FAST & FURIOUS™

72

Build the Legendary DODGE CHARGER R/T



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FAST & FURIOUS

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THE FEMALE CHARACTERS' COSTUMES, FAST & FURIOUS STYLE

In the *Fast & Furious* franchise, sportswear is the predominant style. Anybody might think that for the people in charge of the costumes, finding a T-shirt or a pair of jeans is not such a hard job. It is however much more complicated than it might seem at first – especially when the job is dressing the female characters in *Fast & Furious*.

Like the plots of the movies or the vehicles, the costumes in the franchise have also undergone a remarkable change since the first film. The person who best knows this is without a doubt the costume designer Sanja Milkovic Hays, who has been involved in most of the films in the franchise. To get the style right for the first movie, Sanja wanted to go and watch an actual street race. When she saw all of the people involved, men and women, she realized that they wore Los Angeles street fashion.

DRESSED TO WIN

She wanted to reflect this in the movie, while making the protagonists' clothes a bit cooler. Leafing through some leading fashion magazines, she concentrated on finding the most casual T-shirts and pants that would help to enhance the men's personalities. After that, she set about considering the female characters.

"With the women we were looking for a more fashionable look, but not excessively so," Sanja remembers. "Jordana Brewster's character is not bothered about being totally fashionable because whatever she wears she looks fantastic. As for Michelle Rodriguez, she wears working clothes and jeans … she's a kind of very feminine fighter."

The designer gave free rein to her imagination when dressing the racers in imported cars and the female race fans: everything from high-quality sportswear to hip hop clothes, all adorned with a lot of spandex.

Actress Gal Gadot usually wore comfortable, functional clothing when she was interpreting the fearless character of Gisele.

The female characters' costumes, Fast & Furious style

MARLENE STEWART

As you might expect, Marlene Stewart, born in Boston on August 25, 1949, is fascinated by clothes. Therefore, after graduating from the New York Fashion Institute, she began working on what would be her first line of clothing, the label Covers. From there she went on to work with the singer Madonna, making her costumes for popular videos like *Material Girl*, *La Isla Bonita* and *Like a Prayer*. Her work was so successful that it opened the doors of Hollywood to her, where she established herself, working with two very different directors: with Oliver Stone she worked on *The Doors* (1991) and *JFK* (1991), and with James Cameron she did the same for *Terminator 2: Judgment Day* (1991) and *True Lies* (1994). After that, she dressed Nicholas Cage in *Gone in 60 Seconds* (2000), Will Smith in *Hitch* (2005), and Tom Cruise in *Oblivion* (2013). Apart from working on the *Fast & Furious* franchise, Marlene has also placed her talent at the service of other series like *Night at the Museum* and *Divergent*.

EVERY PLACE HAS ITS COSTUMES

The first movie, *The Fast and the Furious*, marked out the main lines of what the clothes worn by the stars of the franchise were going to be. However, there was still a lot to do. After the second movie, the franchise began to look for locations all over the world, and in very different kinds of places. And, of course, in each city, in each country, the clothes had to go with the location.

"If you look closely," Sanja says, "you can see that the women are actually dressed differently. It became a challenge to better what we had done in the previous film."

Indeed, without renouncing the basic look of the costumes, they had to introduce clothes that were representative of cities as emblematic as Miami, Tokyo, Río de Janeiro and London. It was obvious that characters like Mia Toretto or Gisele could not dress the same in Brazil as in England. But the difficulty for the costume designer was incorporating more or less local garments – like wrapa-round skirts or jackets – that would go with the way each of them dressed.

TWENTY IDENTICAL T-SHIRTS

"In each movie," Sanja says, "we spent hours talking to the actors before shooting to find out how the character had evolved, where they were and what they wanted to transmit through their clothes."

Without clashing too much with the informal style of the other female characters in the franchise, computer hacker Ramsey's style was slightly more sophisticated.



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Anyone would surely be surprised by the huge amount of work the costume designer had in order to find the right clothes for all of the heroes and heroines in the franchise – even if Brian and Mia simply dress in pants and a T-shirt.

"Trying to find the perfect T-shirt and pants is probably the most difficult thing," the designer says. "We changed the brands and the styles that we were using in each movie, so that no one would be wearing the same T-shirt. On top of that, if they're involved in a chase or a fight, the clothes get torn and very dirty."

This means that for sequences like the spectacular chase through the favelas of Río de Janeiro in *Fast Five* they had to find as many as 20 identical T-shirts for each character. It was the only way of ensuring the continuity of the costumes in the very humid conditions in which they had to film.

A PARTY DRESS

There was a notable exception to the casual style of the women in *Fast & Furious* in the seventh movie in the series. The film's plot took the characters to a luxurious party that was held in an amazing skyscraper in Abu Dhabi. The occasion meant that everyone had to dress in formal evening-wear. Ramsey wore a stunning Hervé Léger dress, while a low-cut, backless, ankle-length red dress had to be made for Letty. Sanja had great fun with that party dress, as did actress Michelle Rodriguez.

"Boots and strap T-shirts are great," the star admits, "but I felt like leaving the greased-up overalls in the garage, if only for a short while."

