

FAG



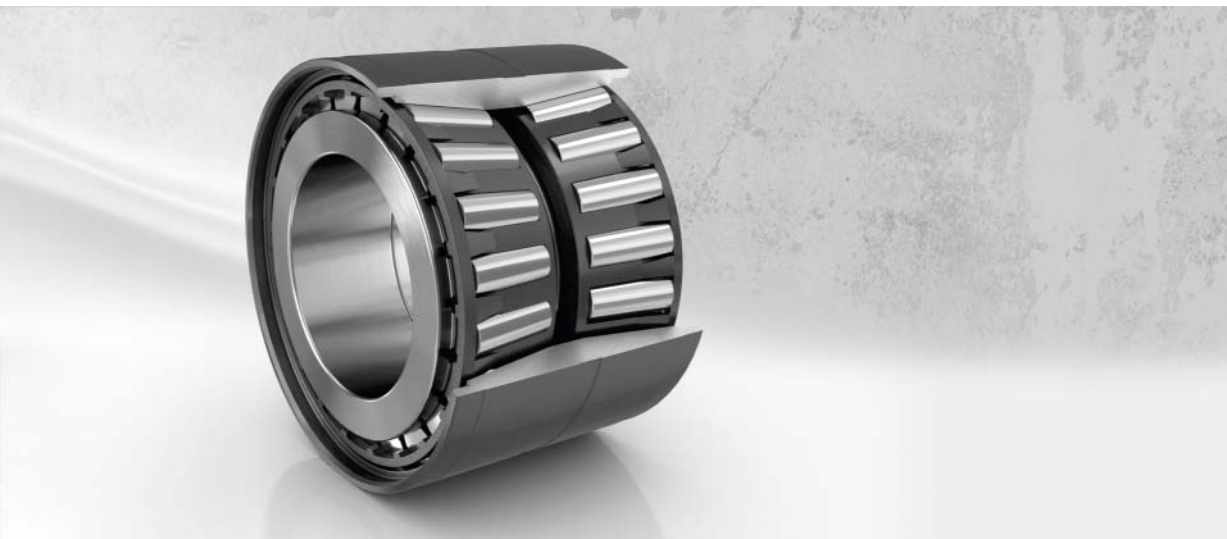
Tapered Roller Bearing Units TAROL

Mounting, dismounting, reconditioning

SCHAEFFLER

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Tapered roller bearing units TAROL

Tapered roller bearing units TAROL

Features TAROL units (**T**apered **R**oller **B**earing) of the FAG brand are double row tapered roller bearings that are supplied set for clearance, greased and sealed. The TAROL units are thus supplied ready for mounting and are pressed onto the shaft journal by means of a hydraulic device.

TAROL units are used for the bearing arrangements of wheelsets on rail vehicles such as freight wagons and passenger carriages. They can be quickly and easily fitted: the bearing is pressed onto the shaft journal in a single operation and secured by means of additional parts and screws. Since the unit has a press fit on a shaft journal of a diameter within the specified tolerances, the bearing arrangement achieves the required axial clearance.

TAROL units are filled as standard with greases proven in practical use. The standard grease in the metric size bearing units is certified in accordance with EN 12081. For inch size units, a grease approved by the AAR (**A**ssociation of **A**merican **R**ailroads) is used as standard. Upon request, we can also supply TAROL units with relubrication holes. The relubrication intervals are then set in accordance with the application. Schaeffler supplies TAROL units in inch and metric sizes for all standardised shaft journals on rail vehicles. Special sizes, individual parts, replacement parts and housing adapters are available by agreement.

Tapered roller bearing units TAROL – metric sizes

Schaeffler supplies TAROL units with a bore diameter between 90 mm and 160 mm in graduations of 10 mm. Depending on the requisite load carrying capacity, each bore diameter is available in various outside diameter and width values. TAROL units are supplied ready for mounting, where the grease selection and seal design are matched to the envisaged application in accordance with the data in the customer specification. The greases used correspond to EN 12081; this is an absolute precondition principally for application within the EU.

Seals of contact and contact-free design are used. In the selection process, attention must be paid to climatic conditions, the adjacent construction and the available space as well as the operating conditions, especially the travel velocity.

TAROL units in metric sizes are generally fitted with cages made from glass fibre reinforced polyamide. Cages made from polyamide have proved themselves in operation for several decades and have largely replaced sheet metal cages, *Figure 1*.

In order to mount a TAROL bearing on the shaft journal, accessory parts are necessary. In addition to the seals already integrated in the bearing, these are the backing ring, end cap, fasteners and, where necessary, further parts.

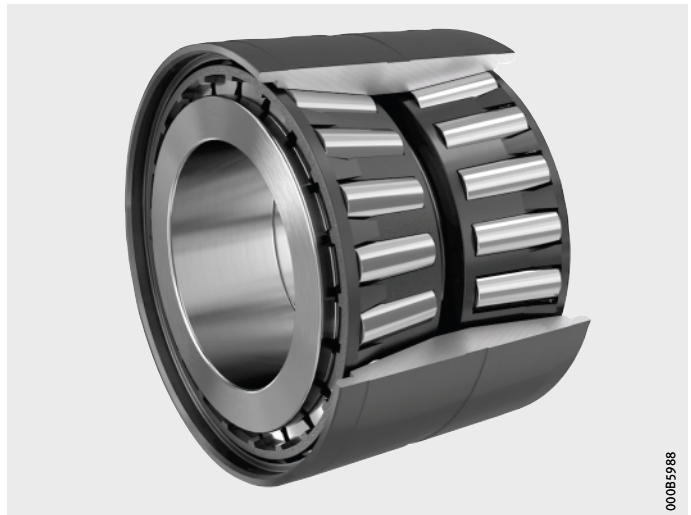


Figure 1
TAROL unit
in metric sizes

Tapered roller bearing units TAROL

Tapered roller bearing units TAROL – inch sizes

TAROL units in inch sizes correspond to the regulations of the AAR. Designs of the classes D, E, F, G and K correspond to the standard AAR M 934.

TAROL units in inch sizes in their normal design are supplied greased using a grease certified by the AAR. For sealing, contact seals are used, where a spring preloaded seal lip generally runs against a special seal wear ring. Sheet metal cages are standard for inch size TAROL units, especially for the North American market. Cages made from polyamide are available by agreement.

The scope of delivery of inch size bearing units in accordance with the AAR includes not only the rolling bearing and seals together with the seal wear rings but also the backing ring and the end cap as well as the axle bolt and retainers, *Figure 2*.



Figure 2
TAROL unit
in inch sizes

Designs For both inch and metric sizes, Schaeffler differentiates between the following variants of TAROL units.

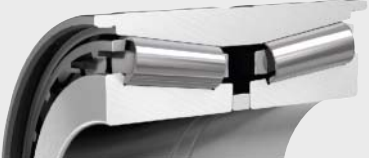
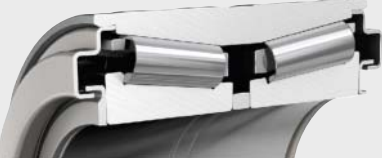

Variants

Designation	Definition
TAROL	Bearing design of standard quality
TAROLX ¹⁾	Bearing design in X-life quality
TAROLC	Bearing design Compact: Greased bearing with integrated seal seats on outer and inner rings for cartridge seals
TAROLS ¹⁾	Bearing design Supreme: TAROLC of X-life quality




¹⁾ The suffixes X and S are not used for new designs.

Tapered roller bearing units TAROL

Identification

Designation	Definition
R	 <p>Roller Bearing (TAROL130/230-R-TVP)</p> <p>Base bearing comprising:</p> <ul style="list-style-type: none"> ■ one outer ring ■ two inner rings ■ two rows or rollers with cages ■ one intermediate ring.
G	 <p>Greased Bearing (F-572309.TAROL130/230) without BRG, EC, MBL and SHR)</p> <p>Base bearing:</p> <ul style="list-style-type: none"> ■ sealed ■ greased.
B	 <p>Bearing unit comprising:</p> <ul style="list-style-type: none"> ■ base bearing (R) ■ sealed as a minimum ■ greased. <p>It is possible to fit further accessory parts or a base unit comprising:</p> <ul style="list-style-type: none"> ■ base bearing (G). <p>Further accessory parts are definitively fitted.</p>

**Identification
(continued)**

Designation	Definition
U ¹⁾	 <p>Unit (F-572309.TAROL130/230-U-TVP) Bearing unit comprising:</p> <ul style="list-style-type: none"> ■ base bearing ■ sealed ■ greased ■ with all necessary accessory parts for complete axle mounting.
BC ¹⁾	 <p>Base Unit in Compact Design (F-568142.02.TAROL-BC-TVP) Bearing unit comprising:</p> <ul style="list-style-type: none"> ■ base bearing of compact design ■ sealed ■ greased. <p>It is possible to fit further accessory parts, but not complete as in the case of the bearing unit UC.</p>
UC ¹⁾	 <p>Unit in Compact Design (F-572086.02.TAROL-UC-TVP) Bearing unit comprising:</p> <ul style="list-style-type: none"> ■ bearing unit of compact design ■ sealed ■ greased ■ with all necessary accessory parts for complete axle mounting.

