# PAIRING CLASSIFICATION SLIDING GUIDE (SINTERED FERRITE) ROLLER BEARING

Recommendation for pairing selection:

Cutting clearance Sliding guide Ball bearing guide Description Recommendation

small	large	Piece parts with small tolerances, closely specified cut edge properties and contours – also parts from thin material	Pairing 1	
medium	medium	Piece parts from sheet thicker than 1 mm – also preferably for	Pairing 2	
medium		progression dies		
large	small	Where demands on edges and burrs are not stringent; note that large die clearances require smaller shearing forces	Pairing 3	
	medium	medium medium	medium medium properties and contours – also parts from thin material  Piece parts from sheet thicker than 1 mm – also preferably for progression dies  Where demands on edges and burrs are not stringent; note that large	

Selection of punch-matrix clearance is largely determined by piece part characteristics: percentage of sheared land versus breakaway, but also by demands on burr formation.

Further criteria are the part piece material, as well as the type and condition of the tooling and the press.

### Combination possibilities guide pillars, cages and bushings:

	Sliding gui	de			Ball bearing guide						
	Guide pilla	r Guide bushinç	Guide pilla	ır Guide bushir	ng						
	Colour	Order No.	Colour	Order No.	Colour	Order No.	Colour	Order No.			
	yellow	.10	yellow	.10	yellow	.10	red	.30			
Pairing 1	green	.20	yellow	.10	yellow	.10	green	.20			
					green	.20	red	.30			
Pairing 2	green	.20	green	.20	yellow	.10	yellow	.10			
	red	.30	yellow	.10	green	.20	green	.20			
	yellow	.10	green	.20	red	.30	red	.30			
		<u> </u>						_			
Pairing 3	red	.30	red	.30	green	.20	yellow	.10			
	green	.20	red	.30	red	.30	green	.20			
	yellow	.10	red	.30	red	.30	yellow	.10			

Identification for tolerances with colour dots on the outside of the guide pillars and bushings. Selection Criteria: die clearance – stock thickness – material

### Note for 4-pillar die sets:

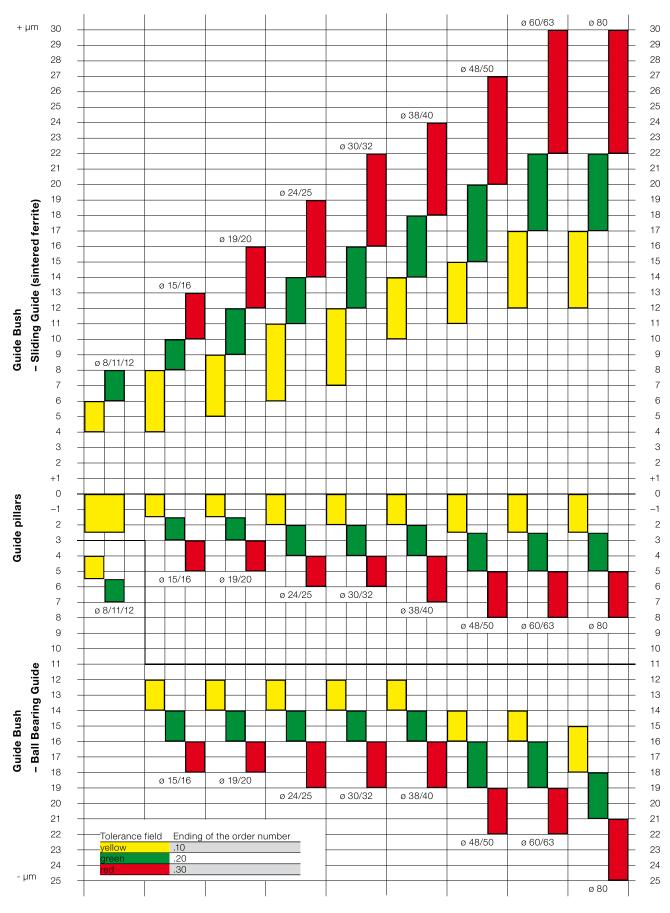
Please be aware that tight bushing clearances or high preloads are generally unsuitable for 4-pillar die sets.

Deviation from the bore geometry and from the perpendicularity requires a pairing classification of pairing 2 or even better pairing 3. The pairing classification does not signify any difference in quality, rather a selection of the optimum bushing clearance in the case of guide pillars or the optimum preloading in the case of ball bearings (see also chart next page).

### Ordering Code (example):

Guide pillar in tolerance code yellow = 202.19.040.260.10 Sintered ferrite bushing with tolerance code green = 2081.31.040.20