As nothing comes easy in the franchise, Michelle could not limit herself to just wearing the original dress. She would have to face the challenge of fighting another character tooth and nail without falling off her heels or tearing a dress that, in the words of Sanja, many women would find difficult to wear under normal circumstances.

REFLECTING THE CHARACTER

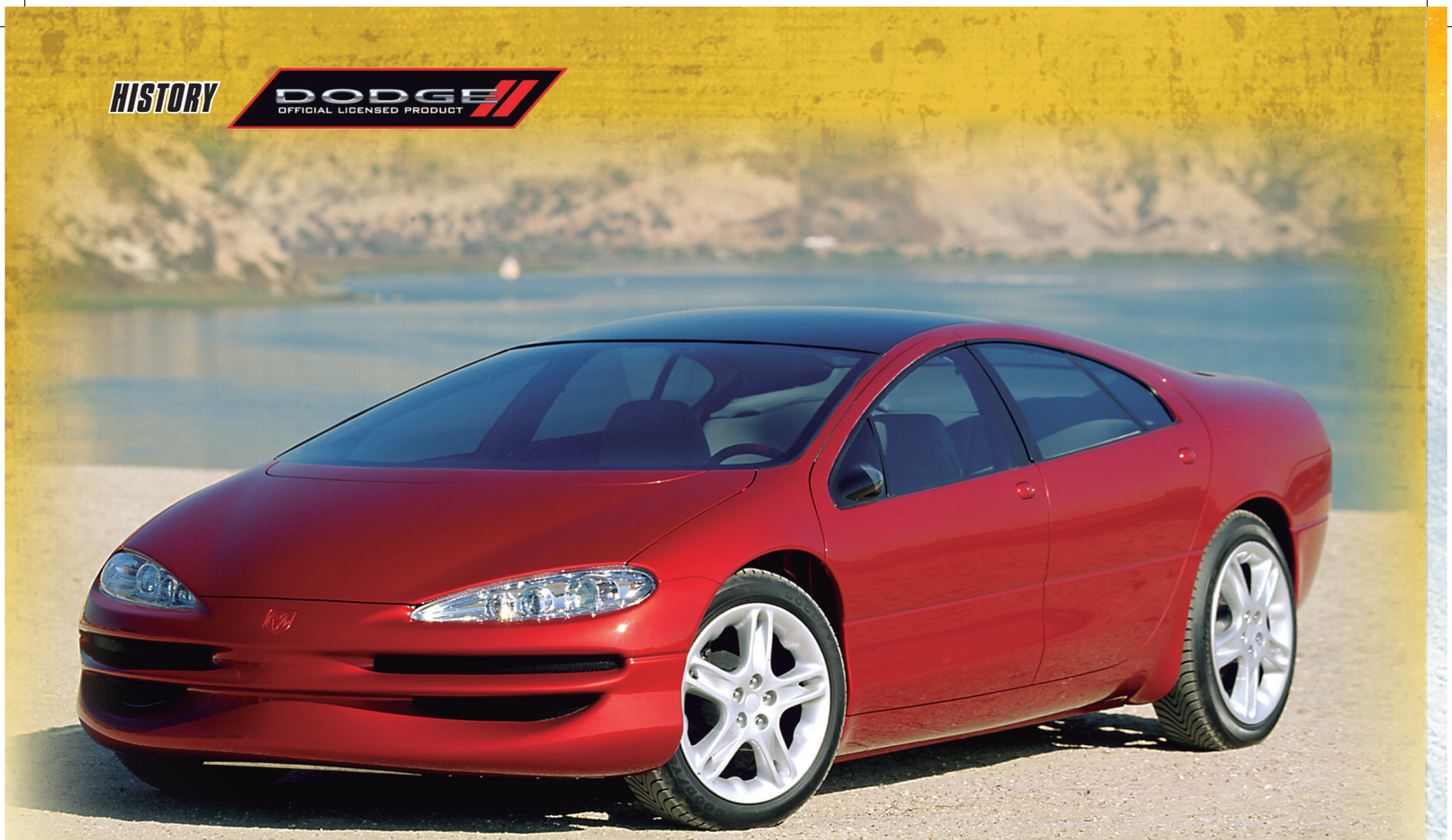
For *Fate of the Furious*, designer Marlene Stewart joined the film's production roster. It was her responsibility to dress the enigmatic cyber-terrorist Cipher. It was no easy task, but Marlene immediately understood that the series does not so much follow fashion as incorporate whatever serves to reflect the character's personality to the costumes they wear. Marlene worked closely with actress Charlize Theron to explore the possibilities offered by the character. In the end, they both agreed to adopt a sophisticated style with very European touches that perfectly portrayed a woman who is sufficiently intelligent, strong and ingenious to become a legend in the international community of hackers. For Marlene, elegant Yves Saint Laurent, Haider Ackermann, Chloé and Rick Owens dresses were a perfect match for the elitist, but at the same time discreet, personality of someone who is fabulously wealthy and lives surrounded by the most expensive art, fashion and technology.

"We tried hard to create a completely new look with Cipher," Charlize Theron says. "The difficulty lay in how to translate it into something elegant and dangerous at the same time. From the braids to the clothes, it's all calculated. I like what it says about her."

Finding a fresh, informal wardrobe for the character of Letty Ortiz is a lot more work than it may seem.



