



## Guide Elements



## Guide Elements

The great importance of exact alignment between punches and matrices in stamping dies has been recognized widely. The accuracy and maintenance of this alignment depends entirely on the quality and wear resistance of the guide elements.

As a consequence of recent rapid developments in stamping techniques it has also been accepted that conventional bush-pillar sets of casehardened steel can no longer stand up to the demands of the modern press shop with its more sophisticated dies, ever faster presses and the stresses in today's carbide tools.

The introduction of FIBRO Guide Elements made available an extensive range, principally based on superlative quality, and comprising some new, highly advanced bearing materials as well as novel assembly techniques of superior accuracy.

Recent additions have further broadened this range, especially in regard of demountable guiding components.

All FIBRO Guide Bushes for permanent fixing are laid out for epoxy-bonding. This highly reliable method ensures unparalleled accuracy together with the elimination of shrink allowances and rectification honing.

Ball Bearing Guides principally excel in undemanding maintenance and through the complete absence of bearing play. Their easy movement on the bench makes them very popular with die makers. Highest stroking speeds present no problems. But common to all ball bearings there remains the characteristic weakness to shock loads, the danger of ball impingement. To some extent this can be compensated for by oversized pillar diameters and the use of four-pillar die sets.

The group of Sliding-Type Guides affords much greater stability, partly due to the damping effect of the all-important, vital oil film . . . which in the past used to be threatened always by the vagaries of lubrication service and the propensity to rupture at high frequencies of travel reversal.

Extensive protection against these perils is offered by FIBRO Sintered Ferrite Bushes. Used in most of our sliding guide systems, their advanced technology comprises:

- porous structure, vacuum-filled with oil
- carbonitrided surface of extreme hardness
- outstanding friction properties
- exceptional wear-resistance
- thousands of oil-retaining porosity pockets.

In combination with our mirror-finished pillars, ferrite guide bushes represent a guiding system of altogether superior properties. A system that virtually precludes seizing under all but the most extreme running conditions.













Beyond such limitations there exist combinations of high velocities with very short strokes where even ferrite bushes cannot guarantee permanence of the oil film.

Here, the rigidity of the sliding guide has to be weighed up against the safety of ball bearings: die set guides are not entirely without problems yet! But at FIBRO we find ourselves very busy indeed with the remainder.




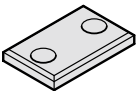



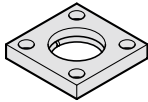








Technical progress may incur modifications without notice.

FIBRO GUIDE ELEMENTS – DESIGNED AND PRODUCED BY PEOPLE IN PURSUIT OF PERFECTION.

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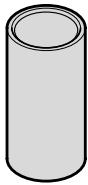
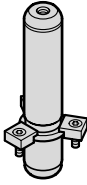
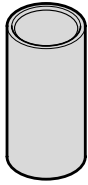
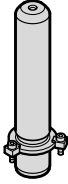

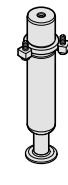


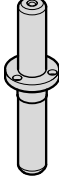
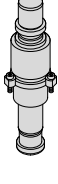

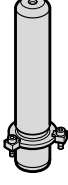
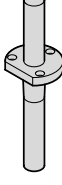


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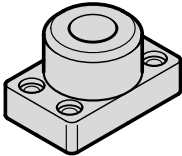
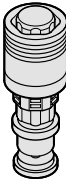
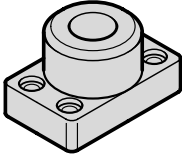
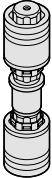
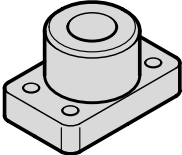
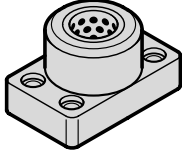
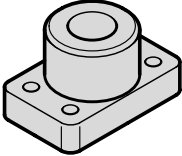
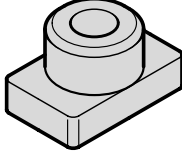
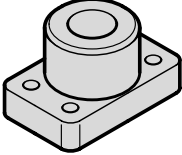
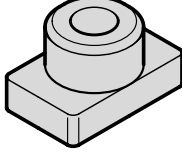
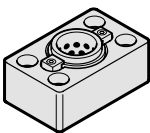
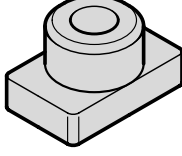
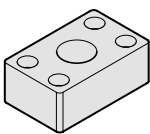
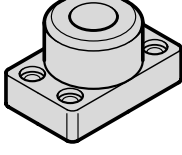
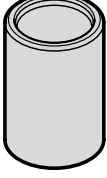
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	Retaining disc with countersunk head cap screw, DIN 9825/ISO 9182-4				Locating plate for guide pillar, to VW	
	<b>202.53.</b>	<b>D44</b>			<b>2022.25.</b>	<b>D52</b>
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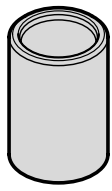
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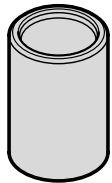
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2051.92.

D97

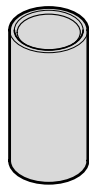
Guide bush "ECO-LINE",  
bronzeplated, ISO 9448-2



2051.72.

D98

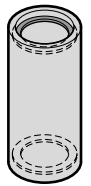
Guide bush "ECO-LINE", Bronze with  
solid lubrication rings, ISO 9448-2



206.49.

D100

Guide bush for ball bearing, AFNOR



2061.47.

D101

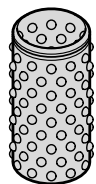
Guide bush for ball bearing, with  
stroke limitation



206.71.

D102

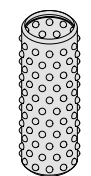
Ball cage with circlip groove, Brass



2060.61.

D103

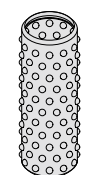
Ball cage with circlip groove,  
Aluminium



206.73.

D104

Ball cage with assembly aid, Brass



2060.63.

D105

Ball cage with assembly aid,  
Aluminium



206.75.

D106

Ball cage with circlip and fastening  
ring groove, Brass



2060.65.

D107

Ball cage with circlip and fastening  
ring groove, Aluminium



2081.67.

D108

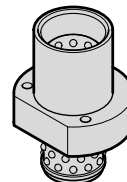
Headed guide bush with ball cage  
retainer



2081.68.

D109

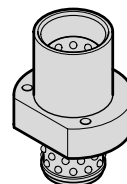
Headed guide bush with ball cage  
retainer



2091.67.

D110

Flanged guide bush with ball cage  
retainer



2091.68.

D111

Flanged guide bush with ball cage  
retainer



2061.82.

D112

Roller cage with circlip groove, Brass


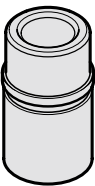


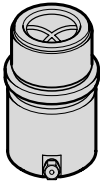



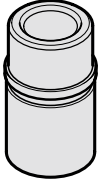
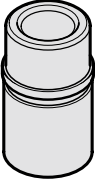
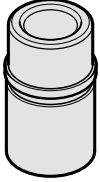
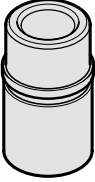
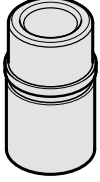


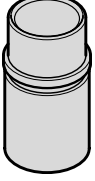


206.72.

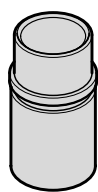
D113

Circlip DIN 471

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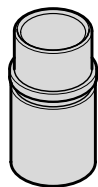
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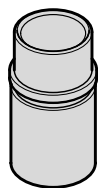
2081.45. D130

Headed guide bush for ball bearing,  
ISO 9448-7



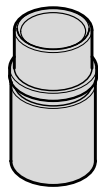
2081.46. D131

Headed guide bush for ball bearing,  
ISO 9448-7



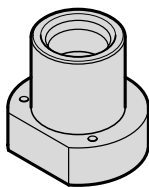
2081.47. D132

Headed guide bush for ball bearing,  
ISO 9448-7



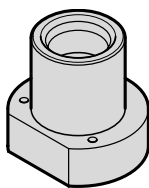
2081.49. D133

Headed guide bush for ball bearing,  
ISO 9448-7



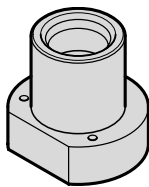
2091.31. D134

Flanged guide bush, sintered ferrite  
carbonitrided with long-term  
lubrication, ISO 9448-4



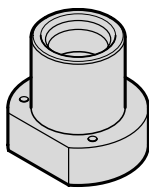
2091.32. D135

Flanged guide bush, sintered ferrite  
carbonitrided with long-term  
lubrication, ISO 9448-4



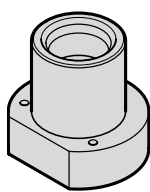
2091.34. D136

Flanged guide bush, sintered ferrite  
carbonitrided with long-term  
lubrication, ISO 9448-4



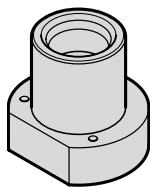
2091.91. D137

Flanged guide bush "ECO-LINE",  
bronzeplated, ISO 9448-4



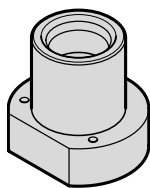
2091.92. D138

Flanged guide bush "ECO-LINE",  
bronzeplated, ISO 9448-4



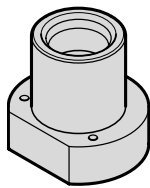
2091.94. D139

Flanged guide bush "ECO-LINE",  
bronzeplated, ISO 9448-4



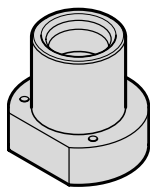
2091.71. D140

Flanged guide bush "ECO-LINE",  
Bronze with solid lubricant rings,  
ISO 9448-4



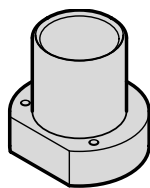
2091.72. D141

Flanged guide bush "ECO-LINE",  
Bronze with solid lubricant rings,  
ISO 9448-4



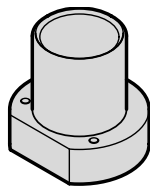
2091.74. D142

Flanged guide bush "ECO-LINE",  
Bronze with solid lubricant rings,  
ISO 9448-4



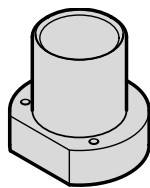
2091.44. D143

Flanged guide bush for ball bearing,  
ISO 9448-5



2091.45. D144

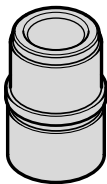
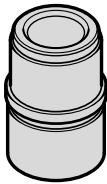
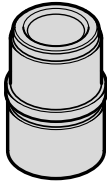
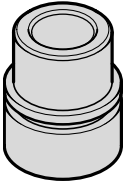
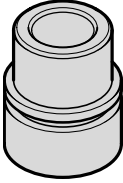
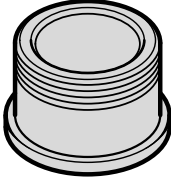
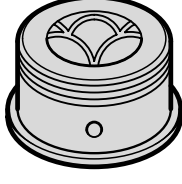

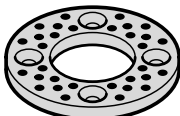






Flanged guide bush for ball bearing,  
ISO 9448-5



2091.46. D145

Flanged guide bush for ball bearing,  
ISO 9448-5

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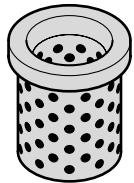
	<b>210.31.</b>	<b>D146</b>			
	Headed guide bush, sintered ferrite carbonitrided with long-term lubrication, ~AFNOR				
	<b>210.34.</b>	<b>D147</b>			
	Headed guide bush, sintered ferrite carbonitrided with long-term lubrication, ~AFNOR				
	<b>210.35.</b>	<b>D148</b>			
	Headed guide bush, sintered ferrite carbonitrided with long-term lubrication, ~AFNOR				
	<b>210.44.</b>	<b>D150</b>			
	Headed guide bush for ball bearing, ~AFNOR				
	<b>210.46.</b>	<b>D152</b>			
	Headed guide bush for ball bearing, ~AFNOR				
	<b>210.45.</b>	<b>D154</b>			
	Guide bush with collar, for ball bearing, ~AFNOR				
	<b>210.85.</b>	<b>D155</b>			
	Guide bush with collar, bronze coated, ~AFNOR				
	<b>207.48.</b>	<b>D156</b>			
	Slotted nut				
				<b>Oilless guide elements</b>	<b>D157-158</b>
				<b>2053.70.</b>	<b>D159</b>
				Thrust washer, Bronze with solid lubricant	
				<b>2052.70.</b>	<b>D160-161</b>
				Guide bush, Bronze with solid lubricant	
				<b>2085.70.</b>	<b>D162</b>
				Guide bush with collar, Bronze with solid lubricant	
				<b>2085.71.</b>	<b>D163</b>
				Guide bush with collar, Bronze with solid lubricant	
				<b>2086.70.</b>	<b>D164</b>
				Guide bush with collar, Bronze with solid lubricant	
				<b>2085.72.</b>	<b>D165</b>
				Guide bush with collar, Bronze with solid lubricant	
				<b>2082.70.</b>	<b>D166</b>
				Guide bush with collar, Bronze with solid lubricant, DIN 9834/ISO 9448	

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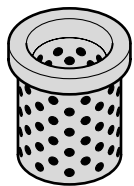
**2082.71.** **D167**

Guide bush with collar, Bronze with solid lubricant, NAAMS



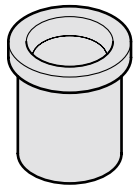
**2086.71.** **D168**

Guide bush with collar, Bronze with solid lubricant, NAAMS



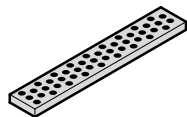
**2102.70.** **D169**

Guide bush with collar, Bronze with solid lubricant, CNOMO



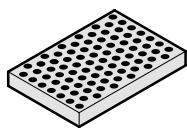
**2102.71.** **D170**

Guide bush with collar, Bronze, CNOMO



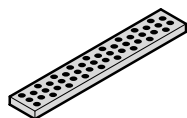
**2961.71.** **D171**

Flat guide bar, Bronze with solid lubricant



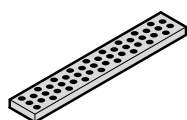
**2961.76.** **D172**

Flat guide bar, Bronze with solid lubricant



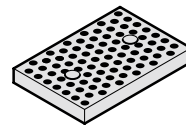
**2961.77.** **D173**

Flat guide bar, Bronze with solid lubricant



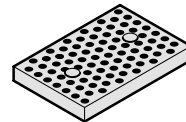
**2961.73.** **D174**

Flat guide bar with two sliding surfaces, Bronze with solid lubricant



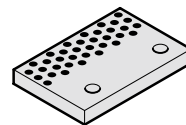
**2961.70.** **D175**

Flat guide bar, Bronze with solid lubricant



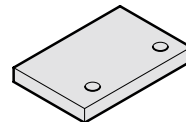
**2961.75.** **D176**

Flat guide bar, Bronze with solid lubricant



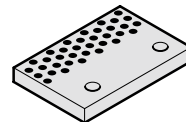
**2961.74.** **D177**

Retaining plate, Bronze with solid lubricant, VDI 3357



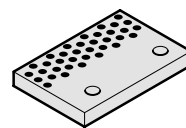
**2961.79.** **D178**

Retaining plate, Steel, VDI 3357



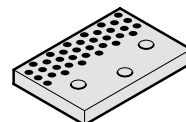
**2961.81.** **D179**

Retaining plate, Steel with solid lubricant, VDI 3357



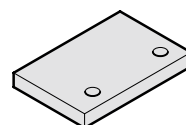
**2961.78.** **D180**

Retaining plate, Bronze with solid lubricant



**2961.82.** **D181**

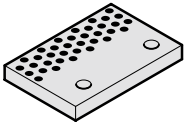
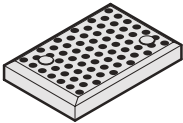
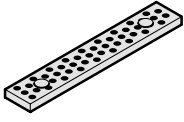
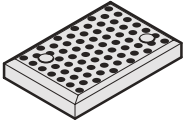
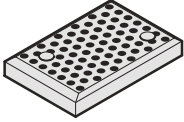
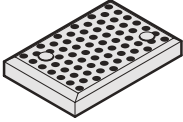
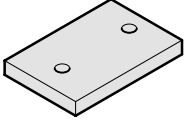
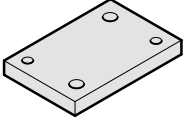
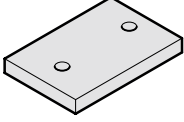
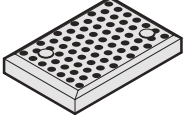
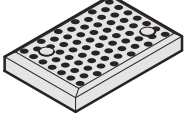
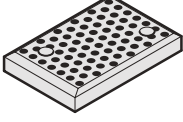
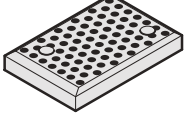
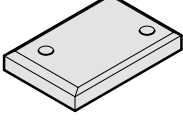
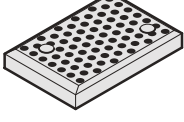
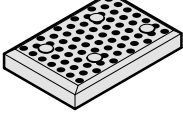
Retaining plate, Steel with solid lubricant, NAAMS



**2961.79.45.** **D182**

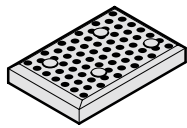
Retaining plate, Steel, CNOMO

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	<b>2961.81.45.</b>	<b>D183</b>		<b>2960.76.</b>	<b>D196</b>
	Retaining plate, Bronze with solid lubricant, CNOMO			Sliding pad, Bronze with solid lubricant	
	<b>2960.72.</b>	<b>D184</b>		<b>2962.78.45.</b>	<b>D197</b>
	Sliding pad, small dimension, Bronze with solid lubricant			Sliding pad, Bronze with solid lubricant, CNOMO	
	<b>2960.71.</b>	<b>D186</b>		<b>2962.78.</b>	<b>D198</b>
	Sliding pad, Bronze with solid lubricant, VDI 3357			Sliding pad, Bronze with solid lubricant	
	<b>2960.87.</b>	<b>D188</b>		<b>2962.84.45.</b>	<b>D200</b>
	Sliding pad, Steel, VDI 3357			Sliding pad, Steel, CNOMO	
	<b>2960.30.</b>	<b>D190</b>		<b>2962.85.</b>	<b>D201</b>
	Sliding pad, Steel with sinterlayer, VDI 3357			Sliding Pad, Steel with solid lubricant	
	<b>2960.70.</b>	<b>D192</b>		<b>2960.79.</b>	<b>D202</b>
	Sliding pad, Bronze with solid lubricant, ISO 9183-1			Sliding pad, Bronze with solid lubricant, NAAMS	
	<b>2960.85.</b>	<b>D194</b>		<b>2960.80.</b>	<b>D203</b>
	Sliding pad, Bronze with solid lubricant			Sliding pad, Steel, NAAMS	
	<b>2960.86.</b>	<b>D195</b>		<b>2960.74.</b>	<b>D204</b>
	Sliding pad, Bronze with solid lubricant			Sliding pad, Bronze with solid lubricant, AFNOR/ISO 9183-2	

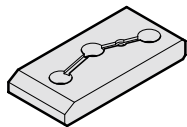


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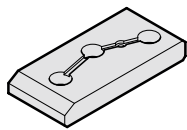
**2960.75.** D206

Sliding pad, Special cast iron (GG25) with solid lubricant, AFNOR/ISO 9183-2



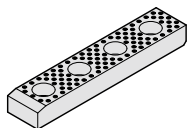
**2960.44.45.** D208

Sliding pad, Steel with oil groove, CNOMO



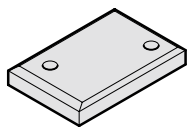
**2960.54.45.** D210

Sliding pad, Bronze with oil groove, CNOMO



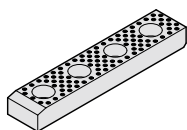
**2960.81.** D211

Sliding pad, Bronze with solid lubricant, VDI 3357



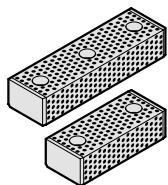
**2960.88.** D212

Sliding pad, Steel, VDI 3357



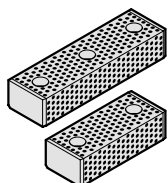
**2960.93.** D214

Sliding Pad, Bronze with solid lubricant, VDI 3357



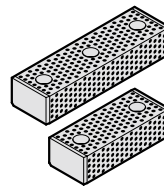
**2962.75.** D215

Guide bar with two sliding surfaces, Bronze with solid lubricant, VDI 3357



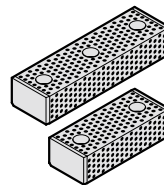
**2962.75.45.** D216

Guide bar with two sliding surfaces, Bronze with solid lubricant, CNOMO



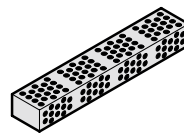
**2962.76.** D217

Guide bar with three sliding surfaces, Bronze with solid lubricant



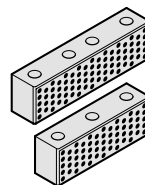
**2962.77.** D218

Guide bar with two sliding surfaces, Bronze with solid lubricant



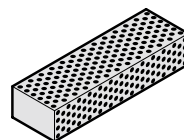
**2962.74.** D219

Guide bar with four sliding surfaces, Bronze with solid lubricant



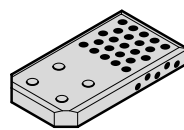
**2962.79.** D220

Guide bar with one sliding surfaces, Bronze with solid lubricant



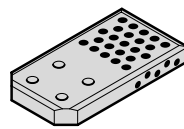
**2962.80.** D221

Guide bar with three sliding surfaces, Bronze with solid lubricant



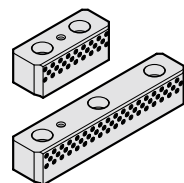
**2960.73.** D222

Guide bracket, Steel with solid lubricant, VDI 3387



**2960.89.** D223

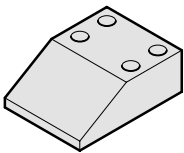
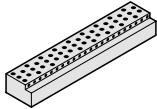
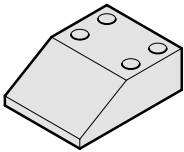
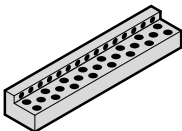
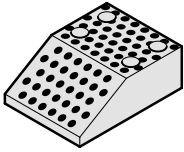
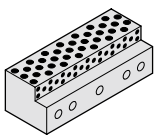
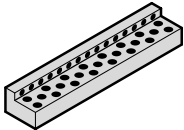
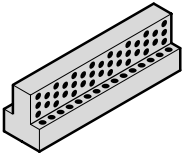
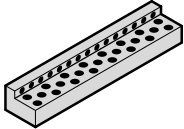
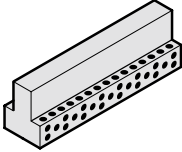
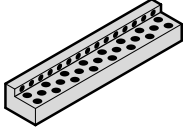
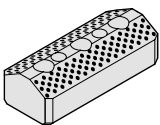
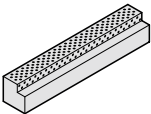
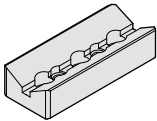
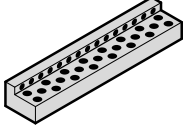
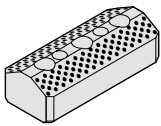
Guide bracket, Bronze with solid lubricant, VDI 3387



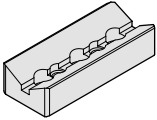
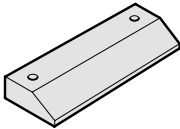
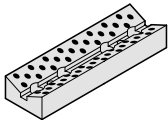
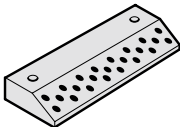
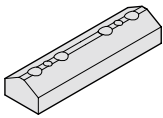
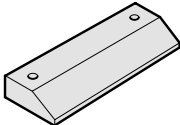
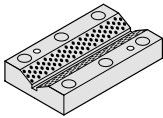
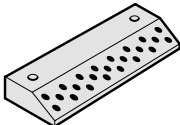
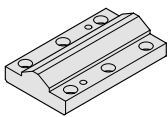
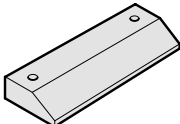
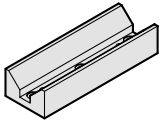
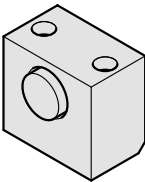
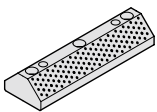
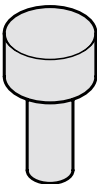
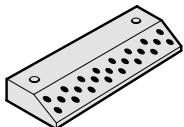
**2966.72.** D224

Slide centre guide, Bronze with solid lubricant

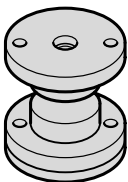

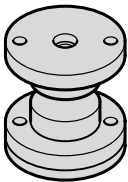

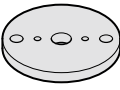
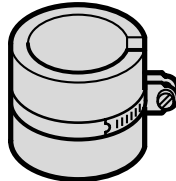
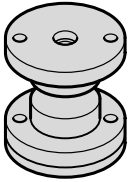
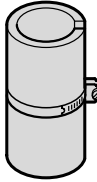
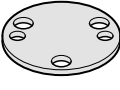
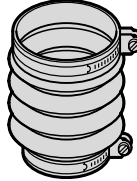
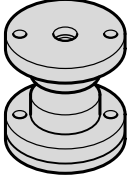

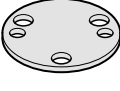
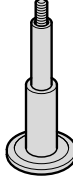
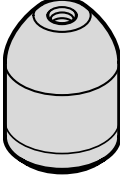

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	<b>2960.90.</b>	<b>D225</b>		<b>2962.81.</b>	<b>D233</b>
	Overrun Cam, Steel hardened, VDI 3357			Angled guide gib, Bronze with solid lubricant	
	<b>2960.91.</b>	<b>D226</b>		<b>2962.82.</b>	<b>D234</b>
	Overrun Cam, Steel hardened and gas nitrided, VDI 3357			Angled guide gib, Bronze with solid lubricant	
	<b>2960.92.</b>	<b>D227</b>		<b>2962.83.</b>	<b>D235</b>
	Overrun Cam, Bronze with solid lubricant, VDI 3357			Angled guide gib, Bronze with solid lubricant	
	<b>2962.70.</b>	<b>D228</b>		<b>2964.77.</b>	<b>D236</b>
	Angled guide gib, Bronze with solid lubricant			T-Guide bar, Bronze with solid lubricant	
	<b>2962.70.45.</b>	<b>D229</b>		<b>2964.78.</b>	<b>D236</b>
	Angled guide gib, Bronze with solid lubricant, CNOMO			T-Guide bar, Bronze with solid lubricant	
	<b>2962.71.</b>	<b>D230</b>		<b>2963.82.</b>	<b>D237</b>
	Angled guide gib, Bronze with solid lubricant			Sliding block, Bronze with solid lubricant, NAAMS	
	<b>2962.72.</b>	<b>D231</b>		<b>2963.83.</b>	<b>D237</b>
	Angled guide gib, Bronze with solid lubricant			Prismatic guide, Steel, NAAMS	
	<b>2962.73.</b>	<b>D232</b>		<b>2963.84.</b>	<b>D238</b>
	Angled guide gib, Bronze with solid lubricant			Sliding block, Bronze with solid lubricant, VDI 3357	

