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DODGE CHARGER R/T



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SPEED AND STYLE

Gorgeous glowing yellows, fiery reds, brilliant blues... the gallery of vehicles that appeared in *The Fast and the Furious: Tokyo Drift* surprised audiences with their exciting colors and their innovative visual style.

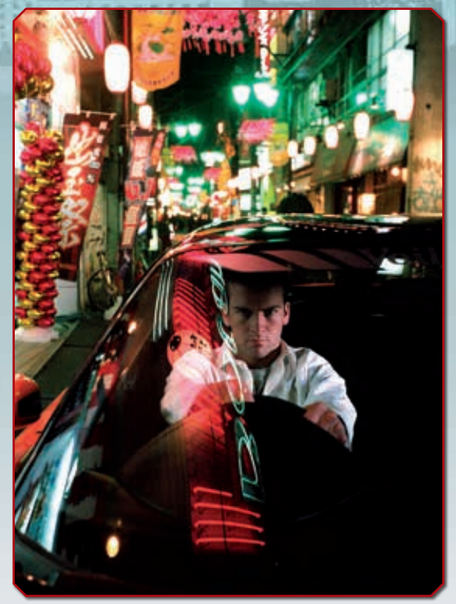
One of the challenges facing the producers of *The Fast and the Furious: Tokyo Drift* was how not to repeat themselves. Fans of the franchise had already enjoyed two movies in which the cars were in the spotlight just as much as the actors. How could the filmmakers surprise fans again? Besides setting the action in a completely different place, the city of Tokyo, and having a new cast, the accent was also placed on the cars. It was time to show something more than the classic American muscle cars.

RED IS THE COLOR

A few weeks before filming began, an open casting for cars was announced in Tokyo. To the surprise of the film's producers, dozens of owners of custom designed latest-generation cars showed up for the casting call. A total of 250 cars were chosen, many of which had to be imported from Japan to the USA, where filming would be completed.

Of all the cars, a few stood out from the rest. First, there was the Mitsubishi Lancer Evolution IX, popularly known as the EVO, which would end up being driven by Sean Boswell, the movie's leading character. Its profile, already spectacular thanks to its compact lines and impressive rear spoiler, was highlighted by painting it red with black flashes down the sides. The incredible impact of this ultrafast car meant that, from then on, red became the color reserved for the most powerful cars in the franchise. The Dodge Charger Daytona in the sixth movie, or the incredible Lykan HyperSport in the seventh, would be painted this color.

Sean Boswell meets with Neela in the parking lot, where car enthusiasts show off their tuned vehicles in a scene from *The Fast and the Furious: Tokyo Drift*.



The neon lights and the illuminated billboards are reflected in the windscreens of the cars. Tokyo is full of lights and colour.

beetle on a black background, was an absolute sensation among car lovers.

THE ART OF VEILSIDE

However, over the years the image that above all has stayed with moviegoers is the car belonging to Han Lue, Sean's mentor in the complex world of drifting. His 1994 Mazda RX-7 is extremely striking, largely because of the spectacular combination of yellows and blacks on its bodywork. The prestigious company, VeilSide, took part in the customisation of this model. Since its beginnings as a seller of engine tuning parts, it has become one of the most popular companies in the world when it comes to improving the aerodynamic and aesthetic appearance of cars.

The extraordinary reaction to this model in the movie caused VeilSide to launch a version of the RX-7 some years later with the bodywork made completely of carbon fibre, considerably reducing the vehicle's total weight.

A CAR FOR NEELA

If in *The Fast and the Furious*, we enjoyed the excellence of Letty as a driver, in *The Fast and the Furious: Tokyo Drift* there was once again a woman behind the wheel: Neela. And with which car could she compete? It was necessary to find a type of car that would serve to strengthen her character as a bold and independent woman.

The other model that was very important in the movie was the 2002 Nissan Fairlady 350Z, the favorite of D.K., Boswell's adversary and his men. In all, 13 vehicles were used for the filming and they all handled the rigorous conditions demanded by the script perfectly. D.K.'s model, with the powerful graphic of a gray



D.K. At the wheel of his powerful car. His character creates a sombre image in the brightly-lit environment created by the film.