¹⁾ Designations are no longer used in the case of new designs.

Tapered roller bearing units TAROL

Designation structure

Figure 3
TAROL unit
to inch size with whole number
dimensional notation

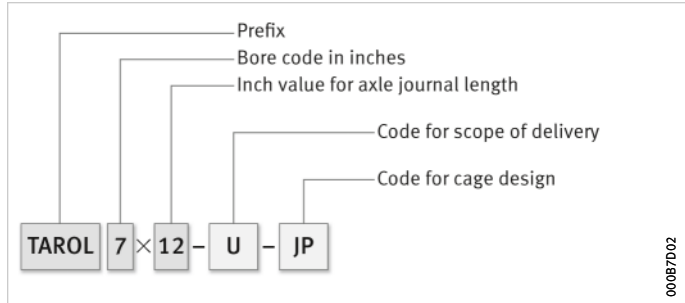


Figure 4
TAROL unit
to inch size with fraction
dimensional notation

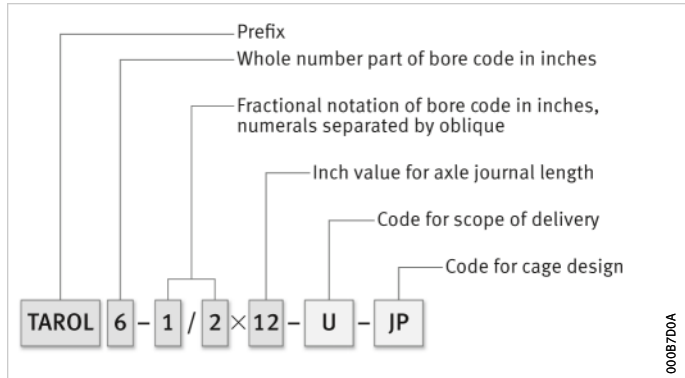
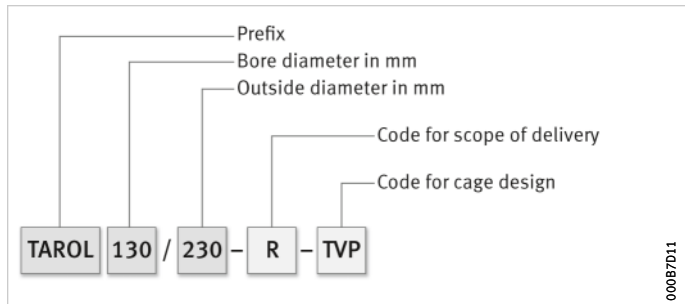


Figure 5
TAROL unit
to metric size



Identification of the cage design is not used in the case of new designs.

Ordering designation For customer-specific designs, the ordering designation is preceded by a drawing number:

- F-607804.TAROLC7X12-G
- F-604048.01.TAROL130/240.

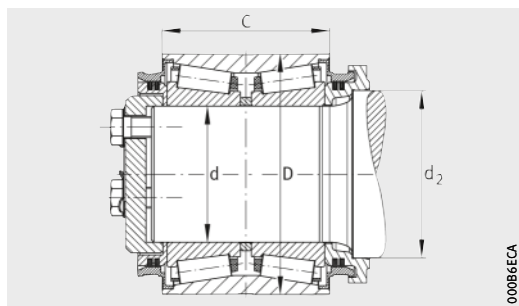
The scope of delivery is identified in accordance with the table, page 8.

In the case of metric size TAROL bearings, the bore and outside diameter can be stated in a combined form without an oblique, for example TAROL3040-R corresponding to TAROL130/240-R.

Tapered roller bearing units

TAROL

Metric sizes

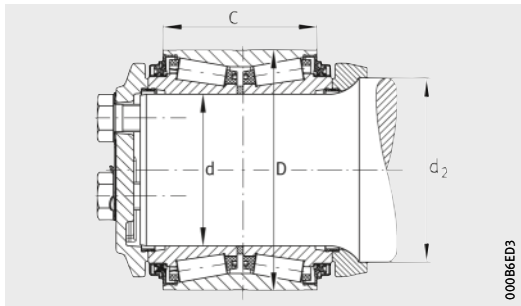


Lamellar seal

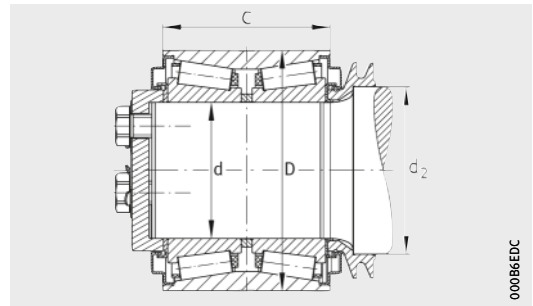
Dimension table · Dimensions in mm

Designation	Typical ordering designation of complete unit	Mass	
		Base bearing ≈ kg	TAROL unit ≈ kg
TAROL90/154-R-TVP ¹⁾	F-567684.TAROL90/154-U	7,5	13
TAROL100/165-R-JP	Z-517874.TAROL100/165-U	9,16	14
TAROL100/175-R-TVP	F-579825.TAROL100/175-U	10,7	16
TAROL110/180-R-TVP	F-572314.TAROL100/180-U	14	17
TAROL120/195-R-TVP ¹⁾	F-600318.TAROL120/195-U	14,7	19
TAROL130/210-R-JP	F-622659.TAROL3010-U	16,7	24
TAROL130/220-R-TVP ¹⁾	F-617389.TAROLC3020A-U	20	31
TAROL130/230-R-TVP ¹⁾	F-606759.TAROL130/230-U	27,1	35
TAROL130/240-R-TVP ¹⁾	F-631814.TAROL3040-U	28,9	37
TAROL140/220-R-JP	F-574500.TAROL140/220-U	18,5	26
TAROL150/250-R-TVP ¹⁾	F-622119.TAROL5050-U	28,9	38
TAROL160/270-R-TVP ¹⁾	F-575890.TAROL160/270-B	33	40
TAROL160/280-R-TVP	Ordering designation available by agreement	–	–

¹⁾ Size also available with JP cage.



Compact seal

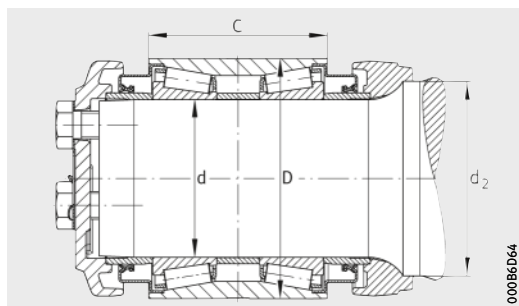


Sheet metal cap seal

Dimensions					Basic load rating DIN ISO 281 C kN
Bearing			Shaft		
d	D	C	d	d ₂	
90	154	115	90 n6	120	390
100	165	114,3	100 n6 (p6)	126 k8	415
100	175	120	100 n6 (p6)	126 k8	510
110	180	142	110 p6	140 t7	520
120	195	131,4	120 p6	138 t7	560
130	210	132	130 p6	150 t7	620
130	220	150	130 p6	160 t7	780
130	230	160	130 p6	160 t7	910
130	240	160	130 p6	160 t7	850
140	220	140	140 p6	160 t7	655
150	250	160	150 p6	170 t7	900
160	270	150	160 p6	190 t7	1 050
160	280	180	160 p6	189 k6	1 270

Tapered roller bearing units

TAROL
Inch sizes

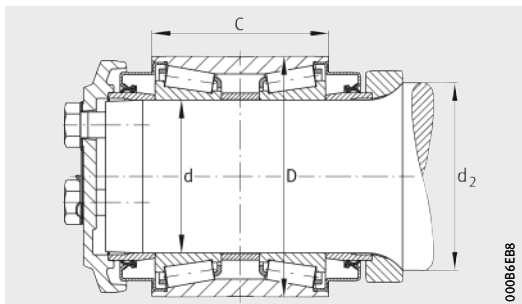


Class E, F, G, GG

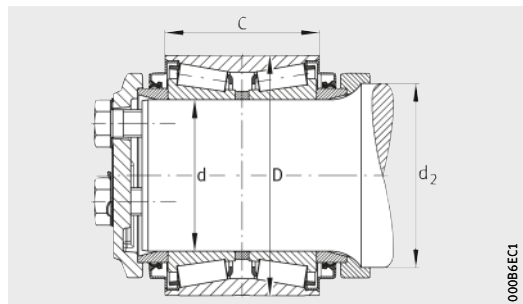
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Dimension table · Dimensions in mm and inch

