FERRARI F1-2000

MICHAEL SCHUMACHER

The Formula I world champion in 2000

5



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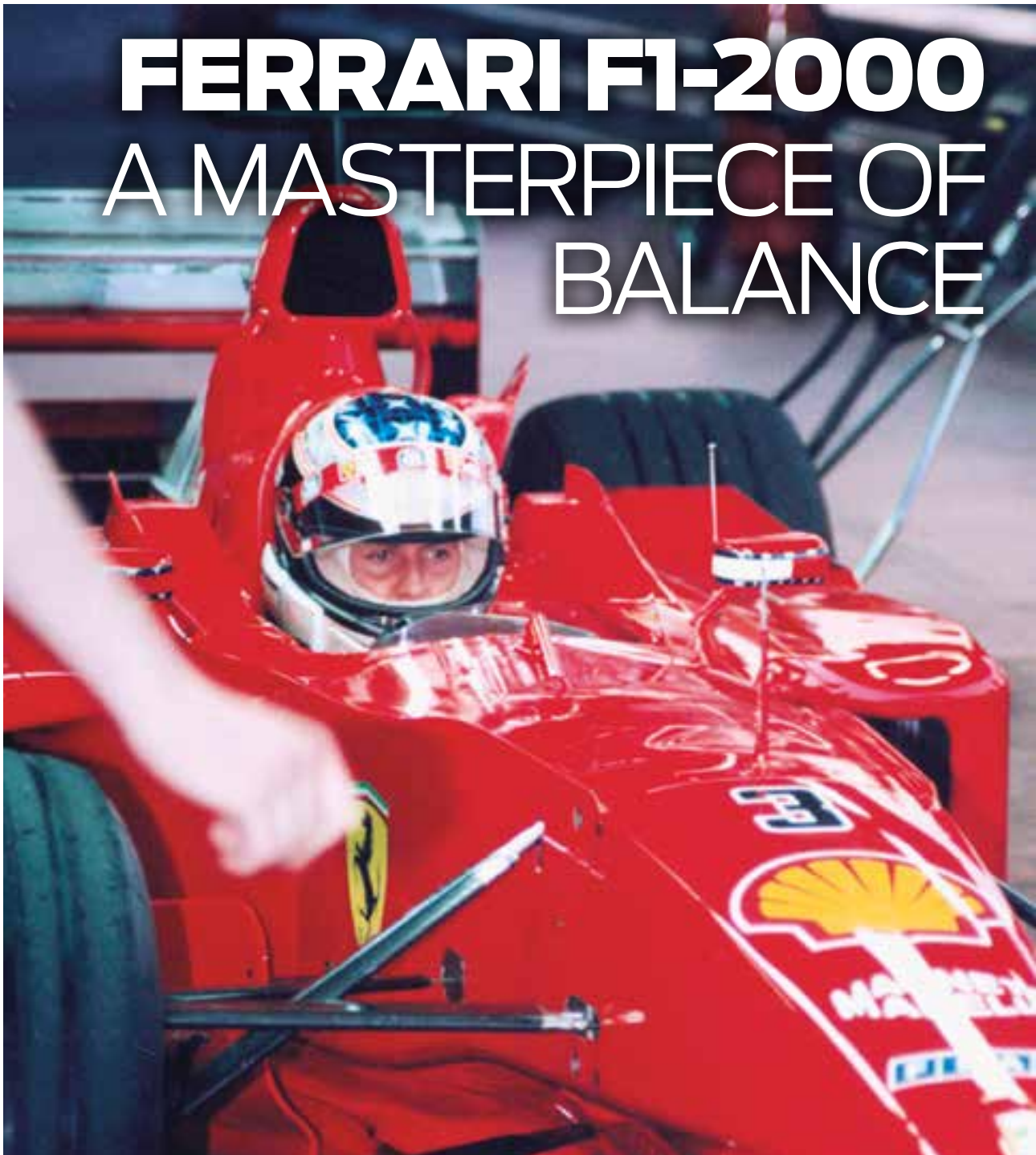
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FERRARI F1-2000
A MASTERPIECE OF BALANCE



To be successful, a Formula 1 car must meet a series of requirements – speed, stability, lightness, safety – which must be in perfect balance with each other, naturally taking into account the rules laid down by the competition regulations. Compared to the F399 that competed in the 1999 World Championship, the F1-2000 built by Ferrari

for the new season was a single-seater that, although it may have appeared similar to its predecessor, was actually completely innovative. This was in terms of both its individual components and, above all, its design philosophy, in which the setup and weight distribution are of crucial importance, as well as aerodynamics.

Chassis and setup

The cell around which the car was developed was the monocoque chassis formed by a honeycomb structure covered with “skins” (very thin layers) of carbon fiber. This material, used for the first time in Formula 1 in 1981 by McLaren, offers an ideal combination of strength and elasticity and allows the creation of a “box” with such rigidity and lightness that it contributes significantly to improving performance in terms of speed and cornering. It also has the essential function of protecting the driver by enveloping him in a very solid shell.



Rubens Barrichello on the Belgian circuit of Spa-Francorchamps. Qualifying sessions are essential for adjusting the car’s setup ahead of the race.





