

WHY TRW? OE TO AFTERMARKET





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ENERGY. EXCELLENCE. EMPATHY.

A semi-truck is driving on a snowy road that curves through a dense forest of tall, thin trees. The road is covered in snow with visible tire tracks. The truck is white with a long trailer and is moving away from the viewer. The overall scene is in a cool, blue-toned color palette.

ENERGY

Because we're innovative, driven and focused on people, we are inventive and proactive within our markets.

EXCELLENCE

Because we put the same dedication into our customer relationships as we do into the design and manufacture of our products.

EMPATHY

Because we are in the same industry as our customers, we're in the right position to understand their individual needs.

WE ARE THE LEADING PROVIDER OF OE QUALITY PARTS TO THE AFTERMARKET. AS A WHOLE CHASSIS PROVIDER, ALL TRW PARTS ARE DESIGNED AND MANUFACTURED TO WORK IN PERFECT HARMONY.

TRW – TRUE ORIGINALS.

WE'RE TRUE ORIGINALS

Our story focuses on the True Originals who work at TRW and tells the world why our people make our parts the best in the market. True Originals shows TRW as a brand with a human face. And because TRW people are imaginative, dedicated and highly professional, it shows that we are premium suppliers too.



**WE'RE THE WORLD'S PREMIUM BRAKE PROVIDER.
AND WE'RE TRUE ORIGINALS.**

UNDERSTANDING YOU

TRW recognizes that the automotive sector cannot be viewed as a single market. We realize that there are many specialist entities within it. That's why we have segmented and branded your offering to meet these different requirements, whilst still delivering the OE specifications and quality the TRW brand is renowned for.

PASSENGER CAR – Automotive, aftermarket and passenger car offering

CV – TRW's heavy commercial offering

MOTO – TRW's motorcycle offering



PASSENGER CAR



CV



MOTO

THE TRW CORNER MODULE



BRAKING

98%

market coverage.
Over 16,688 references.



LINKAGE AND SUSPENSION

90%

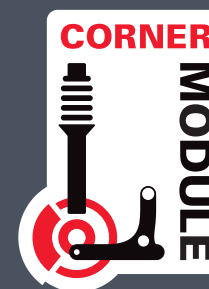
market coverage.
Over 4,100 references.



SHOCK ABSORBERS

90%

market coverage.
Over 3,032 references.





BRAKING





TRUE
ORIGINALS

BRAKING

DISC BRAKE SYSTEMS



BRAKE PADS

- 98% European car parc coverage
- COTEC brake pads – unique friction material which improves braking during bedding-in
- DTEC – an advanced ceramic formulation delivering reduced noise occurrence and 45% less dust
- Pad Fitting Kits (PFK) – avoid disproportionate wear by using a PFK when changing pads. Available with over 540 references
- Copper-free brake pads for passenger cars

FACTS

- Number 1 unparalleled market coverage
- In Europe 1 in 4 brake pads in the aftermarket come from a TRW factory



BRAKE DISCS

- 98% European car parc coverage
- TRW manufactures over 12 million brake discs per annum
- First to market with the black painted discs concept providing increased corrosion resistance
- Large range of carbon discs available, offering improved damping behaviour, greater stability, improved the thermal behaviour and overall better performance



BRAKE CALIPERS

- 85% European car parc coverage
- Creators of the Colette brake caliper. The world's most popular caliper
- Manufacturers of the world's first electronic park brake caliper (EPB)
- Market leaders in caliper remanufacturing
- Rear calipers are pre-filled with brake fluid
- 3-year guarantee
- Market leading core management program

KEY MILESTONES

1975 – Pioneers of the Colette front caliper

2002 – Developed and launched world's first EPB caliper

2015 – Close to 1 in 3 cars were fitted with a TRW EPB caliper

BRAKING

DRUM BRAKE ACTUATION SYSTEMS



SUPERKITS

- Pre-assembled and can save repair time by up to 50%
- Unrivalled car parc coverage
- Includes adjusters, brake shoes, wheel cylinders, special grease and spring and clips