Designation	Design	Size	Mass		Dimensions					
					Bearing					
					d		D _{min}		C	
					lbs	≈ kg	inch	mm	inch	mm
TAROL4-1/4×8-U-JP	B	4 ¹ / ₄ ×8	32,6	14,8	4	101,6	6,5	165,1	4,5	114,3
TAROL5X9-U-JP	C	5×9	54,7	24,8	4,6875	119,063	7,6875	195,263	5,63	142,9
TAROL5-1/2X10-U-JP	D	5 ¹ / ₂ ×10	60,2	27,3	5,187	131,75	8,1875	207,963	6	152,4
TAROL6X11-U-JP	E	6×11	77	34,9	5,687	144,45	8,6875	220,663	6,437	163,5
TAROL6-1/2X12-U-JP	F	6 ¹ / ₂ ×12	116,6	52,9	6,187	157,15	9,9375	252,413	7,25	184,15
TAROL6-1/2X9-U-JP	K	6 ¹ / ₂ ×9	89,7	40,7	6,187	157,15	9,8375	249,873	6,3	160
TAROL7X12-U-JP	G	7×12	132,5	60,1	6,9995	177,787	10,875	276,225	7,31	185,74
TAROLGG6-1/2-U-JP	GG	6 ¹ / ₂	179,5	81,4	6,4995	165,087	11,882	301,803	7,75	196,85
TAROLGG6-7/8-U-JP	GG	6 ⁷ / ₈	170,4	77,3	6,8745	174,612	11,882	301,803	7,75	196,85

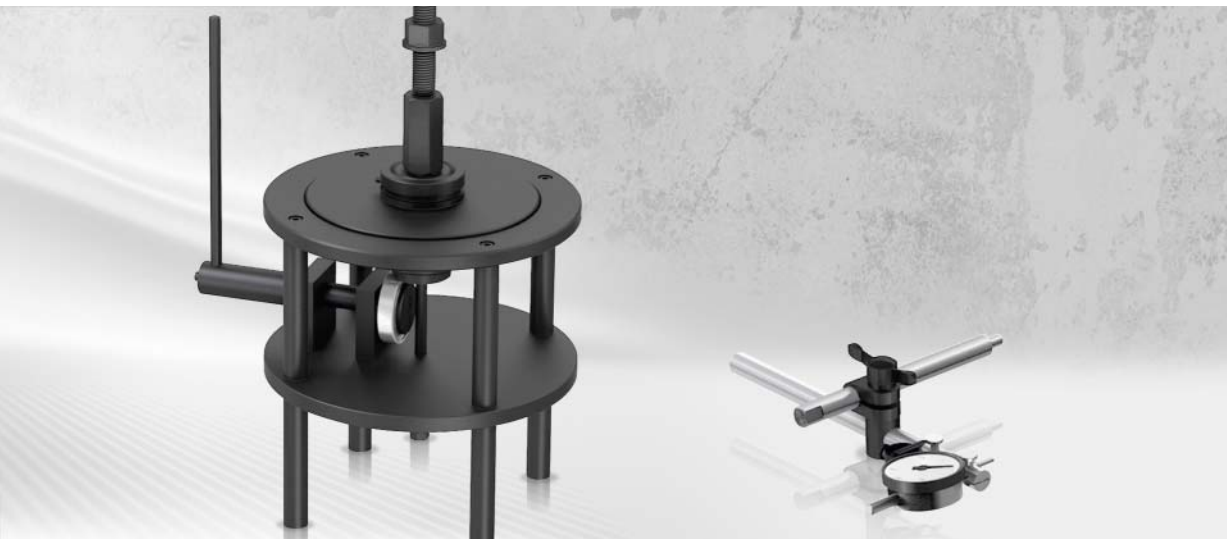


Class B, C, D



Class K

Shaft						Basic load ratings			
						ABEC/RBEC		DIN ISO 281	
d_{min}		d_{max}		d_2		C_1		C	
inch	mm	inch	mm	inch	mm	lbs	kN	kN	
4,003	101,676	4,004	101,702	5	127	106 000	475	415	
4,6905	119,139	4,6915	119,164	5,875	149,225	146 000	655	560	
5,1905	131,839	5,1915	131,864	6,375	161,925	160 000	720	620	
5,6905	144,539	5,6915	114,564	7,030 – 7,032	178,562 – 178,613	170 000	750	655	
6,1905	157,239	6,1915	157,264	7,530 – 7,532	191,262 – 191,313	232 000	1 040	900	
6,1905	157,239	6,1915	157,264	7,530 – 7,532	191,262 – 191,313	232 000	1 040	900	
7,003	177,876	7,004	177,902	8,000 – 8,002	203,200 – 203,251	265 000	1 180	1 020	
6,503	165,176	6,504	165,202	7,905 – 7,906	200,79 – 200,81	300 000	1 530	1 320	
6,878	174,701	6,879	174,727	7,870 – 7,873	199,898 – 199,974	300 000	1 530	1 320	



Preparations for mounting

Tools
Preparations for mounting

Preparations for mounting

Tools for mounting and dismounting

The mounting tools TOOL-RAILWAY for FAG tapered roller bearing units TAROL are also suitable for the mounting and dismounting of completely greased and sealed cylindrical roller bearing units on the axle journal.

Further information on this and similar equipment as well as the associated services can be found in Catalogue IS 1, Mounting and Maintenance of Rolling Bearings.

The following are required for mounting and dismounting, *Figure 1*:

- mobile hydraulic unit
- bearing-specific tool set.

- ① Guide bush
- ② Spindle
- ③ Locknut
- ④ Mounting sleeve
- ⑤ Mobile hydraulic unit
TOOL-RAILWAY-AGGREGATE-2
- ⑥ Socket head screws
for guide bush



Figure 1
Mobile hydraulic unit
with components for mounting

Mobile hydraulic unit

The mobile hydraulic unit TOOL-RAILWAY-AGGREGATE-2 for the mounting of TAROL units can be used flexibly in combination with the bearing-specific tool sets, *Figure 2*.

The electrically driven unit mounted on the lift trolley and a hydraulic cylinder are used to press the TAROL units onto or remove them from the shaft journal.



Figure 2
Mobile hydraulic unit
TOOL-RAILWAY-AGGREGATE-2

Ordering designation

Ordering designation	Ordering number
TOOL-RAILWAY-AGGREGATE-2	093687800-0000-10

TOOL-RAILWAY-AGGREGATE-2

Designation		Value	Unit
Dimensions	Length	1 050	mm
	Width	500	mm
	Height	900	mm
Max. press force		692	kN
Max. working stroke		230	mm
Max. working pressure		700	bar
Working height	min.	425	mm
	max.	990	mm

Preparations for mounting

Tool set for mounting and dismounting

Tool sets are produced for a specific application, *Figure 3*. When making enquiries or placing orders, information on the bearing type and installation drawings (shaft, housing, additional parts) are required.

- ① Yoke
- ② Tie rods
- ③ Withdrawal shoe
- ④ Centring ring
- ⑤ Locknut
- ⑥ Guide bush (2×)
- ⑦ Mounting sleeve
- ⑧ Spindle
- ⑨ Crank arm
- ⑩ Socket head screws for guide bush

Figure 3
Tool set



Ordering designation

Design	Ordering designation	Ordering number
Metric size	TOOL-RAILWAY-AXLE-F-803329-130/230	089761316-0000-10
Inch size	TOOL-RAILWAY-AXLE-E6X11	057502730-0000-10

Axial clearance gauge

The axial clearance gauge is used for measuring the axial clearance before mounting. It comprises:

- base device TOOL-RAILWAY-CLEARANCE-BASIC
- bearing-specific adapter set TOOL-RAILWAY-CLEARANCE.TOP.

The bearing is mounted on the gauge by means of the adapter set. The dial gauge is positioned on the end face of the outer ring and set to zero. By means of an eccentric mechanism, the bearing is raised by its inner ring and the axial clearance present can be read from the dial gauge.

Base device

The base device is suitable for all TAROL units. It comprises a frame and the measuring unit with a dial gauge, *Figure 4*.



Figure 4
Base device
TOOL-RAILWAY-CLEARANCE-BASIC

Ordering designation

Ordering designation	Ordering number
TOOL-RAILWAY-CLEARANCE-BASIC	039043525-0000-10

Preparations for mounting

Bearing-specific adapter set

The adapter set facilitates the precise positioning of the bearing on the base axial clearance gauge, *Figure 5*.



Figure 5
Bearing-specific adapter set
TOOL-RAILWAY-CLEARANCE-TOP

Ordering designation

Design	Ordering designation	Ordering number
Metric size	TOOL-RAILWAY-CLEARANCE.TOP-130/230	089179684-0000-10
Inch size	TOOL-RAILWAY-CLEARANCE.TOP-E6X11	063815117-0000-10

Bearing greasing tool

In the reconditioning of wheel bearing sets for rail vehicles (TAROL units), rapid and uniform greasing of the bearings can be achieved by means of bearing-specific greasing tools. The tool is connected to a drum pump that supplies the appropriate grease quantity.

The bearing greasing tool TOOL-RAILWAY-GREASER is used to grease the inner ring with roller and cage assembly, *Figure 6*.



Figure 6
Bearing greasing tool
TOOL-RAILWAY-GREASER

Ordering designation

Design	Ordering designation	Ordering number
Metric size	TOOL-RAILWAY-GREASER-150/250-R-TVP	093608195-0000-10
Inch size	TOOL-RAILWAY-GREASER-E6X11	063665808-0000-10

Preparations for mounting

Hydraulic press

The hydraulic press is used for the mounting and dismounting of seals on tapered roller bearing units, also known as TAROL units, *Figure 7*. In addition, a matching sealing cap tool is required for each bearing type.