Another factor of primary importance on the F1-2000 was the lowering of the center of gravity, due primarily to the new engine (project number 049), with its 90° V-shaped banks. The designers also placed the oil tank between the chassis and the engine in order to shift the weight further toward the rear, to the benefit of traction; it was a solution that would have been impossible with a higher engine position. Again with the aim of lowering the center of gravity, the rear brake calipers were also mounted low, almost horizontally.

Tungsten ballast

The F1 technical regulations for the 2000 season stipulated that the minimum weight of the car had to be 600 kg (1,323 lb), including the driver. Given that the new V10 engine fitted to the F1-2000 was very compact and light, the weight of the car was around 500 kg (1,102 lb), to which the weight of the driver had be added. This left 30–40 kg (66–88 lb) to be "managed" with special ballast made of tungsten, a material which, thanks to its high density, allows the creation of small but heavy blocks.

Ballast is a valuable tool for varying the car's setup according to the characteristics of the track: by changing its position, it is possible, for example, to make the steering more precise in order to increase cornering speed, or to improve traction and, consequently, acceleration. On the F1-2000, ballast was usually placed in the so-called "knife" area, which is the front end of the flat bottom, basically under the driver's legs. ■

Above left: Schumacher in the pits during practice for the Canadian Grand Prix; above right: mechanics at work at the Fiorano facility, where Ferrari conducts its testing.

THE WEIGHT DISTRIBUTION ON THE CAR IS CALIBRATED USING SPECIAL TUNGSTEN WEIGHTS THAT CAN BE POSITIONED AT VARIOUS POINTS UNDER THE CHASSIS.



Barrichello restarts in the rain after refueling and changing tires during the race at the Nürburgring circuit. The Brazilian finished fourth in the race, which was won by Schumacher.

EUROPE 2000
WINNING IN THE RAIN

On May 21, 2000, the European Grand Prix, the sixth round of the F1 World Championship, was held at the Nürburgring circuit in Germany. Ferrari was coming off two uninspiring races: in Great Britain and Spain, it had finished third twice and fifth once. McLaren, on the other hand, had taken its revenge, with David Coulthard triumphing at Silverstone and Mika Häkkinen in Barcelona. While Schumacher had a 14-point lead over the Finn in the Drivers' Championship, the British team had reduced the gap to Ferrari to seven points in the Constructors' Championship.



In Maranello, there was a strong desire to quickly secure another victory, especially on the part of Michael Schumacher, finally back in front of his home crowd after missing both the German and European Grands Prix in 1999 due to a serious accident. From a technical point of view, Ferrari was testing version B of the 049 engine, which should have enabled it to gain about 200 rpm in race conditions, and fitted narrower and lighter brake calipers to facilitate the work of the suspension and thus improve tire performance. Qualifying confirmed McLaren's excellent form and the fact that only Ferrari could challenge them. Coulthard, in pole position, Schumacher, and Häkkinen were the only three drivers to lap under 1:18. Rubens Barrichello in fourth was seven-tenths behind the Scot, while Ralf Schumacher (fifth with Williams-BMW) was one second behind. Rain was forecast for race day.

Wet-weather wizard

At the start, the track was dry but the sky was overcast. Häkkinen shot off from the second row and took the lead, followed by Schumacher. After just five laps, the leading pair already had a 2.5-second lead over Coulthard, who had slipped into third place. Schumacher followed Hakkinen like a shadow and overtook him on lap 11, just as it started to rain; on the same lap, Barrichello overtook Coulthard. Despite the slippery asphalt, the German – a master in the rain – gained five seconds on the Finn's McLaren in just two laps. After stopping in the pits to refuel and change to wet tires, Schumacher maintained the lead until his second pit stop, when he returned 25 seconds behind Häkkinen, who had chosen to delay his return to the pits to take advantage of his lighter car. However, his strategy did not work because from lap 42, with the rain increasing in intensity, Schumacher was much faster than his rival. When Mika's McLaren made its second pit stop, Schumi returned to the lead and remained there until the end, winning ahead of Häkkinen and Coulthard; Barrichello, who opted for three stops, crossed the finish line in fourth place. Schumacher was now firmly in the lead in the Drivers' Championship with 46 points, ahead of Häkkinen with 28. ■

FINAL RANKING

1 - M. Schumacher Ferrari
2 - M. Häkkinen McLaren-Mercedes
3 - D. Coulthard McLaren-Mercedes
4 - R. Barrichello Ferrari
5 - G. Fisichella Benetton-Playlife
6 - P. de la Rosa Arrows-Supertec
7 - P. Diniz Sauber-Petronas
8 - G. Mazzacane Minardi-Fondmetal
9 - J. Alesi Prost-Peugeot
10 - J. Button Williams-BMW



Schumacher consults the monitor in the pits during practice for the European Grand Prix.



The photo shows the Ferrari 375 F1 cars driven by González and Taruffi in the pits at the Nürburgring circuit before the 1951 German Grand Prix. The race was won by Ascari ahead of Fangio, while the Argentinian and the Italian finished third and fifth respectively.