STEPHEN F. WINDON

Born in Sydney (Australia) in 1959, Stephen F. Windon is the man responsible for the image of much of the *Fast & Furious* franchise. Active since the late 1980s, he stood out above all for the beautiful work he did in Kevin Reynolds' film *Rapa-Nui* (1994), a movie that opened the doors to Hollywood for him. After giving good examples of his style in films as different as *The Postman* (1998), *Deep Blue Sea* (1999) and *House of Wax* (2005), Justin Lin gave him the chance to join the world of *Fast & Furious*, entrusting him with the photography in *The Fast and the Furious: Tokyo Drift*. Both immensely enjoyed designing precise and complex camera movements, working with professional drivers who offered to mount the cameras on their cars. The experience was so gratifying that they decided to work together again on Fast Five. Since then, and despite the fact that Windon has also filmed other movies, like *G.I. Joe: Retaliation* (2013) or *Star Trek Beyond* (2016), he has become the official director of photography for the *Fast & Furious* franchise.

After an exhaustive search, the team came up with a Mazda RX-8. The color wasn't left to chance either. Was it advisable to return to the shocking pink on Suki's car at the start of *2 Fast 2 Furious*? The team was adamant: no way. Neela's color would be blue.

Despite the predominance of cars made in Asia, *The Fast and the Furious: Tokyo Drift* was intended to appear as a singular encounter between the car cultures of East and West. This is why we also see some American classics in the film, like a 1969 Mustang, a 1971 Chevrolet Monte Carlo, or the striking 2005 Dodge Viper.

WELCOME TO THE DIGITAL CAR

One of the most important novelties in the production of *The Fast and the Furious: Tokyo Drift* was the incorporation of digital effects. *The Fast and the Furious* included a total of 150 computer-generated visual effects. In the second movie, there were twice as many. But in *The Fast and the Furious: Tokyo Drift*, the sum total of digitally enhanced shots rose to 768.

Since it was impossible to obtain permits in many locations in Tokyo, the film-makers decided to recreate some of the city's streets with computer graphics. The advanced digital technology also made it possible to reproduce some vehicles completely, making it easier to create impossible shots, especially those in some of the frantic races seen in the film.

The computer-generated cars copied everything, down to the tiniest detail in the appearance of the original cars. The cars were scanned several times in order to reproduce them in 3D and meticulous attention was paid to all the details in order to achieve, for example, the effect of the brightly lit shop windows and the advertising billboards being reflected in the bodywork as the cars passed.

Another digital effect that was incorporated was the smoke coming from the tires when cars accelerated at the start of the race or skidded on the asphalt.



Twinkie's colourful car gives Sean a way to get closer to the world of racing in Tokyo.



DODGE OMNI

The Dodge Omni was the first front-wheel drive model sold by the brand in the United States. Based on the French Simca Horizon (Simca was owned by the Chrysler Group), it was a model with five-door hatchback bodywork launched to compete with the incipient Japanese competition in the affordable models segment.

A 1984 Dodge Omni, with a chrome radiator grille and numerous details with this finish. With respect to its brother, the Plymouth Horizon, the Dodge Omni was a better-equipped model with a smarter look.

The French Simca Horizon, a five-door compact, was one of the last cars developed by the French brand, owned by Chrysler, before it, along with the rest of Chrysler Europe's assets, was sold to Peugeot. Chrysler, however, reserved the production rights for the United States, where it was launched in 1978 as the Dodge Omni and the Plymouth Horizon.

The Dodge Omni kept the European Simca Horizon bodywork, with a few changes, but it had new front suspension and a Volkswagen 1.7 litre engine retuned by Chrysler. Later, the car was fitted with the 2.2-litre engine of the Dodge Aries which, like the Dodge Omni, was front-wheel drive. On this same platform, the company built an attractive three-door coupe called the Dodge 024, which was rather short-lived, as well as a small pickup sold as the Dodge Rampage. There was also a sports car version of the five-door Dodge Omni developed by Carroll Shelby.

The model, which was launched to compete with the low fuel consumption Japanese compacts, was in production until 1990. In all, Chrysler manufactured almost a million units of the Dodge Omni and its brother the Plymouth Horizon.