BRAKE KITS

- Designed to aid the easier fitting of all TRW brakes, saving our customers time and money
- All necessary parts are supplied as standard where applicable
- Tested to the extreme in the lab, on the road and on the track

BRAKE SHOES

- Best in market for range coverage
- Extensive range of shoe fitting kits
- ECE R90 compliant
- Asbestos and heavy metal free

BRAKE DRUMS

- Number 1 in TecDoc application coverage
- Integrated bearing drums – easier fitting for workshops with over 62 references
- Bi-metallic drums – combination of steel and cast iron

FACTS

- Fitting guides available on Tech Corner
- OE fitment of drum brakes will remain above 40% for the next 5 years
- Superkits can save repair time by up to 50%
- Number 2 in TecDoc for market application

BRAKING

FLUIDS AND CLEANERS



BRAKE FLUIDS

- World's first and only supplier of TRW Ultra DOT 5.1 ESP
- Consistent performance in extreme conditions
- Very low viscosity for best flow properties
- Not recycled (free from reclaims)

BRAKE CLEANER

- Specially formulated – CFC free, trichloroethane free and safe on rubber components
- Offers quicker, safer and easier brake repairs or servicing

BRAKE FLUID BLEEDERS

- 2 electric brake bleeding units to meet differing market requirements
- 20 liter wheeled system and a 5 liter portable system
- Eliminate the need for compressed air and includes automatic stop when unit is full
- Enables easy, clean and safe draining and filling of brake fluid

FACTS

- The DOT Number of a brake fluid represents the boiling point
- The lower the viscosity the quicker the brake system reacts
- TRW Ultra DOT 5 ESP fluid exceeds more international specifications than any other

KEY MILESTONE

2014 – TRW launched the world's first DOT 5.1 ESP brake fluid

BRAKING CYLINDERS AND HOSES



CLUTCH CYLINDERS

- Available in both lightweight aluminum and steel cast iron
- Also available in a chrome 6 free 'silver' finish
- 100% end-of-line tested

MASTER CYLINDERS

- Number 1 in car parc coverage
- Manufactured to TRW's OE specification
- 100,000 km guarantee
- Over 889 part numbers available
- Newer applications are manufactured from a lightweight aluminum, thus reducing the weight added to a vehicle

WHEEL CYLINDERS

- Quality and performance assured with 3-year guarantee
- Best durability
- Number 2 in TecDoc applications

BRAKE HOSES

- Extensive market coverage
- Over 1,400 references available
- Car part most sensitive to water permeation
- 100% zinc coated ends to protect against corrosion

FACTS

- Number 1 unparalleled market coverage
- TRW Hoses achieved first place against our competitors in the AMECA Volumetric Expansion Test
- Brake hoses are the part most sensitive to water permeation

BRAKING

CABLES, SERVOS, SENSORS AND VALVES



HANDBRAKE AND CLUTCH CABLES

- Extensive European market coverage
- Over 900 handbrake cable references available
- Over 100 clutch cable references available
- Tailor-made for the needs of each braking system



BRAKE BOOSTERS

- Unique Girvac brake servo
- Enables efficient absorption of pressure from the servo leading to enhanced performance
- Large portfolio of both single and tandem brake servos available



ABS SENSORS

- Over 370 part numbers available
- Range includes both active and passive ABS sensors
- Functional stability and reliability in a temperature range of -40°C to $+150^{\circ}\text{C}$

FACTS

- If the magnet or chip inside the ABS sensor is displaced by just one degree, it could lose up to 30% signal strength
- 98% of the European car parc does not check or change handbrake cables on an annual basis

KEY MILESTONES

- 1968** – TRW developed the first Electronically Controlled Anti-Lock Braking System
- 1994** – TRW developed a 4-wheel ABS system for GM





