 1.10 | 1.10 | 18 | 40.50 | 29.00 | 17000 | 28000 | 0.41 |
| B7209E.T.P4S. | | 85 | 19 | 1.10 | 1.10 | 25 | 39.00 | 27.50 | 15000 | 24000 | 0.41 |
| B71910C.T.P4S. | **50** | 72 | 12 | 0.60 | 0.30 | 14 | 19.00 | 16.60 | 18000 | 30000 | 0.13 |
| B71910E.T.P4S. | | 72 | 12 | 0.60 | 0.30 | 20 | 18.00 | 15.60 | 16000 | 26000 | 0.13 |
| B7010C.T.P4S. | | 80 | 16 | 1.00 | 1.00 | 17 | 28.50 | 22.80 | 17000 | 28000 | 0.25 |
| B7010E.T.P4S. | | 80 | 16 | 1.00 | 1.00 | 23 | 27.00 | 21.60 | 15000 | 24000 | 0.25 |
| B7210C.T.P4S. | | 90 | 20 | 1.10 | 1.10 | 19 | 43.00 | 31.50 | 16000 | 26000 | 0.46 |
| B7210E.T.P4S. | | 90 | 20 | 1.10 | 1.10 | 26 | 40.50 | 30.50 | 14000 | 22000 | 0.46 |
| B71911C.T.P4S. | **55** | 80 | 13 | 1.00 | 0.30 | 16 | 22.80 | 20.40 | 16000 | 26000 | 0.18 |
| B71911E.T.P4S. | | 80 | 13 | 1.00 | 0.30 | 22 | 21.60 | 19.30 | 15000 | 24000 | 0.18 |
| B7011C.T.P4S. | | 90 | 18 | 1.10 | 1.10 | 19 | 38.00 | 31.00 | 15000 | 24000 | 0.37 |
| B7011E.T.P4S. | | 90 | 18 | 1.10 | 1.10 | 26 | 36.00 | 29.00 | 14000 | 22000 | 0.37 |
| B7211C.T.P4S. | | 100 | 21 | 1.50 | 1.50 | 21 | 53.00 | 40.00 | 14000 | 22000 | 0.61 |
| B7211E.T.P4S. | | 100 | 21 | 1.50 | 1.50 | 29 | 50.00 | 38.00 | 13000 | 20000 | 0.61 |
| B71912C.T.P4S. | **60** | 85 | 13 | 1.00 | 0.30 | 16 | 24.00 | 22.80 | 15000 | 24000 | 0.19 |
| B71912E.T.P4S. | | 85 | 13 | 1.00 | 0.30 | 23 | 22.80 | 21.60 | 14000 | 22000 | 0.19 |
| B7012C.T.P4S. | | 95 | 18 | 1.10 | 1.10 | 19 | 39.00 | 33.50 | 14000 | 22000 | 0.40 |
| B7012E.T.P4S. | | 95 | 18 | 1.10 | 1.10 | 27 | 36.50 | 31.50 | 13000 | 20000 | 0.40 |
| B7212C.T.P4S. | | 110 | 22 | 1.50 | 1.50 | 22 | 55.00 | 44.00 | 13000 | 20000 | 0.80 |
| B7212E.T.P4S. | | 110 | 22 | 1.50 | 1.50 | 31 | 52.00 | 42.50 | 12000 | 19000 | 0.80 |
| B71913C.T.P4S. | **65** | 90 | 13 | 1.00 | 0.30 | 17 | 24.50 | 24.00 | 14000 | 22000 | 0.20 |
| B71913E.T.P4S. | | 90 | 13 | 1.00 | 0.30 | 25 | 22.80 | 22.40 | 13000 | 20000 | 0.20 |
| B7013C.T.P4S. | | 100 | 18 | 1.10 | 1.10 | 20 | 40.00 | 35.50 | 13000 | 20000 | 0.42 |
| B7013E.T.P4S. | | 100 | 18 | 1.10 | 1.10 | 28 | 38.00 | 33.50 | 12000 | 19000 | 0.42 |

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# Spindle Bearings




## B719C., B70C., B72C.
Contact angle α = 15°

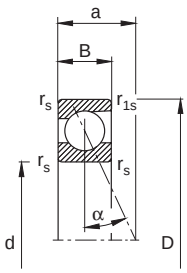
## B719E., B70E., B72E.
Contact angle α = 25°

| Bearing Number | Dimensions | | | | | | Load Rating | | Attainable Speed | | Weight |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | d | D | B | $r_{smin}$ | $r_{1smin}$ | a ≈ | dyn. C | stat. $C_0$ | Grease | Oil minimal | ≈ |
| SWS | mm | | | | | | kN | | rpm | | kg |
| B7213C.T.P4S. | | 120 | 23 | 1.50 | 1.50 | 24 | 67.00 | 54.00 | 12000 | 19000 | 1.02 |
| B7213E.T.P4S. | | 120 | 23 | 1.50 | 1.50 | 33 | 64.00 | 52.00 | 11000 | 18000 | 1.02 |
| B71914C.T.P4S. | **70** | 100 | 16 | 1.00 | 0.30 | 19 | 33.50 | 32.50 | 13000 | 20000 | 0.33 |
| B71914E.T.P4S. | | 100 | 16 | 1.00 | 0.30 | 28 | 31.50 | 31.00 | 12000 | 19000 | 0.33 |
| B7014C.T.P4S. | | 110 | 20 | 1.10 | 1.10 | 22 | 50.00 | 43.00 | 12000 | 19000 | 0.59 |
| B7014E.T.P4S. | | 110 | 20 | 1.10 | 1.10 | 31 | 46.50 | 41.50 | 11000 | 18000 | 0.59 |
| B7214C.T.P4S. | | 125 | 24 | 1.50 | 1.50 | 25 | 69.50 | 58.50 | 11000 | 18000 | 1.12 |
| B7214E.T.P4S. | | 125 | 24 | 1.50 | 1.50 | 35 | 65.50 | 56.00 | 10000 | 17000 | 1.12 |
| B71915C.T.P4S. | **75** | 105 | 16 | 1.00 | 0.30 | 20 | 34.00 | 34.50 | 12000 | 19000 | 0.35 |
| B71915E.T.P4S. | | 105 | 16 | 1.00 | 0.30 | 29 | 32.00 | 32.50 | 11000 | 18000 | 0.35 |
| B7015C.T.P4S. | | 115 | 20 | 1.10 | 1.10 | 23 | 51.00 | 46.50 | 12000 | 19000 | 0.62 |
| B7015E.T.P4S. | | 115 | 20 | 1.10 | 1.10 | 32 | 48.00 | 44.00 | 11000 | 18000 | 0.62 |
| B7215C.T.P4S. | | 130 | 25 | 1.50 | 1.50 | 26 | 72.00 | 63.00 | 11000 | 18000 | 1.21 |
| B7215E.T.P4S. | | 130 | 25 | 1.50 | 1.50 | 36 | 68.00 | 60.00 | 9500 | 16000 | 1.21 |
| B71916C.T.P4S. | **80** | 110 | 16 | 1.00 | 0.30 | 21 | 34.50 | 36.00 | 12000 | 19000 | 0.37 |
| B71916E.T.P4S. | | 110 | 16 | 1.00 | 0.30 | 30 | 32.50 | 34.00 | 11000 | 18000 | 0.37 |
| B7016C.T.P4S. | | 125 | 22 | 1.10 | 1.10 | 25 | 63.00 | 58.50 | 11000 | 18000 | 0.84 |
| B7016E.T.P4S. | | 125 | 22 | 1.10 | 1.10 | 35 | 60.00 | 55.00 | 9500 | 16000 | 0.84 |
| B7216C.T.P4S. | | 140 | 26 | 2.00 | 2.00 | 28 | 93.00 | 78.00 | 10000 | 17000 | 1.47 |
| B7216E.T.P4S. | | 140 | 26 | 2.00 | 2.00 | 39 | 88.00 | 73.50 | 9000 | 15000 | 1.47 |
| B71917C.T.P4S. | **85** | 120 | 18 | 1.10 | 0.60 | 23 | 45.00 | 46.50 | 11000 | 18000 | 0.53 |
| B71917E.T.P4S. | | 120 | 18 | 1.10 | 0.60 | 33 | 42.50 | 44.00 | 9500 | 16000 | 0.53 |
| B7017C.T.P4S. | | 130 | 22 | 1.10 | 1.10 | 25 | 65.50 | 62.00 | 10000 | 17000 | 0.89 |
| B7017E.T.P4S. | | 130 | 22 | 1.10 | 1.10 | 36 | 62.00 | 58.50 | 9000 | 15000 | 0.89 |
| B7217C.T.P4S. | | 150 | 28 | 2.00 | 2.00 | 30 | 96.50 | 85.00 | 9000 | 15000 | 1.85 |
| B7217E.T.P4S. | | 150 | 28 | 2.00 | 2.00 | 42 | 91.50 | 80.00 | 8000 | 13000 | 1.85 |
| B71918C.T.P4S. | **90** | 125 | 18 | 1.10 | 0.60 | 23 | 45.50 | 49.00 | 10000 | 17000 | 0.55 |
| B71918E.T.P4S. | | 125 | 18 | 1.10 | 0.60 | 34 | 43.00 | 46.50 | 9000 | 15000 | 0.55 |
| B7018C.T.P4S. | | 140 | 24 | 1.50 | 1.50 | 27 | 76.50 | 72.00 | 9500 | 16000 | 1.15 |
| B7018E.T.P4S. | | 140 | 24 | 1.50 | 1.50 | 39 | 72.00 | 68.00 | 8500 | 14000 | 1.15 |
| B7218C.T.P4S. | | 160 | 30 | 2.00 | 2.00 | 32 | 122.00 | 104.00 | 8500 | 14000 | 2.26 |
| B7218E.T.P4S. | | 160 | 30 | 2.00 | 2.00 | 44 | 116.00 | 100.00 | 7500 | 12000 | 2.26 |
| B71919C.T.P4S. | **95** | 130 | 18 | 1.10 | 0.60 | 24 | 46.50 | 51.00 | 9500 | 16000 | 0.58 |
| B71919E.T.P4S. | | 130 | 18 | 1.10 | 0.60 | 35 | 44.00 | 48.00 | 8500 | 14000 | 0.58 |
| B7019C.T.P4S. | | 145 | 24 | 1.50 | 1.50 | 28 | 78.00 | 76.50 | 9000 | 15000 | 1.20 |
| B7019E.T.P4S. | | 145 | 24 | 1.50 | 1.50 | 40 | 75.00 | 72.00 | 8000 | 13000 | 1.20 |
| B7219C.T.P4S. | | 170 | 32 | 2.10 | 2.10 | 34 | 127.00 | 114.00 | 8000 | 13000 | 2.78 |
| B7219E.T.P4S. | | 170 | 32 | 2.10 | 2.10 | 47 | 122.00 | 108.00 | 7000 | 11000 | 2.78 |
| B71920C.T.P4S. | **100** | 140 | 20 | 1.10 | 0.60 | 26 | 58.50 | 64.00 | 9000 | 15000 | 0.79 |
| B71920E.T.P4S. | | 140 | 20 | 1.10 | 0.60 | 38 | 55.00 | 60.00 | 8000 | 13000 | 0.79 |
| B7020C.T.P4S. | | 150 | 24 | 1.50 | 1.50 | 29 | 81.50 | 81.50 | 8500 | 14000 | 1.26 |
| B7020E.T.P4S. | | 150 | 24 | 1.50 | 1.50 | 41 | 76.50 | 76.50 | 7500 | 12000 | 1.26 |
| B7220C.T.P4S. | | 180 | 34 | 2.10 | 2.10 | 36 | 156.00 | 137.00 | 7500 | 12000 | 3.32 |
| B7220E.T.P4S. | | 180 | 34 | 2.10 | 2.10 | 50 | 150.00 | 129.00 | 6700 | 10000 | 3.32 |
| B71921C.T.P4S. | **105** | 145 | 20 | 1.10 | 0.60 | 27 | 58.50 | 64.00 | 8500 | 14000 | 0.82 |
| B71921E.T.P4S. | | 145 | 20 | 1.10 | 0.60 | 39 | 55.00 | 60.00 | 7500 | 12000 | 0.82 |

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## B719C., B70C., B72C.
Contact angle α = 15°