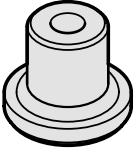
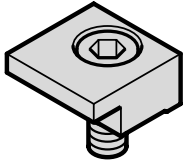
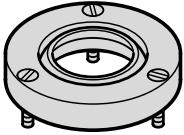
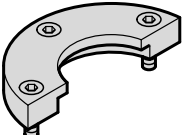
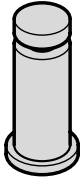
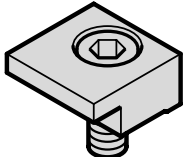
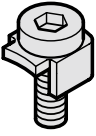
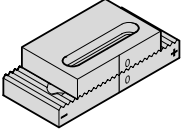
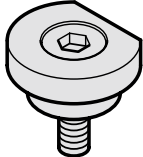
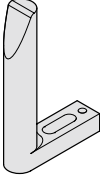
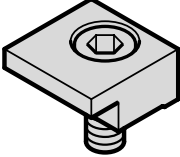
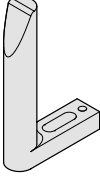
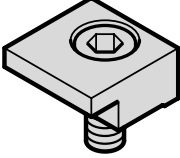
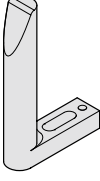
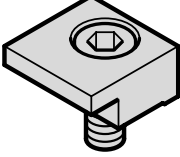
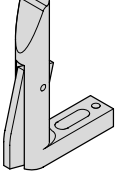
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	<b>2963.85.</b> Prismatic guide, Steel, VDI 3357	<b>D238</b>		<b>2965.83.</b> Single-sided prismatic sliding block, Steel	<b>D245</b>
	<b>2963.70.</b> Prismatic guide, Bronze with solid lubricant	<b>D239</b>		<b>2965.80.45.</b> Single-sided prismatic guide, Bronze with solid lubricant, CNOMO	<b>D246</b>
	<b>2963.71.</b> Sliding block, Steel	<b>D239</b>		<b>2965.82.45.</b> Single-sided prismatic sliding block, Steel, CNOMO	<b>D247</b>
	<b>2963.72.</b> Prismatic guide, Bronze with solid lubricant	<b>D240</b>		<b>2965.80.</b> Single-sided prismatic guide, Bronze with solid lubricant	<b>D248</b>
	<b>2963.73.</b> Sliding block, Steel	<b>D240</b>		<b>2965.82.</b> Single-sided prismatic sliding block, Steel	<b>D249</b>
	<b>2963.81.</b> Prismatic guide, Steel	<b>D242</b>		<b>2451.6.</b> Slide stop	<b>D250</b>
	<b>2963.80.</b> Sliding block, Bronze with solid lubricant	<b>D243</b>		<b>2451.6. .2</b> Stop buffer	<b>D251</b>
	<b>2965.81.</b> Single-sided prismatic guide, Bronze with solid lubricant	<b>D244</b>		<b>Oilless guide elements - Mounting examples</b>	<b>D252-255</b>

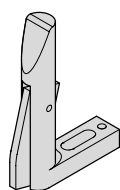
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	2441.11.0. Centering unit with adjusting washer	D256		2445.11. Centring pin to Mercedes-Benz standard	D264
	2441.11. Centering unit	D257		206.91. Concertina shroud with spacer bush	D265
	2441.11.3. Adjusting washer	D258		206.93. Spacer bush	D266
	2441.13.45. Centring unit, CNOMO	D259		206.94. Spacer tube	D266
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	2441.13.3. Adjusting washer, CNOMO	D262		202.91. Cage retainers	D269
	2445.10. Centring pin	D263		202.92.1. Cage retainers	D270

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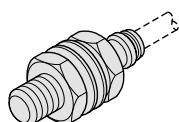
	202.93. Cage retainers	D271		2072.47 Screw clamp with screw, NAAMS	D275
	206.95./2061.95. Pillar wiper	D272		2073.45. Securing flange with screws, CNOMO	D276
	244.00.2. Lifter pin for press tool strips	D273		2072.48.45. Screw clamp with screw, CNOMO	D276
	207.45 Screw clamp with screw	D274		2444.12/2444.13 Spacer plate toothed, with adjusting plate	D278
	2071.45 Screw clamp with screw	D274		2443.10. Guide	D279
	2072.45. Screw clamp with screw	D274		2443.10.20. Guide to Mercedes-Benz Standard - unhardened	D280
	2072.46 Screw clamp with screw	D275		2443.10.20. .1 Guide to Mercedes-Benz Standard - hardened	D281
	2072.46.30. Screw clamp with screw, GM Standard	D275		2443.12. Guide with part position control and spring	D282

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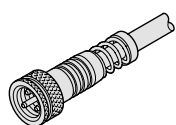
**2443.13. D283**

Guide with part position control, VDI



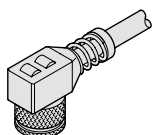
**2018.00.60.08.030 D284**

Inductive proximity switch



**2018.00.60.23.01.5 D285**

Cable - straight



**2018.00.60.23.02.5 D285**

Cable , 90° connector

**D286**

Ball bearing guides - Loading  
Diagram

**D287**

Ball bearing guides - Tables of  
dynamic load indexes

**D288-  
294**

Guide elements - Mounting  
guidelines, Dimension tables



# Notes on Guide Elements

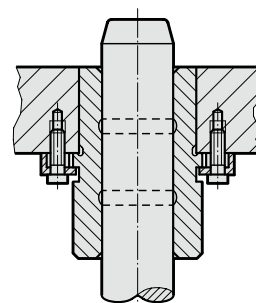
## FIBRO Precision Sliding Guides – Carbonitrided Sintered Ferrite Bushes

These guides employ bushes made from sintered ferrite of high purity with carbonitrided surface. Bearing surfaces are fine-ground.

The sintered ferrite has a porosity content of 18-20 % by volume, vacuum filled with special lubricant FIBROLIT LD. As additional long term lubrication it is recommended to fill up the groove in the bushing with FIBROLIT LD 280.34, see chapter H. Even under arduous running conditions, this material can be relied upon for good protection against oil film rupture.

Under no circumstances must molybdenum disulfide be added to the lubricant.

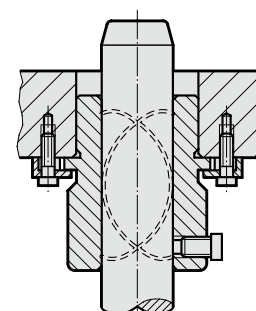
For bearing clearance ranges, see chapter D.



## FIBRO Precision Sliding Guides, bronze-coated

consists of a steel body with bronze-coated running surface with helical oil groove and a grease nipple for lubrication.

The steel body guarantees excellent resistance to breaking, even when subject to high loading at the edges.



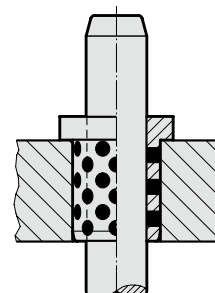
## FIBRO Sliding Bearings with Non-Liquid Lubricant

The pockets containing the non-liquid lubricant occupy some 25 to 30 per cent of the bearing surface consisting of a bronze matrix.

After an initial oil lubrication on assembly, these elements are maintenance-free.

Wherever there is a demand for non-susceptibility against impact, contamination and heat, FIBRO Maintenance-Free Bearings find their ideal application.

We recommend to apply the tolerance classes H7/f6 to bush/pillar combinations using these elements.



## FIBRO High Precision Ball Bearing Guides

Careful manufacture at narrowest tolerances, and exactly the right amount of preloading\* result in a play-free guide element of exceptional performance potential.

Our superfinished running surfaces further enhance the advantages of ball bearing guides.

Toolmakers favour ball bearing guides because of their free movement on the bench.

FIBRO ball bearing guides can be equipped with a choice of brass or aluminium ball cages, which have proved to be very successful in practice due to their ball density and stability

Ball bearing guides with their point contact of the balls remain somewhat sensitive to shock and sustained radial loads. To some extent, generous dimensioning of pillar diameters helps to compensate for this inherent disadvantage.

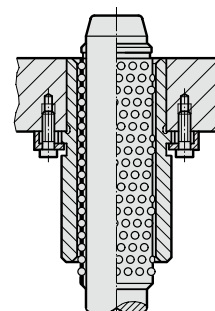
\* Average preloading:

4 µm on pillars from 8 to 12 mm diameter

7– 9 µm on pillars from 15 to 16 mm diameter

9–11 µm on pillars from 18 to 42 mm diameter

11–13 µm on pillars from 50 to 80 mm diameter



## FIBRO Precision Roller Guides

The profile roller cages are in linear contact with the guide bushing and guide pillar. This feature offers much greater capacity for radial loads in the individual roller than an identical size of ball bearing.

The caulking of the roller bearing arrangement is implemented with the same FIBRO-specific solution as that used in ball cages.

The profile rollers are arranged in a spiral formation in an axial direction. This gives each profile roller its own path. The roller cages are designed with a recess for a circlip conforming to DIN 471.

The much larger contact area with the ball bearing guide permits a significant reduction in preload values.

The following preload values apply to FIBRO Roller Guides:

For static loads/low velocities,  
pillar diameters

up to Ø 25 = 2,5 µm

Ø 30/32 = 3 µm

Ø 40-50 = 3,5 µm

Ø 63 = 4 µm

For dynamic loads/High  
velocities, pillar diameters

up to Ø 25 = 1,5 µm

Ø 30/32 = 2 µm

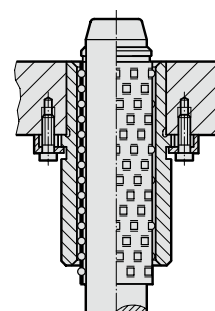
Ø 40-50 = 2,5 µm

Ø 63 = 3 µm

Use only pairing class

guide pillar red = .30

guide bush yellow = .10





## Pairing Classification

### Guide Pillars with sliding sintered Bushes

### Guide Pillars with Ball Bearing Bushes

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

Selection of punch-matrix clearance is largely determined by piece part characteristics such as percentage of sheared land versus breakaway, but also by demands on burr formation.  
Further criteria are: properties of piece part materials, conditions of the tool as well as the condition of the eccentric press.

Colour coding by painted dots	Sliding guide		Bush		Ball bearing		Bush	
	Pillar Colour	Order No	Colour	Order No	Pillar Colour	Order No	Colour	Order No
Pairing 1	yellow	.10	yellow	.10	yellow	.10	red	.30
	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
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

Selection Criteria:  
die clearance – stock thickness – material

#### Note:

Please note that tight bearing clearances are normally unsuitable for 4-pillar die sets. In general, wherever retainer bore geometry is not absolutely perfect, pairings 2 and 3 must be chosen. The pairing classification does not signify differences in quality, rather a selection of the necessary bearing clearance in the case of guide pillars or preloading in the case of ball bearings (see also chart next page).

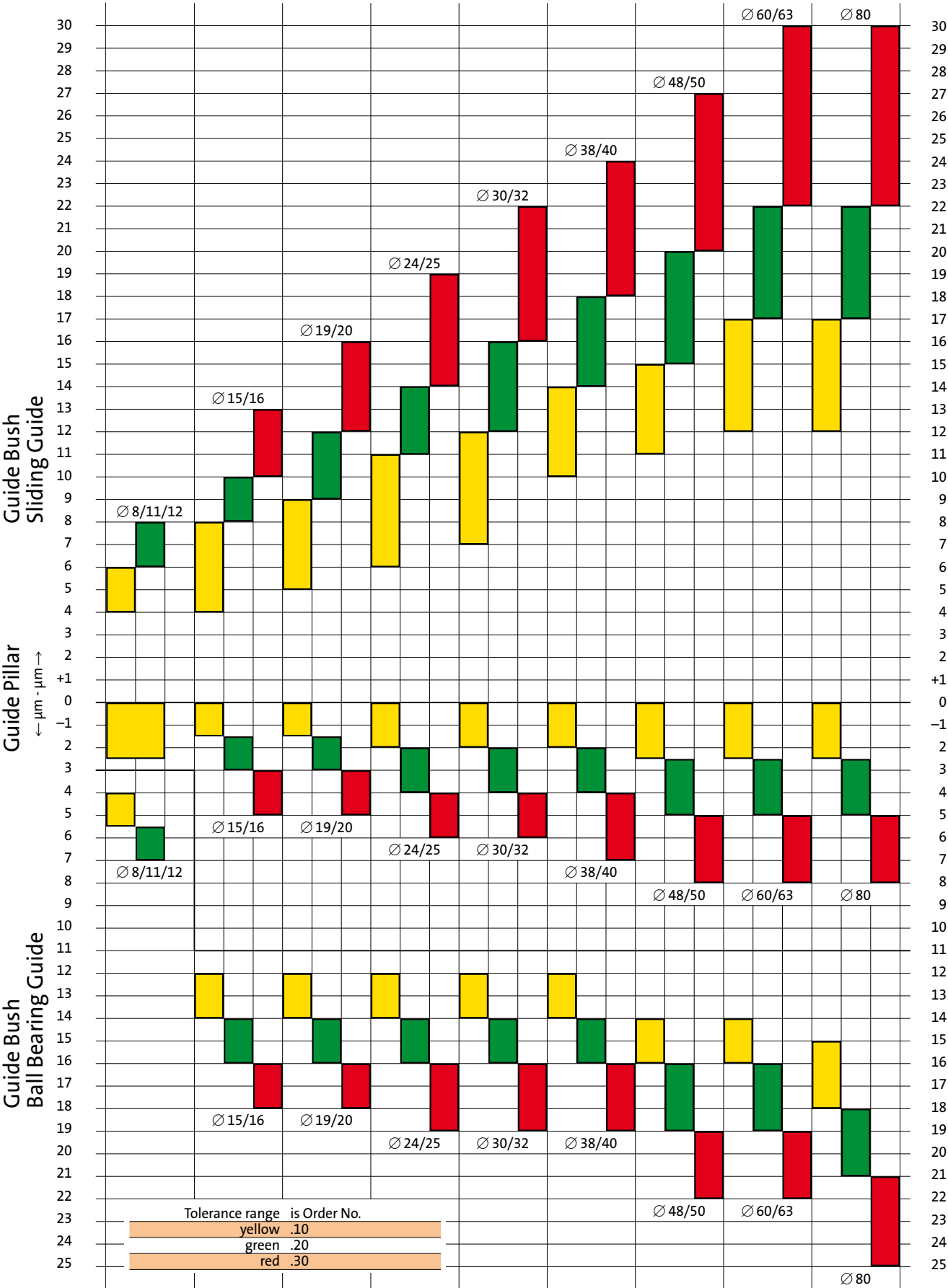
#### Ordering Code (example):

Guide Pillar, tolerance range 1, yellow = 202.19.040.260.10 or green is then .20  
Sliding guide, tolerance range 1, yellow = 2081.31.040.10

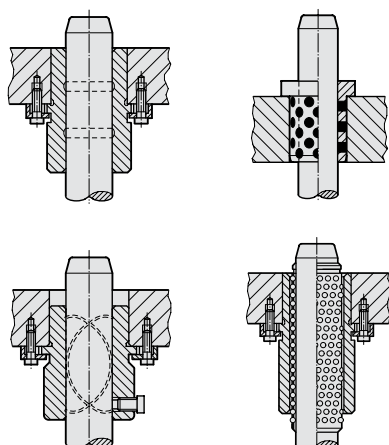
Pairing Classification

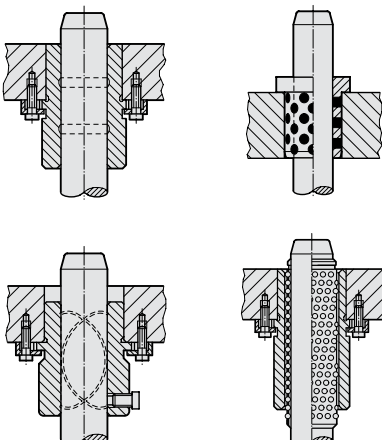
Guide Pillars with sliding sintered Bushes

Guide Pillars with Ball Bearing Bushes



## Selection matrix Guide Pillars - Guide Bushes

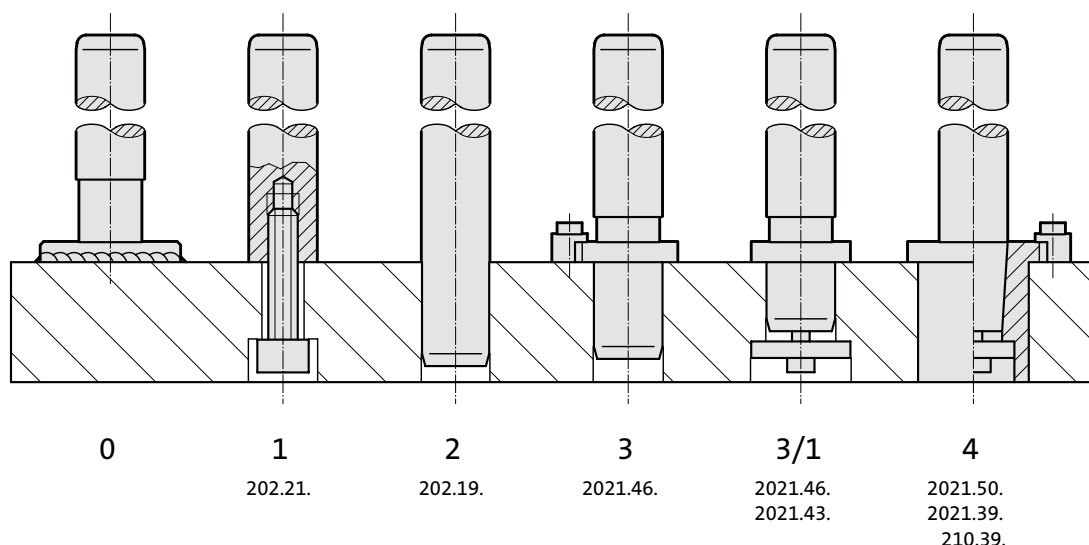


			Guide Pillars	Guide pillars to DIN 9825			Guide pillars with centre fixing	Guide pillars with centre fixing			Guide pillars to AFNOR	Guide pillars to CNOMO	Guide pillars for large tools	Guide pillars ECO-LINE
				Guide pillars, bolt-on type										
				Demountable guide pillars										
				2021.17.	2021.50.		2020.63.	2020.60.			2022.25.	2022.16.45.	2022.12.	2022.29.
				2021.19.	2021.58.		2020.64.						2022.13.	2022.31.
			2021.21.	210.39.								2022.15.		
			2021.22.	2021.44.								2022.16.		
			2021.23.	2021.46.								2022.17.		
			2021.24.	2021.55.								2022.19.		

- = suitable
- <sup>1</sup> = suitable (see pairing classification at the beginning of chapter D)
- = conditionally 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

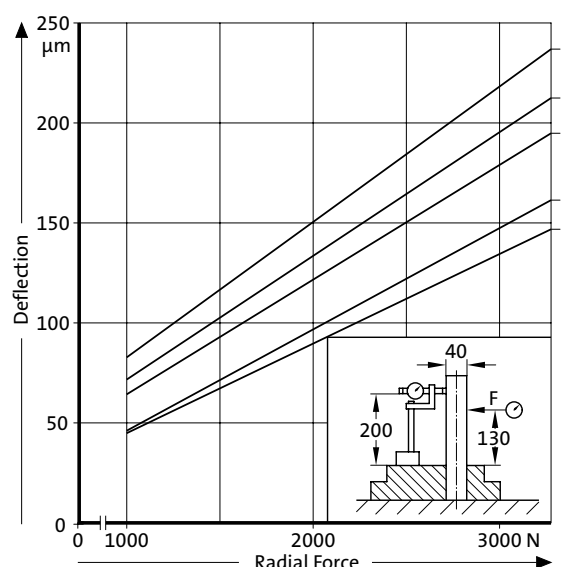


## Deflection of Pillars

The practical applicatoin of these pillars demands a certain amount of re-thinking in regard of tool design. Deflection under radially imposed load is shown in the diagram of the right.

## Mounting Instructions:

Coat head and threads of screws with molydenum disulfite.  
Tighten and undo screw twice before final tightening with torque wrench.



## Bending equation

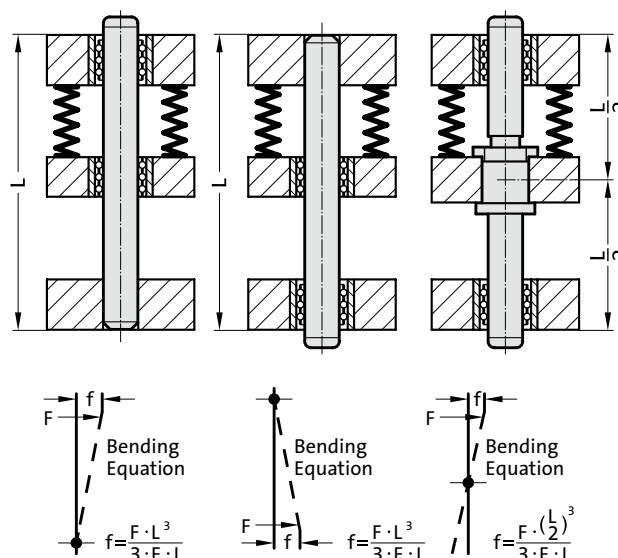
The transverse load resistance to tool guides is greatly influenced by the position of the guide pillar fixing.

For a tool with a spring-mounted die guide plate and pillar fixing at the top or bottom of the tool, the defelction 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 center 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.

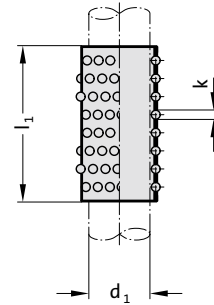
In order to keep moving mass to a minimum and thereby minimize detrimental forces of inertia, FIBRO Stripper-Mounted Pillars are made with a hollow core. Rigidity of the die set - of paramount importance - remains unaffected by the hollow design.



## Ball cage, small dimension Guide bush for ball bearing, small dimension



206.51.



### Material:

Cage: Brass  
Balls: Steel hardened (DIN 5401)

### 206.51. Ball cage, small dimension

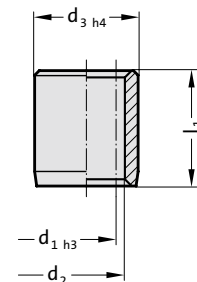
$d_1$	3	4	5	6	8
k	1	1	1	1	1
$l_1$	Total numbers of balls				
10	21	21	29	36	
15	35	35	49	61	61
20	49	49	69	69	69
25		64	89	89	89
30			109	109	109
40					149

### Ordering Code (example):

Ball cage, small dimension	=206.51.
Guide diameter $d_1$	5 mm = 005.
Length $l_1$	30 mm = 030
Order No	=206.51. 005. 030



206.54.



### Material:

Roller bearing steel 100 Cr 6  
Hardness: hardened to 60 + 4 HRC  
Remarks: available in stainless steel on request

### Execution:

Guide bush bores  $d_2$  fine-honed to IT3

### Note:

Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.

### Ordering Code (example):

Guide bush for ball bearing, small dimension	=206.54.
Guide diameter $d_1$	5 mm = 005.
Length $l_1$	10 mm = 010
Order No	=206.54. 005. 010

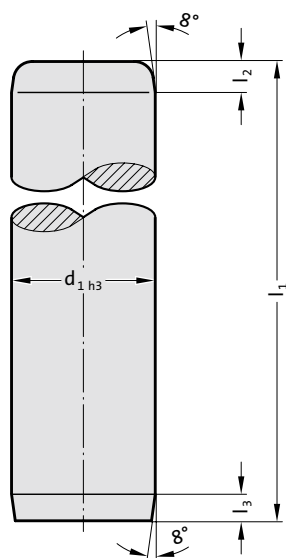
### 206.54. Guide bush for ball bearing, small dimension

$d_1$	3	4	5	6	8
$d_2$	5	6	7	8	10
$d_3$	7	8	10	11	14
$l_1$					
10	●	●	●		
15	●	●	●	●	●
20	●	●	●	●	●
25		●	●	●	●
30			●	●	●
35				●	●
40					●

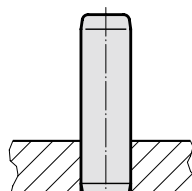
# Guide pillar DIN 9825/ISO 9182-2



202.19.



Mounting example



## Material:

Steel, (Core strength:  $\geq 900 \text{ N/mm}^2$ ) surface hardened  
Surface hardness:  $60 + 3 \text{ HRC}$ , Hardness penetration  $\geq 1,8 \text{ mm}$  (up to  $\varnothing 12$ , throughhardened)

## Execution:

fine-ground and superfinished  
Method of manufacturing entails that centre holes are not concentric with O.D.

## Note:

$\varnothing 3$  to  $\varnothing 8$  are not supplied classified.

$\varnothing 10$  to  $\varnothing 12$  only available in tolerance range yellow = .10

Bearing clearance / Preloading see pairing classification at the beginning of chapter D.

Matching guide combinations, see selection matrix at the beginning of chapter D.

Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.

Tolerance range:

yellow = .10

green = .20

red = .30

## 202.19. Guide pillar DIN 9825/ISO 9182-2

$d_1$	3	4 5	6	8	10	11 12	15 16	19 20	24 25	30 32	38 40	48 50	60 63	80
$l_2$	2	2	2	3	3	3	4	4	6	6	6	8	8	8
$l_3$	2	2	2	3	3	3	3	3	3	3	3	3	3	3
$l_1$														
30	•													
40	•	•	•											
50	•	•	•	•										
60	•	•	•	•	•									
80	•	•	•	•		•								
90					•	•	•							
100		•	•	•	•	•	•	•	•					
112					•	•	•	•	•	•				
125			•	•	•	•	•	•	•	•				
140			•	•	•	•	•	•	•	•	•			
160			•	•		•	•	•	•	•	•	•		
180							•	•	•	•	•	•	•	
200							•	•	•	•	•	•	•	
224							•	•	•	•	•	•	•	
250							•	•	•	•	•	•	•	•
280							•	•	•	•	•	•	•	•
315							•	•	•	•	•	•	•	•
355							•	•	•	•	•	•	•	•
400								•	•	•	•	•	•	•
450									•	•	•	•	•	•
500									•	•	•	•	•	•
550										•	•	•	•	•
600											•	•	•	•
700												•	•	•
800													•	•

## Ordering Code (example):

Guide pillar DIN 9825/ISO 9182-2 =202.19.

Guide diameter  $d_1$  25 mm = 025.

Length  $l_1$  224 mm = 224.

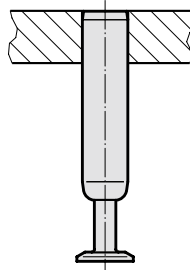
Classification TOL yellow = 10

Order No =202.19. 025.224.10

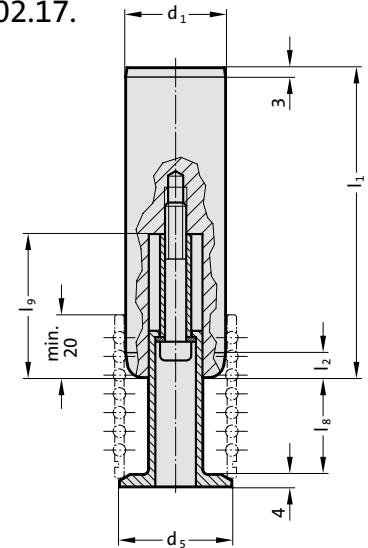
## Guide Pillar with ball cage retainer



Mounting example



202.17.



### Material:

Steel, (Core strength:  $\geq 900 \text{ N/mm}^2$ ) surface hardened  
Surface hardness:  $60 \pm 3 \text{ HRC}$ , Hardness penetration  $\geq 1,8 \text{ mm}$

### Execution:

fine-ground and superfinished

### Note:

Preloading see pairing classification at the beginning of chapter D  
Matching guide combinations, see selection matrix at the beginning of chapter D.

Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.

Dimensions of ball cage retainer see 202.91.

