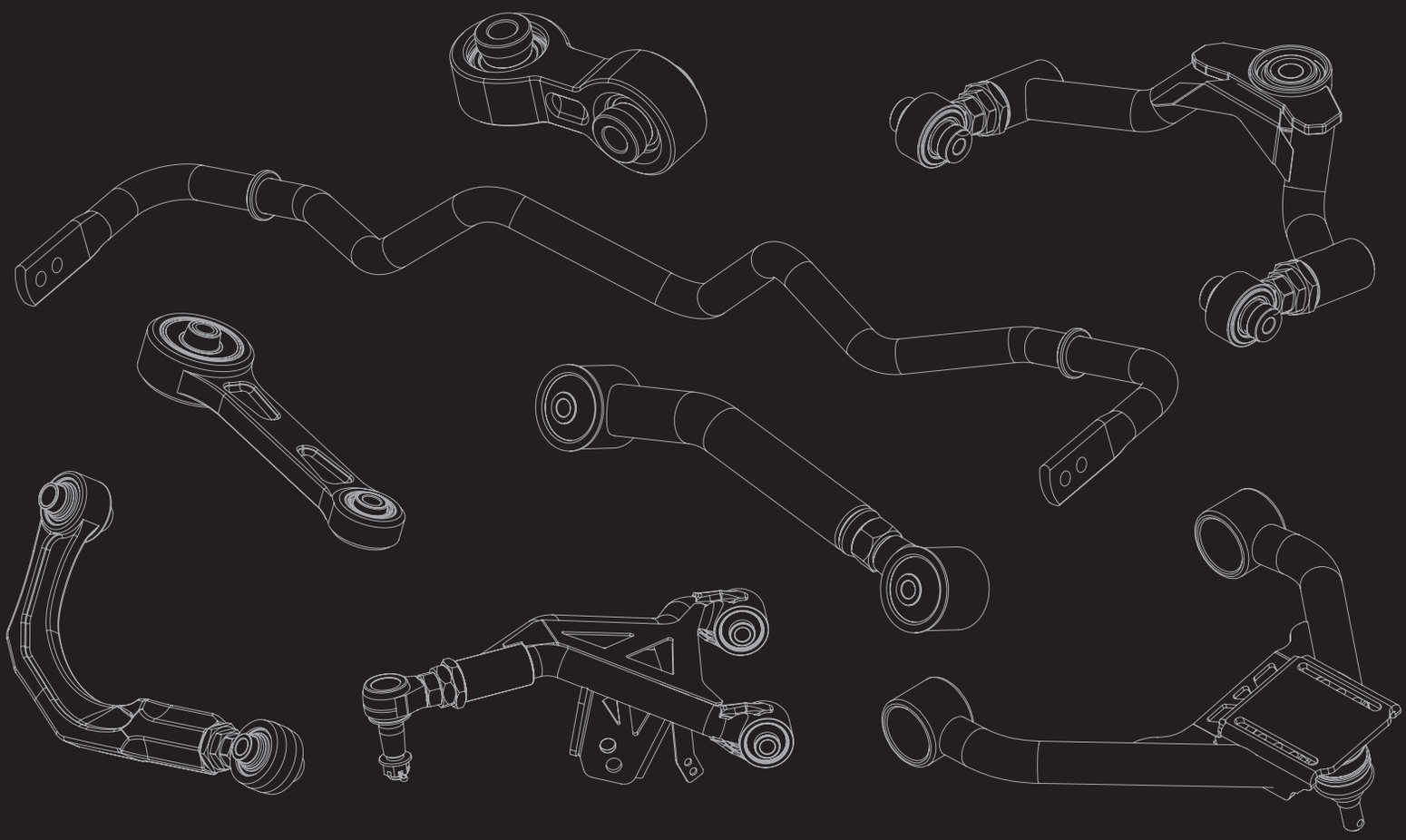


底盤 轉向 定位

CHASSIS STEERING ALIGNMENT

HARDRACE


STRAIGHT


260
A.Casmiri
HARDRACE
CHASSIS STEERING ALIGNMENT
PFITZNER
TOPSTAGE V3
MOTUL
CLUTCH


HARDRACE

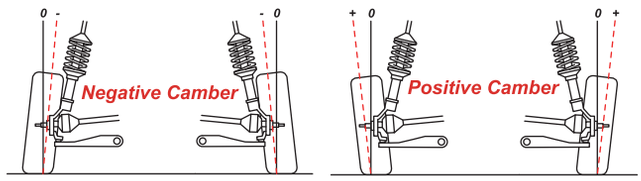
HARDRACE

TABLE OF CONTENTS

HARDRACE TOTAL SOLUTION

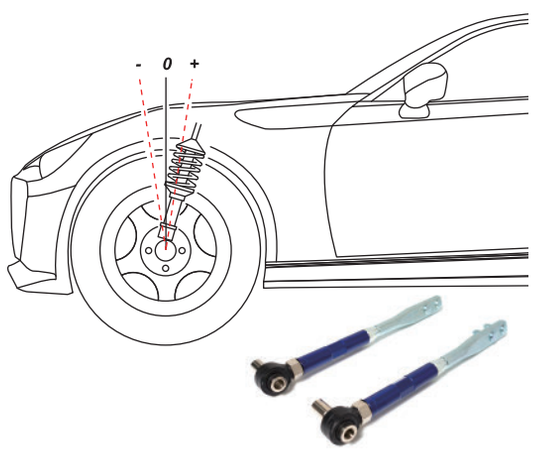
The alignment, stability, handling and performance of a vehicle depend on many factors. One of the most important aspects of these characteristics is the design of the suspension and steering systems. Suspension geometry is defined as: "The angular relationship between the suspension, the steering linkage and the wheels-relative to the road surface."
HARDRACE was devoted to providing best solution of adjustable arms and superior bushings for car' s suspension for many years. We have accumulated a lot of experience on the technique that forms a perfect product line to fine-tune car' s suspension. Our adjustable arms allow you to alter key elements of the cars geometry to optimise the handling characteristics.