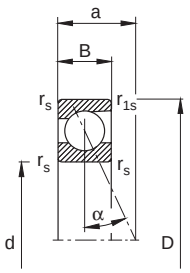
## B719E., B70E., B72E.
Contact angle α = 25°




| Bearing Number | Dimensions | | | | | | Load Rating | | Attainable Speed | | Weight ≈ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | d | D | B | $r_{smin}$ | $r_{1smin}$ | a ≈ | dyn. C | stat. $C_0$ | Grease | Oil minimal | |
| SWS | mm | | | | | | kN | | rpm | | kg |
| B7021C.T.P4S. | | 160 | 26 | 2.00 | 2.00 | 31 | 106.00 | 102.00 | 8000 | 13000 | 1.58 |
| B7021E.T.P4S. | | 160 | 26 | 2.00 | 2.00 | 44 | 102.00 | 98.00 | 7000 | 11000 | 1.58 |
| B7221C.T.P4S. | | 190 | 36 | 2.10 | 2.10 | 38 | 163.00 | 146.00 | 7000 | 11000 | 3.98 |
| B7221E.T.P4S. | | 190 | 36 | 2.10 | 2.10 | 52 | 156.00 | 140.00 | 6300 | 9500 | 3.98 |
| B71922C.T.P4S. | **110** | 150 | 20 | 1.10 | 0.60 | 27 | 58.50 | 67.00 | 8000 | 13000 | 0.85 |
| B71922E.T.P4S. | | 150 | 20 | 1.10 | 0.60 | 40 | 56.00 | 63.00 | 7500 | 12000 | 0.85 |
| B7022C.T.P4S. | | 170 | 28 | 2.00 | 2.00 | 33 | 110.00 | 110.00 | 7500 | 12000 | 2.00 |
| B7022E.T.P4S. | | 170 | 28 | 2.00 | 2.00 | 47 | 104.00 | 104.00 | 6700 | 10000 | 2.00 |
| B7222C.T.P4S. | | 200 | 38 | 2.10 | 2.10 | 40 | 163.00 | 150.00 | 6700 | 10000 | 4.66 |
| B7222E.T.P4S. | | 200 | 38 | 2.10 | 2.10 | 55 | 153.00 | 143.00 | 6000 | 9000 | 4.66 |
| B71924C.T.P4S. | **120** | 165 | 22 | 1.10 | 0.60 | 30 | 73.50 | 85.00 | 7000 | 11000 | 1.17 |
| B71924E.T.P4S. | | 165 | 22 | 1.10 | 0.60 | 44 | 69.50 | 80.00 | 6700 | 10000 | 1.17 |
| B7024C.T.P4S. | | 180 | 28 | 2.00 | 2.00 | 34 | 112.00 | 116.00 | 6700 | 10000 | 2.13 |
| B7024E.T.P4S. | | 180 | 28 | 2.00 | 2.00 | 49 | 106.00 | 110.00 | 6300 | 9500 | 2.13 |
| B7224C.T.P4S. | | 215 | 40 | 2.10 | 2.10 | 42 | 204.00 | 196.00 | 6000 | 9000 | 5.49 |
| B7224E.T.P4S. | | 215 | 40 | 2.10 | 2.10 | 59 | 196.00 | 186.00 | 5300 | 8000 | 5.49 |
| B71926C.T.P4S. | **130** | 180 | 24 | 1.50 | 0.60 | 33 | 86.50 | 100.00 | 6700 | 10000 | 1.54 |
| B71926E.T.P4S. | | 180 | 24 | 1.50 | 0.60 | 48 | 81.50 | 95.00 | 6000 | 9000 | 1.54 |
| B7026C.T.P4S. | | 200 | 33 | 2.00 | 2.00 | 39 | 143.00 | 150.00 | 6000 | 9000 | 3.21 |
| B7026E.T.P4S. | | 200 | 33 | 2.00 | 2.00 | 55 | 137.00 | 143.00 | 5600 | 8500 | 3.21 |
| B7226C.T.P4S. | | 230 | 40 | 3.00 | 3.00 | 44 | 212.00 | 216.00 | 5600 | 8500 | 6.34 |
| B7226E.T.P4S. | | 230 | 40 | 3.00 | 3.00 | 62 | 204.00 | 204.00 | 5000 | 7500 | 6.34 |
| B71928C.T.P4S. | **140** | 190 | 24 | 1.50 | 0.60 | 34 | 90.00 | 108.00 | 6000 | 9000 | 1.65 |
| B71928E.T.P4S. | | 190 | 24 | 1.50 | 0.60 | 50 | 85.00 | 102.00 | 5600 | 8500 | 1.65 |
| B7028C.T.P4S. | | 210 | 33 | 2.00 | 2.00 | 40 | 146.00 | 160.00 | 5600 | 8500 | 3.40 |
| B7028E.T.P4S. | | 210 | 33 | 2.00 | 2.00 | 57 | 140.00 | 150.00 | 5000 | 7500 | 3.40 |
| B7228C.T.P4S. | | 250 | 42 | 3.00 | 3.00 | 47 | 220.00 | 232.00 | 5000 | 7500 | 8.08 |
| B7228E.T.P4S. | | 250 | 42 | 3.00 | 3.00 | 66 | 212.00 | 224.00 | 4500 | 6700 | 8.08 |
| B71930C.T.P4S. | **150** | 210 | 28 | 2.00 | 1.00 | 38 | 122.00 | 143.00 | 5600 | 8500 | 2.54 |
| B71930E.T.P4S. | | 210 | 28 | 2.00 | 1.00 | 56 | 114.00 | 134.00 | 5000 | 7500 | 2.54 |
| B7030C.T.P4S. | | 225 | 35 | 2.10 | 2.10 | 43 | 183.00 | 193.00 | 5300 | 8000 | 4.13 |
| B7030E.T.P4S. | | 225 | 35 | 2.10 | 2.10 | 61 | 173.00 | 186.00 | 4800 | 7000 | 4.13 |
| B7230C.T.P4S. | | 270 | 45 | 3.00 | 3.00 | 51 | 228.00 | 255.00 | 4500 | 6700 | 10.30 |
| B7230E.T.P4S. | | 270 | 45 | 3.00 | 3.00 | 71 | 216.00 | 240.00 | 4000 | 6000 | 10.30 |
| B71932C.T.P4S. | **160** | 220 | 28 | 2.00 | 1.00 | 39 | 125.00 | 150.00 | 5000 | 7500 | 2.68 |
| B71932E.T.P4S. | | 220 | 28 | 2.00 | 1.00 | 58 | 116.00 | 140.00 | 4800 | 7000 | 2.68 |
| B7032C.T.P4S. | | 240 | 38 | 2.10 | 2.10 | 46 | 190.00 | 208.00 | 4800 | 7000 | 5.10 |
| B7032E.T.P4S. | | 240 | 38 | 2.10 | 2.10 | 66 | 176.00 | 196.00 | 4300 | 6300 | 5.10 |
| B7232C.T.P4S. | | 290 | 48 | 3.00 | 3.00 | 54 | 245.00 | 285.00 | 4300 | 6300 | 13.05 |
| B7232E.T.P4S. | | 290 | 48 | 3.00 | 3.00 | 76 | 232.00 | 270.00 | 3800 | 5600 | 13.05 |
| B71934C.T.P4S. | **170** | 230 | 28 | 2.00 | 1.50 | 41 | 129.00 | 163.00 | 4800 | 7000 | 2.83 |
| B71934E.T.P4S. | | 230 | 28 | 2.00 | 1.50 | 61 | 122.00 | 150.00 | 4300 | 6300 | 2.83 |
| B7034C.T.P4S. | | 260 | 42 | 2.10 | 2.10 | 50 | 236.00 | 270.00 | 4500 | 6700 | 6.73 |
| B7034E.T.P4S. | | 260 | 42 | 2.10 | 2.10 | 71 | 224.00 | 255.00 | 4000 | 6000 | 6.73 |
| B7234C.T.P4S. | | 310 | 52 | 4.00 | 4.00 | 58 | 300.00 | 360.00 | 3800 | 5600 | 16.03 |
| B7234E.T.P4S. | | 310 | 52 | 4.00 | 4.00 | 82 | 280.00 | 345.00 | 3600 | 5300 | 16.03 |

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# Spindle Bearings




## B719C., B70C., B72C.
Contact angle α = 15°

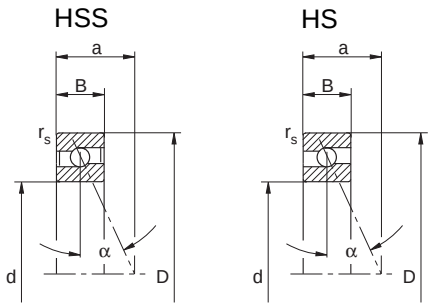
## B719E., B70E., B72E.
Contact angle α = 25°

| Bearing Number | Dimensions | | | | | | Load Rating | | Attainable Speed | | Weight ≈ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | d | D | B | $r_{smin}$ | $r_{1smin}$ | a ≈ | dyn. C | stat. $C_0$ | Grease | Oil minimal | |
| SWS | mm | | | | | | kN | | rpm | | kg |
| B71936C.T.P4S. | **180** | 250 | 33 | 2.00 | 1.00 | 45 | 163.00 | 204.00 | 4500 | 6700 | 4.19 |
| B71936E.T.P4S. | | 250 | 33 | 2.00 | 1.00 | 67 | 156.00 | 193.00 | 4000 | 6000 | 4.19 |
| B7036C.T.P4S. | | 280 | 46 | 2.10 | 2.10 | 54 | 245.00 | 285.00 | 4000 | 6000 | 8.92 |
| B7036E.T.P4S. | | 280 | 46 | 2.10 | 2.10 | 77 | 232.00 | 275.00 | 3800 | 5600 | 8.92 |
| B7236C.T.P4S. | | 320 | 52 | 4.00 | 4.00 | 59 | 305.00 | 390.00 | 3800 | 5600 | 16.76 |
| B7236E.T.P4S. | | 320 | 52 | 4.00 | 4.00 | 84 | 290.00 | 365.00 | 3400 | 5000 | 16.76 |
| B71938C.T.P4S. | **190** | 260 | 33 | 2.00 | 1.00 | 47 | 166.00 | 212.00 | 4300 | 6300 | 4.37 |
| B71938E.T.P4S. | | 260 | 33 | 2.00 | 1.00 | 69 | 156.00 | 200.00 | 3800 | 5600 | 4.37 |
| B7038C.T.P4S. | | 290 | 46 | 2.10 | 2.10 | 55 | 250.00 | 305.00 | 3800 | 5600 | 9.33 |
| B7038E.T.P4S. | | 290 | 46 | 2.10 | 2.10 | 79 | 236.00 | 290.00 | 3600 | 5300 | 9.33 |
| B7238C.T.P4S. | | 340 | 55 | 4.00 | 4.00 | 63 | 315.00 | 415.00 | 3400 | 5000 | 20.32 |
| B7238E.T.P4S. | | 340 | 55 | 4.00 | 4.00 | 89 | 300.00 | 390.00 | 3200 | 4800 | 20.32 |
| B71940C.T.P4S. | **200** | 280 | 38 | 2.10 | 1.10 | 51 | 204.00 | 255.00 | 3800 | 5600 | 6.11 |
| B71940E.T.P4S. | | 280 | 38 | 2.10 | 1.10 | 75 | 193.00 | 240.00 | 3600 | 5300 | 6.11 |
| B7040C.T.P4S. | | 310 | 51 | 2.10 | 2.10 | 60 | 305.00 | 390.00 | 3600 | 5300 | 11.96 |
| B7040E.T.P4S. | | 310 | 51 | 2.10 | 2.10 | 85 | 290.00 | 365.00 | 3200 | 4800 | 11.96 |
| B7240C.T.P4S. | | 360 | 58 | 4.00 | 4.00 | 67 | 325.00 | 440.00 | 3200 | 4800 | 24.38 |
| B7240E.T.P4S. | | 360 | 58 | 4.00 | 4.00 | 94 | 310.00 | 415.00 | 3000 | 4500 | 24.38 |
| B71944C.T.P4S. | **220** | 300 | 38 | 2.10 | 1.10 | 54 | 216.00 | 285.00 | 3600 | 5300 | 6.68 |
| B71944E.T.P4S. | | 300 | 38 | 2.10 | 1.10 | 80 | 204.00 | 270.00 | 3200 | 4800 | 6.68 |
| B7044C.T.P4S. | | 340 | 56 | 3.00 | 3.00 | 66 | 325.00 | 440.00 | 3200 | 4800 | 15.96 |
| B7044E.T.P4S. | | 340 | 56 | 3.00 | 3.00 | 93 | 310.00 | 415.00 | 3000 | 4500 | 15.96 |
| B7244C.T.P4S. | | 400 | 65 | 4.00 | 4.00 | 74 | 400.00 | 560.00 | 2800 | 4300 | 33.64 |
| B7244E.T.P4S. | | 400 | 65 | 4.00 | 4.00 | 105 | 380.00 | 540.00 | 2600 | 4000 | 33.64 |
| B71948C.T.P4S. | **240** | 320 | 38 | 2.10 | 1.10 | 57 | 224.00 | 310.00 | 3200 | 4800 | 7.18 |
| B71948E.T.P4S. | | 320 | 38 | 2.10 | 1.10 | 84 | 212.00 | 285.00 | 3000 | 4500 | 7.18 |
| B7048C.T.P4S. | | 360 | 56 | 3.00 | 3.00 | 68 | 335.00 | 465.00 | 3000 | 4500 | 17.00 |
| B7048E.T.P4S. | | 360 | 56 | 3.00 | 3.00 | 98 | 315.00 | 440.00 | 2800 | 4300 | 17.00 |

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## HSS719C., HSS70C.
## HS719C., HS70C.
Contact angle α = 15°