Tolerance range:

yellow = .10

green = .20

red = .30

## 202.17. Guide Pillar with ball cage retainer

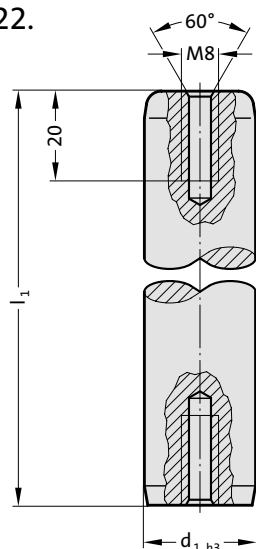
$d_1$	38	40	48	50	60	63
$d_5$	42	44	52	54	64	67
$l_2$	6	6	8	8	8	8
KG ( $l_8 / l_9$ )						
1 (31 / 46)	●	●	●	●	●	●
2 (41 / 56)	●	●	●	●	●	●
3 (51 / 66)	●	●	●	●	●	●
4 (61 / 76)	●	●	●	●	●	●
5 (73 / 89)	●	●	●	●	●	●
$l_1$						
160	●	●				
180	●	●	●	●		
200	●	●	●	●		
224	●	●	●	●		
250	●	●	●	●	●	●
280	●	●	●	●	●	●
315	●	●	●	●	●	●
355	●	●	●	●	●	●
400	●	●	●	●	●	●
450	●	●	●	●	●	●
500	●	●	●	●	●	●
550	●	●	●	●	●	●
600	●	●	●	●	●	●
700	●	●	●	●	●	●
800	●	●	●	●	●	●

### Ordering Code (example):

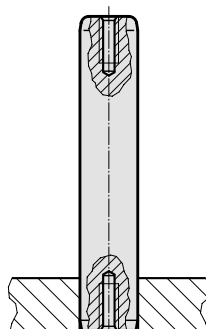
Guide Pillar with ball cage retainer	=202.17.
Guide diameter $d_1$	48 mm = 048.
Length $l_1$	550 mm = 550.
Cage retainer size KG	1 = 1.
Classification TOL	yellow = 10
Order No	=202.17. 048.550.1.10

# Guide pillar with internal thread on both sides, ~DIN 9825/~ISO 9182-2

202.22.



Mounting example



## Material:

Steel, (Core strength:  $\geq 900 \text{ N/mm}^2$ ) surface hardened  
Surface hardness:  $60 + 3 \text{ HRC}$ , Hardness penetration  $\geq 1,8 \text{ mm}$

## Execution:

fine-ground and superfinished  
Method of manufacturing entails that centre holes are not concentric with O.D.

## Note:

Bearing clearance / Preloading see pairing classification at the beginning of chapter D.

Matching guide combinations, see selection matrix at the beginning of chapter D.

Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.

Tolerance range:

yellow = .10

green = .20

red = .30



## 202.22. Guide pillar with internal thread on both sides, ~DIN 9825/~ISO 9182-2

$d_1$	15 16	19 20	24 25	30 32	38 40	48 50	60 63	80
$l_2$	4	4	6	6	6	8	8	8
$l_1$								
90	●							
100	●	●	●					
112	●	●	●					
125	●	●	●	●				
140	●	●	●	●				
160	●	●	●	●	●			
180	●	●	●	●	●	●		
200	●	●	●	●	●	●	●	
224	●	●	●	●	●	●	●	
250	●	●	●	●	●	●	●	●
280	●	●	●	●	●	●	●	●
315	●	●	●	●	●	●	●	●
355	●	●	●	●	●	●	●	●
400		●	●	●	●	●	●	●
450			●	●	●	●	●	●
500			●	●	●	●	●	●
550				●	●	●	●	●
600				●	●	●	●	●
700				●	●	●	●	●
800					●	●	●	●

## Ordering Code (example):

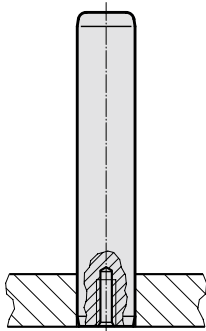
Guide pillar with internal thread on both sides, ~DIN 9825/~ISO 9182-2	=202.22.
Guide diameter $d_1$	32 mm = 032.
Length $l_1$	200 mm = 200.
Classification TOL	yellow = 10
Order No	=202.22. 032.200.10



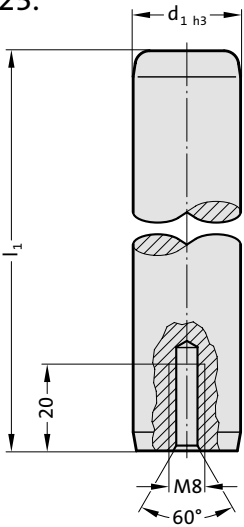
# Guide pillar with internal thread on bottom, ~DIN 9825/~ISO 9182-2



Mounting example



202.23.



**Material:**  
 Steel, (Core strength:  $\geq 900 \text{ N/mm}^2$ ) surface hardened  
 Surface hardness: 60 + 3 HRC, Hardness penetration  $\geq 1,8 \text{ mm}$   
**Execution:**  
 fine-ground and superfinished  
 Method of manufacturing entails that centre holes are not concentric with O.D.

**Note:**  
 Bearing clearance / Preloading see pairing classification at the beginning of chapter D.  
 Matching guide combinations, see selection matrix at the beginning of chapter D.  
 Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.  
 Tolerance range:  
 yellow = .10  
 green = .20  
 red = .30



## 202.23. Guide pillar with internal thread on bottom, ~DIN 9825/~ISO 9182-2

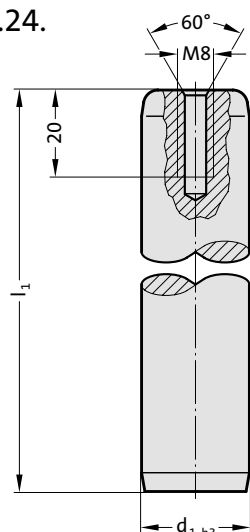
d <sub>1</sub>	15 16	19 20	24 25	30 32	38 40	48 50	60 63	80
l <sub>2</sub>	4	4	6	6	6	8	8	8
l <sub>1</sub>								
90	●							
100	●							
112	●	●	●					
125	●	●	●	●				
140	●	●	●	●				
160	●	●	●	●	●			
180	●	●	●	●	●	●		
200	●	●	●	●	●	●		
224	●	●	●	●	●	●		
250	●	●	●	●	●	●	●	
280	●	●	●	●	●	●	●	●
315	●	●	●	●	●	●	●	●
355	●	●	●	●	●	●	●	●
400		●	●	●	●	●	●	●
450			●	●	●	●	●	●
500				●	●	●	●	●
550					●	●	●	●
600					●	●	●	●
700					●	●	●	●
800					●	●	●	●

### Ordering Code (example):

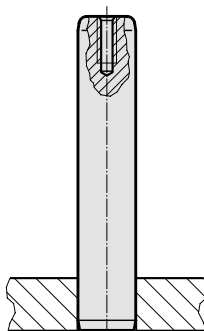
Guide pillar with internal thread on bottom, ~DIN 9825/~ISO 9182-2	=202.23.
Guide diameter d <sub>1</sub>	32 mm = 032.
Length l <sub>1</sub>	200 mm = 200.
Classification TOL	yellow = 10
Order No	=202.23. 032.200.10

# Guide pillar with internal thread on top, ~DIN 9825/~ISO 9182-2

202.24.



Mounting example



## Material:

Steel, (Core strength:  $\geq 900 \text{ N/mm}^2$ ) surface hardened  
Surface hardness: 60 + 3 HRC, Hardness penetration  $\geq 1,8 \text{ mm}$

## Execution:

fine-ground and superfinished  
Method of manufacturing entails that centre holes are not concentric with O.D.

## Note:

Bearing clearance / Preloading see pairing classification at the beginning of chapter D.

Matching guide combinations, see selection matrix at the beginning of chapter D.

Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.

Tolerance range:

yellow = .10

green = .20

red = .30



## 202.24. Guide pillar with internal thread on top, ~DIN 9825/~ISO 9182-2

$d_1$	15 16	19 20	24 25	30 32	38 40	48 50	60 63	80
$l_2$	4	4	6	6	6	8	8	8
$l_1$								
90	●							
100	●							
112	●	●	●					
125	●	●	●	●				
140	●	●	●	●				
160	●	●	●	●	●			
180	●	●	●	●	●	●		
200	●	●	●	●	●	●	●	
224	●	●	●	●	●	●	●	
250	●	●	●	●	●	●	●	●
280	●	●	●	●	●	●	●	●
315	●	●	●	●	●	●	●	●
355	●	●	●	●	●	●	●	●
400		●	●	●	●	●	●	●
450			●	●	●	●	●	●
500			●	●	●	●	●	●
550				●	●	●	●	●
600				●	●	●	●	●
700					●	●	●	●
800					●	●	●	●

## Ordering Code (example):

Guide pillar with internal thread on top, ~DIN 9825/~ISO 9182-2

=202.24.

Guide diameter  $d_1$ 

32 mm = 032.

Length  $l_1$ 

200 mm = 200.

Classification TOL

yellow = 10

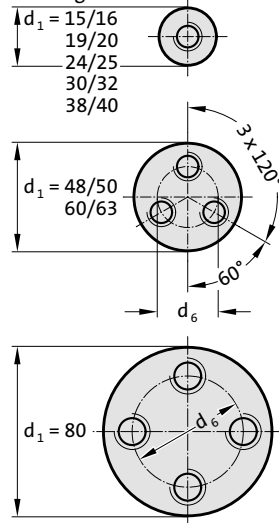
Order No

=202.24. 032.200.10

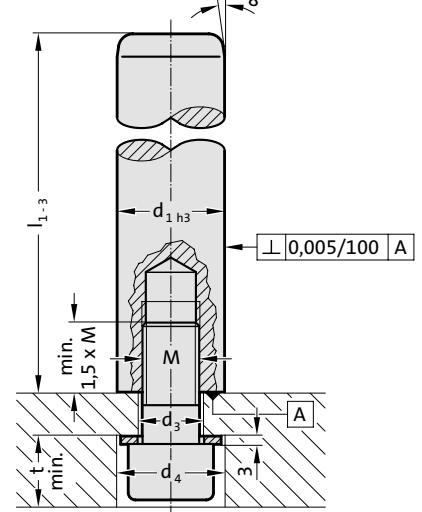
# Guide pillar endwise bolt-on type, ~DIN 9825/~ISO 9182-2



Hole pattern for column (pillar) fastening



202.21.



## Material:

Steel, (Core strength:  $\geq 900 \text{ N/mm}^2$ ) surface hardened  
Surface hardness: 60 + 3 HRC, Hardness penetration  $\geq 1,8 \text{ mm}$

## Execution:

fine precision ground  
End face square within 0.005 mm in 100 mm

## Note:

Bearing clearance / Preloading see pairing classification at the beginning of chapter D.  
Matching guide combinations, see selection matrix at the beginning of chapter D.  
Tolerance range:  
yellow = .10  
green = .20  
red = .30

## 202.21. Guide pillar endwise bolt-on type, ~DIN 9825/~ISO 9182-2

$d_1$	15 16	19 20	24 25	30 32	38 40	48 50	60 63	80
$d_3$	9	11	14	18	18	14	18	18
$d_4$	17	20	22	28	28	22	28	28
$d_6$	-	-	-	-	-	28	34	54
t	12	14	16	20.5	20.5	16	20.5	20.5
M	8	10	12	16	16	12	16	16
Cap screw	M8x35	M10x40	M12x40	M16x40	M16x40	M12x50	M16x60	M16x60
Tightening torque [Nm]	21	37	85	150	150	85	200	200
$l_1$								
90	●							
100	●							
112	●	●	●					
125	●	●	●	●				
140	●	●	●	●				
160	●	●	●	●	●			
180	●	●	●	●	●	●		
200	●	●	●	●	●	●		
224	●	●	●	●	●	●		
250	●	●	●	●	●	●	●	
280	●	●	●	●	●	●	●	●
315	●	●	●	●	●	●	●	●
355	●	●	●	●	●	●	●	●
400		●	●	●	●	●	●	●
450			●	●	●	●	●	●
500			●	●	●	●	●	●
550				●	●	●	●	●
600					●	●	●	●
700					●	●	●	●
800					●	●	●	●

## Ordering Code (example):

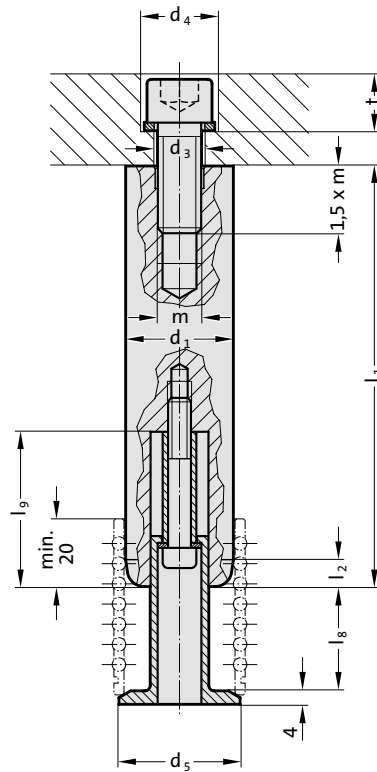
Guide pillar endwise bolt-on type, ~DIN 9825/~ISO 9182-2	=202.21.
Guide diameter $d_1$	32 mm = 032.
Length $l_1$	200 mm = 200.
Classification TOL	yellow = 10
Order No	=202.21. 032.200.10



## Guide pillar endwise bolt-on type with ball cage, ~DIN 9825/~ISO 9182-2



202.55.



### Material:

Steel, (Core strength:  $\geq 900 \text{ N/mm}^2$ ) surface hardened

Surface hardness:  $60 + 3 \text{ HRC}$ , Hardness penetration  $\geq 1,8 \text{ mm}$

### Execution:

fine precision ground

End face square within  $0.005 \text{ mm}$  in  $100 \text{ mm}$

### Note:

Preloading see pairing classification at the beginning of chapter D

Matching guide combinations, see selection matrix at the beginning of chapter D.

Dimensions of ball cage retainer see 202.91.

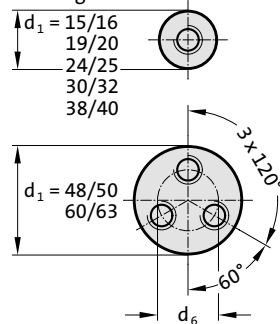
Tolerance range:

yellow =  $.10$

green =  $.20$

red =  $.30$

Hole pattern for column (pillar) fastening



## Guide pillar endwise bolt-on type with ball cage, ~DIN 9825/~ISO 9182-2

### 202.55. Guide pillar endwise bolt-on type with ball cage, ~DIN 9825/~ISO 9182-2

d <sub>1</sub>	38	40	48	50	60	63
d <sub>3</sub>	18	18	14	14	18	18
d <sub>4</sub>	28	28	22	22	28	28
d <sub>5</sub>	42	44	52	54	64	67
d <sub>6</sub>	-	-	28	28	34	34
t	20.5	20.5	16	16	20.5	20.5
m	16	16	12	12	16	16
Cap screw	M16x40	M16x40	M12x50	M12x50	M16x60	M16x60
Tightening torque [Nm]	150	150	85	85	200	200
KG (I <sub>8</sub> / I <sub>9</sub> )						
1 (31 / 46)	●	●	●	●	●	●
2 (41 / 56)	●	●	●	●	●	●
3 (51 / 66)	●	●	●	●	●	●
4 (61 / 76)	●	●	●	●	●	●
5 (73 / 89)	●	●	●	●	●	●
I <sub>1</sub>						
160	●	●				
180	●	●	●	●		
200	●	●	●	●		
224	●	●	●	●		
250	●	●	●	●	●	●
280	●	●	●	●	●	●
315	●	●	●	●	●	●
355	●	●	●	●	●	●
400	●	●	●	●	●	●
450	●	●	●	●	●	●
500	●	●	●	●	●	●
550	●	●	●	●	●	●
600	●	●	●	●	●	●
700	●	●	●	●	●	●
800	●	●	●	●	●	●



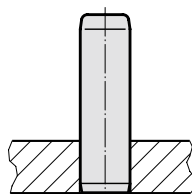
### Ordering Code (example):

Guide pillar endwise bolt-on type with ball cage, ~DIN 9825/~ISO 9182-2	=202.55.
Guide diameter d <sub>1</sub>	48 mm = 048.
Length I <sub>1</sub>	550 mm = 550.
Cage retainer size KG	1 = 1.
Classification TOL	yellow = 10
Order No	=202.55. 048.550.1. 10

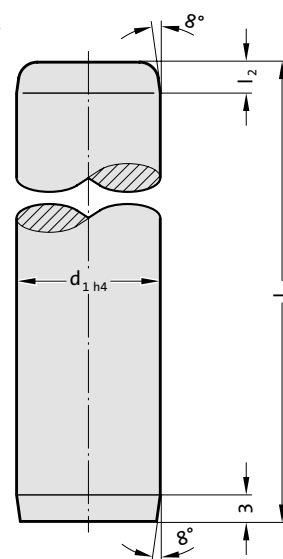
## Guide pillar "ECO-Line", ~DIN 9825/~ISO 9182-2



Mounting example



202.29.



### Material:

Steel, surface hardened

Surface hardness: 60 + 3 HRC, Hardness penetration  $\geq 1,8$  mm

### Execution:

ground

Method of manufacturing entails that centre holes are not concentric with O.D.

### Note:

Guide pillars only recommended for use with sliding guides!

Matching guide combinations, see selection matrix at the beginning of chapter D.

Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.

## 202.29. Guide pillar "ECO-Line", ~DIN 9825/~ISO 9182-2

$d_1$	15 16	19 20	24 25	30 32	38 40	48 50	60 63	80
$l_2$	4	4	6	6	6	8	8	8
$l_1$								
90	●							
100	●							
112	●	●	●					
125	●	●	●	●				
140	●	●	●	●				
160	●	●	●	●	●			
180	●	●	●	●	●	●		
200	●	●	●	●	●	●		
224	●	●	●	●	●	●		
250	●	●	●	●	●	●	●	
280	●	●	●	●	●	●	●	●
315	●	●	●	●	●	●	●	●
355	●	●	●	●	●	●	●	●
400		●	●	●	●	●	●	●
450			●	●	●	●	●	●
500				●	●	●	●	●
550					●	●	●	●
600					●	●	●	●
700					●	●	●	●
800					●	●	●	●

### Ordering Code (example):

Guide pillar "ECO-Line", ~DIN 9825/~ISO 9182-2 =202.29.  
 Guide diameter  $d_1$  32 mm = 032.  
 Length  $l_1$  125 mm = 125  
 Order No =202.29. 032.125

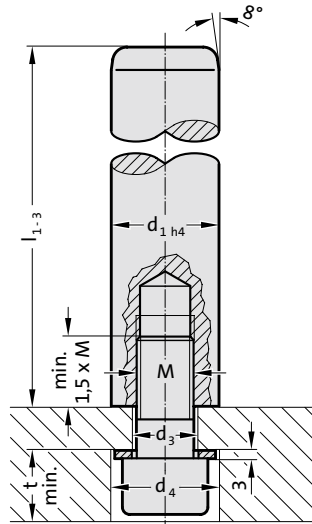




## Guide pillar "ECO-Line" endwise bolt-on type, ~DIN 9825/~ISO 9182-2



202.31.



### Material:

Steel, surface hardened  
Surface hardness: 60 + 3 HRC, Hardness  
penetration  $\geq 1,8$  mm

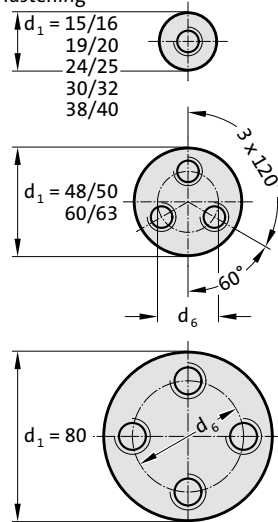
### Execution:

ground

### Note:

Guide pillars only recommended for use with  
sliding guides!  
Matching guide combinations, see selection  
matrix at the beginning of chapter D.

Hole pattern for column (pillar)  
fastening



# Guide pillar "ECO-Line" endwise bolt-on type, ~DIN 9825/~ISO 9182-2

## 202.31. Guide pillar "ECO-Line" endwise bolt-on type, ~DIN 9825/~ISO 9182-2

d <sub>1</sub>	15 16	19 20	24 25	30 32	38 40	48 50	60 63	80
d <sub>3</sub>	9	11	14	18	18	14	18	18
d <sub>4</sub>	17	20	22	28	28	22	28	28
d <sub>6</sub>	-	-	-	-	-	28	34	54
t	12	14	16	20.5	20.5	16	20.5	20.5
M	8	10	12	16	16	12	16	16
Cap screw	M8x35	M10x40	M12x40	M16x40	M16x40	M12x50	M16x60	M16x60
Tightening torque [Nm]	21	37	85	150	150	85	200	200
l <sub>1</sub>								
90	•							
100	•	•	•					
112	•	•	•					
125	•	•	•	•				
140	•	•	•	•				
160	•	•	•	•	•			
180	•	•	•	•	•	•		
200	•	•	•	•	•	•		
224	•	•	•	•	•	•		
250	•	•	•	•	•	•	•	
280	•	•	•	•	•	•	•	•
315	•	•	•	•	•	•	•	•
355	•	•	•	•	•	•	•	•
400		•	•	•	•	•	•	•
450			•	•	•	•	•	•
500			•	•	•	•	•	•
550					•	•	•	•
600					•	•	•	•
700					•	•	•	•
800					•	•	•	•



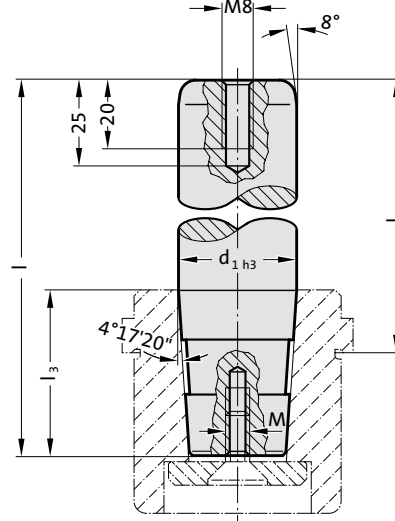
### Ordering Code (example):

Guide pillar "ECO-Line" endwise bolt-on type, ~DIN 9825/~ISO 9182-2	=202.31.
Guide diameter d <sub>1</sub>	32 mm = 032.
Length l <sub>1</sub>	125 mm = 125
Order No	=202.31. 032.125

## Guide pillar, conical, DIN 9825/ISO 9182-4/AFNOR



2021.50.



### Description:

FIBRO demountable pillars with conical shaft 2021.50. are recommended where die sharpening etc. demands frequent demounting and re-fitting.

### Material:

Steel, (Core strength:  $\geq 900 \text{ N/mm}^2$ ) surface hardened  
Surface hardness:  $60 \pm 3 \text{ HRC}$ , Hardness penetration  $\geq 1,8 \text{ mm}$

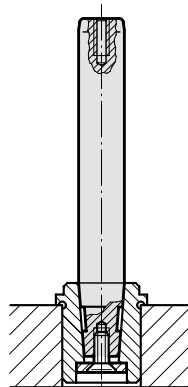
### Execution:

fine-ground and superfinished  
Method of manufacturing entails that centre holes are not concentric with O.D.

### Note:

Matching retaining bushes 2021.39./210.39. and retaining discs 2021.53./202.53. to be ordered separately.  
Preloading see pairing classification at the beginning of chapter D  
Matching guide combinations, see selection matrix at the beginning of chapter D.  
Tolerance range:  
yellow = .10  
green = .20  
red = .30

### Mounting example



## Guide pillar, conical, DIN 9825/ISO 9182-4/AFNOR

### 2021.50. Guide pillar, conical, DIN 9825/ISO 9182-4/AFNOR

d <sub>1</sub>	16	19 20	24 25	25	30 32	32	38 40	40	48 50	50	60 63	63	63
d <sub>5</sub>	22	22	25	25	32	32	40	40	50	50	63	63	63
M	6	6	8	8	8	8	8	8	10	10	12	12	12
l <sub>3</sub>	28	38	35	45	48	61	48	61	58	78	69	77	97
l <sub>1</sub>	1												
82	100												
95	113												
100		126	123										
112	130	138	135		145								
125	143	151	148	158	158		158						
140		166	163		173	186	173		180				
160		186	183	193	193	206	193	206	200		211		
180		206	203	213	213	226	213	226	220		231	237	
200		226	223	233	233		233		240	260	251	257	
224			247		257	270	257	270	264		275		
250			273		283		283	296	290	310	301	307	327
280					313		313		320	340	331	337	
315							348		355	375	366	372	392
355									395		406		432
400													477



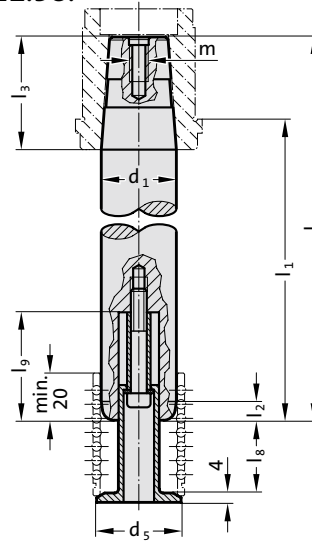
### Ordering Code (example):

Guide pillar, conical, DIN 9825/ISO 9182-4/AFNOR	=2021.50.
Guide diameter d <sub>1</sub>	38 mm = 038.
Guide length l <sub>1</sub>	180 mm = 180.
Cone length l <sub>3</sub>	48 mm = 048.
Classification TOL	yellow = 10
Order No	=2021.50.038.180.048.10

## Demountable guide pillar, conical, with ball cage retainer, DIN 9825/ISO 9182-4/AFNOR



2021.58.



### Description:

FIBRO demountable pillars with conical shaft 2021.58. are recommended where die sharpening etc. demands frequent demounting and re-fitting.

### Material:

Steel, (Core strength:  $\geq 900 \text{ N/mm}^2$ ) surface hardened  
Surface hardness:  $60 \pm 3 \text{ HRC}$ , Hardness penetration  $\geq 1,8 \text{ mm}$

### Execution:

fine-ground and superfinished

### Note:

Dimensions of ball cage retainer see 202.91.  
Matching retaining bushes 2021.39./210.39.  
and retaining discs 2021.53./202.53. to be ordered separately.

Preloading see pairing classification at the beginning of chapter D

Matching guide combinations, see selection matrix at the beginning of chapter D.

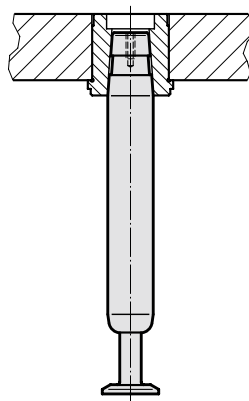
Tolerance range:

yellow = .10

green = .20

red = .30

### Mounting example



# Demountable guide pillar, conical, with ball cage retainer, DIN 9825/ISO 9182-4/AFNOR



## 2021.58. Demountable guide pillar, conical, with ball cage retainer, DIN 9825/ISO 9182-4/AFNOR

d <sub>1</sub>	38	38	40	40	48	50	50	60	63	63	63
d <sub>5</sub>	42	42	44	44	52	54	54	64	67	67	67
m	8	8	8	8	10	10	8	12	12	12	12
l <sub>3</sub>	48	48	48	61	58	58	78	69	69	77	97
KG (l <sub>8</sub> / l <sub>9</sub> )											
1 (31 / 46)	●		●	●	●	●	●	●	●	●	●
2 (41 / 56)		●	●	●	●	●	●	●	●	●	●
3 (51 / 66)		●	●	●	●	●	●	●	●	●	●
4 (61 / 76)		●	●	●	●	●	●	●	●	●	●
5 (73 / 89)		●	●	●	●	●	●	●	●	●	●
l <sub>1</sub>											
125	158	158	158								
140	173	173	173		180	180					
160	193	193	193	206	200	200		211	211		
180	213	213	213	226	220	220		231	231	237	
200	233	233	233		240	240	260	251	251	257	
224	257	257	257	270	264	264		275	275		
250	283	283	283	296	290	290	310	301	301	307	327
280	313	313	313		320	320	340	331	331	337	
315	348	348	348		355	355	375	366	366	372	392
355					395	395		406	406		432
400											477

## Ordering Code (example):

Demountable guide pillar, conical, with ball cage retainer,  
DIN 9825/ISO 9182-4/AFNOR

=2021.58.

