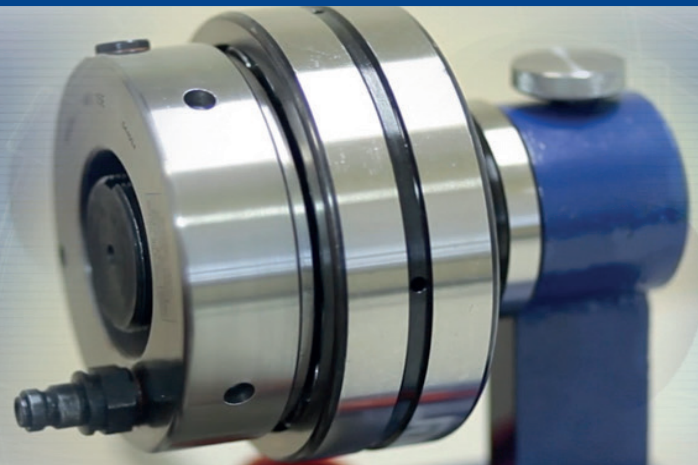


Instructions for Assembling and Disassembling Sleeves under Self-aligning Bearings with Tapered Bore



**Video 05: ASSEMBLING of HYDRAULIC ADAPTER SLEEVE under
self-aligning ROLLER BEARING with HYDRAULIC NUT**

See the step-by-step procedure at www.bgl.com.br/en/treinamento.htm
Technical Videos- **Video 05**

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

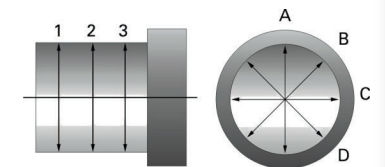
The shaft may show contact corrosion or abrasion and it must be carefully cleaned.



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

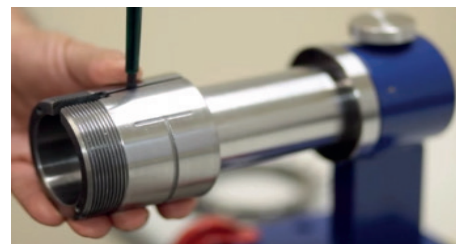
Put a fine film of oil on the internal surface of the Sleeve and also on the shaft.

Note: 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. Next, move it to its position on the shaft.



09

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



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
120	140	0,080	0,120	0,120	0,160	0,160	0,200	0,200	0,260

11

Next, put the bearing on the Sleeve.

Radial Clearance Reduction Calculation Example:

Bearing: **22315 K/C3** with 75 mm bore

Initial Clearance: **0.11 mm**



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



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 are logos for BGL, 100% Brazilian, since 1957, and TUV ISO 9001. Below this is a navigation menu with links 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 large banner for 'BGL | SLEEVES FOR...' with a prominent red button labeled 'ON LINE CALCULATION'. Below the banner, there are several product categories with images: 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', 'TRAINING AND VIDEOS', 'ELECTRONIC CATALOG', 'ON-LINE CALCULATION OF BEARING CLEARANCE', and 'THE BEST TIPS'.

Step 2

Table for calculating the reduction of axial clearance
For assembling of spherical Roller bearing with tapered bore mounted on the adapter or withdrawal sleeve

New Calculation
Bearing: 22315K | Clearance group: C3 | Initial clearance: 0.11 mm | Calculation

Step: 3 With the feeler gauges of 0.03 mm or wider, measure the **initial clearance** existing between external ring and 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		
	including		Clearance group										Sleeve		Sleeve		
	as mm	until mm	C2		Normal		C3		C4		C5		min.	max.	min.	max.	min.
65	80	0.05	0.07	0.07	0.085	0.095	0.12	0.12	0.15	0.15	0.2	0.035	0.04	0.55	0.65	1.4	1.65

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

Table for calculating the reduction of axial clearance
For assembling of spherical Roller bearing with tapered bore mounted on the adapter or withdrawal sleeve

New Calculation
Bearing: 22315K | Clearance group: C3 | Initial clearance: 0.11 mm | Calculation

After measuring the initial clearance, the assembling procedure must be started, taking in account the values indicated in the table of clearance reduction:

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	
	including		Clearance group										mm	
	as mm	until mm	C2		Normal		C3		C4		C5		min.	max.
65	80	0.05	0.07	0.07	0.085	0.095	0.12	0.12	0.15	0.15	0.2	0.61	0.07	

TIPS:
For sleeves above of 32 mm (140 mm of hole/shaft). Always use the hydraulic sleeve OHS, H... or ADR. 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"

In this example, we are using the axial displacement value (0.61 mm) related to the use of Hydraulic Nut for assembling