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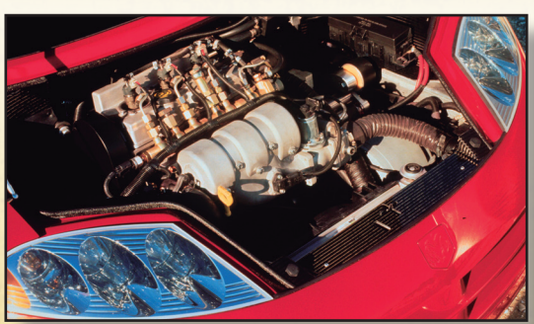


DODGE INTREPID ESX CONCEPT 1996

In 1993 the then president of the United States, Bill Clinton, challenged American manufacturers to develop a car capable of going for 100 kilometres on less than three litres of fuel (80 miles per gallon in the American system). The Chrysler Corporation's response was the prototype Dodge ESX Intrepid, presented in 1996.

The Dodge ESX Intrepid was the brand's first project for achieving consumption below 3 litres per 100km with a big car.

The Dodge ESX Intrepid, with four doors and saloon bodywork, had a very aerodynamic shape. The bodywork designed by Bob Boniface, the Dodge brand's head of design, was developed in a wind tunnel and built with lightweight materials. Its aluminium chassis also helped to reduce the weight as much as possible.



The Dodge ESX II's diesel engine, with cylinder capacity of just 1.5 litres, was similar to the one used in the first prototype.

It had a 1.8-litre diesel engine by the Italian manufacturer VM Motori, with whom the Chrysler Corporation had a contract to supply diesel mechanics for the cars of the Chrysler and Jeep brands sold in Europe. It was combined with two water-cooled electric motors situated on the rear wheels; besides helping to propel the car, they regenerated energy during deceleration and braking to charge the 300V battery that powered them.

The Dodge ESX Intrepid was followed by two more prototypes: the 1998 ESX II, smaller and with two 1.5-litre direct injection diesel engines and a small electric motor, and the 2003 ESX III, with thermoplastic bodywork weighing just 1,020kg and a diesel engine associated with an electric motor powered by an ion lithium battery. None of the three achieved the proposed consumption, but they all got below 4 litres per 100km.

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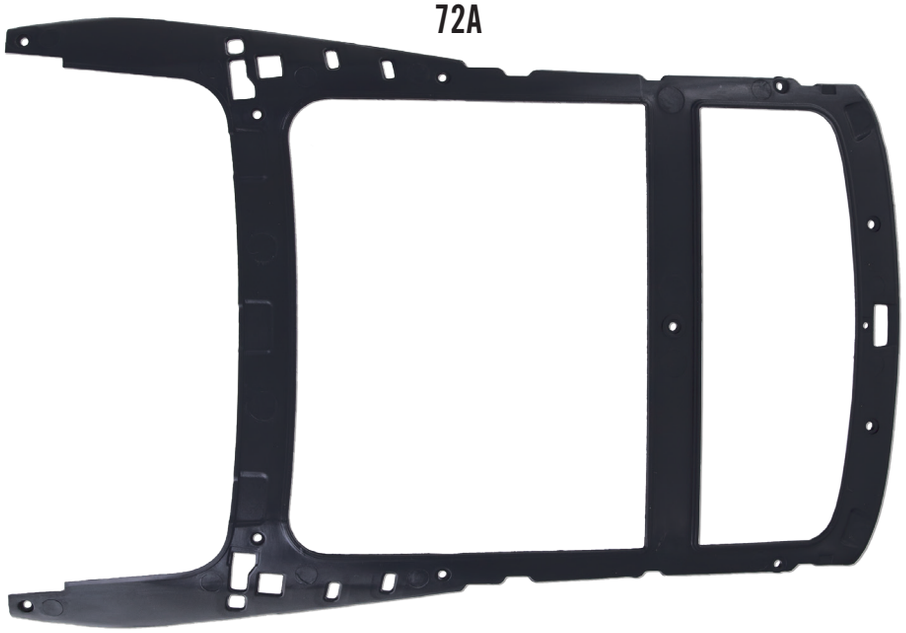


INSTALLING THE ROOF FRAME

In this assembly session you will install the roof frame onto the car body. Follow our instructions carefully, using the illustrations to help you.

PIECES FOR THIS STAGE

72A



CM



LM



72A Roof frame

CM Screws 1.7 × 3 mm (x 2)*

LM Screws 2.3 × 4 mm (x 13)*

* 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.

