

BMW Sauber F1 Team Contents.



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1. The team.

1.1 Battle for the title in 2009.



The BMW Sauber F1 Team aims to be a title contender.

Rarely has making predictions been such a tricky business. However, despite fundamental changes to the rules of the Formula One game going into 2009, the BMW Sauber F1 Team is refusing to waver from its ambitious goal: to be up there fighting for the title in its fourth season on the F1 grid.

BMW Motorsport Director Mario Theissen reinforces the point: "We have set ourselves the task of further improving our performance relative to the rest of the field. The one-two in Canada and eleven podium finishes in 2008 set an exacting standard. In 2009 we are looking to maintain our first-class reliability record while also enhancing our performance levels so that we can be at the front of the pack on a consistent basis. Ferrari and McLaren possess vast reserves of experience and have been operating at the top level for many years. That's what our highly motivated team are setting out to emulate – through hard work and efficiency, coupled with our calm, analytical approach to the job."

The task facing the team is huge. Fundamental changes to the regulations have, in many cases, consigned the fruits of experience to the waste bin. Development work on what will be a radically different race car got underway even earlier than usual. Indeed, the concept phase for the BMW Sauber F1.09 began back in February 2008. The 2009 car cuts a very different figure from all of its predecessors. Its nose is higher and much wider than before. The huge front wing consists of three elements and stretches across the full width of the car. The rear wing, on the other hand, is considerably slimmer – in line with the new regulations – and stands unusually high against the onrushing air. Intricate aerodynamic add-ons, such as air deflectors and cooling air intakes, have been reduced to a minimum. Another eye-catching feature are the sidepods, which are now higher at the front.

2009 also marks the return of treadless tyres (slicks) to Formula One. These will deliver increased front-end grip, which encourages moving more weight to the nose of the car. Counteracting this, however, is another new development which the teams have the option of introducing in the forthcoming season: KERS (Kinetic Energy Recovery System). The component parts of this technology add extra weight at the rear of the car. Alongside aerodynamics and the optimum use of the slick tyres, the integration of KERS represents another key challenge for the engineers. To this end, the front axle has been modified and the rear axle is a new design.

Willy Rampf is responsible for the F1.09 concept and will oversee operations at the race track in his capacity as Technical Coordinator. Managing Director of BMW Sauber AG, Walter Riedl, will also lead the technical department at Hinwil in Switzerland and has responsibility for the development of the car.

While the chassis is the work of the Hinwil team, the KERS technology was developed in Munich. There, Markus Duesmann (Head of Powertrain) and his team also had the job of preparing the BMW V8 engine for an increase in mileage: each power unit now has to last three rather than two grand prix weekends, and the team may use only 20 engines per season, including test drives.

It may be all-change in terms of the engineering behind the car, but the men behind the wheel will be the same as in 2008. The BMW Sauber F1 Team will once again line up on the grid with Robert Kubica (24) from Poland and German Nick Heidfeld (31) as its driver pairing. And Christian Klien, who came on board last year, also stays with the team as test and reserve driver. The Austrian celebrates his 26th birthday in February.

The team's race drivers both demonstrated impressive reliability in 2008. Kubica racked up the most points for the team. He added his name to the list of Formula One race winners in Canada, brought home the team's first pole position in Bahrain and also notched up three second places and three third-place finishes during the course of the season. For 2009 the man from Krakow is hoping "that we are as strong at the start of the season as in 2008, and that we can maintain this level of performance up to the final race."

Kubica's team-mate Heidfeld, meanwhile, collected four second places and recorded the team's first two fastest race laps. Looking ahead to the new season, he says: "The team started work early on the wide range of changes. I'm confident that we're in good shape and am looking forward to the first race, when we'll see whether the balance of power has shifted at all."

The BMW Sauber F1 Team has conducted intensive preparations for 2009 as it attempts to achieve its latest ambitious target. These have included early testing with KERS and new aero elements. "In the three years since the BMW Sauber F1 Team was formed, we have always met the goals we set ourselves and are confident that we can do so again this year," explains Theissen. However, no matter how motivated the team may be and how much development work they have behind them, gauging their progress against the competition has never been so difficult, as Theissen acknowledges: "You can plan your level of performance, but not your results."

1.2 Successful debut in 2006.

Despite an extremely short start-up phase – there were just six months between BMW's decision to take over the majority stake in Sauber and the team presentation – the fledgling outfit managed to claim a string of surprising successes in its debut season. A BMW Sauber F1 Team driver made it into the top ten qualifying 19 times (Heidfeld 10x, Kubica 4x, Jacques Villeneuve 4x). The best place on the grid was third in Monza (Heidfeld). A driver finished in the points 15 times (Heidfeld 10x, Villeneuve 4x, Kubica 1x). The team even managed to take home two trophies after Heidfeld came third in Budapest and Kubica delivered a repeat performance in Monza. The BMW Sauber F1 Team concluded its first race season with a tally of 36 points, placing it fifth in the Constructors' Championship.

