

EASY SOLUTIONS BULLETIN



New material technology enhancing the performance of MOOG parts



Challenge

In the race to lower fuel consumption there is a trend to use smaller and lighter parts on our passenger cars. It is necessary therefore to manufacture these parts using stronger materials in order to maintain the equivalent or even higher safety critical values.

Easy Solutions

In order to keep up with evolving trends and at the same time not to compromise on safety critical components MOOG have upgraded the materials used in manufacturing many housings in their product range. Compared to the industry standards the new materials are up to 18% stronger than previous ones used. The overriding advantage is MOOG parts are stronger which ensure a prolonged life.



PRMMO1605-EN

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MOOG NR.	DESCRIPTION	POSITION	MANUFACTURER	MODELS	YEAR FROM	YEAR TO	OE NUMBERS
FD-BJ-4134	Ball Joint	L/R	Ford	Fiesta IV	08/95		1030025, 1047797, 1054989, 6193086, 6645156, 7152281
				KA	09/96	06/02	
				Puma	03/97	04/03	
FD-WP-4149	Wishbone	Left	Ford	Fiesta IV	08/95		1063255, 1072279, 98FB3051CD
				Puma	03/97	06/02	
				Mazda	121 III	03/96	04/03
FD-WP-4150	Wishbone	Right	Ford	Fiesta IV	08/95		1063236, 1071694, 98FB3042CD
				Puma	03/97	06/02	
				Mazda	121 III	03/96	04/03
ME-TC-0987	Track Control Arm	Left	Mercedes-Benz	C-Class (203)	05/00	08/07	2033301911, 2033303311
				CLC-Class (203)	05/08	06/11	
				CLK (209)	02/02	03/10	
				SLK (171)	03/04	02/11	
ME-TC-0988	Track Control Arm	Right	Mercedes-Benz	C-Class (203)	05/00	08/07	2033302011, 2033303411
				CLC-Class	05/08	06/11	
				CLK (209)	02/02	03/10	
				SLK (171)	03/04	02/11	
PE-ES-5703	Tie Rod End	L/R	Citroën	Berlingo	07/96		381710, 381718, 381750
				C4	11/04		
				Xsara	04/97		
				Xsara Picasso	12/99		
				ZX	03/91	02/98	
			Peugeot	205	02/83	09/98	
				306	04/93	10/03	
				307	08/22		
				Partner I	04/96		
RE-BJ-0811	Ball Joint	L/R	Renault	19	01/88	08/03	7701468411
				Clio II	09/98		
				Kangoo I	08/97		
				Megane I	10/97		
RE-BJ-4264	Ball Joint	L/R	Nissan	Kubistar	08/03		7701462182, 7701468883, 600'538603
				Renault	19	01/88	08/03
			Clio I	05/90	09/98		
				Clio II	09/98		
				Kangoo I	08/97		
				Megane I	08/95	09/03	
Twingo I	03/93						
RE-ES-2092	Tie Rod End	Left	Renault	Clio III	02/08		7701474795
				Megane II	09/03		
RE-ES-2093	Tie Rod End	Right	Renault	Clio III	02/08		7701474796
				Megane II	09/03		
RE-WP-0228	Wishbone	Left	Renault	Twingo I	03/93		7700820028, 8200737125
RE-WP-0229	Wishbone	Right	Renault	Twingo I	09/93		7700820029, 8200737126
RE-WP-0237	Wishbone	Left	Renault	Megane I	10/97		7700425724, 7700430765, 8200737132
RE-WP-0238	Wishbone	Right	Renault	Megane I	10/97		7700425725, 7700430766, 8200737133
RE-WP-7032	Wishbone	Right	Renault	19	01/88	08/03	7700818052, 7700831369, 7700781035, 7700436303, 8200737135
				Megane I	08/95	09/03	
RE-WP-7033	Wishbone	Left	Renault	19	01/88	08/03	7700818051, 7700831368, 7700781034, 7700436302, 8200737134
				Megane I	08/95	09/03<	



Light Vehicles



Suspension



Stabilizer Link Bars



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EASY SOLUTIONS BULLETIN



Metal Sealing Rings on all Link Stabilizers



Challenge

It is standard practice to use plastic sealing rings on stabilizer link bars. However, MOOG found there are some disadvantages as over time they can lose their optimum tightness. As a result dirt and water can penetrate through the seal causing a reduced performance of the ball stud which in turn leads to early wear and subsequent failure.