CAMBER



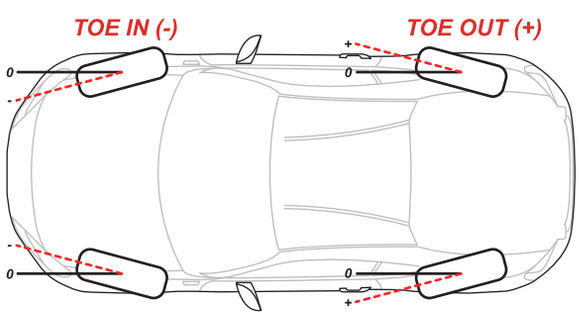
Camber is the inward or outward tilt of the wheels when viewed from the front of the vehicle. The amount of tilt is measured in degrees from the vertical and is called the camber angle.
If the wheel tilts out at the top, the camber angle is positive and if the wheel tilts in at the top it is negative.
Camber alters the handling qualities of a particular suspension design; Negative camber usually improves grip when cornering. This is because it places the tire at a better angle to the road, transmitting the forces through the vertical plane of the tire rather than through a shear force across it.
HARDRACE adjustable camber kits allow you to set the camber correctly and easily.

CASTER



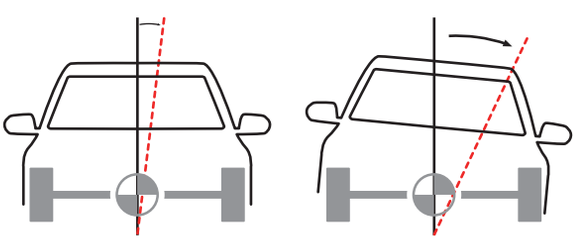
Caster is the angle of the front strut when seem from the side of the vehicle. If the steering axis is tilted rearward, it is called "Positive Caster". A forward tilt is called "Negative Caster".
Generally speaking, positive caster can increases stability at high speeds. Positive caster also causes increased steering effort at low speeds. Having to run less static camber improves traction, reduces tires wear and improves the cars potential braking abilities through improved grip. In addition to increased high speed stability, cornering is enhanced and steering wheel return ability is improved by positive Caster. This generates additional feedback so giving the driver more communication with what the tires are doing.
HARDRACE adjustable caster arms help you to adjust caster accurately.

TOE IN / TOE OUT



Toe is measured at the center of the wheels from one wheel rim to the other. When the distance is greater at the rear of the wheels, it is called toe-in. When the distance is greater at the front of the wheels, it is called toe-out. For example, in a rear wheel drive car, increased front toe in can provides greater straight-line stability at the cost of some sluggishness of turning response. HARDRACE adjustable rear toe arms allow you to set the rear toe as required, be it toe in to generate heat more quickly and increase turn in stability or toe out to make the car more nervous and quicker to change direction for drifting or tight circuit work.

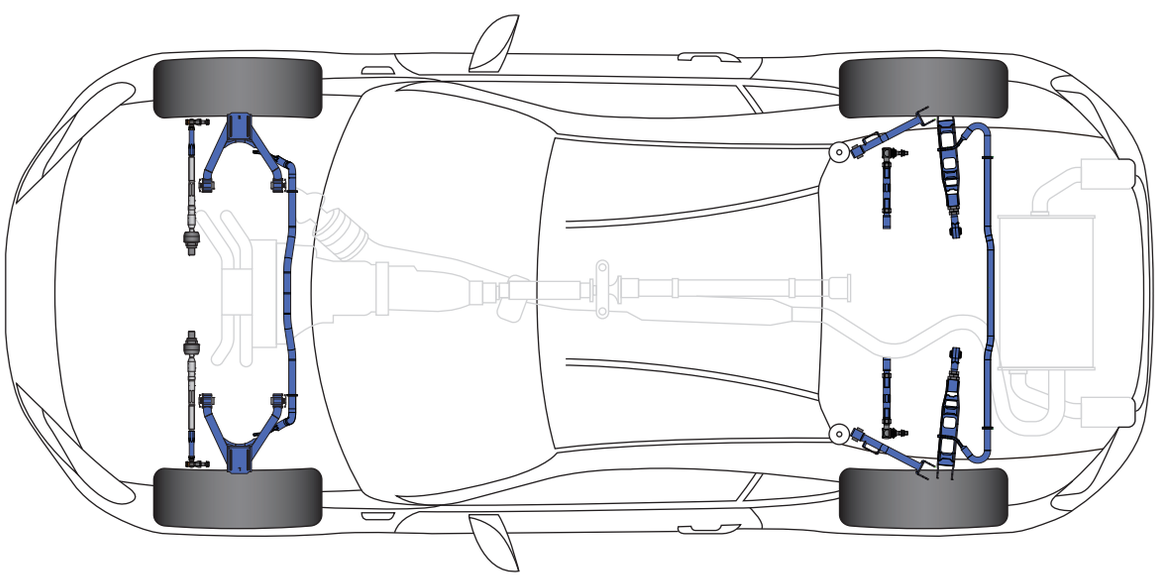
SWAY CONTROL

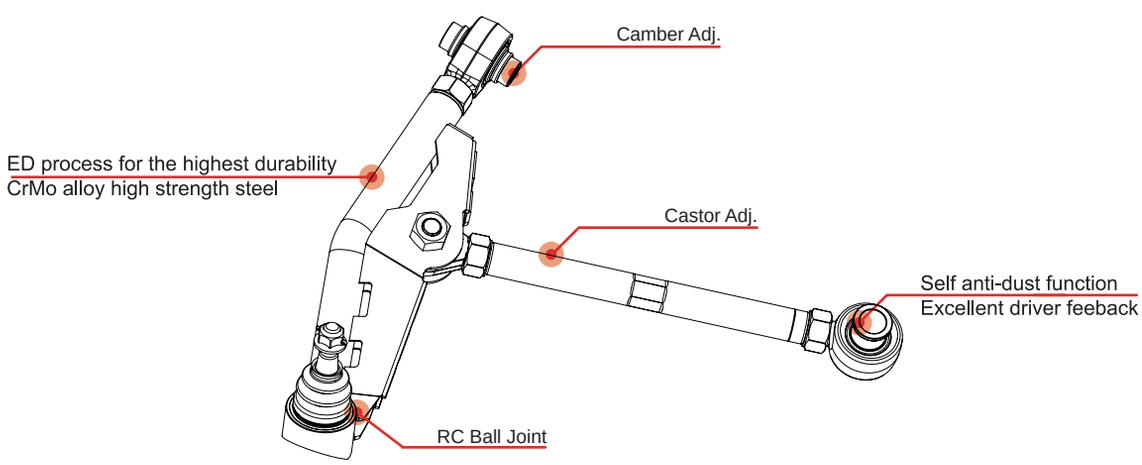


A sway bar or anti-roll bar is a part of car suspension that helps reduce the body roll of a vehicle during fast cornering.
Sway bars provide two main functions. The first function is the reduction of body lean. The other function of anti-roll bars is to tune the handling balance of a car. Sway bar force the tires to hold the road in turns, thus eliminating body roll. Rubber bushings will often deflect excessively before the bar is allowed to operate and benefit the vehicle. HARDRACE sway bar made with hardness alloy steel and increased the suspension's roll stiffness more effectively.

