

# EXPERTS KNOW WHY



# YOUR SPECIALIST IN STEERING AND SUSPENSION PARTS





**“Sidem has been building trust since 1933.”**

**Gwen Verfaillie, Managing Director**



# SIDEM QUALITY



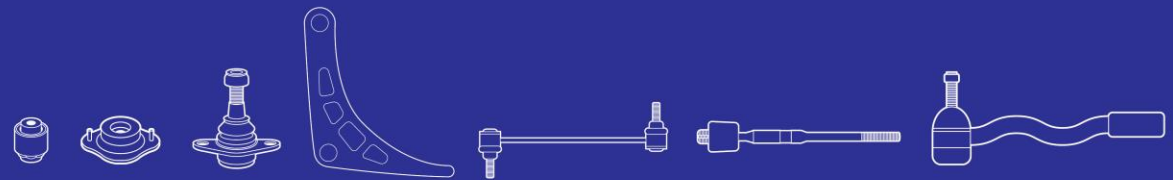
# SIDEM = QUALITY

**CLAIM RETURNS , 0,3 %**  
**50% - REASON – NOT CORRECT INSTALLATION**

**CLAIMS CONFIRMED – 0,15%**



# SAFETY - THE MAIN GOAL



# COMMITMENT TO QUALITY



# OWN TESTS AND COMPARISONS



## TARGET

Check and compare technical quality for positioning SIDEM products on the suspension parts market

## BRANDS

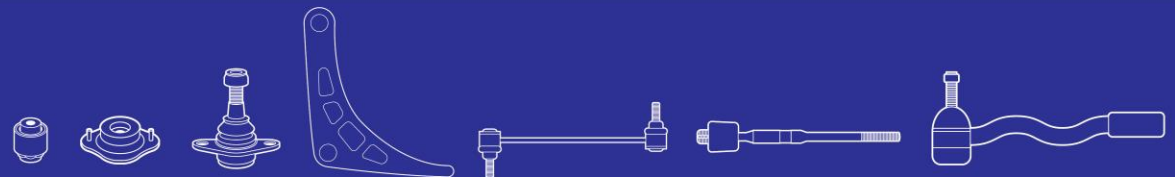
**SIDEM**  
**OE**  
**OTHER MAIN PLAYERS**

## DETAILS

	Sidem ref	OE ref	Car brand
STABILISER	21264	31 30 6 781 547	BMW
BALL JOINT	49186	169 333 01 27	MERCEDES
AXIAL JOINT	9714	16 03 844	OPEL
TRACK CONTROL ARM	63770	1K0 407 151 AC 1K0 407 365 C	AUDI



# OWN TESTS AND COMPARISONS





# WHAT WAS MEASURED AND OBSERVED?

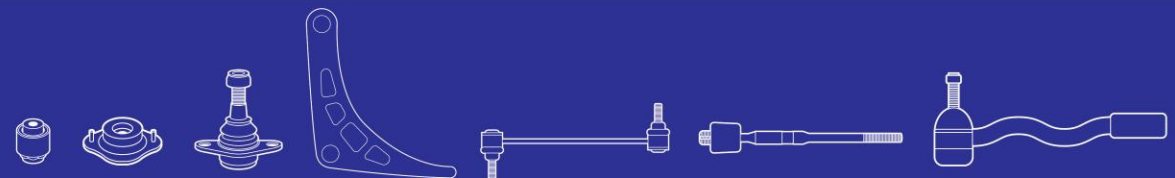


## OBSERVATIONAL DATA:

- Appearance
- Nuts and bolts
- Design features
- Packaging
- Sets - part
- Instructions

## MEASUREMENTS:

- Weight
- Movement
- The diameter of the ball
- The movement of the lever
- Corrosion resistance
- Oscillation
- Vertical movement
- Torque
- Pull force
- Thread check
- The roughness of the ball
- Hardness

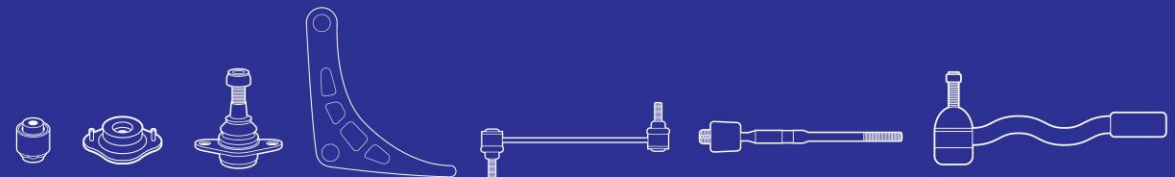


# STABILAZER LINKS



**SIDEM 21264 - OE 31 30 6 781 547 BMW**

FEATURES / ХАРАКТЕРИСТИКА	SIDEM		OE									
	A	B	C	D	E	F	G	H	I	J	K	L
nuts	flange	none	nut	flange	flange	nut	flange	flange	flange	flange		nut
torque Nm	OK	OK	OK	OK	OK	OK	NOK	OK	OK	OK		OK
smooth movement	OK	OK	NOK	NOK	OK	NOK	OK	NOK	OK	OK		OK
pin pull out kN	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK		OK
ball hardness HRC	OK	NOK	OK	OK	OK	OK	NOK	22	22	NOK		OK
hardness house HRB	OK	OK	NOK	OK	NOK	OK	OK	NOK	NOK	OK		NOK
	good	poor										

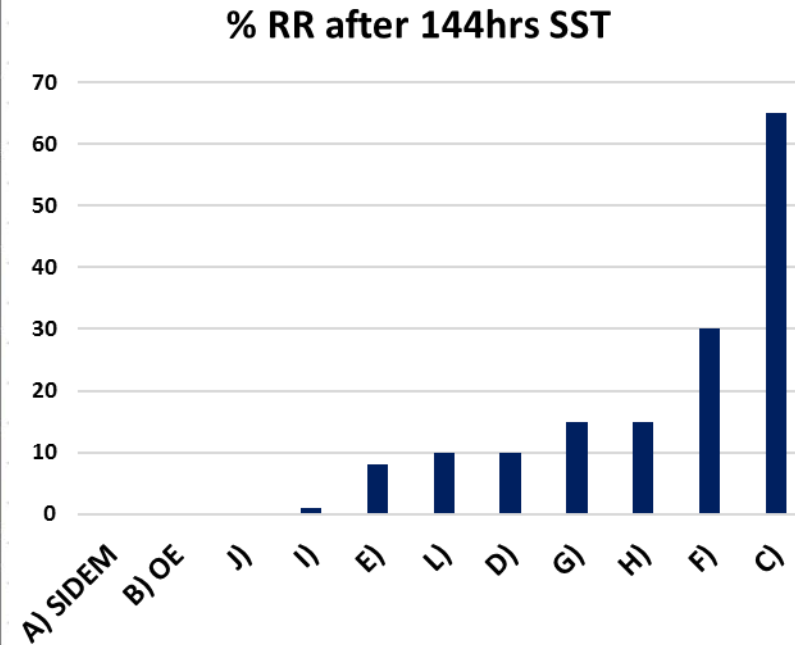


# % OF RUST

## STABILIZER LINKS

### 144 HOURS IN SALT SPRAY TEST

A) SIDEM 0%RR	
B) OE 0%RR	
C) 65%RR	
D) 10%RR	
E) 8%RR	
F) 30%RR	
G) 15%RR	
H) 15%RR	
I) 1%RR	
J) 0%RR	
K) not available	Not available
L) 10%RR	

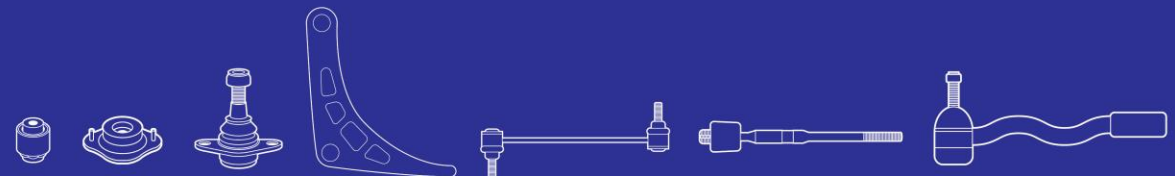


# BALL JOINT



**SIDEM 49186 – OE 169 333 01 27 MERCEDES**

BALL JOINTS / ШАРОВЫЕ ОПОРЫ		SIDEM	OE										
FEATURES / ХАРАКТЕРИСТИКА		A	B	C	D	E	F	G	H	I	J	K	L
bolts & nuts		OK	OK	OK	gold col?	OK	OK	OK	gold col?	OK	OK		OK
torque	Nm	OK	NOK	OK	OK	NOK	OK	OK	OK	OK	NOK		NOK
smooth movement		OK	OK	OK	NOK	OK	NOK	NOK	OK	OK	OK		OK
oscillation	°	OK	OK	OK	NOK	OK	OK	OK	OK	NOK	OK		NOK
play	mm	OK	OK	NOK	OK	OK	OK	OK	NOK	OK	OK		OK
pin pull out	kN	OK	OK	NOK	NOK	OK	OK	OK	NOK	OK	OK		OK
hardness house	HRB	OK	OK	OK	OK	OK	OK	NOK	OK	OK	OK		OK
		good	poor										



# AXIAL JOINT



**SIDEM 9714 – OE 16 03 844 OPEL**

AXIAL JOINTS / РУЛЕВЫЕ ТЯГИ		SIDEM	OE										
FEATURES / ХАРАКТЕРИСТИКА		A	B	C	D	E	F	G	H	I	J	K	L
plastic ring?		OK	OK	NOK	OK		NOK	OK	OK	NOK	NOK		NOK
torque	Nm	OK	OK	NOK	NOK	NOK	NOK	NOK	NOK	NOK	NOK		OK
smooth movement		OK	NOK	OK	NOK	OK	NOK	OK	OK	OK	OK		OK
oscillation	°	OK	OK	NOK	OK	OK	OK	OK	OK	OK	NOK		OK
play	mm	OK	OK	OK	NOK	OK	0,32	NOK	NOK	OK	OK		OK
pin pull out	kN	OK	OK	OK	NOK	OK	41	40	NOK	OK	NOK		OK
		good	poor										

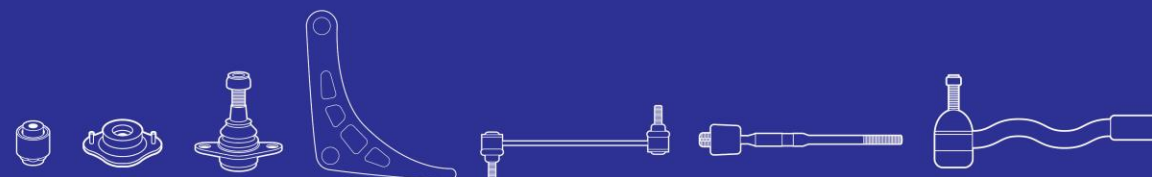


# TRACK CONTROL ARM

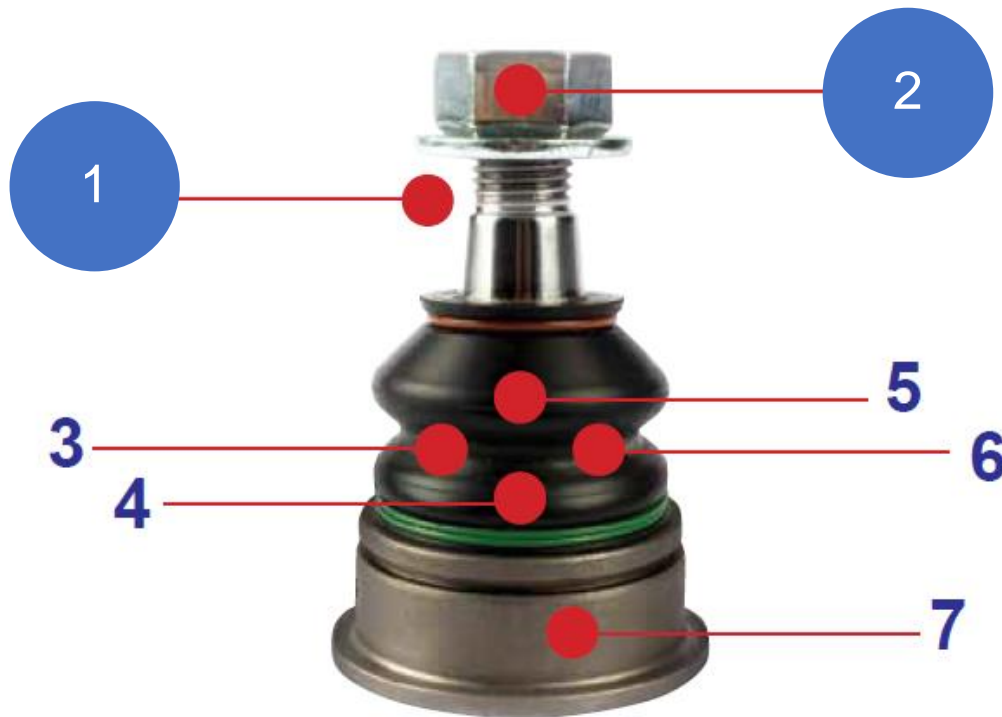
**SIDEM 63770 – OE 1K0 407 151 AC AUDI**



St forged TCA / РЫЧАГИ ПОДВЕСКИ ков. FEATURES / ХАРАКТЕРИСТИКА		SIDEM A	OE B	C	D	E	F	G	H	I	J	K	L
Weight	kg	5,38 (*)	4,65	4,75	4,95	4,88	4,78	4,81	4,95	4,82	4,88		5,24
Ball joint ?		YES	NO	NO	NO	NO	NO	not mounted	NO	NO	NO	NO	NO
coating thickness	μ	OK	OK	OK	OK	OK	OK	NOK	OK	OK	OK		OK
Hardness	HRB	OK	OK	OK	OK	OK	OK	OK	OK	105	OK		OK
push out SB1	kN	OK	OK	OK	OK	NOK	OK	OK	OK	OK	OK	OK	OK
push out SB2	kN	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK



# STEERING AND SUSPENSION PARTS TESTED FOR YOU



## 1 Ball joints function

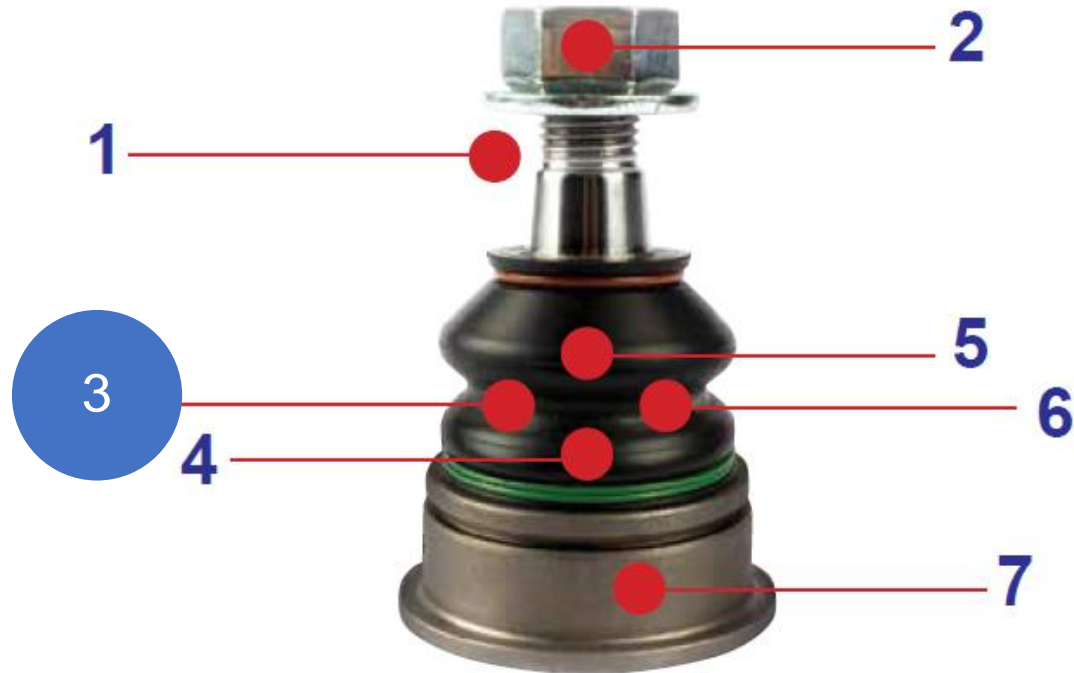
- ✓ Connects the wheel suspension control arms with the wheels.
- ✓ Allows flexible movement between the vehicle's wheels and suspension.