1951 F1 WORLD CHAMPIONSHIP WINNING ASPIRATIONS

The car with which the *Scuderia del Cavallino* competed in the 1951 F1 World Championship had already made its debut the previous year in the Italian Grand Prix (finishing in a creditable second place). It had been an experimental 1950 season for Ferrari, which saw various single-seaters participate, starting with the 125 F1 powered by a 12-cylinder



60° V engine (designed by Gioachino Colombo) with a displacement of 1.5 liters and fed by a single-stage supercharger. That engine proved too fragile and unreliable to compete with Alfa Romeo's powerful in-line 8-cylinder supercharged engines and was quickly shelved. Ferrari decided to focus on naturally aspirated engines, starting with the 275 F1 (3.3 liters) and 340 F1 (4.1 liters) single-seaters.

A 4.5-liter heart

The engine fitted to the 375 F1 – so named after its unit displacement (374.47 cc) – was designed by Aurelio Lampredi, who, in order to get closer to the regulatory limit of 4.5 liters increased the stroke of the V12 fitted to the 340 F1 from 68 to 74.5 mm, while keeping the 80 mm bore unchanged. Now, with a displacement of 4,493.73 cc and a compression ratio of 11:1, the engine was capable of delivering 350 hp at 7,000 rpm.

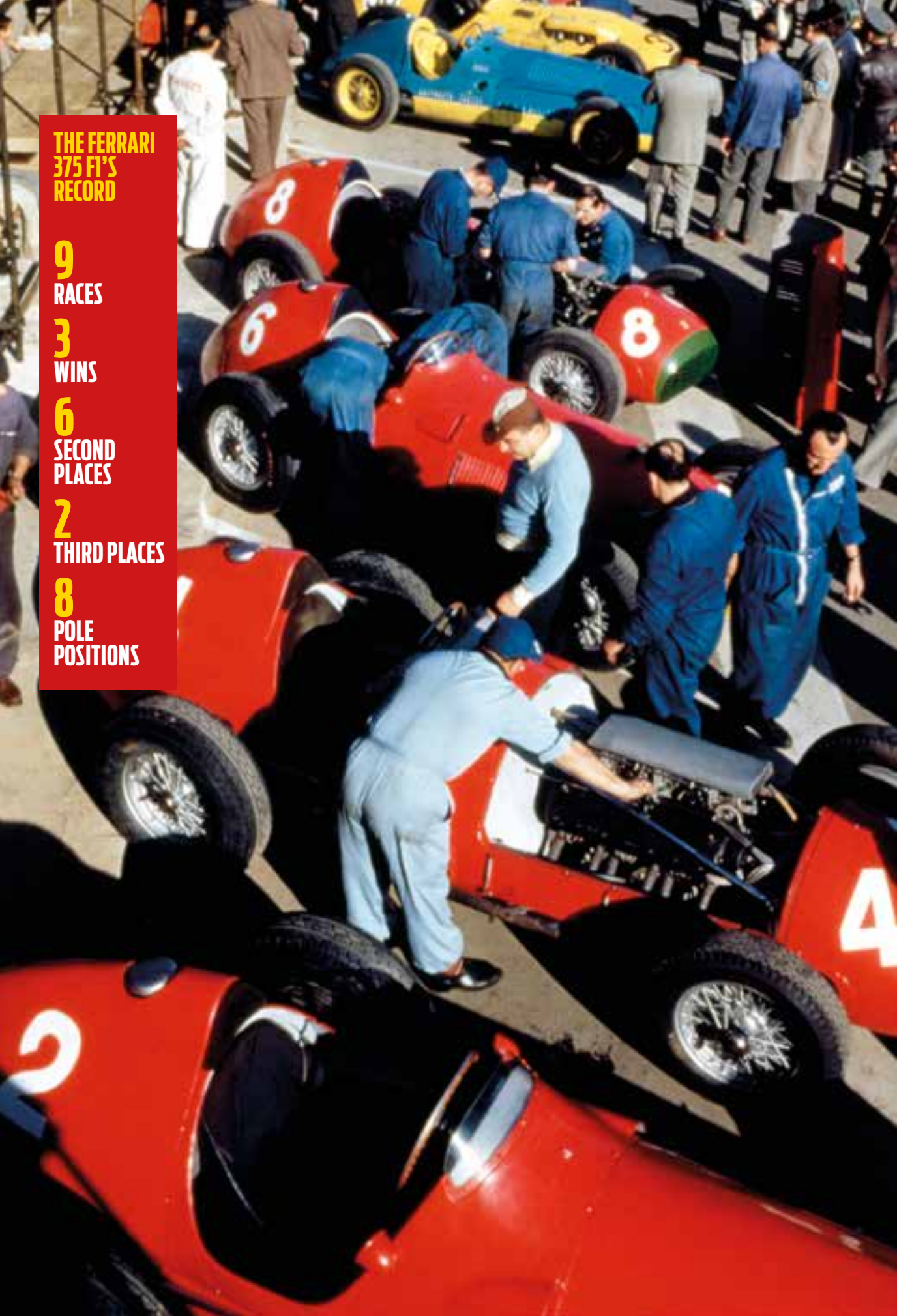
The monoblock was cast in light alloy and a double-walled crankcase was used to reduced weight. The suspension, also derived from the 340 F1, was of the deformable quadrilateral type, with double triangles and transverse leaf springs with Houdaille hydraulic shock absorbers at the front;

AFTER ALFA ROMEO'S ABSOLUTE DOMINANCE IN THE 1950 FORMULA 1 WORLD CHAMPIONSHIP, FERRARI ENTERED THE NEW SEASON WITH A CAR THAT WOULD GIVE THE BISCIONE BRAND A HARD TIME.

the rear suspension featured a De Dion axle with lower transverse leaf springs and upper longitudinal struts, also with Houdaille shock absorbers.

