FAST & FURIOUS™

82

Build the Legendary

DODGE CHARGER R/T



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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: 978-1-4439-5225-5
FFN82: 22 03 30

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

Picture credits: NBCUniversal Archive; FCA Archives; Work Wheels; Shutterstock

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Printed in Poland

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NAVISTAR MXT: A CAR FOR LUKE HOBBS

Not all the vehicles in the *Fast & Furious* franchise are fast. There is also room for other types of models that adapt to the characters' personalities. One of the clearest examples is the imposing Navistar MXT, which, as you might expect, is a ride tailor-made for Luke Hobbs in the sixth movie in the series.

When the franchise's vehicle coordinator, Dennis McCarthy, starts preparing for each movie he makes a detailed study of each character's personality to find the right car to match it. In Fast & Furious 6, the result of this choice put Dominic Toretto behind the wheel of some wild beasts of the road, like the 2010 Dodge Challenger, the 1969 Dodge Daytona, and a 1970 Plymouth Barracuda. Brian O'Conner was provided with cars such as the 1969 Mustang or the 1970 Ford Escort Mk 1, a car close to the hearts of many drivers in the United Kingdom, which was to be one of the main locations for the film. Likewise, we would see Letty at the wheel of an awesome 1973 Jensen Interceptor, and the elusive Owen Shaw in the unstoppable Flip Car, an original design by McCarthy.

But when it came to deciding on the ideal vehicle for Agent Luke Hobbs, things got complicated. Even the muscle cars that Toretto loves so much look like miniatures next to such a huge man. They unquestionably needed to find a vehicle as enormous and as tough as him, so McCarthy opted for the spectacular Navistar MXT.

FROM CRANES TO COMBAT VEHICLES

If you wish to trace the origins of the company that makes this brutal vehicle, you'll have to go back to 1902, no less, when The International Harvester Company was founded in the USA, manufacturing agricultural machinery. When the USA entered World War I the owners of the company began to produce combat vehicles for the US army. And something very similar happened 20 or so years later with the start of the Second World War. On that occasion, many of the operations were dedicated to manufacturing M series trucks for the Navy and the Marine Corps.

Capable of charging into the middle of any battle, the powerful Navistar MXT was the ideal vehicle for Luke Hobbs, and matched his personality perfectly.

Navistar MXT: A car for Luke Hobbs

The vehicles became massively famous when they went into action on the battlefield and worked under extreme conditions. They showed themselves to be tough and incredibly durable, the reason why many soldiers heaped praise on them. These good results convinced the company to continue manufacturing military vehicles, without forgetting other lines of production, like trucks, diesel engines and farm machinery.

Shortly after the Gulf War, the need again arose for the US Army to have high-quality combat vehicles. Thus, in 1993 the company was relaunched as Navistar International. Although its production was enormously diversified, it established the Navistar Defense line for the large-scale production of trucks and armored vehicles. Although the model driven by Luke Hobbs in *Fast & Furious* 6 looks like a real monster on the road, it is considered to be the smallest vehicle in Navistar's catalogue.

JEWELS ON WHEELS

For the movie, the director Justin Lin wished to resort as little as possible to computer generated digital effects. The director was seeking to transmit realism in every shot, so the vehicles could not just be simple display models. Modifications had to be made to all of them, to a greater or lesser extent, to withstand the acrobatic maneuvers that they would be making in front of the cameras, from leaping on a highway in the Canary Islands to burning rubber in the center of London.

AS TOUGH AS IT IS VERSATILE

The MXT is one of the most prestigious models in the Navistar Defense line. Despite the fact that it is less voluminous than the huge trucks in the 700-MV series or the MaxxPro armored vehicles, the MXT line combines mobility with protection. Its power and its agility have a lot to do with the independent suspension, which allows it to

The MXT lives up to its ferocious image perfectly. This tough truck is the most powerful and prestigious model in the range.



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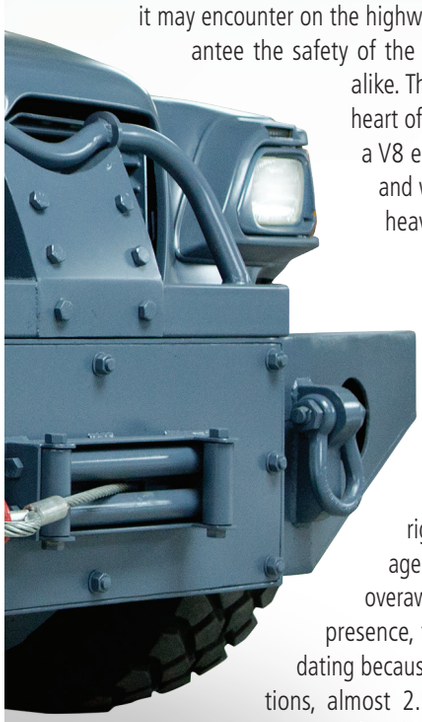
BEN COLLINS

As well as becoming a very popular racing driver thanks to his victories in competitions like Formula 3 and Indy Lights, Ben Collins became a very familiar face after appearing on the popular BBC TV program *Top Gear*, for which he performed countless acrobatic challenges. Born on February 13, 1975, in the English city of Bristol, he began racing in 1994 in different international competitions. A decade later, he approached the film industry as a stunt driver in the movies *National Treasure* (2004) and *National Treasure: Book of Secrets* (2007). He found the experience totally satisfying so he began working regularly in action movies like *Quantum of Solace* (2008), *The Dark Knight Rises* (2012), and the sixth *Fast & Furious* movie. Besides becoming the official driver in the James Bond franchise, including *No Time to Die* (2020), Collins has placed his driving experience at the service of some of the biggest box-office smashes in recent years, like *Kingsman: The Secret Service* (2014), *Transformers: The Last Knight* (2017), *Solo: A Star Wars Story* (2018), and *Ford v. Ferrari* (2019), in which he had a small part as the racing driver Denny Hulme.

present superior results in both maneuverability and braking, even over extreme terrain.