Easy Solutions

To overcome this MOOG has changed all the plastic upper sealing rings to metal versions. The premium metal rings ensure an optimum tightness over a longer period of time which guarantees a longer part life by avoiding water and dirt contaminating the ball stud.



PRMMO1705-EN

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Light Vehicles



Suspension



Steering



Tie Rod Ends



Ball Joint



Track Control Arms



Wishbones



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EASY SOLUTIONS BULLETIN



New ball stud material enhancing the performance of MOOG parts

AUDI / BMW / CITROEN / FORD / MAZDA / MERCEDES BENZ / PEUGEOT / RENAULT

AU-BJ-3914 / BM-DS-1788 / BM-DS-3583 /
 BM-ES-0490 / BM-ES-0491 / FD-BJ-0425 /
 FD-BJ-4134 / FD-WP-4141 / FD-WP-4142 /
 FD-WP-4149 / FD-WP-4150 / F-WP-8011 /
 FD-WP-8012 / ME-TC-0987 / ME-TC-0988 /
 PE-DS-6973 / PE-DS-6974 / RE-DS-0856 /
 RE-DS-0857 / RE-DS-7044 / RE-DS-7045 /
 RE-DS-7058 / RE-DS-7059 / RE-ES-0426 /
 RE-ES-0427 / RE-ES-1747 / RE-ES-1785 /
 RE-ES-2092 / RE-ES-2093 / RE-ES-4287 /
 RE-ES-4288 / RE-ES-7023 / RE-ES-7024 /
 VO-WP-2411 / VO-WP-2412



Challenge

In order to maintain the quality of MOOG components our engineers are continually looking for improvements in technologies and new materials to enhance the performance and increase longevity.



Easy Solutions

MOOG have upgraded the material used in manufacturing many popular ball studs for their product range. This provides the ultimate tensile strength of up to 30% higher than the old material.

The overriding advantage is MOOG parts are stronger which ensures a safer product.

