Ferrari

Media

458 SPECIALE
CONTENT AND TECHNICAL SPECIFICATIONS

PRODUCTION POSITIONING

The 458 Speciale joins the Ferrari range alongside the 458 Italia and 458 Spider and, like all special-series Ferraris, is aimed at a specific kind of owner, in this case those looking for an even more focused sports car that offers extreme driving emotions.

Whether on the road or on the track, drivers will feel immediately at one with the 458 Speciale thanks to the speed with which it responds to every input and the consequently natural control that it offers, even in extreme manoeuvres. This finely-tuned handling balance enables the car to reach the highest performance levels of any Ferrari V8.

Ferrari's core engineering philosophy centres around pushing the envelope with each new model whilst maintaining the innate chassis balance and handling that ensures that even non-professional drivers can extract maximum performance and driving pleasure. With the new 458 Speciale all clients will be able to drive on the limit on the track as well as experience the exhilaration of genuinely sporty driving even at lower speeds on demanding roads.

The new berlinetta is, in fact, the result of the search for extreme technology, driving thrills and performance, with the application of advanced technical solutions for the powertrain, aerodynamics and vehicle dynamics. Those achievements set it apart from the 458 Italia from which it is derived, to an extent unprecedented in the previous Challenge Stradale and 430 Scuderia special series.

The 458 Speciale's performance is exceptional across the board, thanks to factors such as an extraordinary weight-power ratio of 2.13 kg/cv, 0-100 km/h longitudinal acceleration in 3 seconds, lateral acceleration of 1.33 g and a Fiorano lap time of 1'23"5. The 458 Speciale is an extremely entertaining car to drive even in less extreme situations, too: its unparalleled agility, in fact, is reflected in a response time to commands of just 0.060 seconds.

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POWERTRAIN

The 458 Speciale's mid-rear-mounted 4497 cc GDI engine is the most powerful naturally aspirated Ferrari 8-cylinder ever developed, punching out 605 cv at 9000 rpm and maximum torque of 540 Nm at 6000 rpm, while its record 135 cv/l specific power output is also the highest ever achieved by a naturally-aspirated road-going engine.

F1 technology transfer to the 458 Speciale was of fundamental importance to its development, including the production processes. The engine is produced in the factory's in-house foundry using the same machinery and processes as employed by the F1 team for complex components with the extreme structural and dimensional characteristics needed for a naturally-aspirated engine capable of hitting 9000 rpm.

To achieve these results, Maranello's engineers have maximised the 458's V8 potential, carrying out detailed refinements to all the components to optimise combustion, volumetric and mechanical efficiency.

Maximum combustion efficiency is guaranteed by a highly evolved knock control system which senses the ionisation across the spark plug gap thereby optimising combustion across the entire rev range.

The other main challenge aside from boosting power was to improve torque across the entire power curve. This involved increasing the compression ratio to an exceptional 14:1, the highest value ever achieved by a naturally-aspirated V8, which was achieved by modifying piston geometries.

The fluid-dynamics of the combustion chamber were revised to optimise both the intake and exhaust phases. The intakes feature new geometry, both with regard to the manifolds and the cylinder heads, with shorter inlet ducts (-10 mm) in the former instance, and in the latter a higher valve lift (+5%). A new cam profile not only increases valve lift but also helps reduce average pressure during the pumping cycle.

The 458 Speciale's increased power and torque are also the result of redesigning various engine components and reducing internal friction. The pistons are made from a new material that reduces overall mass. New materials were also used for the con-rod bushings while specific heat treatment (DLC: Diamond-Like Carbon) on the piston pins makes for greater fatigue and wear resistance. The crankshaft was also redesigned to optimise and improve lubrication of the main bearings in all conditions of use.

Around 8 kg was also slashed off the engine's overall weight by the redesign of the intake (carbon-fibre plenums and air filter box as well as shortened inlet ducts) and exhaust (in aluminium) systems. Once again Ferrari drew heavily on its extensive F1 experience, particularly with regard to the intake system, which now has a new carbon-fibre plenum and filter box, new materials for the pistons and con-rod bearings.

AERODYNAMICS

One of the car's main characteristics is new Ferrari-patented mobile aerodynamic solutions at the front and the rear of the car which ensure that different aerodynamic configurations can be adopted in cornering, where maximum downforce is essential, and on straights where, instead, drag must be reduced to a minimum.

The 458 Speciale has an excellent downforce (Cl) value of 0.53. Thanks to the aforementioned active aerodynamics, the latter does not penalise the Cd which is just 0.35.

Of particular note are the innovative solutions adopted at the front of the car, with two vertical flaps in the centre and the horizontal flap below them. At relatively low speeds, the vertical flaps are closed, channelling air into the radiators to guarantee the necessary cooling for the engine. However, at speeds in excess of 170 km/h, the flaps open, reducing the volume of air flowing into the radiators, thereby cutting drag. At speeds of over 220km/h the horizontal flap lowers to balance downforce between the front and rear axles, leading to a 20 per cent shift in overall downforce towards the rear.