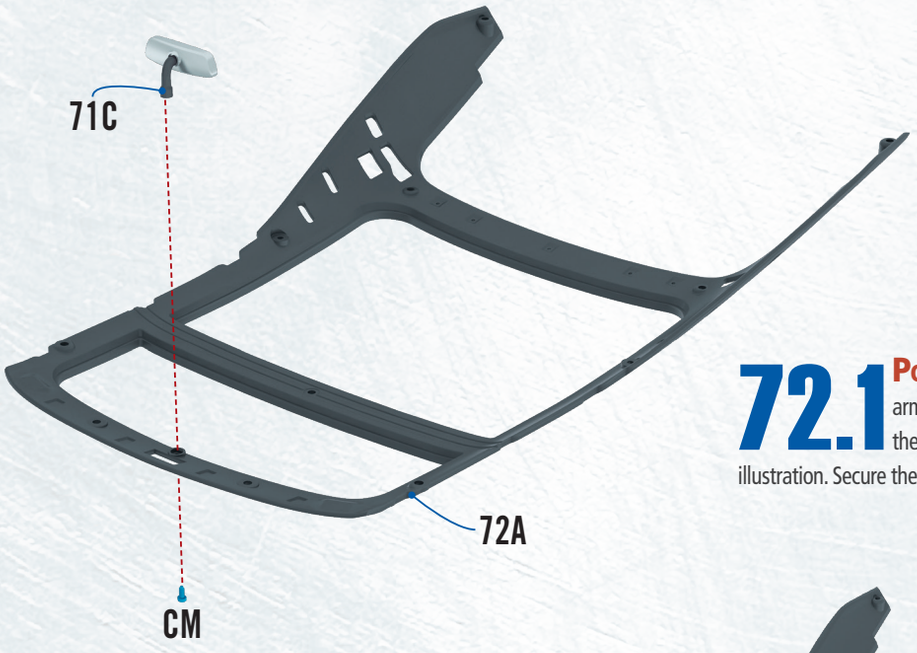
ASSEMBLY AREA



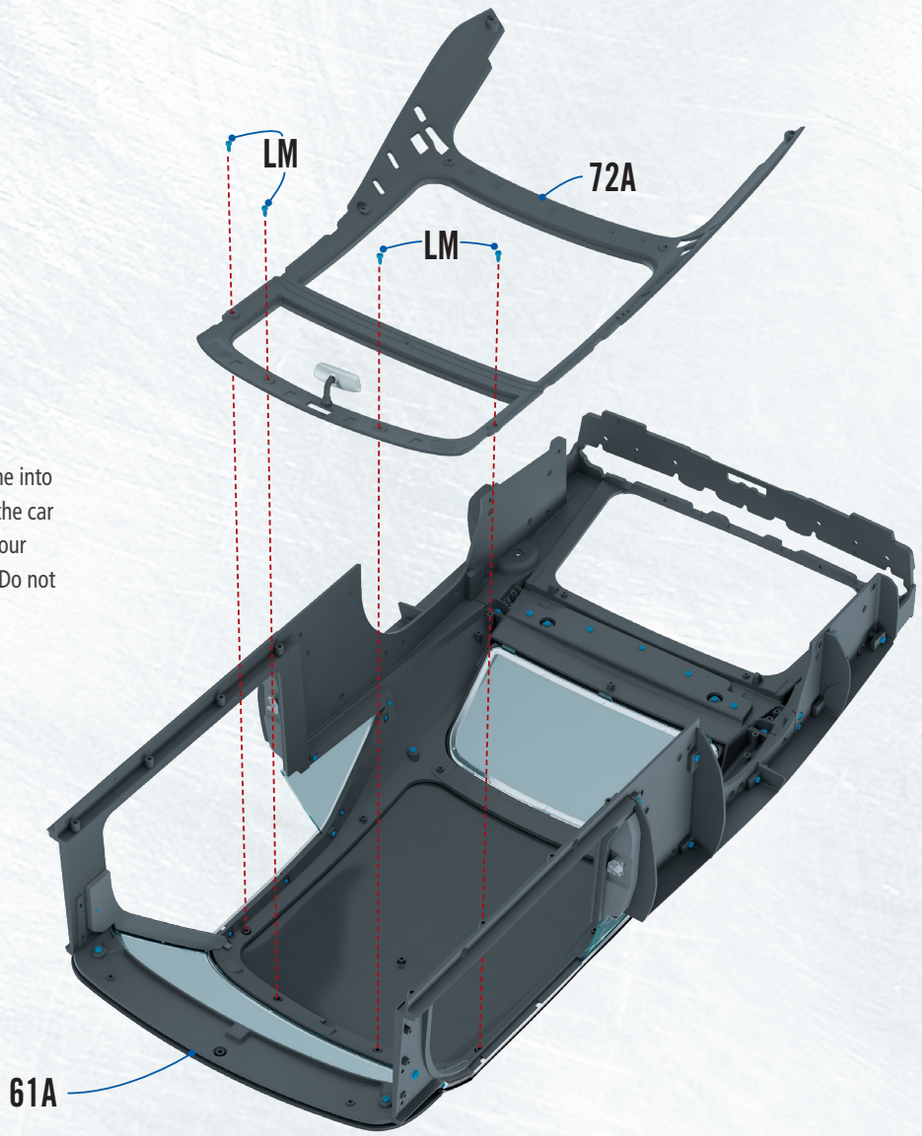
ROOF

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Installing the roof frame



72.1 **POSITION** the end of the rearview mirror arm **71C** over the middle post on the front of the roof frame **72A**, as shown in the illustration. Secure the piece with a **CM** screw. ◄

