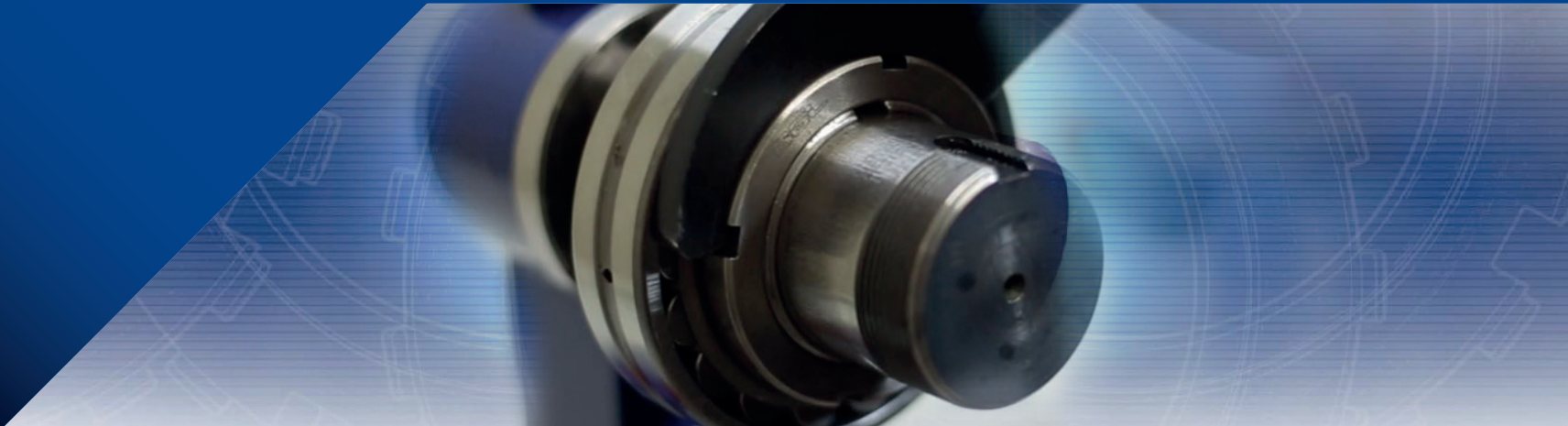


Instructions for Assembling and Disassembling Sleeves under Self-aligning Bearings with Tapered Bore



Video 03: ASSEMBLING of ADAPTER 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 03**

Contents:

Initial Arrangements.....	03
Assembling Procedures.....	04

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.



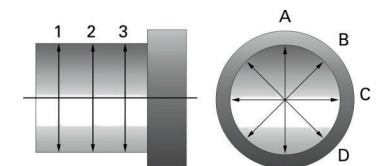
05

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 cylindricity IT5/2 or—at low rotations—IT7/2.

ATTENTION

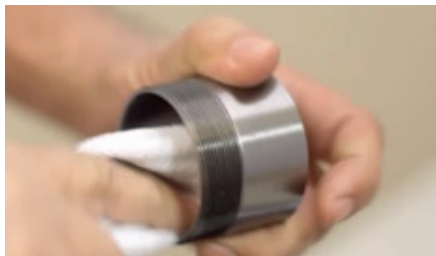
The shaft diameter must be checked using a micrometer in four positions in two or three planes.



▶ **Assembling Procedures**

06

Unpack and clean the Sleeve.



07

Put a thin film of oil on the internal and external surfaces of the Sleeve and also on the shaft.

Note: This procedure helps disassembling the parts. Depending on the type of the equipment demand, the assembling procedure can be done **with dry parts**, without using oil.



08

Put the Sleeve on the shaft. If necessary, enlarge it, inserting a screwdriver in the slot.



