

BGL[®]

Sleeves for Bearings

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



**Video 04: ASSEMBLING of 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 04**

**BGL Application
Engineering**

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Initial Procedures



Remember to use personal protective equipment (PPE):
Gloves, goggles and safety footwear



01

Have the workplace dry and dust-free.



02

Select the proper tools.



03

Before unpacking, make sure to check the designations of each part if they match.



04

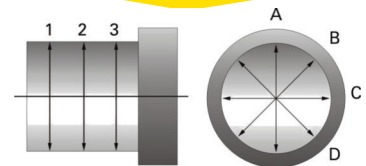
The shaft may show contact corrosion or wear and it must be carefully cleaned.



05

Then check the dimensional accuracy 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 speed, IT7/2.

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



Assembling Procedures

06

Unpack and clean the Sleeve.



07

Apply a thin layer of oil on the sleeve bore, on the tapered surface of the Sleeve and on the shaft.

Note: This procedure will help disassembling the set later. Depending on the equipment requirement, the assembling procedure can be done without applying oil.



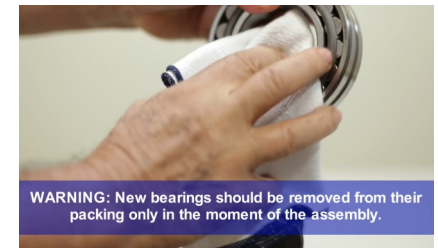
08

Place the sleeve on the shaft. If it's necessary, slightly open the sleeve by inserting a screwdriver in the sleeve slit.



09

Unpack the bearing, then remove the protective oil from the bore and from the outside diameter.



WARNING: New bearings should be removed from their packing only in the moment of the assembly.

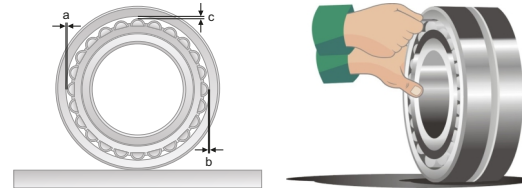
Video 04: ASSEMBLING of ADAPTER SLEEVE under self-aligning ROLLER BEARING with HYDRAULIC NUT

10

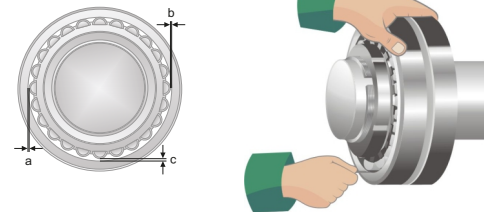
Firstly, rotate the inner or outer rings a few times, making sure that both bearing rings and the rollers are aligned with respect to each other. Insert the feeler gauge between bearings and casing where the larger gap is found* and write it down to be used with the clearance reduction table.

In this example we started the clearance With a 0.08 mm blade.

Note*
If the bearing stands over a table, supported on its outer casing, the clearance measure will be applied as shown on the picture.

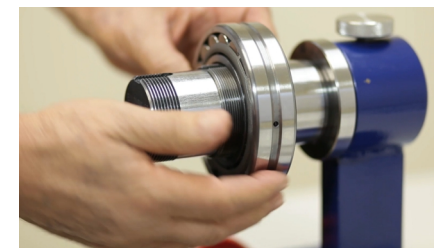


If the bearing stands on the shaft, supported on its inner ring, the clearance measure will be applied as shown on the picture.



11

Then, place the bearing on the Sleeve.



Nominal Measure Internal diameter (d) (Bearing Bore)		Bearing Radial Clearance Before Assembly							
		Clearance Group							
		C2		Normal		C3		C4	
Greater than	Up to including	min.	max.	min.	max.	min.	max.	min.	max.
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:

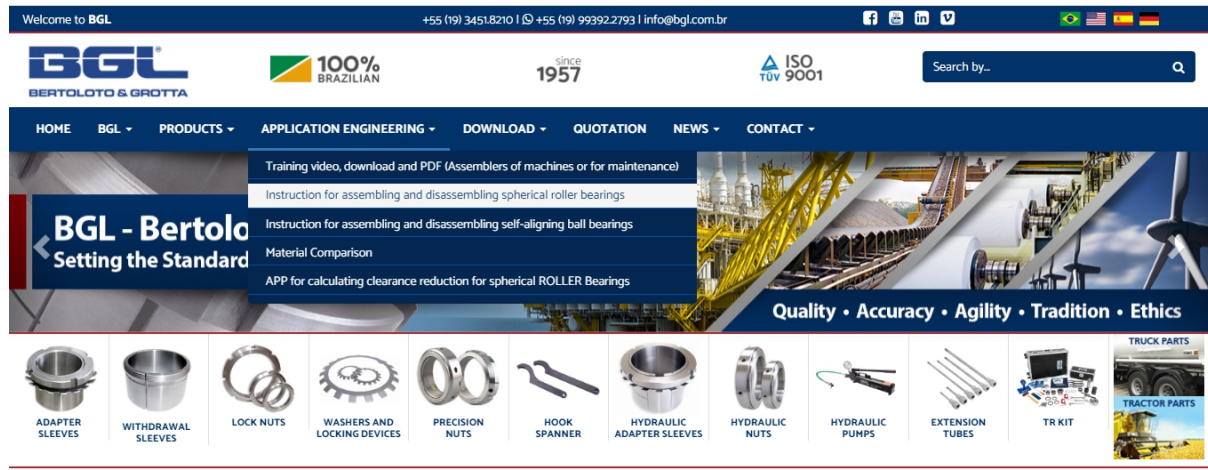
Bearing: 22212 K/C3 with 60 mm bore

Initial Clearance: 0.08 mm

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Calculate the clearance reduction online by accessing:
www.bgl.com.br/en/calculo_reducao

Step 1



Step 2

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Table for calculating the reduction of radial clearance

For assembling of spherical Roller bearing with tapered bore mounted on the adapter or withdrawal sleeve

New Calculation

Bearing: 22212K | Clearance group: C3 | Initial clearance: 0.08 mm | Calculation

Step 3: With the feeler gauges of 0.03 mm or wider, measure the **initial clearance** existing between external ring and end 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 C2					Clearance group C3					C4		C5		Sieve		Sieve	
greater as mm	including until mm	min. mm	max. mm	min. mm	max. mm	min. mm	max. mm	min. mm	max. mm	min. mm	max. mm	min. mm	max. mm	min. mm	max. mm	min. mm	max. mm	min. mm	max. mm
50	65	0.04	0.055	0.055	0.075	0.075	0.095	0.095	0.12	0.12	0.16	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

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Table for calculating the reduction of radial clearance

For assembling of spherical Roller bearing with tapered bore mounted on the adapter or withdrawal sleeve

New Calculation

Bearing: 22212K | Clearance group: C3 | Initial clearance: 0.08 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	
		C3		C5		mm		mm	
greater as mm	including until mm	min. mm	max. mm	min. mm	max. mm	min. mm	max. mm	min. mm	max. mm
50	65	0.075	0.095	0.47	0.47	0.05	0.05		

TIPS:

For sleeves above of 32 mm (140 mm of hole/shaft). Always use the hydraulic sleeve OH... or AGH. Dismounting 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](#).

We will be using the axial displacement value (0.47 mm) show on the calculation for the Hydraulic Nut.

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

Radial Clearance Reduction Calculation Example:

Initial Clearance: **0.08 mm**

Reduction: **0.03 mm**

Final Clearance: **0.05 mm**

Axial Displacement: **0.47 mm**

Nominal Measure Internal diameter (d) (Bearing Bore)		Bearing Radial Clearance Before Assembly										Reduction of Bearing Radial Clearance		Axial Displacement "S"				
		Clearance Group												Axial Displacement Taper 1:12		Axial Displacement Taper 1:30		
		C2		Normal		C3		C4		C5								
Greater than	Up to 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	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	1.400	1.650	
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	2.000	2.350	
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	2.650	3.200	
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	3.300	4.000	
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	4.000	4.850	
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	4.950	6.000	
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	6.200	7.600	
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	7.800	9.500	
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	9.500	11.600	
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	11.900	14.500	
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	1.000	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	15.000	18.300	
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	17.800	21.700	
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	22.700	27.700	
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	

NOTE

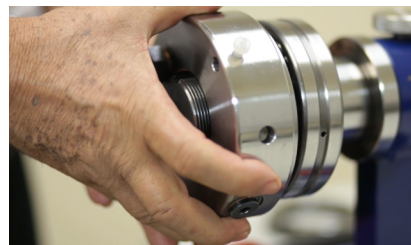
Assembling a self-aligning bearing with internal diameter above 50 mm on an Adapter Sleeve gets extremely easier when using a Hydraulic Nut tool and a dial gauge.

