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FAST & FURIOUS

Build the Legendary DODGE CHARGER R/T



United Kingdom
Published by De Agostini UK Ltd c/o Royds Withy King, 69 Carter Lane, London EC4V 5EQ

USA
Published by De Agostini Publishing USA, Inc. c/o Becker, Glynn, Muffly, Chassin & Hosinski LLP, 299 Park Avenue, New York, New York 10171

ISBN: 978-1-4439-5217-0
FFN74: 22 02 02

ISSN 2631-9799 (Print)
ISSN 2732-4583 (Online)

Picture credits: Age Fotostock; NBCUniversal Archive; FCA Archives; Shutterstock

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Printed in Poland

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THE CANARY ISLANDS: SUN, BEACHES AND HIGH TENSION

The Canary Islands stand out as one of the principal locations in *Fast & Furious 6*. First, because they have become a refuge for Dom and Elena, and second, because Owen Shaw and his men carry out one of their most daring operations there.

The volcanic islands, the cliffs and the spectacular black and white sandy beaches of the Canaries welcomed the almost 400 people in the crew of *Fast & Furious 6*, who after spending weeks in the cold and the rain in London were thankful to be able to disembark in Tenerife in September and October 2012. They had a really demanding filming plan ahead of them, in places like Guía de Isora, Adeje, Santiago del Teide, San Juan de la Rambla, Garachico, Icod and Buenavista. It was in fact on the coast of Buenavista del Norte, in the northwest of the island of Tenerife, where the crew filmed the spectacular race between Dom and Brian that opened the movie, from the Punta de Teno headland to the viewpoint at La Monja.

AN IDEAL PLACE TO RETIRE TO

At the start of *Fast & Furious 6*, a silver 2011 Nissan GT-R R35 and a black 2009 Dodge Challenger SRT-8 burst out of a tunnel like bolts of lightning and speed like arrows along the narrow winding road that runs next to the beach. Once again, Dom and Brian seem to be testing which of them is the fastest. But we soon discover that this is not exactly the case: the race ends at a hospital where Elena is waiting at the entrance. "It's okay, you're just in time," she tells them calmly. It turns out that, in the small clinic, Mia is about to give birth to her first child. "Brian," Toretto says just before going in, "remember, the second you go through those doors, everything changes. Our old life is done."

Later on, we will have the opportunity to see Dom and Elena's home on the island: a small cottage from whose bedroom you can see the beach and the palm trees, and which has a large terrace on which Toretto repairs an engine in order not to forget his notions of mechanics. "I like it here. It's quiet, nice weather, and no extradition," the star says. Agent Luke Hobbs goes there, however, not with the

A winding road along the coast of Buenavista del Norte, on the island of Tenerife, was the natural background for the opening scene of Fast & Furious 6.

The Canary Islands: sun, beaches and high tension



From the top of a bridge Tej and Han warn their companions that a tank, driven by Shaw, is creating havoc on the Spanish highway.

intention of arresting him, but to recruit Dom's team once again and get them to help him capture the dangerous mercenary Owen Shaw.

HEAVENLY SETTINGS

The lush locations in the north of Tenerife served as the setting for this sumptuous house that Dom and Elena share. And also for the mansion in which Brian and Mia look after their baby, a two-story colonial building surrounded by the island's vegetation. And, taking advantage of the paradisiacal setting, a small corner of Tenerife was also adapted to shoot the brief sequence in which we see Tej enjoying his exile in what is supposed to be Puerto Rico.

The presence of the stars of *Fast & Furious* awoke huge expectation among the inhabitants of the island, who tried at all costs to get photographs of their heroes with their cell phones. Everywhere the crew went, a crowd of fans appeared immediately, cheering the stars and asking them if they were having a good time in Spain. Those constant shows of affection allowed the production team to gauge the true impact that a franchise such as *Fast & Furious* was having in very different parts of the world.

THERE'S A TANK ON THE HIGHWAY!

But for the onlookers and fans in the Canaries who were going each day to watch *Fast & Furious 6* being filmed, what must have made the biggest impression was seeing how one fine day a tank appeared in the middle of the highway. It was one of the most incredible sequences in the franchise, possible only thanks to the collaboration of the local authorities.

"The Spanish government allowing us to film on a 19-kilometer stretch of highway made everything really enjoyable," the film's director, Justin Lin, says. "In actual fact, we didn't need a sequence with a tank. However, when we began designing it I realised that it would be really useful to reflect the importance of the trust between the different members of Dom's team. It is very often easier to reveal a character's true nature through action, rather than using dialogues."