ADJUSTABLE ARM

HARDRACE Adjustable Arms divided into four series – STREET, PERFORMANCE, RACING and STANCE, each one collocation with harden rubber bushing or anti-dust pillow ball bushing, provide excellent stability and road response during high speed driving or hard cornering.





STREET SERIES

Street series arms are suitable for daily use, made with harden rubber bushings which are utilized for the low friction with minimal deflection for dynamic shock control, provide solid steering response and driving suspension feel.

Feature:

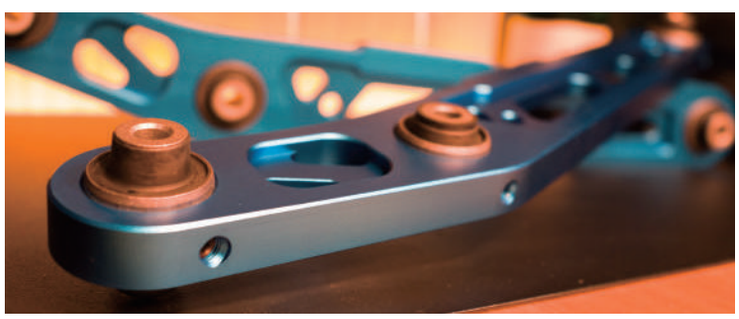
- Equipped with harden rubber bushing
- Adjustable function
- OE design, direct bolt-on
- One piece design
- CAD-CAM designed

PERFORMANCE SERIES

Performance series arms are compound with pillow ball bushing, significantly improve response for better handling and maximum controlling performance, provide excellent driver feedback, precise control and solid suspension feel with aesthetically pleasing.

Feature:

- Equipped with pillow ball bushing
- Adjustable function
- One piece design
- Anti-dust boot
- CAD-CAM designed



STANCE SERIES

Stance series are design for fit extreme lower vehicle. Using pillow ball bushing utilizes the movement of the control arm. The product design helps the vehicle to lower to its extreme besides using coilover. New arm structure makes the BALL JOINT function as original arm, no bending on ball joint.

Feature:

- Large-angle design
- Extreme camber
- HellaFlush & Vip style use
- Ball joint correction
- CAD/CAM designed
- CAD-CAM designed

RACING SERIES

Racing series will be announced soon

Racing series is constructed of 7075 aluminum precision fit and finish, manufactured using all-new design pillow ball bushing for racing level handling, 100% accuracy, during cornering, braking & throttle control, will always yield the better lap time. Lighter alloy solution helps lower weight, fuel usage and running costs while improving service life and reliability.

Feature:

- Aluminum, aircraft material
- Equipped with pillow ball bushing
- No noise, lightweight design

OE CONTROL ARM

OE series arms are manufactured using the finest one-piece steel for strength and durability. OE design, direct replacement without adjustable function. Equipped with harden rubber bushing, also provide solid steering response and reduces vibration.

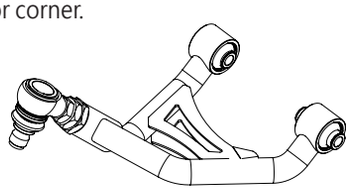
Feature:

- Non-Adjustable
- OEM direct replacement
- Equipped with harden rubber bushing
- ED processing and painting for highest durability

ADJ. CONTROL ARM

The control arm made with hardened steel and compound with superior quality bushing.
A good control arm can regulate the movement of wheels quickly each time you turn or corner.

- ED process and painting for the highest durability
- Equipped with premium quality bushings
- Superior strength and durability
- OE direct replacement
- Dramatically improving handling performance



TOYOTA 86/FR-S/BRZ
ZN6/ZC6
#7427

MAZDA RX8
1st SE3P
#7393

MAZDA 6
2nd GH
#7960

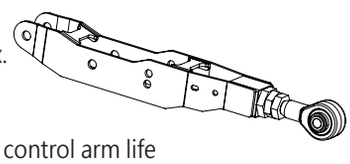
NISSAN SKYLINE
R33/34 GTR
#7888

LEXUS GS 4th
GS350 GRL10
#7624

CAMBER KIT

HARDRACE camber kit reduces tire wear and increase tire durable.
Made with superior quality bushing, provide advanced stability, especially during high speed driving and cornering.

- Provides stability
- Assists to reduce chassis twist and flex.
- Increases steering response
- OE direct replacement
- ED process and painting for extended control arm life



TOYOTA 86/FR-S/BRZ
ZN6/ZC6
#7499

SUBARU IMPREZA
WRX/STI
#7401

MERCEDES-BENZ
A-Class W176
#7839

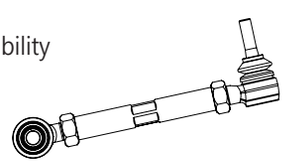
FORD EUROPE
MONDEO MK5
#8517

BMW X5
E53
#7307

TOE ARM

Toe arms allow for fine-tuned adjustments to the rear toe in/out setting of the vehicle. It helps to raise straight line stability and road control.
Toe arm made with high-strength steel alloys to offer high durability, strength and yet remain light-weight.

- ED process and painting for the highest durability
- Provides stability, increase steering response
- Direct bolt on designed
- OE direct replacement



TOYOTA 86/FR-S/BRZ
ZN6/ZC6
#6753

HYUNDAI SONATA
7th LF
#6753

FORD EUROPE
FOCUS MK3
#6410-S

HONDA CIVIC
4th EF
#7407

FORD USA MUSTANG
MK6 S550
#8503

BUSHING

Suspension bushings are some of the most highly stressed components of a vehicle. They provide movement and work as the joints between the frame and arms, struts and shock absorbers. Therefore, suspension bushings are able to affect the driving stability, ride quality, grip of traction, efficiency of the brakes and lifetime of tires. Once these bushings are worn, the vehicle will undergo an unpredictable and unsafe situation.

