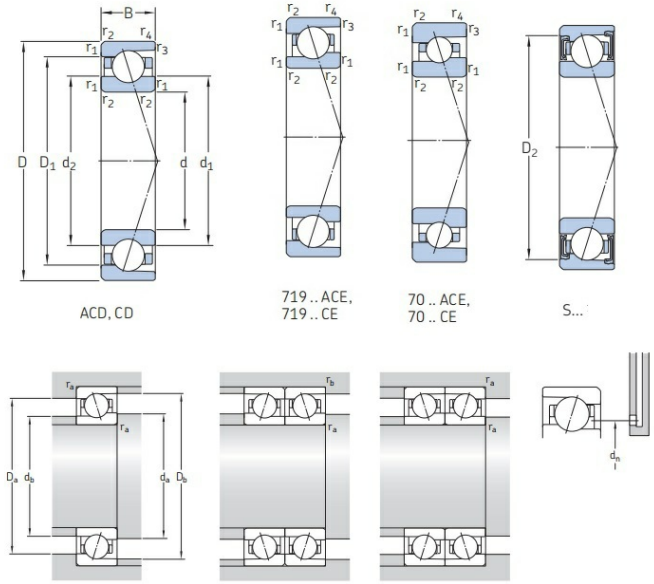
7010CE/HCP4ADGB

super-precision angular contact ball bearings



Technical sheet of 7010CE/HCP4ADGB

What are the Benefits of choosing 7010CE/HCP4ADGB bearings?

- **Ultra-high speed:** The low density of ceramic balls (approximately 40% of steel balls) results in low centrifugal force, significantly increasing the maximum speed.
- **Long lifespan:** High hardness and low coefficient of friction lead to minimal wear; the material itself is corrosion-resistant, high-temperature resistant, and has a long fatigue life.
- **Low heat generation:** Good self-lubricating properties result in low temperature rise during operation and excellent thermal stability.
- **High rigidity:** High elastic modulus (approximately 1.5 times that of steel) provides strong resistance to deformation and more stable machining accuracy.
- **Insulation:** Excellent electrical insulation properties (high resistivity) prevent electrolytic corrosion damage, making it suitable for applications such as motors.
- **Low maintenance:** Low lubrication requirements ensure high long-term operational reliability and reduce downtime for maintenance.

Type :		Angular contact ball bearings, super-precision
Model :		7010CE/HCP4ADGB
Main demensions :	50 mm × 80 mm × 32 mm	Bore Dia × Outside Dia × Width Dia
M kg:	0.46	Mass
HS Code :	8482103000	Bearing customs code

d mm:	50	inner ring diameter
D mm:	80	Outer ring diameter
B(T) mm:	32	Overall Width
Cr kN:	25.39	Radial dynamic load rating
C0r kN:	21.077	Radial static load rating
Grease r/min:	29975	Reference speed
Oil r/min:	45878	Limiting speed

Detailed parameters and installation dimensions:

Part Number	7010CE/HCP4ADGB
Bearing Type	super-precision angular contact ball bearings
Internal design	CE = 15° contact angle, high-speed E design
Series	70..-CE/HCP4A
Accuracy class	P4A
Rows NO.	2
Cage	Cotton fabric reinforced phenolic resin or carbon fibre reinforced PEEK, outer ring centred
Dimension series	ISO dimension series 10
Ball material	HC = Balls made of bearing grade silicon nitride Si3N4 (hybrid bearing)
Contact angle - α	15 °
Manufacturer Part Code	7010 CE/HCP4ADGB
Dimension	
Inside - d φ	50 mm | 1.969 inch
Outside - D Φ	80 mm | 3.150 inch
Width - B	32 mm | 1.260 inch
Chamfer - r_1,r_2(min.)	1 mm | 0.039 inch
Chamfer - r_3,r_4(min.)	0.6 mm | 0.024 inch
Fillet - r_a(max.)	1 mm | 0.039 inch
Fillet - r_b(max.)	0.6 mm | 0.024 inch
d_1	60.3 mm | 2.374 inch
d_2	57.9 mm | 2.280 inch
D_1	72.9 mm | 2.870 inch
D_2	72.9 mm | 2.870 inch
Balls diameter	7.938 mm | 0.313 inch
Properties	
Bore Type	Z = Cylindrical Bore
Ring material	Carbon chromium steel
Balls qty □single□	21
Temperature - T(min)	-30 °C
Temperature - T(max)	+110 °C
Bearing Mass - m	0.46 kg | 1.014 lb

Units	Metric
Contact type	2-point contact
Bearing set arrangement and preload	DGB = Set of two bearings for universal matching, Light preload
Ring type	inner rings(1 piece), outer rings(1 piece)
Load Direction	Angular Contact
Seal	open
Grease quantity - G_{ref}	4.1 cm^3
Calculation coefficient - f_0	8.2
Performance (Load Capacity and speeds)	
Dynamic Radial - C_r	25390 N | 5707 lbf
Static Radial - C_{0r}	21077 N | 4738 lbf
Fatigue Radial - P_u	638 N | 143 lbf
Attainable speeds (Grease)	29975 r/min
Attainable speeds (Oil-air)	45878 r/min
Abutment dimensions	
d_a(min.)	54.6 mm | 2.150 inch
d_b(min.)	54.6 mm | 2.150 inch
D_a(max.)	75.4 mm | 2.968 inch
D_b(max.)	75.8 mm | 2.984 inch
d_n	62.3 mm | 2.453 inch

What are the applications of the 7010CE/HCP4ADGB bearing?