In the movie, Owen Shaw and his team go after a NATO convoy on the highway. When Dom and his team are getting ready to neutralise them, something unexpected happens: the mercenary emerges from the convoy at the controls of a huge Chieftain tank that rolls down the highway ready to crush his enemies.

ACCELERATING UNDER FIRE

This sequence, considered by many stunt performers to be one of the best action scenes filmed in recent years, was made possible by having two sections of highway available in the south of the island. They were under construction so there was no traffic on them.

For the scene, Justin Lin and his crew placed three of the heroes in the film, Dom, Brian and Roman, at the wheels of three fast cars: a 1972 Dodge Charger Daytona,

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ANDY GILL

Andy Gill, considered to be one of the best stunt coordinators in the world, has close ties with the *Fast & Furious* franchise. By now a veteran of the cinema and television, he began working professionally in the 1980s, taking part mainly in series like *MacGyver* and *Knight Rider*, in which he was able to demonstrate his skill handling vehicles. Later on, that talent enabled him to consolidate his reputation through a large number of feature films, such as *Money Train* (1995), *The Rock* (1996), *Bad Boys II* (2003), and *Death Race* (2008). He began working in the *Fast & Furious* franchise in the fifth movie, as Vin Diesel's double in the dangerous driving scenes. In the next film, however, Andy began working as the stunt coordinator, a job that he has continued to do until the present, including *Fast & Furious 9*. Aside from that, thanks to his excellent skills at the wheel of vehicles, he has also helped to create some by now legendary chases in movies like *Captain America: Civil War* (2016), *Black Panther* (2018) and *Bad Boys for Life* (2020).

a Ford Escort Mk I and a 1969 Ford Mustang Fastback. Of course, the highway had to be filled with a lot of local cars, among which we could see for example a 1996 Seat Ibiza, a Volkswagen Golf GTI, a 1998 Opel Astra and a 1996 Peugeot 206, and many others. Obviously, though, apart from the fast cars driven by the stars, a key element in the sequence was the tank driven by Shaw. The film's producers had two replicas built of a real Vickers-Armstrong FV 4201 Chieftain, modifying them to make them lighter. Each of them, weighing approximately 10 tons, could move along the road at an incredible speed.

To make the sequence even more realistic, a large number of vehicles that were found in local junkyards were used to create the effect that the tank was passing over them and leaving them literally squashed flat. "We squashed a lot of cars," producer Neal H. Moritz admitted. "Five-feet high cars were reduced to 12-inch thick sheets. It's an incredible sequence that had never been done before."

A BRIDGE MADE OF PLASTER

The thrilling chase between the tank and the cars had another big moment that forced the people in charge of special effects to sharpen their wits.

"There's a shot during this chase in which the tank is heading toward our heroes," explains Andy Gill, second unit stunt coordinator, "and it fires at a bridge so that lumps of concrete fall in front of the guys. Justin Lin wanted Dom, in the Daytona, to be saved by the skin of his teeth from being hit by the lumps of concrete."

It was obvious that they weren't going to demolish a real bridge. To create this scene without resorting to digital effects, the people in charge of visual effects created a partial replica of the middle of the bridge, made in this case with sections of a very light special plaster. An explosive charge was placed inside the construction and an additional car was left on top of it, so that when the detonation took place it would fall on to the highway.

"To be able to blow up the bridge in the background we had to synchronise everything perfectly," says Ryan Conder, a special effects technician, "so that the cars could continue driving through the explosion."

The principal actors, the stunt performers and the whole technical crew had to work tirelessly for weeks to make their stay in the Canary Islands unforgettable – as it turned out to be – for all the fans of the franchise.



Just like for her brother, the Canary Islands was an ideal hideaway for Mia Toreto to spend time with Brian and their baby. But even in paradise, it does not stay quiet for long.

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The Dodge Razor interpreted the habitual radiator grille of the Dodge models, but it was placed much lower down and Integrated two auxiliary headlamps.

DODGE RAZOR CONCEPT CAR

In 2002 the Dodge Razor was presented, a concept car for which the Dodge brand formed an alliance with Razor, the scooter manufacturer. The idea was to develop a sports car that was pure, light and fast, but at the same time affordable, for active young people. Despite its attractiveness it was never mass-produced, although the possibility was considered.



Its rear end featured a surprising design for the exhaust pipes, dual and positioned vertically, and the fuel cap, right in the middle.