HARDRACE SUSPENSION BUSHING

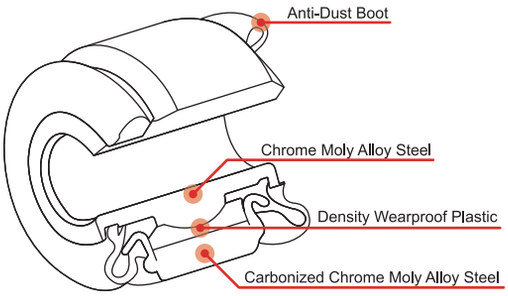
Pillow Ball Series

- 10 years experiences on racing track
- Handling control and responsive steering is superior than harden rubber bush
- Excellent driver feedback
- Precise control and solid suspension feel
- Inner bushing is made accurately with both high molecule plastic tube and specific metal alloy
- Soundless, high durability and reliability
- Outer bushing is combined with anti-dust boot, 100% resistant from dust, water and oil, extend the life of the bushing

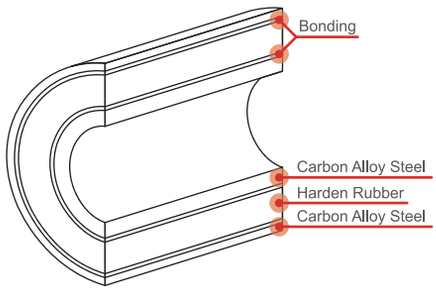
Hyper Rubber Series

- Over 40 years experiences on rubber manufacturing
- HARDRACE exclusive rubber achieves a balance of hardness and flexibility
- Pre-Compressed procedure allows the bushings work under compressed pattern and enhances the durability of bushings.
- High strength and anti-crack material extends the lifetime of rubber bushings significantly.
- Viscosity between rubber and metal is about 2000kgs.

STRUCTURE

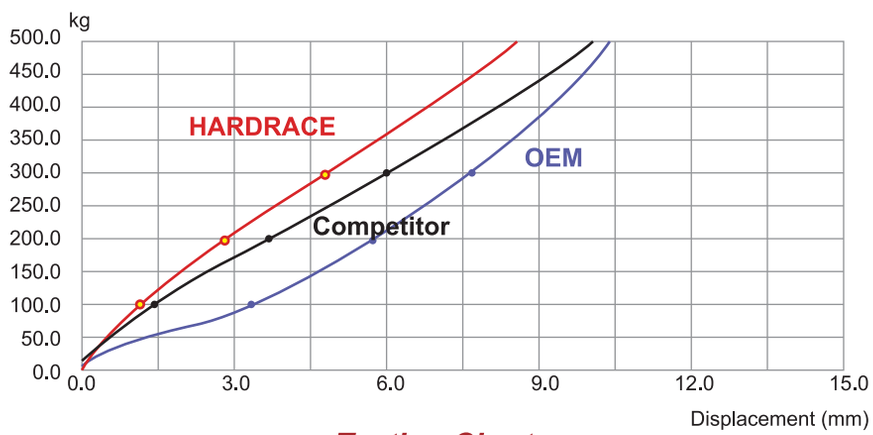


Pillow Ball Bushing



Hyper Rubber Bushing

WHY HARDRACE BUSHING



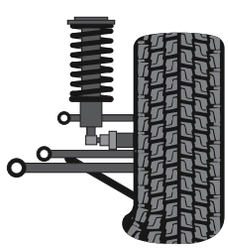
Testing Chart

No.	Brand	Test Date	50kg	100kg	200kg	300kg	K Value
			mm	mm	mm	mm	kgf/mm
1	HARDRACE	2014/12/17	0.44	1.18	2.90	4.82	67.05
2	Competitor	2014/12/17	0.49	1.46	3.67	6.02	52.22
3	OEM	2014/12/17	1.36	3.32	5.69	7.61	24.25
	Average		0.76	1.99	4.09	6.15	47.84

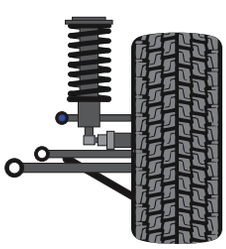
BENEFITS

- Get back the "Sensation of a New Car"
- Optimize grip of traction and braking performance
- Minimize change in suspension geometry under cornering, braking and heavy loading
- Prolong suspension and tire life
- Enhance safety on the road

The Problem



The Cure



SUBARU IMPREZA 5th
WRX/STI VA 2014-
FRONT LOWER ARM BUSH
#7889

HONDA CIVIC
7th ES, EP3
REAR KNUCKLE BUSH
#6597F

TOYOTA CAMRY
XV20 1996 - 2001
FRONT LOWER ARM BUSH
#7844

NISSAN FAIRLADY Z
6th Z34
FRONT LOWER ARM BUSH
#7966

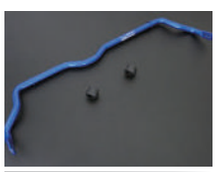
AUDI A4
B8 08-14
FRONT UPPER ARM BUSH
#7844

SWAY BAR

SWAY BAR

Hardrace sway bars are designed to keep balance of a vehicle, improve handling, maintain traction in any performance-driving situation and upgrade your suspension system. Hardrace manufacture the sway bar with the highest technology and CNC machines. We work diligently to ensure the design, material, and the production procedure to make stiffer, resilient, and durable Sway Bar more than stock bars. To cooperate with Hardrace stabilizer bushings and stabilizer links gives you more joy of control.