Guide diameter d<sub>1</sub> 50 mm = 050.

Guide length l<sub>1</sub> 200 mm = 200.

Cone length l<sub>3</sub> 58 mm = 058.

Cage retainer size KG 1 = 1

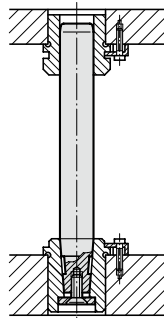
Classification TOL yellow = 1

Order No =2021.58.050.200.058.11

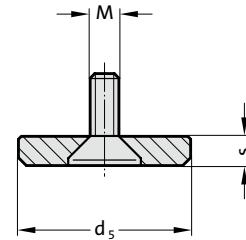
## Retaining disc with countersunk head cap screw, DIN 9825/ISO 9182-4 Retaining disc with socket cap screw, ~ AFNOR



Mounting example



2021.53.



### Material:

Retaining disc: Steel, burnished  
Countersunk head cap screw DIN 7991/ISO 10642

### Note:

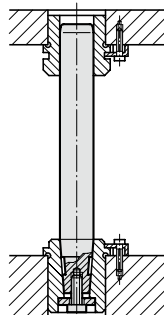
Has to be ordered separately to guide pillar, conical according to DIN 9825 / ISO 9182-4 2021.50. or 2021.58.

### 2021.53. Retaining disc with countersunk head cap screw, DIN 9825/ISO 9182-4

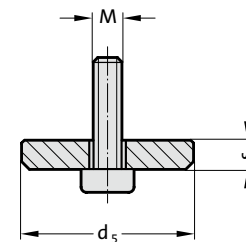
Order No	Nominal- $\phi$	Pillar- $\phi$	$d_s$	s	M
2021.53.020	20	19/20	22	3	M6
2021.53.025	25	24/25	25	3	M8
2021.53.032	32	30/32	32	3	M8
2021.53.040	40	38/40	40	5	M8
2021.53.050	50	48/50	50	5	M10
2021.53.063	63	60/63	63	6	M12



Mounting example



202.53.



### Material:

Retaining disc: Steel, burnished  
Socket head cap screw DIN 6912

### Note:

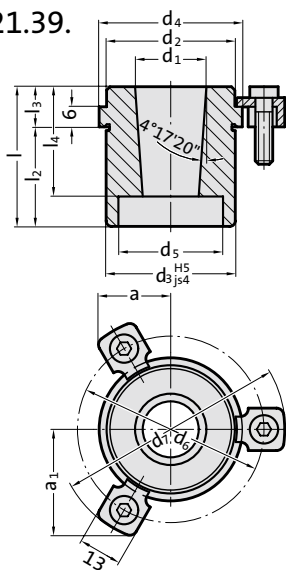
Has to be ordered separately to guide pillar, conical according to AFNOR 2021.50. or 2021.58.

### 202.53. Retaining disc with socket cap screw, ~ AFNOR

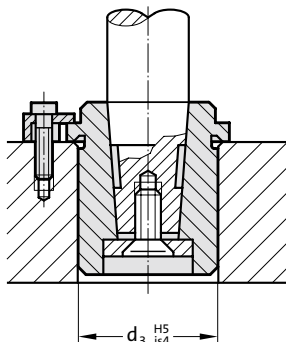
Order No	Pillar- $\phi$	$d_s$	s	M
202.53.016	16	18	3	M6
202.53.020	20	22	3	M6
202.53.025	25	25	4	M8
202.53.032	32	32	4	M8
202.53.040	40	40	4	M8
202.53.050	50	50	5	M10
202.53.063	63	63	6	M12

# Retaining bush for guide pillar conical 2021.50., DIN 9825/ISO 9182-4

2021.39.



Mounting example



## Material:

16 MnCr5,  
case hardened  $58 \pm 2$  HRC  
Hardness penetration:  $\geq 0,8$  mm

## Execution:

Retaining bore, outside diameter and shoulder precision ground.

## Note:

Outside diameter  $d_3$  same as that of guide bushes 2081. and 2091.  
The attachment is with 3 Screw clamp, from  $\varnothing d_1 = 38$  with 4 Screw clamp, which are included in delivery (Order No: 207.45 - Screw clamp incl. socket cap screw DIN 6912, Head  $\varnothing 13$ ).  
Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.



## 2021.39. Retaining bush for guide pillar conical 2021.50., DIN 9825/ISO 9182-4

$d_1$	19 20	24 25	30 32	38 40	48 50	60 63
$d_2$	32	40	48	58	70	85
$d_3$	32	40	48	58	70	85
$d_4$	40	48	56	66	80	95
$d_5$	23	26	33	41	51	64
$d_6$	53	60	67	77	91	106
$d_7$	65.7	72.7	79.7	89.7	103.7	118.7
$a$	20.9	22.65	24.4	35.3	40.2	45.5
$a_1$	30.3	33.4	36.4	35.3	40.2	45.5
$l_1$	42 49	49 59	52 62	62 75	65 78	78 95
$l_2$	30 37	37 47	37 47	47 60	47 60	60 77
$l_3$	12	12	15	15	18	18
$l_4$	39	36	49	49	59	70

## Ordering Code (example):

Retaining bush for guide pillar conical 2021.50., DIN 9825/ISO 9182-4

=2021.39.

Nominal diameter  $d_1$ 

38 mm= 038.

Installation length  $l_2$ 

47 mm= 047

Order No

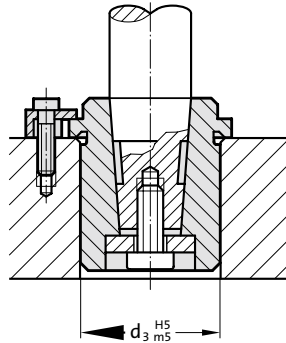
=2021.39.038.047



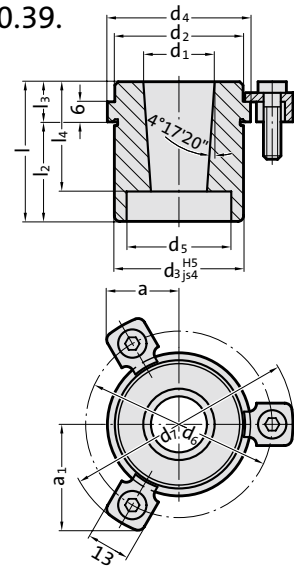
# Retaining bush for guide pillar conical 2021.50.,~ AFNOR



Mounting example



210.39.



## Material:

16 MnCr5,  
case hardened  $58 \pm 2$  HRC  
Hardness penetration:  $\geq 0,8$  mm

## Execution:

Retaining bore, outside diameter and shoulder precision ground.

## Note:

Outside diameter  $d_3$  same as that of guide bushes 210.  
The attachment is with 3 Screw clamp, from  $\varnothing d_1 = 38$  with 4 Screw clamp, which are included in delivery (Order No: 207.45 - Screw clamp incl. socket cap screw DIN 6912, Head  $\varnothing 13$ ).  
Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.



## 210.39. Retaining bush for guide pillar conical 2021.50.,~ AFNOR

$d_1$	16	20	25	32	40	50	63
$d_2$	29	32	41	51	65	84	100
$d_3$	28	32	40	50	63	80	90
$d_4$	32	36	45	56	70	90	110
$d_5$	19	23	26	33	41	51	64
$d_6$	45	49	57	67	81	101	121
$d_7$	57.7	61.7	69.7	79.7	93.7	113.7	133.7
$a$	18.9	19.9	21.9	24.4	36	43	50.1
$a_1$	26.9	28.6	32.1	36.4	36	43	50.1
$l$	40	50	50 60	63 76	63 76	79 96	98 118
$l_2$	30	38	38 48	48 61	48 61	61 78	78 98
$l_3$	10	12	12	15	15	18	20
$l_4$	30	40	37 47	50 63	50 63	63 80	79 99

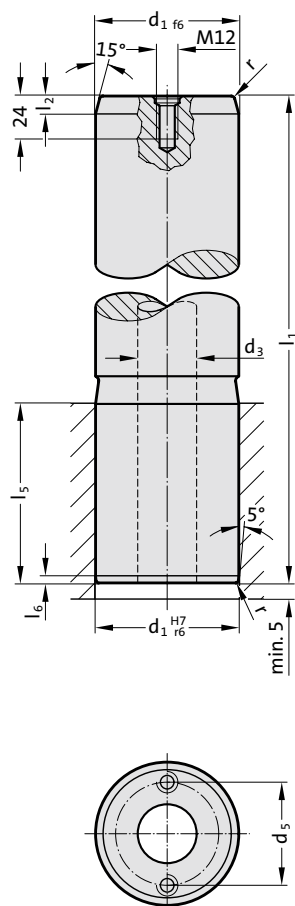
## Ordering Code (example):

Retaining bush for guide pillar conical 2021.50.,~ AFNOR	=210.39.
Nominal diameter $d_1$	40 mm= 040.
Installation length $l_2$	48 mm= 048
Order No	=210.39. 040.048



# Guide pillar for large tools, DIN 9833/ISO 9182-3

2022.19.



## Material:

Steel, surface hardened

Surface hardness: 60 + 4 HRC, Hardness penetration 1,5 + 1 mm

## Execution:

ground

up to  $\varnothing d_1 = 80$  without central holeby  $\varnothing d_1 = 80$  with 1 lifting thread M12from  $\varnothing d_1 = 100$  with central hole (through) and with 2 lifting threads M12

## Note:

The guide pillar is only recommended for use with solid lubricants.

Matching guide combinations, see selection matrix at the beginning of chapter D.

Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.

## 2022.19. Guide pillar for large tools, DIN 9833/ISO 9182-3

$d_1$	25	32	40	50	63	80	100	125	160
$d_3$	-	-	-	-	-	-	50	65	95
$d_5$	-	-	-	-	-	-	72	90	132
$r$	2	2	2	2.5	2.5	3	3	4	4
$l_2$	8	8	8	10	10	10	10	12	12
$l_5$	40	45	56	70	80	100	125	140	180
$l_6$	4	4	4	4	4	4	4	5	5
$l_1$									
125	●	●							
140	●	●	●						
160	●	●	●	●					
180	●	●	●	●	●				
200	●	●	●	●	●				
224	●	●	●	●	●	●			
250		●	●	●	●	●	●		
280			●	●	●	●	●		
315				●	●	●	●	●	
355				●	●	●	●	●	
400					●	●	●	●	●
450						●	●	●	●
500						●	●	●	●
560									●

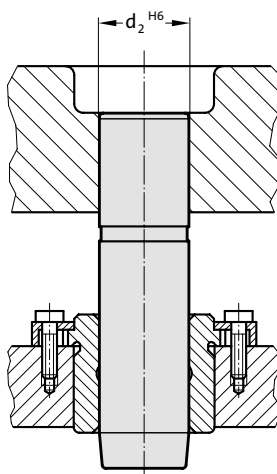
## Ordering Code (example):

Guide pillar for large tools, DIN 9833/ISO 9182-3	=2022.19.
Guide diameter $d_1$	63 mm = 063.
Length $l_1$	180 mm = 180
Order No	=2022.19.063.180

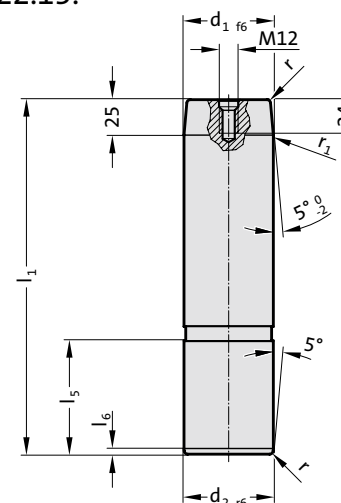
## Guide pillar with 5° pilot taper, to VW-Standard



Mounting example



2022.13.



### Material:

Steel, surface hardened

Surface hardness: 60 + 4 HRC, Hardness penetration 1,5 + 1 mm

### Execution:

precision ground

by  $\varnothing d_1 = 80$  with 1 lifting thread M12

### Note:

The guide pillar is only recommended for use with solid lubricants.

Matching guide combinations, see selection matrix at the beginning of chapter D.

Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.

### Application:

Floating support in upper half of trimming tools.

## 2022.13. Guide pillar with 5° pilot taper, to VW-Standard

$d_1$	40	50	63	80
$d_2$	40	50	63	80
$l_5$	56	70	80	100
$l_6$	4	4	4	4
$r$	2	2.5	2.5	3
$r_1$	3	5	6	8
$l_1$				
140	●			
160	●	●		
180	●	●	●	
200	●	●	●	
224	●	●	●	●
250	●	●	●	●
280	●	●	●	●
315		●	●	●
355		●	●	●
400			●	●

### Ordering Code (example):

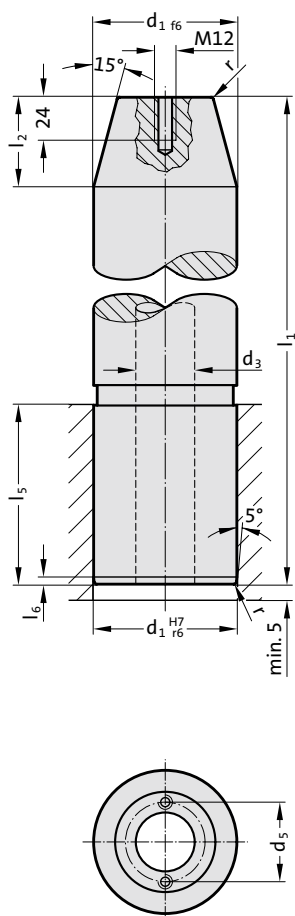
Guide pillar with 5° pilot taper, to VW-Standard	=2022.13.
Guide diameter $d_1$	63 mm = 063.
Length $l_1$	180 mm = 180
Order No	=2022.13.063.180

# Guide pillar with pilot taper, VDI 3356

2022.15.



FIBRO



## Material:

Steel, surface hardened

Surface hardness: 60 + 4 HRC, Hardness penetration 1,5 + 1 mm

## Execution:

ground

Ø  $d_1$  = 80 without central hole with 1 lifting thread M12

from Ø  $d_1$  = 100 with central hole (through) and with 2 lifting threads M8

## Note:

The guide pillar is only recommended for use with solid lubricants.

Matching guide combinations, see selection matrix at the beginning of chapter D.

Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.

## 2022.15. Guide pillar with pilot taper, VDI 3356

$d_1$	80	100	125	160
$d_3$	-	50	65	95
$d_5$	-	62	82	119
$r$	3	3	4	4
$l_2$	50	50	50	50
$l_5$	4	4	5	5
$l_6$	100	125	140	180
$l_1$				
280	●			
315	●	●		
355	●	●	●	
400	●	●	●	
450	●	●	●	●
500			●	●
560				●

## Ordering Code (example):

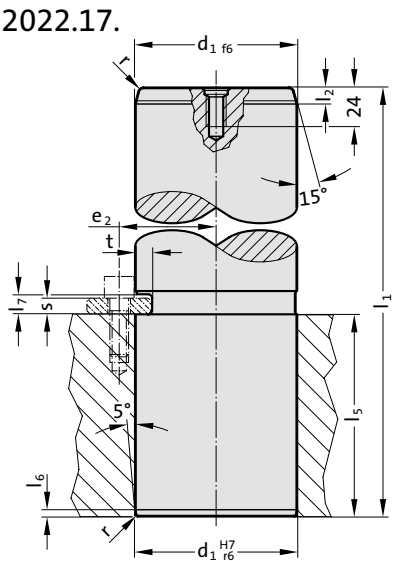
Guide pillar with pilot taper, VDI 3356 = 2022.15.

Guide diameter  $d_1$  125 mm = 125.

Length  $l_1$  355 mm = 355

Order No = 2022.15.125.355

# Guide pillar with groove, to VW



## Material:

Steel, surface hardened  
Surface hardness: 60 + 4 HRC, Hardness penetration 1,5 + 1 mm

## Execution:

ground  
by  $\varnothing d_1 = 80$  with 1 lifting thread M12

## Note:

Secure with locating plate 2022.40.1.  
The guide pillar is only recommended for use with solid lubricants.  
Matching guide combinations, see selection matrix at the beginning of chapter D.  
Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.

## 2022.17. Guide pillar with groove, to VW

$d_1$	25	32	40	50	63	80
$l_2$	8	8	8	10	10	10
$l_5$	40	45	56	70	80	100
$l_6$	4	4	4	4	4	4
$l_7$	7	7	10	10	12	12
$r$	2	2	2	2.5	2.5	3
$e_2$	20.5	24	29.5	33.5	43	50
$t$	3	3	4	4	6.5	8
$l_1$						
125	•	•				
140	•	•	•			
160	•	•	•	•		
180	•	•	•	•	•	
200	•	•	•	•	•	
224	•	•	•	•	•	•
250		•	•	•	•	•
280			•	•	•	•
315				•	•	•
355				•	•	•
400					•	•
450						•
500						•

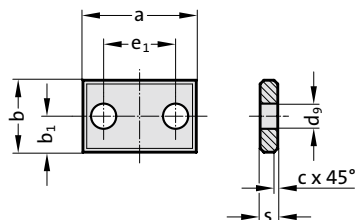
## Ordering Code (example):

Guide pillar with groove, to VW	=2022.17.
Guide diameter $d_1$	50 mm = 050.
Length $l_1$	160 mm = 160
Order No	=2022.17.050.160



## Locating plate for guide pillar, to VW

2022.40.1.



### 2022.40.1. Locating plate for guide pillar, to VW

Order No	Pillar-Ø	a	b	s	c	b <sub>1</sub>	e <sub>1</sub>	d <sub>9</sub>
2022.40.1.02	25 u. 32	40	20	5	1	10	20	9
2022.40.1.04	40 u. 50	48	25	8	2	12.5	24	11
2022.40.1.06	63 u. 80	60	34	10	2	17	30	14

#### Material:

Steel

#### Note:

Screws not included!

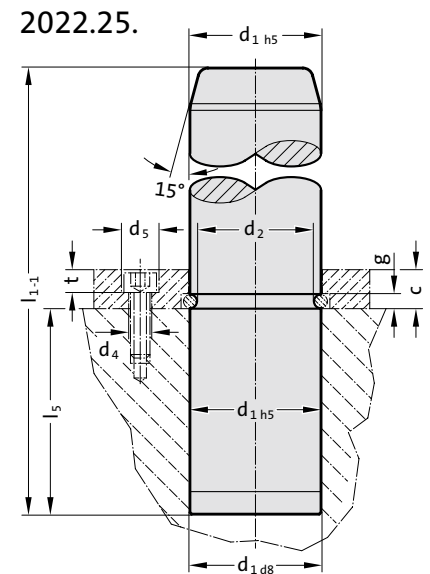
#### Fixing:

Use socket cap screws DIN EN ISO 4762.

#### Ordering Code (example):

Locating plate for guide pillar, to VW	=2022.40.1.
Nominal size NENN	04 = 04
Order No	=2022.40.1. 04

## Guide pillar with retaining ring groove, ~AFNOR



**Material:**

Steel, surface hardened

Surface hardness: 60 + 4 HRC, Hardness penetration 1,5 + 1 mm

Execution:

ground

Note:

The guide pillar is only recommended for use with solid lubricants.

Matching guide combinations, see selection matrix at the beginning of chapter D.

Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.

Fixing:

Clamping flange with retaining ring, without screws, 2073.46.□□□  
order separately.

2022.25. Guide pillar with retaining ring groove, ~AFNOR

$d_1$	25	32	40	50	63	80	100
$d_2$	25	32	40	50	63	80	80
$g$	2.7	4.2	4.2	4.2	6.2	6.2	6.2
$l_5$	25	32	63	80	100	125	160
$l_1$							
100	●						
125	●	●					
140	●	●					
160	●	●					
180	●	●	●				
200	●	●	●	●			
220	●	●	●	●			
250		●	●	●	●		
280			●	●	●		
315			●	●	●	●	
355				●	●	●	●
400				●	●	●	●
450					●	●	●
500					●	●	●

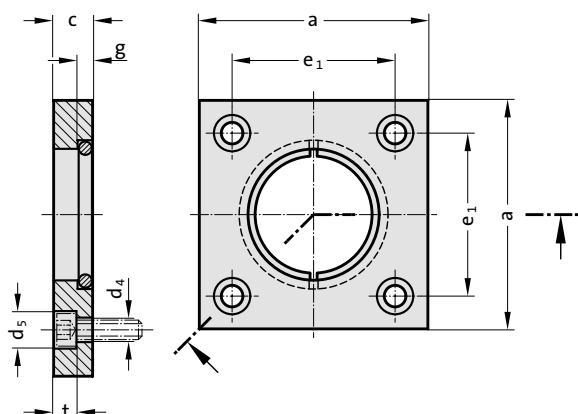
Ordering Code (example):

Guide pillar with retaining ring groove, ~AFNOR	=2022.25.
Guide diameter $d_1$	50 mm = 050.
Length $l_1$	220 mm = 220
Order No	=2022.25.050.220



## Clamping flange with retaining ring, ~AFNOR

2073.46.



2073.46. Clamping flange with retaining ring, ~AFNOR

Order No	d <sub>1</sub>	d <sub>2</sub>	d <sub>4</sub>	d <sub>5</sub>	a	c	g	e <sub>1</sub>	t
2073.46.025	25	22.3	6.6	11	45	10	2.7	31	7
2073.46.032	32	27.8	6.6	11	56	10	4.2	36	7
2073.46.040	40	35.8	6.6	11	70	12	4.2	50	7
2073.46.050	50	45.8	9	15	80	14	4.2	55	9
2073.46.063	63	56.8	11	18	100	18	6.2	70	11
2073.46.080	80	73.8	13.5	20	110	20	6.2	80	13
2073.46.100	100	93.8	13.5	20	140	20	6.2	100	13

**Material:**

Clamping flange: Steel

Retaining ring: Spring steel wire

**Note:**

For fixing the guide pillar 2022.25.

Order No. for reordering retaining ring: 2073.46.□□□.2



## Guide pillar with snap ring groove, to Mercedes-Benz Standard



2022.16.



### Material:

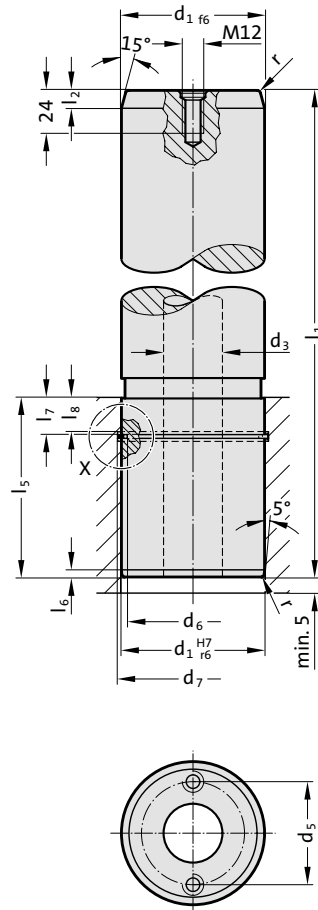
Steel, surface hardened  
Surface hardness: 60 + 4 HRC, Hardness  
penetration 1,5 + 1 mm

### Execution:

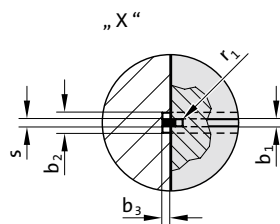
ground  
up to  $\varnothing d_1 = 80$  without central hole  
by  $\varnothing d_1 = 80$  with 1 lifting thread M12  
from  $\varnothing d_1 = 100$  with central hole (through)  
and with 2 lifting threads M12

### Note:

Secure with snap ring 2061.48.  
The guide pillar is only recommended for use  
with solid lubricants.  
Matching guide combinations, see selection  
matrix at the beginning of chapter D.  
Assembly guide lines / Dimensional  
requirements and tolerances at the end of  
chapter D.



### Mounting example



## Guide pillar with snap ring groove, to Mercedes-Benz Standard

### 2022.16. Guide pillar with snap ring groove, to Mercedes-Benz Standard

$d_1$	40	50	63	80	100	125	160
$d_3$	-	-	-	-	50	65	95
$d_5$	-	-	-	-	72	90	132
$d_6$	33	43	55.7	71.4	89.9	114.9	148.9
$r$	2	2.5	2.5	3	3	4	4
$r_1$	1	1	1	1.05	1.3	1.3	1.3
$l_2$	8	10	10	10	10	12	12
$l_5$	56	70	80	100	125	140	180
$l_6$	4	4	4	4	4	5	5
$l_7$	15	15	15	21	31	31	31
$l_8$	14	14	14	20	30	30	30
$b_1$	2	2	2	2.1	2.6	2.6	2.6
$b_2$	3.2	3.2	3.2	4.2	5.2	5.2	5.2
$l_1$							
140	●						
160	●	●					
180	●		●				
200	●	●	●				
224	●	●	●	●			
250	●	●	●	●	●		
280	●	●	●	●	●		
315		●	●	●	●	●	
355		●	●	●	●	●	
400			●	●	●	●	●
450				●	●	●	●
500				●	●	●	●
560							●



### Ordering Code (example):

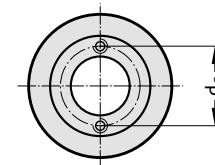
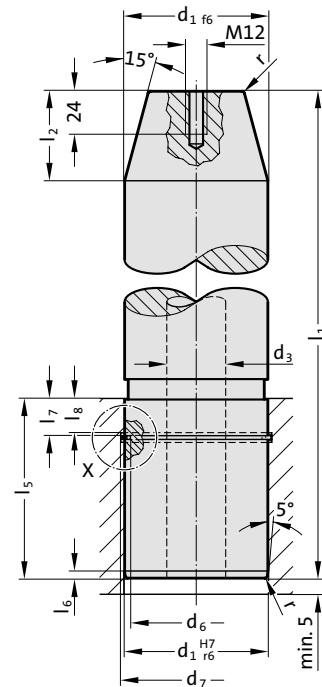
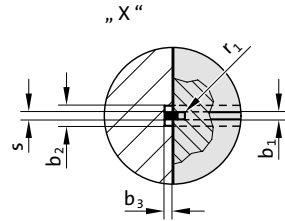
Guide pillar with snap ring groove, to Mercedes-Benz Standard		=2022.16.
Guide diameter $d_1$	80 mm	= 080.
Length $l_1$	224 mm	= 224
Order No		=2022.16.080.224

# Guide pillar with pilot taper and groove, to Mercedes-Benz Standard



Mounting example

2022.12.



## Material:

Steel, surface hardened

Surface hardness: 60 + 4 HRC, Hardness penetration 1,5 + 1 mm

## Execution:

ground

Ø d<sub>1</sub> = 80 without central hole with 1 lifting thread M12

from Ø d<sub>1</sub> = 100 with central hole (through) and

with 2 lifting threads M8

## Note:

Secure with snap ring 2061.48.

The guide pillar is only recommended for use with solid lubricants.

Matching guide combinations, see selection matrix at the beginning of chapter D.

Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.

## 2022.12. Guide pillar with pilot taper and groove, to Mercedes-Benz Standard

d <sub>1</sub>	80	100	125	160
d <sub>3</sub>	-	50	65	95
d <sub>5</sub>	-	62	82	119
d <sub>6</sub>	71.4	89.9	114.9	148.9
r	3	3	4	4
r <sub>1</sub>	1.05	1.3	1.3	1.3
l <sub>2</sub>	50	50	50	50
l <sub>5</sub>	100	125	140	180
l <sub>6</sub>	4	4	5	5
l <sub>7</sub>	21	31	31	31
l <sub>8</sub>	20	30	30	30
b <sub>1</sub>	2.1	2.6	2.6	2.6
b <sub>2</sub>	4.2	5.2	5.2	5.2
l <sub>1</sub>				
280	●			
315	●	●		
355	●	●		
400	●	●	●	
450	●	●	●	●
500			●	●
560				●

## Ordering Code (example):

Guide pillar with pilot taper and groove, to Mercedes-Benz Standard

=2022.12.