The Dodge Razor first appeared at the 2002 Detroit Auto Show, painted an attractive orange color. It was a two-door two-seat car with a four-cylinder turbocharged engine mounted lengthwise in the front (the Chrysler PT Cruiser 2.4 Turbo) and rear-wheel drive. Small, light and very sporty, this concept car, for which possible mass production was mentioned, was seeking to offer a pure driving experience, with interesting performance figures: acceleration from 0 to 100km/h (0-62mph) in just over six seconds and a top speed of 245km/h (152mph).

The Dodge brand's formula was simple: using simple lightweight elements to produce a car that was inexpensive, but at the same time sporty, ideal for young people looking for a car with no strings attached. To achieve that, at the design stage it joined forces with Razor, a company specialising in manufacturing scooters, which made contributions in the final definition. The Dodge Razor stood out for its front, with the maker's characteristic radiator grille and large headlights; its panoramic windscreen, in which the A-pillar, placed well back, improved visibility; and a very pure rear end, with the taillights set high up and minimalist rear wings.

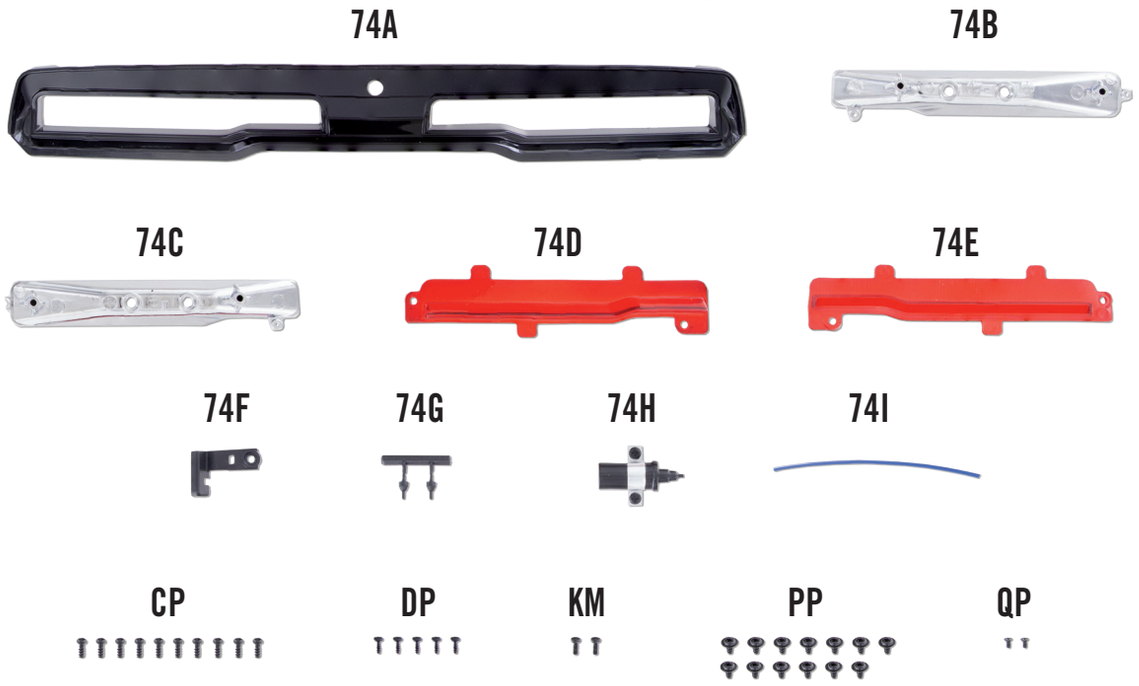
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INSTALLING THE REAR LIGHTS

In this assembly session you will install the rear lights of your model car. Follow our instructions and the accompanying illustrations carefully.

PIECES FOR THIS STAGE



74A Rear body panel
74B Left rear light socket
74C Right rear light socket
74D Left rear light lens
74E Right rear light lens
74F Coil bracket
74G High voltage terminals (x 2)
74H Ignition coil
74I High voltage cable
CP Screws 2 × 5 mm (x 10)*
DP Screws 1.5 × 5 mm (x 5)*
KM Screws 1.7 × 4 mm (x 2)*
PP Screws 2 × 4 × 5 mm (x 13)*
QP Screws 1.7 × 3.5 mm (x 2)*

* 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.