SUBARU IMPREZA
WRX/STI VA
#7027



MERCEDES-BENZ
A-Class W176
#7812

LEXUS ES
6th XV60
#7971

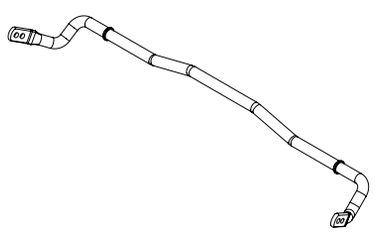
TOYOTA ALTIS/COROLLA
E140/E150
#7980

AUDI A3
2nd 8P
#7987

LEXUS GS
GRL10
#7988

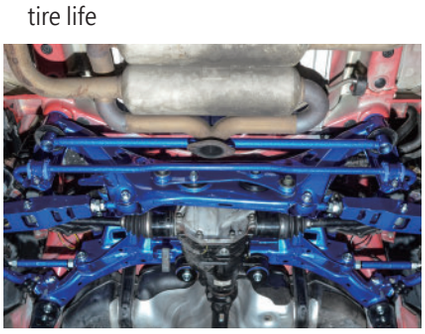
HARDRACE SWAY BAR

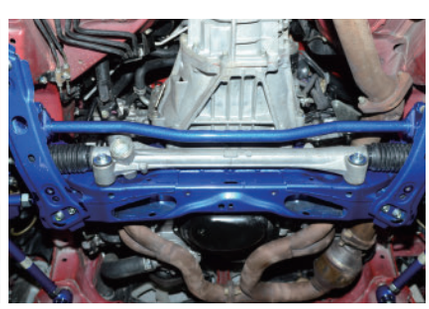
- Front Wheel Drive: Increase the rear sway bar size to neutralise understeer.
- Rear Wheel Drive: Increase the front sway bar size to neutralise oversteer.
- All Wheel Drive: Increase rear then front bar size to fine tune handling behaviour.
- 4 Wheel Drive: Increase front then rear bar size to neutralise understeer.



WHY HARDRACE SWAY BAR

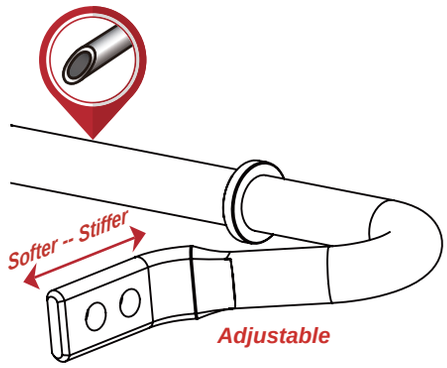
- Manufactured from Hi-Tensile CR-MO Seamless Steel Alloy
- Manufacture the Sway Bar with Centering Rings which prevent Sway Bar movement during cornering
- Precision CNC Cold- Formed, Tempered and Shot-Peened to increase durability
- Hardrace Lightweight hollow tube decrease the feedback response time
- With blue powder coat to prevent rust and corrosion
- Keep your tire maximum contact with the road; the weight and pressure are distributed evenly to four wheels giving longer tire life

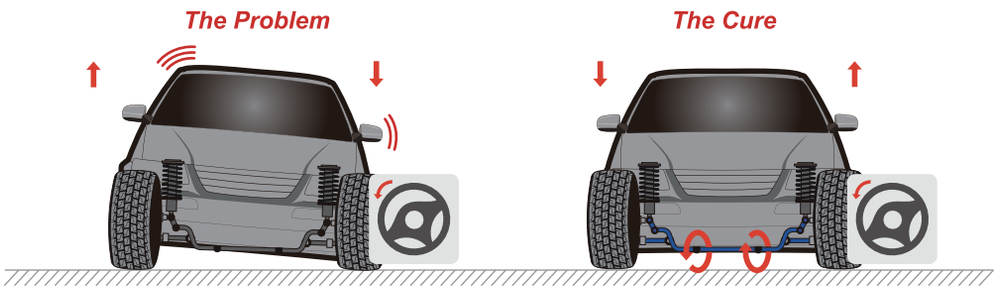


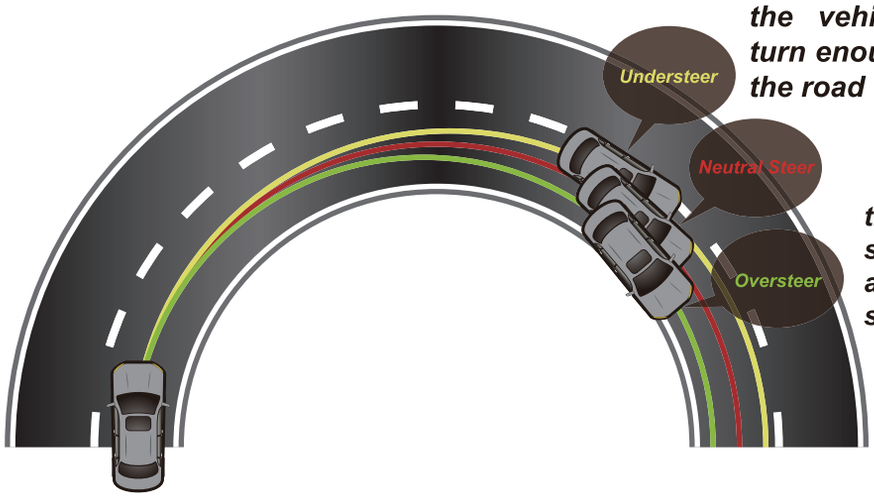


BENEFITS

- Correcting understeer or oversteer situation and perfectly balanced
- Reducing body roll and increasing stability while driving in curves
- Thicker Sway Bar increase the torsional resistance
- Adjustable Sway Bar gives you the ability to fine-tune handing to suit your driving style and achieve the impressive results





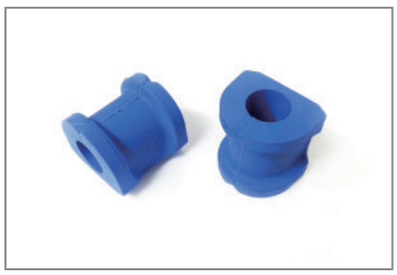


the vehicle does not turn enough and leaves the road

the vehicle turns more sharply than intended and could get into a spin

STABILIZER BUSHING

Hardrace stabilizer bushings increase the hardness over stock one; the benefit is to fasten the feedback time. Hardrace features that our stabilizer bushings can release grease itself. That's also the reason why Hardrace stabilizer link have longer life. It doesn't trouble you to add grease while hearing the uncomfortable noise.



