

Instructions for Assembling and Disassembling Sleeves under Self-aligning Bearings with Tapered Bore



**Video 08: ASSEMBLING of WITHDRAWAL SLEEVE under self-aligning
ROLLER BEARING with HOOK SPANNER**

See the step-by-step procedure at www.bgl.com.br/en/treinamento.htm
Technical Videos - **Video 08**

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INITIAL ARRANGEMENTS

01

Keep the workplace dry and dust-free.



02

Select the adequate tools.



03

It is important that, before unpacking the parts, you compare the designation of the package with your needs.



04

The shaft may show contact corrosion or abrasion and it must be carefully cleaned.



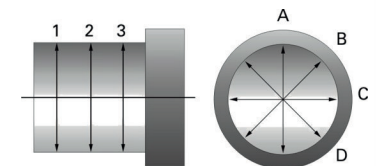
05

Next, check the dimensional precision and the shape of the shaft that will be in contact with the Sleeve.

The shaft dimension must be within the tolerance of maximum h10 and cilindricity IT5/2 or—at low rotations—IT7/2.

ATTENTION

The shaft diameter must be checked using a micrometer in four positions in two or three planes.



Assembling Procedures

06

Remove the package from the bearing, remove the protective oil from the bore and also from the external diameter.

Note: The shaft needs to be scaled.



Há necessidade do eixo ser escalonado

07

With a feeler gauge, measure the initial clearance between the external ring and the bearing roller which shows to be the most free and write it down for usage with the clearance

Nominal measure of the internal diameter d (bore bearing)		Bearing Radial Clearance Before Assembly							
		Clearance Group							
		C2		Normal		C3		C4	
Greater than	Up to including	max.	min.	max.	min.	max.	min.	max.	min.
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
24	30	0.020	0.030	0.030	0.040	0.040	0.055	0.055	0.075
30	40	0.025	0.035	0.035	0.050	0.050	0.065	0.065	0.085
40	50	0.030	0.045	0.045	0.060	0.060	0.080	0.080	0.100
50	65	0.040	0.055	0.055	0.075	0.075	0.095	0.095	0.120
65	80	0.050	0.070	0.070	0.095	0.095	0.120	0.120	0.150
80	100	0.055	0.080	0.080	0.110	0.110	0.140	0.140	0.180
100	120	0.065	0.100	0.100	0.135	0.135	0.170	0.170	0.220



Quando o rolamento estiver apoiado sobre o anel externo, medir a folga no rolo que esteja mais acima.

Radial Clearance Reduction Calculation Example:
Bearing: 22212 K/C3 with 60 mm bore

Initial Clearance: 0.08 mm

08

And put it on the shaft.



09

Unpack and clean the Sleeve.



10

Put a thin film of oil on the internal and external surfaces of the Sleeve. This procedure will help in the assembling process.



11

Put the Sleeve on the shaft. If necessary, enlarge it inserting a screwdriver in the slot and then move it under the bearing until you get a firm contact.



12

Oil the thread and the chamfered face of the Nut that will be in contact with the Sleeve.



13

Screw the nut to the shaft until the Sleeve-shaft-bearing set is firmly set.



14

Perform the online calculation of clearance reduction accessing:

www.bgl.com.br/en/catalogo

Step 1

The screenshot shows the BGL website homepage. At the top, there is the BGL logo and 'BERTOLOTO & GROTTA'. Below it, there are navigation menus for Home, Company, Products, Application engineering, Training and videos, Downloads, Quotation, News, and Contact. A search bar is also present. The main content area features a banner for 'BGL | SLEEVES FOR...' with instructions for assembling and disassembling spherical roller bearings. Below the banner, there are icons for various products: ADAPTER SLEEVES, WITHDRAWAL SLEEVES, LOCKNUTS, WASHERS AND LOCKING DEVICES, PRECISION NUTS, HOOK SPANNER, HYDRAULIC ADAPTER SLEEVES, HYDRAULIC NUTS, HYDRAULIC PUMPS, EXTENSION TUBE, and KIT TR. At the bottom, there are sections for 'BGL' (company description), 'TRAINING AND VIDEOS', 'ELETRONIC CATALOG', 'ON-LINE CALCULATION OF BEARING CLEARANCE', and 'THE BEST TIPS' (listing tips 040, 039, 037, and 036).

Step 2

The screenshot shows the 'Table for calculating the reduction of axial clearance' tool. It includes a 'New Calculation' section with input fields for Bearing (22212K), Clearance group (C3), and Initial clearance (0.08 mm). Below this is a table with columns for 'Nominal measure of the internal diameter of the bearing d', 'Radial clearance before the assembling', 'Reduction of the radial clearance', and 'Axial displacement'. The table is divided into 'Clearance group' C2, C3, C4, and C5. The 'Initial clearance' of 0.08 mm is highlighted in green in the table. Below the table, there are instructions: 'Step 3: With the feeler gauges of 0.03 mm or wider, measure the initial clearance existing between external ring and roll of the bearing (measurement of the clearance that is more free). If the bearing is situated on the shaft, measure on the roll positioned below. See the selected field in green in the table below. In the sequence click on calculation.'