- **Machine tool spindles:** Improve ultimate speed and machining accuracy, extend tool life.
- **Semiconductor equipment:** Meet clean vacuum environment requirements, ensure micron-level positioning.
- **Aerospace:** Reduce weight, withstand temperature differences, and meet high reliability requirements.
- **High-speed motors:** Reduce centrifugal force and temperature rise, achieve ultra-high speed operation.
- **Medical devices:** Quiet and stable operation, meet sterility and long lifespan requirements.
- **Precision instruments:** Reduce vibration and thermal deformation, ensure measurement repeatability.
- **Robotics:** Improve joint response speed and enhance motion trajectory accuracy.

How should choose the right model for a Angular contact ball bearings, super-precision?

Step 1: Select Series by Size

Determine the ISO size series based on installation space and load requirements:

718 Series: Ultra-light, extremely low cross-section height, suitable for space-constrained applications.

719 Series: Extremely light, a general-purpose choice, balancing rigidity and speed.
70 Series: Light, the most commonly used series, with a wide range of applications.
72 Series: Robust, largest cross-section, suitable for heavy-duty, relatively low-speed applications.

Step 2: Select Internal Design by Working Condition (Crucial)

This is the core of SKF selection; different suffixes correspond to different performance orientations:
High Load Capacity D Design: Suffix CD (15° contact angle) or ACD (25° contact angle). Utilizes a large ball design, offering the highest rigidity and load-bearing capacity, suitable for general-purpose machine tool spindles such as machining centers and lathes.
High Speed E Design: Suffix CE (15°), FE (18°), or ACE (25°). Featuring a small, multi-ball design, this bearing boasts higher speed capabilities than the D design, suitable for ultra-high-speed applications such as electric spindles and PCB drilling.
High-Speed B Design: Suffixes CB (15°), FB (18°), or ACB (25°). Smaller and lighter balls, suitable for extremely high speeds and light loads.
UltraFast A Design: Suffix AB (20° contact angle). Available only with hybrid ceramic balls, designed specifically for electric spindles demanding extreme speeds.
Sealed W Design: Suffix FW (18° contact angle). Available only with hybrid ceramic balls, featuring double-sided sealing and lifetime lubrication, suitable for medium-to-high-speed, maintenance-free equipment such as woodworking machinery.

Step 3: Identifying the Seal and Suffix

Seal Identification (Prefix): Models starting with S indicate double-sided sealing (e.g., S7010), pre-filled with grease at the factory, requiring no maintenance for life. Those without S are open bearings.
Material: HC indicates hybrid ceramic balls (ceramic balls + steel rings), enabling higher speeds, electrical insulation, and longer lifespan.
Preload (universal pairing): GA (ultra-light preload), GB (light preload), GC (medium preload). This is a suffix for a single bearing, indicating that the bearing can be arbitrarily paired and combined to achieve a specified preload.
Precision: P4 (ISO Class 4, standard ultra-precision), P4A (operating precision higher than P4), P2 (highest grade).
Arrangement (pair/group suffix): DB (back-to-back), DF (face-to-face), DT (tandem), QBC (quadruple, tandem back-to-back configuration), etc.

Typical Model Explanation

Taking S7010 ACD/HCP4A QBC C as an example:

S: Double-sided seal (lifetime lubrication)
7010: 70 series, 50mm inner diameter
ACD: 25° contact angle, D design (high load capacity)
HC: Hybrid ceramic balls
P4A: Precision grade (super P4)
QBC: Quadruple bearing assembly, tandem back-to-back configuration
C: Medium preload (for heavy preload)

Taking 71922 CDGB TNHA/PA9A L as an example:

71922: 719 series, 110mm inner diameter
CD: 15° contact angle, D design (high load capacity)
GB: Light preload (universal matching)
TNHA: Glass fiber reinforced PEEK cage, outer ring centering
PA9A: Precision grade (ISO) Level 2)

L: Light preload (for triple/quadruple units only)

Selection Key Points Summary

First determine the series: 718/719/70/72
Then determine the design: CD/ACD (high load capacity) or CE/ACE (high speed) or FW (sealing) or AB (UltraFast)
Confirm the seal: Select the S prefix for lifetime lubrication
Optional suffixes: Material HC, Preload GA/GB/GC, Accuracy P4/P4A, Arrangement DB/DF/DT/QBC

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