**LINKAGE AND
SUSPENSION**



**SHOCK
ABSORBERS**



TRUE

ORIGINALS

LINKAGE AND SUSPENSION + SHOCK ABSORBERS

RACKS, PUMPS AND LINKAGES



STEERING RACKS, PUMPS & COLUMN DRIVES

- Over 1,200 parts in the range
- Portfolio includes; manual, hydraulic and electrical steering gears, hydraulic and electrically powered hydraulic steering pumps, electrical column drives
- OE quality products, remanufactured according to OE standards
- 100% end-of-line tested
- Equal performance and warranty as a new part
- Over 25 years of experience in supplying major vehicle manufacturers and the global aftermarket



STEERING LINKAGES

- Portfolio includes over 1,400 references
- Range includes: bellows, tie rods, axial rods, tie rod ends, idler arms, pitman arms, complete tie rod assembly, centre tie rod assembly
- Continuous R&D has developed such innovations as two seat design, specialized dust covers, polished ball pins, special surface protection and uniquely developed grease

KEY MILESTONES

1998 – TRW invented the first Electric Powered Hydraulic Steering system (EPHS)

2014 – TRW lobbied for shock absorbers to receive safety critical status and testing in the MOT

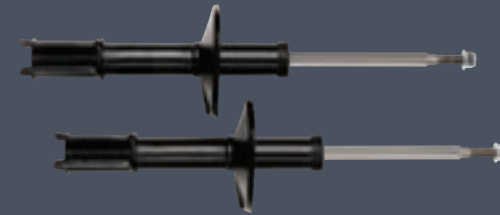
LINKAGE AND SUSPENSION + SHOCK ABSORBERS

SUSPENSION LINKS AND SHOCK ABSORBERS



CONTROL ARMS, BALL JOINTS, BUSHES & STABILIZER LINKS

- Leader in design, development, manufacturing and integration of suspension systems
- Portfolio of more than 2,200 references including parts for front and rear axle
- Latest state of the art materials used such as re-enforced plastics, thixocast castings and composite materials



SHOCK ABSORBERS

- 90% European car parc coverage
- Over 1,392 references available
- Market-leading innovation through our +3 technology – including the MPP (Mirror Polish Process), Valve disc technology and the PTFE over molded piston ring
- All types of shock absorbers available
- Full range of coil springs, protection kits and strut mounts also available



CV RANGE

CV PARTS FROM AN OE SUPPLIER

TRW has been in the commercial vehicle business since 1906. Since then, the brand has become a world leader in the design, development and manufacture of original equipment parts to all major commercial vehicle manufacturers.

TRW is the global aftermarket supplier of CV products to the independent aftermarket (IAM) supplying a range of parts for trucks, trailers and buses – from brake pads to steering gears and shock absorbers to steering and suspension.



TRUE
ORIGINALS

CV FROM OE SUPPLIER PRODUCT RANGE



SHOCK ABSORBERS

- Every TRW CV shock absorber comes complete with fitting instructions and accessories where necessary
- Valve all discs Technology – innovative metal discs within the piston valve and strong retainers improve the performance, safety and comfort
- Mirror Polish Process – ensures a 20% smoother piston rod surface for reduced friction and longer life time



XCAP BALL JOINTS

- Manufactured using advanced technologies which includes a metal spring bearing and hardened bearing seat
- The unique design offers a stronger, more durable ball joint with guaranteed performance
- Enhanced dust cover design for improved corrosion protection



STEERING BOXES

- The program offers more than 60 part numbers
- Remanufacturing of various non-TRW system Manufacturers products
- Tested using TRW's own OE components, we guarantee superior performance, reliability and safety
- Parts that meet OE standards and have been subject to the most rigorous testing, to ensure safety and efficiency in all conditions