Guide diameter d<sub>1</sub>

125 mm = 125.

Length l<sub>1</sub>

355 mm = 355

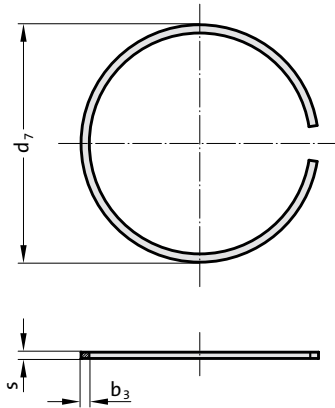
Order No

=2022.12. 125. 355

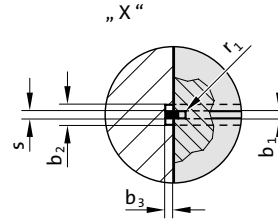


## Snap ring

2061.48.



### Mounting example



### 2061.48. Snap ring

Order No	Pillar- $\varnothing$	$b_1$	$b_3$	$d_7$	$s$
2061.48.040	40	1.7	2.3	43	1.5
2061.48.050	50	1.7	2.3	53	1.5
2061.48.063	63	1.7	2.3	66	1.5
2061.48.080	80	2.1	2.8	83.2	2
2061.48.100	100	2.6	3.4	103.8	2.5
2061.48.125	125	2.6	3.4	128.8	2.5
2061.48.160	160	2.6	4	164.3	2.5

### Material:

Spring strip steel

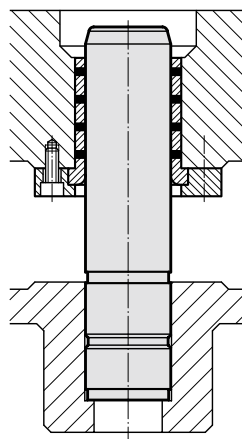
### Note:

For securing guide pillars 2022.12. and 2022.16.

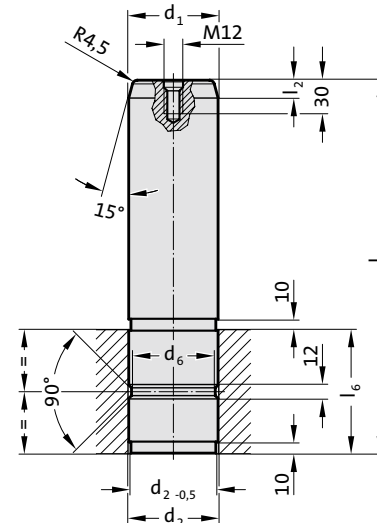
## Guide pillar with groove, to CNOMO



Mounting example



2022.16.45.



### Material:

Steel, surface hardened

Surface hardness: 60 + 3 HRC, Hardness penetration 2 + 1,6 mm

### Execution:

precision ground

### Note:

Fit for receiving bore H7.

The guide pillar is only recommended for use with solid lubricants. Matching guide combinations, see selection matrix at the beginning of chapter D.

## 2022.16.45. Guide pillar with groove, to CNOMO

$d_1$	80	100
Tolerance	-0,010/-0,025	-0,010/-0,025
$d_2$	80	100
Tolerance	+0,04/+0,05	+0,045/+0,055
$d_6$	75	95
$l_2$	16	16
$l_6$	110	140
$l_1$		
350	●	
400	●	●
450		●

### Ordering Code (example):

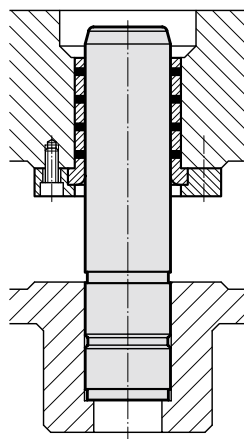
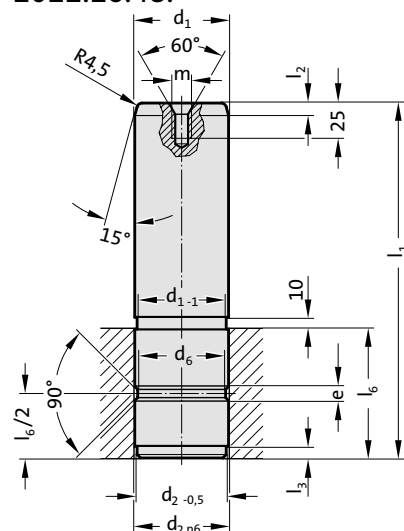
Guide pillar with groove, to CNOMO	=2022.16.45.
Guide diameter $d_1$	100 mm = 100.
Length $l_1$	400 mm = 400
Order No	=2022.16.45. 100.400



## Guide pillar with groove

2022.16.48.

### Mounting example



### Material:

Steel, surface hardened  
Surface hardness: 60 + 3 HRC, Hardness penetration 2 + 1,6 mm

### Execution:

precision ground

### Note:

Fit for receiving bore H7.

Guide pillar is recommended to be used only with guide elements with solid lubricant.

Matching guide combinations, see selection matrix at the beginning of chapter D.

## 2022.16.48. Guide pillar with groove

d <sub>1</sub>	25	30	40	50	60	65	80	100
Tolerance	-0,005/-0,015	-0,005/-0,015	-0,005/-0,015	-0,005/-0,015	-0,01/-0,02	-0,01/-0,025	-0,01/-0,025	-0,01/-0,025
d <sub>2</sub>	25	30	40	50	60	65	80	100
Tolerance	+0,022/+0,035	+0,022/+0,035	+0,026/+0,042	+0,026/+0,042	+0,032/+0,051	+0,032/+0,051	+0,032/+0,051	+0,037/+0,059
d <sub>6</sub>	21	26	36	45	55	60	75	95
l <sub>2</sub>	5	5	5	10	10	10	10	10
l <sub>3</sub>	5	5	5	10	10	10	10	10
l <sub>6</sub>	30	40	50	70	90	100	120	150
m	M8	M8	M8	M12	M12	M12	M12	M12
l <sub>1</sub>								
80	●							
100	●							
120	●	●	●					
140		●	●					
160		●	●	●				
180		●	●	●	●			
200			●	●	●			
220					●			
250				●	●	●	●	
300				●	●	●	●	●
350					●	●	●	●
400							●	●

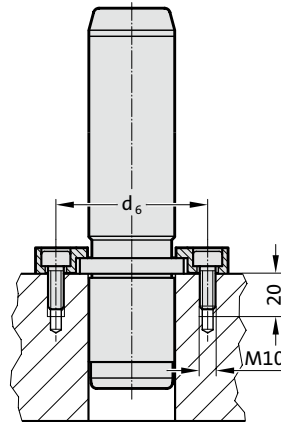
### Ordering Code (example):

Guide pillar with groove = 2022.16.48.  
Guide diameter d<sub>1</sub> 60 mm = 060.  
Length l<sub>1</sub> 200 mm = 200  
Order No = 2022.16.48. 060.200

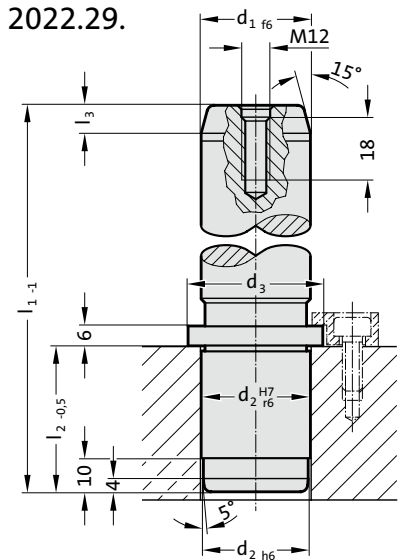
## Guide pillar with collar, to WDX



Mounting example



2022.29.



### Material:

Steel, surface hardened  
Surface hardness: 60 + 4 HRC, Hardness penetration 1,5 + 1 mm

### Execution:

precision ground  
Method of manufacturing entails that centre holes are not concentric with O.D.

### Note:

Guide pillar is recommended to be used only with guide elements with solid lubricant.

Matching guide combinations, see selection matrix at the beginning of chapter D.

Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.

Order No. for guide pillar with collar, to WDX, with screw clamps  
2022.29.□□□.□□□.A

### Fixing:

(to be ordered separately)

Screw clamps with screws 2072.46 (M10 x 20 DIN EN ISO 4762)

up to  $\varnothing d_1 = 50$  - 2 screw clamps

from  $\varnothing d_1 = 63$  - 3 screw clamps

## 2022.29. Guide pillar with collar, to WDX

$d_1$	25	32	40	50	63	80	100
$d_2$	25	32	40	50	63	80	100
$d_3$	32	40	50	60	80	90	110
$d_6$	68	75	83	93	106	123	143
$l_2$	40	42	56	70	80	100	125
$l_3$	6	8	8	10	10	10	10
$l_1$							
125	●						
140	●	●					
160	●		●	●			
180	●	●	●	●			
200	●	●	●	●	●		
224	●	●	●	●	●	●	
250		●	●	●	●	●	
280			●	●	●	●	●
315				●	●	●	●
355					●	●	●
400					●	●	●
500						●	●

### Ordering Code (example):

Guide pillar with collar, to WDX = 2022.29.

Guide diameter  $d_1$  50 mm = 050.

Length  $l_1$  160 mm = 160

Order No = 2022.29. 050. 160

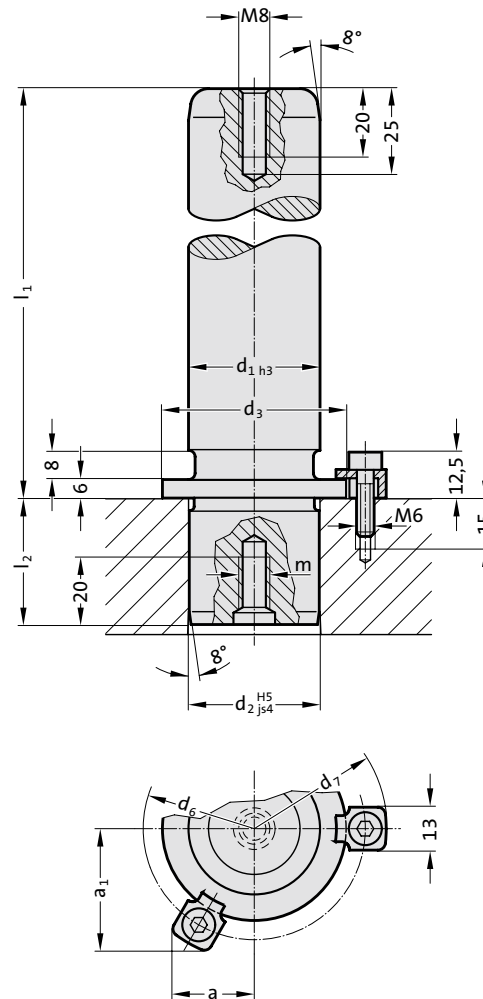




## Guide pillar with collar, screw clamp retention, DIN 9825/~ISO 9182-5



2021.46.



### Description:

Demountable pillars with shoulder are suited to applications where die sharpening requires dismantling and re-fitting.

### Material:

Steel, (Core strength:  $\geq 900 \text{ N/mm}^2$ ) surface hardened

Surface hardness:  $60 \pm 3 \text{ HRC}$ , Hardness penetration  $\geq 1,8 \text{ mm}$

### Execution:

fine precision ground

Method of manufacturing entails that centre holes are not concentric with O.D.

### Note:

The attachment is with 3 Screw clamp, from  $\varnothing d_1 = 38$  with 4 Screw clamp, which are included in delivery (Order No: 207.45 - Screw clamp incl. socket cap screw DIN 6912, Head  $\varnothing 13$ ).

Bearing clearance / Preloading see pairing classification at the beginning of chapter D.  
Matching guide combinations, see selection matrix at the beginning of chapter D.

Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.

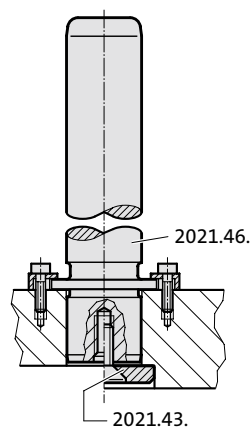
Tolerance range:

yellow = .10

green = .20

red = .30

### Mounting example



# Guide pillar with collar, screw clamp retention, DIN 9825/~ISO 9182-5

## 2021.46. Guide pillar with collar, screw clamp retention, DIN 9825/~ISO 9182-5

d <sub>1</sub>	15 16	19 20	24 25	30 32	38 40	48 50	60 63	80
d <sub>2</sub>	15 16	19 20	24 25	30 32	38 40	48 50	60 63	80
d <sub>3</sub>	22	25	32	40	50	63	80	95
d <sub>6</sub>	33	36	43	51	61	74	91	106
d <sub>7</sub>	45.7	48.7	55.7	63.7	73.7	86.7	103.7	118.7
a	15.9	16.6	18.4	20.4	29.2	33.8	39.8	46.2
a <sub>1</sub>	21.7	23	26	29.5	29.2	33.8	39.8	46.2
m	M8	M8	M8	M8	M8	M8	M8	M12
l <sub>2</sub>	20	23	30	37	37	47	47	60
l <sub>1</sub>								
100	●	●	●					
112	●	●	●	●				
125	●	●	●	●	●			
140	●	●	●	●	●	●		
160	●	●	●	●	●	●	●	
180	●	●	●	●	●	●	●	
200	●	●	●	●	●	●	●	●
224			●	●	●	●	●	●
250			●	●	●	●	●	●
280				●	●	●	●	●
315				●	●	●	●	●
355					●	●	●	●
400						●	●	●



### Ordering Code (example):

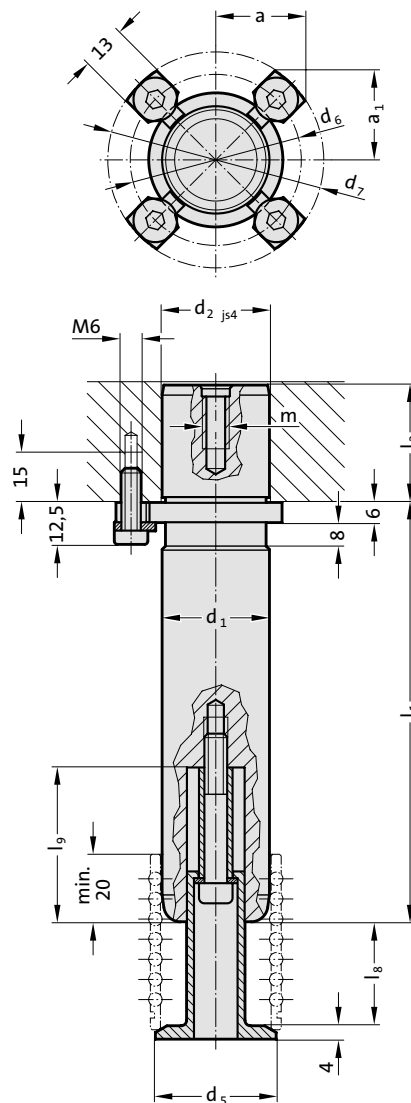
Guide pillar with collar, screw clamp retention,  
DIN 9825/~ISO 9182-5

Guide diameter d <sub>1</sub>	32 mm	=	032.
Length l <sub>1</sub>	315 mm	=	315.
Classification TOL	yellow	=	10
Order No		=	2021.46.032.315.10

## Guide pillar with collar and ball cage retainer



2021.44.



### Description:

Demountable pillars with shoulder are suited to applications where die sharpening requires dismantling and re-fitting.

### Material:

Steel, (Core strength:  $\geq 900 \text{ N/mm}^2$ ) surface hardened

Surface hardness:  $60 + 3 \text{ HRC}$ , Hardness penetration  $\geq 1,8 \text{ mm}$

### Execution:

fine precision ground

### Note:

The attachment is with 3 Screw clamp, from  $\varnothing d_1 = 38$  with 4 Screw clamp, which are included in delivery (Order No: 207.45 - Screw clamp incl. socket cap screw DIN 6912, Head  $\varnothing 13$ ).

Bearing clearance / Preloading see pairing classification at the beginning of chapter D.  
Matching guide combinations, see selection matrix at the beginning of chapter D.  
Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.

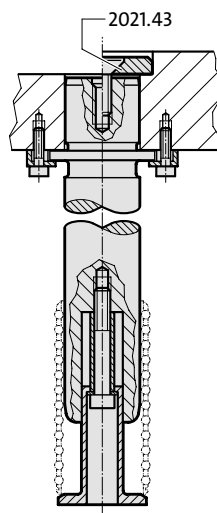
Tolerance range:

yellow = .10

green = .20

red = .30

### Mounting example





## Guide pillar with collar and ball cage retainer

### 2021.44. Guide pillar with collar and ball cage retainer

d <sub>1</sub>	38	40	48	50	60	63
d <sub>2</sub>	38	40	48	50	60	63
d <sub>3</sub>	50	50	63	63	80	80
d <sub>5</sub>	42	44	52	54	64	67
d <sub>6</sub>	61	61	74	74	91	91
d <sub>7</sub>	73.7	73.7	86.7	86.7	103.7	103.7
a	29.2	29.2	33.8	33.8	39.8	39.8
a <sub>1</sub>	29.2	29.2	33.8	33.8	39.8	39.8
m	M8	M8	M8	M8	M8	M8
l <sub>2</sub>	37	37	47	47	47	47
KG (l <sub>8</sub> / l <sub>9</sub> )						
1 (31 / 46)	●	●	●	●	●	●
2 (41 / 56)	●	●	●	●	●	●
3 (51 / 66)	●	●	●	●	●	●
4 (61 / 76)	●	●	●	●	●	●
5 (73 / 89)	●	●	●	●	●	●
l <sub>1</sub>						
125	●	●				
140	●	●	●	●		
160	●	●	●	●	●	●
180	●	●	●	●	●	●
200	●	●	●	●	●	●
224	●	●	●	●	●	●
250	●	●	●	●	●	●
280	●	●	●	●	●	●
315	●	●	●	●	●	●
355	●	●	●	●	●	●
400			●	●	●	●

### Ordering Code (example):

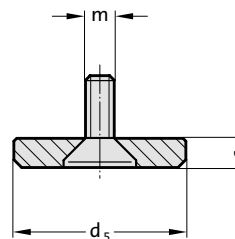
Guide pillar with collar and ball cage retainer		=2021.44.
Guide diameter d <sub>1</sub>	48 mm =	048.
Length l <sub>1</sub>	400 mm =	400.
Cage retainer size KG	1 =	1.
Classification TOL	yellow =	10
Order No	=2021.44.048.400.1.10	



## Retaining disc with screw



2021.43.



### Material:

Retaining disc: Steel

Countersunk head cap screw DIN 7991/ISO 10642

### Note:

For fixing the guide pillars 2021.44., 2021.46. and 2021.29.

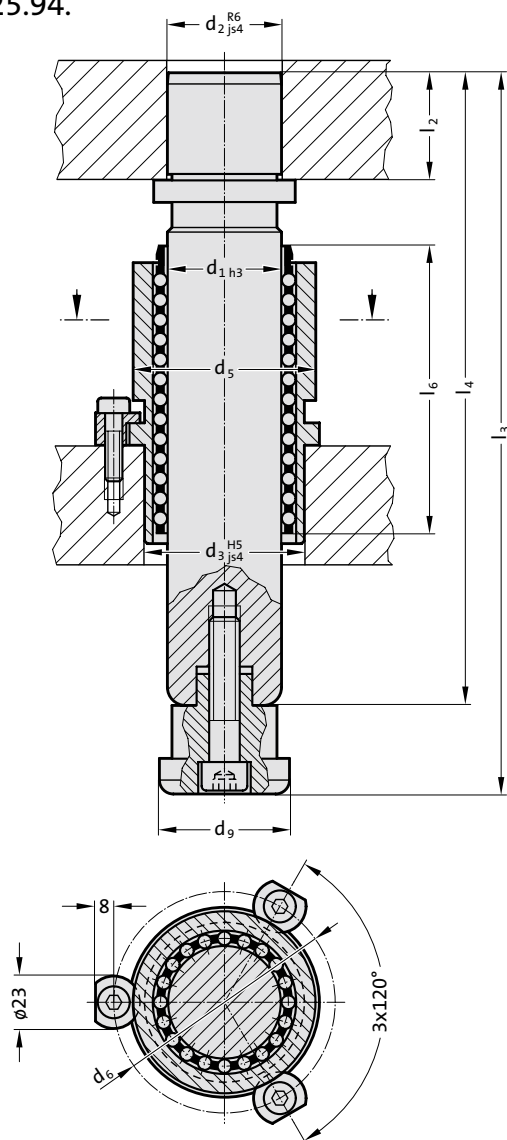
### 2021.43. Retaining disc with screw

Order No	Nominal-ø	Pillar-ø	d <sub>s</sub>	s	m
2021.43.016	16	15/16	22	6	8
2021.43.020	20	19/20	25	6	8
2021.43.025	25	24/25	32	6	8
2021.43.032	32	30/32	40	6	8
2021.43.040	40	38/40	50	6	8
2021.43.050	50	48/50	60	6	8
2021.43.063	63	60/63	70	6	8
2021.43.080	80	80	93	12	12



## Ball guide unit to Mercedes-Benz Standard

2025.94.



### Material:

Demountable guide pillar: Steel, surface hardened

Guide bush: Tooling steel

Cage retainer: Steel

Ball cage: Brass

### Execution:

Ball guide unit 2025.94. consisting of: Demountable guide pillar, guide bush, ball cage, cage retainer, clamps and socket cap screws to DIN EN ISO 4762.

## 2025.94. Ball guide unit to Mercedes-Benz Standard

Pillar diameter $d_1$	50	80
$d_2$	50	80
$d_3$	70	105
$d_5$	80	118
$d_6$	97	135
$d_9$	57	91
$l_2$	47	75
$l_3$	316	450
$l_4$	271	400
$l_6$	128	160

### Ordering Code (example):

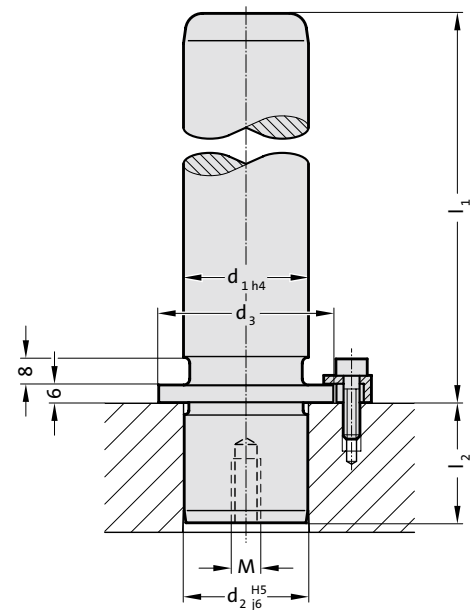
Ball guide unit to Mercedes-Benz Standard =2025.94.  
Pillar diameter  $d_1$  80 mm = 080  
Order No =2025.94.080



# Guide pillar with collar "ECO-LINE"



2021.29.



## Material:

Steel, surface hardened

Surface hardness: 60 + 4 HRC, Hardness penetration 1,5 + 1 mm

## Execution:

ground

Method of manufacturing entails that centre holes are not concentric with O.D.

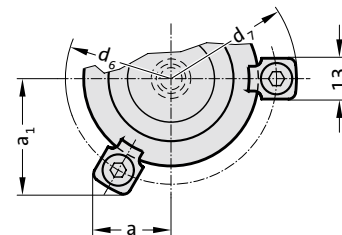
## Note:

Guide pillars only recommended for use with sliding guides!

The attachment is with 3 Screw clamp, from  $\varnothing d_1 = 38$  with 4 Screw clamp, which are included in delivery (Order No: 207.45 - Screw clamp incl. socket cap screw DIN 6912, Head  $\varnothing 13$ ).

Matching guide combinations, see selection matrix at the beginning of chapter D.

Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.



## 2021.29. Guide pillar with collar "ECO-LINE"

$d_1$	15 16	19 20	24 25	30 32	38 40	48 50	60 63	80
$d_2$	15 16	19 20	24 25	30 32	38 40	48 50	60 63	80
$d_3$	22	25	32	40	50	63	80	95
$d_6$	33	36	43	51	61	74	91	106
$d_7$	45.7	48.7	55.7	63.7	73.7	86.7	103.7	118.7
$a$	15.9	16.6	18.4	20.4	29.2	33.8	39.8	46.2
$a_1$	21.7	23	26	29.5	29.2	33.8	39.8	46.2
$M$	M8	M8	M8	M8	M8	M8	M8	M12
$l_2$	20	23	30	37	37	47	47	60
$l_1$								
100	●	●	●					
112	●	●	●	●				
125	●	●	●	●	●			
140	●	●	●	●	●	●		
160	●	●	●	●	●	●	●	
180	●	●	●	●	●	●	●	●
200	●	●	●	●	●	●	●	●
224			●	●	●	●	●	●
250			●	●	●	●	●	●
280				●	●	●	●	●
315				●	●	●	●	●
355					●	●	●	●
400						●	●	●

## Ordering Code (example):

Guide pillar with collar "ECO-LINE" =2021.29.

Guide diameter  $d_1$  32 mm = 032.

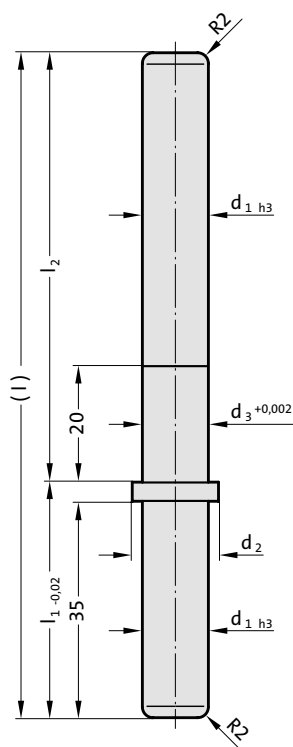
Length  $l_1$  112 = 112

Order No =2021.29.032.112



## Guide pillar with collar

202.61.



### Description:

On small modular die sets the combination plastic ball cage 206.41./collared guide pillar 202.61. has indeed been successful for several years.

### Material:

Steel, surface hardened

Surface hardness: 60 + 4 HRC, Hardness penetration  $1 \pm 0,2$  mm

### Execution:

precision ground

### Note:

For use with ball cage 206.41. and guide bushes 2062.44.012. or 2061.44.15.

## 202.61. Guide pillar with collar

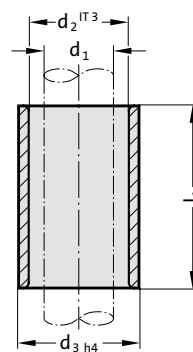
Order No	$d_1$	$d_2$	$d_3$	$l$	$l_1$	$l_2$
202.61.012.041.074	12	15.9	12.02	115	41	74
202.61.015.044.080	15	23.5	15.02	124	44	80



## Guide bush for ball bearing, for highest stroking speed Guide bush for ball bearing, ISO 9448-3



2062.44.012.



### Material:

Tool steel, hardened  $62 \pm 2$  HRC

### Execution:

Bearing surfaces honed,  
outside diameter precision ground.

### Note:

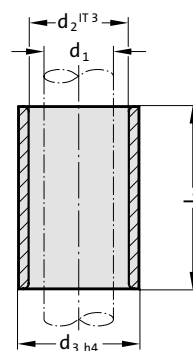
For use with ball cage 206.41. and guide pillar 202.61.