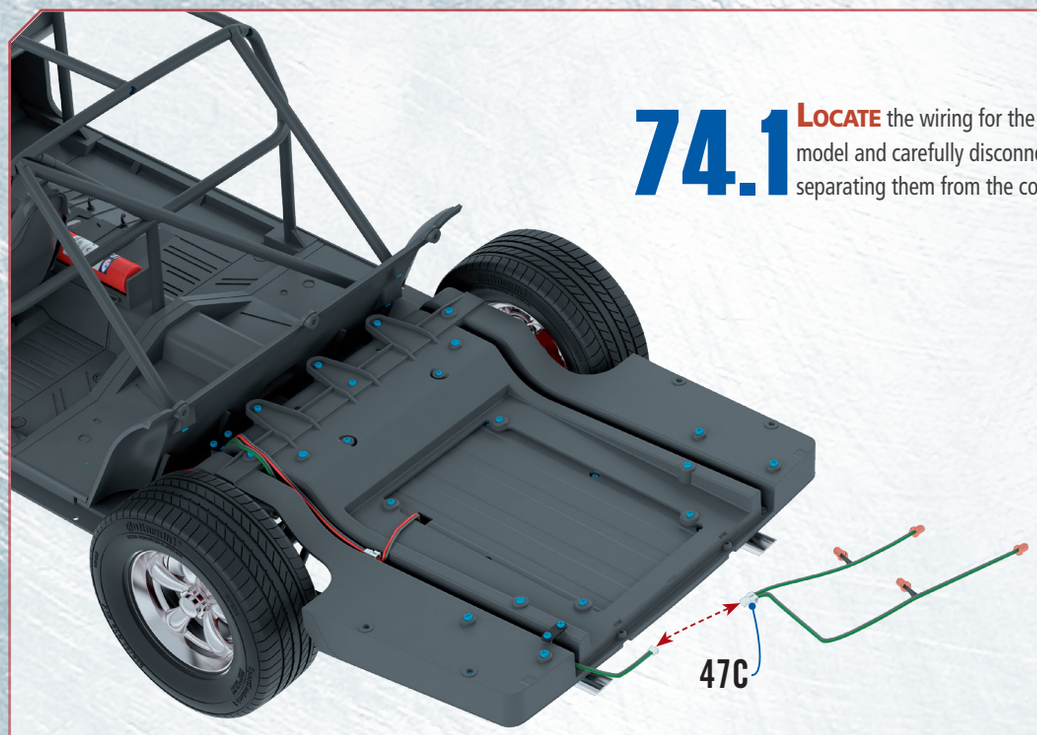
ASSEMBLY AREA



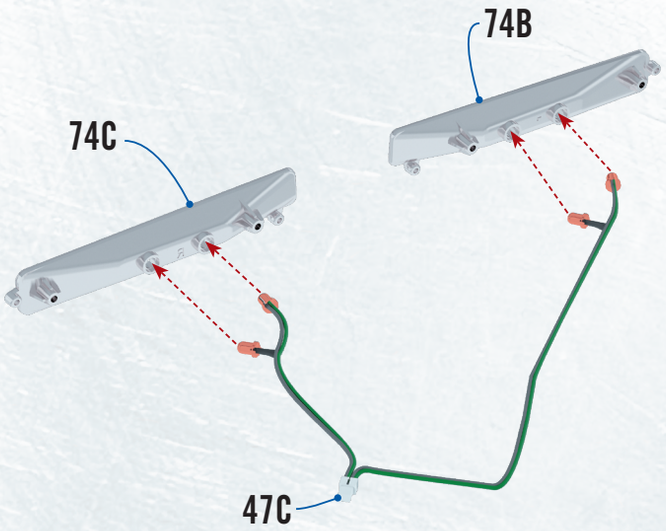
REAR LIGHTS

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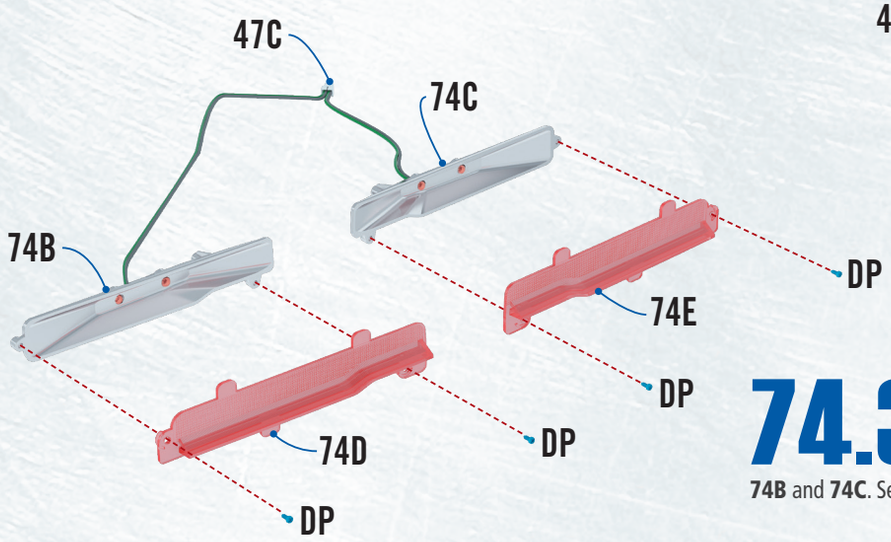
Installing the rear lights