Figure 7
Hydraulic press
TOOL-RAILWAY-PLATEPRESS

Ordering designation

Ordering designation	Ordering number
TOOL-RAILWAY-SEALCAP-PRESS	038455323-0000-10

Sealing cap tool

Sealing cap tools are bearing-specific and include all the parts for mounting and dismounting of the seal. For dismounting, the parts required are an adapter ring, a punch and the appropriate press-out segments. For mounting of the new seal, a support and the appropriate press-in ring are supplied.

Ordering designation

Design	Ordering designation	Ordering number
Metric size	TOOL-RAILWAY-SEALCAP-F-565845-130/230	085324868-0000-10
Inch size	TOOL-RAILWAY-SEALCAP-E6X11	063631369-0000-10

Visual inspection device

The visual inspection device TOOL-RAILWAY-INSPECTION-DEVICE is used for the visual inspection of the running surfaces of rings and rolling elements after dismounting, *Figure 8*.

In the reconditioning of wheelset bearings for rail vehicles (TAROL units), the bearing inner rings with roller and cage assembly are subjected to visual examination after dismounting and cleaning. In order to check the condition of components, a device with a light and magnifying lens is used to visually assess the raceways, rings and all rolling elements.



Figure 8
Visual inspection device
TOOL-RAILWAY-INSPECTION-DEVICE

Ordering designation

Ordering designation	Ordering number
TOOL-RAILWAY-INSPECTION-DEVICE	039043541-0000-10

Preparations for mounting

Drum pump Drum pumps ARCA-PUMP-BARREL, *Figure 9*, table, are pneumatically driven and suitable for delivering large quantities of grease under high pressure over long distances. Drum pumps can be used either as delivery pumps for individual greasing stations or as a supply pump for central lubrication systems.



Figure 9
Drum pump
ARCA-PUMP-BARREL

Available drum pumps

Designation	Pump ratio	Delivery rate at 6 bar g/min	Air consumption l/min	Suitable for container sizes kg
ARCA-PUMP-BARREL-25-S	70:1	1 100	150	25
ARCA-PUMP-BARREL-50-S	70:1	1 100	150	50
ARCA-PUMP-BARREL-180-S	70:1	1 100	150	180

The following accessories are available for the drum pumps:

- drum cover (dust cover)
- plate
- high pressure delivery hoses
- pistol grease guns.

Preparations for mounting

The mounting area must be clean, dry and spacious, as well as being separated from machining plant, welding equipment or compressed air devices.

Inspecting the shaft journals

Before mounting, the shaft journal on the axle must be prepared and inspected.

The shaft journal is measured using a snap gauge set in accordance with the master ring, *Figure 10*. The dimensions of the shaft journal must be within the values stated in the bearing tables.



Figure 10
Setting the snap gauge
by means of the master ring

Preparations for mounting

The shaft journal is inspected as follows:

- ▶ Thoroughly remove contamination, swarf and anti-rust coating.
- ▶ Smooth out any impact marks and corrosion marks using a fine abrasive. The bearing seating surface should be smooth and free from scoring and notches.
- ▶ Demagnetise any magnetised shafts before mounting.
- ▶ Measure the shaft journal, ensuring that the shaft and tool are at the same temperature, *Figure 11*.



Figure 11
Measuring the shaft journal
using the snap gauge

Tolerances of shaft journals in inch sizes



The regulations in the “Manual of Standards and Recommended Practices” of the AAR apply, including the specification M-101 on dimensional and geometrical accuracy. For example, the values for out-of-roundness and conicity must not exceed 0,025 mm (0,001 inch).

The mounting of bearings in accordance with the AAR specification is subject not only to the information in this brochure but also the mounting specifications of the AAR in their current valid version.

These can be found mainly in the Sections G, G-II, H and H-II of the “Manual of Standards and Recommended Practices”.

These include the specification that the end cap screws should be repeatedly tightened until, at the specified tightening torque, there is no longer any rotational movement of the screws.

Tolerances of shaft journals in metric sizes



There is a general specification that the cylindricity tolerance should be max. 0,01 mm.



Mounting

Mounting

Mounting of TAROL units

Tapered roller bearing units TAROL are compact, ready to fit, greased, sealed and axially adjusted rolling bearings that are pressed onto the shaft journal in a single operation. If the shaft journal diameter is within the specified tolerance, the press fit of the bearing will give the required axial internal clearance.

The following guidelines and recommendations apply to the standard mounting and dismounting of TAROL bearings. Where bearing-specific mounting recommendations and parameters exist, these application-specific requirements must be followed.

The TAROL units are mounted as follows:

- Screw the guide bush onto the shaft journal with the aid of the centring bush, *Figure 1*.



Figure 1
Screwing the guide bush
onto the shaft journal

- ▶ Apply a very thin coating of Arcanol MOUNTINGPASTE to the shaft journal to prevent any scoring when sliding the unit into place.
- ▶ Remove the TAROL unit from the packaging and slide it onto the guide bush. In the case of bearing units with rubber seals, the seal wear ring must not be allowed to slip out of the sealing cap, *Figure 2*.



Figure 2
Sliding the TAROL unit
onto the guide bush

Ordering designation

Ordering designation	Ordering number
ARCANOL-MOUNTINGPASTE-250G	019145365-0000-10
ARCANOL-MOUNTINGPASTE-400G	019145373-0000-10
ARCANOL-MOUNTINGPASTE-1KG	019145357-0000-10

Mounting

- ▶ Move the mobile hydraulic device into place and prepare the spindle with locknut and mounting sleeve, *Figure 3*.



Figure 3
Moving the hydraulic unit into place

- ▶ Insert the spindle with the locknut screwed into place from the rear side of the hydraulic unit through the hollow piston.
- ▶ Slide the mounting sleeve onto the spindle of the piston press, *Figure 4*.

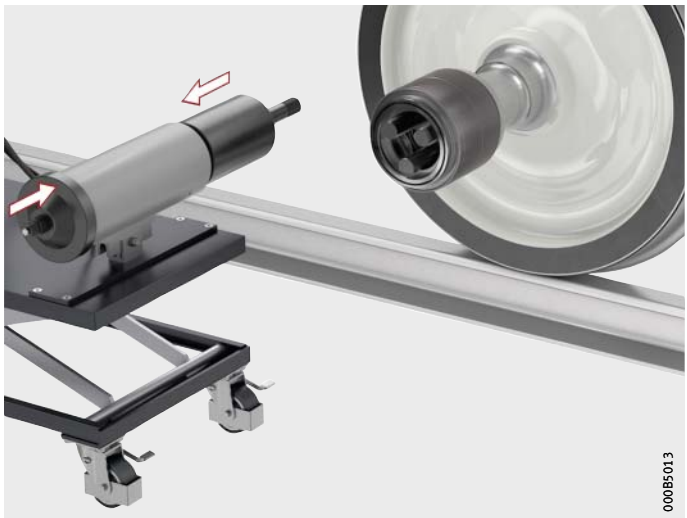


Figure 4
Mounting the spindle and
sliding the mounting sleeve
onto the spindle

- ▶ Align the hydraulic unit to the TAROL unit and the shaft journal.
- ▶ Slide the mounting sleeve onto the guide bush, *Figure 5*.



Figure 5
Aligning the hydraulic unit
to the TAROL unit

00085016

Mounting

- ▶ Screw the spindle of the hydraulic unit using the crank arm into the guide bush, *Figure 6*.



Figure 6
Screwing the spindle
into the guide bush

- ▶ Activate the hydraulic unit in order to press the bearing unit from the guide bush onto the shaft journal with the aid of the mounting sleeve. Rotate the outer ring back and forth by hand so that no tensioning occurs, *Figure 7*.



Figure 7
Pressing the bearing unit into place

- ▷ The pressure will increase rapidly when the backing ring is in axial contact with the shaft shoulder. The highest press force should correspond to the maximum contact forces in the tables.
- ▶ For security, apply the highest contact force again.

Maximum contact force of TAROL units in metric sizes

TAROL unit d mm	Maximum contact force		Pressure Tolerance ± 20 bar bar
	Tolerance ± 20 kN kN	Tolerance ± 2 t t	
90	200	20	200
100	250	25	250
110	250	25	250
120	250	25	250
130	350	35	350
140	350	35	350
150	350	35	350
160	400	40	400

Maximum contact force of TAROL units in inch sizes

TAROL unit	Maximum contact force		Pressure Tolerance ± 55 bar bar
	Tolerance ± 50 kN kN	Tolerance ± 5 t t	
B4-1/4×8	350	35	350
C5×9	350	35	350
D5-1/2×10	500	50	500
E6×11	500	50	500
F6-1/2×12	500	50	500
K6-1/2×9	500	50	500
G7×12	650	65	650
GG6-1/2	650	65	650
GG6-7/8	650	65	650

Mounting

- ▶ Screw the spindle with the locknut out of the guide bush and remove the spindle from the hydraulic nut.
- ▶ Move the hydraulic unit to one side.
- ▶ Remove the mounting sleeve.
- ▶ Unscrew the guide bush from the shaft journal, *Figure 8*.



Figure 8
Unscrewing the guide bush
from the shaft journal

- ▶ Screw the end cap together with the retainer (plate or washer) onto the shaft end face.
- ▶ Tighten the end cap screws to the tightening torque stated in the tables, *Figure 9* and tables, page 40.