Ahead of the 1951 World Championship, the 375 F1 underwent further improvements to the ignition, which went from single with two magnets to double with one magnet, and the fuel supply, with the adoption of three Weber 46DCF-3 carburetors. A further evolution of the 375 F1, with an engine upgraded to 380 hp at 7,500 rpm, made its debut at Monza in 1951.

With this car, the Maranello-based manufacturer won its first world championship Grand Prix in 1951 in Great Britain, with José Froilán González at the wheel, followed by two more victories and numerous podium finishes.



THE FERRARI 375 F1'S RECORD

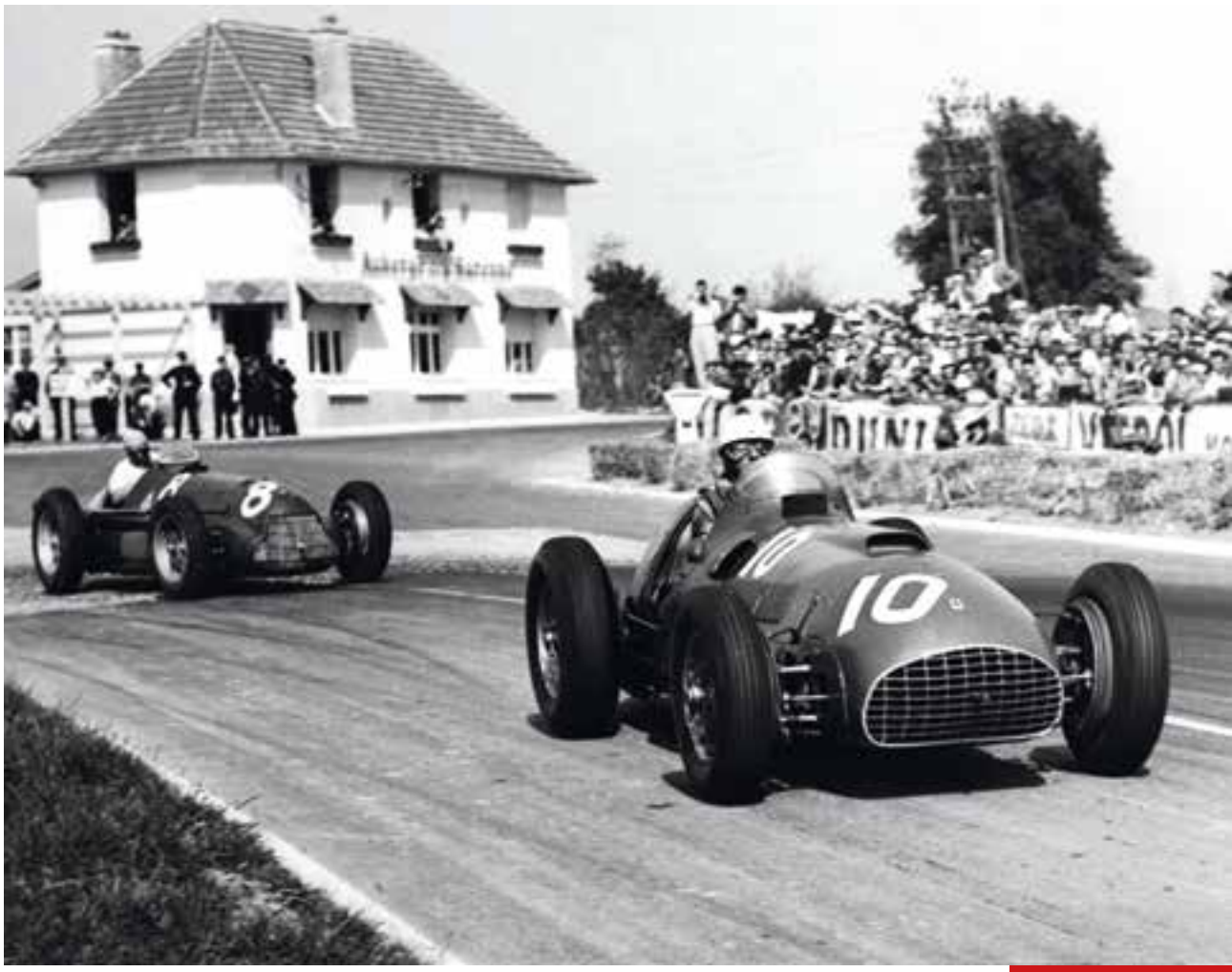
9
RACES

3
WINS

6
SECOND PLACES

2
THIRD PLACES

8
POLE POSITIONS



Left: a parade of racing cars on the Pedralbes circuit for the 1951 Spanish Grand Prix. In the foreground, the Ferraris of Ascari, Villoresi, González, and Taruffi.