## 2 Ready-to-use parts

- ✓ Sidem parts are always delivered as a complete kit containing all necessary accessories.
- ✓ Ball joints are delivered with mounting kit and/or heat shield.
- ✓ The ball joint dustcovers are tested for endurance and temperature resistance to guarantee maximum life span of the part.



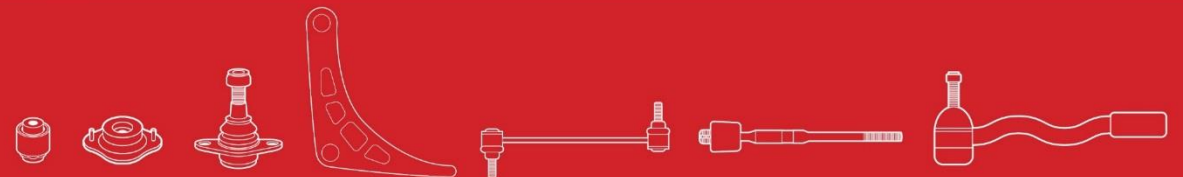
# STEERING AND SUSPENSION PARTS TESTED FOR YOU



## 3 The right torque

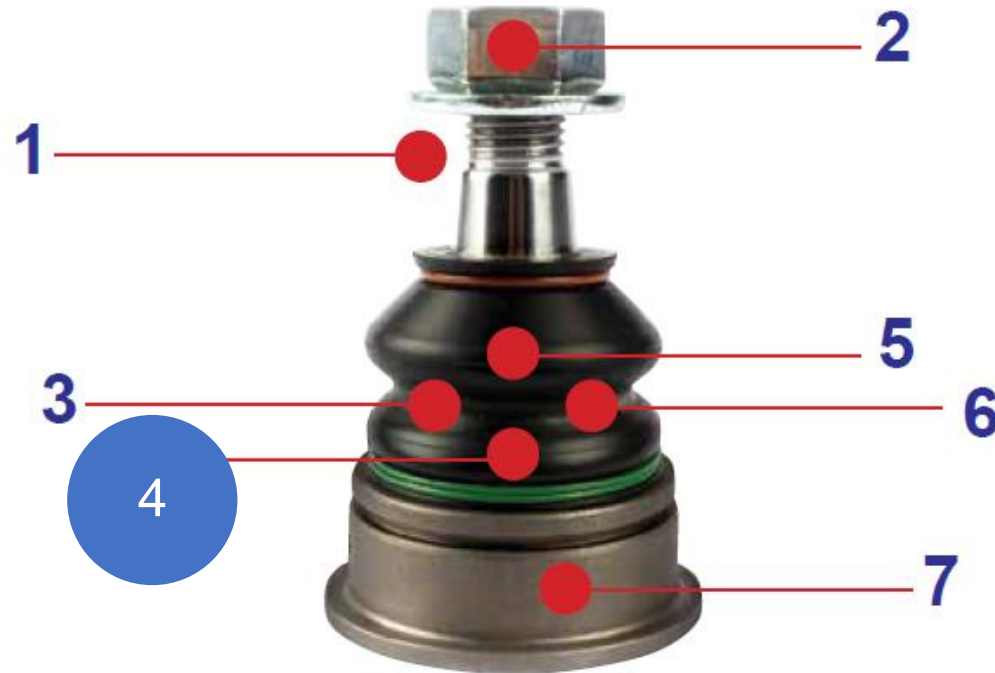
- ✓ Optimized torque prevents premature wear on the part.
- ✓ During the test the housing is held in a fix fixture and the pin is clamped on the automatic measuring device. The device makes a measuring cycle where break away and dynamic torque are measured. The ball stud is also rotated in the housing, and initial break away torque is measured, followed by dynamic torque.
- ✓ Comparative testing with other supplier's ball joints show that Sidem parts offer the best torque values.

Torque value	OEM	SIDEM	Competitor 1	Competitor 2	Competitor 3
Break away/ Dynamic (Nm)	5/3	5/3	5/2	8/2	5/4





# STEERING AND SUSPENSION PARTS TESTED FOR YOU



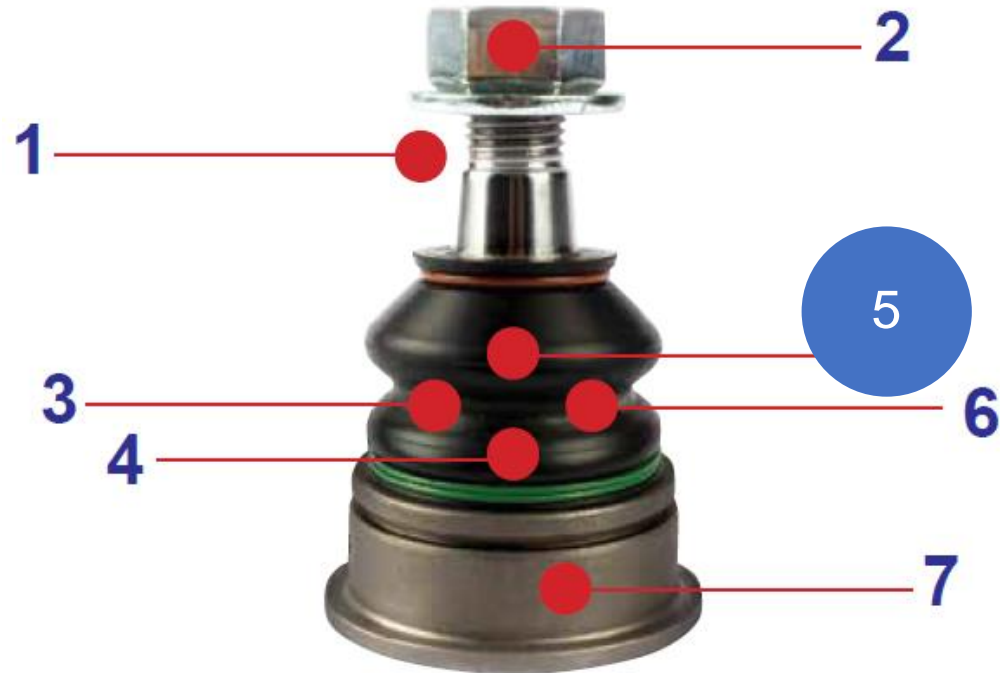
## 4 Maximum oscillation angle

- ✓ The right oscillation angle is important for preventing premature wear of the part.
- ✓ A too small oscillation angle could cause a problem when the car is in maximum rebound or jounce meaning the ball pin touches the housing of the ball joint. This will cause the ball pin to crack.
- ✓ During the test the housing of the assembly is clamped. The pin is tilted to the maximum angle. The angle meter is attached to the pin and is zeroed and the pin is now tilted to the opposite maximum angle. The maximum oscillation angle is measured at this moment.
- ✓ Comparative testing with other supplier's ball joints show that the oscillation angle of Sidem parts is outstanding.

Oscillation angle	OEM	SIDEM	Competitor 1	Competitor 2	Competitor 3
Left/right (°)	21,5/21,5	23/24	21/21	20/20	20,5/21,5



# STEERING AND SUSPENSION PARTS TESTED FOR YOU



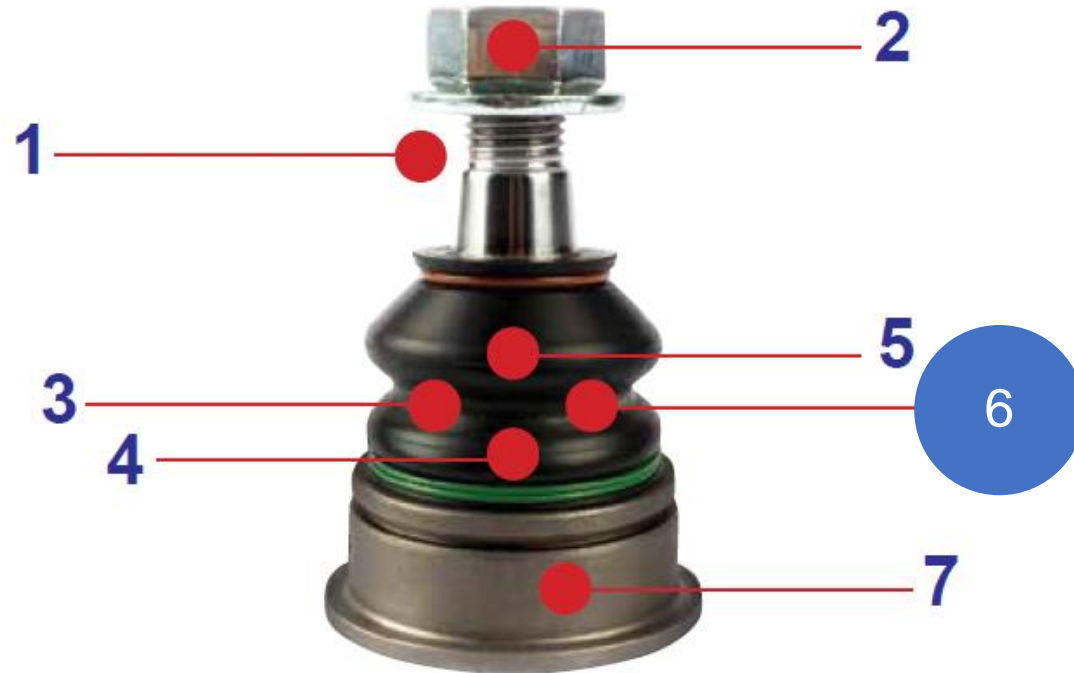
5 Excellent performance for play

- ✓ In case of play in the steering system, parts will wear prematurely leading to a decreased life span.
- ✓ During the test the housing is fix clamped in a fixture and the pin is clamped on the moving part of the tensile strength machine. Then the pin is pulled and pushed while the travel is recorded against the force.
- ✓ Comparative testing with other supplier's ball joints show that Sidem is has excellent values when it comes to play!

Play	OEM	SIDEM	Competitor 1	Competitor 2	Competitor 3
Value (mm)	0,18	0,18	0,37	0,29	0,27



# STEERING AND SUSPENSION PARTS TESTED FOR YOU



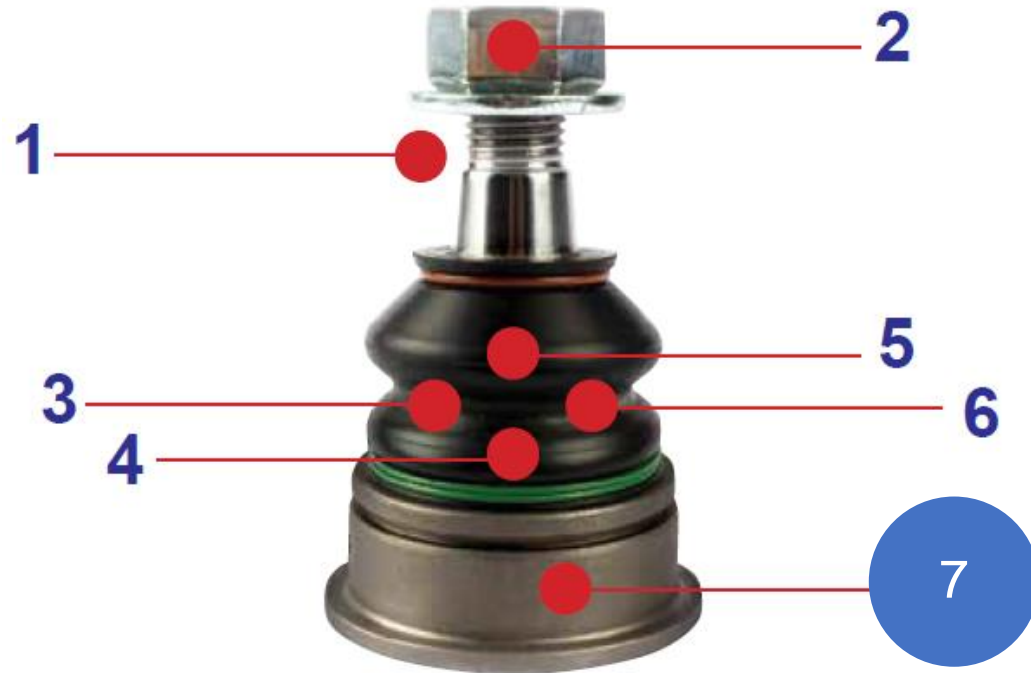
## 6 High pull out force

- ✓ The pull-out force that is needed to pull the ball pin out of the ball joint should be sufficiently high to prevent that the connection between the suspension system and the wheel gets lost.
- ✓ During the test the housing is fix clamped in a fixture and the pin is clamped on the moving part of the tensile strength machine. Then the pin is pulled out of the ball joint and the force needed for the pull out is recorded.
- ✓ Comparative testing with other supplier's ball joints show that Sidem parts need a high force for the ball pin to be pulled out.

Pull-out	OEM	SIDEM	Competitor 1	Competitor 2	Competitor 3
Force (kN)	>55	46	33	31	36



# STEERING AND SUSPENSION PARTS TESTED FOR YOU



## 6 High corrosion resistance

- ✓ Parts that tend to be easily susceptible to corrosion will wear prematurely and have a decreased life span.
- ✓ During the test the part is placed in a corrosion test chamber and corrosion forming is measured according to ISO 9227 standards.
- ✓ Comparative testing with other supplier's ball joints show that Sidem parts are highly resistant to corrosion.

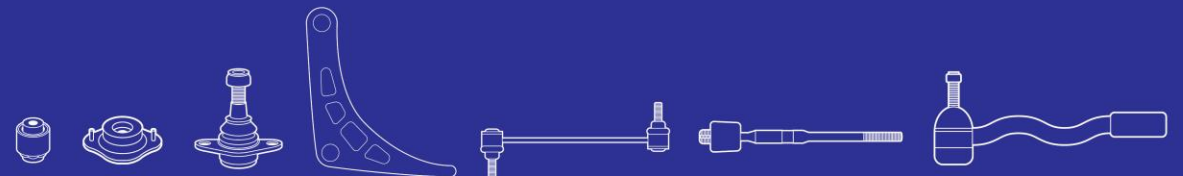
Corrosion	OEM	SIDEM	Competitor 1	Competitor 2	Competitor 3
Value after 144 hrs (%)	0	0	65	15	20



# SUMMARY



- SIDEM supplies correct products, fully compliant to OE and generally better than some brands on the market.
- All relevant properties are considered in the SIDEM design.
- SIDEM products are complete and use-friendly on the field.
- SIDEM products will result a long life-time based on its physical properties.
- It has been observed that many other brand products do originate from the same source.
- SIDEM produces its own products since many years, has build up an extensive knowledge and is very much Q-concerned.