Figure 9
Tightening the end cap screws

- ▶ Where present, bend back both tabs on the tab washer on all the end cap screws, *Figure 10*.



Figure 10
Bending back the tab
on the tab washer

- ▶ In the case of designs with a cover:
Once the end cap screws have been tightened to the prescribed tightening torque and secured, fit the cover over the end cap.

Mounting

Tightening torque of end cap screws for TAROL units in metric sizes

Screw size	Tightening torque	
	Normal screws with retention Tolerance $\pm 5\%$ Nm	Self-retaining screws Tolerance $\pm 5\%$ Nm
M12	75	80
M16	180	205
M20	370	415

Tightening torque of end cap screws for TAROL units in inch sizes

TAROL unit Class/size	Thread dimension of end cap screw inch	Tightening torque Tolerance $\pm 4\%$	
		Nm	ftlbs
B4-1/4×8	3/4	56	115
C5×9	7/8	197	145
D5-1/2×10	7/8	217	160
E6×11	1	393	290
F6-1/2×12	1 ¹ / ₈	569	420
K6-1/2×9	1 ¹ / ₈	569	420
G7×12	1 ¹ / ₄	664	490
GG6-1/2	7/8	502	370
GG6-7/8	7/8	502	370



The tightening torques stated are standard values for axle closure parts supplied by us. Components from other suppliers may vary from these values.



Dismounting

Dismounting

Removing the end cap

The end cap is removed as follows:

- ▶ Clean the bearing and accessory parts.
- ▶ If present, dismount the cover.
- ▶ If present, bend the tab washer away from the lateral faces of the screw heads.
- ▶ Untighten and remove the screws, *Figure 1*.



Figure 1
Dismounting the end cap

- ▶ Remove the end cap without removing the sealing ring, *Figure 2*.



Figure 2
End cap dismounted

- ▷ The end cap is dismounted.

Removing the unit

The unit is removed as follows:

- ▶ Screw on the guide bush with the aid of the centring bush, *Figure 3*.



Figure 3
Screwing on the guide bush

- ▶ Insert the spindle without the locknut through the hollow piston of the hydraulic unit and align the spindle to the shaft, *Figure 4*.



Figure 4
Inserting the spindle
through the hollow piston

Dismounting

- ▶ Screw the spindle into the guide bush, *Figure 5*.



Figure 5
Screwing the spindle
into the guide bush

- ▶ Position the drawing frame with an insert matching the bearing size for the extractor shoe.
- ▶ Ensure that the extractor shoe is in contact with the shaft behind the shaft shoulder, *Figure 6*.



Figure 6
Extractor shoe
in contact with shaft

- ▶ Secure the extractor shoe in place as necessary using an indoor crane in order to prevent damage to the shaft by the extractor shoe after dismounting.
- ▶ Activate the hydraulic unit.
- ▶ During removal, rotate the outer ring back and forth by hand in order to prevent tensioning.
- ▶ Switch off the hydraulic unit once the removal operation is completed.
- ▶ Lift off the drawing frame and place it to one side.
- ▶ Unscrew the spindle from the guide bush.
- ▶ Move the hydraulic unit to one side.
- ▶ Remove the bearing from the guide bush.
- ▶ Unscrew the guide bush, *Figure 7*.



Figure 7
Unscrewing the guide bush

Dismounting

Removing the seals

Removal of the seals requires the hydraulic press, *Figure 8*, and the sealing cap tool with the locating ring and press-in ring, *Figure 9*.



Figure 8
Hydraulic press

00085DF2

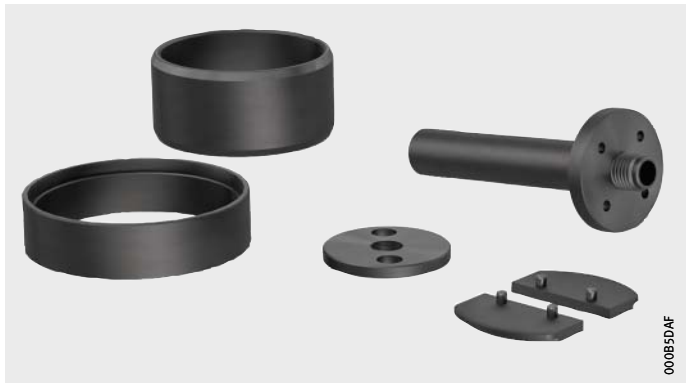


Figure 9
Sealing cap tool
with locating ring and press-in ring

00085DAF

Seal cap tool Variant 1

The seals are removed as follows:

- ▶ Where present in the bearing design, remove the end face seal wear ring from the TAROL unit.
- ▶ Remove the backing ring and, if present, the seal wear ring. In some bearing designs, the backing ring cannot be removed by hand but must instead be carefully knocked out by means of a plastic hammer.
- ▶ Prepare the punch with punch plate and the locknut, press-out segments and the locating ring.
- ▶ Insert the press-out segments between the inner ring and sealing cap, *Figure 10*.



Figure 10
Inserting the press-out segments

- ▶ Guide the punch through the bearing bore until the pins of the segments come into contact with the holes in the punch plate, *Figure 11*.



Figure 11
Guiding the punch
through the bearing bore

Dismounting

- ▶ Screw the locknut onto the punch, thus axially tensioning the punch and segments, *Figure 12*.



Figure 12
Axially tensioning
the punch and segments

- ▶ Insert the bearing together with the matching tool components into the locating ring, *Figure 13*.



Figure 13
Inserting the bearing
into the locating ring

- ▶ Insert the bearing and the press-out tool together with the locating ring in the press and align it, *Figure 14*.



Figure 14
Inserting and aligning
the bearing in the press;
activating the press

- ▶ Press out the seal or sealing cap.
- ▶ Remove the inner ring and spacer ring which are now loose and unscrew the locknut from the punch.
- ▶ Press the seal out on the opposing side of the outer ring as described.
- ▷ The seals are removed.

Dismounting

Seal cap tool Variant 2



Figure 15
Complete seal cap tool,
Variant 2

The seals are removed as follows:

- ▶ Where present, remove the end face seal wear ring from the TAROL unit.
- ▶ Remove the backing ring and, if present, the seal wear ring. In some bearing designs, the backing ring cannot be removed by hand but must instead be carefully knocked out by means of a plastic hammer.
- ▶ Prepare the punch with punch plate, the press-out tool and the locating ring.
- ▶ Remove the backing ring in the TAROL variant with sheet metal cap seals.



Figure 16
Removing the backing ring
in the TAROL variant
with the sheet metal cap seal

- ▶ Position the press-out tool on the TAROL unit and tension the press-out tool between the bearing inner ring and seal it by rotating the knob in a clockwise direction until it stops, *Figure 17*.



Figure 17
Positioning and tensioning
the press-out tool on the TAROL unit

- ▶ Rotate the TAROL unit using the matching press-out tool vertically by 180° and insert it in the locating ring.
- ▶ Position the punch and punch plate from above on the press-out tool, *Figure 18*.



Figure 18
TAROL unit with press-out tool
in locating ring and
punch with punch plate

Dismounting

- ▶ Insert the TAROL unit with the matching press-out tool and locating ring in the plate press, align the unit and the press the seal out by activating the press, *Figure 19*.



Figure 19
Inserting the TAROL unit
in the plate press,
aligning the unit and
activating the press

- ▶ Remove the TAROL unit from the press.
- ▶ Remove the punch and punch plate, press-out tool as well as the inner ring and spacer ring that are now loose.
- ▶ Remove the seal on the opposing bearing side in the same way.
- ▶ Remove the lamellar rings where present, see page 53.

Removing the lamellar rings

The lamellar rings are extracted together with the ring carriers, end cap and backing ring from the unit without any special devices.

The lamellar rings are lifted using a narrow screwdriver, pulled out to a certain extent by hand and then rotated out of the slot.

- ▶ Where present, remove the lamellar rings from the backing ring and end cap together with the ring carriers.
- ▶ Lift the rings using a narrow screwdriver, pull the rings out to a certain extent by hand and rotate them out of the slot, *Figure 20*.



Figure 20
Removing the lamellar rings



Reconditioning

- Dismantling the bearing units
- Cleaning the bearing units
- Examining the bearing parts
- Measuring the axial internal clearance
- Greasing the bearings
- Rolling bearing greases Arcanol
- Completing the TAROL units
- Reconditioning

Reconditioning

Dismantling the bearing units

For inspection, maintenance and lubrication, the TAROL units are dismantled from the shaft journal.

The seals are removed first, all the bearing parts are cleaned, inspected piece by piece for signs of damage and the parts and the axial internal clearance are then measured. The unit is then reassembled using the inspected parts or new parts. The unit is regreased in accordance with the section Greasing the bearings.

All the tools for mounting, dismantling and maintenance of TAROL units can be sourced from Schaeffler. Tools must be intact and appropriate in order to prevent damage to the bearings and seals.

Cleaning the bearing parts

The bearing parts are cleaned as follows:

- ▶ Remove the residual grease from the parts using a wooden spatula and a lint-free cloth.
- ▶ In batch maintenance, use suitable washing machines. Carry out cleaning by hand only in suitable washing containers.
- ▶ Clean the inner rings, roller and cage assemblies, outer ring and spacer ring in a special washing container using kerosene or a cold cleaning agent.
- ▶ After cleaning, spray the bearing parts with Arcanol oil.
- ▶ Wash the adapters, end caps, backing rings and fixing screws in a washing container provided for these parts.