The "father" of the engine

Engineer Aurelio Lampredi was recommended to Enzo Ferrari in 1946, shortly before the latter, already owner of Auto Avio Costruzioni, founded the factory that bears his name. Born in Livorno in 1917, Lampredi initially wanted to enrol at the conservatory to pursue a career in music. He then decided to change direction and, in the immediate postwar period, at the age of just 30, he already had significant experience in the automotive field, having worked at Piaggio (under engineer Corradino D'Ascanio) and at Officine Meccaniche Reggiane-Caproni in Reggio Emilia. He had everything it took to succeed at Ferrari, but after just six months, Lampredi moved to Isotta Fraschini due to disagreements with the Prancing Horse's chief designer, Giuseppe Busso. After some time, however, Lampredi was called back to Maranello – where Busso had returned to Alfa Romeo – to replace Gioachino

Gigi Villoresi (10), in a Ferrari 375 F1, leads Luigi Fagioli (8), in an Alfa Romeo 159, during the 1951 French Grand Prix. Villoresi would finish third, while Fagioli would win alongside future world champion Juan Manuel Fangio, sharing the same car.

Colombo, the "father" of the supercharged V12 that powered the 125 F1. The Livorno-born engineer thus began working on the 12-cylinder naturally aspirated engine commissioned by Ferrari, overseeing all the developments and adaptations of the displacement, both for Formula 1 and for sports competition cars. He then devoted himself to the development of the 500 F2, the single-seater powered by a 2-liter in-line 4-cylinder engine that took part in the victorious 1952 and 1953 F1 World Championships, both won by Alberto Ascari. In 1956, Lampredi left Maranello for good to join Fiat, where he established himself as one of the greatest engine designers of all time. Lampredi also made a valuable contribution to the Turin-based company's success in rallying, first with the 124 Abarth Rally and then with the 131 Abarth Rally. Lampredi died in his home town of Livorno in 1989. ■

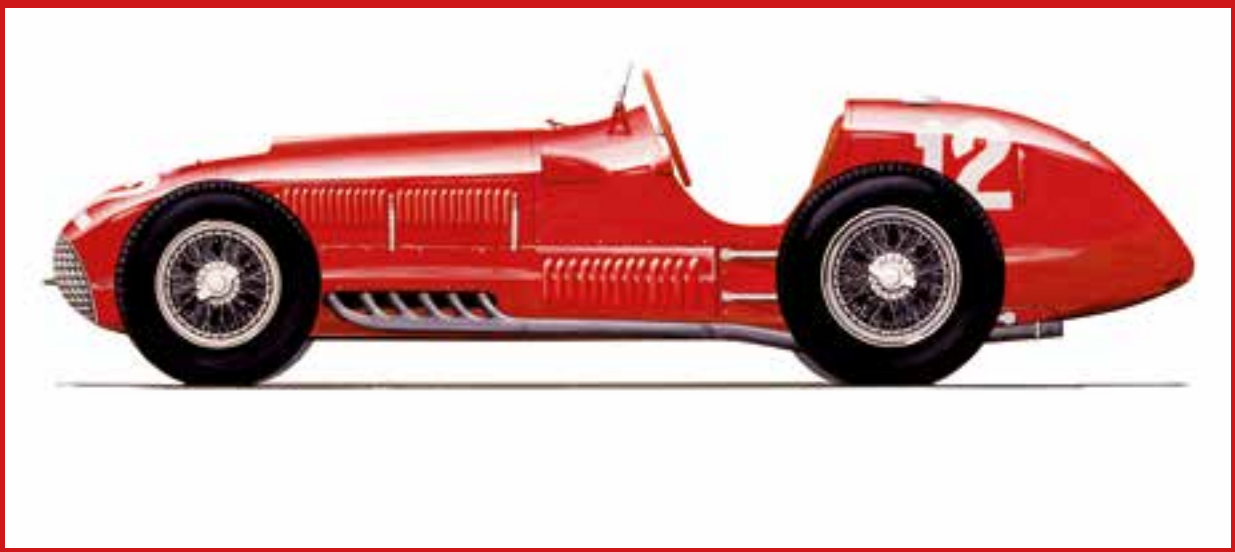


José Froilán González makes his final preparations before getting into the cockpit of the 375 F1, moments before the start of the memorable 1951 British Grand Prix.

Aurelio Lampredi (second from left, next to Enzo Ferrari) during a test session in the Ferrari 166 F2.

