

20<sup>st</sup> July 2009. Today McLaren Automotive announces a major upgrade package for its legendary McLaren F1 road car. Frank Stephensen McLaren Automotive Design chief: "Through this upgrade package we have taken the highly advanced framework of the F1 and updated it in a number of key areas that have seen major advances over the years, providing our customers with the final and ultimate evolution of the McLaren F1."

### The Engine

The first area to see a significant upgrade is the F1's famous BMW S70/2 V12. The revised engine, type number updated to S70/4, sees its capacity grow to 6121 cc as a result of an increased bore from 86 to 86.4 mm. Further changes include larger yet lighter pistons, lighter conrods, a raised compression to 12.0:1 from 11.0:1, redesigned cylinder head, new inlet and exhaust valves, new camshafts with variable valve timing now also on the exhaust side, a new and completely reprogrammed ECU as well as other smaller improvements. The result of these changes is an engine that now produces 491 lb.ft at 5300 rpm compared to 480 lb.ft before and an increased output of 691 bhp at 8200 rpm over the 618 bhp (627 PS) of the original while maintaining its smooth running characteristics and in the mean time improving emissions and its already proven efficiency. Frank Stephensen: "Countless engine development ideas continuously circulate engineering departments, however we feel the offered upgrade provides the best balance between strongly improved performance and maintaining durability, best chassis compatibility and reasonable use of development resources." The 6-speed transmission has remained unchanged. Continuing: "The existing transmission works fine, our customers value it and thanks to its new higher revving engine it now has exactly the right ratio to reach its full top speed potential."

### Ceramic composite brake system

Another major improvement with the 2010 upgrade package is the first ever use of a ceramic composite brake system on the McLaren F1 road car. Mr. Stephensen: "While a highly desired feature during its conception, composite brake technology was not considered mature enough for initial adoption on the F1." The ceramic 380 mm front and 320 mm rear discs with respectively 6 and 4 pot callipers provide extreme stopping power without fading and reduce the unsprung weight by approximately 40 kg. "On a light vehicle as the F1 such a unsprung weight reduction has a very profound influence on the cars cornering performance and ride quality." he adds.

### The Chassis

The 2010 upgrade package further features a completely newly developed adaptive engine mount system. Frank Stephensen: "The V12 engine in the McLaren F1 is a substantial part of its total mass and its dynamics have a very significant influence on both the ride comfort as well as on cornering performance. The newly developed adaptive engine mount system allows us to avoid compromises we had to make with the original design, further reducing engine vibrations during every day driving and enabling us to much better contain the V12's significant mass in cornering." Not only is their a new adaptive engine mount system, but the dampers have been made adaptive as well, another first on the McLaren F1. Mr Stephensen: "The drastically reduced unsprung mass, new 18-inch magnesium wheels, new tires as well as both the new adaptive engine mount and damper systems have prompted a major redesign of the total suspension system, raising the F1's cornering performance and handling to new levels while still maintaining its well established ride quality."

### The Bodywork

With the upgrade the McLaren F1 also sees a few changes to its bodywork. The most important ones being the removal of the automatic brake and balance aerofoil system as well as the active underbody air management system. Mr. Stephensen: "While in itself very effective systems, we wanted to focus on improving weight, weight placement and aerodynamics. Through several evaluations we found that improvements of various technologies allowed us to achieve the goals we set through more conventional means thus lowering weight, the centre of gravity and polar moment of yaw." The weight reducing measures have resulted in a substantial weight loss of 63 kg, with the total weight now being down to 1077 kg. Further detail attention to the aerodynamics has also allowed the drag coefficient to be reduced to 0.31. Together with the F1's small frontal area of 1.79 square meters this results in an extremely low air resistance index of only 0.55 helping the F1 to its amazing top speed potential.

### Performance

The described changes to the McLaren F1 have caused its cornering grip to rise to well over 1.0 G and power to weight ratio to improve with 18% to 478 bhp / ton. As a result the 0-60 time has dropped to 2.9 s, the quarter mile is now done in 10.1 seconds at 144 mph and top speed is now estimated to be significantly faster than 250 mph.\*

\* Only on approved tyres, final data to be disclosed end of 2009.

More information including images, compatibility with existing packages as well as pricing and availability for the 2010 McLaren F1 upgrade package can be provided by our nearest McLaren Authorised Service Centre.

## **Interview with two key people behind the McLaren F1 2010 upgrade package**

At the McLaren Technology Centre McLaren Automotive in Woking, Surrey (UK), sales and marketing director Rob Lindley and Design chief Frank Stephensen answer a few questions about the backgrounds and considerations behind the new McLaren F1 2010 upgrade package.

### **Why did you decide to offer this upgrade package?**

FS: Because it was technically possible and economically viable.