With more than 260 units deployed all over the world in variations on patrol vehicles, ambulances and command vehicles, the Navistar MXT performs equally brilliantly on desert sand and asphalted roads. In fact, in *Fast & Furious 6* it showed it was capable of getting involved in a high-speed chase through the streets of London, trying to stop of the elusive Flip Cars of Shaw and his gang.

With 4x4 performance, the Navistar MXT has MRAP-type protection, against the bullets, mines and bombs that it may encounter on the highway, and this helps to guarantee the safety of the personnel and the cargo alike. The power is supplied by a heart of iron: the MaxxForce 6.0D, a V8 engine giving up to 340hp and which is designed to move heavyweight military vehicles.



HOBBS ON THE ATTACK

McCarthy's decision to provide Hobbs and Riley with a vehicle as classy as the Navistar MXT proved to be the right one. Just like when the agent goes into action, and he overawes his rivals with his mere presence, the vehicle is also intimidating because of its impressive proportions, almost 2.5 metres high and over 2.3 metres wide, with a cargo-carrying capacity of 3,800kg. Obviously, it can't compete with a sports car for speed, but like Hobbs himself, it brushes aside any obstacles that get in its way.

The agent and his Navistar MXT launch themselves fearlessly after Shaw and his gang, aware of their power and their absolute superiority when it comes to action and danger.

The Navistar MXT paralyses its rivals with its imposing presence, and with Hobbs at the wheel it is unstoppable.



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DODGE CARAVAN
THE FOURTH GENERATION

Established as the best-selling minivan in the world, the Dodge Caravan and its twins, the Chrysler Town & Country and the Chrysler Voyager, were given a complete makeover in 2001 with the arrival of new items of equipment and new seven-seat bodywork, available in two lengths.

The fourth-generation Dodge Caravan inherited from its predecessor the title of best-selling minivan in the United States.

The fourth-generation Dodge Caravan was presented at the 2000 Detroit Auto Show. This model, based on the Chrysler Group's RS platform, had a completely flat floor that made the interior distribution of seven seats in three rows easier (arranged 2+2+3), to which access was gained through conventional front doors and large sliding rear doors. For the first time in the model's history, the latter had automatic electronic opening, just like the rear hatch door. From 2005 and coinciding with an important redesign, the Chrysler Group launched the Stow & Go seat reconfiguration that made it possible to hide the individual seats in the second row and the third-row bench seat on the floor of the vehicle, and to take advantage of the extra boot space when the seats were folded down.



The ingenious Stow & Go folding seat system increased this vehicle's versatility.

The brand commercialised two types of bodywork, Caravan and Grand Caravan, the latter being longer (5.09 metres as opposed to the 4.8 of the short version). The Grand Caravan had a longer projecting rear end and a longer wheelbase. The manufacturer sold this large minivan with different engines, all of them petrol-driven. The range began with a 2.4-litre four-cylinder engine giving 150hp, and was completed with two 3.3 and 3.8-litre V6 engines, giving 180 and 200hp respectively. All versions had automatic gearboxes, for both the two-wheel drive versions (front-wheel drive) and the 4×4s.

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MOUNTING THE LEFT DOOR (I)

In this assembly session you will attach several accessories to the left door.
Please follow our assembly instructions and the accompanying illustrations carefully.

PIECES FOR THIS STAGE

82A



82B



82C



82D



82E



82F



AP

CM

DM

82A Left door (outer panel)
82B Handle
82C Lock
82D Wing mirror arm
82E Wing mirror unit
82F Wing mirror adhesive
AP screws 1.7 x 4mm (x 2)*
CM screws 1.7 x 3mm (x 2)*
DM screws 1,7 x 3 x 5mm (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.