BRAKE DISCS

- TRW Brake discs are manufactured from premium grade materials to meet highest quality and engineering standard
- Mechanical and microstructure specifications are similar to OE components
- ECE R90-homologated program to fulfill latest legal requirements
- State-of-the-art casting and machining facilities



BRAKE PADS

- One of the most advanced friction materials in the Aftermarket for better efficiency
- Outperforms Original Equipment Service (OES) parts in independent tests
- All required accessories included in the box for faster fittings
- Advanced backing plate increases the shearing resistance by +30%
- TRW carries out additional tests for increased safety, such as:
 - High performance tests to assess bedding-in and fading
 - Alpine simulation tests (12 minutes constantly braking on a slope of up to 20%)
 - Dynamometer test – in conjunction with ECE R90 homologation



BRAKE CALIPERS

- TRW has decades of experience in manufacturing and remanufacturing brake calipers to exacting OE-standards
- All components are carefully inspected and replaced as new as required
- Potentiometers are being always replaced by new parts
- Excellent performance – ensured by 100% end of line testing
- Each CV caliper comes with all the necessary accessories and fitting instructions



TRW MOTO

TRW has been in the motorcycle vehicle business since 1980. Since then, the company has become one of the leading aftermarket brands for motorcycles with parts and accessories available for over 3,000 models from 1970 onwards and all manufactured to TRWs stringent quality specifications.



TRUE
ORIGINALS

TRW MOTO PRODUCT RANGE



BRAKEPADS

- 14 mixtures
- 8 with homologation (ABE)
- More than 6.600 bike applications
- More than 700 article numbers
- For Road, Custom, Scooter, Racing, Offroad and other categories
- Best test results
- 40 years of experience

BRAKE DISCS

- 18 Types
- 3 with homologation (ABE)
- More than 2.500 bike applications
- More than 600 article numbers
- For Road, Custom, Scooter, Racing, Offroad and other categories

REAR SETS

- High grad for ambitious sport riders
- Individual adjustment of the sitting position
- Made in Germany
- High precision CNC milled
- Elegant, black anodized surface
- Super light weight
- Foldable rests

REGISTRATION PLATE HOLDERS

- High quality Aluminum
- Black coating
- Sportive, elegant design
- Easy to mount at the original points



CHAIN GUARDS

- Attractive design
- High quality aluminum
- Metallic powder coating
- Corrosion resistant surface
- Easy to clean
- Fits most models without top mounted stabilizer

ALUMINIUM HANDLEBARS 22 AND 28.6 MM

- High quality Aluminum
- Anodized surface
- In many colors available
- Superbike
- Speedfighter
- Offroad (different heights)
- Homologation (ABE) for many bikes

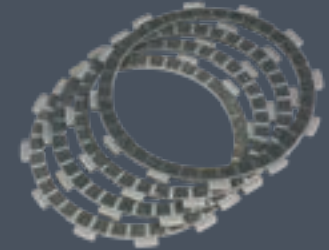
STEEL HANDLEBARS 22 AND 25.4 MM (1")

- High quality Steel
- 3 part coating prevents corrosion
- Homologation (ABE) for many bikes
- Superbike
- Touring
- Custom
- Some with cable holes or indents

RACING CLIP ONS 22 AND 25.4 MM (1")

- High quality Aluminum
- Extremely lightweight
- Anodized black
- Different lengths and heights
- Homologation (ABE) for many bikes

TRW MOTO PRODUCT RANGE



BAR ENDS

- Aluminum or Teflon
- Different designs
- Different colors
- Fit to the TRW bars and others

VARIOFLEX LINES WITH TÜV

- Significantly improve the pressure point
- Can be assembled by the customer
- Either transparent or black cover
- Connectors in many colors available

STEEL-BRAIDED HOSES, TÜV APPROVED

- Delivered ready-to-use
- Suitable also for ABS and dual CBS System
- Connectors and covers in other colours available without surcharge