RL: Our customers have always inquired for various technical upgrades, we found ourselves in a position to have a unique window of opportunity for making a major improvement on our already legendary car and that opportunity was simply too good to let pass.

### **Why is it offered now, quite a long time after the cars launch and so close to the launch of it's successor?**

FS: The core strengths of the McLaren F1, it's layout, dimensions, carbon monocoque and engine still are state of the art even today, yet lot of technologies that now allow us to work around a few design decisions we had to make with the original design, have only recently become available. Offering this package at this point in time also allowed us to share a lot of development work with what was already planned for the F1's successor. In fact without the shared development approach it wouldn't have been possible for us to offer this upgrade package.

### **Aren't you afraid the upgrade package will threaten sales of the P11, the F1's successor?**

RL: No not at all, the F1 was produced in only very limited numbers and as such will not negatively impact any other car we offer or will offer in the future.

### **What were your goals for this upgrade?**

RL: Our goal was to give our customers the option of a final and ultimate evolution of their McLaren F1 road car.

FS: We wanted to take the still unrivalled core strengths of the F1 and by use of the latest technology undo it of all the originally unavoidable compromises necessary to make it a super car for the road in stead of a racecar with limited usability in the real world. Our secondary goal will become clear probably before the end of this year. (subtle smile).

### **Many see the McLaren F1 as a legend, a piece of art even by the hand of Gordon Murray, in that light was it a controversial decision to make such far reaching changes to the car?**

FS: Of course many within McLaren view the car exactly the same way, it is thé McLaren road car, the car we are best known for. However, McLaren is also first and foremost a company about engineering and innovation and as engineers we always strife to improve.

RL: Most of our customers take a keen interest into all the various technical aspects of our cars, so most are really thrilled about this new upgrade. Of course our customers can also keep their cars in the original spec and I can fully understand that as well, our service to all our customers will remain equally excellent regardless of specification.

### **How many people you think will opt for this package?**

RL: Of course we have asked our client base before deciding on this upgrade package and we feel confident the vast majority of them will opt for the upgrade.

### **Is it possible for customers to only adopt a selection of the upgrades from the package?**

FS: Yes, in fact some of our customers have already previously opted for various minor upgrade packages and as a result automatically will only get part of the 2010 upgrade package. That said for all the standard spec cars it is of course relatively more expensive the fewer upgrade options you take and we feel the total package is more than the some of it's parts and therefore we feel strongly in advising our customers to choose the complete upgrade.

**Were there any changes made to the exterior design of the car?**

RL: No, we feel that the McLaren F1's exterior design is of timeless quality and felt absolutely no need whatsoever to make any changes to it.

**Can you tell a bit more about the various technical improvements?**

FS: Well most of the detailed technical information will be first made available directly to our customers through our Authorised Service Centres, but I can't tell you how excited we are about how the different updates together have transformed the dynamic capabilities of our 2010 spec prototype during testing, it really takes the platform to a whole new level. That said, more details and full specifications will be provided in short notice.

**It must've been difficult to cost efficiently develop these changes for such a small number of cars?**

RL: Yes, many people think that it is easy for us to offer all sort of improvements since some cars are now worth over 2 million pounds. However with only 64 cars ever produced the total amount of packages we can sell is very limited so we had to be very prudent with the resources available.

FS: Development and test work for instance on the adaptive dampers, engine mounts and the ceramic brakes could be shared with the P11 project. Also through the years a lot of engine upgrade ideas have surfaced ranging from direct injection to a magnesium / aluminium crankcase to even a high performance version of BMW's larger N73 V12 engine. However BMW already had done a lot of the necessary development for the engine upgrade for several other projects and therefore we were able to offer this normally too costly engine update within the scope of this upgrade package.

**With the engine of the F1 coming from BMW and being so heavily involved with Mercedes, that must've caused some tensions?**

RL: Not everything is always as it seems (smiles), but no, that was not an issue.

**So we can expect to see some of these technologies on the P11 as well?**

RL: Some yes (smiles again), but I can't share much information on that at this point in time.

Mark Harrison  
Head of PR of McLaren Automotive.