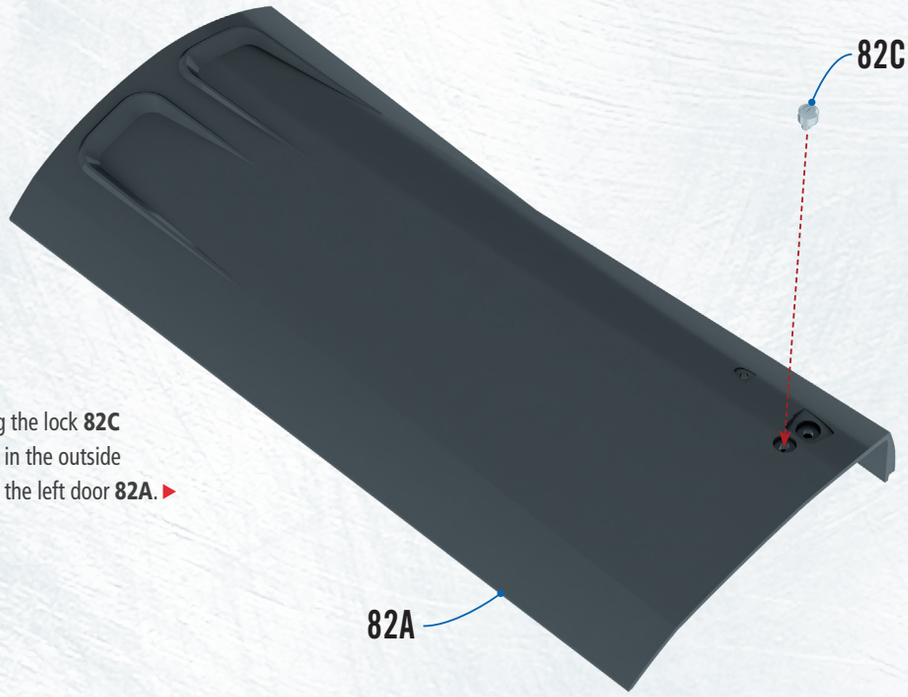
ASSEMBLY AREA



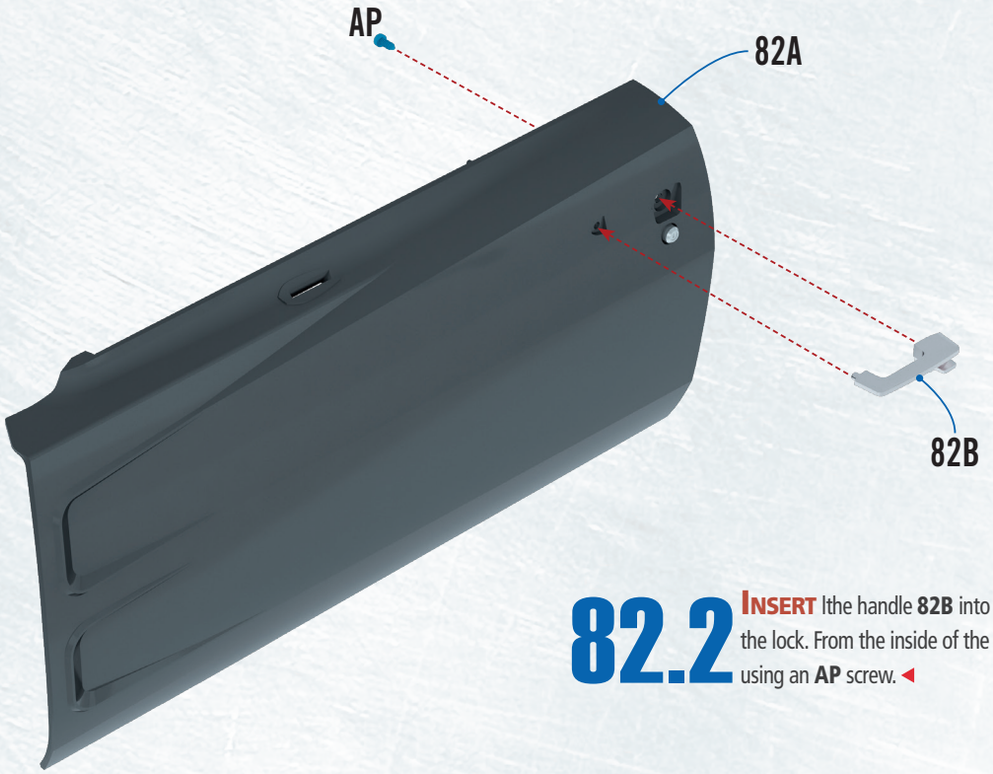
LEFT DOOR

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Mounting the left door (I)



82.1 **START BY** inserting the lock **82C** into the smaller hole in the outside of the outer panel of the left door **82A**. ▶

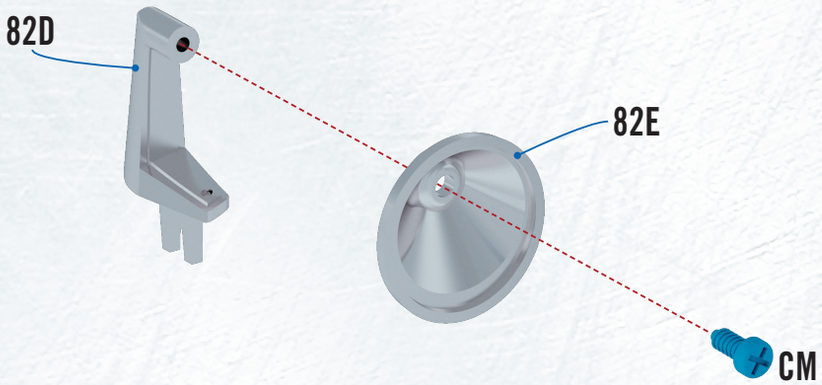


82.2 **INSERT** Ithe handle **82B** into the holes above the lock. From the inside of the door, secure the piece using an **AP** screw. ◀

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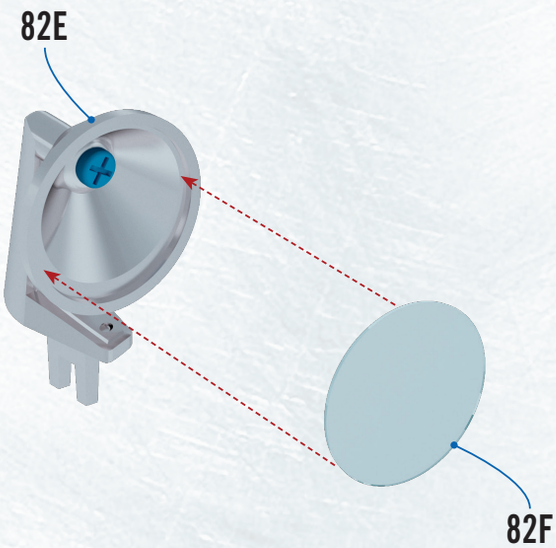