## HSS719E., HSS70E.
## HS719E., HS70E.
Contact angle α = 25°




**Performance data of unsealed spindle bearings, HS, is the same as for the sealed version, HSS.**

| Bearing Number | Dimensions | | | | | Load Rating | | Attainable Speed | | Weight ≈ |
|---|---|---|---|---|---|---|---|---|---|---|
| | d | D | B | $r_{smin}$ | a ≈ | dyn. C | stat. $C_0$ | Grease | HS Oil minimal | |
| SWS | mm | | | | | kN | | rpm | | kg |
| HSS71900C.T.P4S. | **10** | 22 | 6 | 0.30 | 5 | 1.96 | 1.10 | 90000 | 150000 | 0.01 |
| HSS71900E.T.P4S. | | 22 | 6 | 0.30 | 7 | 1.86 | 1.04 | 75000 | 120000 | 0.01 |
| HSS7000C.T.P4S. | | 26 | 8 | 0.30 | 6 | 2.75 | 1.60 | 80000 | 130000 | 0.02 |
| HSS7000E.T.P4S. | | 26 | 8 | 0.30 | 8 | 2.60 | 1.50 | 67000 | 100000 | 0.02 |
| HSS71901C.T.P4S. | **12** | 24 | 6 | 0.30 | 5 | 2.04 | 1.20 | 80000 | 130000 | 0.01 |
| HSS71901E.T.P4S. | | 24 | 6 | 0.30 | 7 | 1.93 | 1.14 | 67000 | 100000 | 0.01 |
| HSS7001C.T.P4S. | | 28 | 8 | 0.30 | 7 | 2.70 | 1.63 | 70000 | 110000 | 0.02 |
| HSS7001E.T.P4S. | | 28 | 8 | 0.30 | 9 | 2.55 | 1.53 | 60000 | 90000 | 0.02 |
| HSS71902C.T.P4S. | **15** | 28 | 7 | 0.30 | 6 | 2.80 | 1.76 | 67000 | 100000 | 0.02 |
| HSS71902E.T.P4S. | | 28 | 7 | 0.30 | 9 | 2.65 | 1.66 | 56000 | 85000 | 0.02 |
| HSS7002C.T.P4S. | | 32 | 9 | 0.30 | 8 | 3.75 | 2.45 | 60000 | 90000 | 0.03 |
| HSS7002E.T.P4S. | | 32 | 9 | 0.30 | 10 | 3.55 | 2.32 | 50000 | 75000 | 0.03 |
| HSS71903C.T.P4S. | **17** | 30 | 7 | 0.30 | 7 | 2.90 | 1.90 | 60000 | 90000 | 0.02 |
| HSS71903E.T.P4S. | | 30 | 7 | 0.30 | 9 | 2.70 | 1.80 | 50000 | 75000 | 0.02 |
| HSS7003C.T.P4S. | | 35 | 10 | 0.30 | 8 | 3.80 | 2.65 | 53000 | 80000 | 0.04 |
| HSS7003E.T.P4S. | | 35 | 10 | 0.30 | 11 | 3.65 | 2.50 | 45000 | 67000 | 0.04 |
| HSS71904C.T.P4S. | **20** | 37 | 9 | 0.30 | 8 | 3.90 | 2.85 | 50000 | 75000 | 0.04 |
| HSS71904E.T.P4S. | | 37 | 9 | 0.30 | 11 | 3.75 | 2.70 | 43000 | 63000 | 0.04 |
| HSS7004C.T.P4S. | | 42 | 12 | 0.60 | 10 | 6.20 | 4.55 | 45000 | 67000 | 0.08 |
| HSS7004E.T.P4S. | | 42 | 12 | 0.60 | 13 | 5.85 | 4.30 | 38000 | 56000 | 0.08 |
| HSS71905C.T.P4S. | **25** | 42 | 9 | 0.30 | 9 | 4.25 | 3.35 | 43000 | 63000 | 0.05 |
| HSS71905E.T.P4S. | | 42 | 9 | 0.30 | 12 | 4.00 | 3.15 | 36000 | 53000 | 0.05 |
| HSS7005C.T.P4S. | | 47 | 12 | 0.60 | 11 | 6.30 | 4.90 | 38000 | 56000 | 0.09 |
| HSS7005E.T.P4S. | | 47 | 12 | 0.60 | 14 | 6.00 | 4.65 | 34000 | 50000 | 0.09 |
| HSS71906C.T.P4S. | **30** | 47 | 9 | 0.30 | 10 | 6.40 | 5.20 | 36000 | 53000 | 0.05 |
| HSS71906E.T.P4S. | | 47 | 9 | 0.30 | 13 | 6.00 | 4.90 | 32000 | 48000 | 0.05 |
| HSS7006C.T.P4S. | | 55 | 13 | 1.00 | 12 | 8.80 | 7.10 | 32000 | 48000 | 0.13 |
| HSS7006E.T.P4S. | | 55 | 13 | 1.00 | 16 | 8.30 | 6.70 | 28000 | 43000 | 0.13 |
| HSS71907C.T.P4S. | **35** | 55 | 10 | 0.60 | 11 | 6.95 | 6.20 | 32000 | 48000 | 0.08 |
| HSS71907E.T.P4S. | | 55 | 10 | 0.60 | 15 | 6.55 | 5.85 | 26000 | 40000 | 0.08 |
| HSS7007C.T.P4S. | | 62 | 14 | 1.00 | 13 | 9.30 | 8.30 | 28000 | 43000 | 0.17 |
| HSS7007E.T.P4S. | | 62 | 14 | 1.00 | 18 | 8.80 | 7.80 | 24000 | 38000 | 0.17 |
| HSS71908C.T.P4S. | **40** | 62 | 12 | 0.60 | 13 | 7.20 | 6.95 | 28000 | 43000 | 0.13 |
| HSS71908E.T.P4S. | | 62 | 12 | 0.60 | 18 | 6.80 | 6.40 | 24000 | 38000 | 0.13 |
| HSS7008C.T.P4S. | | 68 | 15 | 1.00 | 15 | 10.00 | 9.30 | 26000 | 40000 | 0.22 |
| HSS7008E.T.P4S. | | 68 | 15 | 1.00 | 20 | 9.30 | 8.65 | 22000 | 36000 | 0.22 |
| HSS71909C.T.P4S. | **45** | 68 | 12 | 0.60 | 14 | 10.00 | 9.65 | 24000 | 38000 | 0.14 |
| HSS71909E.T.P4S. | | 68 | 12 | 0.60 | 19 | 9.50 | 9.00 | 22000 | 36000 | 0.14 |
| HSS7009C.T.P4S. | | 75 | 16 | 1.00 | 16 | 12.90 | 12.20 | 24000 | 38000 | 0.27 |
| HSS7009E.T.P4S. | | 75 | 16 | 1.00 | 22 | 12.20 | 11.40 | 20000 | 34000 | 0.27 |
| HSS71910C.T.P4S. | **50** | 72 | 12 | 0.60 | 14 | 10.40 | 10.20 | 22000 | 36000 | 0.15 |
| HSS71910E.T.P4S. | | 72 | 12 | 0.60 | 20 | 9.80 | 9.65 | 20000 | 34000 | 0.15 |
| HSS7010C.T.P4S. | | 80 | 16 | 1.00 | 17 | 13.40 | 13.20 | 22000 | 36000 | 0.29 |
| HSS7010E.T.P4S. | | 80 | 16 | 1.00 | 23 | 12.50 | 12.20 | 18000 | 30000 | 0.29 |

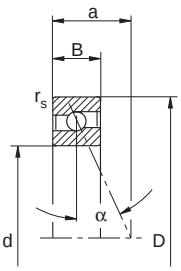
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# Spindle Bearings

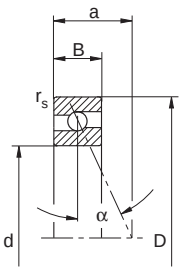
HSS719C., HSS70C.
HS719C., HS70C.
Contact angle α = 15°

HSS719E., HSS70E.
HS719E., HS70E.
Contact angle α = 25°

HSS




HS



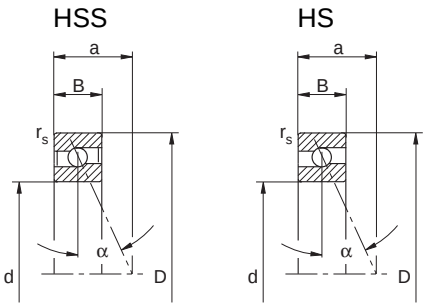

Performance data of unsealed spindle bearings, HS, is the same as for the sealed version, HSS.

| Bearing Number | Dimensions | | | | | Load Rating | | Attainable Speed | | Weight |
|---|---|---|---|---|---|---|---|---|---|---|
| | d | D | B | $r_{smin}$ | a ≈ | dyn. C | stat. $C_0$ | Grease | HS Oil minimal | ≈ |
| SWS | mm | | | | | kN | | rpm | | kg |
| HSS71911C.T.P4S. | **55** | 80 | 13 | 1.00 | 16 | 13.40 | 13.70 | 20000 | 34000 | 0.20 |
| HSS71911E.T.P4S. | | 80 | 13 | 1.00 | 22 | 12.70 | 12.70 | 18000 | 30000 | 0.20 |
| HSS7011C.T.P4S. | | 90 | 18 | 1.10 | 19 | 18.60 | 19.00 | 19000 | 32000 | 0.43 |
| HSS7011E.T.P4S. | | 90 | 18 | 1.10 | 26 | 17.60 | 17.60 | 17000 | 28000 | 0.43 |
| HSS71912C.T.P4S. | **60** | 85 | 13 | 1.00 | 16 | 14.00 | 14.60 | 19000 | 32000 | 0.21 |
| HSS71912E.T.P4S. | | 85 | 13 | 1.00 | 23 | 13.20 | 13.40 | 17000 | 28000 | 0.21 |
| HSS7012C.T.P4S. | | 95 | 18 | 1.10 | 19 | 19.30 | 20.00 | 18000 | 30000 | 0.46 |
| HSS7012E.T.P4S. | | 95 | 18 | 1.10 | 27 | 18.30 | 19.00 | 15000 | 24000 | 0.46 |
| HSS71913C.T.P4S. | **65** | 90 | 13 | 1.00 | 17 | 14.30 | 15.30 | 18000 | 30000 | 0.23 |
| HSS71913E.T.P4S. | | 90 | 13 | 1.00 | 25 | 13.40 | 14.30 | 15000 | 24000 | 0.23 |
| HSS7013C.T.P4S. | | 100 | 18 | 1.10 | 20 | 20.00 | 21.60 | 17000 | 28000 | 0.48 |
| HSS7013E.T.P4S. | | 100 | 18 | 1.10 | 28 | 19.00 | 20.00 | 15000 | 24000 | 0.48 |
| HSS71914C.T.P4S. | **70** | 100 | 16 | 1.00 | 19 | 18.30 | 20.00 | 16000 | 26000 | 0.37 |
| HSS71914E.T.P4S. | | 100 | 16 | 1.00 | 28 | 17.30 | 18.60 | 14000 | 22000 | 0.37 |
| HSS7014C.T.P4S. | | 110 | 20 | 1.10 | 22 | 26.00 | 28.00 | 16000 | 26000 | 0.67 |
| HSS7014E.T.P4S. | | 110 | 20 | 1.10 | 31 | 24.50 | 26.00 | 13000 | 20000 | 0.67 |
| HSS71915C.T.P4S. | **75** | 105 | 16 | 1.00 | 20 | 19.00 | 21.20 | 16000 | 26000 | 0.40 |
| HSS71915E.T.P4S. | | 105 | 16 | 1.00 | 29 | 17.60 | 20.00 | 13000 | 20000 | 0.40 |
| HSS7015C.T.P4S. | | 115 | 20 | 1.10 | 23 | 26.50 | 29.00 | 15000 | 24000 | 0.71 |
| HSS7015E.T.P4S. | | 115 | 20 | 1.10 | 32 | 25.00 | 27.00 | 13000 | 20000 | 0.71 |
| HSS71916C.T.P4S. | **80** | 110 | 16 | 1.00 | 21 | 21.20 | 24.00 | 15000 | 24000 | 0.41 |
| HSS71916E.T.P4S. | | 110 | 16 | 1.00 | 30 | 19.60 | 22.40 | 13000 | 20000 | 0.41 |
| HSS7016C.T.P4S. | | 125 | 22 | 1.10 | 25 | 31.50 | 34.50 | 14000 | 22000 | 0.96 |
| HSS7016E.T.P4S. | | 125 | 22 | 1.10 | 35 | 30.00 | 32.50 | 12000 | 19000 | 0.96 |
| HSS71917C.T.P4S. | **85** | 120 | 18 | 1.10 | 23 | 22.00 | 26.00 | 14000 | 22000 | 0.61 |
| HSS71917E.T.P4S. | | 120 | 18 | 1.10 | 33 | 20.40 | 24.50 | 12000 | 19000 | 0.61 |
| HSS7017C.T.P4S. | | 130 | 22 | 1.10 | 25 | 32.00 | 36.00 | 13000 | 20000 | 0.99 |
| HSS7017E.T.P4S. | | 130 | 22 | 1.10 | 36 | 30.00 | 33.50 | 11000 | 18000 | 0.99 |
| HSS71918C.T.P4S. | **90** | 125 | 18 | 1.10 | 23 | 23.60 | 28.50 | 13000 | 20000 | 0.63 |
| HSS71918E.T.P4S. | | 125 | 18 | 1.10 | 34 | 22.40 | 26.50 | 11000 | 18000 | 0.63 |
| HSS7018C.T.P4S. | | 140 | 24 | 1.50 | 27 | 37.50 | 43.00 | 12000 | 19000 | 1.31 |
| HSS7018E.T.P4S. | | 140 | 24 | 1.50 | 39 | 35.50 | 40.00 | 10000 | 17000 | 1.31 |
| HSS71919C.T.P4S. | **95** | 130 | 18 | 1.10 | 24 | 24.50 | 30.00 | 12000 | 19000 | 0.66 |
| HSS71919E.T.P4S. | | 130 | 18 | 1.10 | 35 | 22.80 | 28.00 | 10000 | 17000 | 0.66 |
| HSS7019C.T.P4S. | | 145 | 24 | 1.50 | 28 | 38.00 | 44.00 | 11000 | 18000 | 1.34 |
| HSS7019E.T.P4S. | | 145 | 24 | 1.50 | 40 | 35.50 | 41.50 | 9500 | 16000 | 1.34 |
| HSS71920C.T.P4S. | **100** | 140 | 20 | 1.10 | 26 | 29.00 | 36.00 | 11000 | 18000 | 0.90 |
| HSS71920E.T.P4S. | | 140 | 20 | 1.10 | 38 | 27.50 | 33.50 | 9500 | 16000 | 0.90 |
| HSS7020C.T.P4S. | | 150 | 24 | 1.50 | 29 | 38.00 | 45.50 | 11000 | 18000 | 1.40 |
| HSS7020E.T.P4S. | | 150 | 24 | 1.50 | 41 | 36.00 | 42.50 | 9000 | 15000 | 1.40 |
| HSS71921C.T.P4S. | **105** | 145 | 20 | 1.10 | 27 | 30.00 | 38.00 | 11000 | 18000 | 0.94 |
| HSS71921E.T.P4S. | | 145 | 20 | 1.10 | 39 | 28.00 | 35.50 | 9000 | 15000 | 0.94 |
| HSS7021C.T.P4S. | | 160 | 26 | 2.00 | 31 | 49.00 | 58.50 | 10000 | 17000 | 1.75 |
| HSS7021E.T.P4S. | | 160 | 26 | 2.00 | 44 | 46.50 | 54.00 | 8500 | 14000 | 1.75 |