2062.44.012. Guide bush for ball bearing,  
for highest stroking speed

Order No	d <sub>1</sub>	d <sub>2</sub>	d <sub>3</sub>	l <sub>1</sub>	for ball Ø
2062.44.012.016.032	12	16	20	32	2
2062.44.012.017.032	12	17	20	32	2.5



2061.44.015.



### Material:

Tool steel, hardened  $62 \pm 2$  HRC

### Execution:

Bearing surfaces honed,  
outside diameter precision ground.

### Note:

For use with ball cage 206.41. and guide pillar 202.61.

Tolerance range:

yellow = .10

green = .20

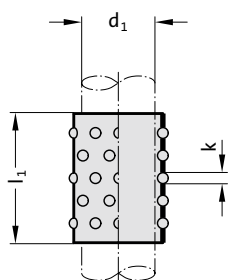
2061.44. Guide bush for ball bearing,  
ISO 9448-3

Order No	d <sub>1</sub>	d <sub>2</sub>	d <sub>3</sub>	l <sub>1</sub>
2061.44.015.023.10	15	21	28	23
2061.44.015.023.20	15	21	28	23
2061.44.015.023.30	15	21	28	23
2061.44.015.030.10	15	21	28	30
2061.44.015.030.20	15	21	28	30
2061.44.015.030.30	15	21	28	30
2061.44.015.037.10	15	21	28	37
2061.44.015.037.20	15	21	28	37
2061.44.015.037.30	15	21	28	37
2061.44.015.047.10	15	21	28	47
2061.44.015.047.20	15	21	28	47
2061.44.015.047.30	15	21	28	47
2061.44.015.060.10	15	21	28	60
2061.44.015.060.20	15	21	28	60
2061.44.015.060.30	15	21	28	60



## Ball cage, plastic, for highest stroking speed

206.41.



### 206.41. Ball cage, plastic, for highest stroking speed

Order No	$d_1$	$l_1$	$k$
206.41.012.020.021	12	21	2
206.41.012.020.042	12	42	2
206.41.012.025.021	12	21	2.5
206.41.012.025.042	12	42	2.5
206.41.015.030.045	15	45	3
206.41.015.030.056	15	56	3
206.41.015.030.063	15	63	3
206.41.015.030.071	15	71	3

#### Description:

Owing to its much lower inertia, the plastic ball cage of particular advantage in die sets operating at stroking speed of 1000 SPM and more.

The phenomenon of ball-drag at the reversal point of cage travel, set up by the cage inertia, no longer occurs. The negative influence of this drag is eliminated – and so are the wear symptoms associated with it.

On small modular die sets the combination plastic ball cage 206.41./collared guide pillar 202.61. has indeed been successful for several years.

#### Material:

Cage: Polyacetal tubing

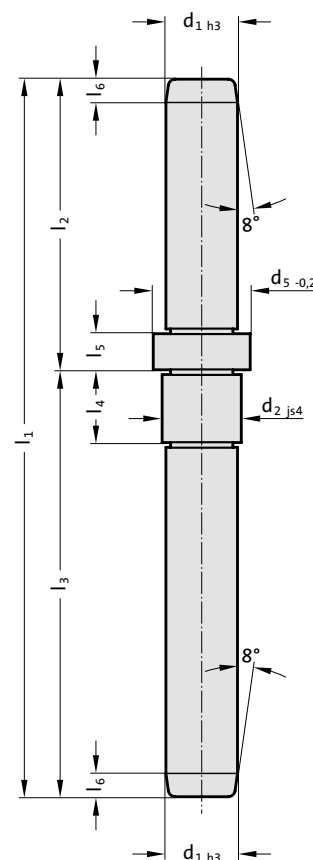
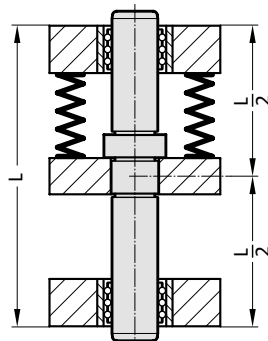
Balls: Steel hardened DIN 5401- Quality Class 1

## Demountable guide pillar with centre fixing



Mounting example

2020.63.



### Material:

Steel, surface hardened

Surface hardness: 62 + 2 HRC, Hardness penetration 1 ± 0,2 mm

### Execution:

precision ground

### Note:

For press fit into register bore N5.

Bending equation see at the beginning of chapter D.

Matching guide combinations, see selection matrix at the beginning of chapter D.

## 2020.63. Demountable guide pillar with centre fixing

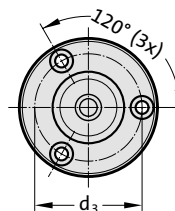
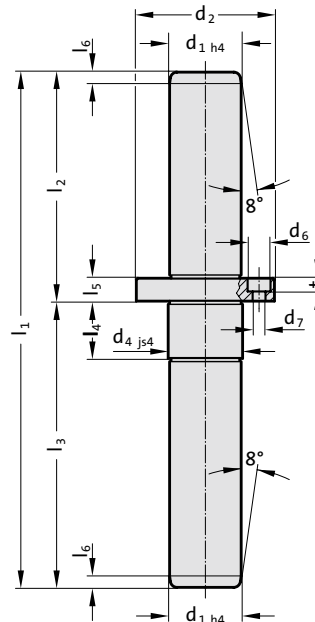
Order No	d <sub>1</sub>	d <sub>2</sub>	d <sub>5</sub>	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	l <sub>4</sub>	l <sub>5</sub>	l <sub>6</sub>
2020.63.012.042.074	12	13	15.9	116	42	74	12.5	5	3
2020.63.016.064.094	16	18	21.9	158	64	94	16	8	5



## Demountable guide pillar with centre fixing



2020.62.



### Material:

Steel, (Core strength:  $\geq 900 \text{ N/mm}^2$ ) surface hardened

Surface hardness:  $60 + 3 \text{ HRC}$ , Hardness penetration  $\geq 2,0 + 1,6 \text{ mm}$

### Execution:

precision ground

### Note:

Use socket cap screws DIN EN ISO 4762 12.9.

Bearing clearance / Preloading see pairing classification at the beginning of chapter D.

Matching guide combinations, see selection matrix at the beginning of chapter D.

Bending equation see at the beginning of chapter D.

$\varnothing 12$  only available in tolerance range

yellow = .10

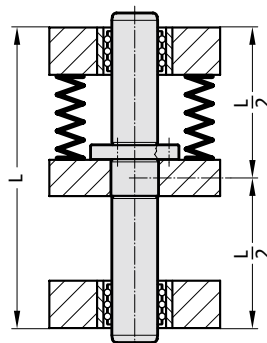
Tolerance range:

yellow = .10

green = .20

red = .30

### Mounting example





## Demountable guide pillar with centre fixing

### 2020.62. Demountable guide pillar with centre fixing

d <sub>1</sub>	d <sub>2</sub>	d <sub>3</sub>	d <sub>4</sub>	d <sub>6</sub>	d <sub>7</sub>	t	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	l <sub>4</sub>	l <sub>5</sub>	l <sub>6</sub>
12	28	20	13	6	3.4	3.4	90	40	50	12	6	3
12	28	20	13	6	3.4	3.4	100	40	60	12	6	3
12	28	20	13	6	3.4	3.4	110	50	60	12	6	3
12	28	20	13	6	3.4	3.4	120	50	70	12	6	3
12	28	20	13	6	3.4	3.4	130	60	70	12	6	3
12	28	20	13	6	3.4	3.4	140	70	70	12	6	3
16	38	28	18	8	4.5	4.6	140	60	80	16	8	4
16	38	28	18	8	4.5	4.6	150	60	90	16	8	4
16	38	28	18	8	4.5	4.6	160	70	90	16	8	4
16	38	28	18	8	4.5	4.6	170	70	100	16	8	4
16	38	28	18	8	4.5	4.6	180	80	100	16	8	4
16	38	28	18	8	4.5	4.6	190	90	100	16	8	4
19	42	32	22	8	4.5	4.6	160	70	90	20	8	4
19	42	32	22	8	4.5	4.6	170	70	100	20	8	4
19	42	32	22	8	4.5	4.6	180	80	100	20	8	4
19	42	32	22	8	4.5	4.6	190	80	110	20	8	4
19	42	32	22	8	4.5	4.6	200	90	110	20	8	4
19	42	32	22	8	4.5	4.6	210	100	110	20	8	4
25	48	38	26	8	4.5	4.6	180	80	100	22	8	6
25	48	38	26	8	4.5	4.6	190	80	110	22	8	6
25	48	38	26	8	4.5	4.6	200	90	110	22	8	6
25	48	38	26	8	4.5	4.6	210	90	120	22	8	6
25	48	38	26	8	4.5	4.6	220	100	120	22	8	6
25	48	38	26	8	4.5	4.6	230	110	120	22	8	6
32	60	48	34	10	5.5	5.7	180	80	100	25	10	7
32	60	48	34	10	5.5	5.7	190	80	110	25	10	7
32	60	48	34	10	5.5	5.7	200	90	110	25	10	7
32	60	48	34	10	5.5	5.7	210	90	120	25	10	7
32	60	48	34	10	5.5	5.7	220	100	120	25	10	7
32	60	48	34	10	5.5	5.7	230	100	130	25	10	7
32	60	48	34	10	5.5	5.7	240	110	130	25	10	7
32	60	48	34	10	5.5	5.7	250	110	140	25	10	7
40	70	56	42	11	6.6	6.8	200	90	110	27	12	7
40	70	56	42	11	6.6	6.8	210	90	120	27	12	7
40	70	56	42	11	6.6	6.8	220	100	120	27	12	7
40	70	56	42	11	6.6	6.8	230	100	130	27	12	7
40	70	56	42	11	6.6	6.8	240	110	130	27	12	7
40	70	56	42	11	6.6	6.8	250	110	140	27	12	7
40	70	56	42	11	6.6	6.8	260	120	140	27	12	7

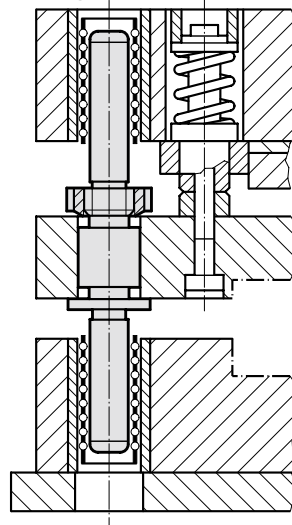
### Ordering Code (example):

Demountable guide pillar with centre fixing	=2020.62.
Guide diameter d <sub>1</sub>	25 mm = 025.
Length with collar (short) l <sub>2</sub>	80 mm = 080.
Length up to collar (long) l <sub>3</sub>	110 mm = 110.
Classification TOL	yellow = 10
Order No	=2020.62.025.080.110.10

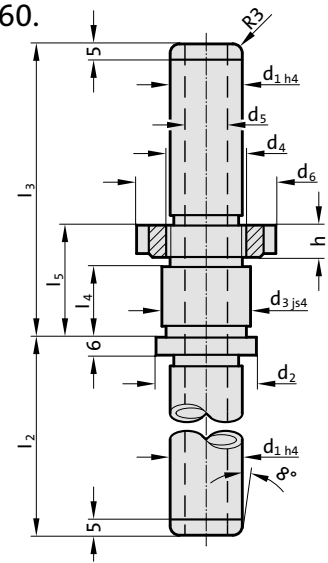
# Demountable guide pillar with centre fixing and ring nut



Mounting example



202.60.



## Material:

Steel, (Core strength:  $\geq 900 \text{ N/mm}^2$ ) surface hardened  
Surface hardness:  $60 \pm 3 \text{ HRC}$ , Hardness penetration  $\geq 1,8 \text{ mm}$

## Execution:

precision ground

## Note:

Bearing clearance / Preloading see pairing classification at the beginning of chapter D.  
Matching guide combinations, see selection matrix at the beginning of chapter D.  
Bending equation see at the beginning of chapter D.  
Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.  
Tolerance range:  
yellow = .10  
green = .20  
red = .30

## 202.60 Demountable guide pillar with centre fixing and ring nut

d <sub>1</sub>	19	25	32	40
d <sub>2</sub>	32	38	46	56
d <sub>3</sub>	25	30	36	46
d <sub>4</sub>	M22 x 1.5	M28 x 1.5	M35 x 1.5	M45 x 1.5
d <sub>5</sub>	8	12	20	28
d <sub>6</sub>	40	50	55	68
h	9	10	11	12
l <sub>2</sub>	80	80	100	100
l <sub>3</sub>	120	120	140	140
l <sub>4</sub>	29	29	34	34
l <sub>5</sub>	45	45	50	50

## Ordering Code (example):

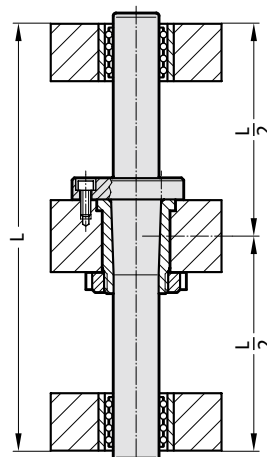
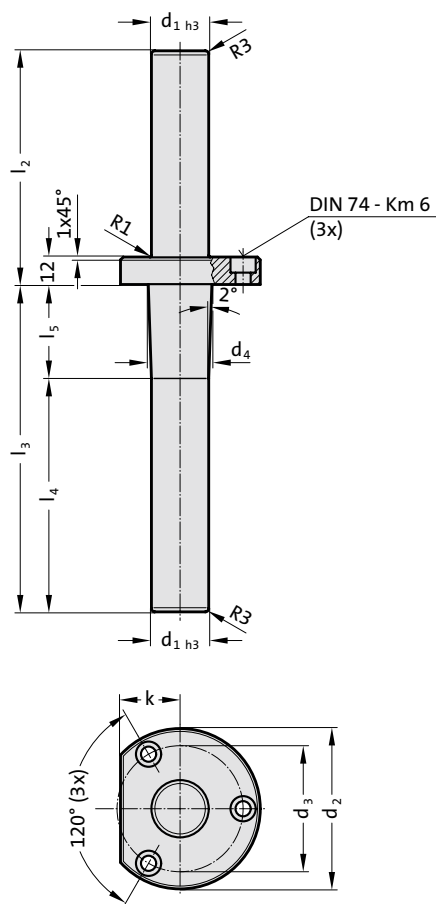
Demountable guide pillar with centre fixing and ring nut	=202.60.
Guide diameter d <sub>1</sub>	32 mm = 032.
Length with collar l <sub>2</sub>	100 mm = 100.
Length up to collar l <sub>3</sub>	140 mm = 140.
Classification TOL	yellow = 10
Order No	=202.60.032.100.140.10



## Demountable guide pillar with conical centre fixing

2020.64.

### Mounting example



### Material:

Steel, hardened  $62 \pm 2$  HRC

### Execution:

precision ground

### Note:

Matching retaining bush 2021.64.

Use socket cap screws DIN EN ISO 4762 12.9.

Bearing clearance / Preloading see pairing classification at the beginning of chapter D.

Matching guide combinations, see selection matrix at the beginning of chapter D.

Bending equation see at the beginning of chapter D.

Tolerance range:

yellow = .10

green = .20

## 2020.64. Demountable guide pillar with conical centre fixing

d <sub>1</sub>	25	25	32	32	32	32	32	32
d <sub>2</sub>	70	70	76	76	76	76	76	76
d <sub>3</sub>	55	55	62	62	62	62	62	62
d <sub>4</sub>	27.86	27.86	34.86	34.86	34.86	34.86	34.86	34.86
k	26	26	30	30	30	30	30	30
l <sub>2</sub>	102	122	102	122	122	137	142	162
l <sub>3</sub>	143	143	143	143	153	153	153	153
l <sub>4</sub>	102	102	102	102	112	112	112	112
l <sub>5</sub>	41	41	41	41	41	41	41	41

### Ordering Code (example):

Demountable guide pillar with conical centre fixing =2020.64.

Guide diameter d<sub>1</sub> 32 mm = 032.

Length with collar (short) l<sub>2</sub> 122 mm = 122.

Length up to collar (long) l<sub>3</sub> 153 mm = 153.

Classification TOL yellow = 10

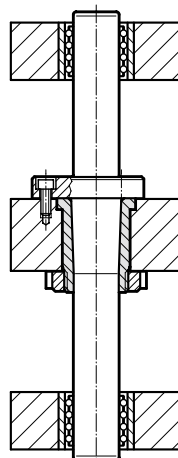
Order No =2020.64.032.122.153.10



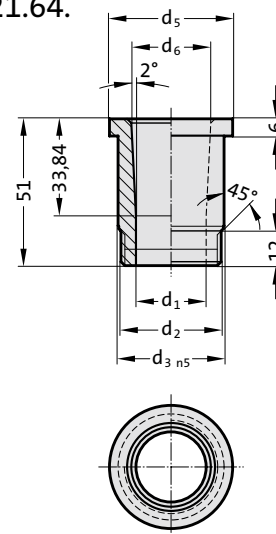
# Retaining bush for guide pillar conical 2020.64.



Mounting example



2021.64.



## Material:

16 MnCr5

Surface hardness:  $60 \pm 2$  HRC, Hardness penetration 0,8–1 mm

## Execution:

Thread not hardened

## Fixing:

Ring nut 2073.48.□□15 order separately.

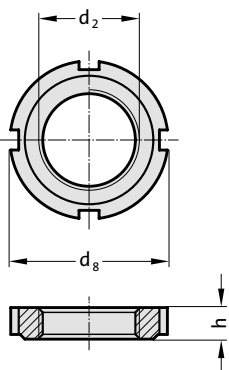
## 2021.64. Retaining bush for guide pillar conical 2020.64.

Order No	D1xx	d <sub>2</sub>	d <sub>3</sub>	d <sub>5</sub>	d <sub>6</sub>
2021.64.025	25.5	M35x1,5	37	43	27.86
2021.64.032	32.5	M40x1,5	44	50	34.86

## Ring nut DIN 1804



2073.48.



## 2073.48. Ring nut DIN 1804

Order No	d <sub>2</sub>	d <sub>8</sub>	h
2073.48.35.15	M35x1,5	48	11
2073.48.40.15	M40x1,5	54	12

## Material:

Steel, hardened

## Note:

For fixing the retaining bush 2021.64.



## Guide unit with collar MILLION GUIDE



**FIBRO**

### 2024.94. Guide unit with collar MILLION GUIDE

d <sub>1</sub>	12	16	20	25	30	32	40	50	60	80
d <sub>2</sub>	12	16	20	25	30	32	40	50	60	80
d <sub>3</sub>	18	24	29	35	40	42	54	64	74	98
d <sub>4</sub>	16	22	26	32	38	40	50	60	72	105
d <sub>5</sub>	18	24	28	34	38	40	50	60	72	105
d <sub>6</sub>	23	30	37	44	50	54	68	78	95	120
m	M5x8	M6x10	M8x20	M8x20	M10x25	M10x25	M12x30	M12x30	M14x30	M16x30
l <sub>2</sub>	12	16	20	25	30	30	35	35	42	45
l <sub>3</sub>	6	6	8	8	8	8	8	8	15	15
l <sub>4</sub>	7	10	13	13	16	16	18	18	20	26
l <sub>5</sub>	3	4	5	5	7	7	9	9	12	13
l <sub>6</sub>	5	6	8	8	9	9	10	12	15	15
l <sub>7</sub>	29.8	30	52	62	68	68	78	82	116	132
l <sub>8</sub>	40	40	60	70	78	78	92	96	120	145
l <sub>9</sub>	0	0	20	20	20	20	20	20	20	25
l <sub>1</sub>										
50	●									
60	●									
70	●									
80	●	●	●							
90	●	●	●							
100	●	●	●	●	●	●				
110	●	●	●	●	●	●				
120	●	●	●	●	●	●	●			
130		●	●	●	●	●	●			
140				●	●	●	●			
150				●	●	●	●	●	●	
160				●	●	●	●	●	●	
170					●	●	●	●	●	
180					●	●	●	●	●	●
190					●	●	●	●	●	●
200					●	●	●	●	●	●
210							●	●	●	●
220							●	●	●	●
230								●	●	●
240								●	●	●
250								●	●	●
260										●
270										●
280										●

### Ordering Code (example):

Guide unit with collar MILLION GUIDE =2024.94.

Guide diameter d<sub>1</sub> 32 mm = 032.

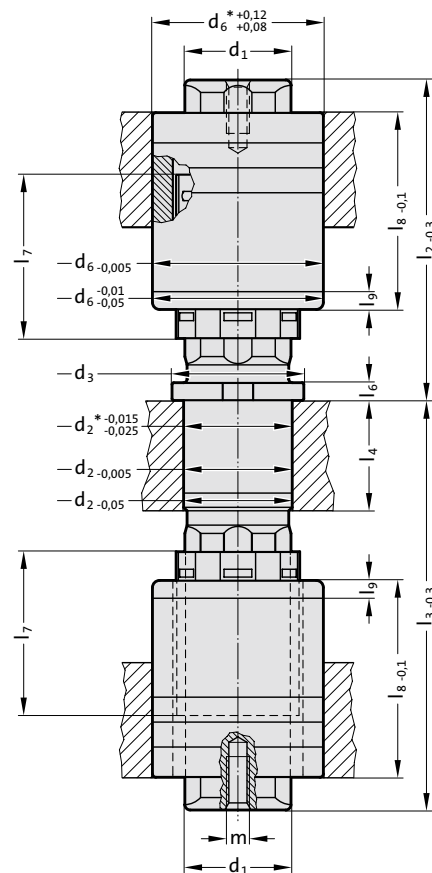
Guide length l<sub>1</sub> 100 mm = 100

Order No =2024.94.032. 100

## Guide unit with center fixing MILLION GUIDE



2024.96.



### Description:

FIBRO Million Guide guide units are used wherever rigidity, robustness and a precision guide function is required.

The large supporting surface of the needle rollers ensures these properties.

For stroke speeds up to 50 m/min and temperatures up to 80°C.

### Material:

Needle roller cages: Plastic

Needle rollers: Steel, hardened

Guide bushes: Tool steel alloy, hardened, 60 ± 2 HRC

Guide pillar: Tool steel alloy, hardened, 60 ± 2 HRC

Disk: Steel

### Execution:

Guide unit consisting of a paired guide pillar, guide bushes and needleroller cages.

Guide pillar and bushes are executed at:

Ø 16 with 4 running surfaces

Ø 12, Ø 20 - Ø 30 with 6 running surfaces

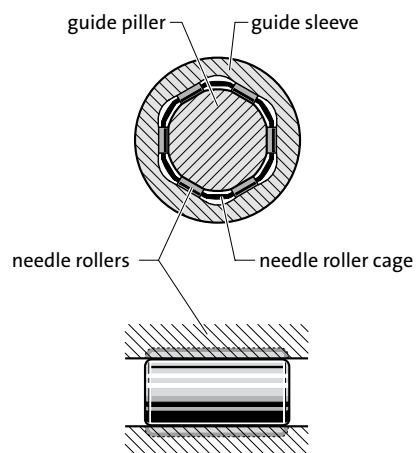
### Note:

Guide unit must be installed in accordance with the instructions!

Guide bushes must be bonded!

\* Mounting bore

### Cross section of guide unit





## Guide unit with center fixing MILLION GUIDE

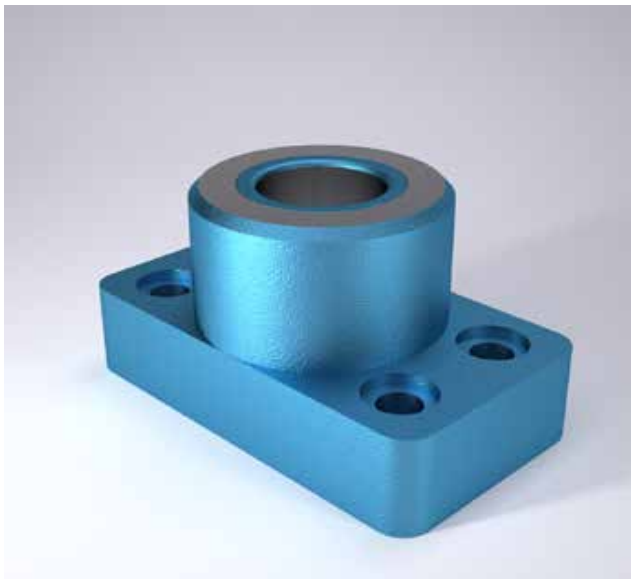
## 2024.96. Guide unit with center fixing MILLION GUIDE

d <sub>1</sub>	12	16	20	25	30
d <sub>2</sub>	12.5	16.5	20.5	25.5	30.5
d <sub>3</sub>	19	23	27	32	37
d <sub>6</sub>	22	28	34	40	48
m	M5x8	M6x10	M8x20	M8x20	M8x20
l <sub>4</sub>	12	16	20	25	30
l <sub>6</sub>	4	5	5	5	5
l <sub>7</sub>	29.8	30	46	56	68
l <sub>8</sub>	30	40	50	60	70
l <sub>9</sub>	-	-	20	20	20
l <sub>3</sub>	l <sub>2</sub>				
50	40 50 60				
60	40 50 60				
70	40 50 60	40 50 60			
80		40 50 60 70	40 50 60 70		
90		40 50 60 70	40 50 60 70	40 50 60 70	40 50 60 70
100			40 50 60 70	40 50 60 70	40 50 60 70
110				40 50 60 70	40 50 60 70

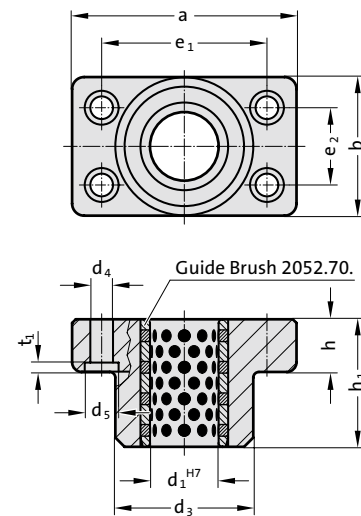
## Ordering Code (example):

Guide unit with center fixing MILLION GUIDE	=2024.96.
Guide diameter d <sub>1</sub>	20 mm = 020.
Length up to collar l <sub>3</sub>	80 mm = 080.
Length with collar l <sub>2</sub>	40 mm = 040
Order No	=2024.96.020.080.040

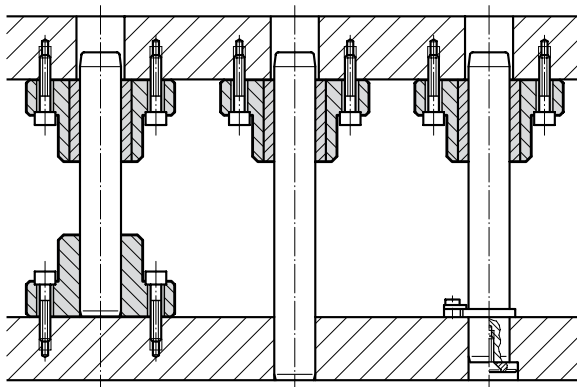
## Guide bearing with solid lubricant



2031.70.



### Mounting example



### Material:

Basic body: Special cast iron

Guide bush 2052.70.: Bronze with solid lubricant, oilless lubricating

### Execution:

Face and top machined.

### Note:

Notes on sliding type guides at the beginning of chapter D.

Matching guide combinations, see selection matrix at the beginning of chapter D.

### 2031.70. Guide bearing with solid lubricant

$d_1$	19 20	24 25	30 32	38 40	50	63	80
$d_3$	45	50	65	80	96	110	130
$d_4$	9	9	11	13.5	17.5	17.5	22
$a$	85	90	115	130	160	180	215
$b$	45	50	65	80	96	110	130
$e_1$	64	68	83	95	118	132	160
$e_2$	24	28	34	45	55	62	75
$h$	18	22	25	30	35	35	40
$h_1$	37	47	60	77	95	120	120
$t_1$	3	3	3	3	4	4	10

### Ordering Code (example):

Guide bearing with solid lubricant =2031.70.