The team had embarked on the 2006 season with Heidfeld and Villeneuve as its drivers. Despite his lack of experience, Kubica made his mark from the outset with outstanding performances in testing and in Friday practice on the GP weekends.

At the 13th GP of the year, Kubica was given his chance to race the second F1.06 alongside Heidfeld in Budapest. He completed his baptism of fire in extremely challenging conditions to cross the line in seventh place, covering 51 laps on intermediates. Unexpectedly high tyre wear coupled with an empty fire extinguisher, which had shed its two kilos of "light water" after hitting a barrier, meant the car was two kilograms below the stipulated weight at the post-race technical inspection and resulted in the Pole being disqualified.

But Kubica had demonstrated his racing skills. A few days later the team parted company with Villeneuve and, as of the next GP in Turkey, Sebastian Vettel took on the role of Friday driver. He was confirmed as the 2007 test and reserve driver alongside Heidfeld and Kubica. Timo Glock was appointed the second test driver.

Results BMW Sauber F1 Team 2006.

Grand Prix	Nick Heidfeld			Jacques Villeneuve			Team placing
	Q	Race	Pts	Q	Race	Pts	
Bahrain	10	12	–	11	DNF	–	–
Malaysia	15	DNF	–	14	7	2	6
Australia	8	4	5	9	6	3	5
San Marino	15	13	–	12	12	–	5
Europe	15	10	–	9	8	1	5
Spain	10	8	1	14	12	–	5
Monaco	16	7	2	15	14	–	5
Great Britain	9	7	2	10	8	1	5
Canada	13	7	2	11	accident	–	5
USA	10	accident	–	6	DNF	–	5
France	12	8	1	18	11	–	6
Germany	16	DNF	–	14	accident	–	6
Grand Prix	Nick Heidfeld			Robert Kubica			Team placing
	Q	Race	Pts	Q	Race	Pts	
Hungary	11	3	6	10	DSQ (7)	–	6
Turkey	6	14	–	9	12	–	6
Italy	3	8	1	7	3	6	5
China	8	7	2	9	13	–	5
Japan	9	8	1	12	9	–	5
Brazil	8	accident	–	9	9	–	5

In its first season, the BMW Sauber F1 Team collected 36 championship points.

1.3 Third-strongest team in 2007.

In only its second season, the BMW Sauber F1 Team exceeded all expectations. Having earned 36 points in its debut season to finish fifth in the championship – a hefty 50 points off fourth place – it emerged as the third-strongest outfit in 2007 from the very first grand prix. By the end of the season it had 101 championship points under its belt. Both drivers made it into the top ten qualifying on each of the 17 GP weekends, and at least one driver finished in the points each Sunday.

BMW Motorsport Director Mario Theissen drew a positive conclusion at the end of a tough season's racing: "We have exceeded our own targets and are proud of it. The fact that on paper we ended up second in the championship, following the penalty imposed on McLaren Mercedes, does not disguise the fact that there were four cars on the grid in 2007 which were markedly faster than ours."

Nick Heidfeld claimed two podium places by finishing second in Canada and third in Hungary. He took points away from 14 out of 17 races to claim fifth in the Drivers' Championship with a total of 61 points – the best final result in his Formula One career so far. Robert Kubica made it into the top eight finishers in eleven grands prix and earned 39 points to finish sixth behind his team-mate. After a serious accident in the Canadian Grand Prix, the Pole was forced to sit out the US race.

There was generally little to choose between Heidfeld and Kubica, and both drivers showed their prowess in head-to-head battles on the race track. In August both drivers were confirmed for 2008. For the Hungarian GP, test and reserve driver Sebastian Vettel switched to a Scuderia Toro Rosso racing cockpit and Timo Glock stepped into the breach as reserve driver.

With the BMW Sauber F1.07 the team had built the third-best Formula One car in only the second year of its development phase. By September, third place in the Constructors' Championship was secure and it was time to turn its focus on development work for 2008. Conditions for this had steadily improved: by the end of the season, the Hinwil workforce target of 430 had almost been achieved and the new extension was ready for occupation.

Results BMW Sauber F1 Team 2007.