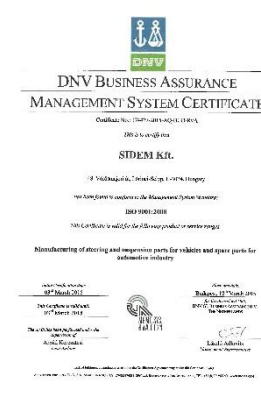
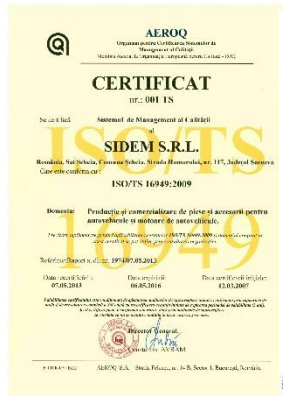


# PROVEN QUALITY BY CERTIFICATION

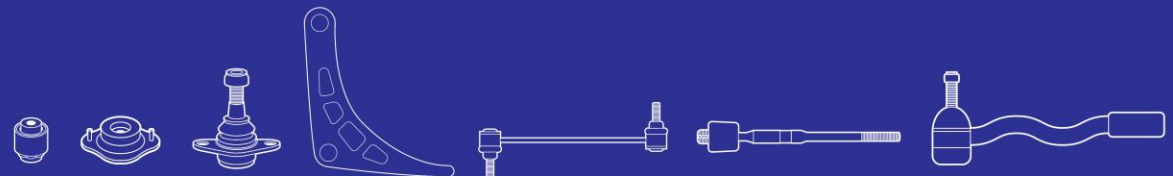


# QUALITY CERTIFICATES

- Quality is an absolute priority and guarantees safety. SIDEM is an OE manufacturer offering the highest quality of spare parts.
- SIDEM is a certified parts supplier in the automotive industry (ISO/TS 16949).
- All SIDEM products are manufactured in Europe and confirmed by the European quality Mark



**SIDEM**  
Steering in safety



# IATF QUALITY CERTIFICATE



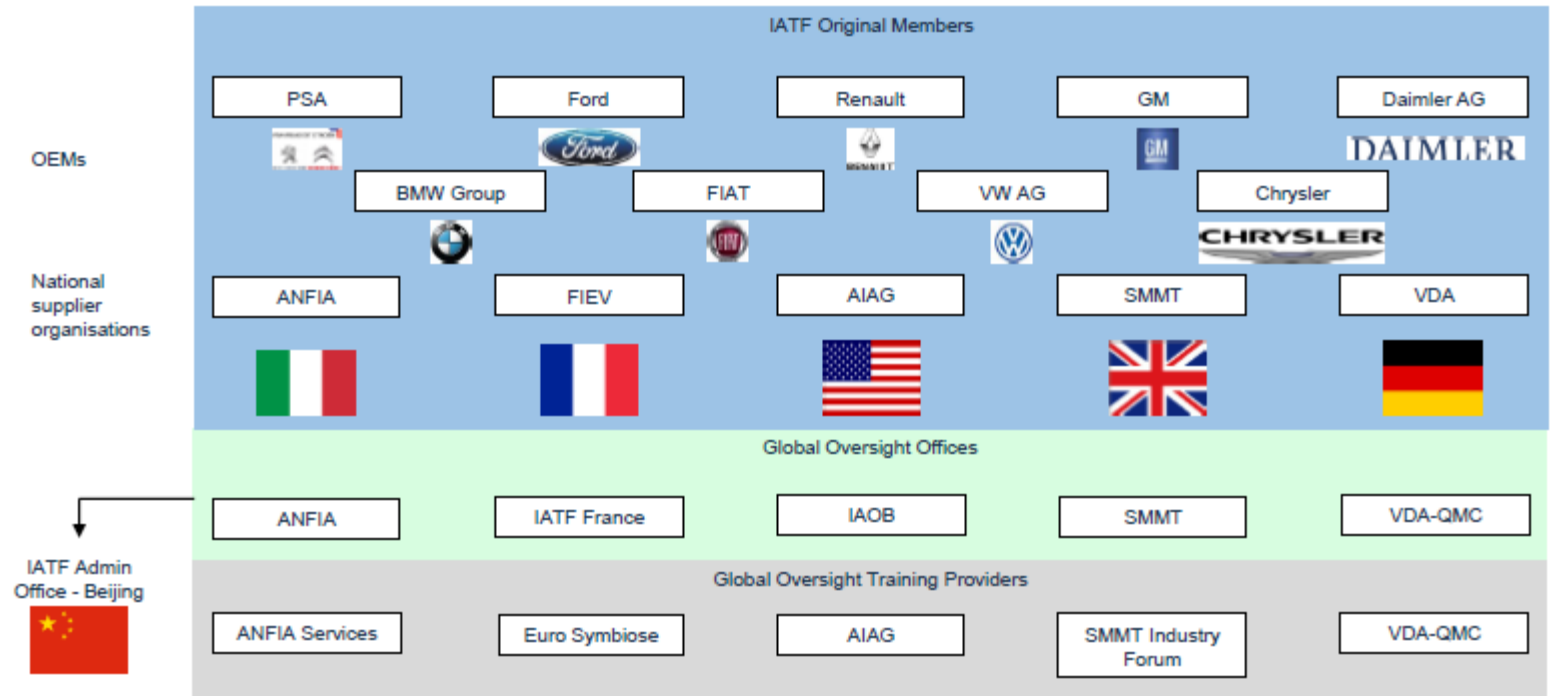
## IATF

this is a group that was created by car manufacturers.

The group's activities are aimed at ensuring and improving the quality of products in the automotive industry worldwide.



## 1.2 Who are the IATF ?





CONFIDENTIAL

# QUALITY CONFIRMED BY **ORIGINAL EQUIPMENT MANUFACTURERS**



# QUALITY CONFIRMED BY ORIGINAL EQUIPMENT MANUFACTURERS



FROM 2009 : BALL JOINTS FOR PDCC  
PORSCHE 911 AND Panamera



CONFIDENTIAL

QUALITY CONFIRMED BY  
**ORIGINAL EQUIPMENT MANUFACTURERS**



CONFIDENTIAL

# QUALITY CONFIRMED BY PARTNERS



# BOSCH





**DURABLE FINISHING**

**OE QUALITY MATERIALS**



**INTELLIGENT DESIGN**

**STATE OF THE ART ENGINEERING**

**SMART DEVELOPMENT**

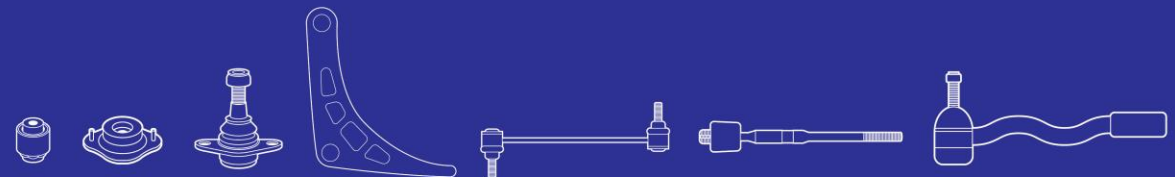
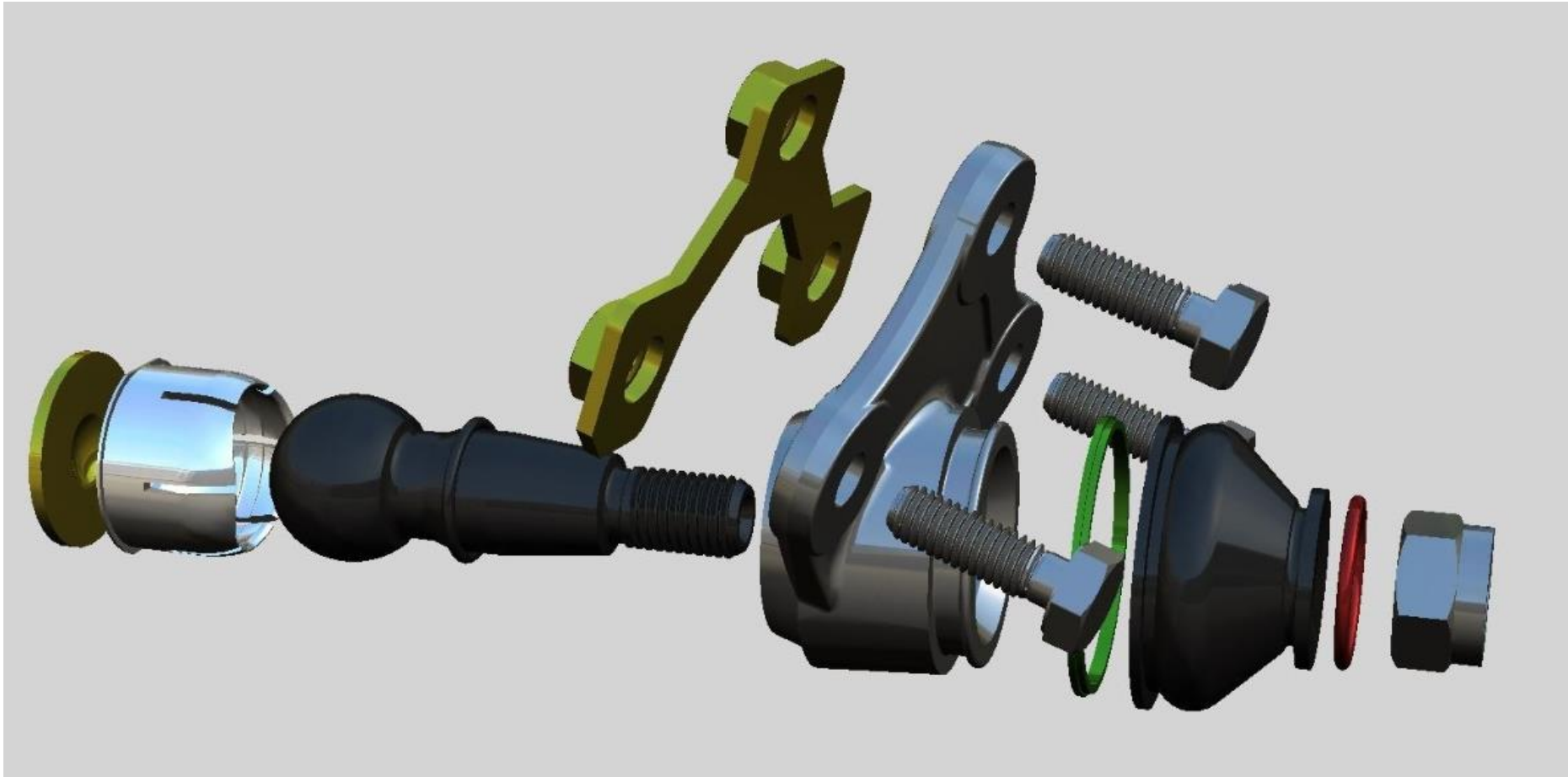
**PERFECT SHAPES**



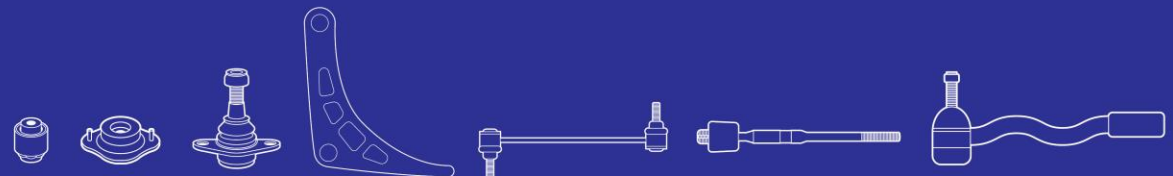
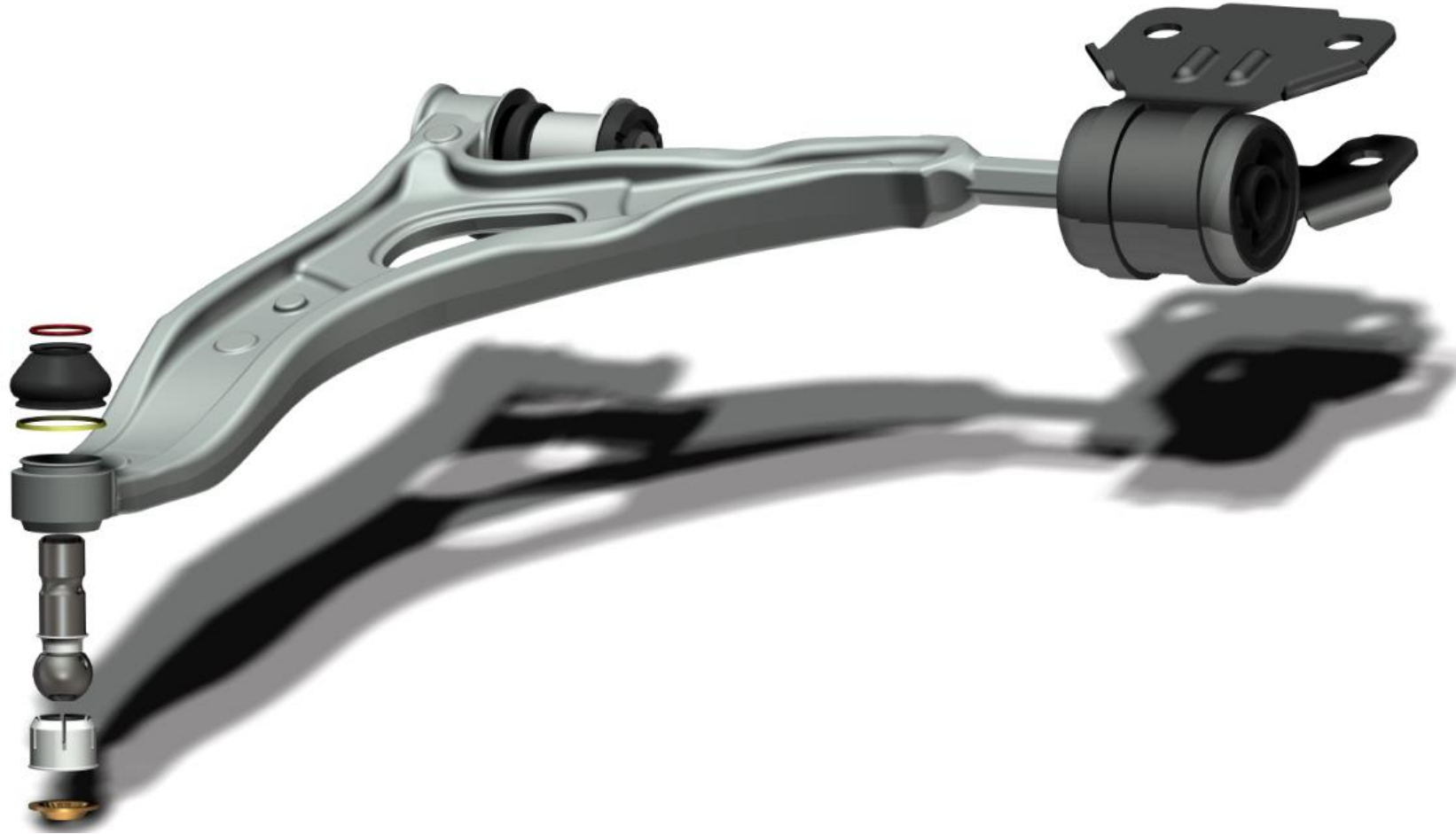
# STATE OF THE ART ENGINEERING



# STATE OF THE ART ENGINEERING

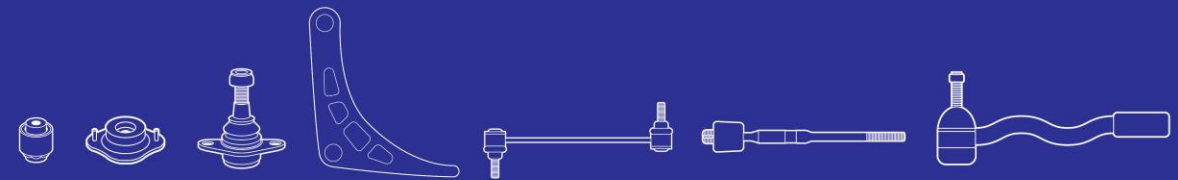
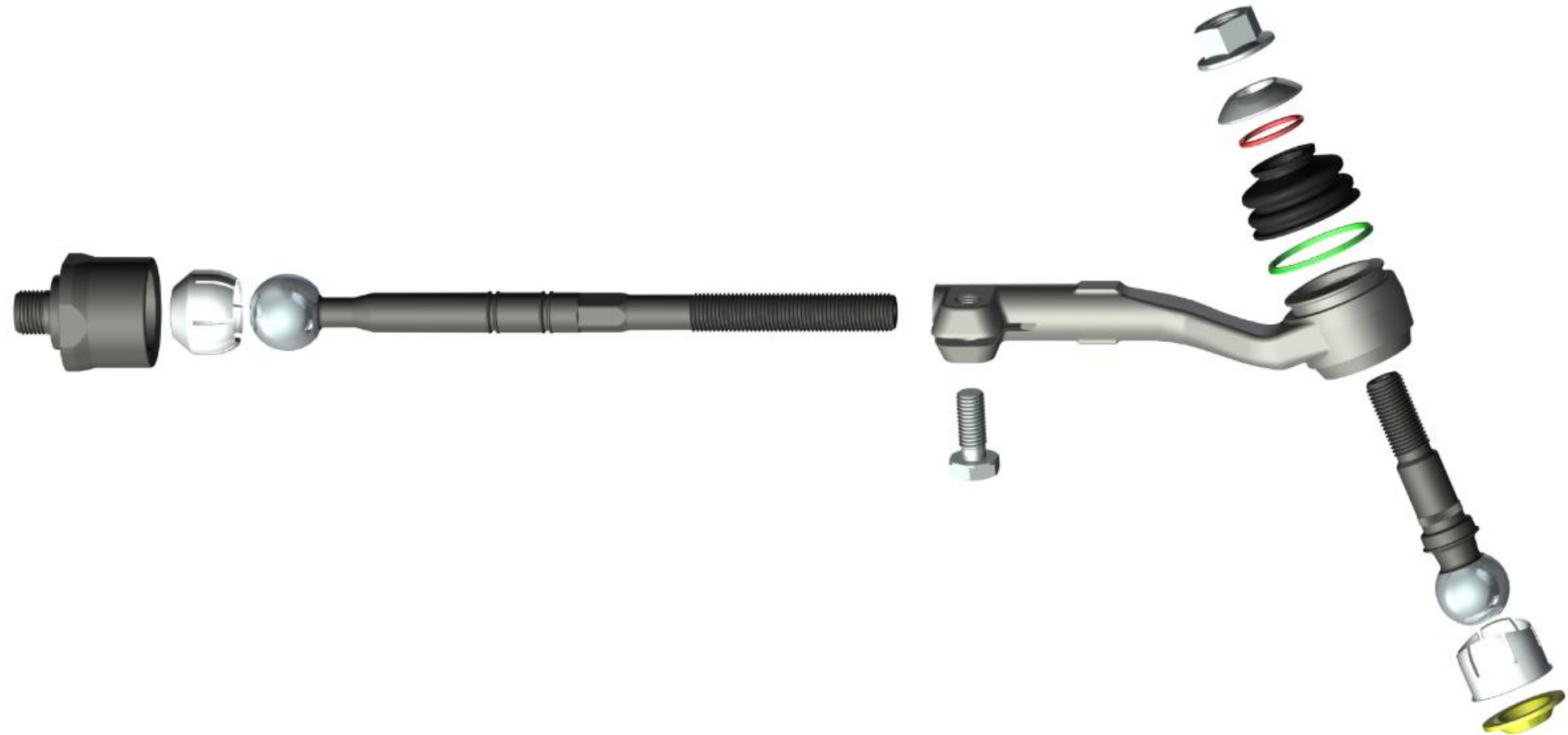