09

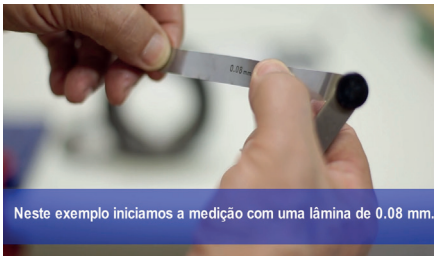
Remove the package from the bearing, remove the protective oil from the bore and also from the external diameter.



Rolamentos novos devem ser retirados de sua embalagem somente no momento da montagem.

10

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 reduction table.



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

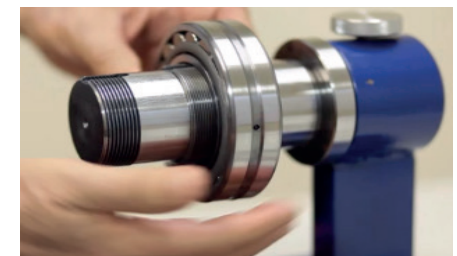
Radial Clearance Reduction Calculation Example:

Bearing: **22212 K/C3** with **60 mm bore**

Initial Clearance: 0.08 mm

11

Next, put the bearing on the Sleeve.



12

Perform the *online* calculation of clearance reduction accessing:

www.bgl.com.br/en/catalogo

Step 1

The screenshot shows the BGL website interface. At the top, there is a navigation bar with links for Home, Company, Products, Application engineering, Training and videos, Downloads, Quotation, News, and Contact. Below this is a banner for 'BGL | SLEEVES FOR' with a 'Material Comparison' section. A central banner features the text 'Instruction for assembling and disassembling spherical roller bearings - ON LINE CALCULATION' and 'Instruction for assembling and disassembling self-aligning ball bearings'. Below the banners 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', 'THE BEST TIPS' (listing tips 040, 039, 037, and 036), and a 'NEWSLETTER' registration form.

Step 2

This screenshot shows the 'New Calculation' interface for calculating axial clearance reduction. It includes a 'Table for calculating the reduction of axial clearance' for spherical roller bearings with tapered bore. The interface has input fields for 'Bearing' (22212K), 'Clearance group' (C3), and 'Initial clearance' (0.08 mm). Below the input fields 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, Normal, C3, C4, C5) and 'Sleeve' (taper 1:12, taper 1:30). The 'C3' group is highlighted in green. Below the table, there are notes: '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.', and '2) The axial displacement is slightly different from one series of bearings to another.'

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**.

Step 3

This screenshot shows the 'New Calculation' interface with the final result. The 'Final clearance after the assembling' is displayed as 0,05 mm. The table structure is similar to Step 2, but with a simplified layout. Below the table, there are 'TIPS' for sleeves above 32 mm (1.40 mm of hole/shaft), the use of the 'hydraulic nut' tool, and information about hydraulic adapters and withdrawal sleeves. At the bottom, there is a quote: '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'.

13

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: **2212 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				
		Clearance 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.	
mm	mm	mm	mm	mm	mm	mm	mm	mm	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	-	-	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	

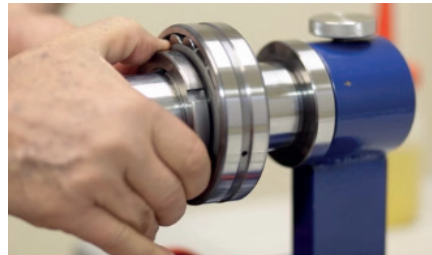
14

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



15

Put the Nut on the Sleeve and screw it, first manually, without the Washer, until the bearing is well settled.



16

With a Hook Spanner HN tighten the nut.



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.



18

Remove the Nut and insert the MB Lockwasher.



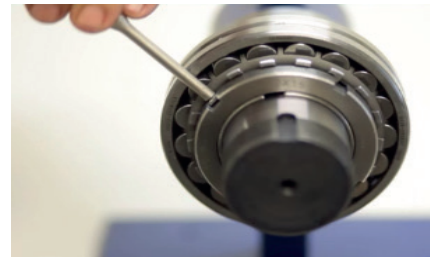
19

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.