Inner rings with a roller and cage assembly, intermediate ring and outer ring must always be kept together.

Examining the bearing parts

In the case of TAROL units, the bearing condition can be inspected by checking the bearing outer ring and rows of rolling elements in the dismantled state. A device with a light and magnifying lens, such as the visual inspection device, can be used to view the raceways of the rings and rolling elements. The raceways are inspected for wear marks and foreign body indentations. Where parts are found to have defects or damage, a decision must be made as to whether they can be reused, whether they are to be repaired or replaced by new parts. For correct assessment, it is important that the individual parts of a bearing that has been dismantled and cleaned are not mixed with parts of other bearings.

Surface corrosion

Surface corrosion occurs on bearing rings and bearing rollers in the form of rust discolouration, etching and pitting:

- Where discolourations and stains can be removed using a fine emery cloth, it is not necessary to reject the rolling bearings. Abrasive debris must be removed every time without leaving any residue.
- If etching marks due to water and acid can be polished out without leaving significant indentations, the parts can be reused.

For polishing of corrosion marks, polishing discs and pastes are used. This allows stains to be removed in the most favourable case. If deeper pitting has been caused by rust and corrosion, the bearing rings and rollers can no longer be used. Bearing parts that exhibit heat discolouration must be rejected.

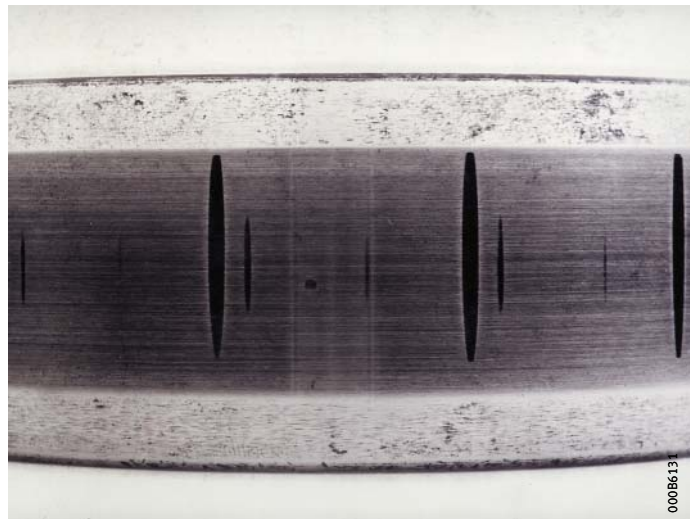


Figure 1
Standstill marks

Reconditioning

Rolling element indentations

Rolling element indentations (brinelling) in the raceways are caused by heavy shock loads or oscillations during standstill.

Figure 2 shows how standstill marks have formed, corresponding to the spacing of the rolling elements, on the raceway of an inner ring.



Figure 2
Rolling element indentations
(brinelling)

Fatigue damage

Fatigue damage to the raceways becomes apparent in the form of pitting. Bearings with fatigue damage must always be replaced, *Figure 3*.



Figure 3
Fatigue damage

**Raceway indentations
due to contamination**

Contaminants in the lubricant can also cause indentations in the raceways. Where such raceway indentations are not apparent due to roughness when rotating the bearings by hand, the parts can be reused, *Figure 4*.



Figure 4
Raceway indentations
due to contamination

Current passage damage

Bearings with fluting or craters that have been caused by the passage of current cannot be reused.



Figure 5
Current passage damage

Reconditioning

Cages and spacer rings

Cages may only be reused if they do not have any cracks or deformations. If the spacer ring exhibits cracks, indentations or burn marks, it must be replaced.

Seats for seals and sealing caps

Before the bearing is assembled, it must be checked whether the seat on the outer ring for the seal or sealing cap still conforms to the requisite dimensions. The diameter is measured using an inside micrometer and must be within the prescribed tolerances, which are given in the tables.

Bearing accessories

- The end cap is examined for cracks, fractures and deformations.
- Where lamellar rings are no longer tensioned against the sealing cap, they must be replaced by new lamellar rings.
- The hexagon head screws must have an intact thread. It must be ensured by checking whether the screws have been subjected to stretching.
- In any examination, the tab washers are replaced.

For inch size bearings, the following applies:

- The sealing rings must not be broken, cracked or deformed. In the lead area of the seal lips, the surfaces must be smooth and must not exhibit any wear. For easier fitting, the inner sealing ring must have a press fit in the backing ring (interference 0,05 mm to 0,175 mm).
- The backing ring must not be damaged. The support radius must be inspected using a gauge. The gauge must be in contact on both sides.

The seals with a vulcanised rubber part are always replaced by new seals when maintenance is carried out on the unit.

Measuring the axial internal clearance

Maintenance includes checking of the axial internal clearance of the rolling bearing after mounting. In this way, it can be ensured that the spacer ring is of the width that is required in order that the bearing exhibits the requisite axial clearance after mounting.

After cleaning, the bearing parts are dipped in machine oil or anti-corrosion oil. The axial internal clearance of the bearing must never be measured on a dry bearing. Measurement is carried out using an axial internal clearance gauge, *Figure 6*.



Figure 6
Axial internal clearance gauge
with rolling bearing

Reconditioning

Measuring the axial internal clearance

The axial internal clearance is measured as follows:

- Fit a suitable centring bush and clamp it firmly in place using a grub screw, *Figure 7*.



Figure 7
Fitting the centring bush

- ▶ Fit the centring ring.
- ▶ Slide an inner ring together with the roller and cage assembly and spacer ring onto the centring bush. Slide the inner ring into place up to its rib, *Figure 8*.



Figure 8
Sliding the inner ring
onto the centring bush

Reconditioning

- ▶ Slide the outer ring over the inner ring, while rotating the outer ring.
- ▶ Insert the second inner ring together with the roller and cage assembly into the outer ring, while rotating the inner ring.
- ▶ Rotate the eccentric upwards into the position “UP”. This raises the bearing.
- ▶ Fit the retaining disc and grip. The retaining disc must not be in contact with the cage or outer ring.
- ▶ Rotate the retaining disc back and forth to a certain extent, tightening the nut finger tight by means of a wrench, *Figure 9*.



Figure 9
Tightening the nut using a wrench

- ▶ Rotate the eccentric downwards into the position “DOWN”.
- ▶ Rotate the inner rings with the aid of the grip 12 times by 360° until the rollers are in contact with the large rib on the upper inner ring, *Figure 10*.



Figure 10
Rotating the outer ring

00055C12

Reconditioning

- ▶ Position the locating ring and dial gauge on the outer ring and set the dial gauge to “0”, *Figure 11*.



Figure 11
Locating ring with dial gauge

- ▶ Rotate the eccentric upwards into the position “UP”.
- ▶ Rotate the outer ring back and forth 10 times by 45° until the rollers are in contact with the large rib on the lower inner ring, *Figure 12*. The pointer on the dial gauge is then stationary.



Figure 12
Rotating the outer ring

00085.C18

Reconditioning

- ▶ Read off the axial internal clearance from the dial gauge and note the measurement value (workbench axial internal clearance).
- ▶ Repeat the measurement.
- ▶ Rotate the eccentric downwards into the position “DOWN”.
- ▶ Remove the locating ring and dial gauge.
- ▶ Rotate the inner rings with the aid of the grip 12 times by 360° until the rollers are in contact with the large rib on the upper inner ring.
- ▶ Position the locating ring and dial gauge on the outer ring and set the dial gauge to “0”.
- ▶ Rotate the eccentric upwards into the position “UP”.
- ▶ Rotate the outer ring back and forth 10 times by 45° until the rollers are in contact with the large rib on the lower inner ring. The pointer on the dial gauge is then stationary.
- ▶ Read off the axial internal clearance from the dial gauge. The measurement value is acceptable if three consecutive measurements are all within a tolerance of 0,020 mm.
- ▶ If the difference is greater than 0,020 mm, the measurement process must be repeated until the measurement value is reproducible.

If the axial internal clearance is too large, the spacer ring must be reground. If the axial internal clearance is too small, a wider spacer ring must be selected. The appropriate spacer ring and the other bearing parts comprise a unit and must remain together until mounting.

Workbench axial internal clearance values for dismounted TAROL units

Workbench axial internal clearance values for the bearings of inch and metric sizes, see tables.