Suggestion: When ordering the HMV_E Hydraulic Nut, check that the 2 number digits of the Nut matches exactly with the same as of the Adapter Sleeve. For example, H 2322 (M 110x2) is used with an HMV 22E (M 110x2) up to the size HMV 96E. Above that, check the Adapter sleeve thread to match with the HMV...E's thread.



14

Place the Hydraulic Nut on the Sleeve thread, with the piston facing towards the bearing, and thread the nut.



15

Use a straight pin Spanner, provided with the Hydraulic nut, to get proper contact between the hydraulic nut and the face of the bearing on the Sleeve to determine the zero point of the hydraulic assembly.

Note: that is the starting point for Clearance Reduction (Zero Point).



16

Then insert the dial gauge into the Hydraulic Nut and lock it with the nylon screw.



17

Set the dial gauge to zero (0).



18

Then consult the axial displacement table to find out the value to be displaced and set the second dial hand to the value given in the table.

Axial displacement (0.47 mm)



Video 04: ASSEMBLING of ADAPTER SLEEVE under self-aligning ROLLER BEARING with HYDRAULIC NUT

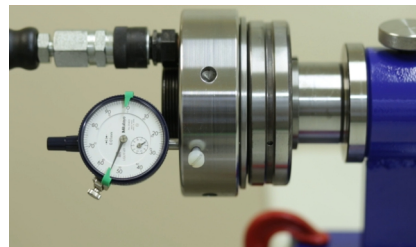
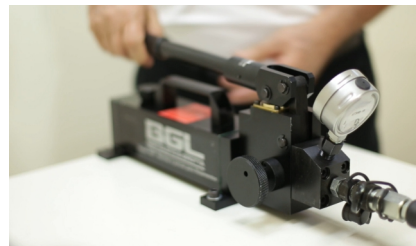
19

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



20

Pump the oil into the Hydraulic Nut, displacing the piston, observing the clearance reduction by axial displacement on the dial gauge.



21

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



22

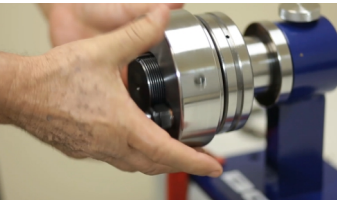
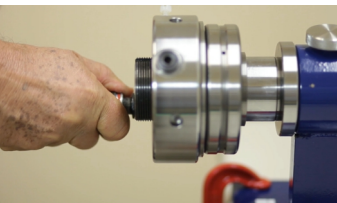
With the straight pin spanner, tighten the Hydraulic Nut further against the bearing to return the piston back to its original position and return the oil to the hand Pump.



Video 04: ASSEMBLING of ADAPTER SLEEVE under self-aligning ROLLER BEARING with HYDRAULIC NUT

23

Disconnect the hand Pump and remove the Hydraulic Nut.



24

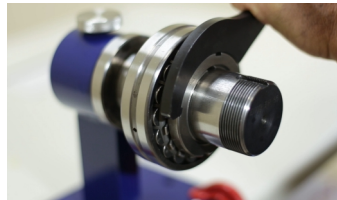
Check with the feeler gauge (paying attention to the right places of measuring the clearance) if the final radial clearance is correct.

Place the Lock washer and the lock nut on the sleeve.



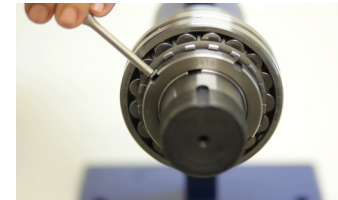
25

Thread the Locknut and tighten it firmly using the BGL HN Hook Spanner.



26

Align the nearest keyway of the Nut with one of the Lock Washer tabs and, with the help of a punch, bend the tab.



27

Finally, make sure the bearing can rotate easily by hand.



To learn more how to disassemble the set, please watch the **Video 13** at
www.bgl.com.br/en/treinamento.htm

TR TRAINING KIT

BGL TR TRAINING KIT Practical and dynamic training solution which helps technical teams to improve their skills on how to mount and dismount bearings properly and safely.



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For more information, please check:

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

PDF 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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Sleeves for Bearings
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