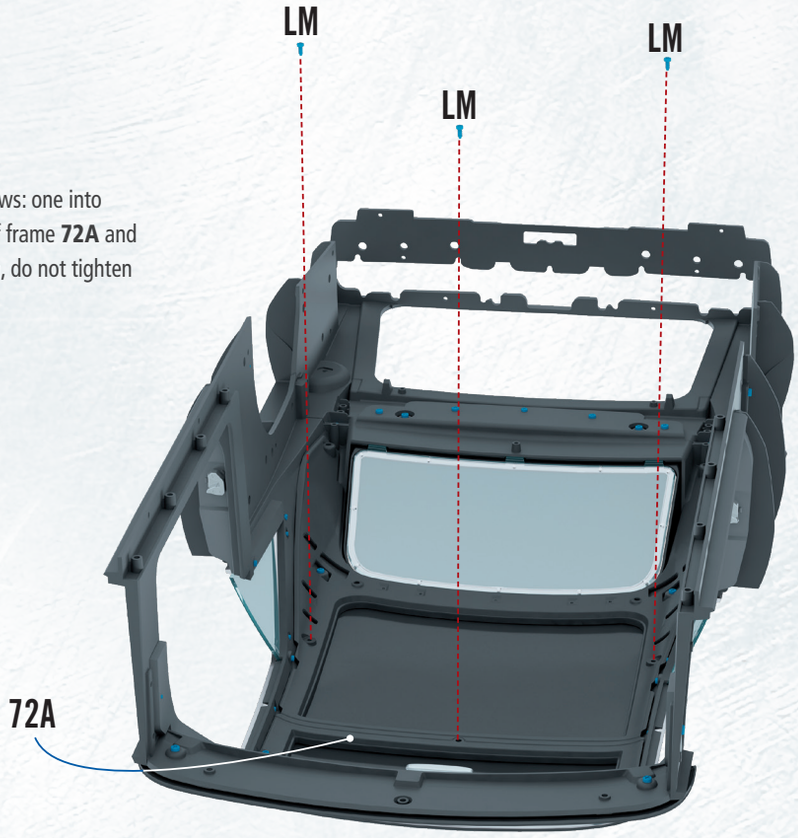


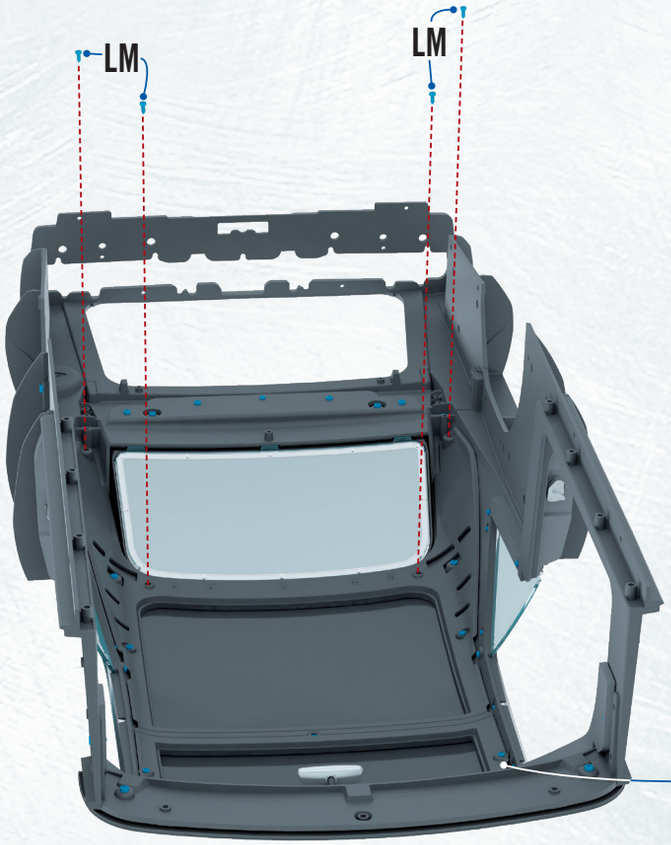
72.2 **INSERT** the roof frame into the middle section of the car body **61A** and insert four **LM** screws into the front mounting holes. Do not tighten them completely yet. ►

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72.3 **INSERT** three more **LM** screws: one into the middle section of the roof frame **72A** and two into the side holes. Again, do not tighten them completely. ▶