Nick Heidfeld				Robert Kubica			
Grand Prix	Q	Race	Pts	Q	Race	Pts	WM placing
Australia	3	4	5	5	DNF	–	3
Malaysia	5	4	5	7	18	–	3
Bahrain	5	4	5	6	6	3	3
Spain	7	DNF	–	5	4	5	3
Monaco	7	6	3	8	5	4	3
Canada	3	2	8	8	accident	–	3
Nick Heidfeld				Sebastian Vettel			
USA	5	DNF	–	7	8	1	3
Nick Heidfeld				Robert Kubica			
France	7	5	4	4	4	5	3
Great Britain	9	6	3	5	4	5	3
Europe	4	6	3	5	7	2	3
Hungary	3	3	6	7	5	4	3
	Grid 2						
Turkey	6	4	5	5	8	1	3
Italy	4	4	5	6	5	4	3
Belgium	7	5	4	5	9	–	2
	Grid 6			Grid 14			
Japan	5	DNF	–	10	7	2	2
				Grid 9			
China	8	7	2	9	DNF	–	2
Brazil	6	6	3	7	5	4	2

In its second year, the BMW Sauber F1 Team collected 101 championship points.

1.4 Exacting targets achieved in 2008.

In a Formula One season which seemed to have a surprise lurking around every corner, the BMW Sauber F1 Team was a model of consistency. As if setting out to reinforce the stereotypes of German thoroughness and Swiss precision, they swept through 2008 without a single technical retirement and recorded, by a mile, the most race laps and fastest pit stops of any team.

The BMW Sauber F1.08 racers were not only reliable, they also proved their performance mettle. The season's highlights were the one-two finish in Canada when Robert Kubica took the chequered flag ahead of team-mate Nick Heidfeld a year after crashing heavily in Montreal; Kubica's pole position in Bahrain; and Heidfeld's two fastest race laps (Malaysia and Germany). The BMW Sauber F1 Team drivers collected a total of eleven trophies in the team's third season – up from two in 2007. For a time, the team set the pace at the top of the Constructors' Championship, and Kubica also headed the drivers' standings for a while – the first driver from the team to achieve that benchmark.

Indeed, Kubica posted consistently strong performances throughout 2009, retained an outside chance of winning the World Championship title going into the penultimate GP, and ultimately finished fourth in the standings. Heidfeld, by contrast, found himself battling serious difficulties at times during the season. He was unable to bring his tyres up to peak operating temperature fast enough in qualifying, and the problem was reflected in relatively poor starting positions.

The BMW Sauber F1.08 was fêted as “the first real BMW Sauber” at its unveiling and, as such, marked the culmination of the team's development phase. The team opted for an aggressive, innovative approach with the new car. This was entirely the right course given its aims for the season – turning the two-horse race at the top of the standings into a three-way battle and recording its first GP win – but also one not without risk. Indeed, the F1.08 was still far from its full potential at the launch in Valencia. By the season opener in Australia, though, the team had the F1.08 very much on track, and the development process continued through 2008. Having said that, several components did not yield the progress on the track towards the end of the season they had promised in the wind tunnel.

In early October Kubica and Heidfeld were confirmed as the race drivers for 2009 and Christian Klien as the test and reserve driver. However, fewer testing opportunities meant that the team parted company with the young Estonian Marko Asmer – also a test driver for the team in 2008 – at the end of the year.

Results BMW Sauber F1 Team 2008.

Grand Prix	Nick Heidfeld			Robert Kubica			WM placing
	Q	Race	Pts	Q	Race	Pts	
Australia	5	2	8	2	DNF	–	3
Malaysia	7	6	3	6	2	8	2
	Grid 5			Grid 4			
Bahrain	6	4	5	1	3	6	1
Spain	9	9	–	4	4	5	2
Turkey	9	5	4	5	4	5	2
Monaco	13	14	–	5	2	8	3
	Grid 12						
Canada	8	2	8	2	1	10	2
France	12	13	–	7	5	4	2
	Grid 11			Grid 5			
Great Britain	5	2	8	10	DNF	–	2
Germany	12	4	5	7	7	2	2
Hungary	16	10	–	4	8	1	3
	Grid 15						
Europe	8	9	–	3	3	6	3
Belgium	5	2	8	8	6	3	3
Italy	10	5	4	11	3	6	3
Singapore	6	6	3	4	11	–	3
	Grid 9						
Japan	16	9	–	6	2	8	3
China	7	5	4	12	6	3	3
	Grid 9			Grid 11			
Brazil	8	10	–	13	11	–	3

In its third year, the BMW Sauber F1 Team collected 135 championship points.