74.1 **LOCATE** the wiring for the rear lights **47C** at the back of your model and carefully disconnect the part with the LED lights, separating them from the connector. ◄



74.2 **POSITION** the left and right rear light sockets (**74B** and **74C**) as shown in the illustration. Insert the LED lights on the wiring **47C** into the two holes in each rear light socket. The shorter wire of the wiring **47C** corresponds to the right rear light socket **74C**, while the longer one attaches to the left rear light socket **74B**. ►



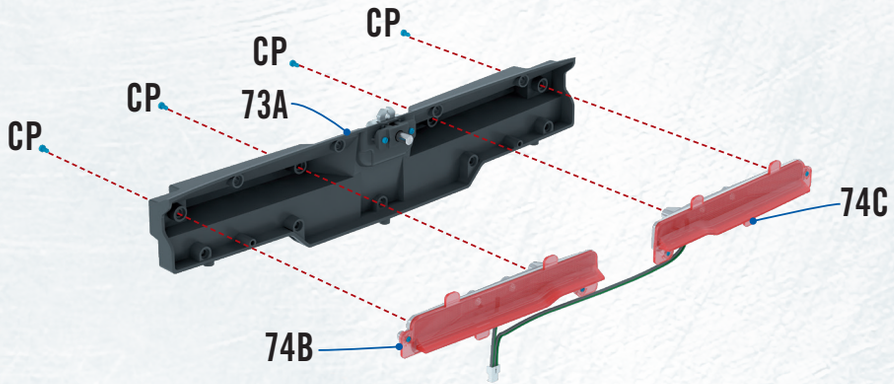
74.3 **ATTACH** the left rear light lens **74D** and the right rear light lens **74E** to the two corresponding rear light sockets **74B** and **74C**. Secure both lenses with two **DP** screws. ◄

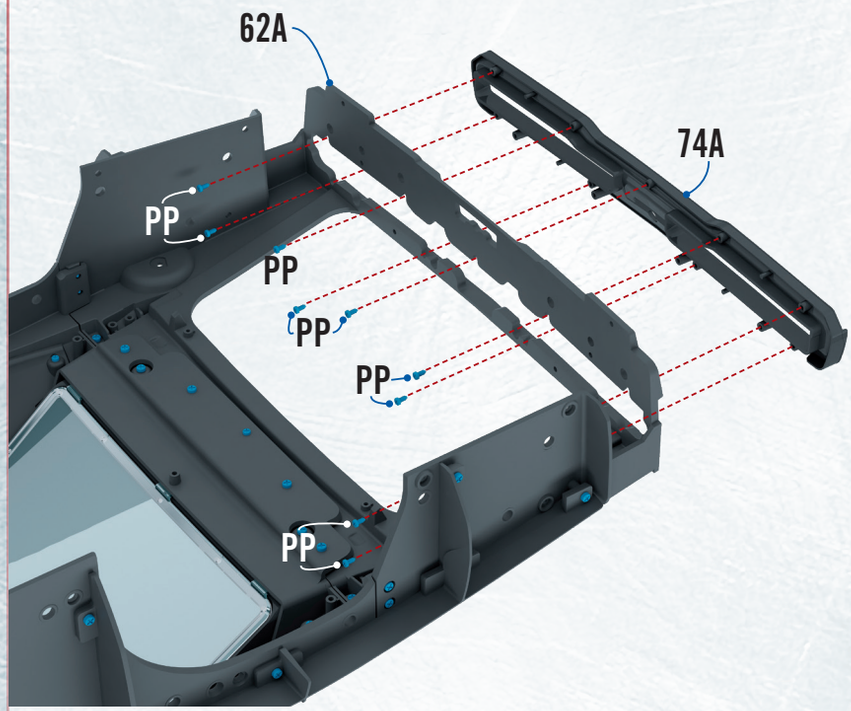
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74.4

GET the tailgate panel you assembled in the last assembly session and insert the assembled rear lights **74B** and **74C**. Secure the pieces with four **CP** screws. The close-up image shows you where the wire should be. ▼