CLUTCH FRICTION PLATES

- Precision friction plates with organic material
- Kits with carbon material
- Material for fast road, Sports riders and racers
- Dry clutches for BMW
- Large market coverage



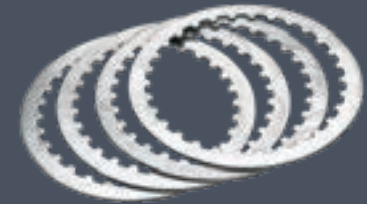
POWER KITS

- Clutch discs and intermediate steel plates complete as a reinforced set
- High wear resistance
- Top performance
- Loss-free transmission of power



CLUTCH SUPER KITS

- All inclusive clutch kit
- Price advantage
- Perfectly matched complete solutions



CLUTCH PLATE KITS

- Stable pressure point
- Low abrasion for a long service life

TRW MOTO

PRODUCT RANGE



CLUTCH DISCS

- Original quality
- Friction material like with the original equipment.



DIAPHRAGM SPRINGS

- High-quality spring steel
- Reliable power transmission



CLUTCH PRESSURE PLATES

- Durable cast part
- Precision cut friction surface



CLUTCH HOUSING

- Carries the starter ring gear
- Dimensions and hardness for the OE equipment



BRAKE AND CLUTCH LEVERS – STREET AND RACING WITH TÜV APPROVAL

- Fine-adjustment wheel
- CNC milled levers made of high quality aluminum
- Ergonomic design, with 50mm and 80mm grip length
- Appealing, clean and lightweight design
- Good modulation and excellent feel
- Defined breaking point on the lever for increased safety



LOWERING- AND JACK UP KITS WITH TÜV APPROVAL

- Lowering Kits
- Allows more secure stand through greater ground contact
- As with the jack-up kits, the lowering kits are also in stainless steel or milled aluminum
- Tie rods for lowering are longer than the original parts