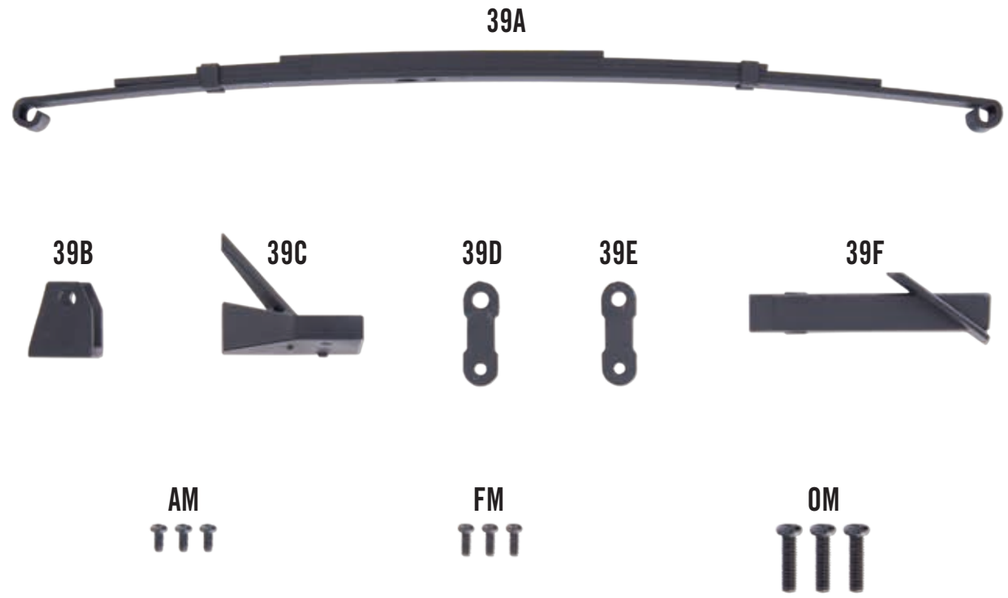
The Dodge 024 sports version was launched a year after the sedan and was also fitted with the 2.2 litre four-cylinder engine of the Dodge Aries. The car in the picture, from 1982, has the Dodge Charger finish with this engine.



RIGHT REAR LEAF SPRING

In this assembly session you will assemble part of the right rear suspension, preparing the leaf spring that will subsequently be attached to the chassis.

PIECES FOR THIS STAGE



39A Right rear leaf spring	39D Leaf spring shackle 1	AM Screws 2 × 4 mm, (x 3)*
39B Rear leaf spring mounting bracket	39E Leaf spring shackle 2	FM Screws 2 × 5 mm, (x 3)*
39C Front leaf spring hanger	39F Rear leaf spring hanger	OM Screws 3 × 11 mm, (x 3)*

* Some of the parts are spares.

Editor's note: The parts shown here may differ slightly from the parts supplied with this issue. This does not affect the quality or the assembly instructions in any way.

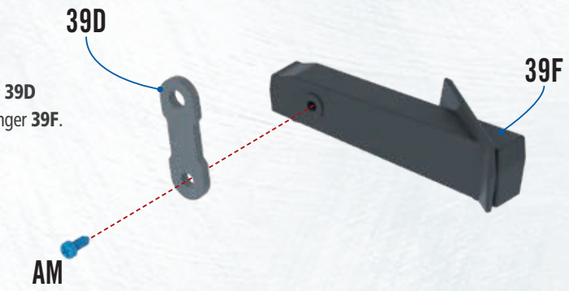
ASSEMBLY AREA

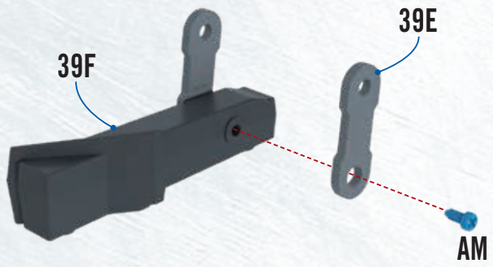


REAR SUSPENSION

Right rear leaf spring

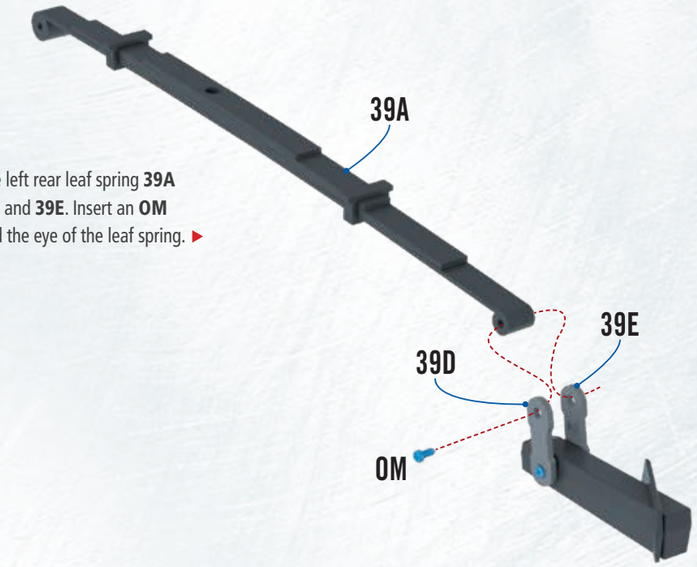
39.1 **ALIGN** the smallest hole in the leaf spring shackle 1 **39D** with the corresponding hole in the rear leaf spring hanger **39F**. Secure the pieces with an **AM** screw. ▶