# STATE OF THE ART ENGINEERING





# STATE OF THE ART ENGINEERING



# SHORT DEVELOPMENT TIME FOR NEW REFERENCES



REF 37714  
AUDI A4



# THE PROCESS BEGINS



## THE CHOICE OF RANGE OF PRODUCTS

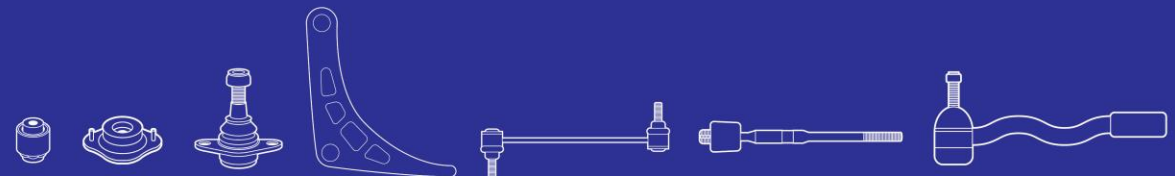
### DATA ANALYSIS

### LISTING ALL THE NEW MODELS

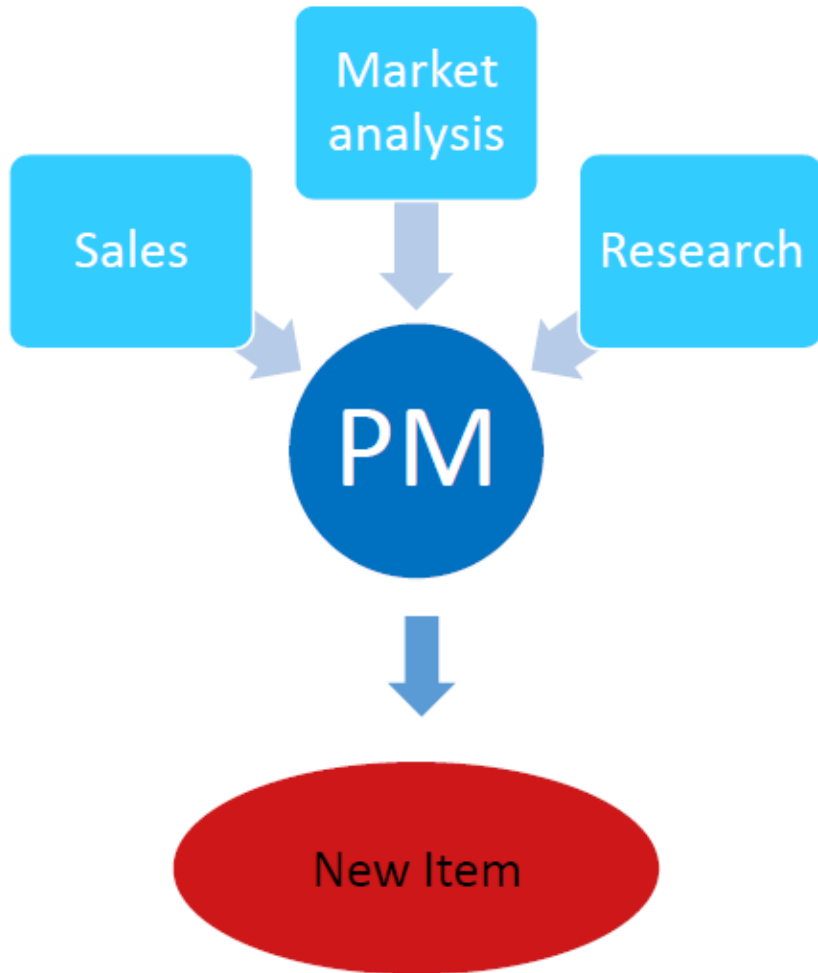
### EXPECTED VOLUME

### SALES 1 YEAR

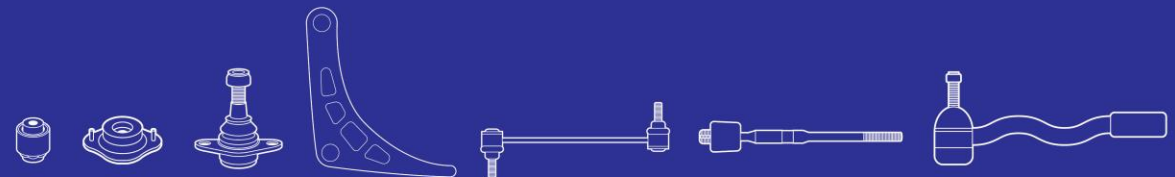
Priority	Amount	Cat	Availability
NLA	>200,000	6 months	18 months
NLB	>100,000	12 months	24 months
NLC	> 50,000	12 months	24 months
NLD	>25,000	24 months	36 months
NLE	<25,000	36 months	48 months



# THE CHOICE OF THE RANGE



**GOAL SIDEM  
=  
FIRST TO MARKET**



# INPUT OE



**OE QUALITY = SIDEM MINIMUM STANDARD**

**GOAL SIDEM : AS GOOD AS OE or EVEN BETTER !**



# REVERSE ENGINEERING



## 3D MODELLING



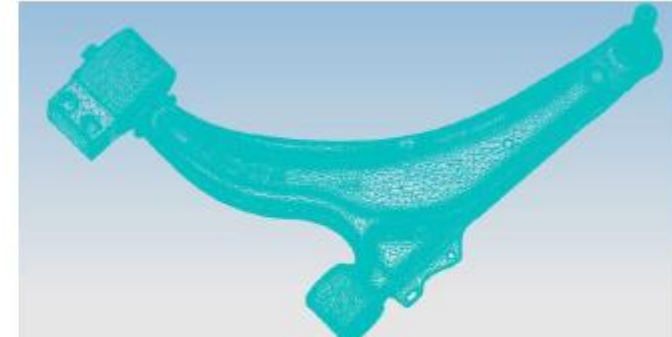
# REVERSE ENGINEERING



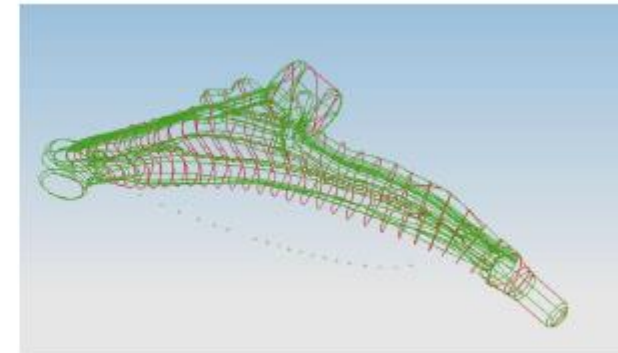
First Scan, point cloud



3D mesh



Sections



3D Model

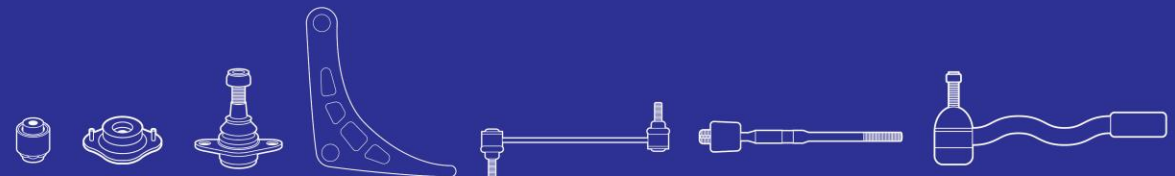


1. First Scan, point cloud

2. 3D mesh

3. Sections

4. 3DModel



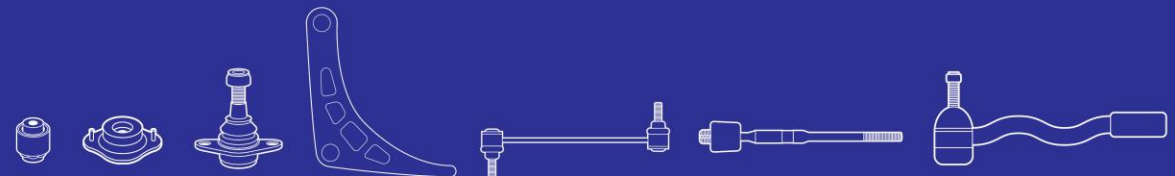
# REVERSE ENGINEERING



## Measuring OE specifications

Cyclic test

Torque test



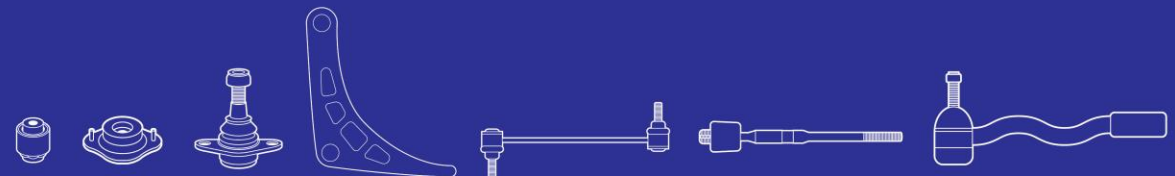
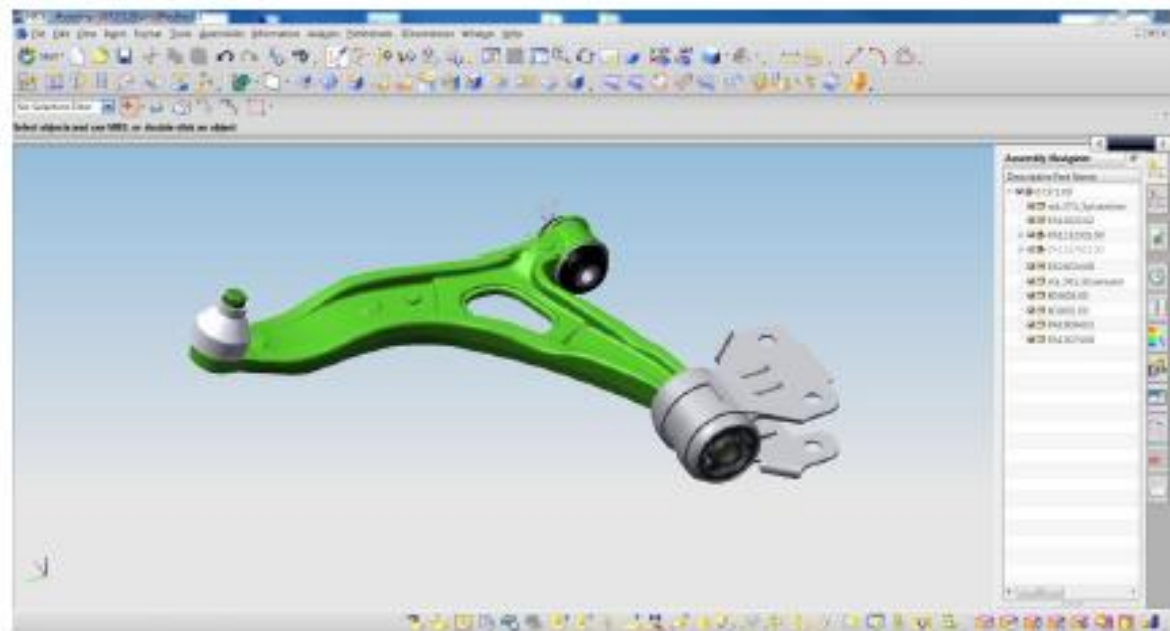
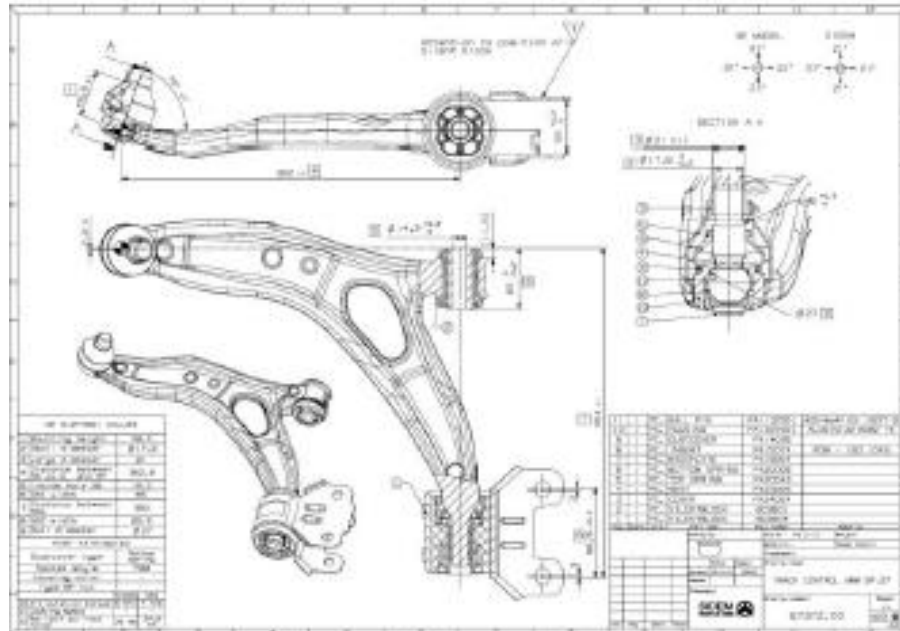


# REVERSE ENGINEERING



## DESIGN

### Drawings for prototyping



# REVERSE ENGINEERING



## PROTOTYPE

- **DEFINING PRODUCTION CONDITIONS**
- **ASSURING THE CAPABILITY OF THE PROCESS,**
- **100% MEASURING**



# REVERSE ENGINEERING



## Testing

### THE EFFECTS on TCA of HEAVY IMPACT

- BUCKLING test
- DYNAMIC LIFE test
- DYNAMIC WEAR test : BJ & TRE

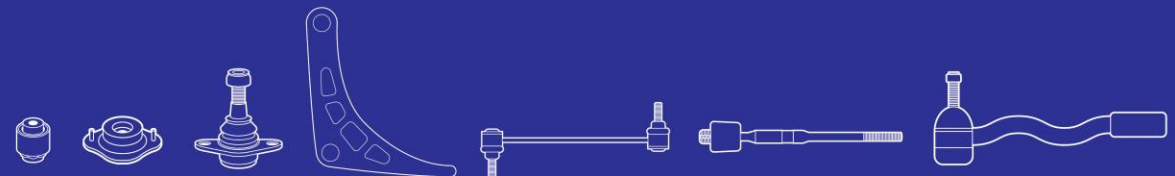


# REVERSE ENGINEERING



## WEAR TESTS

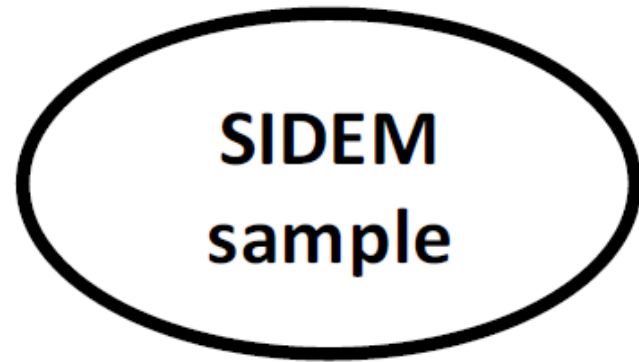
- DYNAMIC DUSTCOVER TEST
- DYNAMIC SB TEST
- LEAK TEST of BJ
- FORCE PATH CHARACTERISTIC of BJ & TRE