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## HSS719C., HSS70C.
## HS719C., HS70C.
Contact angle α = 15°

## HSS719E., HSS70E.
## HS719E., HS70E.
Contact angle α = 25°




**Performance data of unsealed spindle bearings, HS, is the same as for the sealed version, HSS.**

| Bearing Number | Dimensions | | | | | Load Rating | | Attainable Speed | | Weight |
|---|---|---|---|---|---|---|---|---|---|---|
| | d | D | B | $r_{smin}$ | a ≈ | dyn. C | stat. $C_0$ | Grease | HS Oil minimal | ≈ |
| SWS | mm | | | | | kN | | rpm | | kg |
| HSS71922C.T.P4S. | **110** | 150 | 20 | 1.10 | 27 | 34.50 | 44.00 | 10000 | 17000 | 0.95 |
| HSS71922E.T.P4S. | | 150 | 20 | 1.10 | 40 | 32.50 | 40.50 | 8500 | 14000 | 0.95 |
| HSS7022C.T.P4S. | | 170 | 28 | 2.00 | 33 | 50.00 | 60.00 | 9500 | 16000 | 2.23 |
| HSS7022E.T.P4S. | | 170 | 28 | 2.00 | 47 | 46.50 | 56.00 | 8000 | 13000 | 2.23 |
| HSS71924C.T.P4S. | **120** | 165 | 22 | 1.10 | 30 | 36.50 | 48.00 | 9000 | 15000 | 1.34 |
| HSS71924E.T.P4S. | | 165 | 22 | 1.10 | 44 | 34.00 | 45.00 | 8000 | 13000 | 1.34 |
| HSS7024C.T.P4S. | | 180 | 28 | 2.00 | 34 | 51.00 | 63.00 | 8500 | 14000 | 2.33 |
| HSS7024E.T.P4S. | | 180 | 28 | 2.00 | 49 | 48.00 | 58.50 | 7500 | 12000 | 2.33 |
| HSS71926C.T.P4S. | **130** | 180 | 24 | 1.50 | 33 | 41.50 | 56.00 | 8500 | 14000 | 1.77 |
| HSS71926E.T.P4S. | | 180 | 24 | 1.50 | 48 | 39.00 | 52.00 | 7000 | 11000 | 1.77 |
| HSS7026C.T.P4S. | | 200 | 33 | 2.00 | 39 | 65.50 | 83.00 | 7500 | 12000 | 3.67 |
| HSS7026E.T.P4S. | | 200 | 33 | 2.00 | 55 | 62.00 | 78.00 | 6700 | 10000 | 3.67 |

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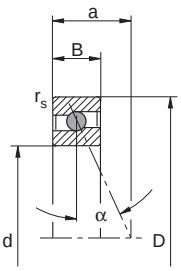
# Spindle Bearings

## Hybrid - Ceramic Balls

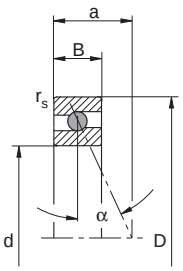
HCS719C., HCS70C.
HC719C., HC70C.
Contact angle α = 15°

HCS719E., HCS70E.
HC719E., HC70E.
Contact angle α = 25°

HCS




HC




Performance data of unsealed spindle bearings, HC, is the same as for the sealed version, HCS.

| Bearing Number | Dimensions | | | | | Load Rating | | Attainable Speed | | Weight ≈ |
|---|---|---|---|---|---|---|---|---|---|---|
| | d | D | B | $r_{smin}$ | a ≈ | dyn. C | stat. $C_0$ | Grease | HC Oil minimal | |
| SWS | mm | | | | | kN | | rpm | | kg |
| HCS71900C.T.P4S. | **10** | 22 | 6 | 0.30 | 5 | 1.37 | 0.77 | 100000 | 170000 | 0.01 |
| HCS71900E.T.P4S. | | 22 | 6 | 0.30 | 7 | 1.29 | 0.72 | 85000 | 140000 | 0.01 |
| HCS7000C.T.P4S. | | 26 | 8 | 0.30 | 6 | 1.90 | 1.10 | 90000 | 150000 | 0.02 |
| HCS7000E.T.P4S. | | 26 | 8 | 0.30 | 8 | 1.80 | 1.06 | 75000 | 120000 | 0.02 |
| HCS71901C.T.P4S. | **12** | 24 | 6 | 0.30 | 5 | 1.40 | 0.83 | 90000 | 150000 | 0.01 |
| HCS71901E.T.P4S. | | 24 | 6 | 0.30 | 7 | 1.34 | 0.80 | 80000 | 130000 | 0.01 |
| HCS7001C.T.P4S. | | 28 | 8 | 0.30 | 7 | 1.86 | 1.12 | 80000 | 130000 | 0.02 |
| HCS7001E.T.P4S. | | 28 | 8 | 0.30 | 9 | 1.76 | 1.08 | 70000 | 110000 | 0.02 |
| HCS71902C.T.P4S. | **15** | 28 | 7 | 0.30 | 6 | 1.93 | 1.22 | 75000 | 120000 | 0.02 |
| HCS71902E.T.P4S. | | 28 | 7 | 0.30 | 9 | 1.83 | 1.16 | 63000 | 96000 | 0.02 |
| HCS7002C.T.P4S. | | 32 | 9 | 0.30 | 8 | 2.60 | 1.70 | 70000 | 110000 | 0.03 |
| HCS7002E.T.P4S. | | 32 | 9 | 0.30 | 10 | 2.45 | 1.60 | 60000 | 90000 | 0.03 |
| HCS71903C.T.P4S. | **17** | 30 | 7 | 0.30 | 7 | 2.00 | 1.34 | 70000 | 110000 | 0.02 |
| HCS71903E.T.P4S. | | 30 | 7 | 0.30 | 9 | 1.90 | 1.27 | 60000 | 90000 | 0.02 |
| HCS7003C.T.P4S. | | 35 | 10 | 0.30 | 8 | 2.65 | 1.83 | 63000 | 95000 | 0.04 |
| HCS7003E.T.P4S. | | 35 | 10 | 0.30 | 11 | 2.50 | 1.73 | 53000 | 80000 | 0.04 |
| HCS71904C.T.P4S. | **20** | 37 | 9 | 0.30 | 8 | 2.70 | 1.96 | 56000 | 85000 | 0.04 |
| HCS71904E.T.P4S. | | 37 | 9 | 0.30 | 11 | 2.55 | 1.86 | 48000 | 70000 | 0.04 |
| HCS7004C.T.P4S. | | 42 | 12 | 0.60 | 10 | 4.30 | 3.20 | 53000 | 80000 | 0.08 |
| HCS7004E.T.P4S. | | 42 | 12 | 0.60 | 13 | 4.05 | 3.00 | 45000 | 67000 | 0.08 |
| HCS71905C.T.P4S. | **25** | 42 | 9 | 0.30 | 9 | 2.90 | 2.36 | 48000 | 70000 | 0.05 |
| HCS71905E.T.P4S. | | 42 | 9 | 0.30 | 12 | 2.75 | 2.20 | 40000 | 60000 | 0.05 |
| HCS7005C.T.P4S. | | 47 | 12 | 0.60 | 11 | 4.30 | 3.45 | 45000 | 67000 | 0.09 |
| HCS7005E.T.P4S. | | 47 | 12 | 0.60 | 14 | 4.05 | 3.25 | 38000 | 56000 | 0.09 |
| HCS71906C.T.P4S. | **30** | 47 | 9 | 0.30 | 10 | 4.40 | 3.65 | 43000 | 63000 | 0.05 |
| HCS71906E.T.P4S. | | 47 | 9 | 0.30 | 13 | 4.15 | 3.45 | 36000 | 53000 | 0.05 |
| HCS7006C.T.P4S. | | 55 | 13 | 1.00 | 12 | 6.00 | 4.90 | 38000 | 56000 | 0.12 |
| HCS7006E.T.P4S. | | 55 | 13 | 1.00 | 16 | 5.70 | 4.65 | 32000 | 48000 | 0.12 |
| HCS71907C.T.P4S. | **35** | 55 | 10 | 0.60 | 11 | 4.80 | 4.40 | 36000 | 53000 | 0.08 |
| HCS71907E.T.P4S. | | 55 | 10 | 0.60 | 15 | 4.50 | 4.05 | 30000 | 45000 | 0.08 |
| HCS7007C.T.P4S. | | 62 | 14 | 1.00 | 13 | 6.40 | 5.85 | 34000 | 50000 | 0.17 |
| HCS7007E.T.P4S. | | 62 | 14 | 1.00 | 18 | 6.10 | 5.40 | 28000 | 43000 | 0.17 |
| HCS71908C.T.P4S. | **40** | 62 | 12 | 0.60 | 13 | 5.00 | 4.80 | 32000 | 48000 | 0.12 |
| HCS71908E.T.P4S. | | 62 | 12 | 0.60 | 18 | 4.75 | 4.50 | 28000 | 43000 | 0.12 |
| HCS7008C.T.P4S. | | 68 | 15 | 1.00 | 15 | 6.80 | 6.55 | 30000 | 45000 | 0.2 |
| HCS7008E.T.P4S. | | 68 | 15 | 1.00 | 20 | 6.40 | 6.10 | 26000 | 40000 | 0.2 |
| HCS71909C.T.P4S. | **45** | 68 | 12 | 0.60 | 14 | 6.95 | 6.70 | 28000 | 43000 | 0.13 |
| HCS71909E.T.P4S. | | 68 | 12 | 0.60 | 19 | 6.55 | 6.30 | 24000 | 38000 | 0.13 |
| HCS7009C.T.P4S. | | 75 | 16 | 1.00 | 16 | 8.80 | 8.50 | 26000 | 40000 | 0.26 |
| HCS7009E.T.P4S. | | 75 | 16 | 1.00 | 22 | 8.30 | 8.00 | 24000 | 38000 | 0.26 |
| HCS71910C.T.P4S. | **50** | 72 | 12 | 0.60 | 14 | 7.10 | 7.20 | 26000 | 40000 | 0.14 |
| HCS71910E.T.P4S. | | 72 | 12 | 0.60 | 20 | 6.70 | 6.70 | 22000 | 36000 | 0.14 |
| HCS7010C.T.P4S. | | 80 | 16 | 1.00 | 17 | 9.15 | 9.15 | 24000 | 38000 | 0.27 |
| HCS7010E.T.P4S. | | 80 | 16 | 1.00 | 23 | 8.65 | 8.50 | 22000 | 36000 | 0.27 |

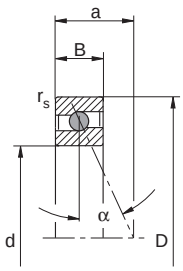
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## Hybrid - Ceramic Balls

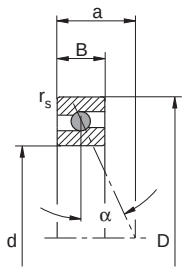
### HCS719C., HCS70C.
### HC719C., HC70C.
Contact angle α = 15°