1.5 Timeline – key dates.

22 nd June 2005	At a press conference in Munich, BMW announces its takeover of the majority stake in Sauber AG.
16 th September 2005	BMW announces it has signed up Nick Heidfeld.
14 th November 2005	The name “BMW Sauber F1 Team” is confirmed.
28 th November 2005	First test in Barcelona for the Sauber C24B interim chassis with the BMW P86 V8 engine.
1 st December 2005	Jacques Villeneuve is confirmed as team driver.
20 th December 2005	Robert Kubica is signed as the team’s test and reserve driver.
1 st January 2006	BMW completes the shareholding takeover.
16 th /17 th January 2006	The BMW Sauber F1 Team presents itself to the public in Valencia. The BMW Sauber F1.06 has its first outing.
February 2006	Planning application for the Hinwil extension.
12 th March 2006	The BMW Sauber F1 Team contests its first grand prix in Bahrain.
19 th March 2006	The team secures its first World Championship points in the second race: Villeneuve comes seventh in Malaysia.
2 nd April 2006	The third GP sees both drivers finish in the points: in Australia Heidfeld comes fourth and Villeneuve sixth.
April 2006	Work begins on the design of the BMW Sauber F1.07.
6 th August 2006	Kubica drives his first Formula One race in Budapest. In the team’s 13 th World Championship race, Heidfeld claims its first podium place.

7 th August 2006	The BMW Sauber F1 Team and Villeneuve part company.
25 th August 2006	In Istanbul, Sebastian Vettel takes on the job of the team's Friday driver for the first time.
September 2006	Start of the construction phase for the BMW Sauber F1.07.
10 th September 2006	Kubica comes third in Monza to pick up the team's second trophy.
October 2006	The wind tunnel in Hinwil is now running three shifts. A year previously it had been on a single daily shift.
19 th October 2006	The 2007 drivers are announced: Heidfeld and Kubica as race drivers, Vettel as test and reserve driver.
22 nd October 2006	The BMW Sauber F1 Team concludes its debut year in fifth place in the Constructors' Championship. Meanwhile, 100 new staff have been taken on at Hinwil, with a further 50 scheduled to follow.
28 th November 2006	Start of winter testing in Barcelona.
14 th December 2006	Presentation of the new Albert2 supercomputer.
21 st December 2006	Timo Glock is signed on as second test driver.
16 th January 2007	Presentation of the BMW Sauber F1.07 and the BMW Sauber F1 Team in Valencia.
18 th March 2007	In the first race of the season in Australia, the team emerges as the third-strongest.
May 2007	Work starts on the BMW Sauber F1.08 concept.
10 th June 2007	At the Canadian GP Heidfeld finishes second on his own merit. Kubica suffers a serious crash but emerges virtually unscathed.

17 th June 2007	The official medical team refuse to let Kubica race. Vettel stands in for him and finishes eighth to pick up a championship point in his F1 race debut.
31 st July 2007	Glock moves up into the reserve driver slot after Vettel is offered a racing cockpit by Team Scuderia Toro Rosso.
5 th August 2007	Heidfeld comes third in Hungary to claim the second trophy of the season for the BMW Sauber F1 Team.
21 st August 2007	Heidfeld and Kubica are confirmed as drivers for 2008.
from October 2007	The move into the extension in Hinwil, where the workforce has now grown to 430; when BMW took over the team there were 275 employees.
21 st October 2007	With fifth and sixth in the final in Brazil, Kubica and Heidfeld confirm the team's position as the third-strongest. They are also fifth and sixth in the Drivers' Championship, with Heidfeld boasting a clear lead over Kubica. After the disqualification of McLaren Mercedes, the team is officially second in the Constructors' Championship with 101 points.
14 th January 2008	The BMW Sauber F1.08 is presented at BMW Welt, the new car delivery centre in Munich. It runs its first few metres with Heidfeld at the wheel.
15 th January 2008	Kubica is in the cockpit for the car launch in Valencia. Neither the maiden outing nor the subsequent days of testing deliver the expected lap times. The team has its work cut out.
2 nd February 2008	Austrian Christian Klien is signed up as test and reserve driver; Marko Asmer of Estonia also comes on board as a test driver.
February 2008	Work starts on the BMW Sauber F1.09 concept.
15 th /16 th March 2008	The tour de force has been accomplished and the F1.08 is on top form for the season opener. In qualifying Kubica just misses out on pole position; Heidfeld finishes second in the Australian GP.

23 rd March 2008	In the Malaysian GP, Kubica comes second to pick up his second trophy. Heidfeld claims the first fastest race lap for the BMW Sauber F1 Team.
5 th April 2008	Kubica secures the team's first pole position in Bahrain.
6 th April 2008	A third podium place for Kubica, who finishes third. The team leave Bahrain leading the championship.
May 2008	Supercomputer Albert3 goes on stream.
25 th May 2008	Kubica is hailed runner-up in the royal box in Monaco.
8 th June 2008	The targeted first win turns out to be a one-two: Kubica triumphs in Canada in front of Heidfeld. Kubica moves into the lead in the Drivers' Championship.
6 th July 2008	Heidfeld comes second in Silverstone to take home the team's seventh trophy.
15 th July 2008	An F1.07 equipped with KERS is tested for the first time on the Miramas (FR) test track.
20 th July 2008	In Hockenheim, Heidfeld claims the fastest race lap for the second time.
24 th August 2008	Kubica takes third place on Valencia's street circuit.
7 th September 2008	Heidfeld finishes second in Spa.
14 th September 2008	Kubica is third to cross the start/finish line in Monza.
12 th October 2008	Second-place finish for Kubica in Fuji – the eleventh and last podium position for the team in 2008.
November 2008	The team ends the season in third place with 135 points. Kubica finishes fourth in the Drivers' Championship, Heidfeld sixth.