74.5

GET the body of your car and put it roof-down on the work surface. Position the rear body panel **74A** in place and secure it with nine **PP** screws. ◀



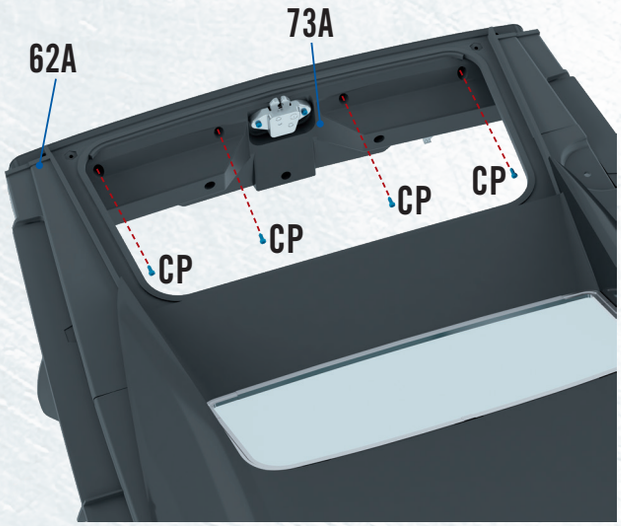
74.6

FROM THE INSIDE of the car body, insert the tailgate panel **73A** complete with the rear lights. ▶

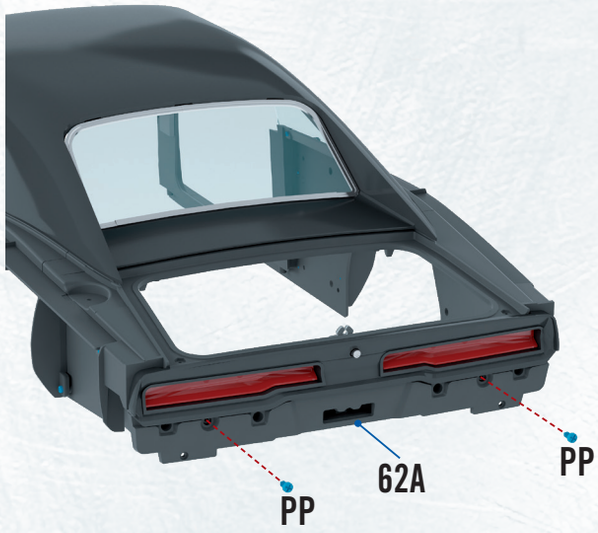
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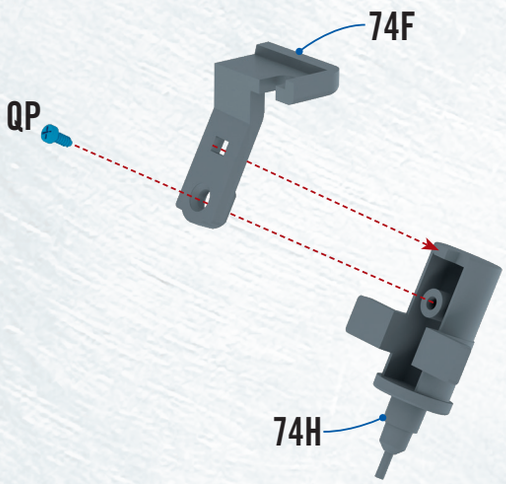
Installing the rear lights

74.7 **TURN** the car body over and from underneath insert four **CP** screws into the holes in the tailgate panel **73A**. ▼



74.8 **FROM ABOVE** insert two **PP** screws into the rear section of the car body **62A**. ▼





74.9 **ATTACH** the ignition coil **74H** to the coil bracket **74F** using a **QP** screw. Put everything you have built so far in a safe place until you need it again. ▲

RESULTS OF STAGE 74

This is the result of this interesting assembly session. Put everything you have done so far in a safe place.



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THE SECRETS OF COATINGS



The artificial coatings sector has had a major influence in recent years. Traditional coatings based on galvanic treatments have largely been replaced, and more and more new materials have emerged, with much-improved technical characteristics.

The reason for a surface coating, for example on a piston skirt, is due to the constant search for maximum performance, in this case a reduction in friction. The evolution of the technology has led to the formulation of coatings with unique characteristics, and they have found wide use in the motorsport sector. Engineers have developed surface coatings with extraordinary characteristics. Their application uses CVD

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The secrets of coatings



Carbon is used in surface coatings and its presence makes them particularly hard and friction-free, as well as creating chemical inertia in the ferrous materials with which it comes into contact. An example is carbon clutch plates.