### HCS719E., HCS70E.
### HC719E., HC70E.
Contact angle α = 25°

HCS




HC




**Performance data of unsealed spindle bearings, HC, is the same as for the sealed version, HCS.**

| Bearing Number | Dimensions | | | | | Load Rating | | Attainable Speed | | Weight ≈ |
|---|---|---|---|---|---|---|---|---|---|---|
| | d | D | B | $r_{smin}$ | a ≈ | dyn. C | stat. $C_0$ | Grease | HC Oil minimal | |
| SWS | mm | | | | | kN | | rpm | | kg |
| HCS71911C.T.P4S. | **55** | 80 | 13 | 1.00 | 16 | 9.30 | 9.50 | 24000 | 38000 | 0.19 |
| HCS71911E.T.P4S. | | 80 | 13 | 1.00 | 22 | 8.80 | 8.80 | 20000 | 34000 | 0.19 |
| HCS7011C.T.P4S. | | 90 | 18 | 1.10 | 19 | 12.90 | 13.20 | 22000 | 36000 | 0.4 |
| HCS7011E.T.P4S. | | 90 | 18 | 1.10 | 26 | 12.20 | 12.20 | 19000 | 32000 | 0.4 |
| HCS71912C.T.P4S. | **60** | 85 | 13 | 1.00 | 16 | 9.65 | 10.00 | 22000 | 36000 | 0.19 |
| HCS71912E.T.P4S. | | 85 | 13 | 1.00 | 23 | 9.00 | 9.50 | 19000 | 32000 | 0.19 |
| HCS7012C.T.P4S. | | 95 | 18 | 1.10 | 19 | 13.40 | 14.00 | 20000 | 34000 | 0.43 |
| HCS7012E.T.P4S. | | 95 | 18 | 1.10 | 27 | 12.70 | 13.20 | 18000 | 30000 | 0.43 |
| HCS71913C.T.P4S. | **65** | 90 | 13 | 1.00 | 17 | 9.80 | 10.80 | 20000 | 34000 | 0.21 |
| HCS71913E.T.P4S. | | 90 | 13 | 1.00 | 25 | 9.30 | 10.00 | 18000 | 30000 | 0.21 |
| HCS7013C.T.P4S. | | 100 | 18 | 1.10 | 20 | 13.70 | 15.00 | 20000 | 34000 | 0.45 |
| HCS7013E.T.P4S. | | 100 | 18 | 1.10 | 28 | 12.90 | 14.00 | 17000 | 28000 | 0.45 |
| HCS71914C.T.P4S. | **70** | 100 | 16 | 1.00 | 19 | 12.70 | 14.00 | 19000 | 32000 | 0.35 |
| HCS71914E.T.P4S. | | 100 | 16 | 1.00 | 28 | 12.00 | 13.20 | 16000 | 26000 | 0.35 |
| HCS7014C.T.P4S. | | 110 | 20 | 1.10 | 22 | 18.00 | 19.60 | 18000 | 30000 | 0.63 |
| HCS7014E.T.P4S. | | 110 | 20 | 1.10 | 31 | 17.00 | 18.30 | 15000 | 24000 | 0.63 |
| HCS71915C.T.P4S. | **75** | 105 | 16 | 1.00 | 20 | 12.90 | 15.00 | 18000 | 30000 | 0.37 |
| HCS71915E.T.P4S. | | 105 | 16 | 1.00 | 29 | 12.20 | 13.70 | 15000 | 24000 | 0.37 |
| HCS7015C.T.P4S. | | 115 | 20 | 1.10 | 23 | 18.30 | 20.00 | 17000 | 28000 | 0.66 |
| HCS7015E.T.P4S. | | 115 | 20 | 1.10 | 32 | 17.30 | 18.60 | 15000 | 24000 | 0.66 |
| HCS71916C.T.P4S. | **80** | 110 | 16 | 1.00 | 21 | 14.60 | 16.60 | 17000 | 28000 | 0.38 |
| HCS71916E.T.P4S. | | 110 | 16 | 1.00 | 30 | 13.70 | 15.60 | 15000 | 24000 | 0.38 |
| HCS7016C.T.P4S. | | 125 | 22 | 1.10 | 25 | 21.60 | 24.50 | 16000 | 26000 | 0.89 |
| HCS7016E.T.P4S. | | 125 | 22 | 1.10 | 35 | 20.40 | 22.80 | 13000 | 20000 | 0.89 |
| HCS71917C.T.P4S. | **85** | 120 | 18 | 1.10 | 23 | 15.00 | 18.00 | 16000 | 26000 | 0.57 |
| HCS71917E.T.P4S. | | 120 | 18 | 1.10 | 33 | 14.30 | 17.00 | 13000 | 20000 | 0.57 |
| HCS7017C.T.P4S. | | 130 | 22 | 1.10 | 25 | 22.00 | 25.00 | 15000 | 24000 | 0.92 |
| HCS7017E.T.P4S. | | 130 | 22 | 1.10 | 36 | 20.80 | 23.20 | 13000 | 20000 | 0.93 |
| HCS71918C.T.P4S. | **90** | 125 | 18 | 1.10 | 23 | 16.30 | 19.60 | 15000 | 24000 | 0.58 |
| HCS71918E.T.P4S. | | 125 | 18 | 1.10 | 34 | 15.60 | 18.60 | 13000 | 20000 | 0.58 |
| HCS7018C.T.P4S. | | 140 | 24 | 1.50 | 27 | 26.00 | 30.00 | 14000 | 22000 | 1.22 |
| HCS7018E.T.P4S. | | 140 | 24 | 1.50 | 39 | 24.50 | 28.00 | 12000 | 19000 | 1.22 |
| HCS71919C.T.P4S. | **95** | 130 | 18 | 1.10 | 24 | 17.00 | 20.80 | 14000 | 22000 | 0.61 |
| HCS71919E.T.P4S. | | 130 | 18 | 1.10 | 35 | 16.00 | 19.30 | 12000 | 19000 | 0.61 |
| HCS7019C.T.P4S. | | 145 | 24 | 1.50 | 28 | 26.00 | 31.00 | 13000 | 20000 | 1.24 |
| HCS7019E.T.P4S. | | 145 | 24 | 1.50 | 40 | 24.50 | 28.50 | 11000 | 18000 | 1.25 |
| HCS71920C.T.P4S. | **100** | 140 | 20 | 1.10 | 26 | 20.40 | 25.00 | 13000 | 20000 | 0.84 |
| HCS71920E.T.P4S. | | 140 | 20 | 1.10 | 38 | 19.00 | 23.60 | 11000 | 18000 | 0.84 |
| HCS7020C.T.P4S. | | 150 | 24 | 1.50 | 29 | 26.50 | 31.50 | 12000 | 19000 | 1.29 |
| HCS7020E.T.P4S. | | 150 | 24 | 1.50 | 41 | 25.00 | 30.00 | 11000 | 18000 | 1.29 |
| HCS71921C.T.P4S. | **105** | 145 | 20 | 1.10 | 27 | 20.80 | 26.50 | 12000 | 19000 | 0.87 |
| HCS71921E.T.P4S. | | 145 | 20 | 1.10 | 39 | 19.60 | 24.50 | 11000 | 18000 | 0.87 |
| HCS7021C.T.P4S. | | 160 | 26 | 2.00 | 31 | 34.00 | 40.50 | 12000 | 19000 | 1.61 |
| HCS7021E.T.P4S. | | 160 | 26 | 2.00 | 44 | 32.00 | 38.00 | 10000 | 17000 | 1.62 |

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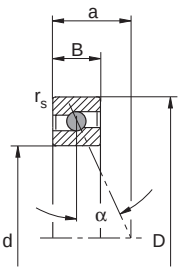
# Spindle Bearings

## Hybrid - Ceramic Balls

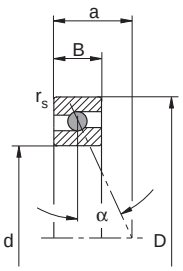
HCS719C., HCS70C.
HC719C., HC70C.
Contact angle α = 15°

HCS719E., HCS70E.
HC719E., HC70E.
Contact angle α = 25°

HCS




HC




Performance data of unsealed spindle bearings, HC, is the same as for the sealed version, HCS.

| Bearing Number | Dimensions | | | | | Load Rating | | Attainable Speed | | Weight ≈ |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | dyn. | stat. | | HC | |
| | d | D | B | $r_{smin}$ | a ≈ | C | $C_0$ | Grease | Oil minimal | |
| SWS | mm | | | | | kN | | rpm | | kg |
| HCS71922C.T.P4S. | **110** | 150 | 20 | 1.10 | 27 | 24.00 | 30.50 | 12000 | 19000 | 0.87 |
| HCS71922E.T.P4S. | | 150 | 20 | 1.10 | 40 | 22.80 | 28.50 | 10000 | 17000 | 0.87 |
| HCS7022C.T.P4S. | | 170 | 28 | 2.00 | 33 | 34.50 | 41.50 | 11000 | 18000 | 2.08 |
| HCS7022E.T.P4S. | | 170 | 28 | 2.00 | 47 | 32.50 | 39.00 | 9000 | 15000 | 2.08 |
| HCS71924C.T.P4S. | **120** | 165 | 22 | 1.10 | 30 | 25.00 | 33.50 | 11000 | 18000 | 1.25 |
| HCS71924E.T.P4S. | | 165 | 22 | 1.10 | 44 | 23.60 | 31.00 | 9000 | 15000 | 1.25 |
| HCS7024C.T.P4S. | | 180 | 28 | 2.00 | 34 | 35.50 | 44.00 | 10000 | 17000 | 2.13 |
| HCS7024E.T.P4S. | | 180 | 28 | 2.00 | 49 | 33.50 | 41.50 | 8500 | 14000 | 2.13 |
| HCS71926C.T.P4S. | **130** | 180 | 24 | 1.50 | 33 | 29.00 | 39.00 | 9500 | 16000 | 1.65 |
| HCS71926E.T.P4S. | | 180 | 24 | 1.50 | 48 | 27.00 | 36.50 | 8000 | 13000 | 1.65 |
| HCS7026C.T.P4S. | | 200 | 33 | 2.00 | 39 | 45.50 | 58.50 | 9000 | 15000 | 3.45 |
| HCS7026E.T.P4S. | | 200 | 33 | 2.00 | 55 | 42.50 | 54.00 | 7500 | 12000 | 3.45 |

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# Double Direction Angular Contact Thrust Ball Bearings



## Double Direction Angular Contact Thrust Ball Bearings

Double direction angular contact thrust ball bearings were developed for machine tool spindles and are manufactured solely high precision. In the case of main spindles of machine tools these bearings carry the axial forces. They are matched with the mounting dimensions of the double row cylindrical roller bearing of the NN30 series,

**External Dimensions**

Double direction angular contact thrust ball bearings are mounted next to a double row radial cylindrical roller bearing. The nominal size of the external diameter is the same for both bearings. This simplifies the machining of the housing bore. The tolerance for the external diameter of the double direction angular contact thrust ball bearing is designed so that the bearings are clear in the housing bore.

**Bearing Design**

Double direction angular contact thrust ball bearings have a contact angle of 60° and are axially preloaded. They are therefore especially well suited for high speeds. The contact angle and the axial preload ensures good ball control, particularly under the centrifugal forces with fast rotating spindles.

They have solid one piece brass cages which are ball guided.

**Speedability**

SWS double direction angular contact thrust ball bearings are suitable for high speeds. Speed limit values for grease and oil lubrication are given in the bearing tables.

**Lubrication**

Gease or oil.The outer ring O.D. has a lubricating groove in the centre with lubricating holes. The application of the lubricant between the two rows of balls maximises the distribution of lubricant to both raceways.

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# Double Direction Angular Contact Thrust Ball Bearings

234424M.SP

**Series Type Number**

2344 For assembly on the smaller side of the NN30 taper
2347 For assembly on the larger side of the NN30 taper

**Bore Size Code**

10 10 · 5 = 50 mm
18 18 · 5 = 90 mm

**Precision**

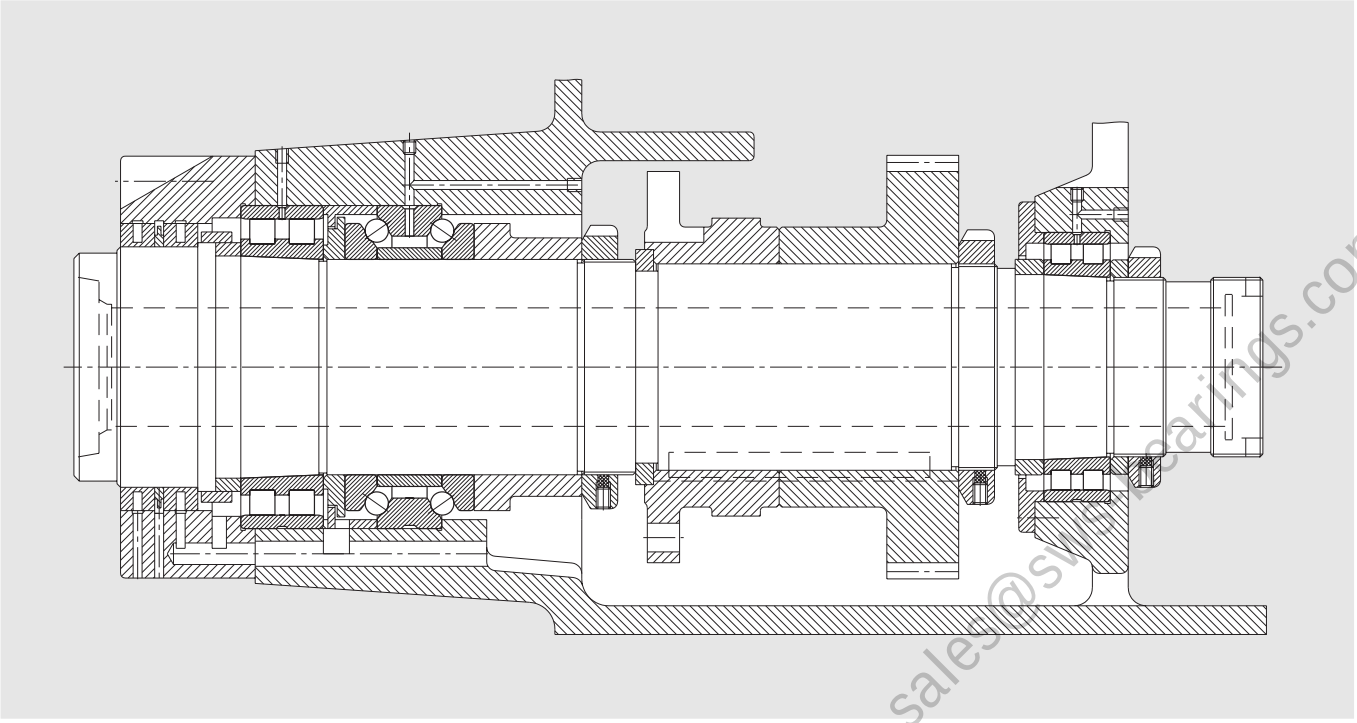
SP Super precision
UP Ultra precision

**Cage**

M Brass cage

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# Double Direction Angular Contact Thrust Ball Bearings



## Drill and Milling Spindle

**Rigidity**

To attain good machining results the bearings for machine tool spindles must exhibit high rigidity as well as high precision; this means that they must run precisely and must allow only slight deflection under load. The double direction angular contact thrust ball bearings gain their rigidity through their internal design and preload.