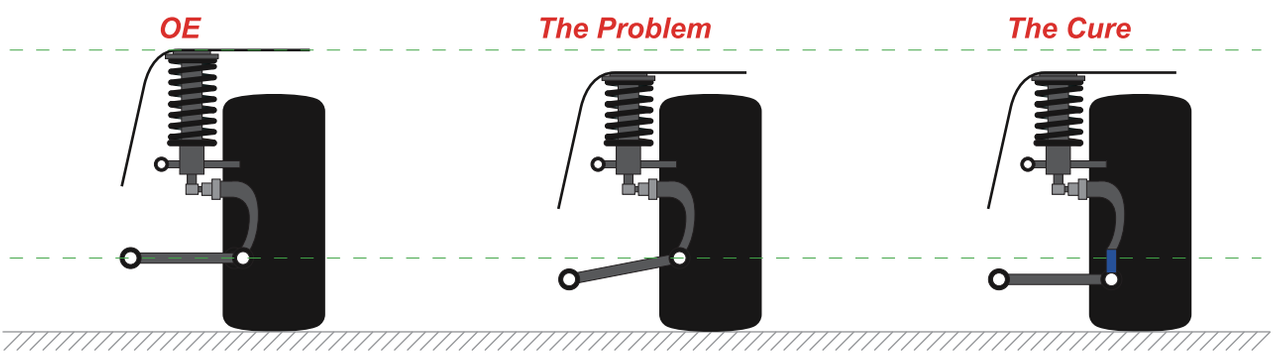
ROLL CENTER ADJUSTER

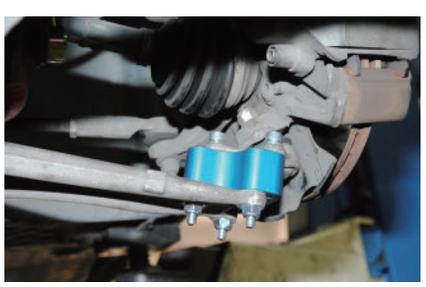
The roll center of a vehicle is a virtual pivot point at which the cornering forces in the suspension are reacted to the vehicle body. The position of roll center affects the handling significantly and what factors must be considered when tuning the suspension.

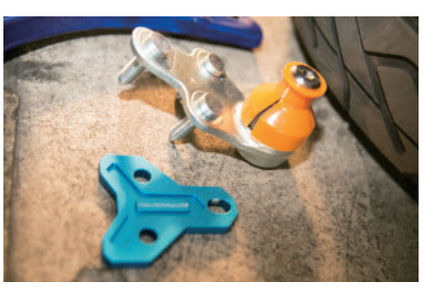
RC BALL JOINT

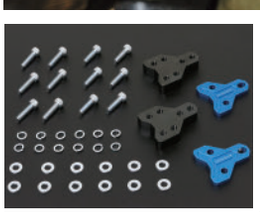
As soon as the height of a vehicle is dropped, the balance of suspension geometry is collapsed. The deviation of roll center will increase the amount of roll, even though the center of mass is dropped. The change of suspension geometry will lead to deterioration of mechanical grip, and also increase the burden on suspension components.

By installing HARCRACE Roll Center Adjuster, the lengthened ball stud is able to correct the geometry of suspension, putting the control arms back closer to inherent position, resulting in optimized steering response and stability of handling. Additionally, the durability of suspension components will be increased due to corrected suspension geometry. Thus, the HARDRACE Roll Center Adjuster is a must-have upgrade for any serious driver.

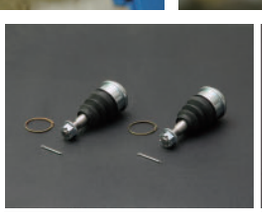




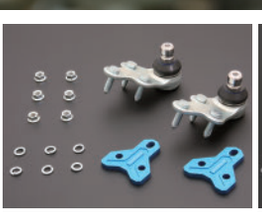




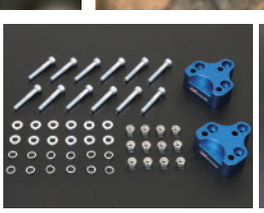
VOLVO
V40 2013
#7493



TOYOTA 86/FR-S
ZN6/ZC6
#7493



FORD EUROPE
FOCUS MK3
#7652

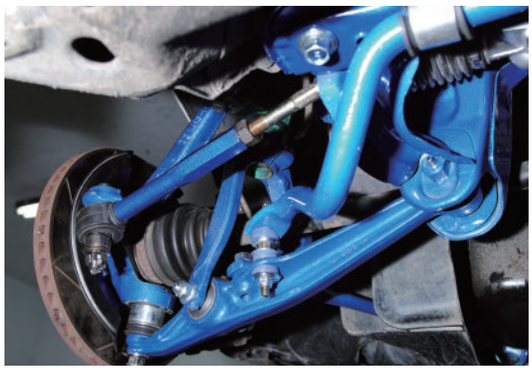


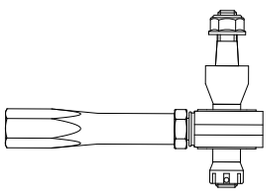
VOLKSWAGEN
GOLF MK6
#7936

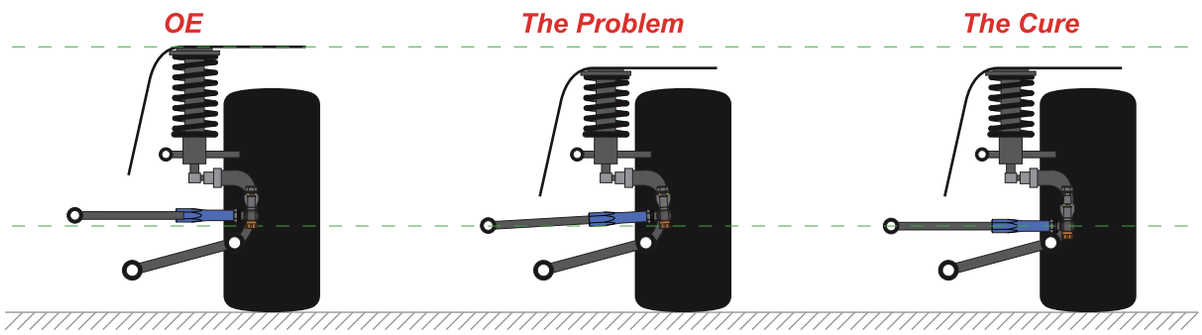
LEXUS GS
2nd JZS160
#7859

RC TIE ROD END

The angle of the tie rod is changed as soon as the vehicle is lowered down; it would induce toe change during cornering (the bump steer). HARDRACE Tie Rod Ends, by lengthening the length of the ball joint, correct the tie rods angle for lowered vehicle and provide an appropriate geometry to restore the original steering characteristic.
Moreover, HARDRACE Tie Rod Ends are designed with high quality alloy steel,resulting a better stiffness and durability.