39.2 **IN THE SAME WAY,** align the smallest hole in the shackle 2 **39E** with the hole on the other side of the rear leaf spring hanger **39F**. Again, secure with an **AM** screw. ◀

39.3 **POSITION** the rear end of the left rear leaf spring **39A** between the two shackles **39D** and **39E**. Insert an **OM** screw through the shackles and the eye of the leaf spring. ▶



THE TWO ENDS OF THE LEAF SPRING
The top hole in the leaf spring is not exactly in the centre, but is closer to the front end of the piece: here's how to recognize the rear end.

AN OVERVIEW

This illustration shows a detail of the chassis of your Dodge Charger R / T; the right leaf spring, highlighted in green, is what you will be preparing during this work session. In red, you can see the left rear leaf spring, which you have already assembled. Generally, the leaf springs in a suspension system are composed of numerous steel plates, which decrease in length. The two eyes at each end of the longer blade are attached to the vehicle. This type of suspension is common on heavy vehicles, off-road vehicles and muscle cars. In the latter case, it was customary to use these suspensions longitudinally or transversely on the rear bridge, where they offered more advantages than coil springs.



Right rear leaf spring



39.4 **ALIGN** the front leaf spring mounting bracket **39B** with the holes in the front leaf spring hanger **39C**, as shown in the illustration. Secure with two **FM** screws. ◄

39.5 **POSITION** the front end of the right rear leaf spring **39A** between the two tabs of the front mounting bracket **39B**. Secure the pieces with an **OM** screw; it must be inserted from the same side that you inserted the fixing screw for the rear end of the leaf spring. ◄

STAGE 39 FINAL RESULT



You have now prepared right rear leaf spring, which will later be installed on your model car.

HOW THE COMPONENTS ARE TREATED



After seeing them in action, let's take a step back and find out what treatments have allowed car parts, especially engines, to be able to stand up to the enormous stresses that are imposed on them.

When designing a component in the automotive sector, it is not only its size and shape that is important but also the material that is used for its construction. But it does not stop there. The component must then be subjected to treatments that help it to stand up to the stresses and strains of daily use.

In the automotive industry, pure metals are rarely used because they tend not to have appropriate properties. So they are almost always used in the form of alloys that have superior mechanical characteristics. They are then treated in a way that allows them to function reliably. If, for example, the gears commonly used in transmissions were not sub-

