



7209 CD/P4A Super-precision, high-capacity, single row angular contact ball bearing

Super-precision, high-capacity, single row angular contact ball bearing

These super-precision, high-capacity, single row angular contact ball bearings, with 15° contact angle, accommodate radial and axial loads acting simultaneously, where the axial load acts in one direction only. They are designed to accommodate heavy loads at relatively high speeds under low to moderate operating temperatures.

- Very high running accuracy
- Very high load carrying capacity
- Relatively high speed and stiffness

Overview

Dimensions

Bore diameter	45 mm
Outside diameter	85 mm
Width	19 mm
Contact angle	15 °

Performance

Basic dynamic load rating	42.3 kN
Basic static load rating	31 kN
Attainable speed for grease lubrication	17 000 r/min
Attainable speed for oil-air lubrication	28 000 r/min

Properties

Contact type	Normal contact (two-point contact)
Number of rows	1
Ring type	One-piece inner and outer rings
Design	High-capacity D
Universal matching bearing	No
Matched arrangement	No
Matched condition (axial clearance/ preload)	Not applicable
Tolerance class	P4A
Material, bearing	Bearing steel

Coating	Without
Sealing	Without
Lubricant	None

Technical Specification

Universal matching bearing(s)

No



Dimensions

d	45 mm	Bore diameter
D	85 mm	Outside diameter
B	19 mm	Width
d_1	57.3 mm	Shoulder diameter of inner ring (large side face)
d_2	57.3 mm	Shoulder diameter of inner ring (small side face)
D_1	72.7 mm	Shoulder diameter of outer ring (large side face)
$r_{1,2}$	min. 1.1 mm	Chamfer dimension
$r_{3,4}$	min. 0.6 mm	Chamfer dimension
a	18.3 mm	Distance from side face to pressure point

Abutment dimensions

d_a	min. 52 mm	Diameter of shaft abutment
d_b	min. 52 mm	Diameter of shaft abutment
D_a	max. 78 mm	Diameter of housing abutment
D_b	max. 80.8 mm	Diameter of housing abutment
r_a	max. 1 mm	Radius of fillet
r_b	max. 0.6 mm	Radius of fillet
d_n	60.6 mm	Position of oil nozzle





Calculation data

Basic dynamic load rating	C	42.3 kN
Basic static load rating	C ₀	31 kN
Fatigue load limit	P _u	1.32 kN
Attainable speed for grease lubrication		17 000 r/min
Attainable speed for oil-air lubrication		28 000 r/min
Contact angle	α	15 °
Ball diameter	D _w	12.7 mm
Number of rows	i	1
Number of balls (per bearing)	z	14
Reference grease quantity (per bearing)	G _{ref}	5.922 cm ³

Preload and stiffness (back-to-back, face-to-face)

Preload, class A	G _A	160 N
Axial stiffness for preload A (sets of two brgs back to back or face to face)		61 N/μm
Preload, class B	G _B	320 N
Axial stiffness for preload B (sets of two brgs back-to-back or face-to-face)		82 N/μm
Preload, class C	G _C	640 N
Axial stiffness for preload C (sets of two brgs back-to-back or face-to-face)		115 N/μm
Preload, class D	G _D	1 280 N
Axial stiffness for preload D (sets of two brgs back-to-back or face-to-face)		166 N/μm

Correction factors for preload calculation

Correction factor dependent on bearing series and size	f	1.07
Correction factor dependent on contact angle	f_1	1
Correction factor, preload class A	f_{2A}	1
Correction factor, preload class B	f_{2B}	1.01
Correction factor, preload class C	f_{2C}	1.03
Correction factor, preload class D	f_{2D}	1.05
Correction factor for hybrid bearings	f_{HC}	1

Factors for equivalent bearing load calculation

Calculation factor for equivalent loads	f_0	14.2
Additional factors for equivalent loads		Refer to Notes 1 and 2 below

Mass

Mass		0.41 kg
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