## McLaren F1 Roadcar – 2010 UP Specification

### Body

Length	<b>4287 / 168.78</b> mm / inches
Width	<b>1820 / 71.65</b> mm / inches
Height	<b>1140 / 44.88</b> mm / inches
Wheelbase	<b>2718 / 107.01</b> mm / inches
Front Overhang	<b>970 / 38.18</b> mm / inches
Rear Overhang	<b>599 / 23.58</b> mm / inches
Front Track	<b>1568 / 61.73</b> mm / inches
Rear Track	<b>1472 / 57.95</b> mm / inches
Luggage Capacity - 2 occupants (VDA)	<b>283 / 10</b> litres / cu ft.
Luggage Capacity - 3 occupants (VDA)	<b>227 / 8</b> litres / cu ft.
Fuel Tank Capacity	<b>90</b> litres
Kerb Weight	<b>1077 / 2375</b> kg / lbs
Weight Distribution	<b>41.1/58.9</b> F/R
Drag Coefficient ( $C_d$ )	<b>0.31</b>
Drag index ( $C_dA$ )	<b>0.55</b>

### Performance\*

Top Speed	**
0-60 mph	<b>2.9</b> seconds
0-100 mph	<b>5.5</b> seconds
0-150 mph	<b>10.7</b> seconds
0-200 mph	<b>21.7</b> seconds
1/4 mile	<b>10.1</b> seconds @ <b>232 / 144</b> km/h / mph
Standing km	<b>18.9</b> seconds @ <b>303 / 188</b> km/h / mph

\* 2010 UP spec prototype data.

\*\* To be disclosed end of 2009.

### Powertrain

Type Number	<b>S 70/4</b>
Cylinder Arrangement	<b>V12</b>
Cylinder Angle	<b>60</b> degrees
Power Output	<b>515 / 700 / 691</b> kW / PS / bhp @ <b>8200</b> rpm
Max. Torque	<b>666 / 491</b> Nm / lb.ft @ <b>5300</b> rpm
Engine Capacity	<b>6121 / 373.3</b> cc / in <sup>3</sup>
Valves/Cylinder	<b>4</b>
Bore	<b>86.4 / 3.40</b> mm / inches
Stroke	<b>87.0 / 3.42</b> mm / inches
Compression Ratio	<b>12.0:1</b>
Ignition system	Transistorised system with twelve individual coils
Induction system	12 single throttle valves, carbon composite airbox
Valvetrain	Chain driven double overhead camshaft with continuously variable valve timing on intake and exhaust valves.
Engine Block	Cast aluminium 60 deg V12
Cylinder heads	4 valves per cylinder cast aluminium alloy
Flywheel	Aluminium
Cam Carriers/Covers	Cast magnesium

Lubrication System	Dry sump magnesium casting with scavenge pumps and one pressure pump
Advised Fuel	98 RON unleaded (95 RON possible at reduced output).
Oil	5W40/10W60
Cooling System	Twin aluminium water radiators and oil/water heat exchanger.
Fuel system	Flexible safety fuel cell with in-tank high pressure pump
Electrics	12V system with high capacity battery & 160 amp alternator, Chassis ECU, Engine ECU, DC/DC converter for heated glass
Engine mounting	Dynamically through adaptive engine mounts
Transmission	Transverse unit with high speed bevel gears and spur final drive All synchro constant mesh 6 Speed Limited slip differential Fan assisted air / oil radiator - pumped lubrication system
1st Gear Ratio	<b>3.23/8.7</b>
2nd Gear Ratio	<b>2.19/12.7</b>
3rd Gear Ratio	<b>1.71/16.7</b>
4th Gear Ratio	<b>1.39/20.0</b>
5th Gear Ratio	<b>1.16/24.0</b>
6th Gear Ratio	<b>0.93/30.0</b>
Final Drive Ratio	<b>2.37:1</b>
Clutch	Triple plate Carbon/Carbon 200mm (7.87") diameter Remote actuation (hydraulic)
Steering	Unassisted rack and pinion Two turns lock to lock

### Chassis

Front Suspension	Double wishbones, Ground Plane shear Centre sub-frames, light alloy adaptive dampers/ co-axial coil springs, anti-roll bar
Rear Suspension	Double wishbones, inclined Axis Shear mounting system, light alloy adaptive dampers/ co-axial coil springs, toe-in / toe-out control links
Front Tyre	<b>235/40 ZR 18</b>
Front Wheel	<b>9 x 18</b> inches
Rear Tyre	<b>315/40 ZR 18</b>
Rear Wheel	<b>11.5 x 18</b> inches
Front Calliper Type	<b>6</b> pot monobloc light alloy calliper
Rear Calliper Type	<b>4</b> pot monobloc light alloy calliper
Front Brake disc Type	Ventilated ceramic composite
Rear Brake disc Type	Ventilated ceramic composite
Front Brake Disc diameter	<b>380 / 14.96</b> mm / inches
Rear Brake Disc diameter	<b>320 / 12.6</b> mm / inches
Front Brake Disc Thickness	<b>32 / 1.26</b> mm / inches
Rear Brake Disc Thickness	<b>32 / 1.26</b> mm / inches
Turns Lock-to-Lock	<b>2</b>
Parking Brake	Automatic computerised control system
Brake Cooling	Automatic computerised control system
Turning Circle	<b>12.6 / 41.4</b> m / ft