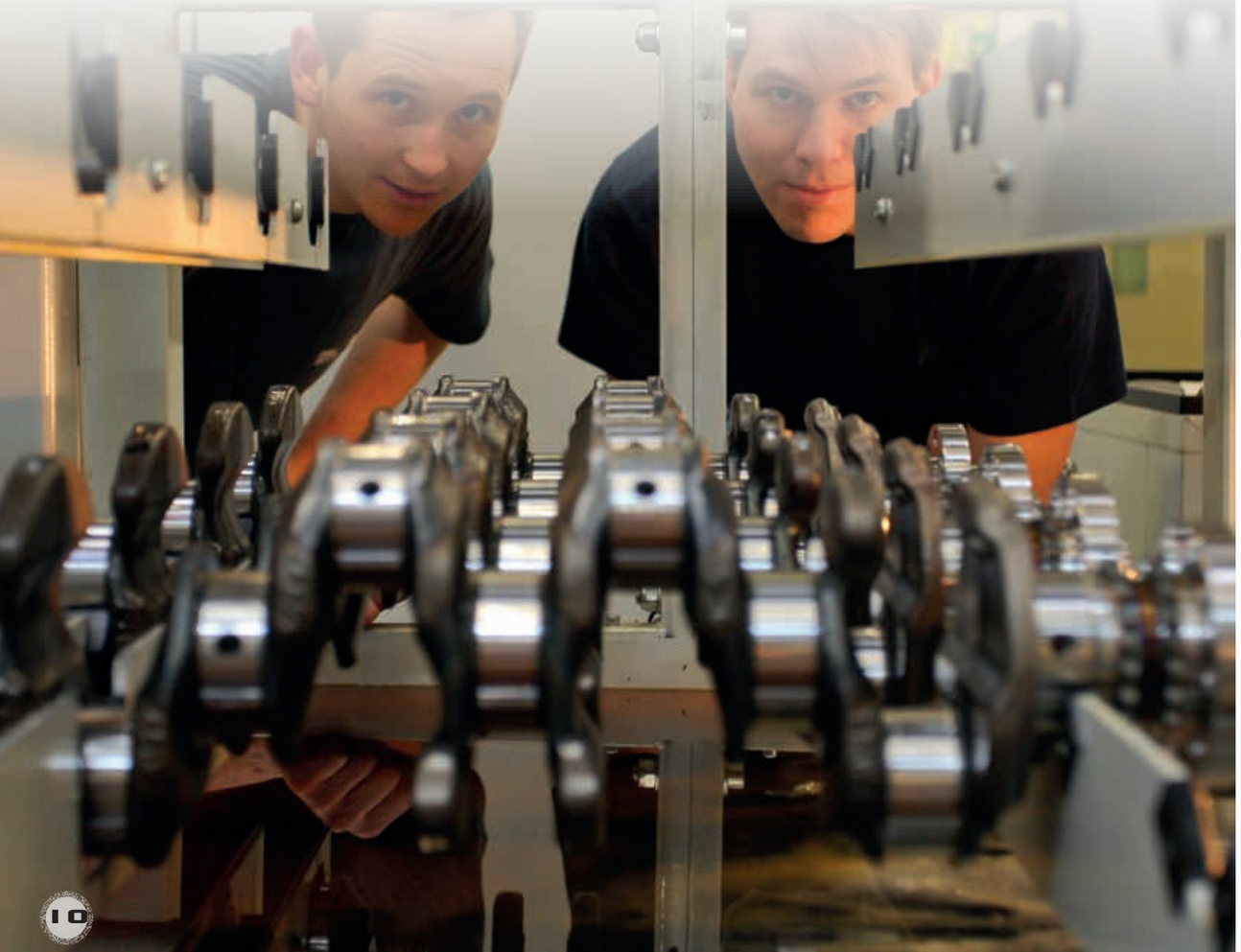
Before being assembled, the engine components are subjected to a series of heat treatments that modify their characteristics, substantially improving their strength and durability.

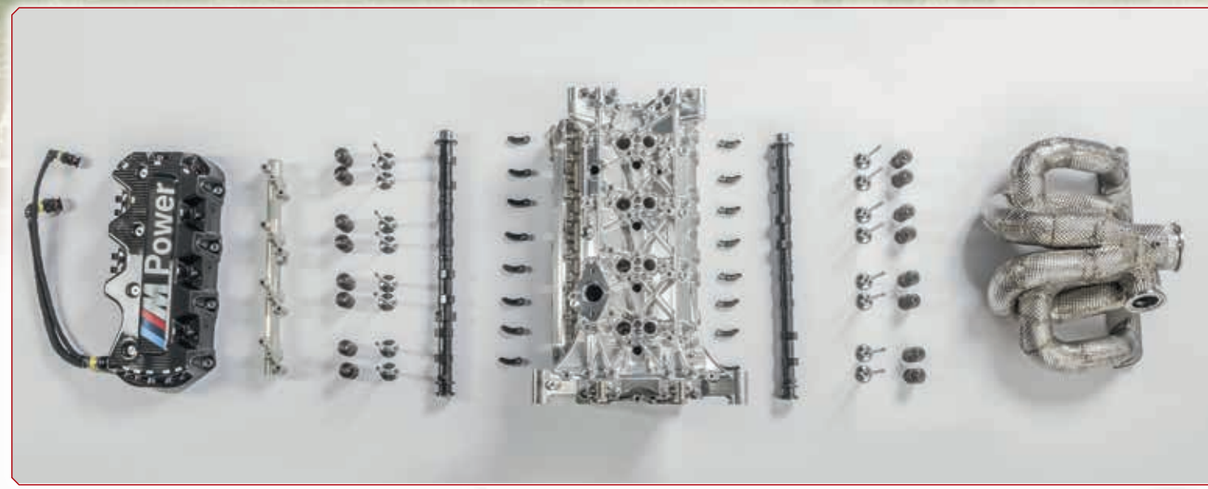
jected to adequate treatment, they would quickly become damaged by the contact pressures and the meshing activity. Similar considerations apply to many other components that we find in the engine, like the camshafts.