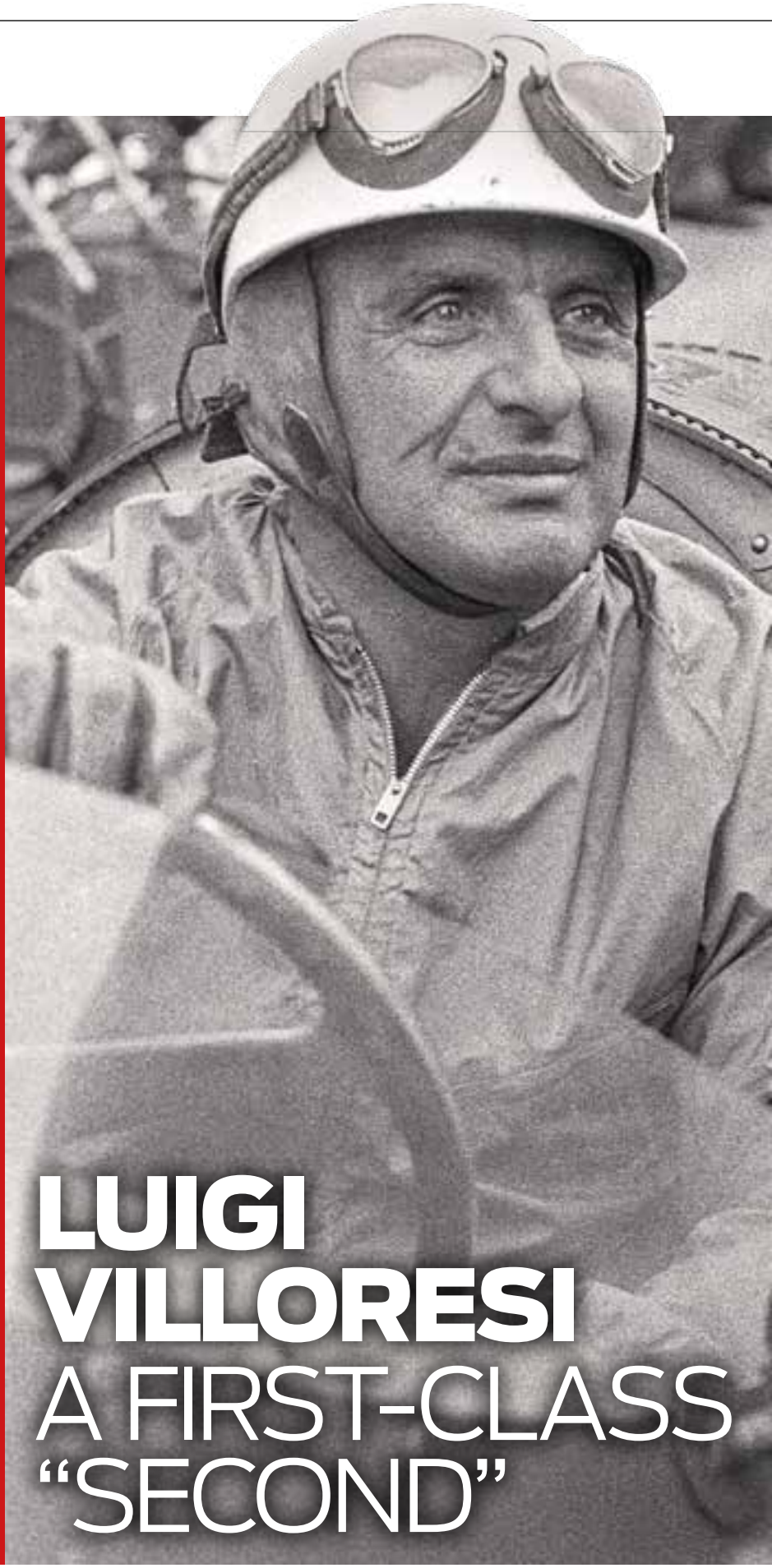


FERRARI 375 F1 IN BRIEF



Engine type 375, front, longitudinal, 12 cylinders in a 60° V configuration	**Displacement** 4,493.73 cc	**Bore x stroke** 80 mm × 74.5 mm	**Distribution** single overhead camshaft	**Number of valves** 2 per cylinder
Compression ratio 11:1	**Fuel supply** 3 Weber 42 DCF carburetors	**Ignition** dual, 1 magneto	**Cooling** Water	**Maximum power** 350 hp at 7,000 rpm
Transmission rear-wheel drive	**Gearbox** 4 speeds + RM	**Chassis** tubular side members and cross members	**Front suspension** independent, deformable quadrilaterals, transverse leaf spring, Houdaille hydraulic shock absorbers	**Rear suspension** swinging axle, De Dion axle, transverse leaf spring, Houdaille hydraulic shock absorbers
Brakes drum	**Tires** Pirelli front 16 rear 17	**Wheelbase** 95.3 in (2,420 mm)	**Front track width** 49.2 in (1,250 mm)	**Rear track width** 49.2 in (1,250 mm)
Length 155 in (3,937 mm)	**Width** 56.2 in (1,428 mm)	**Height** 37.8 in (960 mm)	**Weight** 1,874 lb (850 kg) ready to drive	**Maximum speed** approx. 186 mph (300 km/h)

On July 14, 1951, the day of Ferrari's first victory in a world championship Grand Prix, there was another Ferrari driver on the podium at Silverstone alongside José Froilán González: Luigi Villoresi.



LUIGI VILLORESI
A FIRST-CLASS "SECOND"



Luigi "Gigi" Villoresi was born in Milan in May 1909 and from an early age was irresistibly attracted to motor racing. Starting in the early 1930s, he took part in various competitions, soon making a name for himself with his talent for speed. Among the many victories he secured before the outbreak of World War II, the two Florio Targa trophies won in 1939 and 1940 in a Maserati Tipo 6CM stand out.

The arrival at Ferrari

At the end of the war, Villoresi resumed racing, becoming Italian champion (a highly prestigious title at the time) in 1947 and 1948. His triumphs led Enzo Ferrari to contact him in 1949 to offer him a contract, but Gigi was initially uncertain: ten years had passed since his beloved brother Emilio, also a talented driver, had been killed during a test at Monza in 1939 in an Alfa Romeo car under Ferrari's supervision, and since then a deep rift had separated the victim's older brother from the patron of the newly formed *Scuderia del Cavallino*. In the end, however, Gigi Villoresi accepted the offer.