82.3 **JOIN** the arm **82D** and the wing mirror unit **82E**, as shown in the illustration. Secure the pieces with a **CM** screw. ▼





82.4 **REMOVE THE PROTECTIVE FILM** from the adhesive **82F** and stick the latter inside the wing mirror unit **82E,** using a pair of fine-point tweezers. ▼

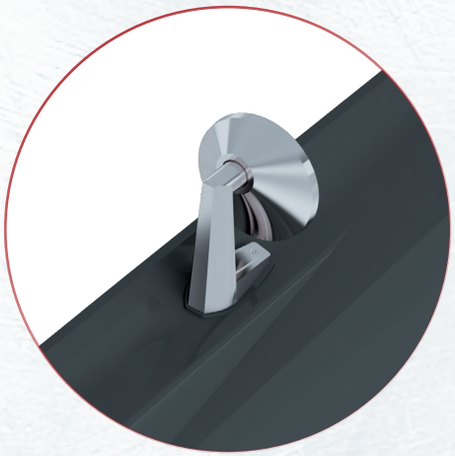


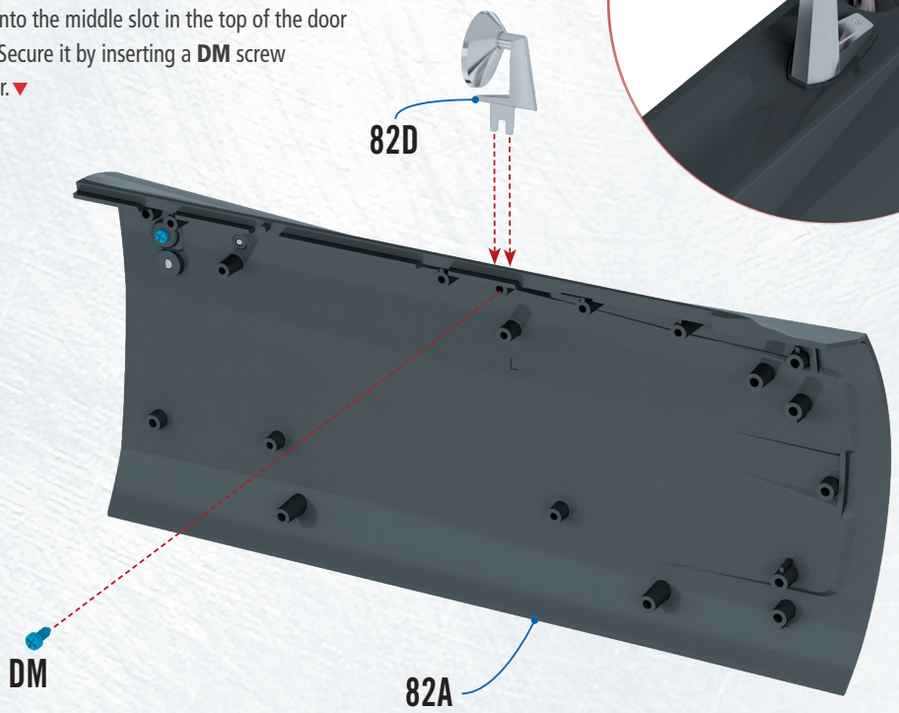
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Mounting the left door (I)

82.5 Insert the wing mirror arm

82D into the middle slot in the top of the door **82A**. Secure it by inserting a **DM** screw from the inside of the door.▼