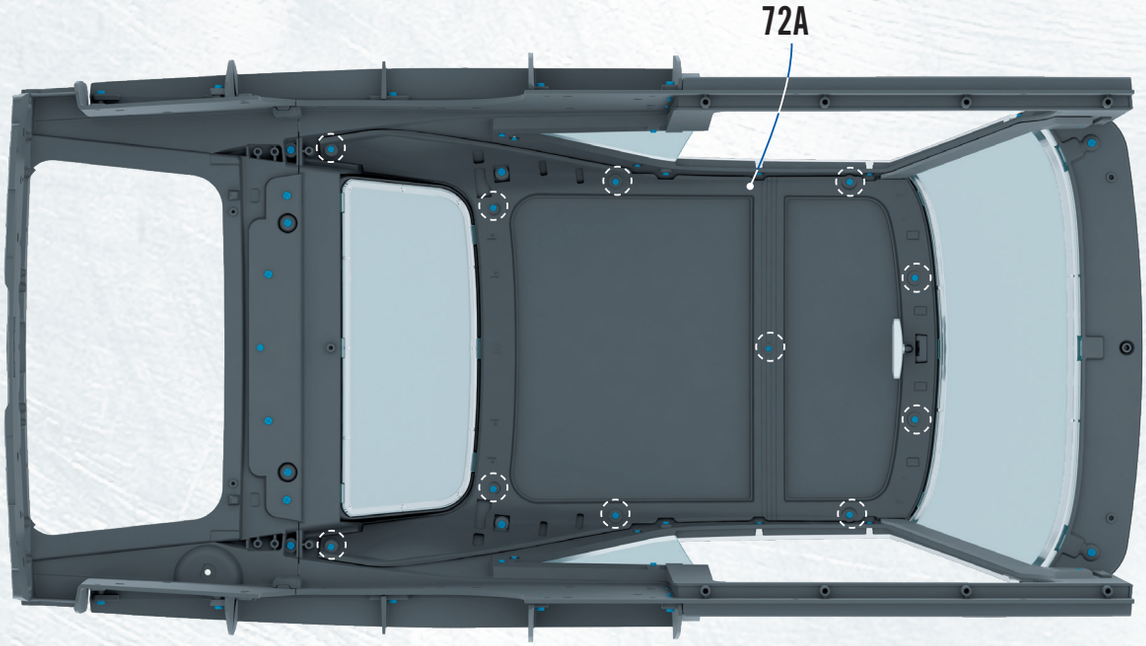




72.4 **INSERT** the last four **LM** screws into the rear holes in the roof frame **72A** and partially tighten them. ◀

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Installing the roof frame



72.5 **Now** tighten all eleven **LM** screws firmly, making sure that they are tightened equally. ▲

RESULTS OF STAGE 72

You have now secured the roof frame and rearview mirror to the middle section of the car body.



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BRAKES: HOW THEY WORK



What happens when you press the brake pedal? We examine the braking system and discover the components that allow you to stop your car safely.

When you press the brake pedal, you pressurise a hydraulic system that operates callipers. These force brake pads to squeeze the rotating discs attached to the wheels and slow the vehicle. The *pressure* you are able to exert on the pedal would not normally be enough to stop the car. This is why it is necessary to multiply the force by a considerable amount. This is done using Pascal's Principle, the same method that is behind the operation of hydraulic jacks, car inspection bridges and many other hydraulic machines. As you probably know, most liquids cannot be easily compressed. Therefore, applying pressure to a liquid allows force to be transmitted. In a typical hydraulic brake circuit, the pressure is determined by the piston of a small-diameter pump. In physics, "pressure" is the result of applied force divided by the area to which it is applied. Therefore, a small diameter pump and a medium-sized foot on the brake pedal can create a considerable amount of pressure.

The brake servo performs a vital function. It multiplies the force transmitted by the brake pedal to the pump and makes braking easier.

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Brakes: how they work

There must be no air bubbles in the fluid in the brake circuit. This would compromise its ability to pressurise the system. For this reason, every couple of years, a standard car's brake fluid should be changed, and any air must be bled out of the system.

When that pressure acts on components with a larger diameter, such as the pistons of the brake calliper, it transmits a large amount of force to them. To give you an example, if the pressure in the circuit is about 30bar and each calliper is equipped with four pistons, each of which has a diameter of 33mm, each pad is pressed against the disc with a force of over half a ton. If the piston of the pump has a diameter of 16mm, to obtain pressure in the circuit of 30 bar, it is sufficient to act on it with a force of 60kg. In the case of the standard car braking system, there is a device that will multiply the force the driver applies. This means that the pedal only needs to be pressed relatively gently to create those 60kgs of force. In the UK, it is called a vacuum servo, usually called a "brake servo", or in the USA, a "brake booster".

THE FORCE MULTIPLIER

The amount of pressure in a circuit is the same at every point in that circuit. The pump converts the lineal force exerted by your foot into hydraulic pressure that acts everywhere throughout the circuit. A typical brake pump has a piston that is housed in a cylinder and connected to a fluid reservoir. The latter is not pressurised. Its job is to supply fluid to the circuit as required. For example, more fluid might