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PRMMO1607-EN

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MOOG NR.	DESCRIPTION	POSITION	MANUFACTURER	MODELS	YEAR FROM	YEAR TO	OE NUMBERS
AU-BJ-3914	Ball Joint	L/R	Audi	80, 90	07/80	12/96	857505365
BM-DS-1788	Tie Rod Assembly	Right	BMW	3 series (E46), Z4 (E85, E86)	02/98	04/05	32211096898
BM-DS-3583	Tie Rod Assembly	Left	BMW	3 series (E46), Z4 (E85, E86)	02/98	04/05	32221096897
BM-ES-0490	Tie Rod End	Right	BMW	3 series (E46), Z4 (E85, E86)	02/98	04/05	32211095958
BM-ES-0491	Tie Rod End	Left	BMW	3 series (E46), Z4 (E85, E86)	02/98	04/05	32211095957
FD-BJ-0425	Ball Joint	L/R	Ford	Focus I	10/98	11/04	98AG3395AE, 96FB3395AB, 1679401
FD-BJ-4134	Ball Joint	L/R	Ford / Mazda	Fiesta IV, Courier, KA I, Puma, 121 III	08/95	11/08	1030025, 1047797, 1054989, 6193086, 6645156
FD-WP-4141	Wishbone	Right	Ford / Mazda	Fiesta IV, Courier, 121 III	08/95	04/03	1071683, 98FB3042AD
FD-WP-4142	Wishbone	Left	Ford / Mazda	Fiesta IV, Courier, 121 III	08/95	04/03	1071701, 98FB3051AD
FD-WP-4149	Wishbone	Left	Ford / Mazda	Fiesta IV, Courier, KA I, Puma, 121 III	08/95	04/03	1072279, 98FB3051CD, 1015264, 1045656, 1063255
FD-WP-4150	Wishbone	Right	Ford / Mazda	Fiesta IV, Courier, KA I, Puma, 121 III	08/95	04/03	1071694, 98FB3042CD, 1330238, 1063236, 1710792
FD-WP-8011	Wishbone	Left	Ford	Street KA	05/03	07/05	1448487, 3S513051AB
FD-WP-8012	Wishbone	Right	Ford	Street KA	05/03	07/05	1448485, 3S513042AB
ME-TC-0987	Track Control Arm	Left	Mercedes-Benz	C-Class (203), CLC-Class (203), CLK (209), SLK (171)	05/00	06/11	2033301911
ME-TC-0988	Track Control Arm	Right	Mercedes-Benz	C-Class (203), CLC-Class (203), CLK (209), SLK (171)	05/00	06/11	2033302011
PE-DS-6973	Tie rod assembly	Right	Citroen / Peugeot	Saxo, 106	08/91	04/04	381286
PE-DS-6974	Tie Rod Assembly	Left	Citroen / Peugeot	Saxo, 106	08/91	04/04	381285
RE-DS-0856	Tie Rod Assembly	Left	Renault	Megane I, Scenic I	08/95	09/03	7701468952
RE-DS-0857	Tie Rod Assembly	Right	Renault	Megane I, Scenic I	08/95	09/03	7701468953
RE-DS-7044	Tie Rod Assembly	Right	Renault	Twingo I	03/93	06/07	7701467219
RE-DS-7045	Tie Rod Assembly	Left	Renault	Twingo I	03/93	06/07	7701467218
RE-DS-7058	Tie Rod Assembly	Right	Renault	Laguna I	11/93	03/01	7701467502
RE-DS-7059	Tie Rod Assembly	Left	Renault	Laguna I	11/93	03/01	7701467501
RE-ES-0426	Tie Rod End	Left	Renault	Avantime / Espace III	09/01	05/03	6025370229
RE-ES-0427	Tie Rod End	Right	Renault	Avantime / Espace III	09/01	05/03	6025370230
RE-ES-1747	Tie Rod End	Right	Renault	21	09/89	09/95	7701624286
RE-ES-1785	Tie Rod End	Left	Renault	21	09/89	09/95	7701624287
RE-ES-2092	Tie Rod End	Left	Renault	Clio III 2.0 16V Sport, Megane II, Scenic II	09/03		7701474795
RE-ES-2093	Tie Rod End	Right	Renault	Clio III 2.0 16V Sport, Megane II, Scenic II	09/03		7701474796
RE-ES-4287	Tie Rod End	Left	Renault	Clio I	05/90	09/98	6000030065, 7701467273
RE-ES-4288	Tie Rod End	Right	Renault	Clio I	05/90	09/98	6000030064, 7701467274
RE-ES-7023	Tie Rod End	Left	Renault	Safrane	07/96	12/00	6000022714
RE-ES-7024	Tie Rod End	Right	Renault	Safrane	07/96	12/00	6000022715
VO-WP-2411	Wishbone	Left	Audi	A2	02/00	08/05	8Z0407151J
VO-WP-2412	Wishbone	Right	Audi	A2	02/00	08/05	8Z0407152J

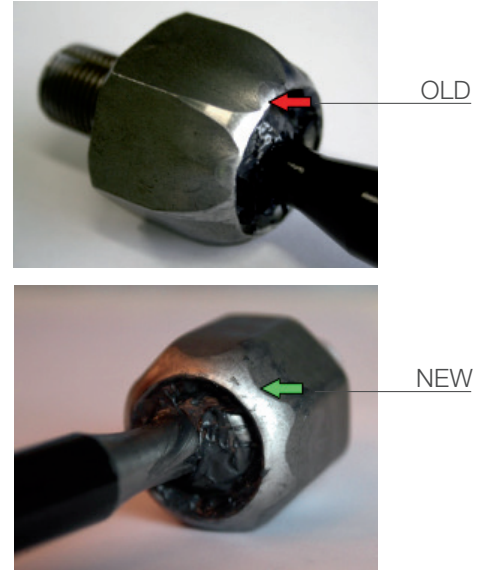
EASY SOLUTIONS BULLETIN



An increased lifetime due to a more robust design

IVECO DAILY
FI-AX-4971

MAKE	MODEL	Year from → Year to
Iveco	Daily III, IV	05/99 →
MOOG PART NUMBER	OE PART NUMBERS	DESCRIPTION
FI-AX-4971	2992593	Stabilizer link bar LH/RH



Challenge

The original hexagonal design of this steering axial rod resulted in uneven segments of the chamfered area (see above picture) and consequently led to the possibility of the ball pin pulling out of its socket under adverse driving conditions, leading to failure of the steering system.