The turning vanes at either side of the front bumper slow the air flow which increases downforce, thereby shifting the aerodynamic balance 4 per cent over the front. Thanks to their shape, the aerodynamic fins ahead of the rear wheels increase downforce very much in the same way as the front turning vanes.

The rear spoiler has a larger surface area and more pronounced shape which has improved the efficiency of the underbody, increasing downforce. Moving the position of the tailpipes also allowed a new diffuser to be designed which optimises the extraction capacity of the underbody. The rear flaps have two different configurations: raised for high downforce and lowered to minimise drag. Sophisticated sensors and a specific algorithm allow the flaps to be lowered by as much as a 17° angle, thereby stalling the diffuser and reducing Cd by 3 points.

DYNAMICS

The 458 Speciale's dynamic behaviour guarantees maximum driving emotions in all situations, allowing drivers to match and improve their own limits with ease and delivering an intense driving experience even at lower speeds.

Nimble and responsive, the car is at its best over really twisty routes with demanding switchbacks and camber changes. New technical features have not only improved the 458 Speciale's lap time over single laps, but also the repeatability of that performance on subsequent laps without needing to be a professional driver, offering unprecedented levels of driving pleasure.

Side Slip Angle Control (SSC)

The 458 Speciale sees the introduction of Side Slip Angle Control (SSC) for more effortless car control on the limit, thereby greatly enhancing driver enjoyment.

Thanks to sophisticated new software, which computes lateral acceleration, yaw angle, steering wheel angle and speed, SSC carries out instantaneous analysis of the car's side slip angle, comparing it with reference data, thereby allowing smooth, controllable oversteer, and optimising both torque management (via F1-Trac traction control) and differential torque distribution between the two driven wheels (via the E-Diff electronic differential) for maximum vehicle response times.

With the Manettino set at RACE or CT OFF, the 458 Speciale will then make the most of available grip for improved acceleration out of corners, greater ease and control on the limit, and more consistent performance.

Also available on request is an advanced telemetry system which records data from track sessions which can then be accessed directly through the multimedia menu or via an external device such as an iPad or laptop. The system uses a series of high-precision GPS antennae installed in the car to pinpoint its position on a pre-loaded circuit or a recordable route. At the end of the session, the Virtual Track Engineer helps drivers analyse their performance, highlighting the main critical errors (e.g. braking too early or too late).

Braking system

To cope with the demands of the car's increased performance, all of the components in the Brembo braking system have been evolved from the solutions introduced on the LaFerrari. The 458 Speciale sports Extreme Design calipers, new generation HT2 discs with a higher percentage of silicon, and smaller front pads made from HY hybrid material for improved heat dissipation which is also boosted by special channels in the bodywork and is crucial in extreme driving situations. The result is shorter stopping distances (100 – 0 km/h in 31 m) without any compromises in weight, and more consistent performance under severe use.

Tyres and wheels

Part and parcel of the Speciale's development included Michelin Pilot Sport Cup2 tyres which were specifically honed for it in an intensive collaboration programme involving lengthy track tests and simulator sessions.

Specially made for the 458 Speciale, they feature a compound obtained using specific additives to boost performance over a single lap in the dry as well as improving performance consistency over multiple laps. They also deliver 6 per cent more grip, which also translates into better grip even in the wet.

The forged 20" wheels feature a new design, resulting in a weight reduction of over 12 kg.

Suspension

Thanks to being very flat through corners, the 458 Speciale is extremely efficient and satisfying in faster, sharper, more challenging changes of direction. This is due partly to

its Frequency-Shaped SCM-E (Frs SCM-E) dampers which have twin solenoids, new CPU and new software that modifies the magnetic field every millisecond. The result is a much faster response and more precise body control.

These technical features guarantee exceptionally fast response to inputs from the road or the steering (0.060 s) and mean the car can deliver 1.33 g of lateral acceleration, a combination that ensures a genuinely extraordinary experience behind the wheel. The car, in fact, responds instantaneously and is easy to drive on the limit in all types of situations.

Soundtrack

Like the rest of the car, the 458 Speciale's soundtrack is both seductive and uncompromising, thanks to unprecedented intensity inside the cabin as well as outside. The position of the tailpipes lends the V8 the full-bodied low frequency soundtrack typical of Ferrari's sportiest engines while the configuration of the silencers is designed to guarantee maximum intensity and exceptional clarity. The immense power and full-bodied nature of the sound inside the cabin were achieved by redesigning the inlet tract.

Gear-shift strategy

The F1 dual-clutch transmission now features a new control logic that delivers an even keener sense of urgency during gear shifts. The car feels much sportier as it shifts up through the gears, with response time to commands more prompt than ever, thereby guaranteeing 40 per cent faster longitudinal acceleration with engine revs adapting 20 per cent more rapidly. Conversely with the Fast-Down Shift strategy, when down-shifting, the transient time required for engine revs to match the gear ratio is 44 per cent faster.