Workbench axial internal clearance values for inch size bearings

TAROL unit Class, size	Axial internal clearance			
	min. mm	max. mm	min. inch	max. inch
B4-1/4×8	0,46	0,61	0,018	0,024
C5×9	0,46	0,61	0,018	0,024
D5-1/2×10	0,51	0,66	0,020	0,026
E6×11	0,51	0,66	0,020	0,026
F6-1/2×12	0,51	0,66	0,020	0,026
K6-1/2×9	0,51	0,66	0,020	0,026
G7×12	0,51	0,66	0,020	0,026
GG6-1/2	0,46	0,61	0,018	0,024
GG6-7/8	0,46	0,61	0,018	0,024

Workbench axial internal clearance values for metric size bearings

TAROL unit Class, size	Axial internal clearance	
	min. mm	max. mm
TAROL90/154	0,53	0,63
TAROL100/165	0,53	0,68
TAROL100/175	0,53	0,68
TAROL100/180	0,53	0,68
TAROL110/180	0,53	0,68
TAROL120/195	0,53	0,69
TAROL130/210	0,53	0,69
TAROL130/220	0,51	0,66
TAROL130/230	0,51	0,66
TAROL130/240	0,59	0,63
TAROL140/220	0,53	0,69
TAROL150/250	0,53	0,69
TAROL160/270	0,6	0,75
TAROL160/280	0,6	0,75

Reconditioning

Greasing the bearings

Only use certified greases. High quality, acid-free greases must be used that are resistant to oxidation and ageing. Preference is given to greases with a lithium soap base and corrosion protection additives.

Grease must be stored in the closed original packaging and protected from heat. The prescribed grease quantity must only be introduced into the dismantled bearing. It is not permissible to press grease into the bearing when mounted on the shaft. In the design NFL (**No Field Lubrication**), the TAROL units do not have a lubrication nipple or a screw plug in the end cap. The bearing unit is filled with sufficient grease for the whole travel distance up to the maintenance date. TAROL units with a relubrication facility are available by agreement.

During greasing, contaminants such as dust, sand, swarf, ash, fibres or lint must not be allowed to enter either the grease or the bearing parts. All bearing parts that come into contact with the shaft after mounting of the unit must remain free from grease on their end faces.

The grease quantity prescribed for an inner ring with a roller and cage assembly is introduced with the aid of a bearing greasing tool, *Figure 13*.

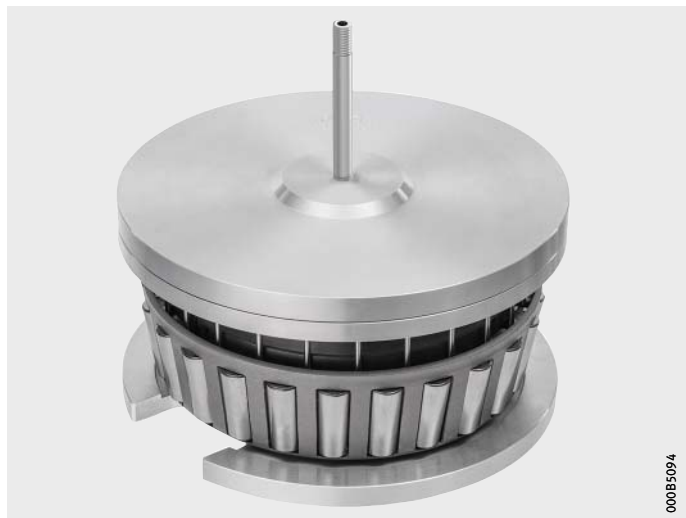


Figure 13
Bearing greasing tool
TOOL-RAILWAY-GREASER

The bearing is greased as follows:

- ▶ Place the inner ring on the baseplate of the device.
- ▶ Position the grease distributor of the lubrication device such that the cannulae are arranged between the rolling elements and then introduce the proportionate grease quantity, *Figure 14*. The end faces of the inner ring must remain free from grease.



Figure 14
Grease distributor

00066E84

Reconditioning

- ▶ Insert the inner ring together with the roller and cage assembly from above into the stationary outer ring.
- ▶ Grease the second roller and cage assembly on the same basis as the first.
- ▶ Clean the end face of the inner ring to remove any grease residues.
- ▶ Fit the sealing cap.
- ▶ Fit the outer ring on the backing ring.
- ▶ Place the press-in ring on the sealing cap.
- ▶ Insert the parts in the press, align the parts and press in the sealing cap.
- ▶ Remove the bearing from the backing ring, turn it over and place it back on the backing ring with the sealing cap already pressed in.
- ▶ Insert the spacer ring.
- ▶ Distribute the grease quantity along the inner wall of the outer ring in accordance with the table.
- ▶ Insert the second roller and cage assembly once it has been greased.
- ▶ Grease the outer end faces of the rollers. The end face of the inner ring must not be greased.
- ▶ Position the second sealing cap and the press-in ring and press the bearing in the press together until the sealing cap snaps into the outer ring.
- ▷ The bearing is assembled.

Rolling bearing greases Arcanol

Special rolling bearing greases such as Arcanol offer the best conditions for achieving reliable, durable and cost-effective bearing arrangements. As a result, bearings that fail prematurely because they were lubricated with the wrong grease are increasingly a thing of the past.

In co-operation with renowned lubricant manufacturers, Schaeffler has for many years developed lubricants that are particularly suitable for rolling bearings. Before a grease can be included in the Arcanol range, it is subjected to a series of tests in the Schaeffler lubricant laboratory, in which its characteristics are examined.

On the lubricant test rigs FE8 (testing in accordance with DIN 51819) and FE9 (testing in accordance with DIN 51821), the greases are tested in rolling bearings for service life, friction and wear. Only the greases with the best characteristics are then selected to undergo the subsequent tests under simulated field conditions in far more complex rolling bearing test rigs. If the results meet the requirements of the stringent Schaeffler specifications, the grease then receives the Arcanol seal of approval. In addition, we test every single batch to ensure the uniform quality of the product. It is only after this final test that approval can be given to transfer the grease to containers under the name of Arcanol.

The range is graduated such that almost all areas of application can be optimally covered using these greases.

The advantages of Arcanol greases include:

- 100% tested, guaranteeing constant quality of lubricants for longer rolling bearing life
- developed and tested in the field by application and tribology experts
- close co-operation at all times with renowned lubricant manufacturers
- optimally designed for rolling bearing applications.

Reduced costs through:

- longer maintenance intervals
- lower friction
- less wear and bearing damage
- considerably longer bearing operating life
- increased operational security.

Reconditioning

Operating limits and areas of application

Characteristic	Grease designation		
	L218	L222	L224
Specification	GA41	GA40	GA40
Operating limits	Wheelset bearing grease > 200 km/h	Wheelset bearing grease < 200 km/h	Wheelset bearing grease < 200 km/h
Typical areas of application	<ul style="list-style-type: none"> ■ High speed train 	<ul style="list-style-type: none"> ■ Axle bearings in rail vehicles ■ Freight wagons, passenger carriages and powered units ■ Area of application – SNCF/SNCB 	<ul style="list-style-type: none"> ■ Axle bearings in rail vehicles ■ Freight wagons, passenger carriages and powered units ■ Area of application – DB
Application criteria	<ul style="list-style-type: none"> ■ High speed applications ■ Extended maintenance intervals ■ Good sealing of labyrinths ■ Good wear protection 	<ul style="list-style-type: none"> ■ Mean rolling bearing diameter up to 185 mm ■ Wheel diameter up to 800 mm ■ Excellent water resistance ■ Good corrosion protection ■ Good oxidation resistance 	<ul style="list-style-type: none"> ■ Mean rolling bearing diameter up to 185 mm ■ Wheel diameter up to 800 mm ■ Excellent water resistance ■ Good corrosion protection ■ Good oxidation resistance
Application	ICE, TGV	SNCF	DB
Thickener type	Lithium soap	Lithium soap	Lithium soap
Base oil	Mineral oil	Mineral oil	Mineral oil
NLGI grade	2 to 3	2 to 3	2 to 3
Base oil viscosity +40 °C	42	100	100
Base oil viscosity +100 °C	7	11	11
Operating temperature °C	–50 to +140	–20 to +120	–20 to +120
Continuous limit temperature °C	80	75	75
Copper corrosion DIN 51811	1/+120 °C	1/+100 °C	2/+100 °C
Emcor test DIN 51802	0/0	0/0	0/0
Behaviour in the presence of water DIN 51807-1	1 to 90	1 to 90	1 to 90
Speed limit $n \cdot d_m$			
Ball bearings, cylindrical roller bearings	800 000 mm/min	400 000 mm/min	400 000 mm/min
Other roller bearings	350 000 mm/min	250 000 mm/min	250 000 mm/min

L225	L293	L055	VIB3
GA40	GA40	GA34	–
Wheelset bearing grease < 200 km/h	Wheelset bearing grease < 200 km/h	Universal wheelset bearing grease	Wheelset bearing grease for strong vibrations
<ul style="list-style-type: none"> ■ Axle bearings in rail vehicles ■ Freight wagons, passenger carriages and powered units ■ Area of application – Europe, such as SBB 	<ul style="list-style-type: none"> ■ Axle bearings in rail vehicles ■ Freight wagons, passenger carriages and powered units ■ AAR 48 hour vibration test 	<ul style="list-style-type: none"> ■ Local public transport ■ Tram ■ Wheelset bearings in cold climates ■ Freight wagons 	<ul style="list-style-type: none"> ■ Axle bearings in rail vehicles ■ Trams and metro trains
<ul style="list-style-type: none"> ■ Tunnel traffic ■ Excellent water resistance ■ Good corrosion protection ■ Good oxidation resistance ■ Testing on Schaeffler test rig AN42 	<ul style="list-style-type: none"> ■ Excellent water resistance ■ Good corrosion protection ■ Good oxidation resistance ■ Long grease operating life 	<ul style="list-style-type: none"> ■ Versatile application ■ Moderate to high load ■ Low starting temperatures ■ Suitable for a wide temperature range ■ Suitable for a very wide speed range ■ Good relubrication 	<ul style="list-style-type: none"> ■ High pressure absorption under shock loads ■ For low starting temperatures ■ Good starting friction
For SBB and others	Approval in accordance with AAR M 94298	DB	–
Lithium soap	Lithium soap	Lithium soap	Lithium soap
Mineral oil	Mineral oil	Mineral oil + PAO	Mineral oil
2 to 3	1 to 2	2	3
100	173	82	170
11	14,5	12,5	14
–20 to +120	–30 to +120	–50 to +140	–30 to +150
75	80	80	90
2/+100 °C	Not applicable	2/+140 °C	–
0/0	0/0	0/0	–
1 to 90	1 to 90	1 to 90	–
400 000 mm/min	500 000 mm/min	800 000 mm/min	350 000 mm/min
250 000 mm/min	350 000 mm/min	350 000 mm/min	200 000 mm/min