The relevant selection data and calculation for double direction angular contact thrust ball bearings can be found on pages :

- Life Calculations
- Lubrication
- Tolerances
- Manufacturing Tolerances for Mating Parts
- Attainable speed
- Rigidity

**Technical Details**

Motor power: 20 kW
Rotational speed: 11 ... 2240 rpm

**Bearing Selection**

The radial and axial forces are supported separately. Double row cylindrical roller bearings are incorporated as radial bearings; on the drive side a SWS NN3024ASK.M.SP and a NN3020ASK.M.SP on the opposite side.

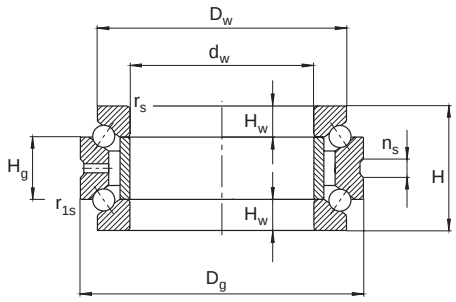
The double direction angular contact thrust ball bearings SWS 234424M.SP locates the spindle axially. This bearing has a set preload making adjustments un-necessary. Due to the external diameters of the radial and axial bearings having the same nominal size machining of the bore for the housing is simplified. The tolerance of the double direction angular contact thrust ball bearings is such that there is a clearance fit in the housing.

**Lubrication, Sealing**

Oil re-circulation lubrication. The Labyrinth seal on the work side is made up of ready to assemble components. The inner labyrinth ring retains the lubricating oil, whilst the outer labyrinth ring excludes the cutting fluid.

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# Double Direction Angular Contact Thrust Ball Bearings




## 2344, 2347

Contact angle α = 60°

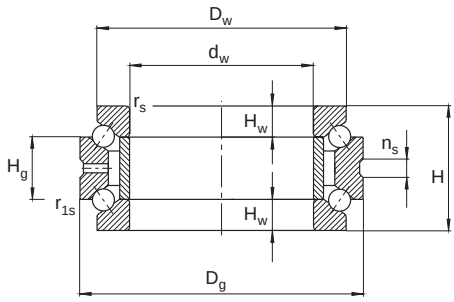
| Bearing Number | Dimensions | | | | | | | | | Load Rating | | Attainable Speed | | Weight ≈ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $d_w$ | $D_g$ | $D_w$ | H | $H_g$ | $H_w$ | $r_{smin}$ | $r_{1smin}$ | $n_s$ | dyn. C | stat. $C_0$ | Grease | Oil | |
| SWS | mm | | | | | | | | | kN | | rpm | | kg |
| 234406M.SP | **30** | 55 | 47 | 32 | 16 | 8 | 1 | 0.15 | 4.8 | 14.3 | 24 | 11000 | 16000 | 0.293 |
| 234706M.SP | **32** | 55 | 47 | 32 | 16 | 8 | 1 | 0.15 | 4.8 | 14.3 | 24 | 11000 | 16000 | 0.27 |
| 234407M.SP | **35** | 62 | 53 | 34 | 17 | 8.5 | 1 | 0.15 | 4.8 | 17.6 | 31.5 | 9500 | 14000 | 0.38 |
| 234707M.SP | **37** | 62 | 53 | 34 | 17 | 8.5 | 1 | 0.15 | 4.8 | 17.6 | 31.5 | 9500 | 14000 | 0.35 |
| 234408M.SP | **40** | 68 | 58.5 | 36 | 18 | 9 | 1 | 0.15 | 4.8 | 20.8 | 38 | 8500 | 12000 | 0.463 |
| 234708M.SP | **42** | 68 | 58.5 | 36 | 18 | 9 | 1 | 0.15 | 4.8 | 20.8 | 38 | 8500 | 12000 | 0.429 |
| 234409M.SP | **45** | 75 | 65 | 38 | 19 | 9.5 | 1 | 0.15 | 4.8 | 23.2 | 45 | 7500 | 10000 | 0.579 |
| 234709M.SP | **47** | 75 | 65 | 38 | 19 | 9.5 | 1 | 0.15 | 4.8 | 23.2 | 45 | 7500 | 10000 | 0.536 |
| 234410M.SP | **50** | 80 | 70 | 38 | 19 | 9.5 | 1 | 0.15 | 4.8 | 24 | 49 | 7000 | 9500 | 0.629 |
| 234710M.SP | **52** | 80 | 70 | 38 | 19 | 9.5 | 1 | 0.15 | 4.8 | 24 | 49 | 7000 | 9500 | 0.581 |
| 234411M.SP | **55** | 90 | 78 | 44 | 22 | 11 | 1.1 | 0.3 | 6.5 | 34 | 67 | 6300 | 8500 | 0.944 |
| 234711M.SP | **57** | 90 | 78 | 44 | 22 | 11 | 1.1 | 0.3 | 6.5 | 34 | 67 | 6300 | 8500 | 0.884 |
| 234412M.SP | **60** | 95 | 83 | 44 | 22 | 11 | 1.1 | 0.3 | 6.5 | 33.5 | 68 | 6000 | 8000 | 1.01 |
| 234712M.SP | **62** | 95 | 83 | 44 | 22 | 11 | 1.1 | 0.3 | 6.5 | 33.5 | 68 | 6000 | 8000 | 0.944 |
| 234413M.SP | **65** | 100 | 88 | 44 | 22 | 11 | 1.1 | 0.3 | 6.5 | 36 | 76.5 | 5600 | 7500 | 1.08 |
| 234713M.SP | **67** | 100 | 88 | 44 | 22 | 11 | 1.1 | 0.3 | 6.5 | 36 | 76.5 | 5600 | 7500 | 1.01 |
| 234414M.SP | **70** | 110 | 97 | 48 | 24 | 12 | 1.1 | 0.3 | 6.5 | 42.5 | 93 | 5300 | 7000 | 1.49 |
| 234714M.SP | **73** | 110 | 97 | 48 | 24 | 12 | 1.1 | 0.3 | 6.5 | 42.5 | 93 | 5300 | 7000 | 1.36 |
| 234415M.SP | **75** | 115 | 102 | 48 | 24 | 12 | 1.1 | 0.3 | 6.5 | 44 | 100 | 5000 | 6700 | 1.57 |
| 234715M.SP | **78** | 115 | 102 | 48 | 24 | 12 | 1.1 | 0.3 | 6.5 | 44 | 100 | 5000 | 6700 | 1.43 |
| 234416M.SP | **80** | 125 | 110 | 54 | 27 | 13.5 | 1.1 | 0.3 | 6.5 | 52 | 120 | 4500 | 6000 | 2.16 |
| 234716M.SP | **83** | 125 | 110 | 54 | 27 | 13.5 | 1.1 | 0.3 | 6.5 | 52 | 120 | 4500 | 6000 | 1.98 |
| 234417M.SP | **85** | 130 | 115 | 54 | 27 | 13.5 | 1.1 | 0.3 | 9.5 | 52 | 125 | 4500 | 6000 | 2.25 |
| 234717M.SP | **88** | 130 | 115 | 54 | 27 | 13.5 | 1.1 | 0.3 | 9.5 | 52 | 125 | 4500 | 6000 | 2.07 |
| 234418M.SP | **90** | 140 | 123 | 60 | 30 | 15 | 1.5 | 0.3 | 9.5 | 61 | 146 | 4000 | 5300 | 2.92 |
| 234718M.SP | **93** | 140 | 123 | 60 | 30 | 15 | 1.5 | 0.3 | 9.5 | 61 | 146 | 4000 | 5300 | 2.71 |
| 234419M.SP | **95** | 145 | 128 | 60 | 30 | 15 | 1.5 | 0.3 | 9.5 | 61 | 150 | 4000 | 5300 | 3.04 |
| 234719M.SP | **98** | 145 | 128 | 60 | 30 | 15 | 1.5 | 0.3 | 9.5 | 61 | 150 | 4000 | 5300 | 2.83 |
| 234420M.SP | **100** | 150 | 133 | 60 | 30 | 15 | 1.5 | 0.3 | 9.5 | 62 | 156 | 3800 | 5000 | 3.17 |
| 234720M.SP | **103** | 150 | 133 | 60 | 30 | 15 | 1.5 | 0.3 | 9.5 | 62 | 156 | 3800 | 5000 | 2.95 |
| 234421M.SP | **105** | 160 | 142 | 66 | 33 | 16.5 | 2 | 0.6 | 9.5 | 69.5 | 176 | 3600 | 4800 | 4.07 |
| 234721M.SP | **109** | 160 | 142 | 66 | 33 | 16.5 | 2 | 0.6 | 9.5 | 69.5 | 176 | 3600 | 4800 | 3.73 |
| 234422M.SP | **110** | 170 | 150 | 72 | 36 | 18 | 2 | 0.6 | 9.5 | 90 | 224 | 3400 | 4500 | 5.19 |

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# Double Direction Angular Contact Thrust Ball Bearings

## 2344, 2347

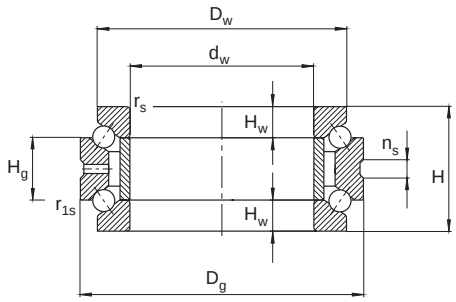
Contact angle $\alpha = 60°$




| Bearing Number | Dimensions | | | | | | | | | Load Rating dyn. | stat. | Attainable Speed | | Weight ≈ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $d_w$ | $D_g$ | $D_w$ | H | $H_g$ | $H_w$ | $r_{smin}$ | $r_{1smin}$ | $n_s$ | C | $C_0$ | Grease | Oil | |
| SWS | mm | | | | | | | | | kN | | rpm | | kg |
| 234722M.SP | **114** | 170 | 150 | 72 | 36 | 18 | 2 | 0.6 | 9.5 | 90 | 224 | 3400 | 4500 | 4.79 |
| 234424M.SP | **120** | 180 | 160 | 72 | 36 | 18 | 2 | 0.6 | 9.5 | 93 | 240 | 3200 | 4300 | 5.56 |
| 234724M.SP | **124** | 180 | 160 | 72 | 36 | 18 | 2 | 0.6 | 9.5 | 93 | 240 | 3200 | 4300 | 5.14 |
| 234426M.SP | **130** | 200 | 177 | 84 | 42 | 21 | 2 | 0.6 | 12.2 | 118 | 300 | 2800 | 3800 | 8.28 |
| 234726M.SP | **135** | 200 | 177 | 84 | 42 | 21 | 2 | 0.6 | 12.2 | 118 | 300 | 2800 | 3800 | 7.58 |
| 234428M.SP | **140** | 210 | 187 | 84 | 42 | 21 | 2.1 | 0.6 | 12.2 | 122 | 320 | 2600 | 3600 | 8.78 |
| 234728M.SP | **145** | 210 | 187 | 84 | 42 | 21 | 2.1 | 0.6 | 12.2 | 122 | 320 | 2600 | 3600 | 8.07 |
| 234430M.SP | **150** | 225 | 200 | 90 | 45 | 22.5 | 2.1 | 0.6 | 15 | 132 | 355 | 2600 | 3600 | 10.8 |
| 234730M.SP | **155** | 225 | 200 | 90 | 45 | 22.5 | 2.1 | 0.6 | 15 | 132 | 355 | 2600 | 3600 | 9.95 |
| 234432M.SP | **160** | 240 | 212 | 96 | 48 | 24 | 2.1 | 0.6 | 15 | 156 | 415 | 2400 | 3400 | 12.9 |
| 234732M.SP | **165** | 240 | 212 | 96 | 48 | 24 | 2.1 | 0.6 | 15 | 156 | 415 | 2400 | 3400 | 12 |
| 234434M.SP | **170** | 260 | 230 | 108 | 54 | 27 | 2.1 | 0.6 | 15 | 193 | 520 | 2200 | 3200 | 17.7 |
| 234734M.SP | **176** | 260 | 230 | 108 | 54 | 27 | 2.1 | 0.6 | 15 | 193 | 520 | 2200 | 3200 | 16.3 |
| 234436M.SP | **180** | 280 | 248 | 120 | 60 | 30 | 2.1 | 0.6 | 15 | 216 | 585 | 2000 | 3000 | 23.4 |
| 234736M.SP | **187** | 280 | 248 | 120 | 60 | 30 | 2.1 | 0.6 | 15 | 216 | 585 | 2000 | 3000 | 21.5 |
| 234438M.SP | **190** | 290 | 258 | 120 | 60 | 30 | 2.1 | 0.6 | 15 | 224 | 630 | 1900 | 2800 | 24.7 |
| 234738M.SP | **197** | 290 | 258 | 120 | 60 | 30 | 2.1 | 0.6 | 15 | 224 | 630 | 1900 | 2800 | 22.6 |
| 234440M.SP | **200** | 310 | 274 | 132 | 66 | 33 | 2.1 | 0.6 | 15 | 265 | 720 | 1800 | 2600 | 31.5 |
| 234740M.SP | **207** | 310 | 274 | 132 | 66 | 33 | 2.1 | 0.6 | 15 | 265 | 720 | 1800 | 2600 | 29.2 |
| 234444M.SP | **220** | 340 | 304 | 144 | 72 | 36 | 3 | 1.1 | 15 | 315 | 900 | 1600 | 2200 | 41.7 |
| 234744M.SP | **228** | 340 | 304 | 144 | 72 | 36 | 3 | 1.1 | 15 | 315 | 900 | 1600 | 2200 | 38.5 |
| 234448M.SP | **240** | 360 | 322 | 144 | 72 | 36 | 3 | 1.1 | 15 | 325 | 965 | 1500 | 2000 | 43.8 |
| 234748M.SP | **248** | 360 | 322 | 144 | 72 | 36 | 3 | 1.1 | 15 | 325 | 965 | 1500 | 2000 | 40.4 |
| 234452M.SP | **260** | 400 | 354 | 164 | 82 | 41 | 4 | 1.5 | 17.7 | 380 | 1180 | 1400 | 1900 | 64.5 |
| 234752M.SP | **269** | 400 | 354 | 164 | 82 | 41 | 4 | 1.5 | 17.7 | 380 | 1180 | 1400 | 1900 | 59.7 |
| 234456M.SP | **280** | 420 | 374 | 164 | 82 | 41 | 4 | 1.5 | 17.7 | 390 | 1270 | 1300 | 1800 | 69 |
| 234756M.SP | **289** | 420 | 374 | 164 | 82 | 41 | 4 | 1.5 | 17.7 | 390 | 1270 | 1300 | 1800 | 63.8 |
| 234460M.SP | **300** | 460 | 406 | 190 | 95 | 47.5 | 4 | 1.5 | 17.7 | 450 | 1530 | 1200 | 1700 | 98.4 |
| 234760M.SP | **310** | 460 | 406 | 190 | 95 | 47.5 | 4 | 1.5 | 17.7 | 450 | 1530 | 1200 | 1700 | 91.2 |
| 234464M.SP | **320** | 480 | 426 | 190 | 95 | 47.5 | 4 | 1.5 | 17.7 | 455 | 1630 | 1200 | 1700 | 102 |
| 234764M.SP | **330** | 480 | 426 | 190 | 95 | 47.5 | 4 | 1.5 | 17.7 | 455 | 1630 | 1200 | 1700 | 94.9 |
| 234468M.SP | **340** | 520 | 459 | 212 | 106 | 53 | 4 | 1.5 | 17.7 | 540 | 2000 | 1100 | 1600 | 138 |
| 234768M.SP | **350** | 520 | 459 | 212 | 106 | 53 | 4 | 1.5 | 17.7 | 540 | 2000 | 1100 | 1600 | 129 |