Nominal measure of the internal diameter of the bearing d	Radial clearance before the assembling												Reduction of the radial clearance	Axial ^(1) 2) displacement taper 1:12		Axial ^(1) 2) displacement taper 1:30	
	Clearance group													Sleeve		Sleeve	
	C2		Normal		C3		C4		C5		min	max		min	max	min	max
greater as	including	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
50	65	0.04	0.055	0.055	0.075	0.075	0.095	0.095	0.12	0.12	0.18	0.025	0.035	0.45	0.54	1.15	1.35

Valid only for solid and hollow steel shafts in general applications.
1) The values listed must be used only as a reference. The final checking must be done using feeler gauge.
2) The axial displacement is slightly different from one series of bearings to another.

Step 3

The screenshot shows the same online calculation tool as in Step 2, but with the 'Final clearance after the assembling' highlighted in yellow. The final clearance is 0.05 mm. Below the table, there are 'TIPS' for sleeves above 32 mm and instructions on using the 'hydraulic nut' tool.

Nominal measure of the internal diameter of the bearing d	Radial clearance before the assembling												Theoretical ^(1) 2) axial displacement with taper 1:12	Final clearance after the assembling	
	Clearance group														Sleeve
	C3		C3		C3		C3		C3		C3				
greater as	including	min	max	min	max	min	max	min	max	min	max	min	max	min	
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	
50	65	0.075	0.095	0.075	0.095	0.075	0.095	0.075	0.095	0.075	0.095	0.075	0.095	0.05	

TIPS:
For sleeves above of 32 mm (140 mm of hole/shaft). Always use the hydraulic sleeve OH, H... or AOH. Disassembling process can be made so very rapid, with security and in an economic form.
The use of the tool "hydraulic nut" for mounting or dismounting sleeves can reduce until 10 times the total assembling time compared to hand toolings.
More informations about Hydraulic Adapter and Withdrawal Sleeves, Hydraulic nuts, Hydraulic pumps, Extension tubes.
For more informations, please access: Latest tips.

"The BGL main point with this application is to instruct the professionals of the maintenance activities to perform their works with efficiency, security, quickness and certainly with lower costs"

15

You can also consult the Printed **Table of Radial Clearance Reduction** to assemble Self-Aligning Roller Bearings with Tapered Bore. Order yours from BGL.

Radial Clearance Reduction Calculation Example:

Bearing: 22212 K/C3 with 60 mm bore

Initial Clearance: 0.08 mm

Reduction: 0.03 mm

Final Clearance: 0.05 mm

Nominal measure of the internal diameter d (bore bearing)		Bearing Radial Clearance Before Assembly										Reduction of Bearing Radial Clearance		Axial Taper "S" ⁽¹⁾²			
		Clearence Group												Axial Displacement Taper 1:12		Axial Displacement Taper 1:30	
		C2		Normal		C3		C4		C5							
Greater than	Up to including	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.
24	30	0.020	0.030	0.030	0.040	0.040	0.055	0.055	0.075	-	-	0.010	0.015	0.250	0.290	-	-
30	40	0.025	0.035	0.035	0.050	0.050	0.065	0.065	0.085	0.085	0.105	0.015	0.020	0.300	0.350	-	-
40	50	0.030	0.045	0.045	0.060	0.060	0.080	0.080	0.100	0.100	0.130	0.020	0.025	0.370	0.440	-	-
50	65	0.040	0.055	0.055	0.075	0.075	0.095	0.095	0.120	0.120	0.160	0.025	0.035	0.450	0.540	1.150	1.350
65	80	0.050	0.070	0.070	0.095	0.095	0.120	0.120	0.150	0.150	0.200	0.035	0.040	0.550	0.650	1.4	1.65
80	100	0.055	0.080	0.080	0.110	0.110	0.140	0.140	0.180	0.180	0.230	0.040	0.050	0.660	0.790	1.650	2.000
100	120	0.065	0.100	0.100	0.135	0.135	0.170	0.170	0.220	0.220	0.280	0.050	0.060	0.790	0.950	2	2.35
120	140	0.080	0.120	0.120	0.160	0.160	0.200	0.200	0.260	0.260	0.330	0.060	0.075	0.930	1.100	2.300	2.800
140	160	0.090	0.130	0.130	0.180	0.180	0.230	0.230	0.300	0.300	0.380	0.070	0.085	1.050	1.300	2.65	3.2
160	180	0.100	0.140	0.140	0.200	0.200	0.260	0.260	0.340	0.340	0.430	0.080	0.095	1.200	1.450	3.000	3.600
180	200	0.110	0.160	0.160	0.220	0.220	0.290	0.290	0.370	0.370	0.470	0.090	0.105	1.300	1.600	3.3	4
200	225	0.120	0.180	0.180	0.250	0.250	0.320	0.320	0.410	0.410	0.520	0.100	0.120	1.450	1.800	3.700	4.450
225	250	0.140	0.200	0.200	0.270	0.270	0.350	0.350	0.450	0.450	0.570	0.110	0.130	1.600	1.950	4	4.85
250	280	0.150	0.220	0.220	0.300	0.300	0.390	0.390	0.490	0.490	0.620	0.120	0.150	1.800	2.150	4.500	5.400
280	315	0.170	0.240	0.240	0.330	0.330	0.430	0.430	0.540	0.540	0.680	0.135	0.165	2.000	2.400	4.95	6
315	355	0.190	0.270	0.270	0.360	0.360	0.470	0.470	0.590	0.590	0.740	0.150	0.180	2.150	2.650	5.400	6.600
355	400	0.210	0.300	0.300	0.400	0.400	0.520	0.520	0.650	0.650	0.820	0.170	0.210	2.500	3.000	6.2	7.6
400	450	0.230	0.330	0.330	0.440	0.440	0.570	0.570	0.720	0.720	0.910	0.195	0.235	2.800	3.400	7.000	8.500
450	500	0.260	0.370	0.370	0.490	0.490	0.630	0.630	0.790	0.790	1.000	0.215	0.265	3.100	3.800	7.8	9.5
500	560	0.290	0.410	0.410	0.540	0.540	0.680	0.680	0.870	0.870	1.100	0.245	0.300	3.400	4.100	8.400	10.300
560	630	0.320	0.460	0.460	0.600	0.600	0.760	0.760	0.980	0.980	1.230	0.275	0.340	3.800	4.650	9.5	11.6
630	710	0.350	0.510	0.510	0.670	0.670	0.850	0.850	1.090	1.090	1.360	0.310	0.380	4.250	5.200	10.600	13.000
710	800	0.390	0.570	0.570	0.750	0.750	0.960	0.960	1.220	1.220	1.500	0.350	0.425	4.750	5.800	11.9	14.5
800	900	0.440	0.640	0.640	0.840	0.840	1.070	1.070	1.370	1.370	1.690	0.395	0.480	5.400	6.600	13.500	16.400
900	1000	0.490	0.710	0.710	0.930	0.930	1.190	1.190	1.520	1.520	1.860	0.440	0.535	6.000	7.300	15	18.3
1.000	1.120	0.530	0.770	0.770	1.030	1.030	1.300	1.300	1.670	1.670	2.050	0.490	0.600	6.400	7.800	16.000	19.500
1.120	1.250	0.570	0.830	0.830	1.120	1.120	1.420	1.420	1.830	1.830	2.250	0.550	0.670	7.100	8.700	17.8	21.7
1.250	1.400	0.620	0.910	0.910	1.230	1.230	1.560	1.560	2.000	2.000	2.450	0.610	0.750	8.000	9.700	19.900	24.300
1.400	1.600	0.680	1.000	1.000	1.350	1.350	1.720	1.720	2.200	2.200	2.700	0.700	0.850	9.100	11.100	22.7	27.7
1.600	1.800	0.750	1.110	1.110	1.500	1.500	1.920	1.920	2.400	2.400	2.950	0.790	0.960	10.200	12.500	25.600	31.200

16

With a Hook Spanner HN tighten the nut.



Para aperto de porca de eixo KM 11, solicitar a Chave de Gancho HN 11.

17

Using again the feeler gauge check the radial clearance reduction until you reach the calculated clearance. If necessary, tighten it again.

Note: After this procedure, make sure the bearing is well set.



Quando o rolamento estiver apoiado no eixo, medir no rolo que esteja mais abaixo.

18

Remove the Nut and insert the MB Lockwasher.



19

Tighten the Locknut firmly using the HN Hook Spanner.



20

Align the nearest notch of the Nut with the external jut of the Washer and, with the help of a pricker, bend it.



21

To finish, make sure the bearing can be turned easily with your hands.



To disassemble, see **Video 14** at www.bgl.com.br/en/treinamento.htm

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For more information, see:

Complete Electronic Catalog:
www.bgl.com.br/en/catalogo

Assembling Instructions:
www.bgl.com.br/en/treinamento.htm

Online Reduction Calculation:
www.bgl.com.br/en/calculo_reducao

Catalog Download:
www.bgl.com.br/en/catalogos-folders.htm

Reference Technical Standards:
ABNT NBR 16535-1: SLEEVES FOR BEARINGS
ABNT NBR 16535-2: LOCKNUTS AND LOCKWASHERS

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