Reconditioning

Available containers

Rolling bearing grease	Container	Designation	Order no.
Arcanol L055	180 kg drum	ARCANOL-L055-180KG#S	078873452-0000-10
Arcanol L218	180 kg drum	ARCANOL-L218-180KG#K	038704897-0000-10
Arcanol L222	1 kg can	ARCANOL-L222-1KG-M23S#K	039615553-0000-10
	12,5 kg bucket	ARCANOL-L222-12,5KG#S	070903077-0000-10
	25 kg hobbock	ARCANOL-L222-25KG#S	079961509-0000-10
	180 kg drum	ARCANOL-L222-180KG#K	038558416-0000-10
Arcanol L224	400 g cartridge	ARCANOL-L224-400G#S10	087670674-0000-10
	1 kg can	ARCANOL-L224-1KG#S	087670992-0000-10
	25 kg hobbock	ARCANOL-L224-25KG#S	087671093-0000-10
	180 kg drum	ARCANOL-L224-180KG#S	071800280-0000-10
Arcanol L225	400 g cartridge	ARCANOL-L225-400G#S10	092536840-0000-10
	12,5 kg bucket	ARCANOL-L225-12,5KG#S	070903093-0000-10
	25 kg hobbock	ARCANOL-L225-25KG#S	084705434-0000-10
	50 kg hobbock	ARCANOL-L225-50KG#S	075239329-0000-10
	180 kg drum	ARCANOL-L225-180KG#S	067505627-0000-10
Arcanol VIB3	400 g cartridge	ARCANOL-VIB3-400G#S	055289568-0000-10
	1 kg can	ARCANOL-VIB3-1KG#K	038652226-0000-10
	5 kg bucket	ARCANOL-VIB3-5KG#K	019144210-0000-10
	25 kg hobbock	ARCANOL-VIB3-25KG#K	019144202-0000-10
	50 kg hobbock	ARCANOL-VIB3-50KG#S	055289746-0000-10
Arcanol L293	25 kg hobbock	ARCANOL-L293-25KG#S	060871822-0000-10
	180 kg drum	ARCANOL-L293-180KG#S	056775946-0000-10

Completing the TAROL units TAROL units with rotary shaft seal

Units with a rotary shaft seal are mounted without any special devices.

Units with a rotary shaft seal are mounted as follows:

- ▶ Slide the seal wear ring on the outer side carefully into the seal until it is contact with the inner ring.
- ▶ Insert the seal wear ring for the inner side of the bearing into the backing ring.
- ▶ Now slide both parts together carefully into the seal, precisely as far as the inner ring.
- ▶ Ensure that all end faces of the parts are free from grease.
- ▶ Ensure that the lips of the rotary shaft seal are not folded over and are not damaged.



Figure 15
TAROL unit
with rotary shaft seal

Reconditioning

TAROL units with lamellar rings

The lamellar rings should be gently spread out and laid into the slots of the ring carriers with a screw type motion. Only small quantities of grease are distributed on the rings. The ring carriers together with the lamellar rings can be easily fitted by hand in the sealing caps. The sealing caps have appropriate bevels. The end faces of the ring carriers must be kept free from grease. The two double lamellar rings are tensioned against the non-rotating sealing cap and, together with the slots, form an effective labyrinth seal.



Figure 16
TAROL unit
with lamellar rings

TAROL units with compact seal

When mounting units with a compact seal, the following must be observed:

- The compact seal must be replaced each time that dismantling is carried out.
- For each size, a device is required that fixes the spacing between the inner and outer sealing ring.
- With the aid of the hydraulic press, the seal is pressed onto the inner ring and simultaneously into the outer ring until the seal is in contact with the base.



Figure 17
TAROL unit
with compact seal

TAROL units with sheet metal cap seals

When mounting units with sheet metal cap seals, the following must be observed:

- Sheet metal cap seals can be reused if they are in a technically acceptable condition.
- Depending on the design, one or two mounting rings are required.



Figure 18
TAROL unit
with sheet metal cap seal

Sheet metal cap seals are fitted as follows:

- ▶ Locate the inner U sealing washer with a ring in the ring bore.
- ▶ Fit the outer sealing ring with a press-in ring.
- ▶ By means of the hydraulic press, press the outer sealing ring into the outer ring until the seal is in contact with the base.
- ▷ The sheet metal cap seals are fitted.

Retaining clip

The O ring of the seal must always be replaced. The plastic ring is pressed carefully by hand into the inner ring. The backing ring is then slid with a slightly rotating motion onto the retaining clip until it is in contact with the inner ring.

Before mounting of the end cap

Apart from the outer end cap, a new tab washer and three hexagon head screws must be prepared.

Packaging, storage

If the TAROL unit is not mounted immediately after maintenance, it is packed in the same way as a new bearing unit and put into storage.

Reconditioning

Reconditioning Schaeffler offers the opportunity to have wheelset bearings professionally reconditioned. For operators of rail vehicles, this means:

- 100% performance capability of rail bearings with a significant cost saving in comparison with new bearings
- utilisation of the maximum operating life of wheelset bearings due to high quality maintenance services.

Reconditioning Reconditioning is carried out irrespective of manufacturer and covers all wheelset bearings of cylindrical, spherical and tapered roller design for a comprehensive range of rail vehicles such as high speed trains, trams and subway trains.

TAROL units TAROL units are predominantly used as wheelset bearings in rail vehicles. The aggressive operating conditions lead to corrosion, deposits and wear. After reconditioning, their functional capability is fully restored, *Figure 19*.

- ① Before reconditioning
- ② After reconditioning

Figure 19
TAROL units



TAROL units and similar bearing units are reconditioned without further consultation with the customer and according to predetermined cost rates. This reconditioning differs in certain respects from standard reconditioning, *Figure 20*.

Units with damaged components are disposed of. Superficial operating marks are removed by means of polishing. Wear parts such as seals are replaced on the basis of an agreement with the customer. The units are greased using a specified lubricant and assembled, after which preservation and packing is carried out in accordance with customer requirements.

Figure 20
Reconditioning
of TAROL units



Advantages

- Increase in operating life
- Reduction in life cycle costs
- Implementation of regular maintenance cycles
- Reconditioning in accordance with Schaeffler quality standards
- Feedback on defect patterns and frequencies detected
- Short throughput times
- Return delivery ready for mounting
- Public Service Channel:
the order status can be tracked online
- Records including damage images, graphical representation of data (age of bearings, damage statistics, distribution ratios, manufacturer).

Reconditioning

Digitalised serialisation

Schaeffler serialises axle bearings in parallel with maintenance by means of DMC (Data Matrix Code) in reconditioning, *Figure 21*.

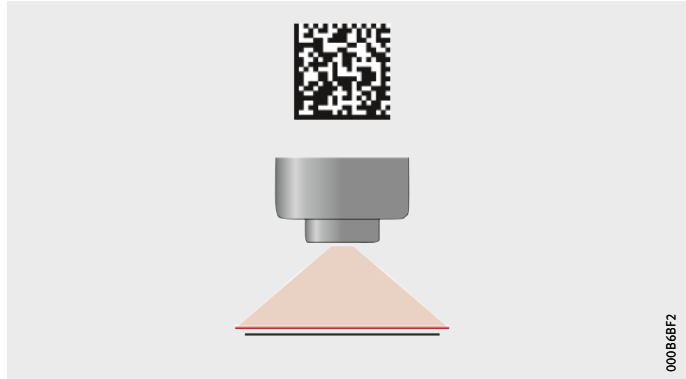


Figure 21
Serialisation using DMC

The advantages of serialisation using DMC are as follows:

- Parts are identified uniquely worldwide by means of a serialised manufacturer ID. A serialised ID offers the highest levels of traceability for digitalisation and data interchange.
- The quality of marking must be adequate in terms of the application in order that identification of the parts is ensured for the long term.
- Reliability: the code is machine-readable, eliminating the possibility of human error.
- Comprehensive optimisation is ensured within the scope of maintenance. The complete warehouse stock can be retrospectively equipped, irrespective of manufacturer, with DMC.
- The condition data for wheelset bearings can be linked, by means of DMC, with operating data for the rail vehicles such as distance travelled, route profile or vehicle payload.

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