TRW ELECTRIC BLUE



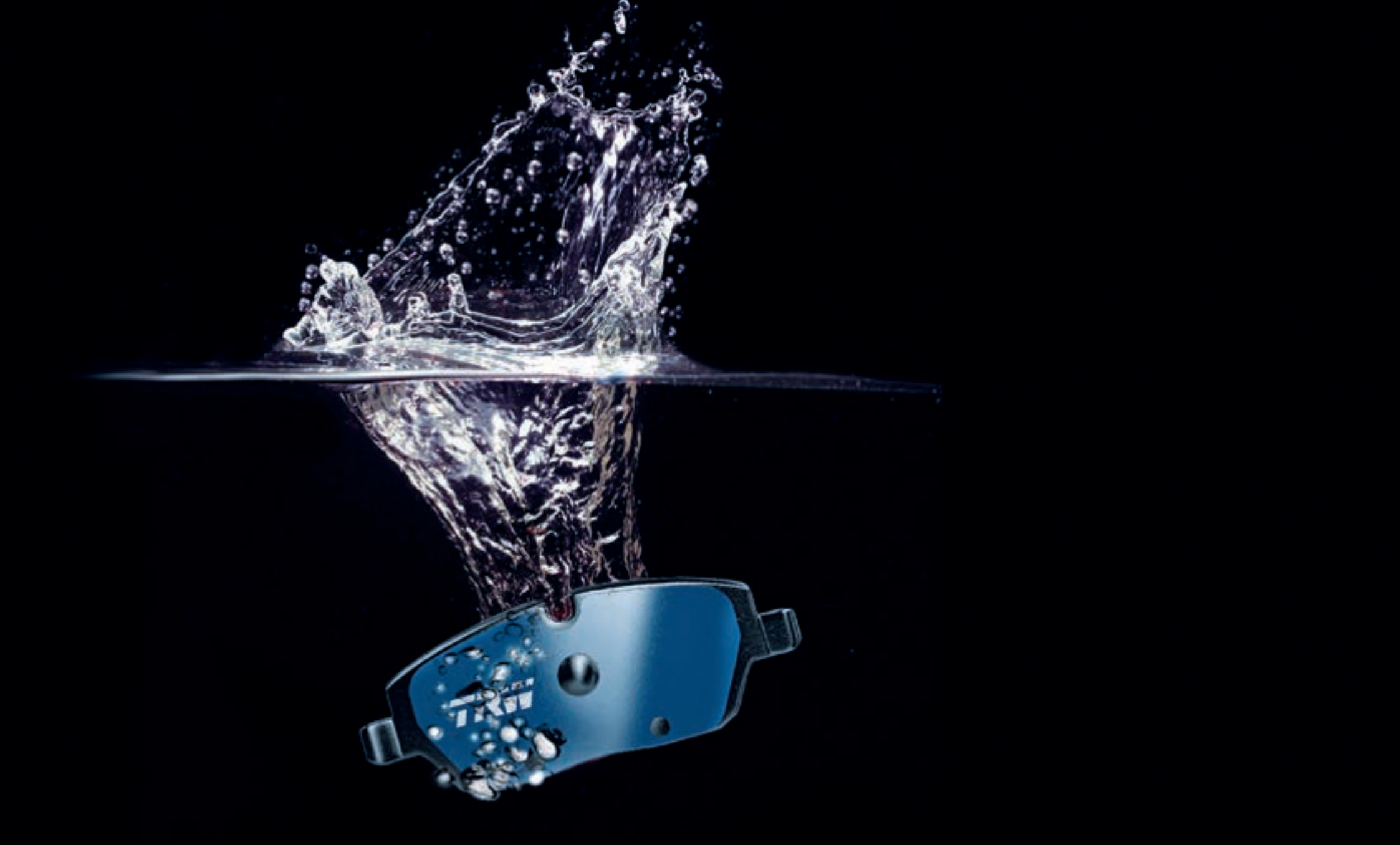
LESS NOISE AND LESS **VIBRATION**

The TRW Electric Blue Brake Pad solves the NVH problem faced by OEMs and reduces noise and vibration in electric and hybrid vehicles. Additionally all Electric Blue Brake Pads are supplied with the necessary rubberized accessories that support the pads noise-damping properties.

WHY WE CREATED THE TRW ELECTRIC BLUE BRAKE PAD

Development of the TRW Electric Blue Brake Pad was driven by increasing demand for electric vehicles in the European market.

- Available in 21 part numbers
- Covers 25 applications
- Available in 30 part numbers (for any hybrid vehicles)
- Can be fitted to 97% of electric vehicles in Europe, as well as 92% of hybrids
- Continuous expansion of the range







TESTED FOR PERFORMANCE

All TRW Aftermarket brake pads are tested to the extreme, both in the lab and on the road.

- NVH test (specification SAE J2521A)
- Noise matrix test
- Vehicle durability run
- Alpine test
- Performance test

FASTER FITTING OF BRAKE PARTS

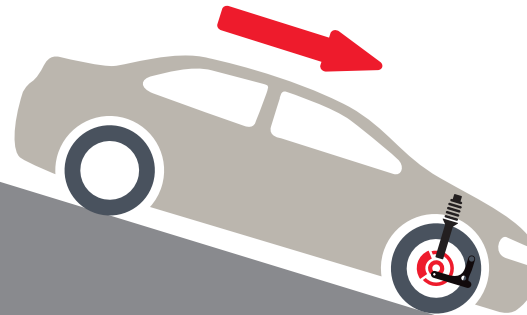
The TRW Electric Blue Brake Pad comes with all the fitting accessories required to achieve a fast fit, and our (50,000km) warranty will give you peace of mind and add value to your business.

OUR TESTING PROCEDURES

TRW Aftermarket parts – tested to the extreme. “Nothing leaves our factory until it has been tested to the extreme both in the laboratory and on the road”.