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# Double Direction Angular Contact Thrust Ball Bearings




## 2344, 2347

Contact angle $\alpha$ = 60°

| Bearing Number | Dimensions | | | | | | | | | Load Rating | | Attainable Speed | | Weight ≈ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $d_w$ | $D_g$ | $D_w$ | H | $H_g$ | $H_w$ | $r_{smin}$ | $r_{1smin}$ | $n_s$ | dyn. C | stat. $C_0$ | Grease | Oil | |
| SWS | mm | | | | | | | | | kN | | rpm | | kg |
| 234472M.SP | **360** | 540 | 479 | 212 | 106 | 53 | 4 | 1.5 | 17.7 | 540 | 2040 | 1000 | 1500 | 144 |
| 234772M.SP | **370** | 540 | 479 | 212 | 106 | 53 | 4 | 1.5 | 17.7 | 540 | 2040 | 1000 | 1500 | 135 |
| 234476M.SP | **380** | 560 | 499 | 212 | 106 | 53 | 4 | 1.5 | 17.7 | 560 | 2200 | 1000 | 1500 | 154 |
| 234776M.SP | **390** | 560 | 499 | 212 | 106 | 53 | 4 | 1.5 | 17.7 | 560 | 2200 | 1000 | 1500 | 144 |
| 234480M.SP | **400** | 600 | 532 | 236 | 118 | 59 | 5 | 2 | 17.7 | 630 | 2550 | 900 | 1300 | 198 |
| 234780M.SP | **410** | 600 | 532 | 236 | 118 | 59 | 5 | 2 | 17.7 | 630 | 2550 | 900 | 1300 | 187 |

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# Cylindrical Roller Bearings



## Cylindrical Roller Bearings

SWS produces cylindrical roller bear-
ings of super precision in the series N10 and NN30.

The double row bearings are used in applications where a :
- radially stiff
- high capacity
- high precision support is required.

Any axial load would be taken up by the double direction angular contact thrust bearings of the series 2344

The single row bearing would be mostly used as the 'loose' bearing in combination with SWS spindle bearings as 'fixed' bearings.

**Bearing Design**

Double row cylindrical roller bearings have a high load carrying capacity thanks to the high number of cylindrical rollers in each row.

The cage is of robust solid brass construction.

Single row cylindrical roller bearings also have a solid brass cage and are specially designed for the demands of high speed spindles.

The bearing bore is tapered (taper 1:12). The desired radial preload or radial clearance can be set by an axial adjustment on the conical shaft.

**Lubrication**

SWS cylindrical roller bearings can be lubricated with either grease or oil.For this purpose the double row bear-ings have a lubricating groove and lubri-cating hole in the middle of the outer ring.

Selection data and calculations for super precision cylindrical roller bearings can be found as follows:
- Life Calculations
- Lubrication
- Tolerances
- Manufacturing Tolerances for Mating Parts
- Attainable speed
- Rigidity

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# Cylindrical Roller Bearings

NN3008ASK.M.SP.C2

**Type**

| | |
|---|---|
| N | Single row, shoulders on the IR |
| NN | Double row, shoulders on the IR |

**Dimensional Series**

| | |
|---|---|
| 10 | Single row bearings |
| 30 | Double row bearings |

**Bore Size Code**

| | |
|---|---|
| 06 | 6 · 5 = 30 mm |
| 08 | 8 · 5 = 40 mm |
| /500 | 500 mm |

**Tapered Bore**

| | |
|---|---|
| K | Tapered bore, single row bearing |
| ASK | Tapered bore, lubrication holes in OR double row bearing |

**Cage**

| | |
|---|---|
| M1 | Brass cage single row |
| M | Brass cage double row |

**Precision**

| | |
|---|---|
| SP | Super precision |
| UP | Ultra precision |

**Radial Play**

| | |
|---|---|
| C2 | Radial per standards |
| R40.50 | Special radial play |

IR = Inner Ring
OR = Outer Ring

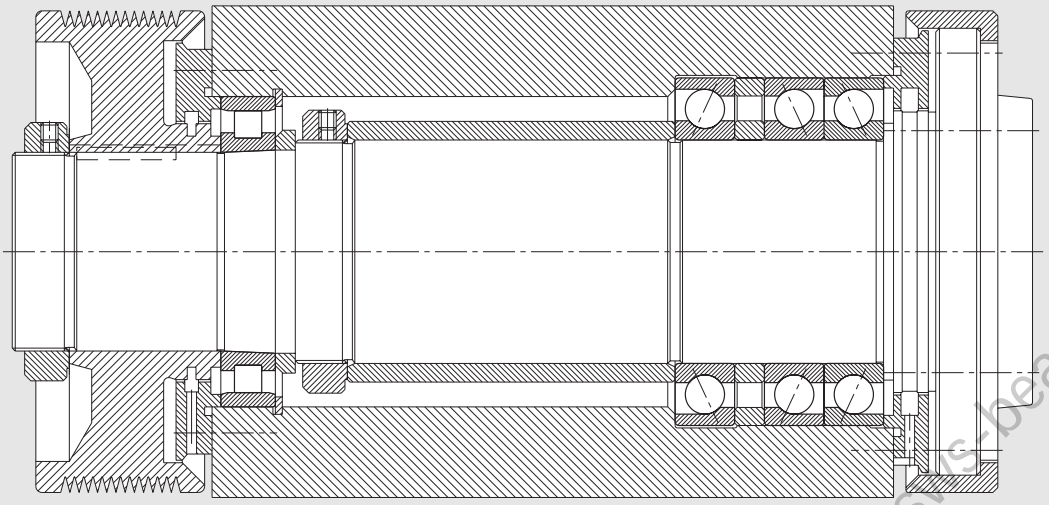
**Radial play of SWS Cylindrical Roller Bearings with tapered**

| Nominal bearing bore | | Bore Dimensions in mm | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Over | | 30 | 40 | 50 | 65 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 225 | 250 | 280 | 315 | 355 | 400 | 450 | |
| | to | 30 | 40 | 50 | 65 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 225 | 250 | 280 | 315 | 355 | 400 | 450 | 500 | |
| **Bearing Design** | | Radial play in µm | | | | | | | | | | | | | | | | | | | |
| ASK.M.SP, | min | 15 | 15 | 17 | 20 | 25 | 35 | 40 | 45 | 50 | 55 | 60 | 60 | 65 | 75 | 80 | 90 | 100 | 110 | 120 | |
| ASK.M.UP, K.M1.SP | max | 25 | 25 | 30 | 35 | 40 | 55 | 60 | 70 | 75 | 85 | 90 | 95 | 100 | 110 | 120 | 135 | 150 | 170 | 190 | |
| ASK.M.SP.C2, | min | 20 | 20 | 25 | 30 | 35 | 40 | 50 | 55 | 60 | 75 | 85 | 95 | 105 | 115 | 130 | 145 | 165 | 185 | 205 | |
| ASK.M.UP.C2 | max | 45 | 45 | 55 | 60 | 70 | 75 | 90 | 100 | 110 | 125 | 140 | 155 | 170 | 185 | 205 | 225 | 255 | 285 | 315 | |

The standard radial clearance of Precision SP and UP is C1NA.

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# Cylindrical Roller Bearings



## The Main Spindle of a CNC Lathe.

**Technical Data**

Motor power: 25 kW
Speed: 31.5....5000 rpm

**Bearing Selection**

The bearings must support the spindle both axially and radially precisely and rigidly. The bearings are preloaded and manufactured to super precision tolerances.

Work side: 1 spindle bearing set SWS B7018E.T.P4S.TBTL in a Tandem, back to back arrangement as a fixed bearing.Diven side: single row cylindrical roller bearings SWSN1016K.M1.SP as a floating bearing.
The arrangement is suited to high speeds and high cutting efficiency.

**Bearing Dimensions**

The bearing size is determined principally by the required spindle rigidity, i.e. the spindle diameter.

The fatigue life of the bearing is taken into consideration during selection, however, in practice it does not figure greatly. As the grease working life and the Hertzian contact stresses in the rolling bearing are the decisive factors.

Main spindles do not as a rule fail on account of fatigue, but instead because of wear.

**Lubrication, Sealing**

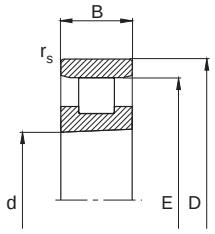
The bearings are lubricated for life with SWS bearing grease Arcanol L74V.

The free space in spindle bearings is filled to ca. 35 % and with cylindrical roller bearings to ca. 20 %.

Sealing is accomplished via a labyrinth with discrete narrow radial gaps.

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# Cylindrical Roller Bearings