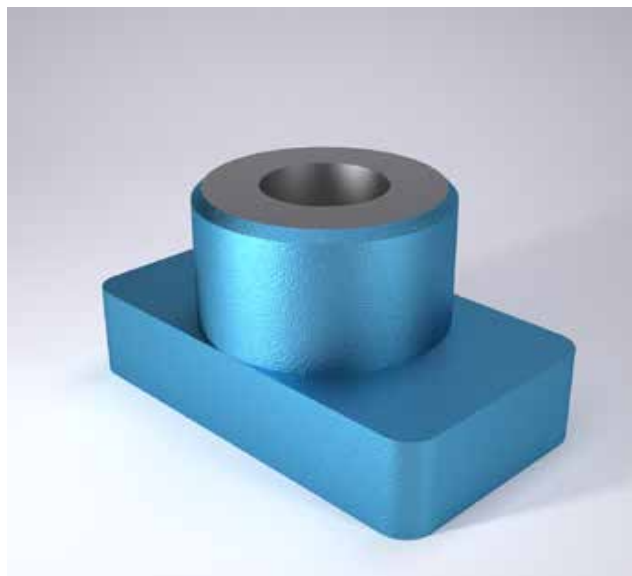
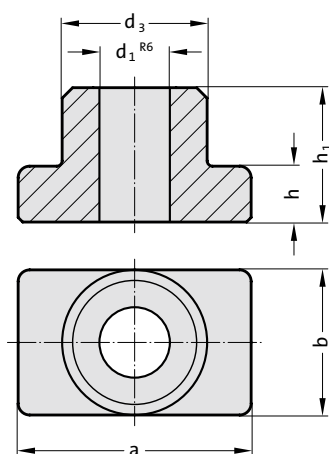
Guide diameter  $d_1$  32 mm = 032

Order No =2031.70.032



## Retention bearing

2031.01.



### Material:

Special cast iron

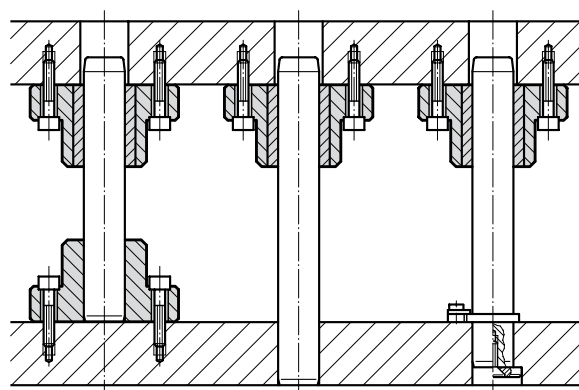
### Execution:

Face and top machined. Hole fine bored to  $d_1^{R6}$  fit.

### Note:

Check squareness of pillars after press-fitting.

### Mounting example



## 2031.01. Retention bearing

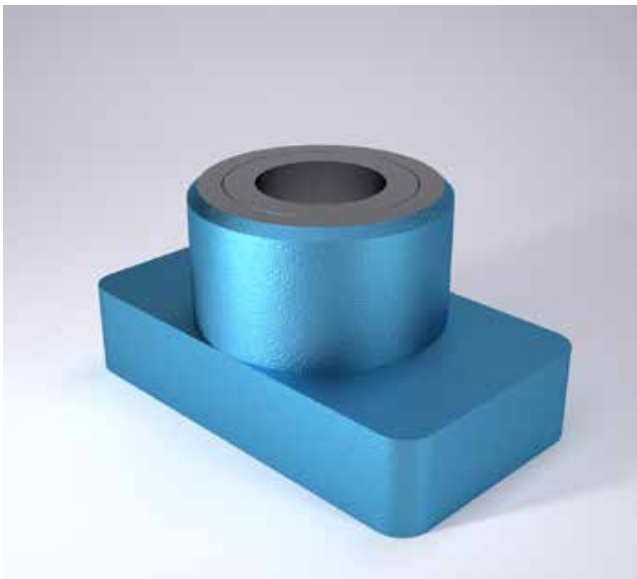
$d_1$	15 16	19 20	24 25	30 32	38 40	48 50	60 63	80
$d_3$	35	45	50	65	80	96	110	130
a	70	85	90	115	130	160	180	215
b	35	45	50	65	80	96	110	130
h	18	18	22	25	30	35	35	40
$h_1$	30	37	47	60	77	95	120	120

### Ordering Code (example):

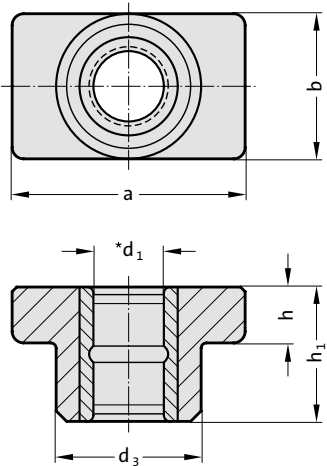
Retention bearing = 2031.01.  
 Guide diameter  $d_1$  32 mm = 032  
 Order No = 2031.01.032



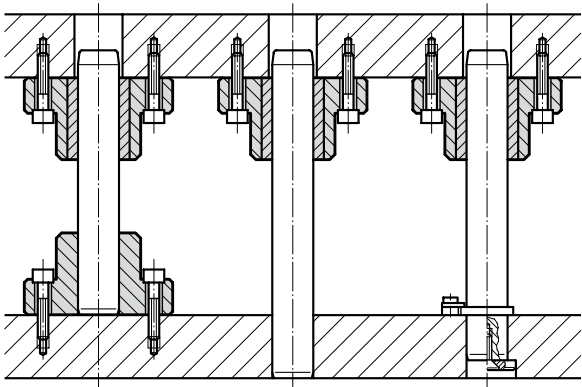
# Guide bearing, sintered guide



2031.31.



## Mounting example



## Material:

Basic body: Special cast iron

Guide bush 2051.32.: Sintered ferrite of high purity, carbonitrided, long-term lubrication

## Execution:

Face and top machined. Bores honed.

## Note:

Notes on sliding type guides at the beginning of chapter D.

Bearing clearance see pairing classification at the beginning of chapter D.

Matching guide combinations, see selection matrix at the beginning of chapter D.

Tolerance range:

yellow = .10

green = .20

red = .30

## 2031.31. Guide bearing, sintered guide

d <sub>1</sub>	15 16	19 20	24 25	30 32	38 40	48 50	60 63	80
d <sub>3</sub>	35	45	50	65	80	96	110	130
a	70	85	90	115	130	160	180	215
b	35	45	50	65	80	96	110	130
h	18	18	22	25	30	35	35	40
h <sub>1</sub>	30	37	47	60	77	95	120	120

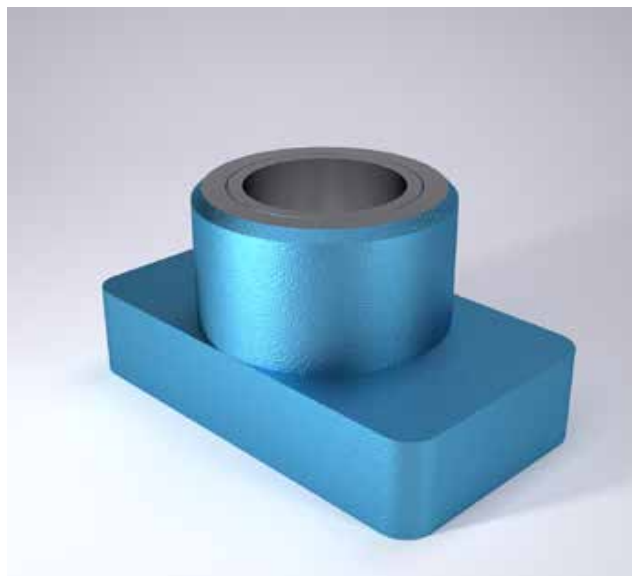
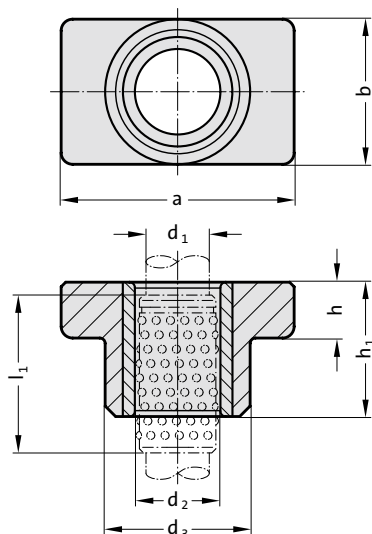
## Ordering Code (example):

Guide bearing, sintered guide =2031.31.  
Guide diameter d<sub>1</sub> 32 mm = 032.  
Classification TOL yellow = 10  
Order No =2031.31.032.10



## Guide bearing for ball bearing guide

2031.41.



### Material:

Basic body: Special cast iron

Guide bush 2061.44.: Tool steel, Hardness:  $62 \pm 2$  HRC

### Execution:

Face and top machined. Bores honed.

### Note:

Notes on ball bearing type guides at the beginning of chapter D.

Preloading see pairing classification at the beginning of chapter D

Matching guide combinations, see selection matrix at the beginning of chapter D.

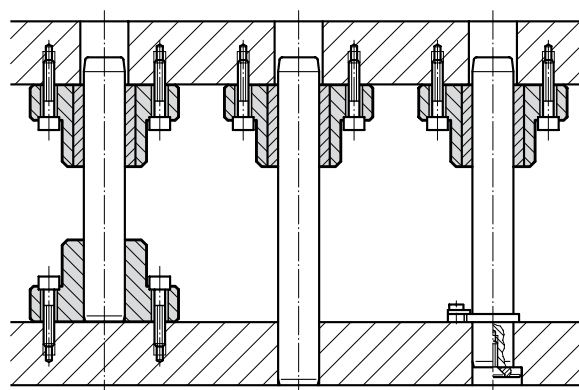
Tolerance range:

yellow = .10

green = .20

red = .30

### Mounting example



## 2031.41. Guide bearing for ball bearing guide

d <sub>1</sub>	15	16	19	20	24	25	30	32	38	40	48	50	60	63
d <sub>2</sub>	21	22	25	26	30	31	38	40	46	48	56	58	68	71
d <sub>3</sub>	35	35	45	45	50	50	65	65	80	80	96	96	110	110
a	70	70	85	85	90	90	115	115	130	130	160	160	180	180
b	35	35	45	45	50	50	65	65	80	80	96	96	110	110
h	18	18	18	18	22	22	25	25	30	30	35	35	35	35
h <sub>1</sub>	30	30	37	37	47	47	60	60	77	77	95	95	120	120
l <sub>1</sub>	4	4	4	4	56	56	71	71	95	95	120	120	140	140
l*	45	45	45	45	56	56	71	71	95	95	120	120	140	140

\*l = Nominal ordering length of ball cage - preferred length

### Ordering Code (example):

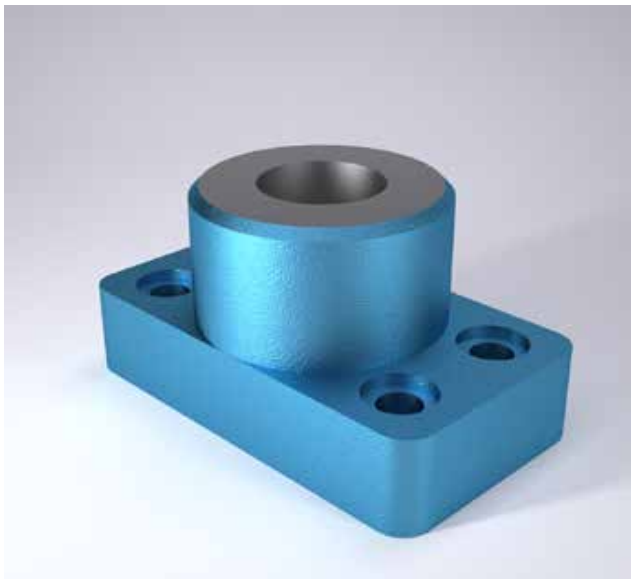
Guide bearing for ball bearing guide = 2031.41.

Guide diameter d<sub>1</sub> 32 mm = 032.

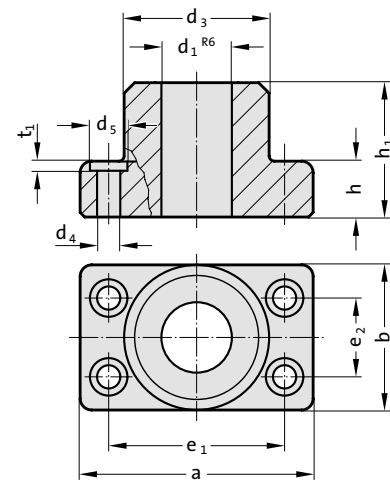
Classification TOL yellow = 10

Order No = 2031.41.032.10

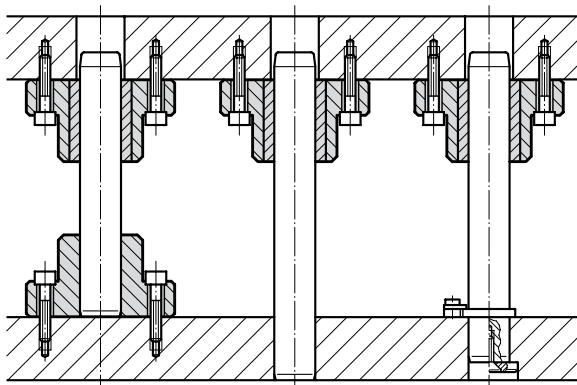
# Retention bearing with screw holes



2031.02.



## Mounting example



### Material:

Special cast iron

### Execution:

Face and top machined. Hole fine bored to  $d_1^{R6}$  fit.

### Note:

Check squareness of pillars after press-fitting.

## 2031.02. Retention bearing with screw holes

$d_1$	15 16	19 20	24 25	30 32	38 40	48 50	60 63	80
$d_3$	35	45	50	65	80	96	110	130
$d_4$	6.6	9	9	11	14	18	18	22
$d_5$	11	15	15	18	20	26	26	33
$t_1$	3	3	3	3	3	4	4	4
$a$	70	85	90	115	130	160	180	215
$b$	35	45	50	65	80	96	110	130
$e_1$	53	64	68	83	95	118	132	160
$e_2$	19	24	28	34	45	55	62	75
$h$	18	18	22	25	30	35	35	40
$h_1$	30	37	47	60	77	95	120	120

## Ordering Code (example):

Retention bearing with screw holes =2031.02.

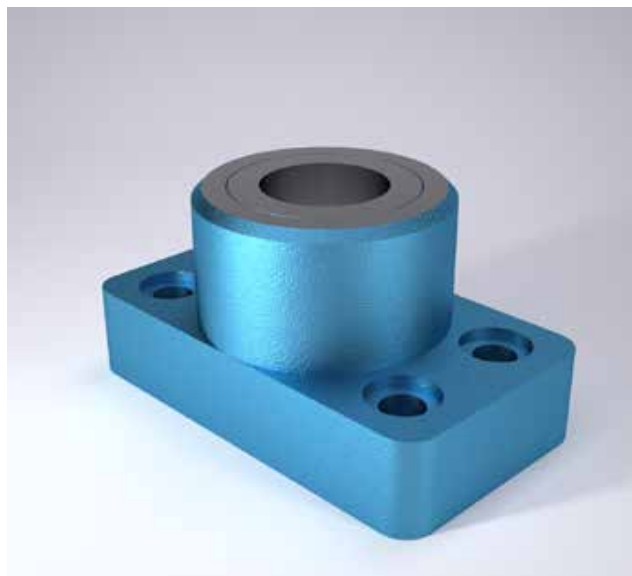
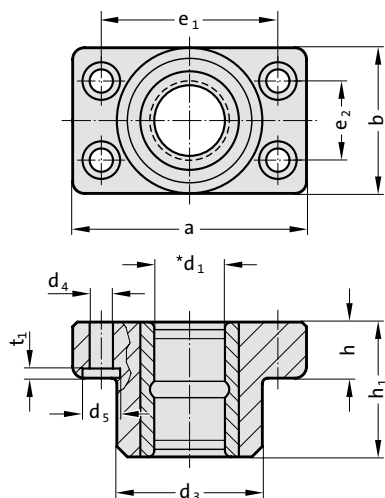
Guide diameter  $d_1$  32 mm = 032

Order No =2031.02.032



## Guide bearing with screw holes, sintered guide

2031.34.



### Material:

Basic body: Special cast iron

Guide bush 2051.32.: Sintered ferrite of high purity, carbonitrided, long-term lubrication

### Execution:

Face and top machined. Bores honed.

### Note:

Notes on sliding type guides at the beginning of chapter D.

Bearing clearance see pairing classification at the beginning of chapter D.

Matching guide combinations, see selection matrix at the beginning of chapter D.

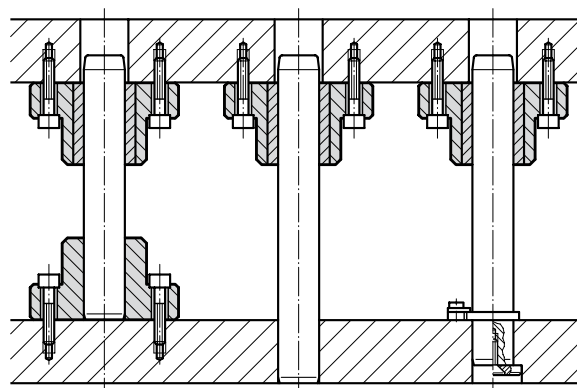
Tolerance range:

yellow = .10

green = .20

red = .30

### Mounting example



## 2031.34. Guide bearing with screw holes, sintered guide

	15 16	19 20	24 25	30 32	38 40	48 50	60 63	80
$d_1$	15	19	24	30	38	48	60	80
$d_3$	35	45	50	65	80	96	110	130
$d_4$	6.6	9	9	11	14	18	18	22
$d_5$	11	15	15	18	20	26	26	33
$t_1$	3	3	3	3	3	4	4	4
$a$	70	85	90	115	130	160	180	215
$b$	35	45	50	65	80	96	110	130
$e_1$	53	64	68	83	95	118	132	160
$e_2$	19	24	28	34	45	55	62	75
$h$	18	18	22	25	30	35	35	40
$h_1$	30	37	47	60	77	95	120	120

### Ordering Code (example):

Guide bearing with screw holes, sintered guide

=2031.34.

Guide diameter  $d_1$

32 mm = 032.

Classification TOL

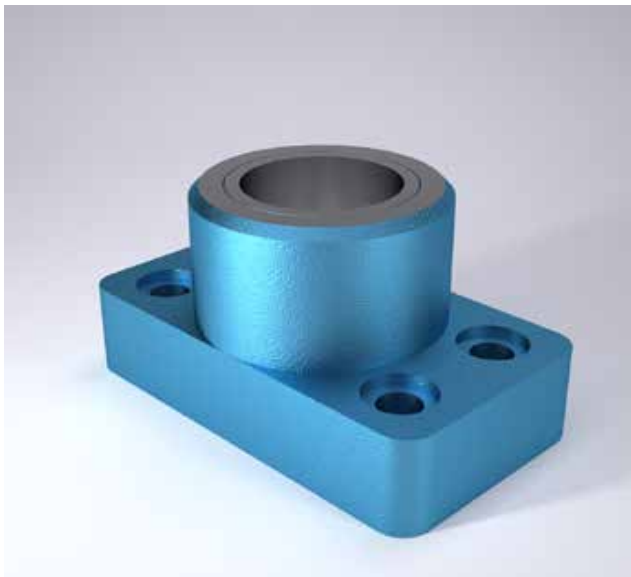
yellow = 10

Order No

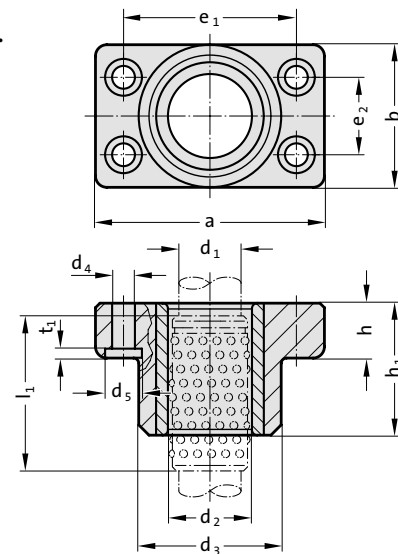
=2031.34.032.10



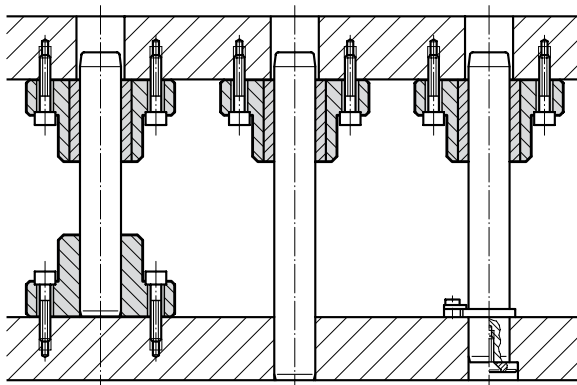
# Guide bearing with screw holes, for ball bearing guide



2031.42.



## Mounting example



## Material:

Basic body: Special cast iron

Guide bush 2061.44.: Tool steel, Hardness: 62 ± 2 HRC

## Execution:

Face and top machined. Bores honed.

## Note:

Notes on ball bearing type guides at the beginning of chapter D.

Preloading see pairing classification at the beginning of chapter D

Matching guide combinations, see selection matrix at the beginning of chapter D.

Tolerance range:

yellow = .10

green = .20

red = .30

## 2031.42. Guide bearing with screw holes, for ball bearing guide

d <sub>1</sub>	15 16	19 20	24 25	30 32	38 40	48 50	60 63
d <sub>2</sub>	21 22	25 26	30 31	38 40	46 48	56 58	68 71
d <sub>3</sub>	35	45	50	65	80	96	110
d <sub>4</sub>	6.6	9	9	11	14	18	18
d <sub>5</sub>	11	15	15	18	20	26	26
t <sub>1</sub>	3	3	3	3	3	4	4
a	70	85	90	115	130	160	180
b	35	45	50	65	80	96	110
e <sub>1</sub>	53	64	68	83	95	118	132
e <sub>2</sub>	19	24	28	34	45	55	62
h	18	18	22	25	30	35	35
h <sub>1</sub>	30	37	47	60	77	95	120
l <sub>1</sub>	44	44	56	70	95	120	140
l*	45	45	56	71	95	120	140

\*l = Nominal ordering length of ball cage - preferred length

## Ordering Code (example):

Guide bearing with screw holes, for ball bearing guide

=2031.42.

Guide diameter d<sub>1</sub>

32 mm = 032.

Classification TOL

yellow = 10

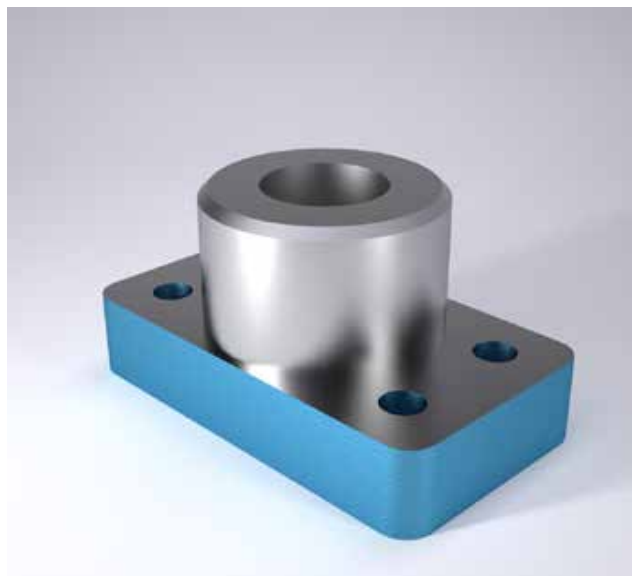
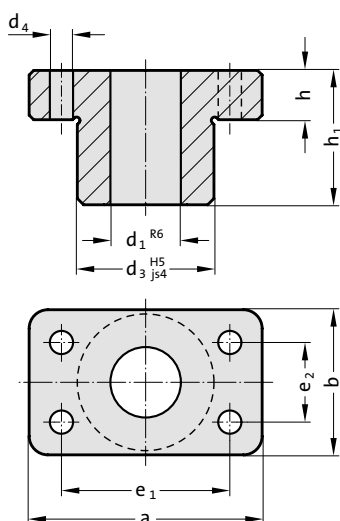
Order No

=2031.42.032.10



## Retention bearing, low build height

2031.04.



### Material:

Special cast iron

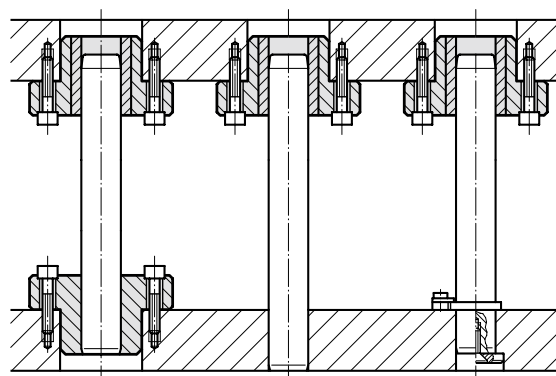
### Execution:

Both faces machined to dims. h; O. D.  $d_3$  turned.  
Hole fine bored to  $d_1^{R6}$  - fit.

### Note:

Check squareness of pillars after press-fitting.

### Mounting example



## 2031.04. Retention bearing, low build height

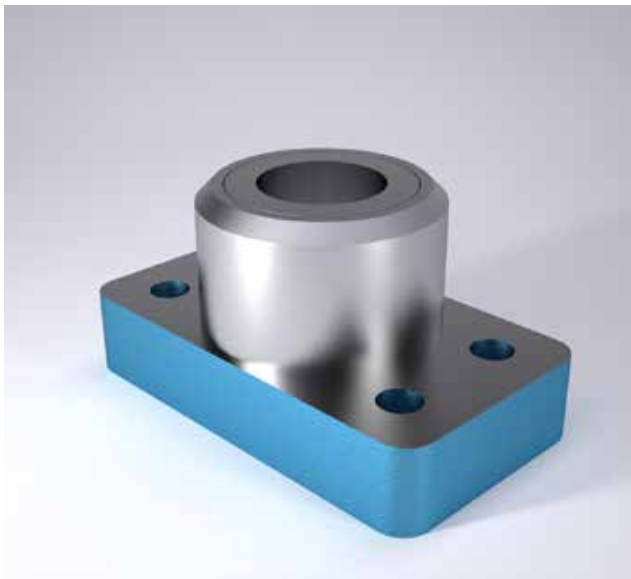
$d_1$	15 16	19 20	24 25	30 32	38 40	48 50	60 63	80
$d_3$	32	42	47	62	77	93	107	127
$d_4$	7	9	9	11	14	18	18	22
a	70	85	90	115	130	160	180	215
b	35	45	50	65	80	96	110	130
$e_1$	53	64	68	83	95	118	132	160
$e_2$	19	24	28	34	45	55	62	75
h	16	16	20	23	28	33	33	38
$h_1$	30	37	47	60	77	95	120	120

### Ordering Code (example):

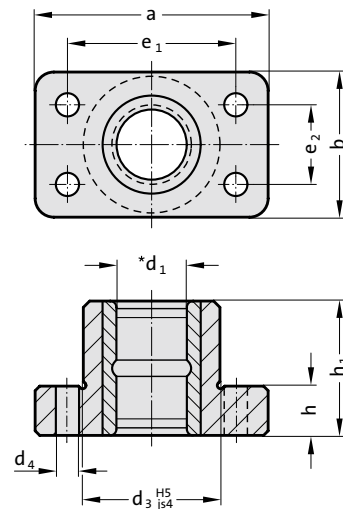
Retention bearing, low build height =2031.04.  
Guide diameter  $d_1$  32 mm = 032  
Order No =2031.04.032



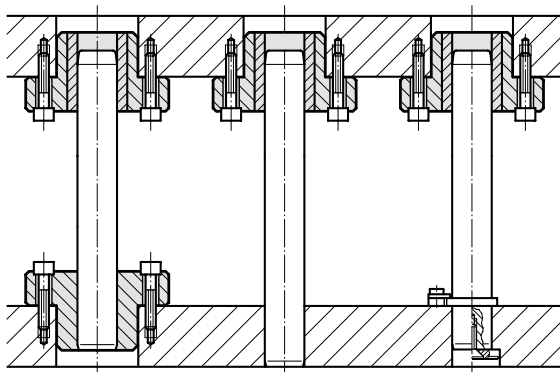
## Guide bearing, low build height, sintered guide



2031.38.