IT ALL STARTS HERE

Most metals are solids at room temperature and have a crystalline structure. The structure of a solid metal consists of closely-packed metal atoms. These atoms are arranged in a regular way to form a metallic lattice structure that make up cells. Crystal size and cell type obviously influence the characteristics of metals. We are especially interested in alloys composed of two or more different elements, of which at least one is a metal. More specifically, we are considering alloys of iron, or steels and cast irons, and aluminium. Cast irons are iron-carbon alloys with more than about 2% carbon. In steels, on the other hand, the percentage of carbon is lower. In the latter, the alloy's characteristics change considerably as the percentage of carbon varies. As its percentage increases, castability, hardness, and tensile strength increase. However, ductility, toughness, resilience and workability progressively worsen. In addition to carbon, other elements are also present in "alloy" steels, such as nickel, chromium and molybdenum. Thanks to these elements, specific characteristics can be further enhanced. On the subject of components, connecting rods and crankshafts intended for high-performance engines are invariably made from these materials. These three elements improve both tensile strength, elasticity, toughness and hardness. However, chromium and molybdenum cause a decrease in the ductility or "stretchability" of the material.

Heat treatment typically consists of three phases: a heating cycle, temperature maintenance, and subsequent cooling. Particularly important is control of the speed with which the cooling takes place.





HARDENING AND TEMPERING

Undoubtedly, the best-known heat treatment is hardening. It is carried out by heating a steel component to a very high temperature (800°C or more) and maintaining it for a certain period of time. It is then suddenly subjected to very rapid cooling, usually by immersion in water or oil. This process causes the creation of high internal stresses and also a variation in size. The material becomes very hard. The percentage of carbon is important in this process. It has very high tensile strength but becomes brittle and fragile. To reduce fragility, a tempering process is used. Alternatively, in some cases, a system is used that allows only the outermost layer of the metal to harden, thus maintaining the toughness of the internal part. In this case, we are talking about surface hardening, which is achieved by heating the components very quickly by means of strong induced electrical currents. Subsequent immediate cooling is carried out with a cold water shower system. Usually, surface hardening is carried out on steel parts with a carbon percentage between 0.3% and 0.5%. It achieves a layer of hardness that penetrates a depth of a few millimetres. Among the parts that are most frequently hardened in this way are gears and the lobes of crankshafts.

Tempering involves gradually reheating the material to a lower temperature – around 550°C – and then cooling it more slowly in still air. The material acquires ductility and toughness, but its tensile strength decreases. The completed process reduces the stress within the metal. Steels treated in this way are primarily used in the automotive field and have a carbon content of the order of 0.4%. Typically, the type of steel components that are

For aluminium alloys, the most important heat treatment is structural hardening. This is carried out by bringing the piece to a temperature of around 560° C and then cooling it very quickly. Subsequently, "ageing" is carried out, with the piece being kept at 150-200°C for times in the order of 10 hours and then slowly cooled.

Light but strong

Aluminium alloys are widely used in the automotive field due to their low density, high thermal conductivity and useful mechanical characteristics. They fall into two main groups: alloys for casting and those intended for moulding. Among the most famous alloys we can have aluminium-copper alloys, aluminium-silicon and aluminium-zinc alloys. Here the intermetallic compounds are of particular importance because they significantly improve the characteristics of aluminium. For example, the presence of copper increases tensile strength and allows us to obtain alloys capable of working at high temperatures; silicon improves castability, reduces the coefficient of thermal expansion and increases hardness; magnesium improves tensile strength and, when combined with silicon, increases hardness. Aluminium-zinc alloys for plastic processing are those with the highest mechanical characteristics. The best known is Ergal 55.

How the components are treated



Some treatments reduce the stresses generated inside the material during the casting process. Others serve to improve workability.

subjected to hardening are connecting rods and crankshafts. After a casting or forging process, annealing is very often carried out. This is a treatment that improves the machinability of the steel, lowers its hardness and releases internal stresses. In this case, the metal parts are brought to a temperature that is generally around 700°C. They remain in this condition for almost four hours and then undergo prolonged cooling, almost always inside the oven itself.