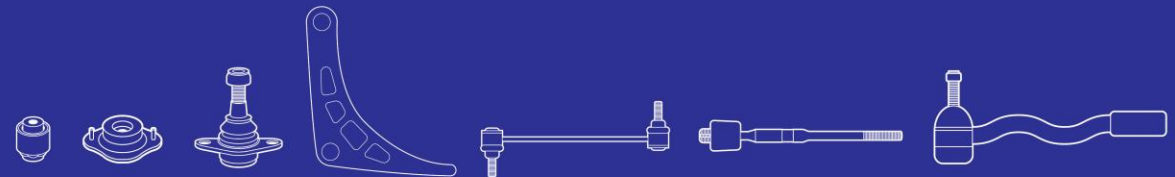
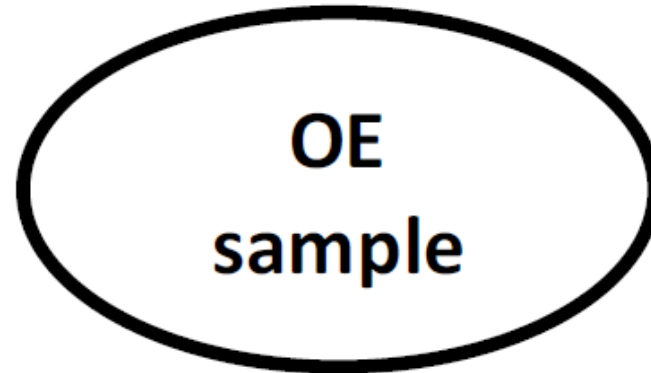
# REVERSE ENGINEERING



Final approval



= 100%  
EQUIVALENT



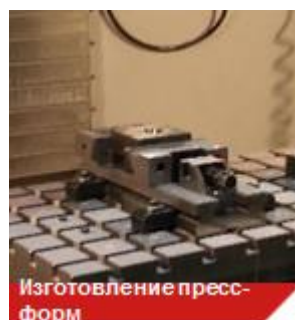
**VERTICAL INTEGRATION**  
FROM RAW MATERIAL  
TO FINISHED PRODUCT



# VERTICAL INTEGRATION



FROM RAW MATERIAL TO FINISHED PRODUCT



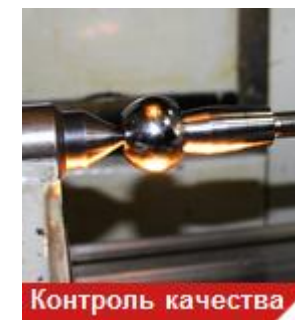
Изготовление пресс-форм



Ковка



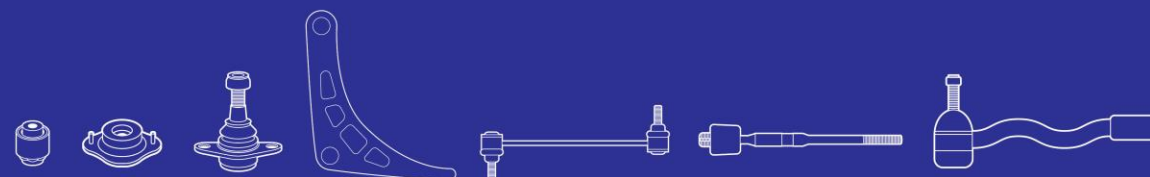
Обработка, Сварка



Контроль качества



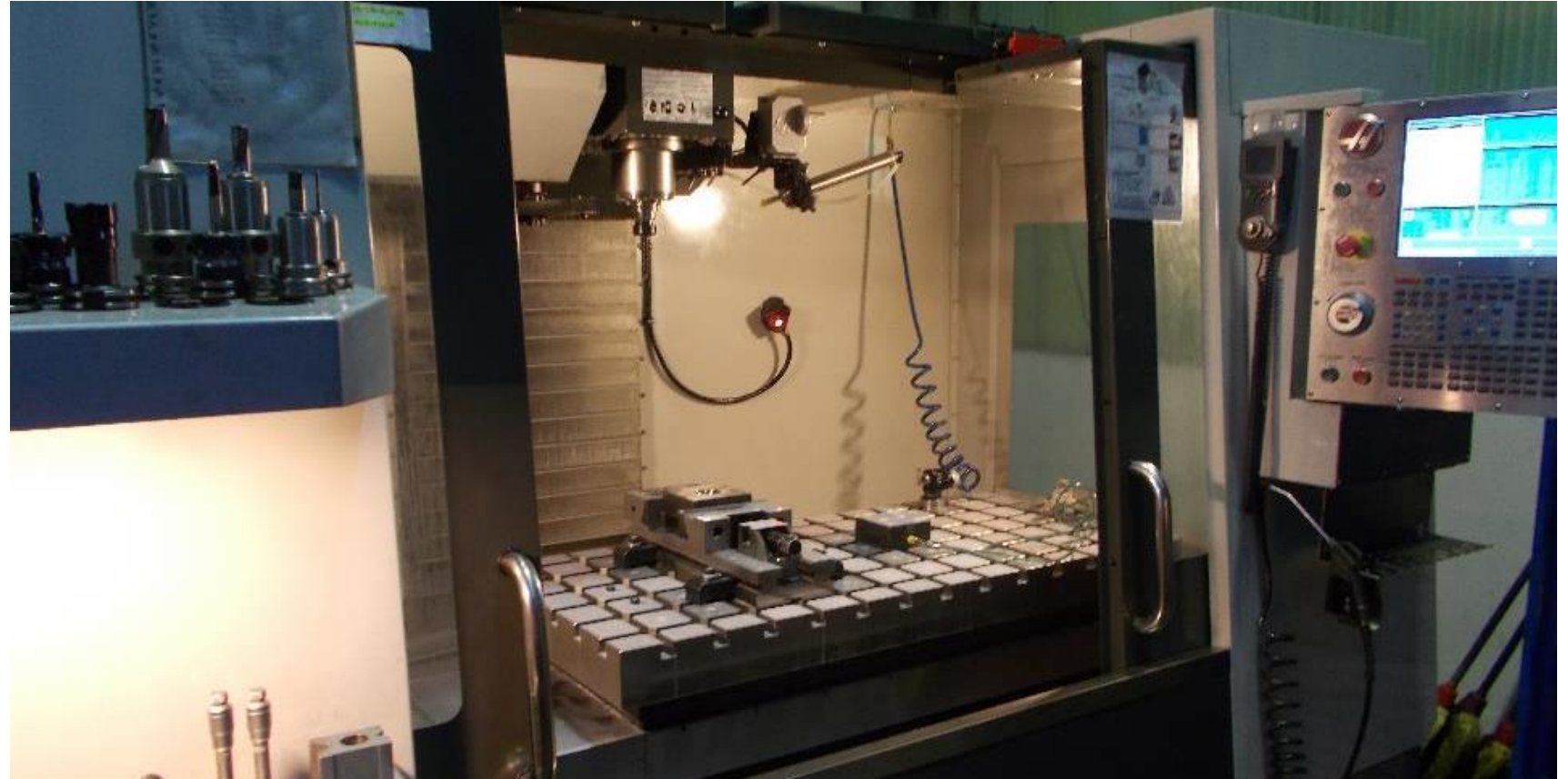
Сборка



# VERTICAL INTEGRATION



## THE MANUFACTURE OF MOLDS





# VERTICAL INTEGRATION



**FORGING**  
2 LINES



# VERTICAL INTEGRATION

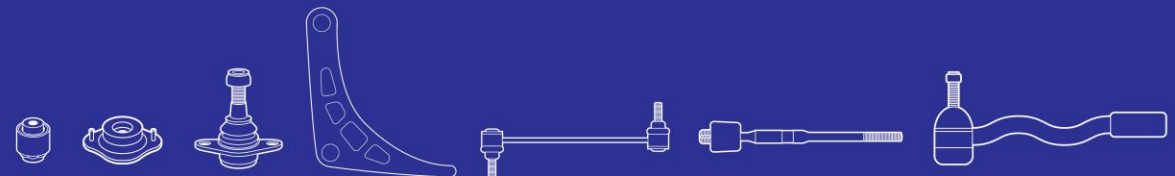


## HIGH-TECH WELDING

**CNC welding**

**Automation and mobility  
go hand in hand**

**Quality control in strict  
accordance with the  
regulations**



# VERTICAL INTEGRATION

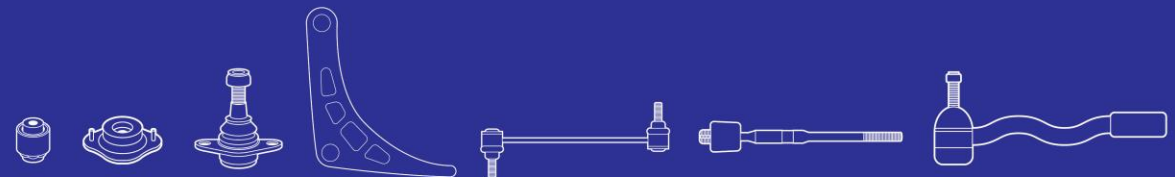
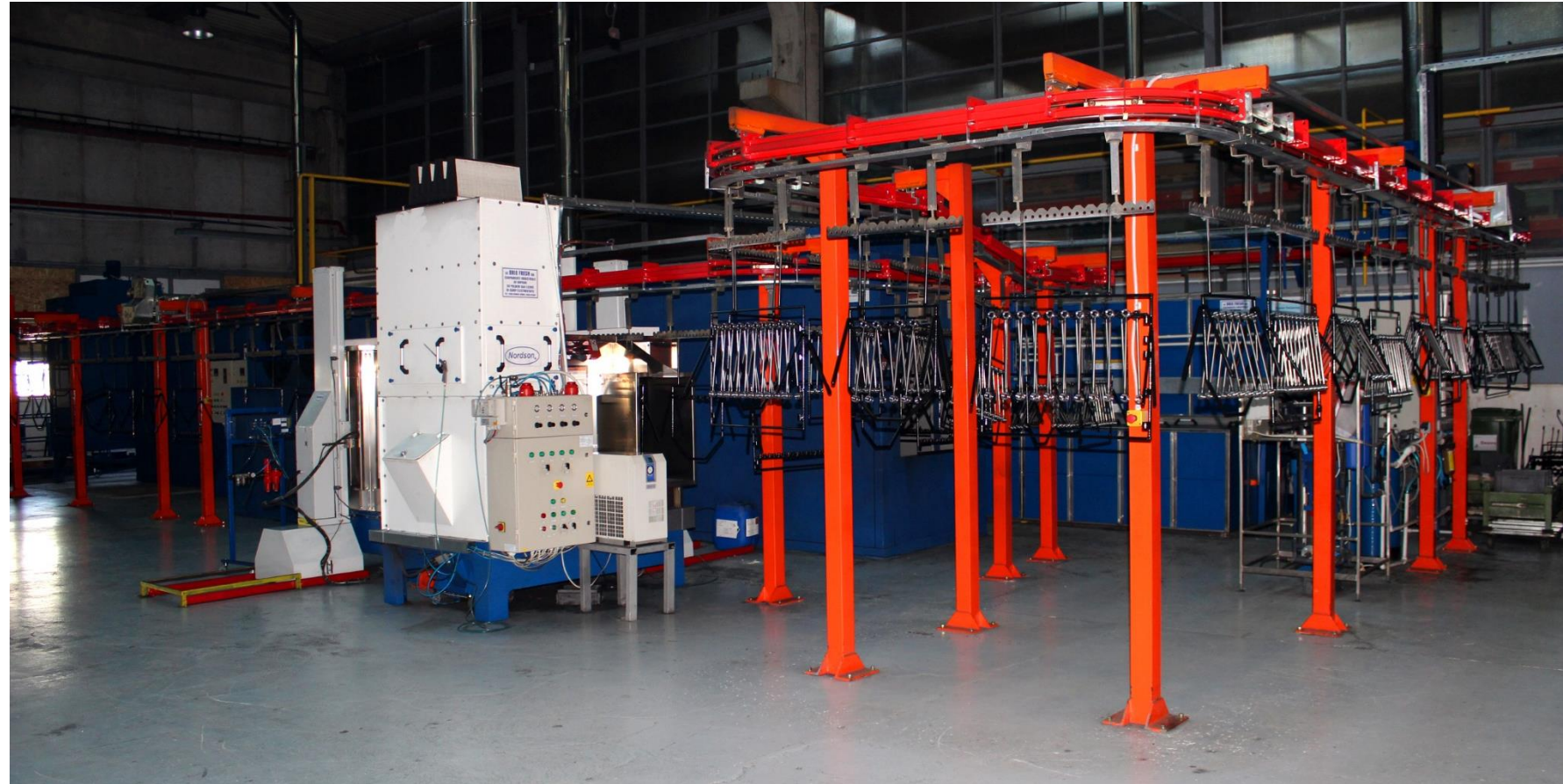