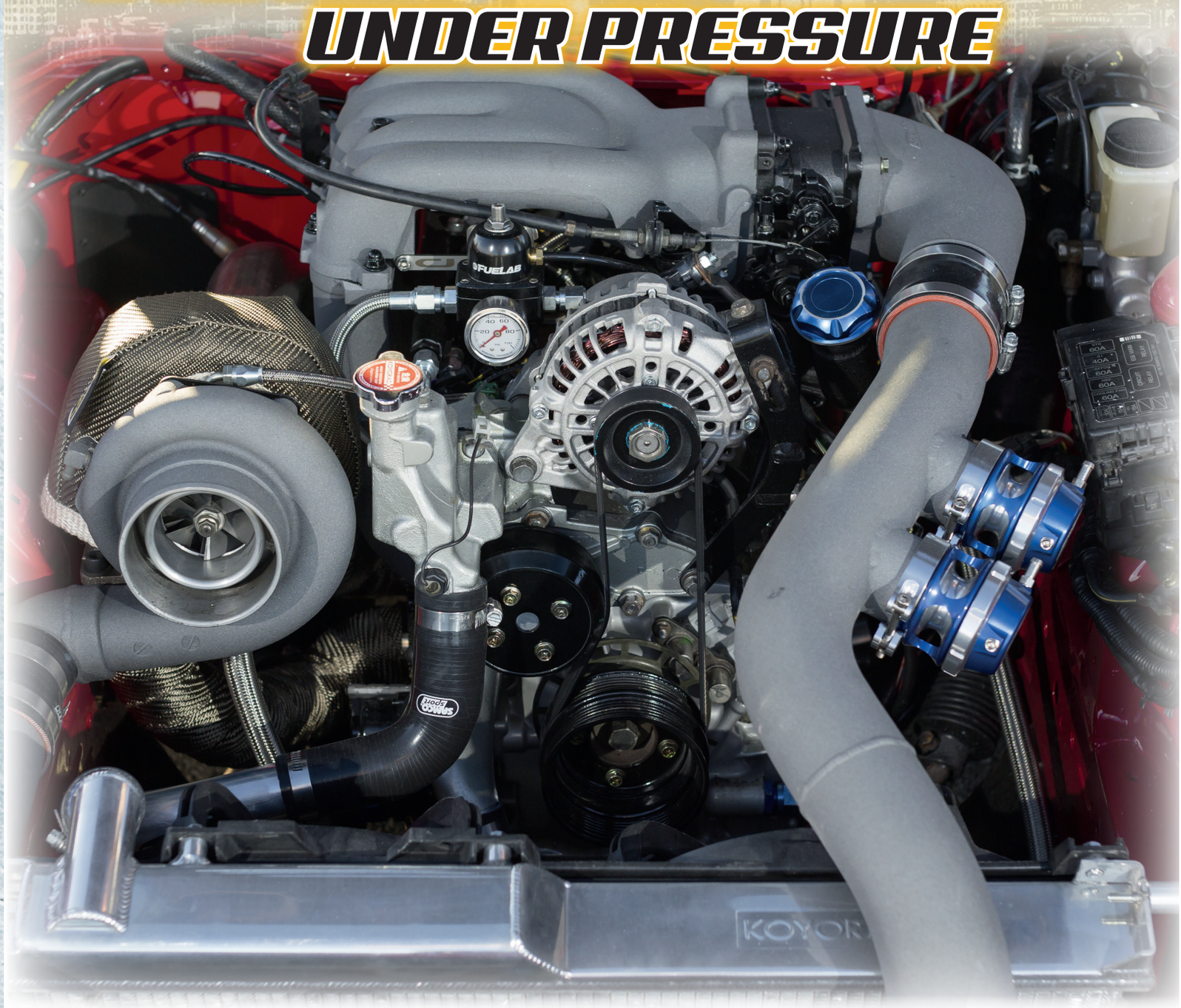
RESULTS OF STAGE 82



You have now attached the first set of accessories to the left door.

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STAYING COOL UNDER PRESSURE



Compressors, whether they are centrifugal, volumetric Roots type, or vane-type superchargers, always heat up the air they discharge. This is a significant disadvantage for the engine's performance. That is why intercoolers, heat exchangers that reduce the air temperature, were invented!

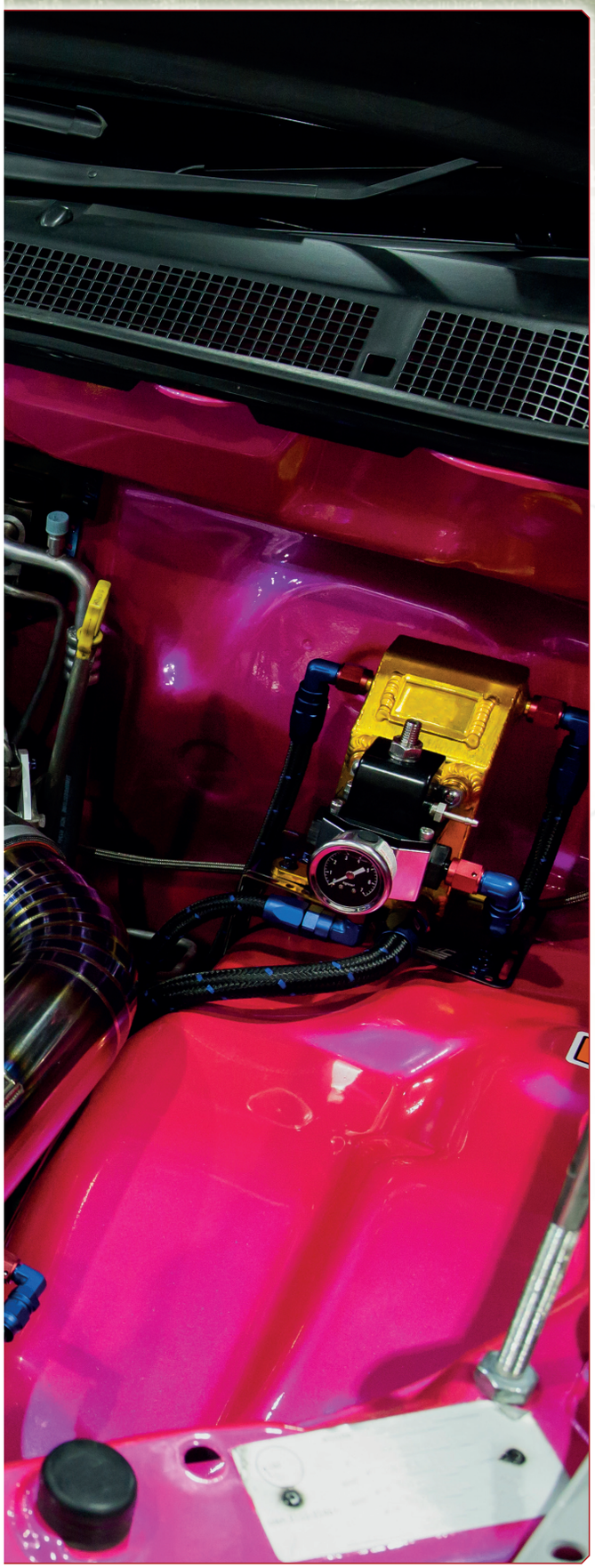
The compressor sends air to the cylinders with higher pressure than ambient air, and with a much higher temperature. To be more precise, with a constant boost pressure the air increases in temperature inversely to the efficiency of the compressor. To illustrate with numbers: with a boost pressure of 0.5 bar and an ambient temperature of 20°C, if the efficiency is 0.50, the air will exit the compressor at a temperature of

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Staying cool under pressure



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the order of 90°C. If the efficiency is 0.75 it will exit at approximately 65°C. Therefore, for each given output, the increase in the temperature of the air from the compressor is inversely proportionate to the boost pressure.