(chemical vapour deposition) or PVD (physical vapour deposition) technologies. Of course, the first to benefit from it are usually Formula 1 engines. The coatings in question, which are invariably extremely hard, are characterised by a thickness of only a few microns combined with an excellent friction coefficient. The best known, and most widely used, are those using chromium nitride (CrN), that has a hardness of the order of 2300 Vickers points. By contrast, the hardness of stainless steel is equal to 140 Vickers points. Among other things, they are used on many titanium engine valves. In the motorcycle field, they are very popular for coating the barrels of telescopic forks. Other coatings that are used on valve stems are those made of aluminium nitride and titanium nitride. For the gears of competition engines, tungsten carbide/carbon (WC/C) multilayer inserts are sometimes used, which allow an improvement in mechanical efficiency, thanks to the lower friction coefficient.

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SURFACE PROCESSES

For a long time the surfaces of mechanical parts that are subjected to friction, often in the presence of considerable contact pressures and perhaps even marginal lubrication, were protected from wear by means of thin surface coatings that were almost always applied through an industrial galvanising process. This solution, which is both practical and economical, is still widely used. The most widely reported material, in the case of components like piston rings, valve stems and rocker-arm pads, is chromium. In this case, we are talking about galvanic chromium plating. In other cases, for example when parts such as connecting rods need to be protected from corrosion, zinc plating is more common. The most common type of galvanising is hot dip galvanising, which is carried out by immersing the substrate in a tank containing molten zinc (with small amounts of other metals), at a temperature of about 450°C. Under these particular

The secrets of coatings



Automotive piston skirts are often coated to reduce friction, wear and noise.

conditions, different layers consisting of almost pure zinc (outer layer), and of alloys and inter-metallic iron-zinc compounds of various compositions, form on the surface of the steel. Alternatives are electro galvanising (plating), which uses electrical current to cause positively charged zinc ions to be attracted to negatively charged steel; and galvanising by thermal diffusion using zinc in powder form combined with particular additives. Vapour phase galvanising in a vacuum is also used, with zinc vapours being deposited on a metal substrate.

Less frequently, a material is coated using flame or plasma spraying systems to apply a thin layer of metallic molybdenum - a component that increases surface hardness, with abrasion and heat resistance.

Anodising, mainly of aluminium alloys, is often used for aesthetic reasons because of its particular finish. However, in reality it is fundamental in the mechanical field because it ensures great resistance to wear and abrasion. In practice, an electrochemical process creates an artificial protective oxide layer on the treated surface. Other more recent processes are chromic passivation, which is frequently used to protect the surfaces of magnesium alloy components from corrosion, and phosphating, which involves the formation of a surface layer of

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porous metal phosphate crystals that are able to retain oil. This has beneficial effects on the durability of parts that are subjected to friction wear. The latter is used, for example, on competition pistons, to provide additional protection against seizing.

LIKE A DIAMOND

The most famous surface covering has for some time been the DLC (Diamond Like Carbon) system. In fact, this abbreviation is quite generic, since it identifies a certain group of coatings that can have characteristics that are significantly different from each other. These very thin layers are only a few microns thick. They are applied to metal surfaces and have extraordinary properties. Their characteristics are determined by the percentage of hydrogen present and the relationship between two types of bond, one typical of graphite, the other of diamond. We can, therefore, create completely amorphous materials (with or without hydrogen) and other microcrystalline materials. Hardness can range from just over 1000 Vickers points to over 5000. The coefficient of friction in some cases is so low (less than 0.1) that it is close to that of PTFE (Teflon®). Given the reduced thickness of the deposit, it is important that a very high finish, even higher than that obtained by polishing, is imparted to the underlying metal surface.

DLC coatings are used for the finger rockers of high-performance engines, as well as the tappets and the camshafts. These days they are mainly used on Formula 1 cars and some motorcycles.