## SURFACE TREATMENT

**Phosphating**

**Powder painting**

**Galvanizing (2016)**

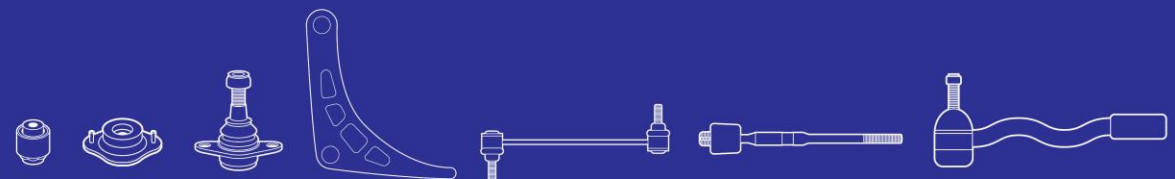


# VERTICAL INTEGRATION



## ASSEMBLY

10 lines



# VERTICAL INTEGRATION

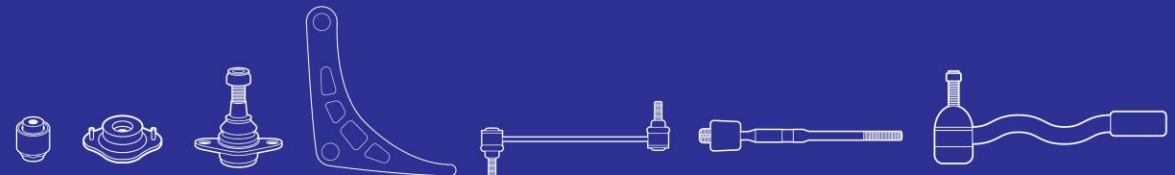
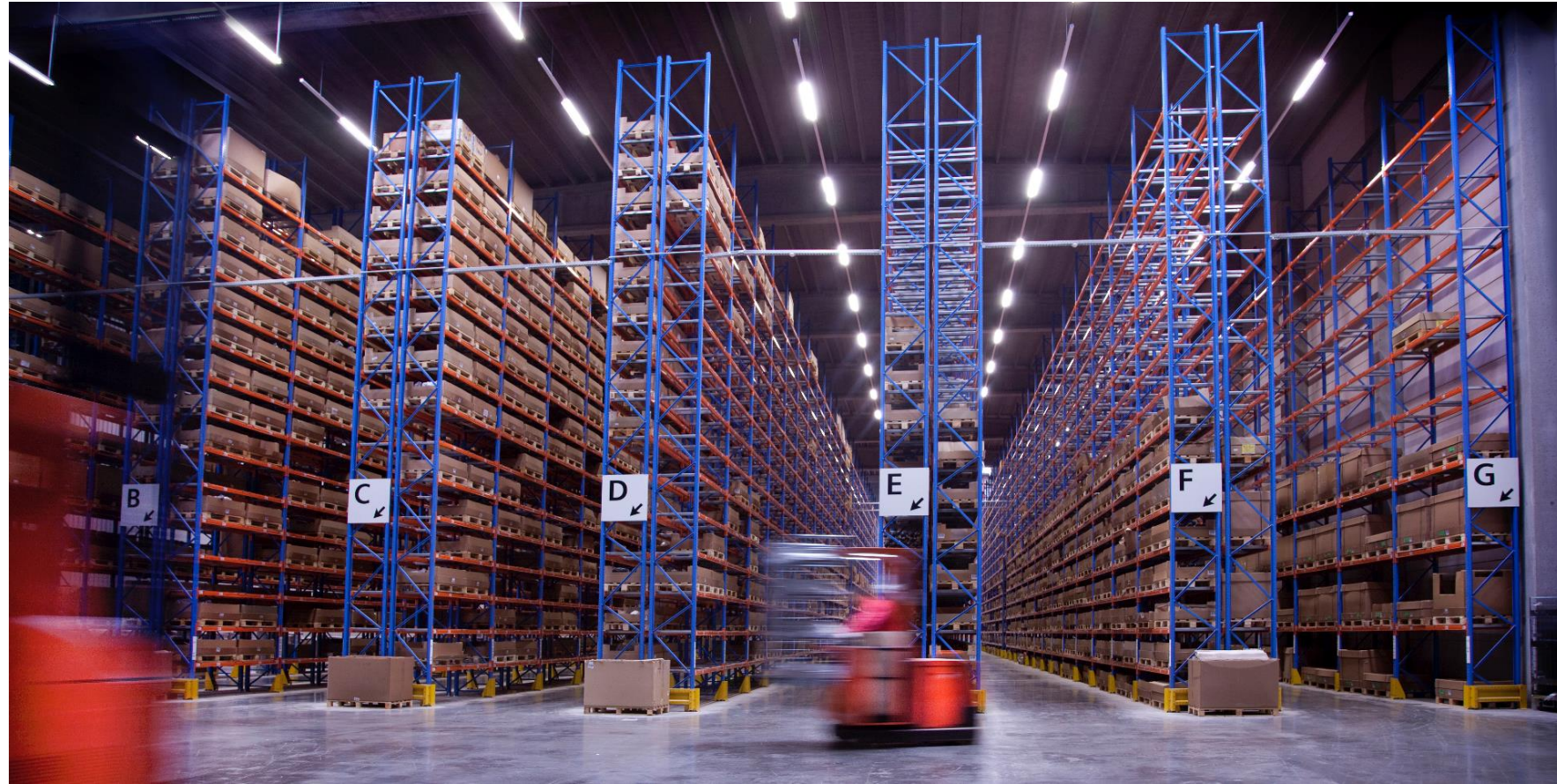


## FAST AND FLEXIBLE DISTRIBUTION

Micro loading system with 24 compartments

Pallet Warehouse

The total number of stock 3 million units



# VERTICAL INTEGRATION

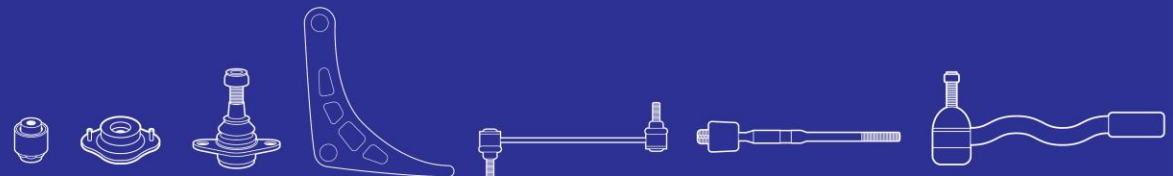


**FAST AND FLEXIBLE  
DISTRIBUTION**

**AUTOMATED WAREHOUSE**

**Stöcklin mini loading  
system**

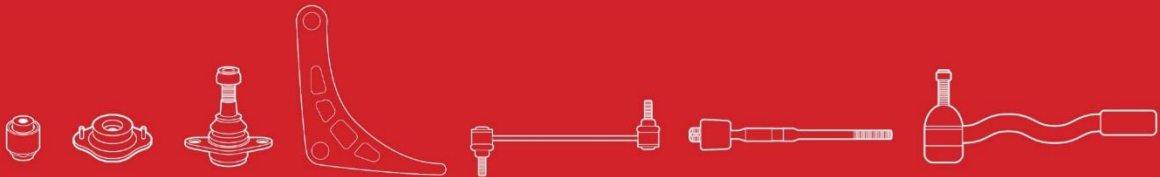
**24,000 cells**





# TECHNICAL TRAININGS

**SIDEM**  
Experts know why



# Technical Feature : Dustcover

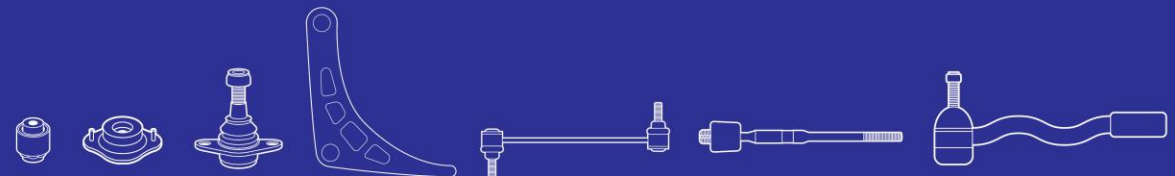
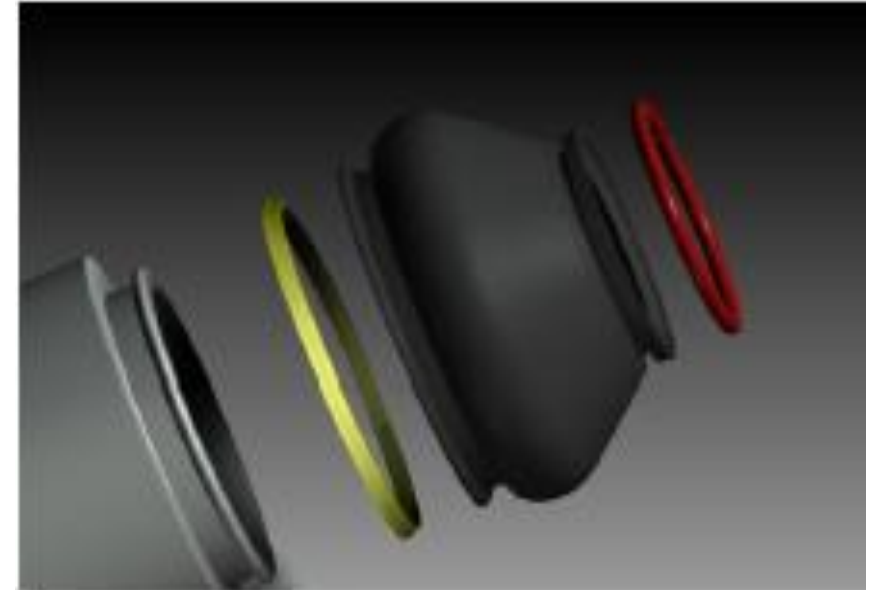


**Maximum sealing dustcover**

**High quality CR rubber**

**Advantages of CR rubber:**

- **Keep sits elasticity when exposed to extreme temperatures: -40 °C -+150 °C**
- **Very long life > 10 years**
- **Resistant to chemical substances such as oil, fuel, grease,...**

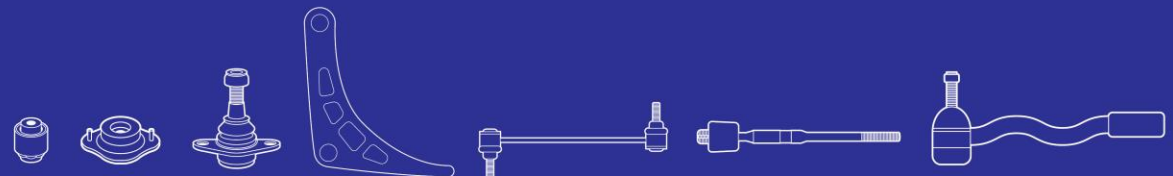
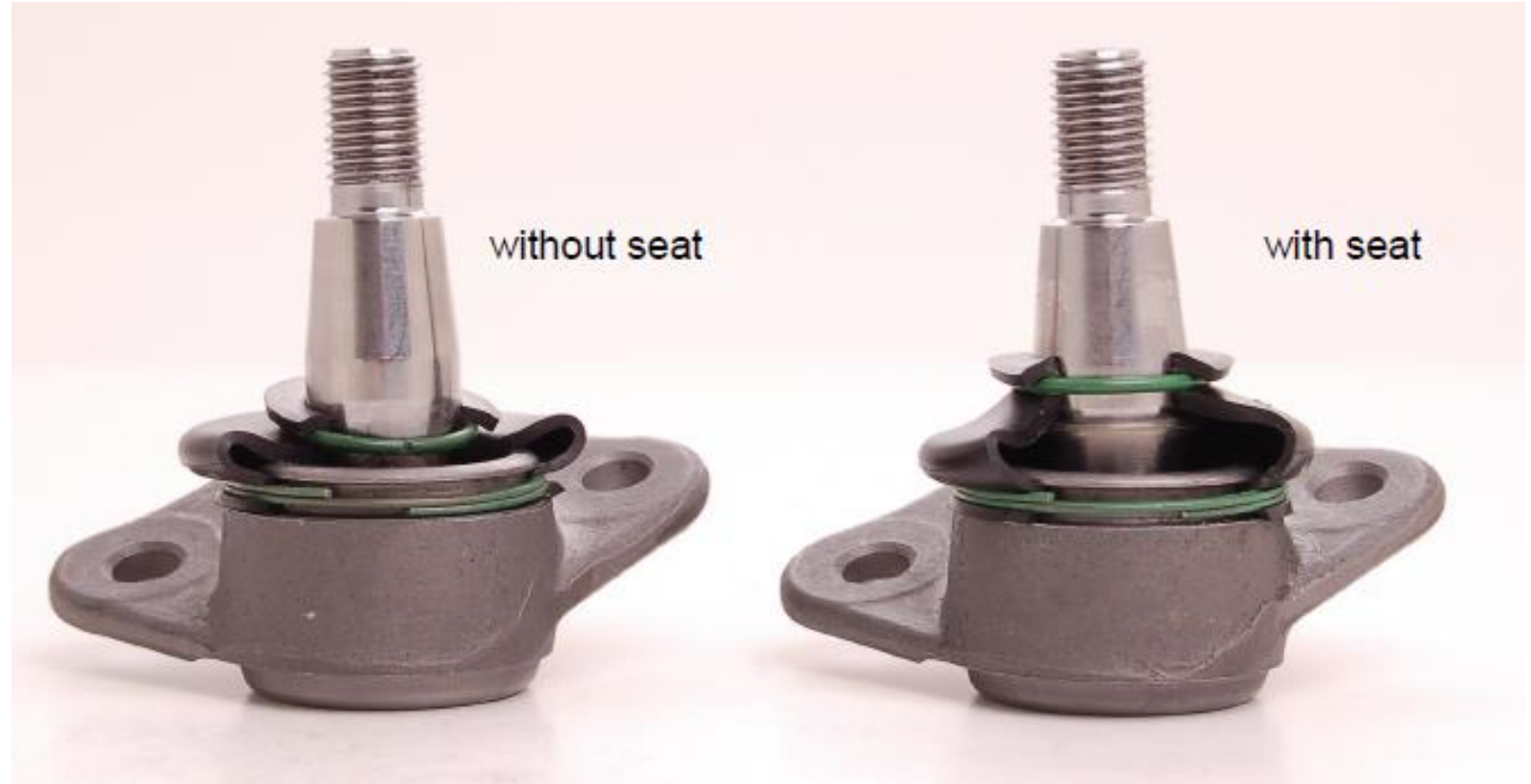




# Technical Feature : Dustcover



## Dustcover seats



# Technical Feature : Dustcover



## Non-rotating dustcover

- Sidemnew type of dustcover that prevents twisting...



twisted



old design



new design

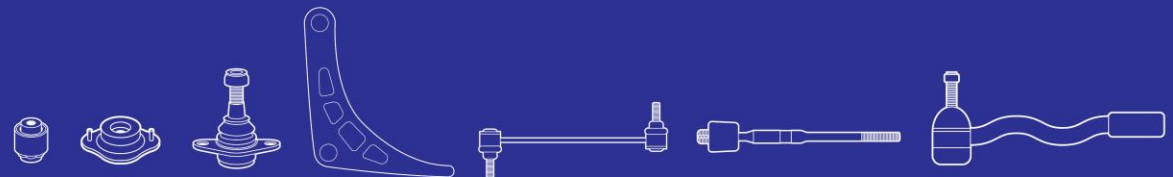


# Technical Feature : Dustcover



## Dustcover grooves

- No chance of water infiltration



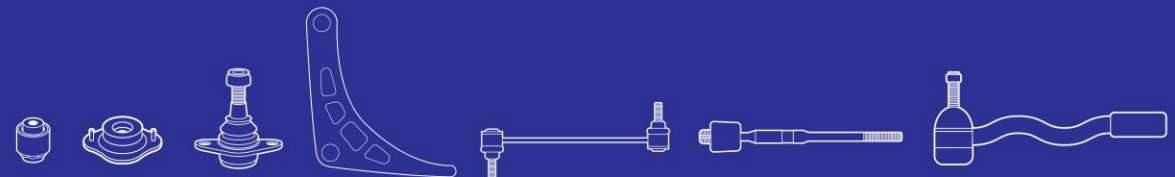
# Technical Feature : Springs



## DIFFERENT COLOURS of SPRINGS

Colored springs to avoid mistakes in productions of the correct dimension of the spring:

**wrong diameter = early wear**



# Technical Feature : Springs



## High elastic spring steel



Compare of diameter before the test: purple spring: sidem, silver color spring: competitor

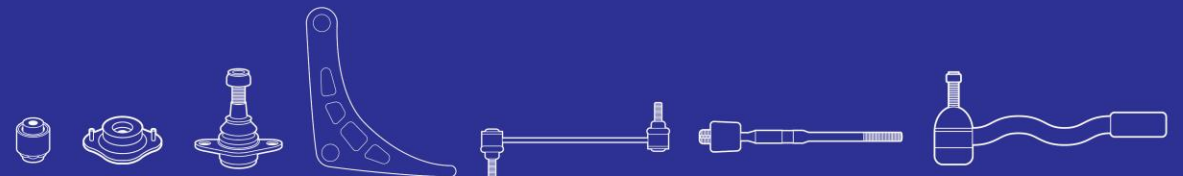


Test: both rings are put on a conical tube to stretch them to the maximum elongation

After the test the springs are removed to check their elongation according the initial state



Left our original spring, in the middle our spring after the test: there's not much elongation, right the competitor spring that is deformed after the test