1.6 Who's who.

BMW Motorsport Director	Prof. Dr.-Ing. Mario Theissen
Driver number 5	Robert Kubica
Driver number 6	Nick Heidfeld
Test and reserve driver	Christian Klien
Managing Director	Walter Riedl
Technical Coordinator	Willy Rampf
Head of Powertrain	Markus Duesmann
Chief Designer	Christoph Zimmermann
Head of Aerodynamics	Willem Toet
Team Manager	Beat Zehnder
Race Engineer Nick Heidfeld	Giampaolo Dall'Ara
Race Engineer Robert Kubica	Antonio Cuquerella
Chief Mechanic Race Team	Amiel Lindesay
Head of Sponsoring and Business Relations	Guido Stalmann
Head of BMW Sport Communication	Jörg Kottmeier

1.7 Pit stop in Munich.

The heart of BMW Motorsport beats in the north of Munich – at Anton-Ditt-Bogen, to be precise. Markus Duesmann is responsible for the development, manufacture, testing and race deployment of all Formula One powertrain components, which include the engine, transmission, electrics/electronics, hydraulics and the KERS energy regeneration system slated for 2009.

In late 2005, the division moved into a new complex on this industrial estate, which houses the latest-generation test rigs and laboratories for powertrain development as well as the electronics department. Immediately adjacent is the Formula One component production facility with its own quality control department.

At Anton-Ditt-Bogen, not just BMW's F1 activities, but all its other motor sport projects as well were brought together on a single site. This is where all the offices are located, including that of BMW Motorsport Director, Mario Theissen. The Sponsoring and Business Relations department is based here, as is the logistics command centre.

All access points are secured, and without a prior appointment or an electronic employee ID nobody can get inside. The entire ambience is dominated by the colour white, with the other BMW Motorsport colours blue and red adding highlights. The modern interior reflects the character of BMW Motorsport with its high functionality and simple elegance.

Overall, the Formula One departments are spread across six buildings containing workshops, laboratories and offices. This taut centralisation and the close link to the neighbouring BMW Research and Innovation Centre (FIZ) make for short distances and a high degree of flexibility, whether it is a matter of coordination, development or production processes. The FIZ is the nucleus of all BMW production vehicles and, along with its resources and engineering staff, is also available to the Formula One engineers. Conversely, the FIZ experts benefit from their proximity to the fast-track Formula One research undertaking. Nowhere else does theory have to be turned into practice at such a rapid pace.

A 45-minute drive northeast of Munich, in Landshut, is where the Formula One foundry is located. It was annexed to the series production foundry to guarantee the shortest possible routes for technology transfer in this area as well.

The Bayerische Motoren Werke was founded in the year 1916. In its early years, the Munich-based company manufactured aircraft engines. In the 1920s, BMW made a name for itself beyond Germany's borders with its development of motorcycles. Then finally, in the 1930s, BMW began to produce automobiles.

The BMW Group ranks among Germany's seven biggest industrial enterprises. With vehicle sales exceeding 1.5 million in 2007, the BMW Group with its BMW, MINI and Rolls-Royce brands is the most successful car manufacturer in the premium segment. It has 23 production sites in four continents, as well as subsidiaries and importers in more than 140 countries. It employs a total workforce of over 100,000.

As BMW's Development Director, Dr Klaus Draeger has also been responsible for the group's motor sport projects since 1st November 2006.

BMW's Formula One history began in 1981 during the turbo era. 1983 brought victory in the Drivers' World Championship with Nelson Piquet in a Brabham BMW. Seasons 2000 through to 2005 witnessed the BMW WilliamsF1 Team partnership, six years which produced a tally of ten GP wins and 17 pole positions. The best championship placing was second in 2002 and 2003.

Ahead of the 2009 season, BMW has notched up 232 starts, 20 grand prix wins and 33 pole positions.

Since the BMW Sauber F1 Team came into being, it has claimed 15 podium places – two in its debut year of 2006, two in season 2007, and eleven in 2008. The best individual result was the one-two result at the 2008 Canadian Grand Prix (Robert Kubica ahead of Nick Heidfeld). In 2008 the BMW Sauber F1 Team also claimed a pole position (Kubica) and two fastest race laps (Heidfeld).

1.8 Pit stop in Hinwil.

When the management resolved to expand the team, the decision also implied an extension of the existing factory in Hinwil. The requirement was to create space for additional machinery and test rigs, as well as for new staff intake.