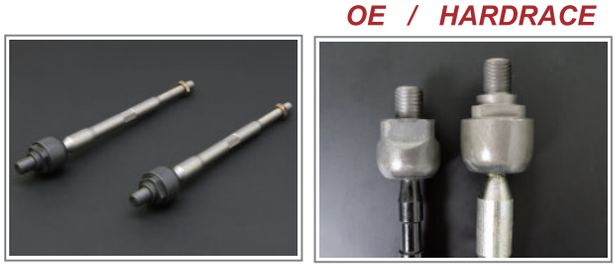




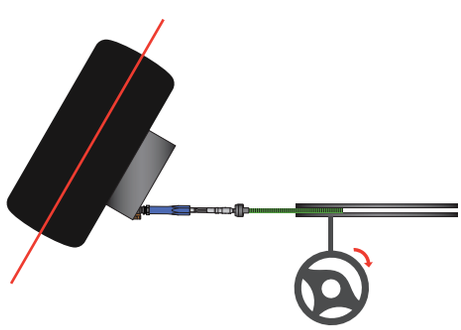
HARD TIE ROD

- Manufactured from high-tensile, forged steel
- Suitable for track and road use
- No change for TOE angle
- 5mm built-in rack spacer to increase steering lock
- As used on our championship winning drift cars

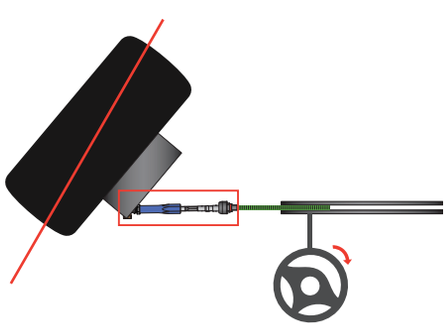
OE / HARDRACE



***OE** Maximum Rotation 3 Turns*

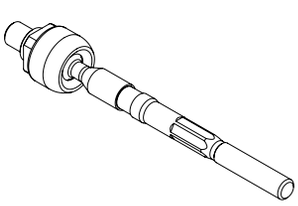


***HARDRACE** Maximum Rotation 3.25 Turns*



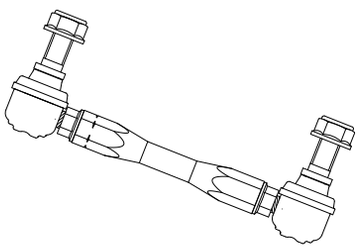
BENEFITS

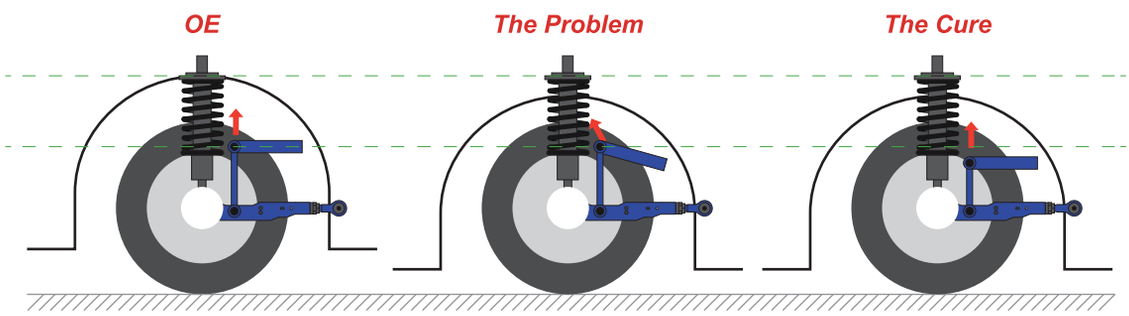
- Correct suspension geometry
- Minimize change in suspension geometry
- Optimize steering accuracy
- Prolong suspension life
- Enhance safety on the road



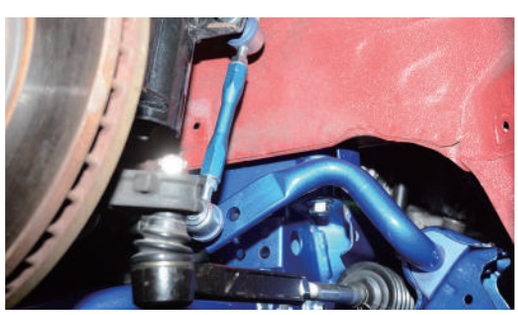
STABILIZER LINK

Stabilizer link is connecting the sway bar and the suspension arm (or damper). When the height of a vehicle is lowered, the angle of the lower arm changed. Hardrace adjustable stabilizer link allows you to adjust the link length and let the sway bar function effectively.
Hardrace stabilizer link made from tight ball joints and with rubber boots to extend its life.

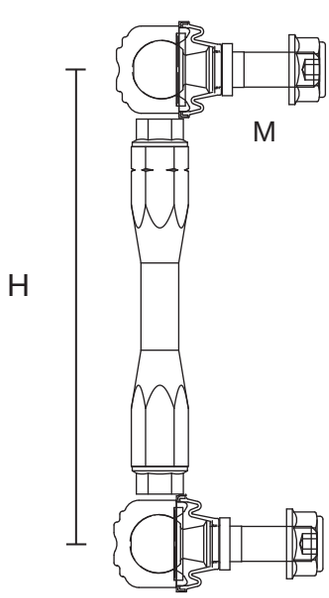




VOLKSWAGEN GOLF
MK6 TYP 5K
#7512-340



TOYOTA 86/BRZ/FR-S
ZN6/ZC6
#7512-220



12MM SERIES

NO.	Ball Studs(M)	Range(H)
7512-110	12mm	104mm~130mm
7512-140	12mm	123mm~162mm
7512-180	12mm	163mm~202mm
7512-220	12mm	203mm~242mm
7512-260	12mm	243mm~282mm
7512-300	12mm	283mm~322mm
7512-340	12mm	323mm~362mm