Not only that, but as its temperature increases, the density of the air decreases, and this is a fundamental consideration. In fact, the increase in power is directly linked to the ratio between the density of the air supplied to the cylinders and that of the ambient air.

REDUCING THE TEMPERATURE

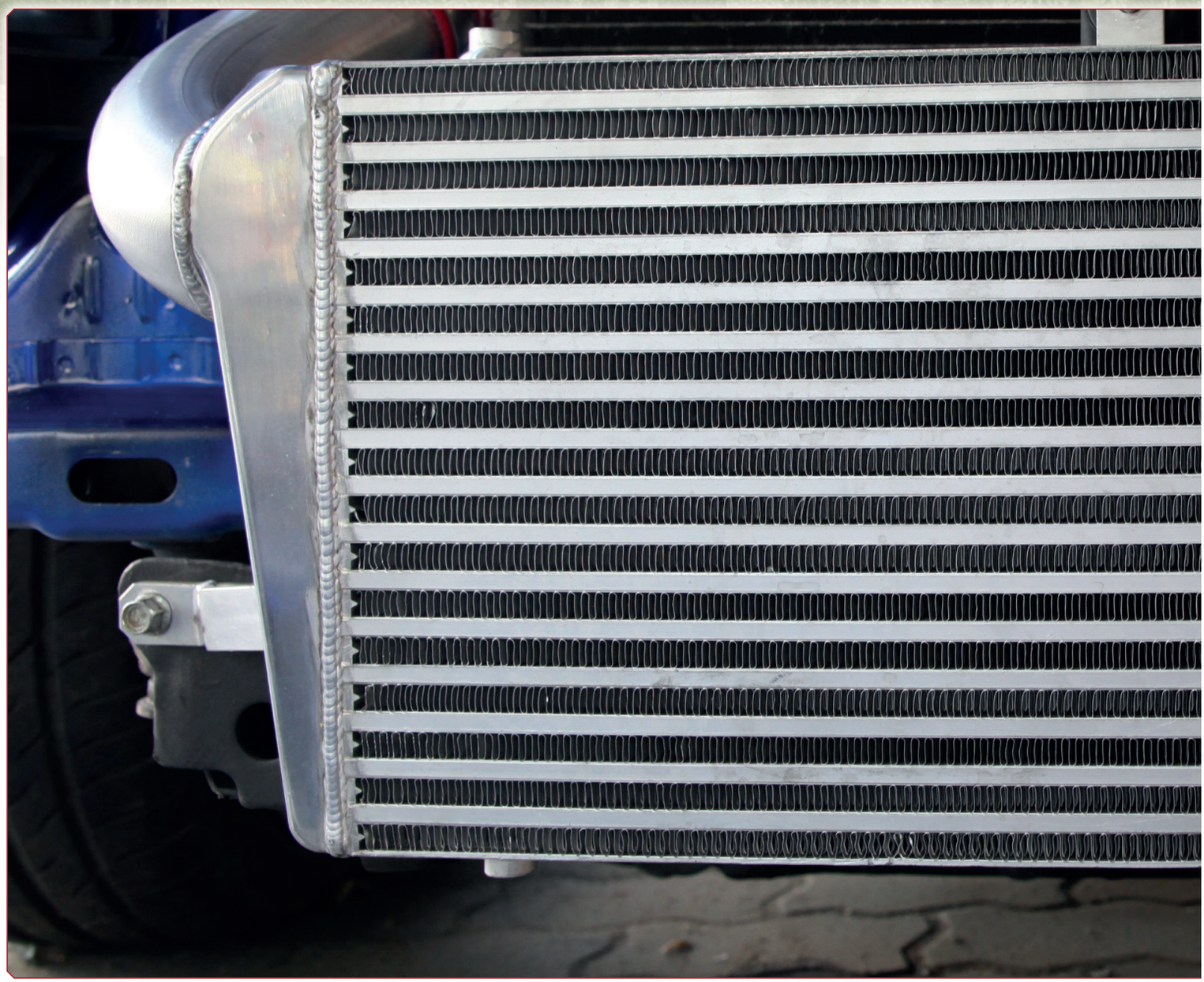
The compressor heats the air, and consequently the air that it sends to the cylinders contains fewer molecules per unit volume than you might think if you only consider the boost pressure. If, for example, the boost is one bar (which is equivalent to saying that the feed pressure is 2 bar), the air density is not twice that of the ambient air, but perhaps only 55-60% higher, due to the heating that the air undergoes. An initial advantage can be obtained by reducing the air temperature and therefore achieving an improvement in performance derived from the introduction of denser air into the cylinders. The amount of the advantage, in terms of power, varies from case to case. In some diesel engines, a 10°C decrease in the temperature of the air supplied to the cylinders can lead to an increase in power of the order of 3%. However, there is another good reason to reduce the temperature of the air supplied to the cylinders: The maximum temperatures of the cycle, and therefore the thermal stresses to which components such as valves and pistons are subjected, increase as the temperature of the air present in the cylinder increases at the beginning of the compression phase. This is as well as the risk of pre-ignition in four-stroke engines.