Planning work for the extension began in October 2005, and by early February the plans had been submitted for permission. Excavation work started in July 2006, and in autumn of 2007 the first workplaces were ready to be occupied. The extension was directly annexed to the existing building, which had been there since 1992, increasing the total area from 6,900 to 15,600 square metres (not including the wind tunnel).

The concept for what was also a visually attractive building was subject to a strict practical brief. It is designed to ensure short distances and optimal work processes. Efficiency is paramount, as reflected, for example, in the enclosed bridge that connects the wind tunnel with the area housing the design office.

On the ground floor is the truck bay. Next to this there is space for large production equipment such as the portal milling machine. Also housed here are the mechanical production department as well as the autoclaves. The eroding machines, quality control and warehouse are on the first floor.

The second floor boasts an intriguing visual design. The Formula One race cars are serviced in the central area, which is designed as an atrium to allow the cars to be seen from the third floor as well. The second floor also accommodates the carbon-fibre, car body, hydraulics and rapid prototyping departments. Also housed here are the administration, the design office and the electronics department.

The wind tunnel.

Immediately next to the new building is the cutting-edge wind tunnel that started up in spring 2004. The construction measures 65 metres long by 50 metres wide by 17 metres high and features a striking glazed façade. It houses the offices of highly qualified specialists. In addition to the aerodynamicists, these include the model designers and builders, CFD (Computational Fluid Dynamics) engineers and other staff in the aero department.

The technology of this facility is state-of-the-art. That applies to all the relevant aspects such as wind speed, size of the test section and models, dimensions of the rolling road, the model motion system and data collection.

The wind tunnel is designed as a closed circuit and has a total length of 141 metres and a maximum tube diameter of 9.4 metres. The steel elements along with the fan housing reach a combined weight of 480 tonnes. The single-stage axial fan with carbon rotor blades uses 3,000 kW at full load.

At the core of any wind tunnel is the test section. Both its cross-section and the length of the rolling road are so generous as to create optimum conditions for precision results. Work is carried out on 60-percent scale models.

The entire measuring platform rotates to allow test models to be exposed to the airflow not just frontally but also at an angle of up to ten degrees. The platform has a rotating steel belt that simulates the relative motion between the car and the road and runs in sync with the air stream. Load cells are fitted under the moving belt to measure wheel loads.

Beyond the technology itself, the design of the wind tunnel also sets great store by its visual appearance. The glass-clad façades underline its uniqueness as a combination of industrial building and event venue. What appears from the outside as a homogeneous hall in fact consists of two clearly separate elements: the actual wind tunnel and a wing housing workspaces and an event platform, where partners and sponsors can stage events in a unique setting. The first-floor gallery has capacity for 150 people.

This area is divided from the technical section by a glass wall, ensuring the visual link is maintained while effectively insulating it against noise from the wind tunnel.

Supercomputer Albert3.

The BMW Sauber F1 Team unveiled its Albert2 supercomputer in December 2006. This facility for CFD calculations was already based on Intel technology (consisting of processors, motherboard, chip set and server housing). In the

interests of efficiency, the BMW Sauber F1 Team had opted early on for a combination of wind tunnel and simulation rather than building a second wind tunnel.

Albert2 had 256 nodes with two Intel®Xeon® 5160 Dual Core processors each (two cores per processor). That came to a total of 1,024 processor cores. An extra 32 nodes were added soon afterwards, bringing the total to 288 nodes or 1,152 processor cores.

The latest stage – Albert3 – has been up and running since spring 2008. 384 nodes equipped with Intel®Xeon® E5472 Quad Core processors (four cores per processor) and related Intel technology were added to the existing system, which meant Albert3 now had a total of 4,224 processor cores at its disposal. RAM grew to 8,448 GB and maximum computing power to 50.7 TFlops, or 50,700,000,000,000 computations per second.

Like its predecessors, this supercomputer was developed by the Swiss company Dalco and runs on CFD software by Ansys-Fluent.

The technical potential of Albert3 is harnessed for aerodynamics analysis. With the supercomputer's help, the aero experts calculate components for the Formula One race car. In this they use grid models frequently comprising over 100 million cells. CFD plays a particularly important role in the development of front and rear wings as well as in engine and brake cooling.

Formula One acts as a pacemaker for the motoring industry both in the ongoing development of hardware and software and in the deployment of such tools. Far from competing with the work in the wind tunnel, computer-aided airflow simulation augments it: "A major advantage of CFD is that you can represent the air stream visually and in that way understand why one component is better than another," explains Willem Toet, Head of Aerodynamics.