# PAIRING CLASSIFICATION SLIDING GUIDE (SINTERED FERRITE) ROLLER BEARING



## SELECTION MATRIX GUIDE PILLARS - GUIDE BUSHES

			Guide pillars conforming to DIN 9825 Guide pillars, bolt-on type Pallet die sets			Guide pillars with centre fixing	Guide pillars with centre fixing		Guide pillars to AFNOR	Guide pillars	Guide pillars for large tools	Guide pillars ECO-LINE	Guide pillars with cage retainer bore		
		Guide pillars	202.17. 202.55. 202.19. 2021.44.	202.21. 2021.46. 202.22. 2021.50.	202.23. 2021.58. 202.24.	202.61. 2020.64. 2020.63.		202.60. 2020.62.		2022.25.	2022.16.45. 2022.16.48.	2021,28. 2022.17. 2022.12. 2022.19. 2022.13. 2022.29. 2022.15. 2022.16.	202.29. 2021.29. 202.31.	202.1930.94 2021.4630.94	
		ਰ Tolerance	203		202	203				20%	-0.010		203		
Guide bushes			range	.30	.20	.10	h3	.30	.20	.10	h5	-0.010	f6	h4	.30
Ball guide bushes 20 Guide bearing for ball bearing 20 guide 20 20 20	206.49. 210.44. 210.45. 210.46.	2081.46. 2081.47. 2081.49. 2081.67.	.10	●1	•1	•1	•1	•1	•1	●1	×	×	×	•1	•
	2031.42. 2091.44 2031.44. 2091.45 2061.44. 2091.46 2061.47. 2091.67.	2081.68. 2091.44. 2091.45. 2091.46.	.20	<b>•</b> 1	•1	•1	•1	•1	●1	●1	×	×	×	×	•
		2091.67. 2091.68.	.30	●1	•1	●1	•1	•1	●1	●1	×	×	×	×	•
Recirculating ball bush	2061.69.	2081.69.	-	•	×	×	×	•	×	×	×	×	×	×	×
Sintered ferrite guide bushes	210.34. 208 210.35. 208 2031.31. 208 2031.34. 208 2031.38. 208	2081.32. 2081.33. 2081.34. 2081.35.	.10	●1	●1	•1	×	•1	●1	●1	×	×	×	•	×
Guide bearing, sintered guide		2091.31. 2091.32. 2091.34.	.30	●1 ●1	●1 ●1	●1 ●1	×	●1 ●1	●1 ●1	●1 ●1	× ×	×	×	•	×
Guide bushes ECO-LINE bronze with solid lubrication rings	2051.72. 2081.71. 2081.74. 2081.75.	2091.71. 2091.72. 2091.74.	H6	•	0	×	×	×	×	×	×	×	×	•	×
Guide bushes, bronze coated	210.85. 2081.81. 2081.84.	2081.85.	IT5	•	•	0	×	×	×	×	×	×	×	•	×
Guide bushes ECO-LINE bronze plated	2051.92. 2081.91. 2081.94. 2081.95.	2091.91. 2091.92. 2091.94.	H5	•	0	×	×	×	×	×	×	×	×	•	×
Guide bushes with solid lubrication Guide bearing with solid lubricant	2031.70. 2082.70. 2082.71. 2085.70. 2085.72.	2087.70. 2087.71. 2087.72. 2087.73.	H7	•	×	×	×	×	×	×	•	•	•	•	×
Guide bushes with solid lubrication	2085.71.		E7	•	•	•	×	×	×	×	•	•	•	•	×
Guide bushes with solid lubrication	2032.70. 2052.70.	2086.70.	F7	•	•	×	×	×	×	×	•	•	•	•	×
Guide bushes with solid lubrication	2102.70.	2102.71.	G7	•	•	×	×	×	×	×	•	•	•	•	×
Guide bushes with solid lubrication	2086.71.		C9	•	•	•	×	×	×	×	•	•	•	•	×

ullet = suitable

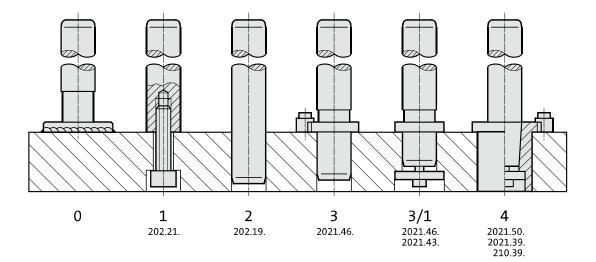
 $ullet^1$  = suitable (see pairing classification at the beginning of chapter D)

O = Limited suitability

 $<sup>\</sup>times$  = Not suitable

The combinations should be considered as recommendations. Depending on the installation situation and type of use, a previous examination or test is mandatory, since different combinations may result in varying clearance (slide guide) or pretension (ball guides) values.

## **DEFLECTION OF PILLARS AND BENDING EQUATION**



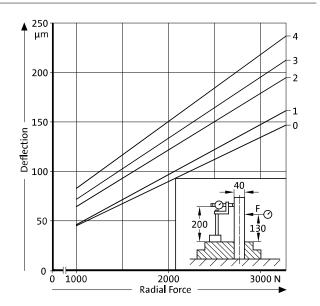
### **Deflection of Pillars**

The practical use of this type of screw-on column with the technical advantages of bending stiffness shown requires a rethink in the design of the tool.

### **Mounting Instructions:**

The friction surfaces of the screw connections (bearing surface and thread) must be lubricated with Molykote paste.

To compensate for the setting of the screws, the connection should be loosened at least twice and tightened again with a torque wrench (see tightening torque in table).



### **Bending equation**

The transverse load resistance to tool guides is greatly influenced by the position of the guide pillar fixing.

For a tool with a spring-mounted die guide plate and pillar fixing at the top or bottom of the tool, the deflection and pillar bending values do not differ when the load is applied at the side since the distance (L) from the point of application of the force is the same.

Significantly better pillar bending values can be achieved by fixing the guide pillars in the guide plate, i.e. in the centre of the pillar.

Since the distance (L/2) between the point of application of the force and the fixing surface is thus halved, the load-bearing capacity is increased by eight times.

At stroke rates > 500 strokes/min., increased mass acceleration values arise due to the larger plate weight of the stamp guide plate (incl. weight of the guide pillars). To counteract this negative effect, these guide pillars are designed as hollow pillars.