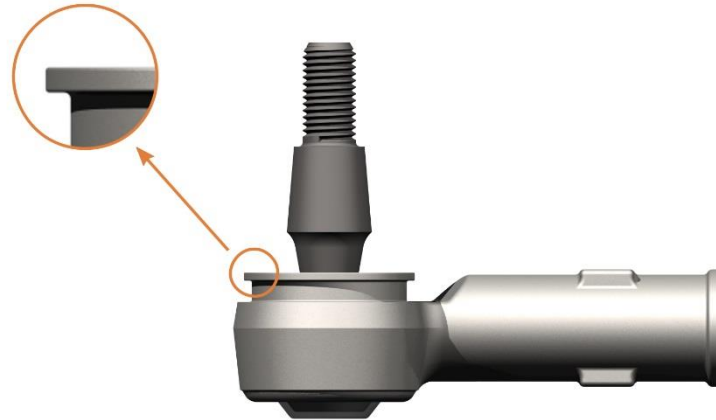
# Technical Feature : Housing



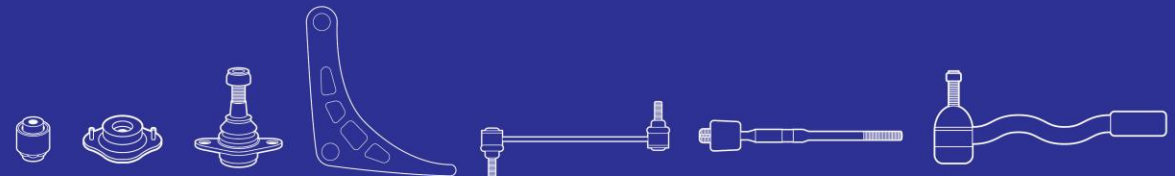
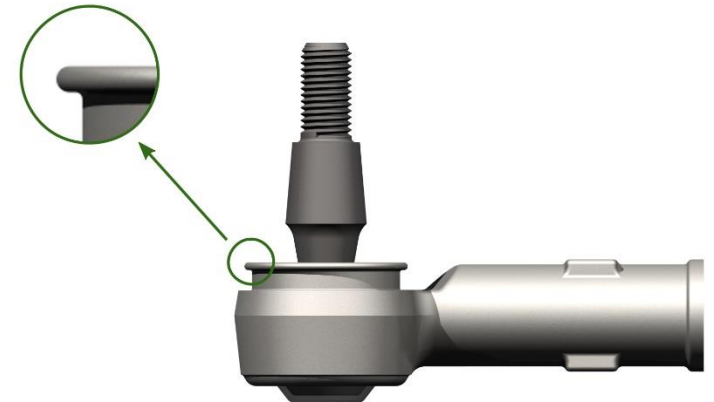
## FINISHING of the HOUSING



NON-SIDEM: sharp edges



SIDEM: no sharp edges

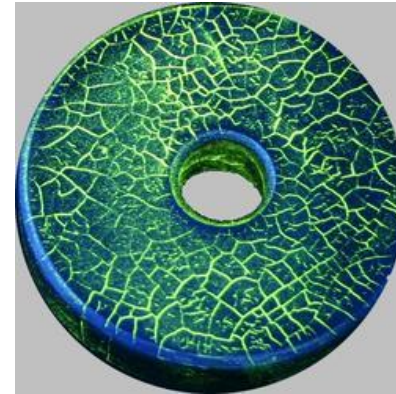


# Technical Feature : Housing

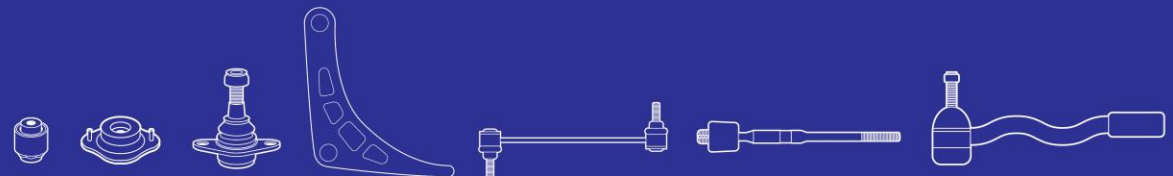
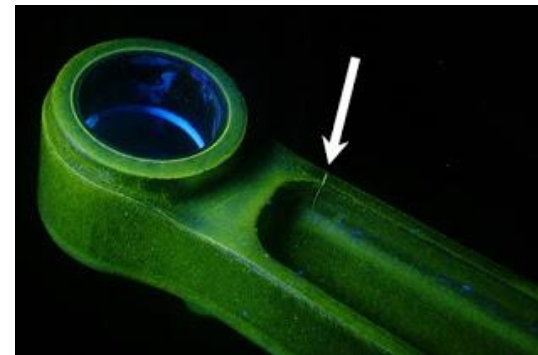
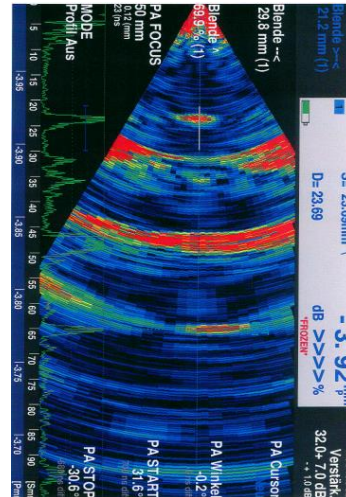


**MATERIAL of HOUSING as GOOD as OE**

MAGNAFLUX test



ULTRASONIC test



# Technical Feature : Steel ball stud

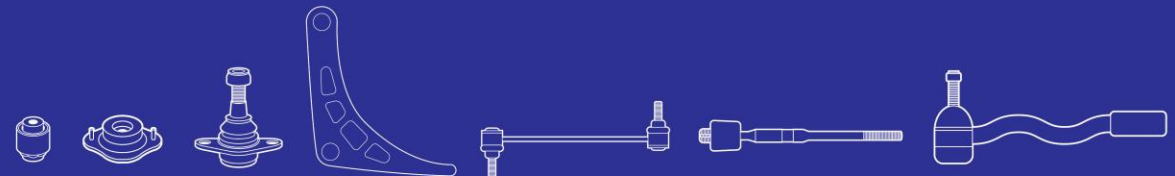


## CHROMIUM STEEL for SAFETY COMPONENT

Chromium steel (42CrMo4V), cold forged and polished.

### Advantages:

- Prevents the part from breaking at extreme impact
- More rust resistant than carbon steel
- Cold forging = optimal material structure which increases the strength of the part
- Polished as a mirror to decrease friction and increase lifetime of the part



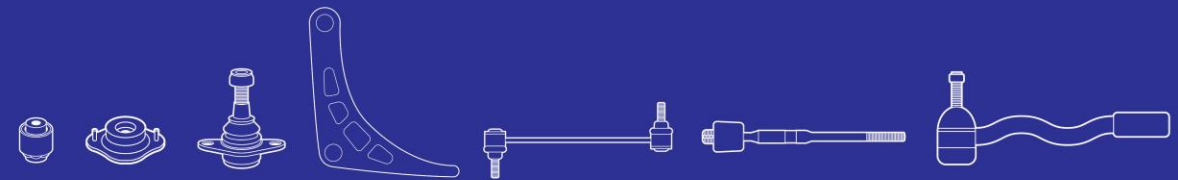


# Technical Feature : Grease



**SIDEM GREASE : TOTAL MULTIS MS2 used by OE**

- **EXTREME PRESSURE**
- **WATER REPELLENT**
- **RESISTANT TO TEMPERATURES: -40°C -+130°C**
- **REDUCES FRICTION**
- **SMOOTH MOVEMENT**
- **POM INSERT**



# Technical Feature : Insert

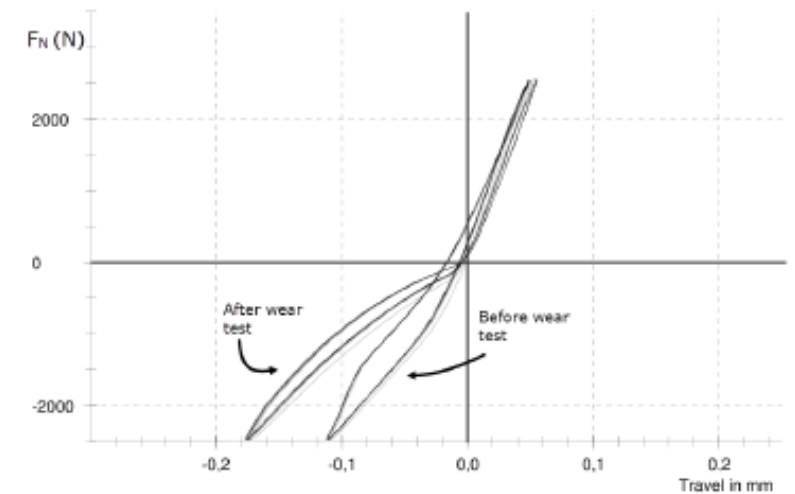
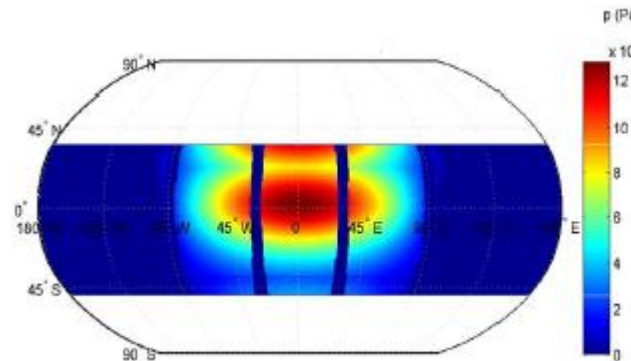


## SELECTED POLYMER

- Resistanttoextreme temperatures:  $-40^{\circ}\text{C}$  up to  $+ 30^{\circ}\text{C}$
- Resistanttohigh impact = NO deformation
- NO deformation= NO wear

## Wear analysis

Pressurefield visualisations across the insert surface:

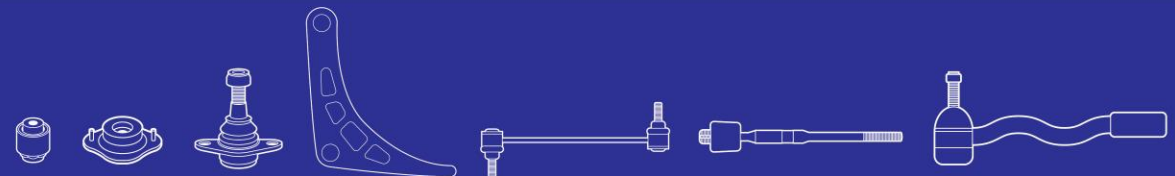


# Technical Feature : Silent blocks



**SidemSB's keeps the noise away**

- **SB made from Natural Rubber (NR)**
- **Rubber to metal BINDING must be very high**
- **The SB STIFNESS in line with OE design**
- **The compound must show GOOD DAMPING FACILITY & VIBRATION ABSORPTION**
- **Rubber with excellent FATIGUE PROPERTIES**
- **NO BRITTLE RUBBER at low temperatures (-40 °C)**
- **RESISTANT to OILS & OZONE**



# Technical Feature : Torque of BJ



## REQUIREMENTS OF BJ

- easy to move
- maintenance-free
- noise-insulating.

## SIDEM BJ stands for:

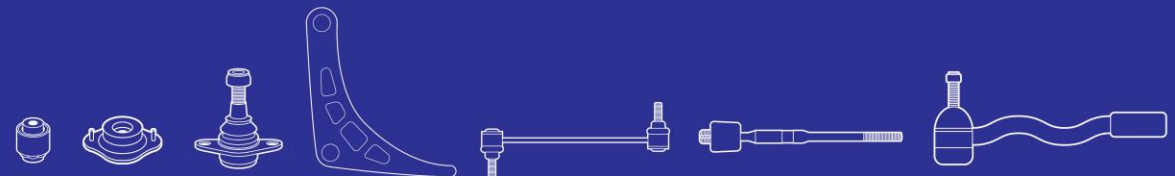
- Low tilting torques
- Low elasticity due to low clearance
- Accurate wheel guidance
- Long durability

## Sidem

Nominal ball size Ø	< 25 mm	25 – 34 mm	> 34 mm	Dimension
Break-away torque ( Primair )	≤ 8,0	≤ 10,0	≤ 16,0	( Nm )
Motion torque ( Dynamic )	0,5 - 4,0	1,0 - 6,0	2,0 - 10,0	( Nm )

## Non Sidem

Nominal Ball size Ø	< 25 mm	25 - 34 mm	> 34 mm	Dimension
Break-away torque ( Primair )	≤ 14	≤ 18,0	≤ 22,0	( Nm )
Motion torque ( Dynamic )	4,0 - 10,0	8,0 - 14,0	10,0 - 18,0	( Nm )

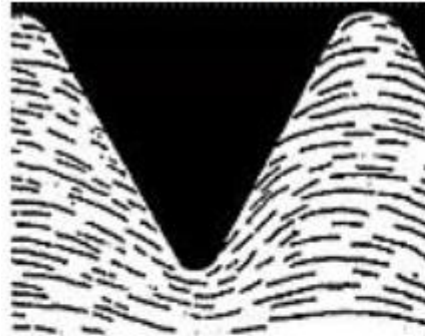


# Technical Feature : Rolled thread

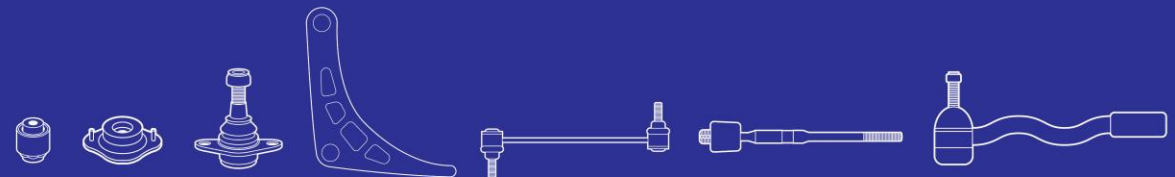
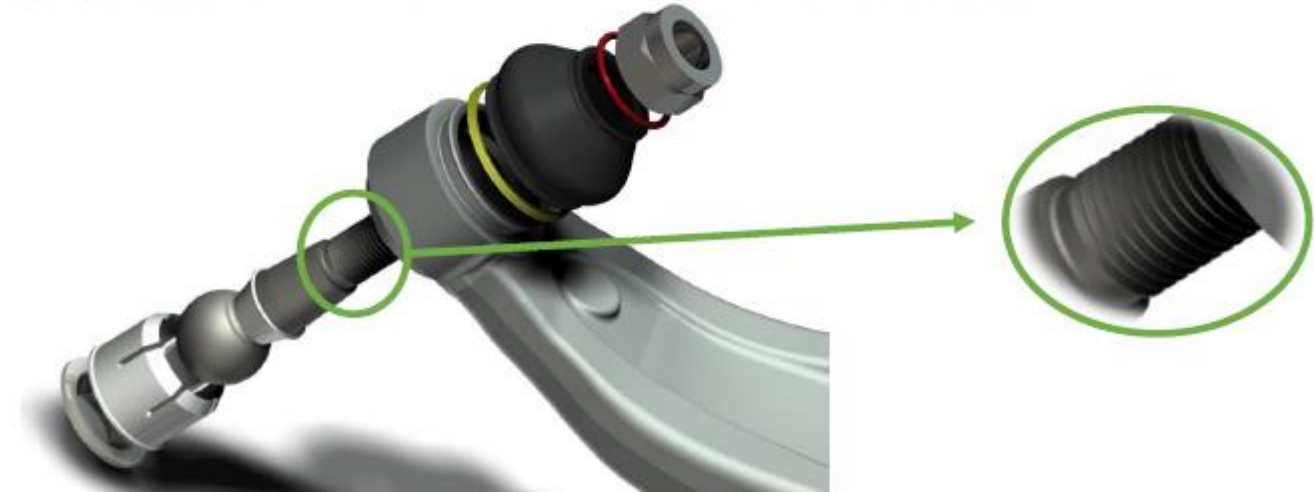


**ROLLED vs CUTTING**

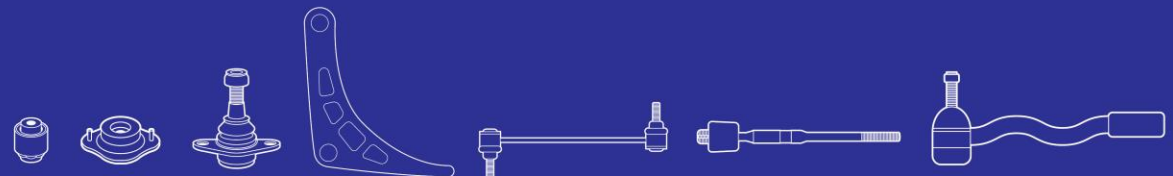
SIDEM = ROLLING



NO SIDEM = CUTTING



# THE PRICE OF SAFETY





# THE MOST EXPENSIVE ITEM

SET

37351 AUDI A4 - A5

EXW - 270.00 EUR



# THE MOST EXPENSIVE ITEM



**TRACK CONTROL ARM**

**49356 MERCEDES ML-GL-GLE-GLS (\_166)**

**EXW – 154.00 EUR**





# THE MOST EXPENSIVE ITEM



## STABILIZER BAR

954001 CITROEN / PEUGEOT / FIAT

EXW – 128.00 EUR



# THE CHEAPEST ITEM



**SILENT BLOCK**

**849607 MERCEDES - C123-T123-W123 - S-CLASS**

**EXW - 00.42 EUR**



# THE CHEAPEST ITEM

**STABILIZER LINK**

**63469 SEAT / VOLKSWAGEN**

**EXW – 1,55 EUR**



# THE CHEAPEST ITEM



## TIE ROD END

19930 LADA - 1200 - 1300 - 1500 - 1600

EXW - 2,20 EUR

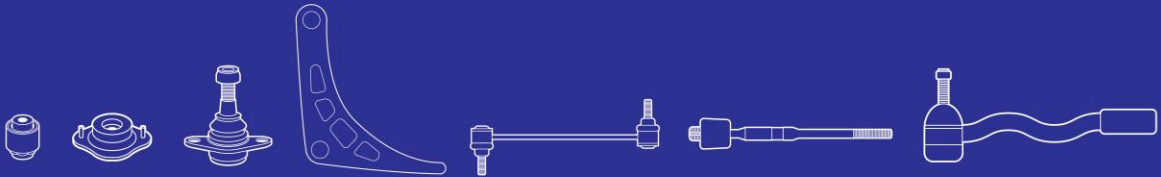




# THE PRICE OF SAFETY



**SIDEM**  
Steering in safety



# COMMITMENT TO QUALITY



# CERTIFICATES



- ISO = International Organization for Standardization covers many different standards