2. The season. 2.1 Grand prix information.

GP 2009	Date	Circuit length	Race distance	Winner 2008	Pole 2008	Fastest race lap 2008
1 Australia Melbourne	29.03.	5.303 km	307.574 km 58 laps	Lewis Hamilton McLaren Mercedes 1 hr 34:50.616	Lewis Hamilton McLaren Mercedes 1:26.714 min	Heikki Kovalainen McLaren Mercedes 1:27.418 min
2 Malaysia Sepang	05.04.	5.543 km	310.408 km 56 laps	Kimi Räikkönen Ferrari 1 hr 31:18.555	Felipe Massa Ferrari 1:35.748 min	Nick Heidfeld BMW Sauber F1 Team 1:35.366 min
3 China Shanghai	19.04.	5.451 km	305.066 km 56 laps	Lewis Hamilton McLaren Mercedes 1 hr 31:57.403	Lewis Hamilton McLaren Mercedes 1:36.303 min	Lewis Hamilton McLaren Mercedes 1:36.325 min
4 Bahrain Sakhir	26.04.	5.412 km	308.238 km 57 laps	Felipe Massa Ferrari 1 hr 31:06.970	Robert Kubica BMW Sauber F1 Team 1:33.096 min	Heikki Kovalainen McLaren Mercedes 1:33.193 min
5 Spain Barcelona	10.05.	4.655 km	307.104 km 66 laps	Kimi Räikkönen Ferrari 1 hr 38:19.051	Kimi Räikkönen Ferrari 1:21.813 min	Kimi Räikkönen Ferrari 1:21.670 min
6 Monaco Monte Carlo	24.05.	3.340 km	260.520 km 78 laps	Lewis Hamilton McLaren Mercedes 2 hrs 00:42.742	Felipe Massa Ferrari 1:15.787 min	Kimi Räikkönen Ferrari 1:16.689 min
7 Turkey Istanbul	07.06.	5.338 km	309.396 km 58 laps	Felipe Massa Ferrari 1 hr 26:49.451	Felipe Massa Ferrari 1:27.617 min	Kimi Räikkönen Ferrari 1:26.506 min
8 Great Britain Silverstone	21.06.	5.141 km	308.355 km 60 laps	Lewis Hamilton McLaren Mercedes 1 hr 39:09.440	Heikki Kovalainen McLaren Mercedes 1:21.049 min	Kimi Räikkönen Ferrari 1:32.150 min
9 Germany Nürburgring	12.07.	5.148 km	308.863 km 60 laps	–	–	–



GP 2009	Date	Circuit length	Race distance	Winner 2008	Pole 2008	Fastest race lap 2008
10 Hungary Budapest	26.07.	4.381 km	306.458 km 70 laps	Heikki Kovalainen McLaren Mercedes 1 hr 37:27.067	Lewis Hamilton McLaren Mercedes 1:20.899 min	Kimi Räikkönen Ferrari 1:21.195 min
11 Europe Valencia	23.08.	5.440 km	310.080 km 57 laps	Felipe Massa Ferrari 1 hr 35:32.339	Felipe Massa Ferrari 1:38.989 min	Felipe Massa Ferrari 1:38.708 min
12 Belgium Spa	30.08.	7.004 km	308.052 km 44 laps	Felipe Massa Ferrari 1 hr 22:59.394	Lewis Hamilton McLaren Mercedes 1:47.338 min	Kimi Räikkönen Ferrari 1:47.930 min
13 Italy Monza	13.09.	5.793 km	306.720 km 53 laps	Sebastian Vettel Toro Rosso 1 hr 26:47.494	Sebastian Vettel Toro Rosso 1:37.555 min	Kimi Räikkönen Ferrari 1:28.047 min
14 Singapore	27.09.	5.067 km	309.087 km 61 laps	Fernando Alonso Renault 1 hr 57:16.304	Felipe Massa Ferrari 1:44.801 min	Kimi Räikkönen Ferrari 1:45.599 min
15 Japan Suzuka	04.10.	5.807 km	unconfirmed at editorial deadline	–	–	–
16 Brazil São Paulo	18.10.	4.309 km	305.909 km 71 laps	Felipe Massa Ferrari 1 hr 34:11.435	Felipe Massa Ferrari 1:12.368 min	Felipe Massa Ferrari 1:13.736 min
17 Abu Dhabi	01.11.	tbc	tbc	–	–	–

