Dimension verification sheet

Ball bearing

Drawing RFS 6205 · rev. A
Model measured 3D geometry of the technical video (generated by code)
Verification date 14-11-2026

The 40 dimensions of the 6205 deep groove ball bearing, from the reality sheet and the drawing, measured again on the 3D model used to make the video.

> **40 within tolerance · 0 out of tolerance**

ID	DIMENSION	DRAWING (MM)	TOLERANCE	MODEL (MM)	RESULT
R01	Outside diameter D	52	–	52	Within tolerance
R02	Width B, outer ring	15	–	15	Within tolerance
R03	Width B, inner ring	15	–	15	Within tolerance
R04	Bore d	25	–	25	Within tolerance
R05	Outer ring shoulder D1 (Ø)	43.23	–	43.23	Within tolerance
R06	Inner ring shoulder d1 (Ø)	33.71	–	33.71	Within tolerance
R07	Outer ring groove radius	4.21	–	4.21	Within tolerance
R08	Outer ring groove centre (radius)	18.993385	–	18.993385	Within tolerance
R09	Outer ring chamfers (number)	4	–	4	Within tolerance
R10	Outer raceway bottom (Ø) = dm + Dw	46.40677	–	46.40677	Within tolerance
R11	Outer ring chamfer, 1 × 45°	1	–	1	Within tolerance
R12	Inner ring groove radius	4.13	–	4.13	Within tolerance
R13	Inner ring groove centre (radius)	19.395385	–	19.395385	Within tolerance
R14	Inner ring chamfers (number)	4	–	4	Within tolerance
R15	Inner raceway bottom (Ø) = dm – Dw	30.53077	–	30.53077	Within tolerance
R16	Inner ring chamfer, 1 × 45°	1	–	1	Within tolerance
R17	Balls (number)	9	–	9	Within tolerance
R18	Ball diameter Dw	7.938	–	7.938	Within tolerance
R19	Pitch diameter dm of the model	38.46877	–	38.46877	Within tolerance
R20	Demonstration support, width	76	–	76	Within tolerance
R21	Demonstration support, height	70	–	70	Within tolerance
R22	Demonstration support, depth	15	–	15	Within tolerance
R23	Shaft, front overhang	8	–	8	Within tolerance
R24	Shaft, rear overhang	10	–	10	Within tolerance
R25	Keyway at the shaft end, length	6	–	6	Within tolerance
R26	Keyway, width	8	–	8	Within tolerance
R27	Keyway, depth	4	–	4	Within tolerance

ID	DIMENSION	DRAWING (MM)	TOLERANCE	MODEL (MM)	RESULT
R28	Cage, outer radius of the strip	21.23	–	21.23	Within tolerance
R29	Cage, inner radius of the strip	17.23	–	17.229999	Within tolerance
R30	Cage, radial width of the strip	4	–	4.000002	Within tolerance
R31	Cage, pocket radius	4.07	–	4.07	Within tolerance
R32	Cage, sheet thickness over the ball	0.6	–	0.6	Within tolerance
R33	Cage, sheet thickness at the bridge	0.6	–	0.6	Within tolerance
R34	Rivets (number)	9	–	9	Within tolerance
R35	Rivet head (Ø)	1.6	–	1.6	Within tolerance
R36	Ball dot: cap Ø (on a sphere with a 0.008 mm larger radius)	0.95	–	0.951915	Within tolerance
R37	Ball dot: angle to the spin axis (°)	33	–	33	Within tolerance
R38	Ball dot: height above the sphere	0.008	–	0.008	Within tolerance
R39	Radial gap, ball–outer raceway (section plane)	0	–	0.000000	Within tolerance
R40	Radial gap, ball–inner raceway (section plane)	0	–	0.000000	Within tolerance

Notes

- The drawing carries no manufacturing tolerances. The sheet checks that the 3D model is the one on the drawing: dimensions in mm are compared with their nominal value using an internal limit of ±0.00001 mm, except R36, which is measured on a different sphere (see its note). It is not a certification.
- Source of the dimensions: R01–R04 and R18 are catalogue data for size 6205; the chamfers (R09, R11, R14 and R16) start from the catalogue minimum chamfer dimension, 1 mm, and are drawn at 1 × 45° in the model; R17 and R34 are derived; the rest are our own demonstration design, of the same order as published values.
- R19: the pitch diameter of the model is a calculated value (7.938 × 63/13), so that the cage advances 25 ball pitches every 7 shaft turns. Published values range from 38.6 to 39.04. The drawing shows it rounded: Ø38.47.
- R36–R38: the dot on each ball is a marker in the video to show its spin; real balls carry no mark. It measures 0.95 on the ball and 0.951915 on the sphere it is drawn on, whose radius is 0.008 mm larger.
- R39 and R40: in the model each ball touches both raceways with no gap, i.e. zero radial internal clearance. In a real, unmounted 6205 with Normal clearance, the radial internal clearance is 5 to 20 µm. No grease, seals or load zone.
- Other declared simplifications: a fixed cut-away window, from 5° to 105°, removes what lies in front of the mid-plane of the rings and the cage, and the balls are shown whole; the ball spin is –65/28 of the shaft rotation, 0.066 % faster than pure rolling (–1900/819), a value adjusted for the demonstration; the short shaft with keyway and the support are for demonstration.
- Check: a program measures the 40 dimensions on the geometry used to make the video (31 tests, 0 failures) and checks the contact of the 9 balls with both raceways in all 375 frames (error below 0.000001 mm, no penetration). Our own demonstration design “RFS 6205”.