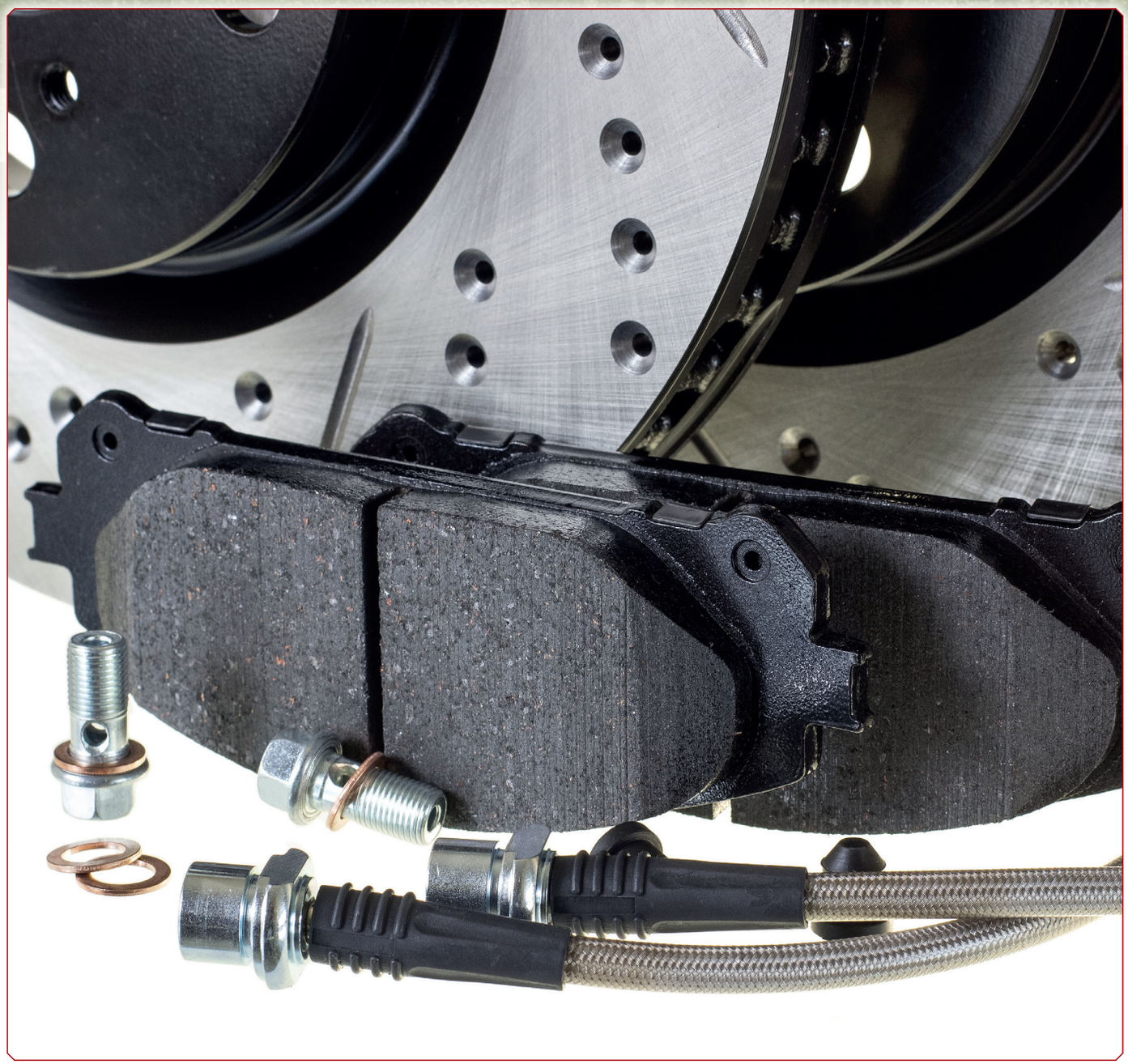
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be needed to compensate for wear on the pads that increases the travel of the calliper pistons. For safety reasons, the brake system hydraulic circuit is usually a dual or "redundant" system. In almost all passenger cars, the pump is operated not directly by the brake pedal but by the brake servo. This has the important function of significantly multiplying the force transmitted to it. A brake servo is generally operated by a vacuum. In cars equipped with a petrol engine, it functions using the vacuum that is created in the intake system downstream of the throttle valve during the release phase, i.e. when the valve is closed or almost closed. In vehicles operated by a diesel engine, where there is no throttle valve, the vacuum is usually created by a dedicated vacuum pump.

FLUID AND LINES

The circuit has both rigid pipes and flexible hoses - known as "lines". Like all components that affect vehicle safety, these are manufactured to rigorous standards. When the brakes are applied, pressures of several tens of *bar* are distributed through the hydraulic system. Although they are very robust, standard brake lines can actually suffer a slight increase in diameter or bulging when substantial pressure is applied to them. The driver might even notice





Although they are very robust, standard brake lines can bulge when heavy pressure is applied to them. Performance cars often use lines with an outer sheath made of braided stainless steel or Kevlar, as they deform less.

this effect when braking hard in a competitive environment. In these circumstances, it may be advantageous to use lines with an outer sheath made of stainless steel or Kevlar braid, as they tend to suffer less elasticity. Since gases are very easy to compress while fluids are practically incompressible, for the brake control circuit to operate correctly, the hydraulic fluid must be completely free of air bubbles. If air bubbles are present, they will be compressed when the brakes are applied, absorbing part or all of the stroke of the pump piston. Therefore, when replacing the brake fluid (which generally must be performed at least once every two years for normal vehicle use), it is essential to carefully bleed any air out of the circuit.

BRAKE PADS

The components that slow the rotation of the brake discs are the brake pads. These are mild steel plates onto which a layer of friction material is glued. Between these two elements, there is also a thin layer that acts as a thermal barrier designed to limit the transfer of heat to the calliper pistons. As you know, the pads press hard against the discs when braking. Therefore, they must have a series of very specific mechanical characteristics. They must be resistant to wear, have a high coefficient of friction and be able to maintain those qualities unchanged over time, both during braking and after repeated or prolonged braking.