Easy Solutions

At MOOG our engineers have redesigned the component with an octagonal design and even material thickness around the chamfered area (see picture above). We have also incorporated a larger ball pin with increased diameter in order to prevent pull out even in the most extreme driving conditions.

With this new robust design you can be rest assured that a significantly increased lifetime will be gained by using the MOOG part.



PRMMO1703-EN

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Light Vehicles



Commercial Vehicles



Suspension



Steering



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EASY SOLUTIONS BULLETIN

MOOG

Replacement of rubber to metal components made easy



Challenge

Replacing the rubber-to-metal components on a vehicle's axle can be a challenging and time consuming exercise. Not every workshop has a hydraulic press to hand to enable an efficient and swift job.



Easy Solutions

General or vehicle specific tools to remove and install bushes can be found at your local distributor or on the internet. Such tools **make the replacement of rubber to metal components considerably easier and very often quicker** as there is not a necessity to remove part of the axle where the bush is mounted. In many instances the job can also be completed with the components from your ratchet case, such as, stud threads, nuts and washers, and the sockets.

Using these tools rather than a hammer which is often used where there is no alternative guarantees a precise and professional job is performed and the need for a hydraulic press is not required.

PRMMO1604-EN

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 **FEDERAL-MOGUL**
MOTORPARTS



EASY SOLUTIONS BULLETIN



Axial rod & gaiter kits for extra strength and protection



Challenge

Axial rods and gaiters have to be robust and hard wearing. They have to achieve excellent durability and last but not least, they need to provide additional responsiveness to the steering.

In most cases the axial rod fails due to a split gaiter which allows dirt and water to contaminate the axial rod joint. Therefore each time an axial rod is replaced, it's recommended to replace also the gaiter.

Easy Solutions

MOOG has introduced a range of axial rod & gaiter kits that provide all the necessary components for the repair. Each kit contains an axial rod, a single gaiter, 2 metal ties to ensure a stronger and durable seal and a sachet of grease.

The main advantage of replacing all components at the same time is a superior quality repair that is achieved in less time and is backed up by the MOOG 3 years guarantee.



PRMMO1701-EN

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Diagnosis of worn wheel end bearings

Challenge

Wheel end bearings are vital components of a car. They are crucial for safe, quiet operation, minimising rolling resistance and assuring proper ABS function. On average the replacement cycle is around **150.000 Km**. This is only a rule of thumb, the lifetime of wheel end bearings is negatively impacted by:



Incorrect installation

- Incorrect torque setting
- Incorrect (press)fitting of bearing in the hub
- Damage to the bearing during the installation process



Heavy driving conditions

- Extra weight due to pulling a trailer or a caravan
- Sporty driving (heavy braking, acceleration, cornering)
- Uneven road surfaces (potholes, speed bumps, curbstones)



Car modifications

- Bigger rims and low profile tires
- Lowered suspension
- Track width adjustments (fitting wheel spacers or wheels with lower ET value)



Extreme environmental conditions

- Extreme temperatures, snow, road salt, flooding, dust & sand

A worn wheel end bearing will negatively impact the car's road holding and cause the car to fail the vehicle inspection. Therefore wheel end bearings must be checked during every maintenance inspection.

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Easy Solutions

Symptoms indicating worn or failing wheel end bearings.

If below symptoms occur, a worn wheel bearing is most probably the cause:

- A humming, rumbling or growling noise that increases with acceleration or as the vehicle turns
- A loud constant whining or grinding noise when the vehicle is in motion
- Looseness, excessive play in the steering wheel (vague steering) or a clunking noise (especially when driving over rough road surfaces)
- Vibration, felt in the steering wheel, which changes with the vehicle speed or as the vehicle turns
- ABS system issues (may be related to failure of the ABS sensor integrated in the wheel end bearing)

LOOK FOR THESE TELLTALE SIGNS

 Clunking or grinding noise under vehicle	 ABS light is illuminated
 Steering wheel vibration	 Steering wheel play

Note: Play or looseness and clunking noises may also indicate a worn suspension component.