Between F1 and endurance racing

Villoresi made his debut in the first Formula 1 World Championship at the Monaco Grand Prix, when he had already been an official driver for the Maranello team for a year. At the wheel of the 125 F1, his best finish in the 1950 season was sixth place at the Belgian circuit of Spa-Francorchamps, while in the non-championship races at Pau (France), San Remo (Italy), and Zandvoort (Netherlands), he finished second. Confirmed by Ferrari for 1951, Villoresi knew that he was second in the team hierarchy behind Alberto Ascari. But this did not bother him in the slightest: the two Milanese drivers were close friends and Gigi, nine years older, recognized Alberto's superiority with great sportsmanship, without ever giving up trying to beat him, sometimes with success. Ahead of the 1951 World Championship, Ferrari fielded

Date of birth
May 16, 1909

Date of death
August 24, 1997

Nationality
Italian

Active in F1
1950–56

First GP
Monaco 1950

Last GP
Italy 1956

GPs contested
34 (31 starts)

Podiums
8

Fastest laps
1

World Championship points
46 (49 actual)



Right: Villoresi driving his 375 F1 during the 1951 Monza Grand Prix, where he finished fourth.

IN ADDITION TO HIS FORMULA 1 PODIUMS, VILLORESI'S ACCOLADES INCLUDE TRIUMPHS IN LEGENDARY RACES SUCH AS THE MILLE MIGLIA AND THE TARGA FLORIO.

the 375 F1 single-seater, which was entrusted not only to Ascari and Villoresi, but also to Piero Taruffi and José Froilán González. Villoresi had a very positive season. He took part in seven races in the world championship calendar (excluding the Indianapolis 500, in which European drivers and teams very rarely took part), but was forced to retire in the opening race of the season in Switzerland and in the final race in Spain. Between these two unfortunate races, he achieved five excellent placings: third in Belgium, France, and Great Britain, and fourth in Germany and Italy. At Silverstone, on July 14, he was on the podium alongside the winner, his teammate González, and Fangio, on the day of Ferrari's first historic triumph in a Formula 1 Grand Prix valid for the World Championship.



Villoresi drives up the access ramp to the track before the start of the 1951 German Grand Prix. The Milanese driver finished the race in fourth place at the Nürburgring.

In 1951, Villoresi scored 18 championship points but, due to the rules allowing only the four best results to be counted, he finished with 15, ending the season in fifth place, his best performance in terms of overall standings, which he repeated in 1953, again at the wheel of a Ferrari (a season in which he also set his only fastest lap in a race, at the Zandvoort circuit). Also in 1951, again at the wheel of the 375 F1, Villoresi won the non-world championship races in Syracuse and Pau, while in endurance races – in addition to his prestigious triumph in the Mille Miglia (in a Ferrari 340 America Berlinetta Vignale) – he also won the Intereuropa Cup at Monza (in a 212 MM Berlinetta Vignale) and the Senigallia Circuit (in a 340 America). At the end of the season, Villoresi took part in Ferrari's triumphant outing at the Carrera Panamericana: paired with Ascari in a virtually standard 212 Inter Berlinetta Vignale, he finished the grueling Mexican race in second place, behind his teammates Taruffi and Chinetti.

Villoresi's Formula 1 career ended in 1956, after the driver had alternated between Ferrari, Lancia, and Maserati. The Milanese champion passed away in 1997. ■

005 | REAR SPOILER FLAPS



PARTS LIST

5A First lower flap

5B First upper flap

5C Second upper flap

5D Second lower flap

SCREWS*

16 **NP** screws 1.2 × 4 mm (+ 2 spare)

16 screws **NP**



** The screw codes end with the letter **M** or **P**: the former are for metal and the latter are for plastic. It is advisable to use lubricant for type M screws that are difficult to insert and to screw them in progressively, unscrewing and screwing them back in one or two turns at a time.*