10MM SERIES

NO.	Ball Studs(M)	Range(H)
6853-080	10mm	80mm~89mm
6853-090	10mm	90mm~99mm
6853-100	10mm	100mm~110mm
7656-140	10mm	120mm~159mm
7656-180	10mm	160mm~199mm
7656-220	10mm	200mm~239mm
7656-260	10mm	240mm~279mm
7656-300	10mm	280mm~319mm
7656-340	10mm	320mm~359mm

ENGINE MOUNT

The purpose of the engine mount is to support the engine on the chassis and dampen vibration and noise from reverberating to the rest of the vehicle. HARDRACE engine mounts reduce drivetrain movement under hard acceleration, deceleration and cornering. Allowing the most efficient transmission of all available power to the ground. HARDRACE engine mounts dramatically reduce motor movement for much more precise operation of your shifts and much more direct application of power to the ground.

TOYOTA 86/FR-S
#7440

SUBARU BRZ/86
#7441

MAZDA 6 GG/GY
#7440

TOYOTA CROWN GRS18
#8506

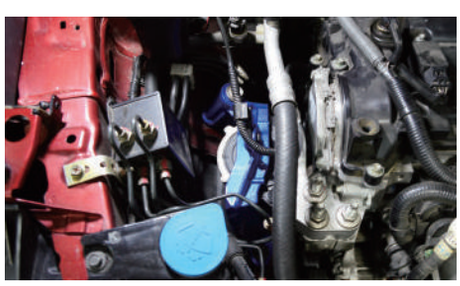
SUZUKI SWIFT ZC32
#7440

SUBARU IMPREZA EJ
#6959

Hardness

70° Racing

50° Street

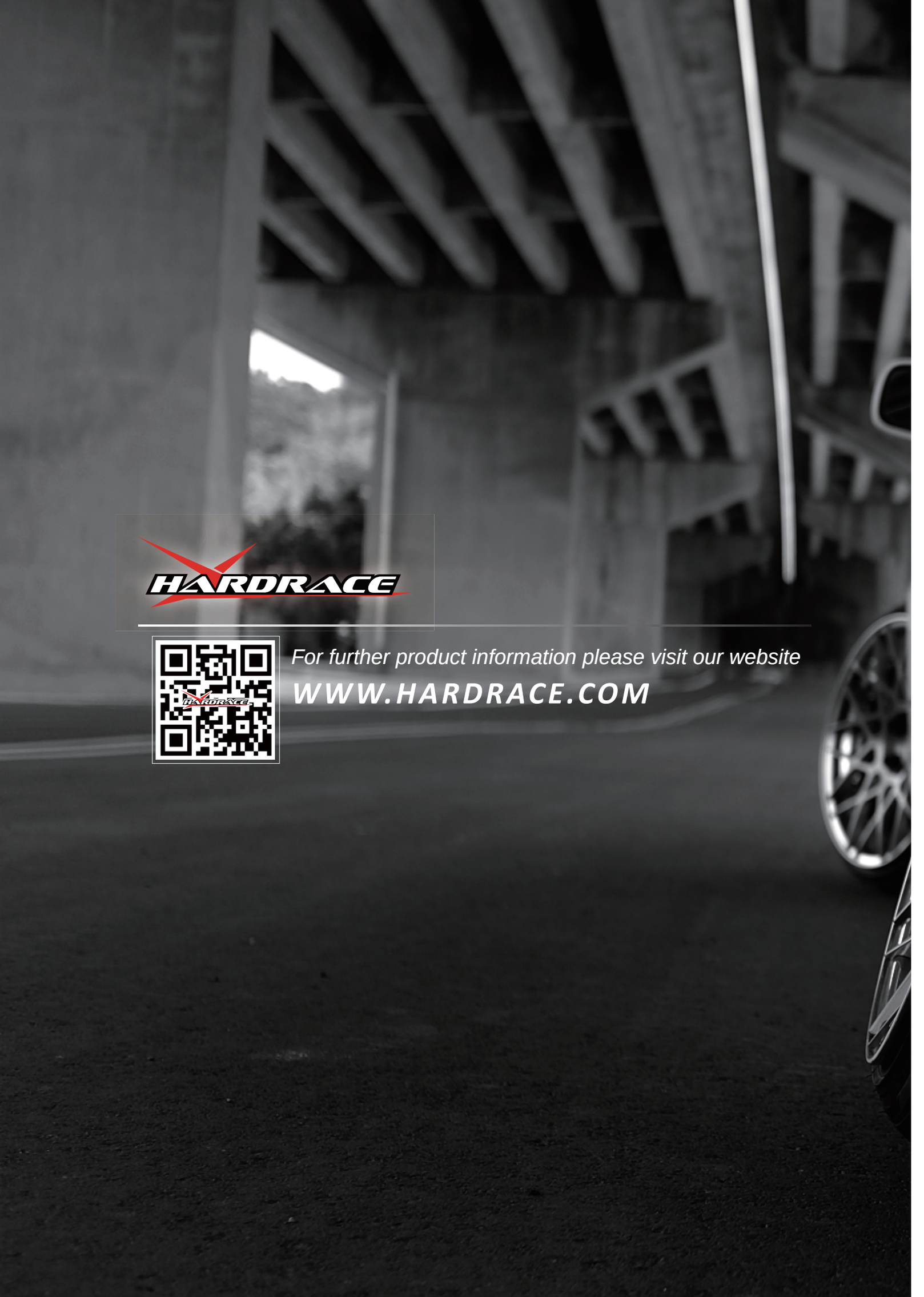


HARDRACE Reinforced Engine Mounts are made with hard rubber.
You can immediately experience the power feedback with solid response and expects a few vibrations in a dash at idle. They give the maximum level of control over engine movement under the most extreme driving conditions.

Our street series engine mount is a good upgrade from OE engine mounts. Even through, it looks like OE mount, we have changed the structure of the rubber in order to increase the durability.

BENEFITS

- All rubber material is manufactured to specific Durometer measurements based on the vehicle' s application requirements.
- A special bonding agent is used to ensure a superior rubber-to-metal bond
- CAD-CAM designed
- Increase output under engine acceleration



For further product information please visit our website

WWW.HARDRACE.COM

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