DESIGN

Exterior

Aerodynamic requirements guided the work of the Ferrari Styling Centre which collaborated on the project with Pininfarina to sculpt forms that are more performance-oriented than ever, balancing aerodynamic requirements while staying true to Ferrari's aesthetic philosophy.

Most of the bodywork panels have been redesigned without modifying either the passenger cell or the signature design features of the 458 Italia. The thickness of the glass used has been reduced to cut weight, while the rear windscreen is now a Lexan© panel.

The composite bumpers have been redesigned and the front bonnet now features two deep air outlets to channel away the air exiting the radiator.

The air outlets to the side of the headlight assemblies now also include three louvers reminiscent of Ferraris of the past, from the 250 GTO to the F40. The rear features a Kamm tail with a full-width grille and twin exhausts.

Interior

The cockpit features a distinctly racing-inspired atmosphere, with simplicity the order of the day. Lightweight exclusive technical materials, such as Alcantara and carbon-fibre, are used extensively but meld seamlessly with the superb craftsmanship and sophistication typical of all Ferrari interiors, courtesy of exclusive details, contrasting hand-stitching, aluminium triangular-pattern tread plates and sills with a pewter grey finish, and particularly fluidly sculpted door panels.

The glove compartment on the dash has been replaced with convenient odds and ends pockets on the tunnel and doors. This has significantly streamlined the volumes under the dash adding practical padding at knee level.

Onboard ergonomics are absolutely functional with all controls clustered around the driver and on the steering wheel. This concept has been further enhanced by the use of the iconic bridge, a carbon-fibre wing that extends over the central tunnel section, putting the F1 gearbox controls at an ideal angle to the driver. There is also a comfortable leg rest cushion on the driver's side of the tunnel.

The Sabelt seats have carbon-fibre shells and boast excellent side bolstering thanks to an ergonomic design which also helps contain weight. The shoulder-rests are trimmed in Alcantara for improved grip while seated and the backrests are padded with a breathable 3D fabric to guarantee excellent air circulation and comfort.

The 458 Speciale is being unveiled in an unusual red livery featuring a blue and white central stripe inspired by the historic NART (North America Racing Team) livery which is available on request. Characterised by five exceptionally slender spokes, its newly designed forged wheels are available in gold, dark grey and black.

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458 Speciale Technical Specifications

Engine

Type	V8, 90° - Direct Injection - Dry Sump
Bore and stroke	94 x 81 mm (3.7 x 3.2 in)
Overall displacement	4497 cm^3 (274.4 cu in)
Compression ratio	14.0:1
Maximum power**	445 kW (605 cv) at 9000 rpm
Specific power output	135 cv/l (1.62 kW/cu in)
Maximum torque	540 Nm (398 lb ft) at 6000 rpm
Maximum revs (limiter)	9000 rpm

Dimensions and weight

Length	4571 mm (180.0 in)
Width `	1951 mm (76.8 in)
Height	1203 mm (47.4 in)
Wheelbase	2650 mm (104.3 in)
Front track	1679 mm (66.1 in)
Rear track	1632 mm (64.3 in)
Dry weight*	1290 kg_f (2844 lb_f)
Kerb weight*	1395 kg_f (3075 lb_f)
Weight distribution	42% front, 58% rear
Weight/power ratio	2.13 kg/cv (6,39 lb_f/kW
Fuel tank capacity	86 l (22.7 US gallon)

Tyres and wheels

Front	245/35 ZR20 J9
Rear	305/30 ZR20 J11

Carbon-ceramic braking system

Front	398x223x36 mm (15.7 x 8.8 x 1.4 in)
Rear	360x233x32 mm (14.2 x 9.2 x 1.3 in)

Electronic control systems

ESC	Stability control
High performance ABS/EBD brake force distribution	High performance anti-lock braking system/electronic
F1-Trac	F1 traction control
E-Diff 3	Third generation electronic differential
SSC	Side slip angle control
Frs SCM-E	Magnetorheological suspension control with frequency analysis system and twin solenoids

Gearbox
7-speed F1 dual-clutch transmission

Performance

Maximum speed	>325 km/h (>202 mph)
0-100 km/h (0-62 mph)	3.0 sec
0-200 km/h (0-124 mph)	9.1 sec
0-400m (0-437 yd)	10.7 sec
0-1000m (0-1093 yd)	19.4 sec
100 - 0 km/h (62 – 0 mph)	31 m (101.7 ft)
Fiorano lap time	1'23''5

Fuel consumption and emissions (ECE + EUDC combined cycle)

Fuel consumption***	11.8 l/100 km
CO_2 emissions***	275 gr/km

*With optional equipment
**Including 3.7 kW by ram effect
*** Combined cycle with HELE system (ECE+EUDC)