ALL CARBON IS NOT THE SAME

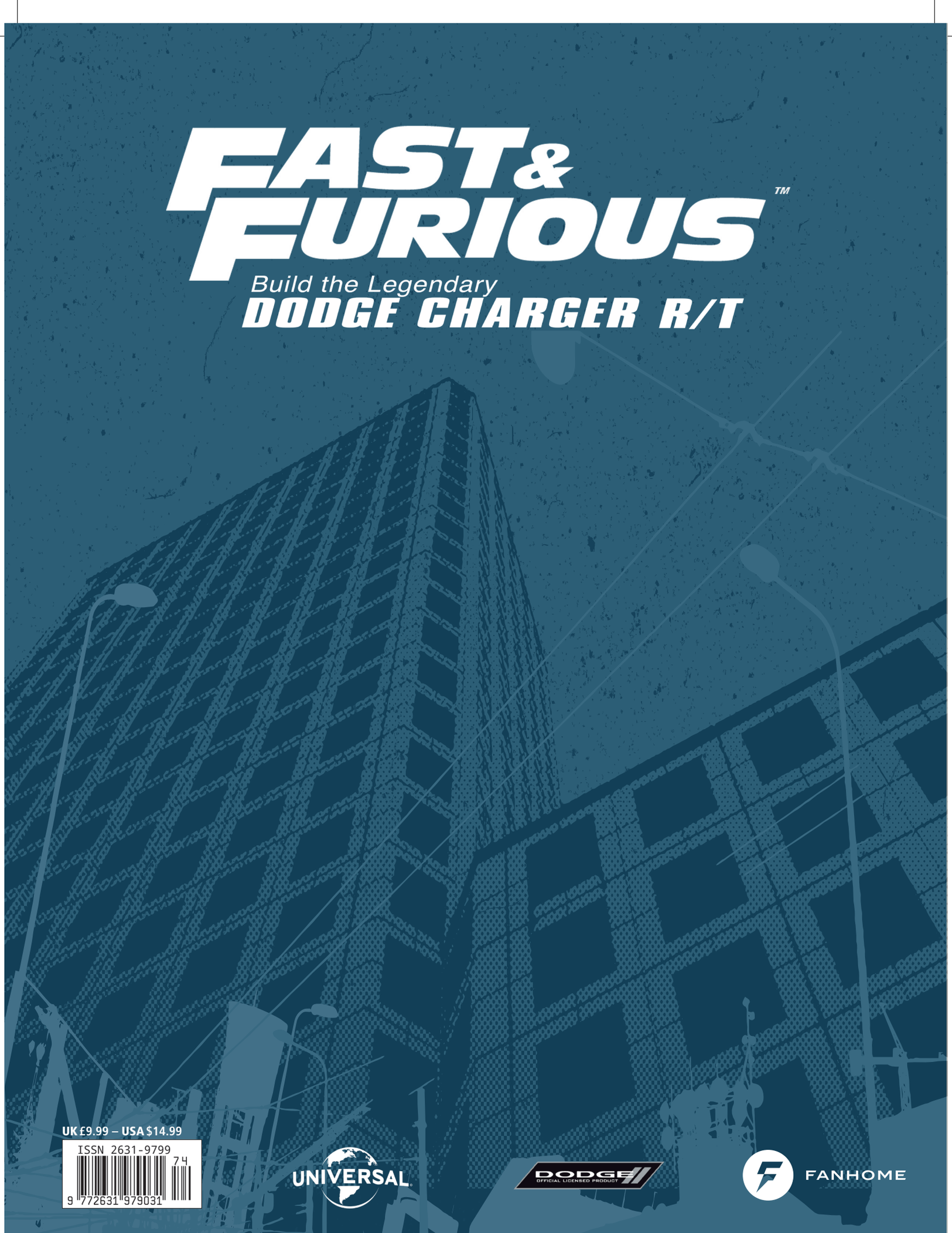
After years of trial and error with the use of special plastics and ceramics, it is now clear that the material of the future, outside of the world of metals, is carbon. Motorsport fans are already familiar with the more "traditional" use of carbon in the production of single-seater Formula 1 cars. Composites of carbon fibres are also used for the various aerodynamic bodywork elements of this type of car. If it were not so expensive, it would probably also be widely used on normal production cars. Carbon fibres are now available in a wide variety of types, and can boast some extraordinary characteristics. In the aeronautical field, they are widely used, although not for elements that are subjected to high mechanical stress. These fibres combine low density with excellent tensile strength and very high rigidity. They are often used in the form of superimposed layers of fabric, embedded in an epoxy resin matrix.

A very different story is the carbon used to make the brake discs for Formula 1 cars. In this case, one of the two production technologies used involves the creation of a three-dimensional support structure using short fibres, which is then impregnated with carbon molecules. The process takes place in a methane-rich atmosphere at a temperature of about 1000°C, and at a pressure lower than atmospheric pressure. It takes a long time - in a hundred hours only one layer is deposited, with a thickness of the order of one hundredth of a millimetre! The cost, of course, is very high. The other technology employed involves the use of a carbon-rich liquid mixture based on carbon fibres and other agents. In this case, too, the temperature is very high and the process can take months.

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