13

You can also to 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: **22315 K/C3** with **75 mm** bore

Initial Clearance: **0.11 mm**

Reduction: **0.04 mm**

Final Clearance: **0.07 mm**

Axial Displacement: **0.61 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	

ATTENTION

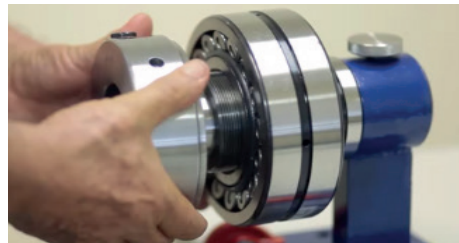
The assembling of the Adapter Sleeve under the self-aligning bearing with internal diameter above 50 mm gets extremely easier when you use the Hydraulic Nut and the comparator dial.

Note: Order the HMV_E Hydraulic Nut, being the suffix exactly the same as the one of the Adapter Sleeve.



14

Insert the Hydraulic Nut in the Sleeve, with the plunger turned to the bearing, and screw it.



15

Use a straight pin spanner, to get a proper contact between the bearing, the Sleeve and the shaft.

Note: Starting point for Clearance Reduction (Zero Point).



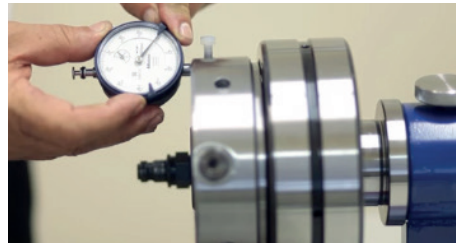
16

Next, insert the comparator dial into the Hydraulic Nut and tie it with the nylon screw.



17

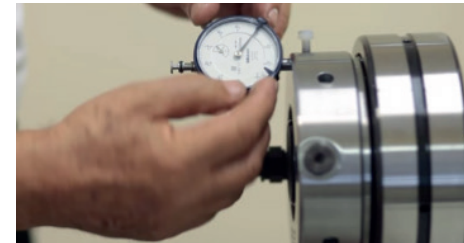
Set the comparator dial indicator to zero (0).



18

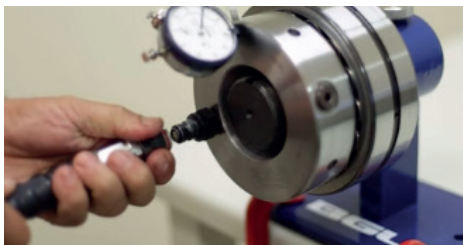
After that, consult the Axial Displacement Table to know the amount to be displaced and set the second marker to the figure in the table.

Axial displacement (0.61 mm)



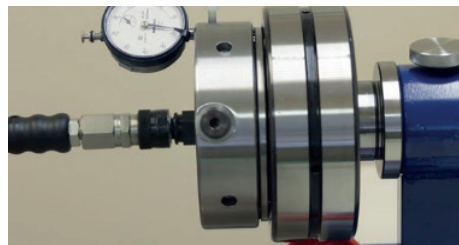
19

Tie the Pump hose to the quick coupling of the Hydraulic Nut.



20

Pump the oil to the Hydraulic Nut, displacing the plunger, observing on the comparator dial the clearance reduction by axial displacement.



21

Upon reaching the desired axial displacement, relieve the Pump pressure and remove the comparator dial.



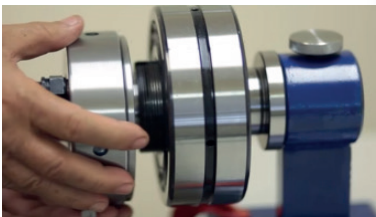
22

With the pin spanner, tighten the Hydraulic Nut moving back the plunger for the oil to return to the Pump.



23

Disconnect the Pump and remove the Hydraulic Nut.



24

Check with the feeler gauge the final radial clearance. Put the Lockwasher.



25

Tighten the Locknut firmly using the HN Hook Spanner.



26

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



27

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



To disassemble, see **Video 12** at www.bgl.com.br/en/treinamento.htm

TR TRAINING KIT

Practical and dynamic training which helps salespeople and technical staff in their learning.

With the TR KIT you can take your training where you want and as many times as you want.



TR-BGL Kit product available for sale. Consult your distributor.

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

BGL
BERTOLOTO & GROTTA

Sleeve for Bearings
ISO 9001 | since 1957

BGL - Bertoloto & Grotta Ltda
Av. Major José Levy Sobrinho, 1296
CEP 13486-190 | Limeira – SP | Brasil
Phone +55 19 3451-8510
info@bgl.com.br
facebook.com/bglbuchas
www.bgl.com.br