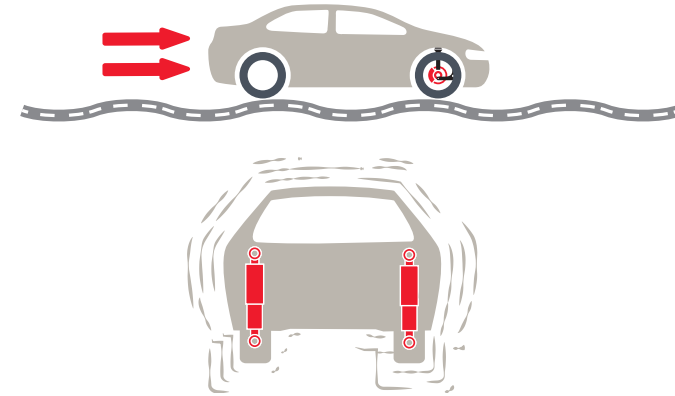
ALPINE TEST

- Takes place on the Grossglockner Mountain in Austria, a test track also used by vehicle manufacturers
- Test is performed to check the stability of the friction material, discs and brake fluid boiling points are exhaustively tested
- Vehicle travels down a section of steep winding roads whilst undertaking a continuous braking test for about 25 miles
- At the end, an emergency stop is performed with full ABS support. This is performed to check that brake performance is maintained at a high level
- The temperature and pressure of the entire brake system is then measured. Temperatures reached as high as 600–700°C
- Road track tests are also run, using equipment that not only tests the individual part but also its performance within the braking system as a whole
- This really pushes the brakes to the limit and TRW will not release a friction material until it consistently passes this test