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Simple, but only in appearance

Brake pads are components with high technological content and are manufactured by highly specialised companies. In addition to the characteristics of the friction material, other factors are of considerable importance. These include the shape and the size of the pad. During the design phase, computers are widely used to learn about the distribution of pressures on the working surface and to visualise the temperatures reached at various points. Large pads are generally advantageous, not only in terms of durability but also to better diffuse the heat that is generated. Often, callipers with a large number of pistons use more than two brake pads per calliper. A modern solution involves the use of two pads on each side of the disc. This allows double the number of "leading edges", improving the initial grip, especially for performance car use. Furthermore, this arrangement minimises the risk of slight distortions of the pad and facilitates the discharge of dust caused by wear.



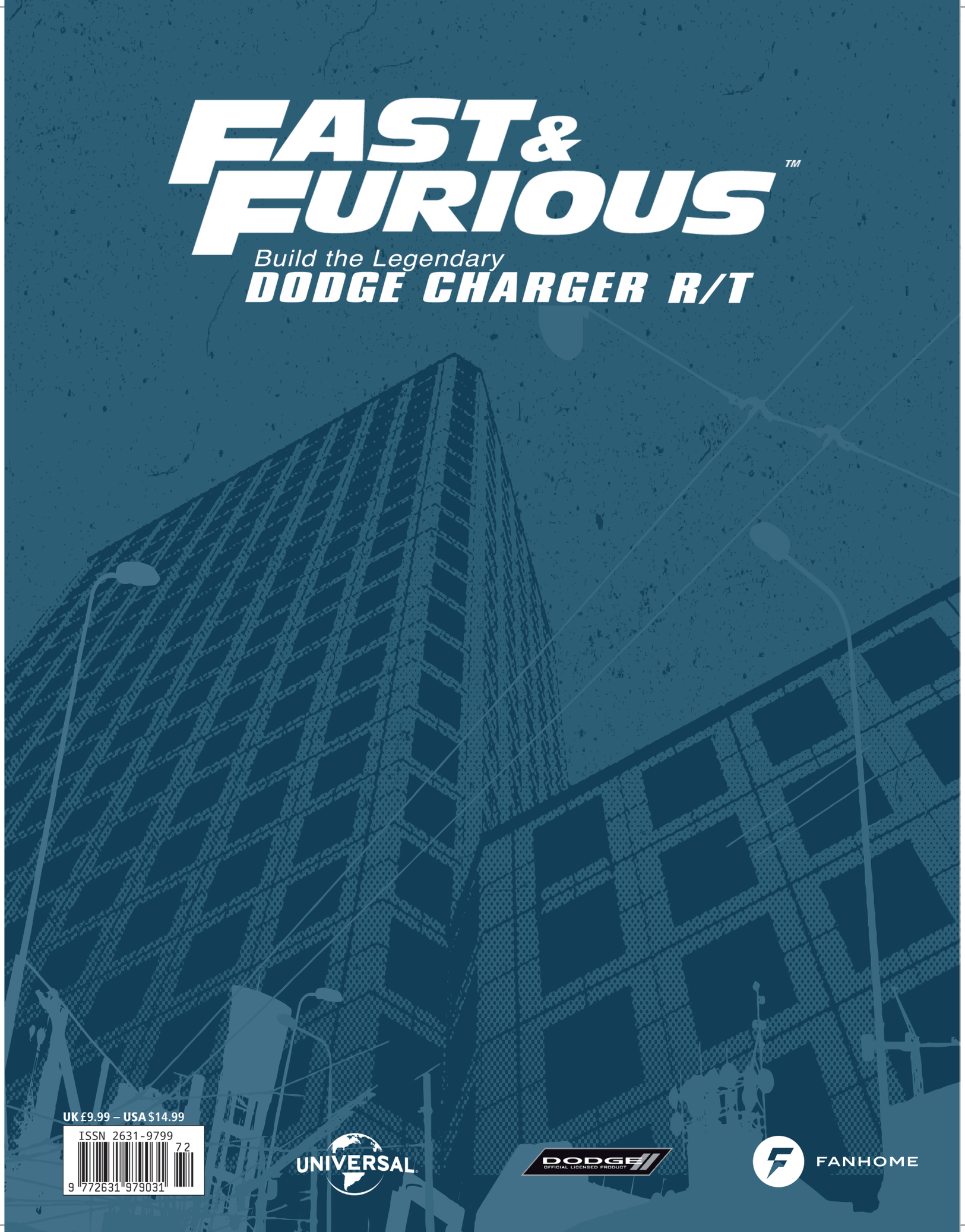
TOP SECRET RECIPES

There are different kinds of brake pads on the market for both standard road cars and for sports use, and they use different friction materials. The "recipes" for the materials are often a closely guarded secret, but in principle, they will include abrasive and lubricating powders. These and other additives contribute to obtaining the necessary mechanical and thermal properties, and they are all embedded in a fibre-reinforced resin matrix. The latter is often the supporting structure of the material and can be made of heat-dissipating materials like Kevlar or some metals. Their behaviour during braking depends on the abrasive substances, mainly metal and silicon oxides, and on the lubricating substances like sulphides and graphite. In addition to those qualities that are strictly related to braking efficiency, they also need to minimise wear on the disc and not generate excessive noise. The construction process requires the mixture to be compacted and moulded and then subjected to polymerisation or oven baking.

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