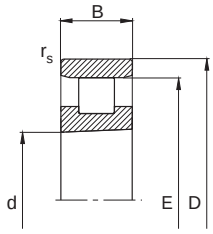

N10

| Bearing Number | Dimensions | | | | | Load Rating | | Attainable Speed | | Weight ≈ |
|---|---|---|---|---|---|---|---|---|---|---|
| | d | D | B | $r_{smin}$ | E | dyn. C | stat. $C_0$ | Grease | Oil minimal | |
| SWS | mm | | | | | kN | | rpm | | kg |
| N1006K.M1.SP | **30** | 55 | 13 | 0.6 | 48.5 | 18.6 | 18 | 19000 | 22000 | 0.13 |
| N1007K.M1.SP | **35** | 62 | 14 | 0.6 | 55 | 23.6 | 24.5 | 16000 | 18000 | 0.172 |
| N1008K.M1.SP | **40** | 68 | 15 | 0.6 | 61 | 27.5 | 29 | 15000 | 17000 | 0.216 |
| N1009K.M1.SP | **45** | 75 | 16 | 0.6 | 67.5 | 32.5 | 35.5 | 13000 | 15000 | 0.271 |
| N1010K.M1.SP | **50** | 80 | 16 | 0.6 | 72.5 | 36 | 41.5 | 12000 | 14000 | 0.297 |
| N1011K.M1.SP | **55** | 90 | 18 | 1 | 80.5 | 41.5 | 50 | 11000 | 13000 | 0.439 |
| N1012K.M1.SP | **60** | 95 | 18 | 1 | 85.5 | 44 | 55 | 10000 | 12000 | 0.47 |
| N1013K.M1.SP | **65** | 100 | 18 | 1 | 90.5 | 45 | 58.5 | 9500 | 11000 | 0.499 |
| N1014K.M1.SP | **70** | 110 | 20 | 1 | 100 | 64 | 81 | 9000 | 10000 | 0.691 |
| N1015K.M1.SP | **75** | 115 | 20 | 1 | 105 | 65.5 | 85 | 8500 | 9500 | 0.728 |
| N1016K.M1.SP | **80** | 125 | 22 | 1 | 113.5 | 76.5 | 98 | 7500 | 8500 | 0.986 |
| N1017K.M1.SP | **85** | 130 | 22 | 1 | 118.5 | 78 | 104 | 7500 | 8500 | 1.04 |
| N1018K.M1.SP | **90** | 140 | 24 | 1.1 | 127 | 93 | 125 | 6700 | 7500 | 1.34 |
| N1019K.M1.SP | **95** | 145 | 24 | 1.1 | 132 | 96.5 | 129 | 6300 | 7000 | 1.4 |
| N1020K.M1.SP | **100** | 150 | 24 | 1.1 | 137 | 98 | 134 | 6000 | 6700 | 1.46 |
| N1021K.M1.SP | **105** | 160 | 26 | 1.1 | 145.5 | 112 | 153 | 5600 | 6300 | 1.82 |
| N1022K.M1.SP | **110** | 170 | 28 | 1.1 | 155 | 140 | 190 | 5300 | 6000 | 2.3 |
| N1024K.M1.SP | **120** | 180 | 28 | 1.1 | 165 | 150 | 208 | 5000 | 5600 | 2.47 |
| N1026K.M1.SP | **130** | 200 | 33 | 1.1 | 182 | 180 | 250 | 4300 | 4800 | 3.72 |
| N1028K.M1.SP | **140** | 210 | 33 | 1.1 | 192 | 183 | 265 | 4000 | 4500 | 3.94 |
| N1030K.M1.SP | **150** | 225 | 35 | 1.5 | 205.5 | 208 | 310 | 3800 | 4300 | 4.75 |
| N1032K.M1.SP | **160** | 240 | 38 | 1.5 | 220 | 245 | 355 | 3400 | 3800 | 5.79 |
| N1034K.M1.SP | **170** | 260 | 42 | 2.1 | 237 | 300 | 430 | 3200 | 3600 | 7.77 |
| N1036K.M1.SP | **180** | 280 | 46 | 2.1 | 255 | 360 | 520 | 3000 | 3400 | 10.2 |
| N1038K.M1.SP | **190** | 290 | 46 | 2.1 | 265 | 365 | 550 | 2800 | 3200 | 10.6 |
| N1040K.M1.SP | **200** | 310 | 51 | 2.1 | 281 | 400 | 600 | 2600 | 3000 | 14 |
| N1044K.M1.SP | **220** | 340 | 56 | 3 | 310 | 510 | 765 | 2400 | 2800 | 17.9 |
| N1048K.M1.SP | **240** | 360 | 56 | 3 | 330 | 540 | 850 | 2200 | 2600 | 19.3 |
| N1052K.M1.SP | **260** | 400 | 65 | 4 | 364 | 655 | 1020 | 1900 | 2200 | 28.6 |
| N1056K.M1.SP | **280** | 420 | 65 | 4 | 384 | 680 | 1100 | 1800 | 2000 | 30.9 |
| N1060K.M1.SP | **300** | 460 | 74 | 4 | 420 | 900 | 1430 | 1600 | 1800 | 43.7 |
| N1064K.M1.SP | **320** | 480 | 74 | 4 | 440 | 915 | 1500 | 1500 | 1700 | 45.1 |
| N1068K.M1.SP | **340** | 520 | 82 | 5 | 475 | 1120 | 1830 | 1400 | 1600 | 60.7 |

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# Cylindrical Roller Bearings

## N10

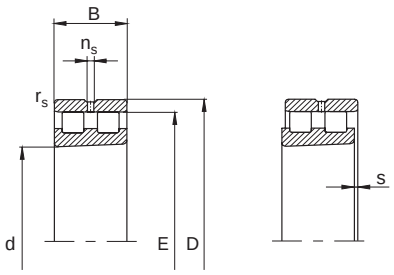



| Bearing Number | Dimensions | | | | | Load Rating | | Attainable Speed | | Weight ≈ |
|---|---|---|---|---|---|---|---|---|---|---|
| | d | D | B | $r_{smin}$ | E | dyn. C | stat. $C_0$ | Grease | Oil minimal | |
| SWS | mm | | | | | kN | | rpm | | kg |
| N1072K.M1.SP | **360** | 540 | 82 | 5 | 495 | 1140 | 1900 | 1300 | 1500 | 64.4 |
| N1076K.M1.SP | **380** | 560 | 82 | 5 | 515 | 1180 | 2000 | 1300 | 1500 | 66.6 |
| N1080K.M1.SP | **400** | 600 | 90 | 5 | 550 | 1370 | 2320 | 1200 | 1400 | 88.1 |
| N1084K.M1.SP | **420** | 620 | 90 | 5 | 570 | 1400 | 2450 | 1100 | 1300 | 90.7 |
| N1088K.M1.SP | **440** | 650 | 94 | 6 | 597 | 1560 | 2750 | 1100 | 1300 | 106 |
| N1092K.M1.SP | **460** | 680 | 100 | 6 | 624 | 1660 | 3000 | 1000 | 1200 | 120 |
| N1096K.M1.SP | **480** | 700 | 100 | 6 | 644 | 1700 | 3100 | 950 | 1100 | 125 |
| N10/500K.M1.SP | **500** | 720 | 100 | 6 | 664 | 1760 | 3200 | 950 | 1100 | 130 |

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# Cylindrical Roller Bearings

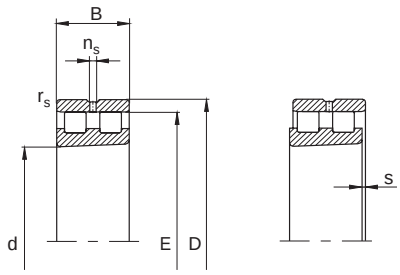
## NN30




| Bearing Number | Dimensions | | | | | | | Load Rating | | Attainable Speed | | Weight ≈ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | d | D | B | $r_{smin}$ | E | $n_s$ | s | dyn. C | stat. $C_0$ | Grease | Oil minimal | |
| SWS | mm | | | | | | | kN | | rpm | | kg |
| NN3006ASK.M.SP | **30** | 55 | 19 | 1 | 48.5 | 4.8 | 1.4 | 29 | 34 | 16000 | 19000 | 0.199 |
| NN3007ASK.M.SP | **35** | 62 | 20 | 1 | 55 | 4.8 | 1.4 | 35.5 | 44 | 14000 | 17000 | 0.259 |
| NN3008ASK.M.SP | **40** | 68 | 21 | 1 | 61 | 4.8 | 1.4 | 45 | 58.5 | 12000 | 15000 | 0.315 |
| NN3009ASK.M.SP | **45** | 75 | 23 | 1 | 67.5 | 4.8 | 1.7 | 54 | 72 | 11000 | 14000 | 0.408 |
| NN3010ASK.M.SP | **50** | 80 | 23 | 1 | 72.5 | 4.8 | 1.7 | 57 | 80 | 10000 | 13000 | 0.41 |
| NN3011ASK.M.SP | **55** | 90 | 26 | 1.1 | 81 | 4.8 | 1.9 | 72 | 100 | 9000 | 11000 | 0.652 |
| NN3012ASK.M.SP | **60** | 95 | 26 | 1.1 | 86.1 | 4.8 | 1.9 | 75 | 110 | 8500 | 10000 | 0.672 |
| NN3013ASK.M.SP | **65** | 100 | 26 | 1.1 | 91 | 4.8 | 1.9 | 76.5 | 116 | 8000 | 9500 | 0.741 |
| NN3014ASK.M.SP | **70** | 110 | 30 | 1.1 | 100 | 6.5 | 2.3 | 98 | 150 | 7000 | 8500 | 1.07 |
| NN3015ASK.M.SP | **75** | 115 | 30 | 1.1 | 105 | 6.5 | 2.3 | 100 | 156 | 6700 | 8000 | 1.13 |
| NN3016ASK.M.SP | **80** | 125 | 34 | 1.1 | 113 | 6.5 | 2.5 | 120 | 186 | 6300 | 7500 | 1.56 |
| NN3017ASK.M.SP | **85** | 130 | 34 | 1.1 | 118 | 6.5 | 2.5 | 125 | 200 | 6000 | 7000 | 1.64 |
| NN3018ASK.M.SP | **90** | 140 | 37 | 1.5 | 127 | 6.5 | 2.5 | 140 | 224 | 5600 | 6700 | 2.13 |
| NN3019ASK.M.SP | **95** | 145 | 37 | 1.5 | 132 | 6.5 | 2.5 | 143 | 236 | 5300 | 6300 | 2.23 |
| NN3020ASK.M.SP | **100** | 150 | 37 | 1.5 | 137 | 6.5 | 2.5 | 146 | 245 | 5300 | 6300 | 2.32 |
| NN3021ASK.M.SP | **105** | 160 | 41 | 2 | 146 | 6.5 | 2.6 | 190 | 310 | 4800 | 5600 | 2.96 |
| NN3022ASK.M.SP | **110** | 170 | 45 | 2 | 155 | 6.5 | 2.8 | 220 | 360 | 4500 | 5300 | 3.76 |
| NN3024ASK.M.SP | **120** | 180 | 46 | 2 | 165 | 6.5 | 3.1 | 232 | 390 | 4300 | 5000 | 4.1 |
| NN3026ASK.M.SP | **130** | 200 | 52 | 2 | 182 | 9.5 | 3.3 | 290 | 500 | 3800 | 4500 | 6.04 |
| NN3028ASK.M.SP | **140** | 210 | 53 | 2 | 192 | 9.5 | 3.3 | 300 | 520 | 3600 | 4300 | 6.48 |
| NN3030ASK.M.SP | **150** | 225 | 56 | 2.1 | 206 | 9.5 | 3.7 | 335 | 585 | 3400 | 4000 | 7.88 |
| NN3032ASK.M.SP | **160** | 240 | 60 | 2.1 | 219 | 9.5 | 4.2 | 375 | 670 | 3200 | 3800 | 9.57 |
| NN3034ASK.M.SP | **170** | 260 | 67 | 2.1 | 236 | 9.5 | 4.5 | 450 | 800 | 3000 | 3600 | 13 |
| NN3036ASK.M.SP | **180** | 280 | 74 | 2.1 | 255 | 12.2 | 4.8 | 570 | 1000 | 2800 | 3400 | 17 |
| NN3038ASK.M.SP | **190** | 290 | 75 | 2.1 | 265 | 12.2 | 4.8 | 585 | 1040 | 2600 | 3200 | 18 |
| NN3040ASK.M.SP | **200** | 310 | 82 | 2.1 | 282 | 12.2 | 5.3 | 655 | 1200 | 2400 | 3000 | 23 |
| NN3044ASK.M.SP | **220** | 340 | 90 | 3 | 310 | 15 | 5.5 | 800 | 1460 | 2200 | 2800 | 32.9 |
| NN3048ASK.M.SP | **240** | 360 | 92 | 3 | 330 | 15 | 6 | 850 | 1560 | 2000 | 2600 | 36 |
| NN3052ASK.M.SP | **260** | 400 | 104 | 4 | 364 | 15 | 6.5 | 1060 | 2000 | 1900 | 2400 | 48 |
| NN3056ASK.M.SP | **280** | 420 | 106 | 4 | 384 | 15 | 6.8 | 1080 | 2080 | 1800 | 2200 | 51.7 |
| NN3060ASK.M.SP | **300** | 460 | 118 | 4 | 418 | 17.7 | 7.4 | 1270 | 2400 | 1600 | 1900 | 71.5 |
| NN3064ASK.M.SP | **320** | 480 | 121 | 4 | 438 | 17.7 | 7.9 | 1320 | 2600 | 1600 | 1900 | 77.2 |
| NN3068ASK.M.SP | **340** | 520 | 133 | 5 | 473 | 17.7 | 8.7 | 1630 | 3250 | 1400 | 1700 | 103 |

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# NN30




| Bearing Number | Dimensions | | | | | | | Load Rating | | Attainable Speed | | Weight ≈ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | d | D | B | $r_{smin}$ | E | $n_s$ | s | dyn. C | stat. $C_0$ | Grease | Oil minimal | |
| SWS | mm | | | | | | | kN | | rpm | | kg |
| NN3072ASK.M.SP | **360** | 540 | 134 | 5 | 493 | 17.7 | 8.7 | 1660 | 3350 | 1400 | 1700 | 109 |
| NN3076ASK.M.SP | **380** | 560 | 135 | 5 | 513 | 17.7 | 9 | 1700 | 3450 | 1300 | 1600 | 114 |
| NN3080ASK.M.SP | **400** | 600 | 148 | 5 | 549 | 17.7 | 9.5 | 2160 | 4500 | 1200 | 1500 | 149 |
| NN3084ASK.M.SP | **420** | 620 | 150 | 5 | 569 | 17.7 | 10 | 2120 | 4500 | 1200 | 1500 | 156 |
| NN3088ASK.M.SP | **440** | 650 | 157 | 6 | 597 | 23.5 | 10.3 | 2450 | 5100 | 1100 | 1400 | 179 |
| NN3092ASK.M.SP | **460** | 680 | 163 | 6 | 624 | 23.5 | 10.5 | 2600 | 5400 | 1100 | 1400 | 204 |
| NN3096ASK.M.SP | **480** | 700 | 165 | 6 | 644 | 23.5 | 11 | 2700 | 5850 | 1000 | 1300 | 214 |
| NN30/500ASK.M.SP | **500** | 720 | 167 | 6 | 664 | 23.5 | 11.5 | 2650 | 5850 | 1000 | 1300 | 223 |

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