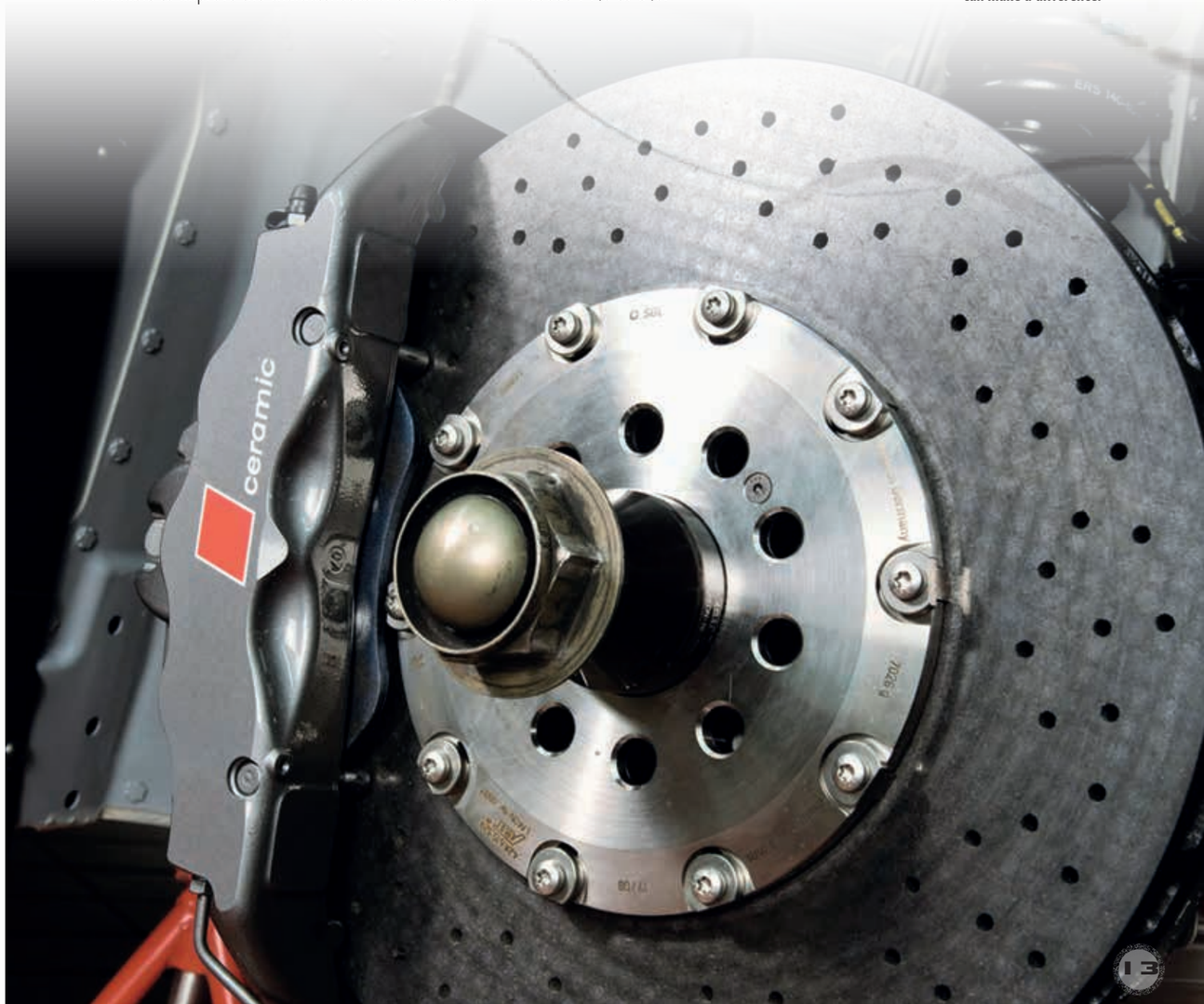
ITRIDING

If we want to improve surface hardness, wear and fatigue resistance, there is no more effective treatment than enrichment with nitrogen. The nitrogen gas is absorbed into the outermost layers of the pieces being treated, and the process is called "Nitriding". This procedure is carried out in a gaseous atmosphere at a temperature of about 500°C, on components made with steels with a high percentage of carbon, between 0.30% and 0.50%. The achievable hardness is very high but with very little depth to the hardened layer – we are talking about 0.2 mm. The downside is a high cost both in economic terms and in terms of time. It can take from 15 to 100 hours. A quicker and less demanding alternative is the Tenifer salt bath treatment, in which nitrogen enrichment is carried out by immersing the pieces in a bath of molten salts at 500°C for 60-180 minutes. Nitriding is mainly used for components such as camshafts, crankshafts for racing engines, bearing cages for racing engines, and steel piston rings for the various latest-generation pistons.