Identifying the faulty wheel end bearing

In many cases it's difficult to say which bearing is worn as the noise travels through the car body or frame. Here are a couple of tricks to help identify the faulty wheel end bearing:

- Lift the car so the wheel is off the ground and can spin freely
- Check play/looseness by trying to shake the wheel with 2 hands at 2:45h and 5:30h position. If the wheel feels loose, the bearing is worn or damaged and should be replaced as soon as possible
- Rotate the wheel by hand and listen for any unusual noise. Please note that noise can only be noticeable when driving the car. A stethoscope helps to identify noise that is not noticeable with the naked ear or only in the interior of the car when driving
- Check vibration by holding the suspension spring with your index and thumb fingers and spinning the wheel with the other hand. For a wheel bearing that is bad you will feel vibrations in the spring. A good new bearing will cause absolutely no vibration in the spring and the best part of this trick is that you will also be able to tell when a bearing is going bad before it makes any noticeable noise

Check every wheel of the car and replace the wheel end bearing if you notice any play, noise or vibration.



PRMMO1702-EN

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EASY SOLUTIONS BULLETIN



MOOG SIGNIFICANTLY EXTENDS ITS WHEEL END BEARING PROGRAMME



 **Challenge**

Offering the most comprehensive coverage of quality wheel end bearings

MOOG supports installers and distributors in their ambition to give its customers the best service in the market. Fast and complete availability of wheel end bearings is vital for optimized customer satisfaction. **MOOG keeps on investing in its range of parts for a maximum of makes** - without compromising on quality and delivery times.

 **Easy Solutions**

- **With over 90% coverage and more than 100 New Product Introductions** MOOG shows its commitment to be installers' and distributors' preferred supplier and partner of choice for wheel end bearings. The MOOG range contains all bearing types, including latest generations and covers not only popular aftermarket applications but also niche applications to provide a one-stop-shop experience.
- Every single wheel bearing **contains all necessary hardware and accessories** in the box for a perfect and hassle-free installation and is engineered, tested and validated according to OE standards and comes with a **3 year guarantee** to offer installers and distributors **true peace of mind**.
- Visit www.moogproducts.com for the most up to date product and application data.

PRMMO1606-EN

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EASY SOLUTIONS BULLETIN



The importance of replacing wheel end bearings accessories

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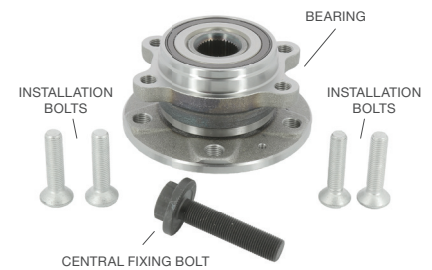
Challenge

Replacing the accessories is essential for a perfect installation of new wheel end bearings.

Accessories such as bolts, nuts, seegers/circlips, split pins and back up crowns retain and secure the bearing in the correct position for optimal performance and durability. Loss of bearing retention will result in wheel vibration and/or excessive noise and premature bearing failure.

Moreover, certain accessories such as stretching bolts and nuts (central fixing bolts and nuts) will not hold the torque set at installation when used again. In fact, they will stretch more, loose clamping force and often fracture. Therefore, stretch bolts must ALWAYS be replaced with new ones, and never reused!

Some accessories such as gaskets, seals, dust caps/shields and protection covers, protect the wheel bearing from water or dust intrusion. These accessories often get deformed or damaged when removing the worn wheel bearing. If they get reused, the new wheel bearing will not be fully protected any more. Water and dust or dirt will be able to penetrate into the bearing and will cause premature failure of the bearing.



Easy Solutions

Every single MOOG wheel end bearing comes with all the necessary accessories inside the box for an easy and perfect installation. The content of each MOOG wheel end bearing kit is listed in the new 2018-2019 MOOG wheel end bearing catalogue (CATMO1802) and can also be found on TecDoc in the tab «Accessory List».



PRMMO1727-EN

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Troubleshooting Wheel End Bearings with ABS functionality

Challenge

A vehicle's ABS control module is designed to notify the driver with a warning light if there is a malfunction in the system. The malfunction is rarely the modul or ABS itself. It is often one or more sensors, or the wiring to the sensors. The most common ABS problems occur when impulse wheels and / or sensors become contaminated with debris or get damaged.

Easy Solutions



PRMMO1706-EN

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Diagnosis of worn wheel end bearings

Challenge

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Damage to the bearing during the installation process



Heavy driving conditions

Extra weight due to pulling a trailer or a caravan
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Easy Solutions

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PRMMO1702-EN

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