- ISO9001:2015 – replaces ISO9001:2008 en becomes effective from 2018 onwards  
= QMS (Quality Management System) requirements

IATF16949:2016 replaces ISO/TS16949:2009

= QMS requirements for delivery to OEM

IATF = International Automotive Task Force ;

covered by automotive one can only receive IATF certification, if supplies via tier 1 or tier 2

more particularly for SIDEM ; to Bosch and BWI (Porsche)

based on ISO9001 but with some additional requirements

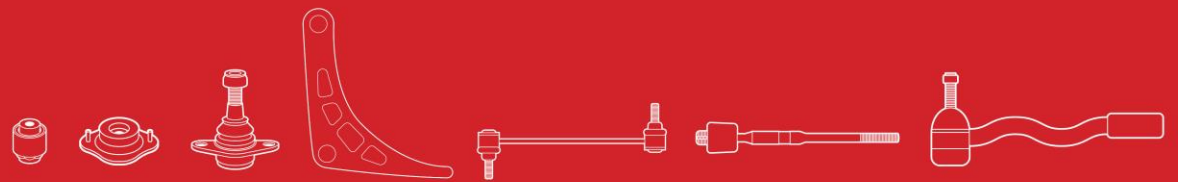
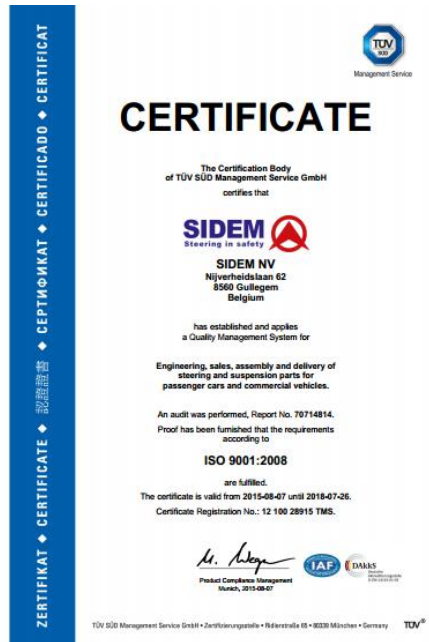
IATF certification includes automatically ISO9001





# CERTIFICATES

Certification obtained after a certification audit by recognized certification body is valid for 3 year with each yearly a positive surveillance audit  
 IATF certificate is issued by IATF by accredited auditors.  
 One can at each moment check the validity of a certificate on the web



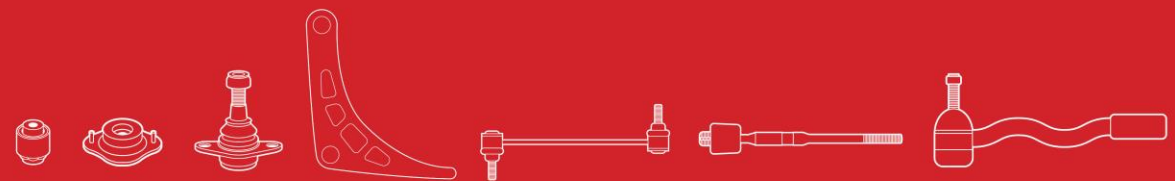


# Risk-based thinking

ISO9001 requires organisations to determine risks



# Risk - based thinking



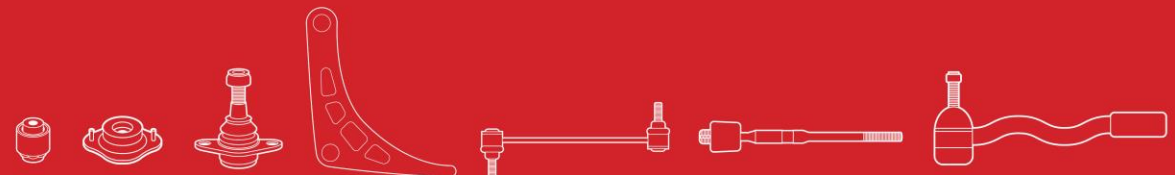
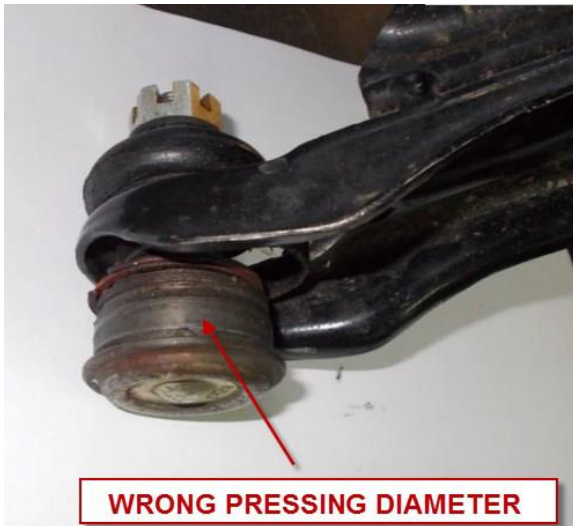
# Special characteristics



## A-SAFETY

### Critical safety characteristics

If these characteristics are not respected it will lead to the loss of the steering of the vehicle.  
The result will be a car accident.



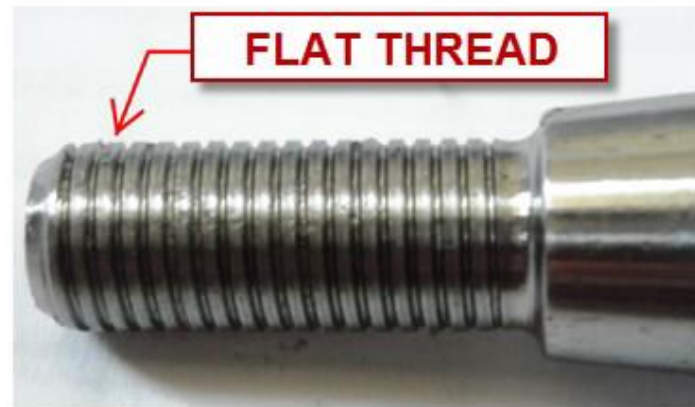
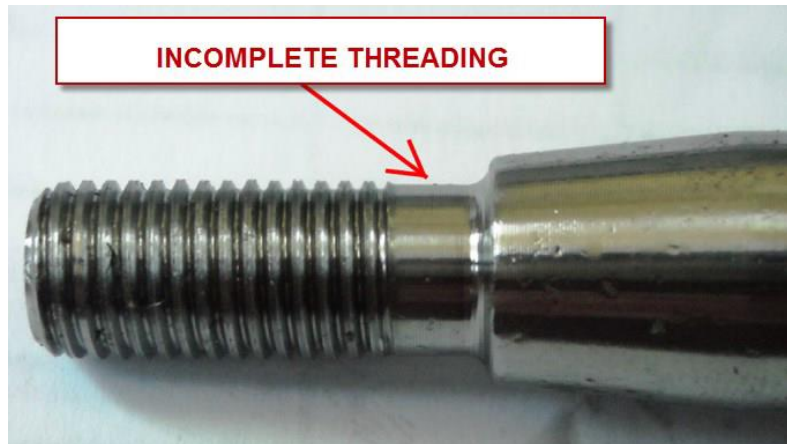
# Special characteristics



## A-SAFETY

### Critical safety characteristics

If these characteristics are not respected it will lead to the loss of the steering of the vehicle.  
The result will be a car accident.



# Special characteristics



## A-SAFETY

### Critical safety characteristics

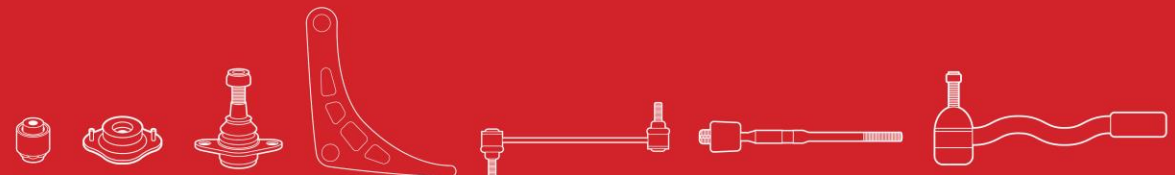
If these characteristics are not respected it will lead to the loss of the steering of the vehicle.  
The result will be a car accident.



# Special characteristics

Fk-FUNCTION

Functional critical characteristics



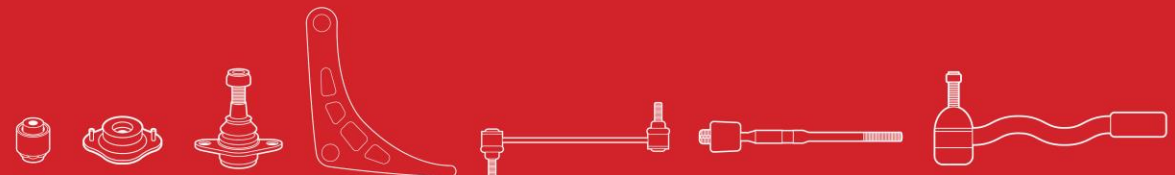
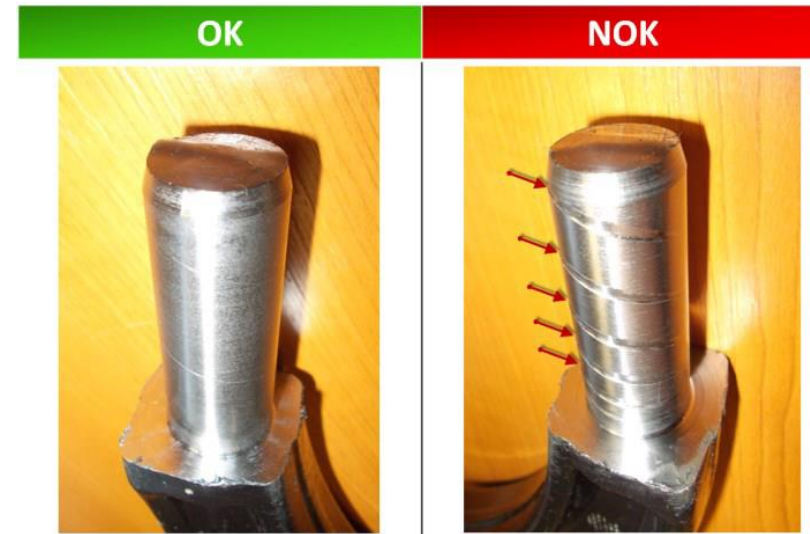
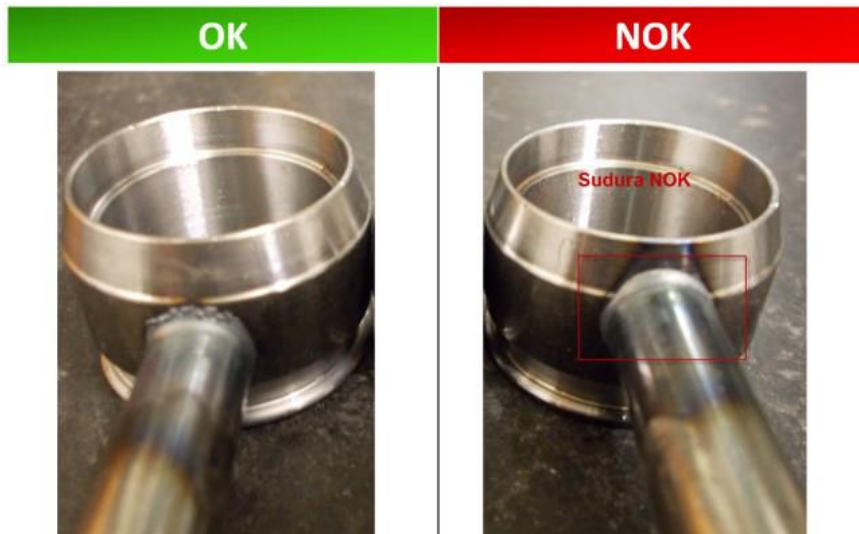
# Special characteristics



## PK-PROCESSING

### PROCESS CRITICAL CHARACTERISTICS

If these characteristics are not respected than as a result will be the impossibility or difficulty of making the next operation.



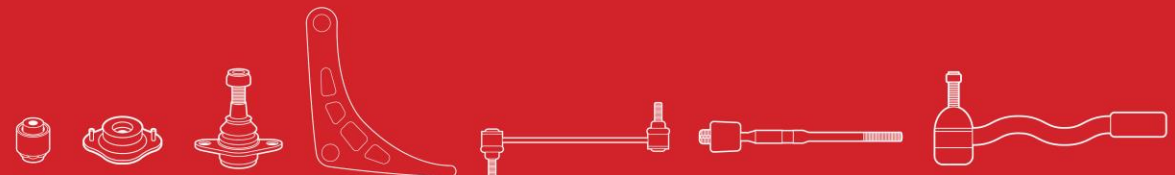
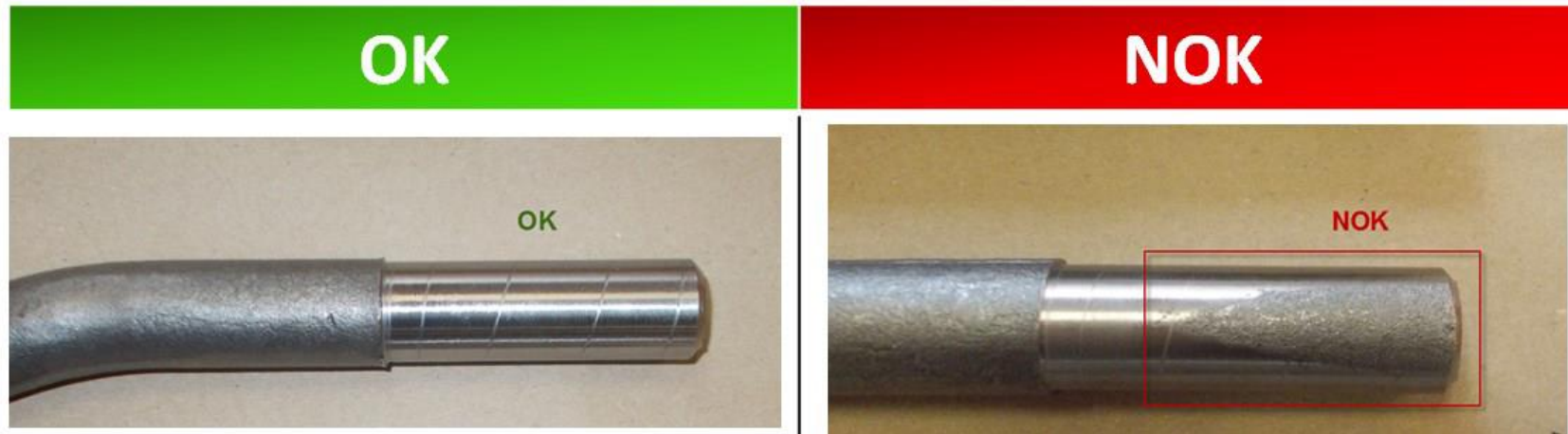
# Special characteristics



## Pk-PROCESSING

## PROCESS CRITICAL CHARACTERISTICS

If these characteristics are not respected than as a result will be the impossibility or difficulty of making the next operation.





# COMMITMENT TO QUALITY