IMPROVED RESULTS

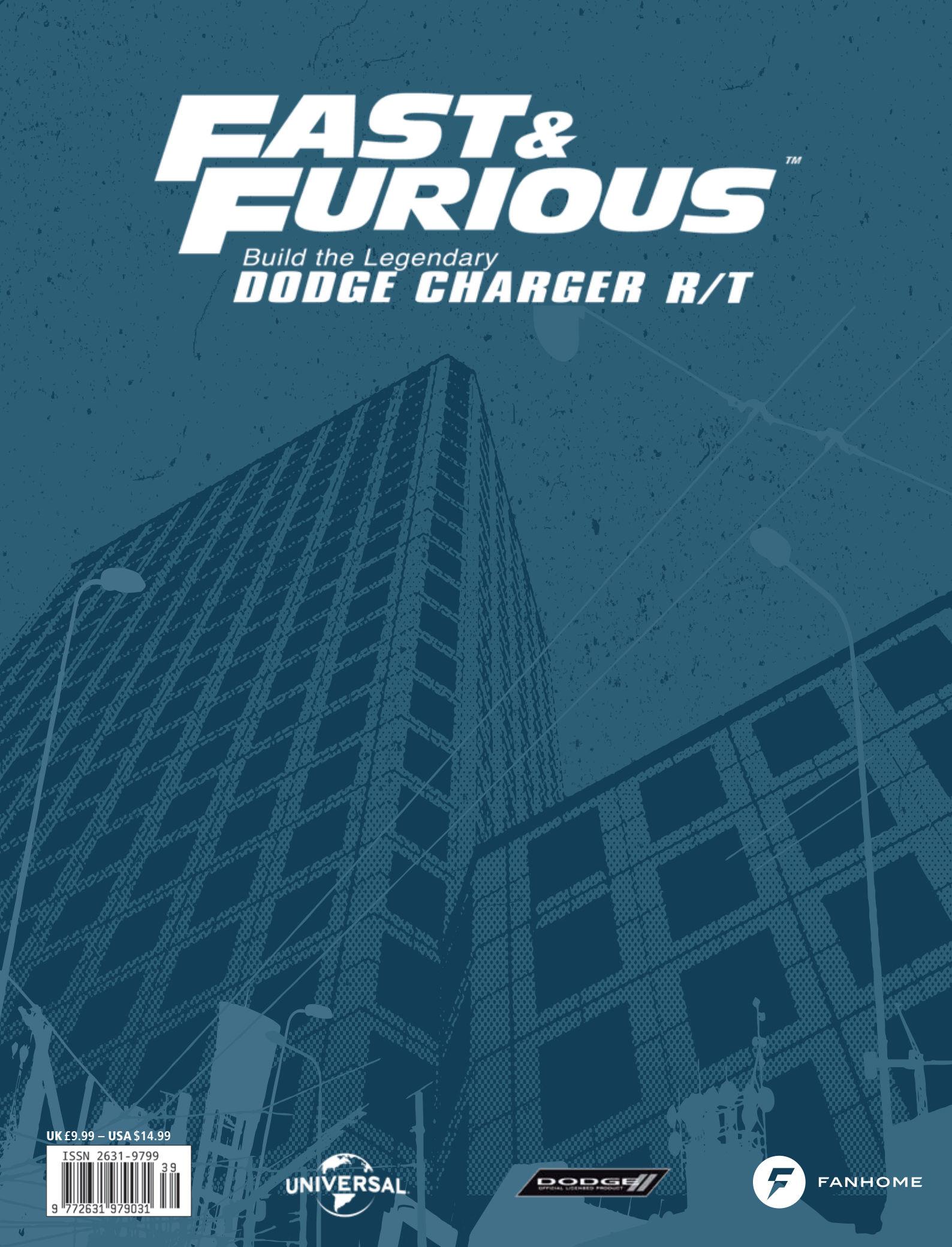
As we have seen, we have various heat treatments available to improve the characteristics of the materials. Let's now look at some practical examples. In steel with a carbon content between 0.30% and 0.35%, passing from the annealed to the quenched state, we have an average increase in tensile strength of almost 38%. The results are even more impressive in aluminium alloys. For example, an AlSi7MgMn alloy gains nearly 54% in terms of tensile strength and about 38% in hardness. A forging alloy such as Avional sees its tensile strength even doubled. In the well-known Ergal 55, the T6 treatment (a two-phase process which is applied to Aluminium, Copper, or Silicon alloys) almost triples the tensile strength, and at the same time, creates a considerable reduction in waiting time, which reduces from about 14% to 8%.

The lightness and resistance that characterise aluminium alloys make them perfect for use in the automotive sector. For example, they are used for the brake callipers of high-performance cars, where a few grams less can make a difference.



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