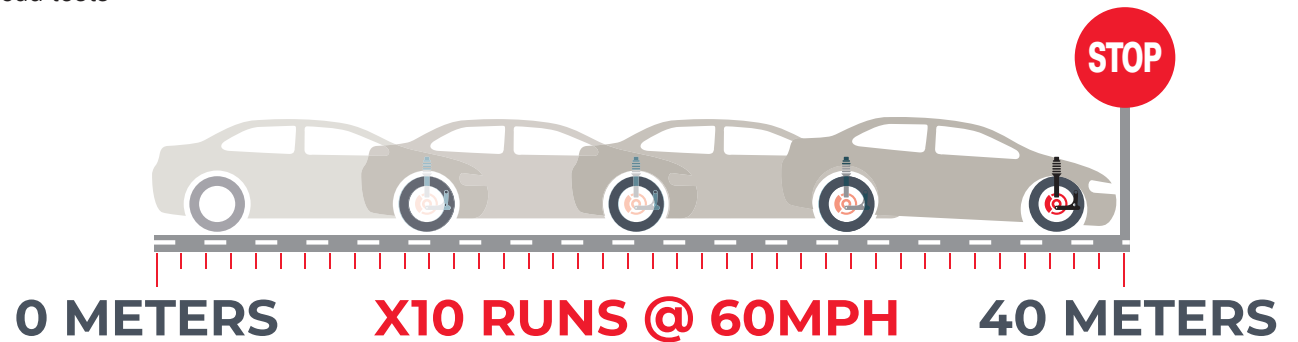
AMS BRAKE FADE TEST

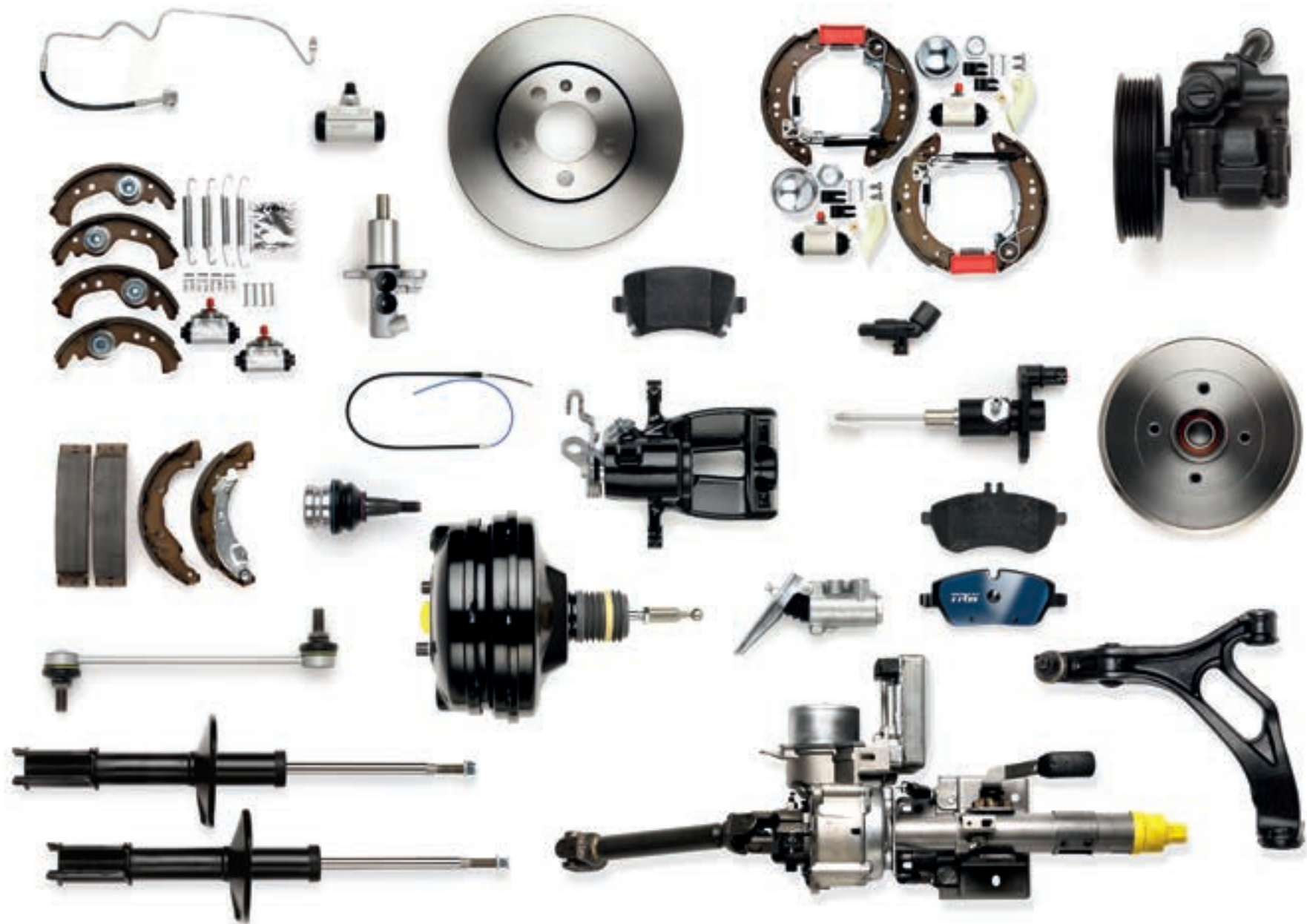
- Internationally recognized test named after the German automotive magazine "Auto Motor Sport"
- Now required by industry legislation (ECE R90 Homologation process)
- 10 brake stops from 60mph to 0mph are performed
- Maximum acceleration up to 60mph
- Maximum de-acceleration down to 0mph
- Procedure repeated for all 10 brake stops



ENDURANCE AND VELOCITY TESTS

- Low and high velocity tests are conducted where damping settings and ride comfort are regulated
- Endurance tests to check the shock absorber for durability and behavior during extensive use
- New parts are tuned to optimum handling performance during road tests







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