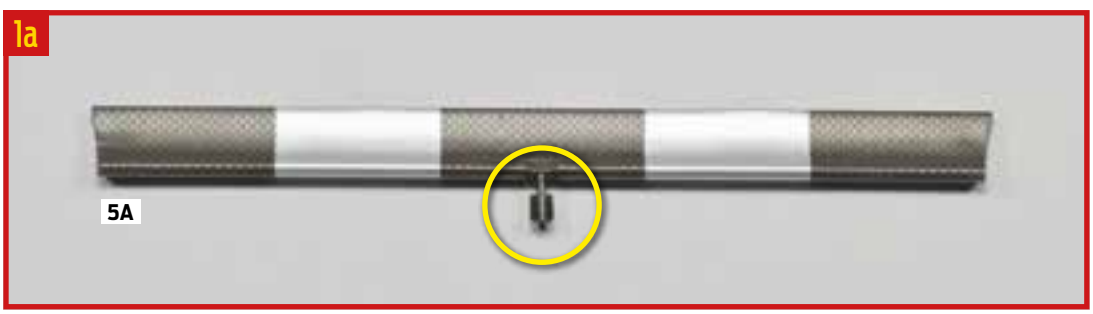


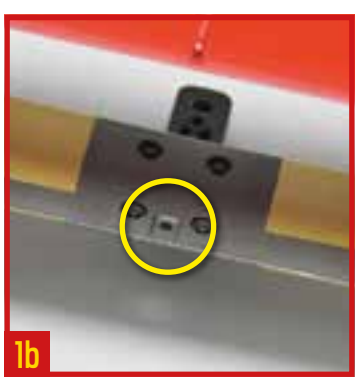
TIPS



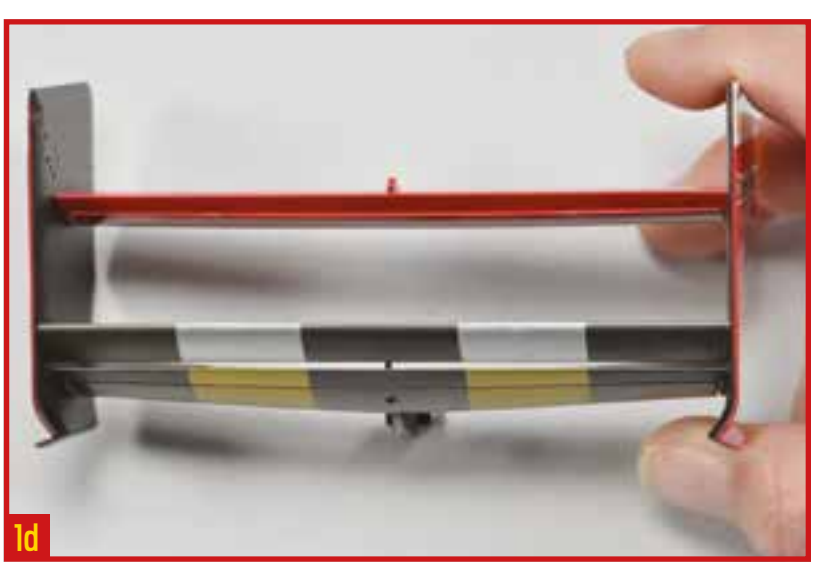
Before proceeding with assembly, screw and unscrew an **NP** screw into the side holes of all panels to make it easier to connect them during the assembly process.

1 Take the first lower flap **5A**, which has a perpendicular central support (highlighted with a circle in photo **1a**). Then retrieve the rear spoiler assembled in issue 4; the lower wing has a rectangular recess with a hole (highlighted with a circle in photo **1b**). Position flap **5A** so that its central support matches the recess on the wing (photo **1c**). Then align the sides of piece **5A** (each with two holes) with the corresponding holes in the left and right side bulkheads of the spoiler (photo **1d**). Secure flap **5A** by inserting two **NP** screws into the left bulkhead (photo **1e**) and two more **NP** screws into the right bulkhead.





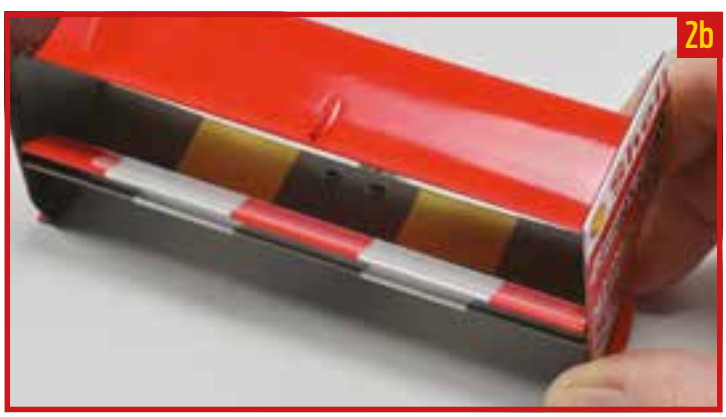






2 Take the second lower flap **5D** (photo **2a**) and, keeping its thinner edge facing the rear of the spoiler, place it between the two bulkheads and align its side holes with those on the bulkheads themselves (photo **2b**). Then secure piece **5D** by inserting two **NP** screws into the left bulkhead (photo **2c**) and two more **NP** screws into the right bulkhead.







3 Take the first upper flap **5B** (photo **3a**), marked with the number 9 on one side (highlighted with a circle in photo **3b**). Position piece **5B** immediately above the upper wing of the spoiler, keeping its thinner edge facing upwards (photo **3c**) and aligning its side holes with the corresponding holes in the two bulkheads. Then secure flap **5B** by inserting two **NP** screws into the left bulkhead (photo **3d**) and another two **NP** screws into the right bulkhead.



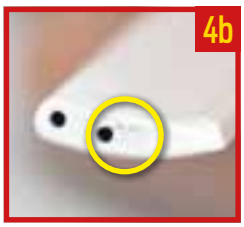






4 Take the second upper flap **5C** (photo **4a**), marked with the number 10 on one side (photo **4b**), and place it above flap **5B**, keeping its thinner edge facing upwards (photo **4c**) and aligning its side holes with the corresponding holes in the two bulkheads. Then secure piece **5C** by inserting two **NP** screws into the left bulkhead (photo **4d**) and two more **NP** screws into the right bulkhead.









FINAL RESULT



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