UNWANTED EXPLOSIONS

If the pressure or temperature inside the combustion chamber exceeds certain values, the air-fuel mixture not yet reached by the flame front can ignite suddenly and explosively. In other words, detonation, or pre-ignition, takes place. If air is introduced into the cylinders under pressure and with a temperature considerably higher than the ambient temperature, regardless of the compression ratio, it inevitably causes this extremely dangerous phenomenon, which can quickly lead to damage of components such as pistons. It is for this reason that supercharged petrol engines normally have a lower compression ratio than the corresponding naturally aspirated versions. However, this leads to a deterioration in the thermal efficiency, that is to say an increase in fuel consumption. When the boost pressure exceeds a certain value, it becomes essential to cool the discharged air. With diesel engines, there is no problem of

Air-to-water intercoolers usually have their own radiator and their own electrically driven centrifugal pump. The coolant is independent of the coolant in the cooling system.

Staying cool under pressure



When passing through the intercooler, the air must meet the minimum possible resistance consistent with the need to obtain efficient cooling. The air channels have a large cross-section, in order to minimise load losses.

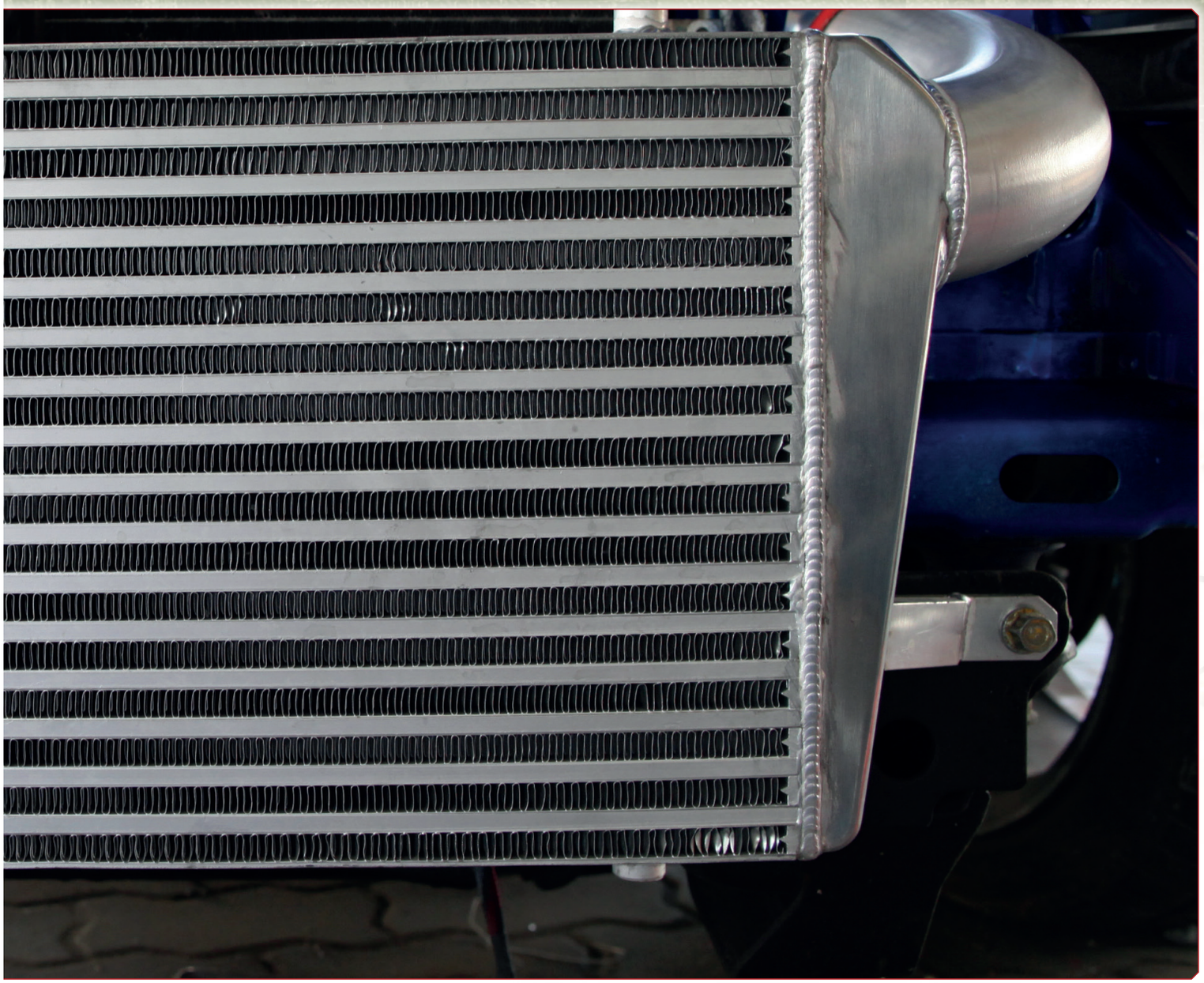
pre-ignition, but adequate refrigeration of the air, and often a reduction in the compression ratio, is essential to limit thermal and mechanical stresses.

DIFFERENT TYPES

Heat exchangers (intercoolers) are used to reduce the temperature at which the air is delivered by the compressor before it enters the engine. Depending on the case, it may be air-air or air-water. They are not always necessary, but they become essential when the turbocharging pressure is in the order of 0.5 bar or more.