### Mounting example



### Material:

Basic body: Special cast iron

Guide bush 2051.32.: Sintered ferrite of high purity, carbonitrided, long-term lubrication

### Execution:

Both faces machined to dims. h; O. D. d<sub>3</sub> turned.

Bores honed.

### Note:

Notes on sliding type guides at the beginning of chapter D.

Bearing clearance see pairing classification at the beginning of chapter D.

Matching guide combinations, see selection matrix at the beginning of chapter D.

### Tolerance range:

yellow = .10

green = .20

red = .30

### 2031.38. Guide bearing, low build height, sintered guide

d <sub>1</sub>	15 16	19 20	24 25	30 32	38 40	48 50	60 63	80
d <sub>3</sub>	32	42	47	62	77	93	107	127
d <sub>4</sub>	7	9	9	11	14	18	18	22
a	70	85	90	115	130	160	180	215
b	35	45	50	65	80	96	110	130
e <sub>1</sub>	53	64	68	83	95	118	132	160
e <sub>2</sub>	19	24	28	34	45	55	62	75
h	16	16	20	23	28	33	33	38
h <sub>1</sub>	30	37	47	60	77	95	120	120

### Ordering Code (example):

Guide bearing, low build height, sintered guide =2031.38.

Guide diameter d<sub>1</sub> 32 mm = 032.

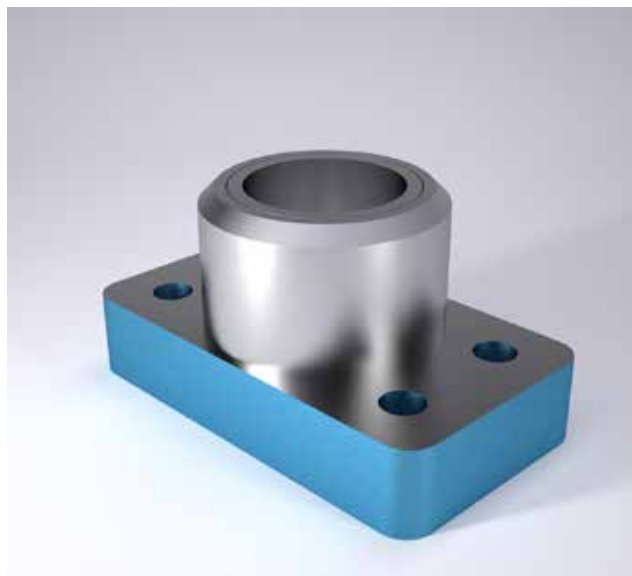
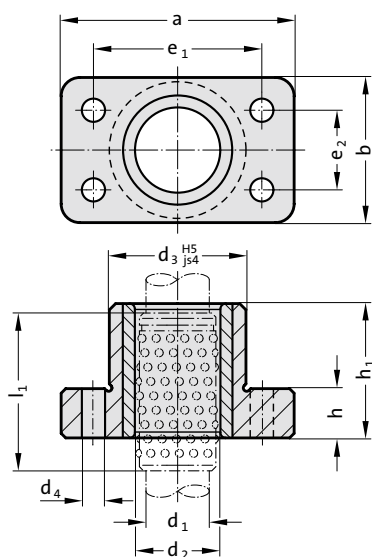
Classification TOL yellow = 10

Order No =2031.38.032.10



## Guide bearing low build height, for ball bearing guide

2031.44.



### Material:

Basic body: Special cast iron

Guide bush 2061.44.: Tool steel, Hardness: 62 ± 2 HRC

### Execution:

Both faces machined to dims. h; O. D. d<sub>3</sub> turned.

Bores honed.

### Note:

Notes on ball bearing type guides at the beginning of chapter D.

Preloading see pairing classification at the beginning of chapter D

Matching guide combinations, see selection matrix at the beginning of chapter D.

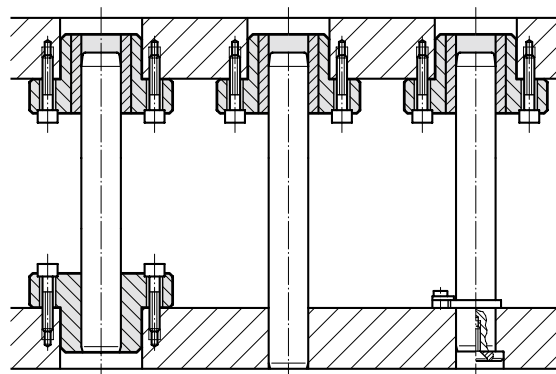
Tolerance range:

yellow = .10

green = .20

red = .30

### Mounting example



## 2031.44. Guide bearing low build height, for ball bearing guide

d <sub>1</sub>	19 20	24 25	30 32	38 40	48	50
d <sub>2</sub>	25 26	30 31	38 40	46 48	56	58
d <sub>3</sub>	42	47	62	77	93	93
d <sub>4</sub>	9	9	11	14	18	18
a	85	90	115	130	160	160
b	45	50	65	80	96	96
e <sub>1</sub>	64	68	83	95	118	118
e <sub>2</sub>	24	28	34	45	55	55
h	16	20	23	28	33	33
h <sub>1</sub>	37	47	60	77	95	95
l <sub>1</sub>	44	56	70	95	120	120
l*	45	56	71	95	120	10

\*l = Nominal ordering length of ball cage - preferred length

### Ordering Code (example):

Guide bearing low build height, for ball bearing guide = 2031.44.

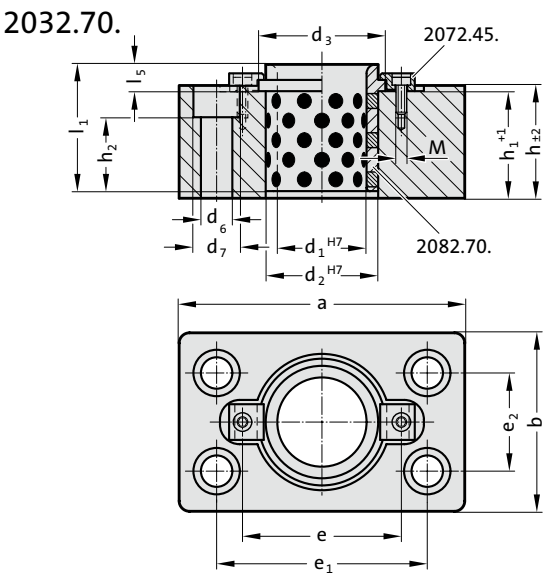
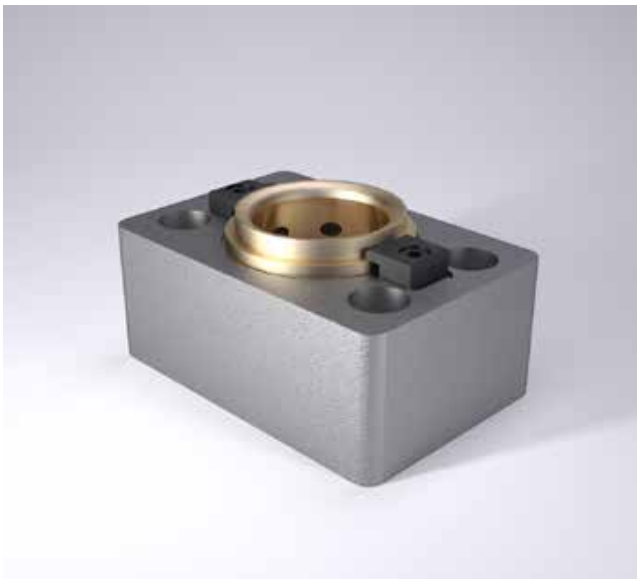
Guide diameter d<sub>1</sub> 32 mm = 032.

Classification TOL yellow = 10

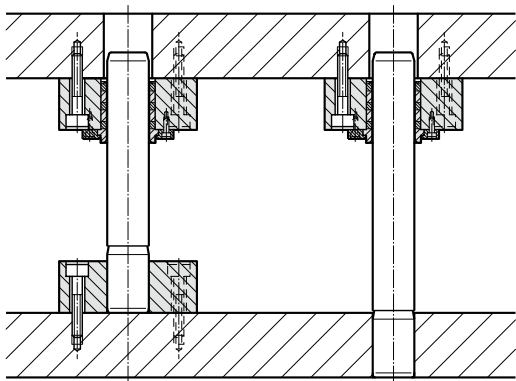
Order No = 2031.44.032.10



# Guide bearing with headed guide bush with solid lubricant



## Mounting example



## Material:

Basic body: Steel, St 37

Guide bush 2082.70.: Bronze with solid lubricant, oilless lubricating

## Execution:

Face machined.

## Note:

Notes on sliding type guides at the beginning of chapter D.

Matching guide combinations, see selection matrix at the beginning of chapter D.

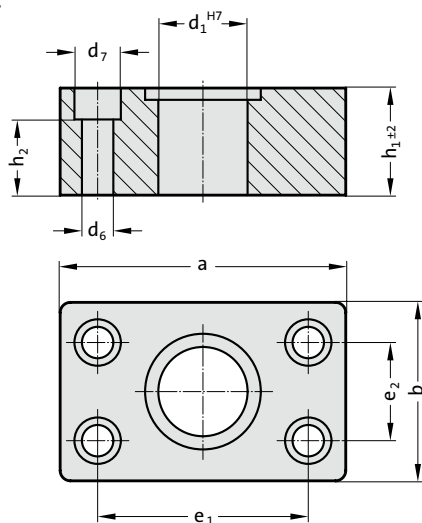


## 2032.70. Guide bearing with headed guide bush with solid lubricant

Order No	d <sub>1</sub>	a	b	h	H1	d <sub>2</sub>	d <sub>3</sub>	l <sub>1</sub>	L5	d <sub>6</sub>	d <sub>7</sub>	h <sub>2</sub>	e	e <sub>1</sub>	e <sub>2</sub>	M
2032.70.050	50	160	100	60	57	63	71	71	17	17.5	26	40	89	118	55	M6
2032.70.063	63	180	125	70	67	80	90	80	19	17.5	26	50	123	132	62	M10
2032.70.080	80	215	145	90	87	100	112	100	22	22	33	66	143	160	75	M10
2032.70.100	100	230	170	110	107	125	140	125	21	22	33	86	168	168	110	M10
2032.70.125	125	270	205	140	137	160	180	160	30	26	40	112	203	203	142	M10
2032.70.160	160	315	250	180	177	200	220	200	32	26	40	152	243	243	170	M10

# Retention bearing for guide pillars for large tools

2032.02.



## Material:

Steel, St 37

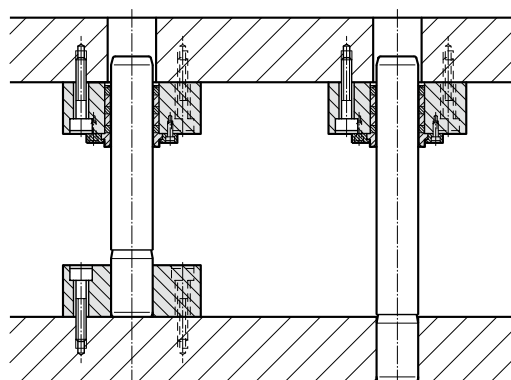
## Execution:

Face machined. Hole fine bored to  $d_1^{H7}$  fit.

## Note:

For guide pillars with mounting diameter r6.  
Check squareness of pillars after press-fitting.

## Mounting example



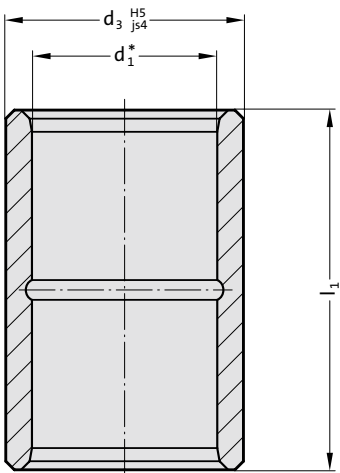
## 2032.02. Retention bearing for guide pillars for large tools

Order No	$d_1$	a	b	$h_1$	$d_6$	$d_7$	$h_2$	$e_1$	$e_2$
2032.02.050	50	160	100	70	17.5	26	40	118	55
2032.02.063	63	180	125	80	17.5	26	50	132	62
2032.02.080	80	215	145	100	22	33	66	160	75
2032.02.100	100	230	170	125	22	33	86	168	110
2032.02.125	125	270	205	140	26	40	112	203	142
2032.02.160	160	315	250	180	26	40	152	243	170

# Guide bush, sintered ferrite carbonitrided with long-term lubrication, ISO 9448-2



2051.32.



**Material:**

Sintered ferrite of high purity, carbonitrided, long-term lubrication

**Execution:**

Bearing surfaces and outside diameter precision ground.

**Slip-Fit Bonding:**

The position of the bearing is given by push fit holes tolerance H5. The adhesive (order no. 281.648) provides optimum push retention whilst offering the following **advantages:**

- high accuracy and stiffness
- no problems to find position when changing bushings

We do not recommend to press fit for the same reasons mentioned above.

**Note:**

Notes on sliding type guides at the beginning of chapter D.

\* Bearing clearance see pairing classification at the beginning of chapter D. Matching guide combinations, see selection matrix at the beginning of chapter D.

Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.

Ø 8 - Ø 12 not available in tolerance range red = .30.

Tolerance range:

yellow = .10

green = .20

red = .30

## 2051.32. Guide bush, sintered ferrite carbonitrided with long-term lubrication, ISO 9448-2

	8	11 12	15 16	19 20	24 25	30 32	38 40	48 50	60 63	80
d <sub>1</sub>	13.7	22	28	32	40	48	58	70	85	95.7
d <sub>3</sub>										
l <sub>1</sub>										
15	●									
23		●	●	●	●		●			
30		●	●	●	●	●	●			
37		●	●	●	●	●	●	●		
47			●	●	●	●	●	●		
60			●	●	●	●	●	●	●	●
77				●	●	●	●	●	●	●
95						●	●	●	●	
110										●
120							●	●	●	●

**Ordering Code (example):**

Guide bush, sintered ferrite carbonitrided with long-term lubrication, ISO 9448-2

=2051.32.

Guide diameter d<sub>1</sub>

30 mm= 030.

Length l<sub>1</sub>

30 mm= 030.

Classification TOL

yellow = 10

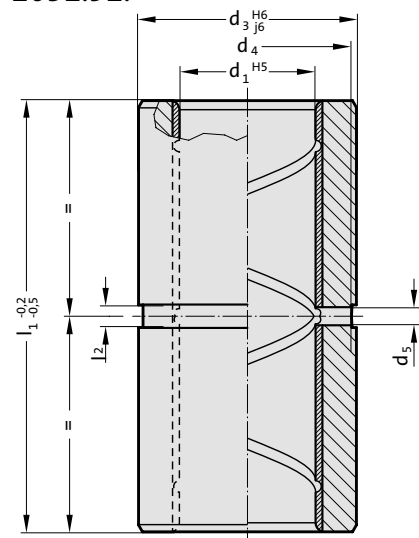
Order No

=2051.32.030.030.10



## Guide bush "ECO-LINE", bronzeplated, ISO 9448-2

2051.92.



### Material:

Steel,  $d_3$  induction hardened

### Execution:

Bronze coated internal bore

Outside diameter fine-ground

### Slip-Fit Bonding:

The position of the bearing is given by push fit holes tolerance H5. The adhesive (order no. 281.648) provides optimum push retention whilst offering the following **advantages**:

- high accuracy and stiffness
- no problems to find position when changing bushings

### Note:

Notes on sliding type guides at the beginning of chapter D.

Matching guide combinations, see selection matrix at the beginning of chapter D.

Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.

We do not recommend to press fit for the same reasons mentioned above.

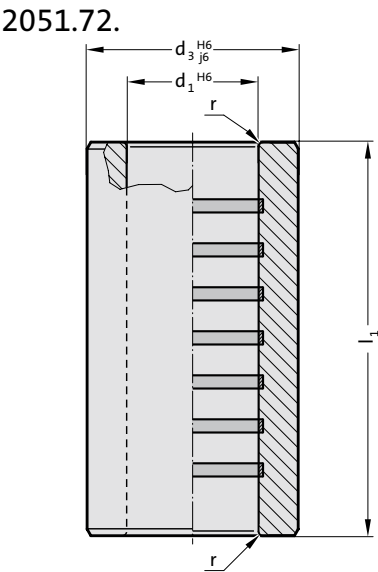
## 2051.92. Guide bush "ECO-LINE", bronzeplated, ISO 9448-2

$d_1$	15 16	19 20	24 25	30 32	38 40	48 50	60 63	80
$d_3$	28	32	40	48	58	70	85	105
$d_4$	26	30	38	46	56	67	82	101
$d_5$	4	4	4	4	4	5	5	8
$l_2$	5	5	5	5	5	6	6	9
$l_1$								
23	•	•	•					
30	•	•	•	•	•			
37	•	•	•	•	•	•		
47	•	•	•	•	•	•		
60	•	•	•	•	•	•	•	
77		•	•	•	•	•	•	
95				•	•	•	•	
120					•	•	•	•
135								•

### Ordering Code (example):

Guide bush "ECO-LINE", bronzeplated, ISO 9448-2	=2051.92.
Guide diameter $d_1$	32 mm= 032.
Length $l_1$	30 mm= 030
Order No	=2051.92.032.030

# Guide bush "ECO-LINE", Bronze with solid lubrication rings, ISO 9448-2



**Material:**  
 Bronze with solid lubricant, oilless lubricating

**Execution:**  
 Contact surface with solid lubricant rings  
 Outside diameter precision ground

**Slip-Fit Bonding:**  
 The position of the bearing is given by push fit holes tolerance H5. The adhesive (order no. 281.648) provides optimum push retention whilst offering the following **advantages:**

- high accuracy and stiffness
- no problems to find position when changing bushings

**Note:**  
 Notes on sliding type guides at the beginning of chapter D.  
 Matching guide combinations, see selection matrix at the beginning of chapter D.  
 Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.

We do not recommend to press fit for the same reasons mentioned above.

## 2051.72. Guide bush "ECO-LINE", Bronze with solid lubrication rings, ISO 9448-2

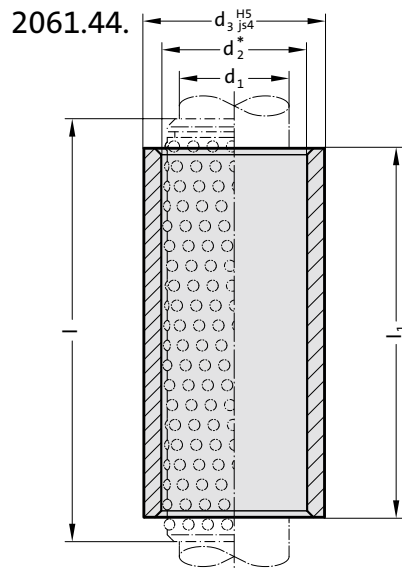
d <sub>1</sub>	15 16	19 20	24 25	30 32	38 40	48 50	60 63	80
d <sub>3</sub>	28	32	40	48	58	70	85	105
r	2	2	2.5	2.5	3	3	3.5	4
l <sub>1</sub>								
23	•		•					
30	•	•	•	•	•			
37	•	•	•	•	•	•		
47	•	•	•	•	•	•		
60		•	•	•	•	•	•	
77			•	•	•	•	•	•
95				•	•	•	•	•
120						•	•	•
135								•

## Ordering Code (example):

Guide bush "ECO-LINE", Bronze with solid lubrication rings, ISO 9448-2	=2051.72.
Guide diameter d <sub>1</sub>	32 mm= 032.
Length l <sub>1</sub>	30 mm= 030
Order No	=2051.72.032.030



## Guide bush for ball bearing, ISO 9448-3



### Material:

Tool steel, hardened  $62 \pm 2$  HRC

### Execution:

Bearing surfaces honed,  
outside diameter precision ground.

### Slip-Fit Bonding:

The position of the bearing is given by push fit holes tolerance H5. The adhesive (order no. 281.648) provides optimum push retention whilst offering the following **advantages**:

- high accuracy and stiffness
- no problems to find position when changing bushings

We do not recommend to press fit for the same reasons mentioned above.

### Note:

Notes on ball bearing type guides at the beginning of chapter D.

\* Preloading see pairing classification at the beginning of chapter D

Matching guide combinations, see selection matrix at the beginning of chapter D.

Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.

Ø 8 - Ø 12 not available in tolerance range red = .30.

Tolerance range:

yellow = .10

green = .20

red = .30

## 2061.44. Guide bush for ball bearing, ISO 9448-3

d <sub>1</sub>	8	10	11	12	15	16	19	20	24	25	30	32	38	40	48	50	60	63	80
d <sub>2</sub>	11	14	15	16	21	22	25	26	30	31	38	40	46	48	56	58	68	71	92
d <sub>3</sub>	18	22	22	22	28	28	32	32	40	40	48	48	58	58	70	70	85	85	105
l <sub>1</sub> / l*																			
30 / 40	•	•	•	•															
23 / 40		•	•	•															
37 / 40		•	•	•															
23 / 45					•	•	•	•	•	•									
30 / 45					•	•	•	•	•	•	•	•	•	•					
37 / 45					•	•	•	•	•	•	•	•	•	•					
47 / 56					•	•	•	•	•	•	•	•	•	•					
60 / 71					•	•	•	•	•	•	•	•	•	•					
77 / 95							•	•	•	•	•	•	•	•	•	•	•	•	•
37 / 50											•	•	•	•	•	•	•	•	•
95 / 120											•	•	•	•	•	•	•	•	•
47 / 63													•	•	•	•	•	•	•
60 / 80													•	•	•	•	•	•	•
120 / 140													•	•	•	•	•	•	•
60 / 95																	•	•	•

\*l = Nominal ordering length of ball cage - preferred length

### Ordering Code (example):

Guide bush for ball bearing, ISO 9448-3 = 2061.44.

Guide diameter d<sub>1</sub> 25 mm = 025.

Installation length l<sub>1</sub> 23 mm = 023.

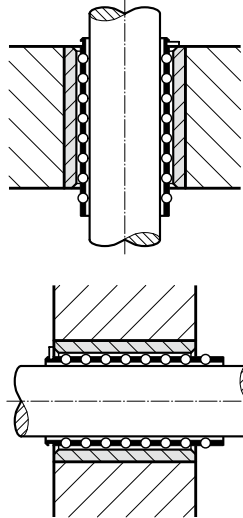
Classification TOL yellow = 10

Order No = 2061.44.025.023.10

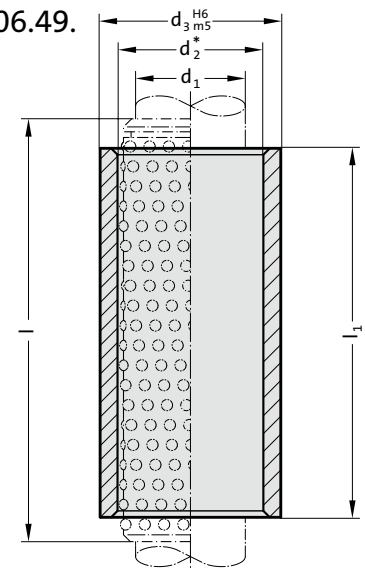
# Guide bush for ball bearing, AFNOR



Mounting example



206.49.



## Material:

Tool steel, hardened  $62 \pm 2$  HRC

## Execution:

Bearing surfaces honed,  
outside diameter precision ground.

## Slip-Fit Bonding:

The position of the bearing is given by push fit holes tolerance H6. The adhesive (order no. 281.648) provides optimum push retention whilst offering the following **advantages**:

- high accuracy and stiffness
- no problems to find position when changing bushings

We do not recommend to press fit for the same reasons mentioned above.

## Note:

Notes on ball bearing type guides at the beginning of chapter D.

\*Preloading see pairing classification at the beginning of chapter D

Matching guide combinations, see selection matrix at the beginning of chapter D.

Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.

Tolerance range:

yellow = .10

green = .20

red = .30

## 206.49. Guide bush for ball bearing, AFNOR

$d_1$	16	20	25	32	40	50
$d_2$	22	26	31	40	48	58
$d_3$	28	32	40	50	63	80
$l_1 / l^*$						
35 / 45	●	●				
40 / 45	●	●	●			
50 / 56	●	●	●			
60 / 71	●	●	●	●		
70 / 80		●	●	●	●	●
80 / 95		●	●	●	●	●
90 / 95			●			
45 / 56				●		
90 / 105				●	●	●
100 / 120				●	●	●
55 / 63					●	
120 / 140					●	●

\* $l$  = Nominal ordering length of ball cage - preferred length

## Ordering Code (example):

Guide bush for ball bearing, AFNOR = 206.49.

Guide diameter  $d_1$  32 mm = 032.

Installation length  $l_1$  45 mm = 045.

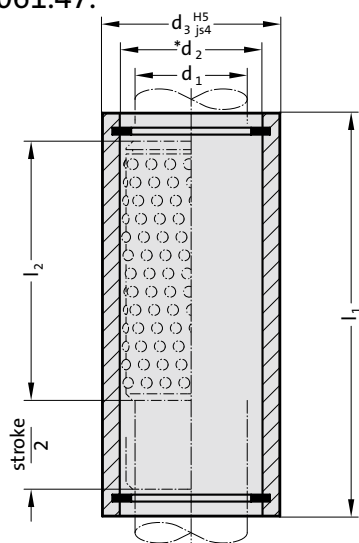
Classification TOL yellow = 10

Order No = 206.49. 032.045.10



## Guide bush for ball bearing, with stroke limitation

2061.47.



### Material:

Tool steel, hardened  $62 \pm 2$  HRC

### Execution:

Bearing surfaces honed,  
outside diameter precision ground.

### Slip-Fit Bonding:

The position of the bearing is given by push fit holes tolerance H5. The adhesive (order no. 281.648) provides optimum push retention whilst offering the following **advantages**:

- high accuracy and stiffness
- no problems to find position when changing bushings

### Note:

Notes on ball bearing type guides at the beginning of chapter D.

\* Preloading see pairing classification at the beginning of chapter D

Matching guide combinations, see selection matrix at the beginning of chapter D.

Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.

Tolerance range:

yellow = .10

green = .20

red = .30

We do not recommend to press fit for the same reasons mentioned above.

## 2061.47. Guide bush for ball bearing, with stroke limitation

d <sub>1</sub>	15 16	19 20	24 25	30 32	38 40	48 50	60 63
d <sub>2</sub>	21 22	25 26	30 31	38 40	46 48	56 58	68 71
d <sub>3</sub>	28	32	40	48	58	70	85
l <sub>1</sub> / l <sub>2</sub> *							
60 / 44	●						
77 / 44		●	●				
95 / 50				●			
120 / 65					●		
120 / 80						●	
120 / 95							●

\*l<sub>2</sub> = Manufacturing length of ball cage

### Ordering Code (example):

Guide bush for ball bearing, with stroke limitation	=2061.47.
Guide diameter d <sub>1</sub>	32 mm= 032.
Installation length l <sub>1</sub>	95 mm= 095.
Classification TOL	yellow= 10
Order No	=2061.47.032.095.10