For a long time the most widely used were those of the "air-air" type, which are still preferred because of their simplicity. These devices closely resemble the normal radiators used for cooling circuits. They are typically made up of two elements in the form of properly interconnected "trays" that have the task of channelling the air and distributing it appropriately, and an exchange matrix consisting of a series of tubes connected by thin sheet-metal fins arranged perpendicularly to the tubes. The material used is always aluminium alloy, appreciated for its low density and high thermal conductivity. The fins increase the surface area exposed to the outside air as it passes through the matrix and faciitates the removal of heat. To increase the surface area in contact with the feeding air, and to impart to it a certain turbulence that improves the coefficient of heat exchange, elements called "turbulators" are used. These devices turn a laminar boundary layer into a turbulent boundary layer. This method can only be followed up to a certain point,

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as the pressure drops caused by the passage of the supply air through the intercooler must be kept to a minimum.

In air-water intercoolers, the task of cooling the compressed air before it enters the engine is entrusted to the coolant that circulates in its own system equipped with its own radiator. One or two electric pumps circulate the water at a specific speed. This is the preferred solution for engines intended for competitive use. The air-water intercoolers are very compact and can considerably reduce the path that the feed air must take to get from the compressor to the cylinders - a considerable advantage! The other side of the coin is a higher cost, as they involve an additional circuit with its own pumps and its own radiator. However, it can be considerably less cumbersome than an air-to-air intercooler.

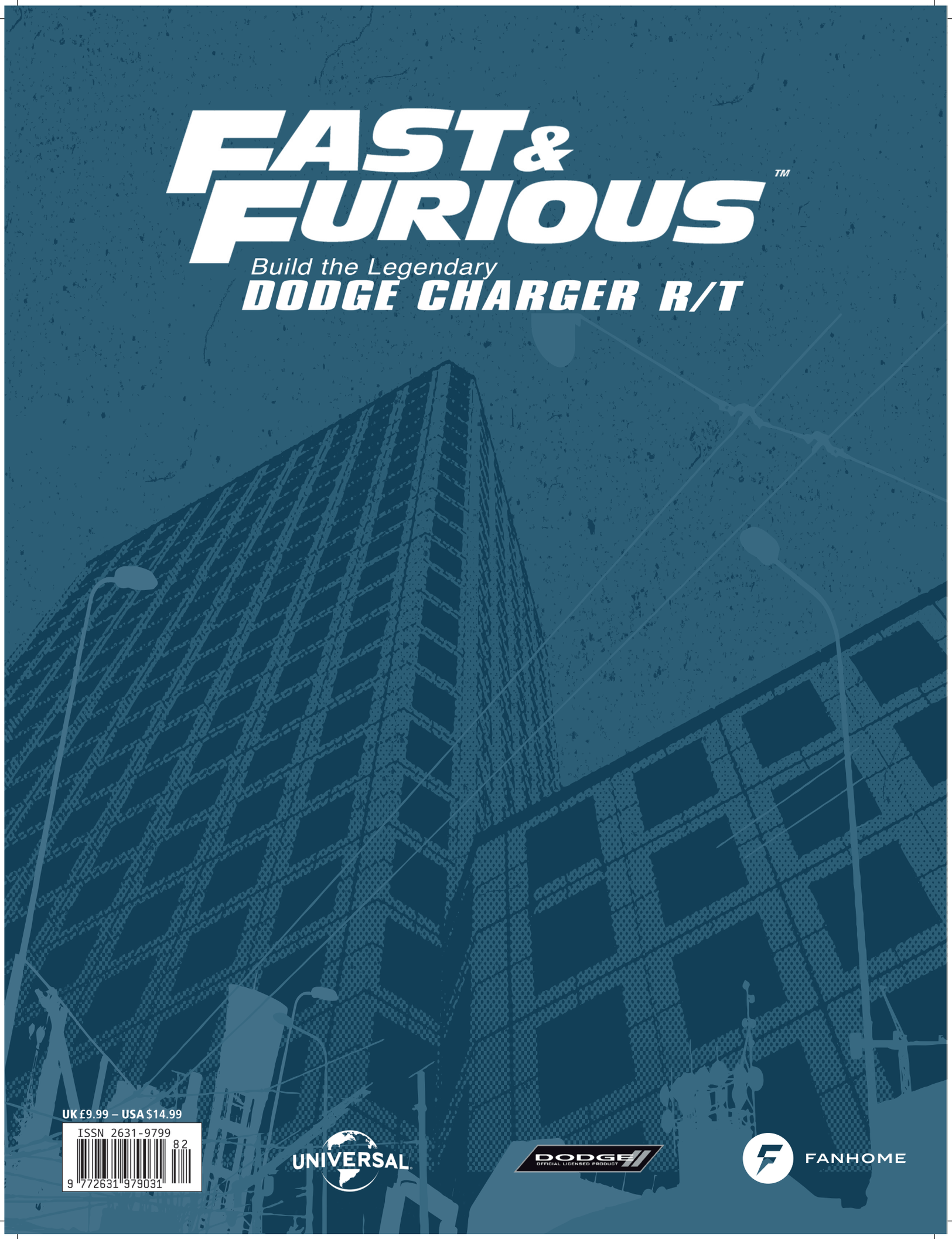
THE IMPORTANCE OF EFFICIENCY

While the temperature of the air leaving the compressor depends on the efficiency and boost pressure adopted, we are talking about 120-130°C on average for a standard compressor. These values need to be lowered to approximately 60°C - a reduction of around 50%. For highly tuned engines, the charge air "stress" increases drastically, even touching temperature differences of almost 110°C! If we take a dip into the past and return to the 1980s when Formula 1 first used turbocharged engines, intercoolers were able to ensure air temperature reductions of up to 180°C. This was a very high value, considering that the air could exit from the compressor at up to 230°C, with boost pressures sometimes higher than 3 bar.

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