GP	Full-throttle ratio Ø	Top speed race	Longest full-throttle section	Right-/left-hand turns	Tyre wear	Brake wear	Downforce level	Gear changes per lap
AU	65%	303 km/h	10 sec/735 m	10/6	medium/low	high	high	60
MY	65%	297 km/h	12 sec/830 m	10/5	medium	low	high	60
CN	55%	310 km/h	19 sec/1,370 m	9/7	medium	medium	medium/high	52
BH	63%	309 km/h	14 sec/1,050 m	9/6	medium	high	medium	58
ES	57%	308 km/h	16 sec/1,140 m	9/7	medium	low	high	44
MC	42%	286 km/h	8 sec/510 m	12/7	medium	high	very high	54
TR	63%	315 km/h	16 sec/1,200 m	6/8	high	low	medium	42
GB	64%	294 km/h	12 sec/890 m	10/7	medium/high	low	high	40
DE	62%	300 km/h	12 sec/800 m	9/6	medium	high	medium	58
HU	58%	291 km/h	11 sec/750 m	8/6	medium/high	high	very high	50
EU	59%	306 km/h	13 sec/930 m	13/12	medium	medium	high	74
BE	70%	310 km/h	24 sec/1865 m	9/10	medium	low	low	52
IT	70%	351 km/h	16 sec/1,320 m	7/4	low	high	very low	46
SG	44%	297 km/h	9 sec/650 m	9/14	medium	very high	very high	76
JP	67%	313 km/h	16 sec/1,230 m	10/8	high	high	low	42
BR	65%	314 km/h	17 sec/1,220 m	5/10	medium	low	medium	40
AE	–	–	–	–	–	–	–	–

2.2 Looking ahead.

GP Mario Theissen	Willy Rampf	Drivers
<p>1 AU "We're very pleased that the first GP of the year will once again be Australia. This time the season is starting two weeks later and it may well be slightly cooler in Melbourne as a result. There is always a very special atmosphere in the city and the sports-mad Australians have really developed a taste for F1. Last year Nick took second place for us in the opening race of the year and we're hoping to get off to a good start once again in Albert Park this time around."</p>	<p>"There's always a buzz around the place leading up to the first race of the season, but this time the anticipation is even greater than usual. Of course, we all want to find out how our radically different new cars shape up alongside our rivals'. The switch to slick tyres, in particular, represents a great unknown. Melbourne is a stop-start kind of circuit which places the brakes under heavy loads and at the same time demands good traction. The levels of grip here are very low, especially at the start of the weekend."</p>	<p>Robert Kubica: "The first race of the year was very frustrating for me in 2008. Everything was going well until Kazuki Nakajima drove into the back of me at the end of the third Safety Car phase and I had to retire. Having said that, I can't wait for the start of the new season in Melbourne. All the speculation comes to an end in Australia. The whole team has been working unbelievably hard all winter. I like the Melbourne circuit. If it was up to me, we would only race on street circuits. The fans and the beautiful city backdrop create a wonderful atmosphere, and all of this gives the first race of the season a very special charm."</p>
<p>2 MY "Our first home race of the season! Every year since our team was founded in 2006 we have seen for ourselves the charismatic presence of our premium partner Petronas in Malaysia. It is always amazing to experience the fantastic reception we enjoy as a team in Malaysia. Last year, Nick recorded our first ever fastest race lap as a team and Robert finished in second place. The BMW Group has stepped up its involvement in Malaysia in recent years as part of its Asia strategy. The first of a total of seven races in Asia is an important one for BMW and Petronas, and will be keenly fought, that's for certain!"</p>	<p>"We always look forward to this race, in particular as it's the home GP for our partner Petronas. The Sepang circuit is very challenging and places big demands on the chassis and the teams' choice of set-up. There are several corner combinations in which stability is a crucial factor. At the same time, the slower sections of the track place the emphasis on good traction under acceleration on the exit. High levels of aerodynamic efficiency are also essential. Added to which, the rear tyres always operate under extremely heavy loads."</p>	<p>Nick Heidfeld: "I always feel very comfortable in Malaysia. All the activities we've been involved in with Petronas have given me the chance to see a bit of the country. I've also been here on holiday and to acclimatise before the GP. Very high temperatures and humidity, as well as the occasional cloudburst, are all part of the experience in Malaysia. The Petronas Twin Towers are a major landmark of Kuala Lumpur and make a huge impression on me every time I see them. The Sepang track is enjoyable and challenging. Last year I managed to pull off some nice passing manoeuvres."</p>

GP	Mario Theissen	Willy Rampf	Drivers
3 CN	<p>“Shanghai is a booming metropolis with a population in the millions, and the scale of the race circuit and its facilities is unmatched anywhere else in Formula One. The track-layout is demanding. The Chinese GP is of great interest commercially to both BMW as a car maker and to all of our partners. The Chinese market continues to have enormous growth potential. BMW has run its own production facility in China since 2004, where the BMW 3 Series and 5 Series models are produced as part of a joint venture.”</p>	<p>“The Shanghai circuit is one of those where good aerodynamic efficiency is particularly important. The track demands high levels of downforce through the corners, but also allows good overtaking opportunities thanks to its generous width and long straights. The first corner, in particular, calls for excellent car balance. The drivers enter the corner at very high speeds and have to brake gradually right through the turn. From a driver's point of view, this section is without doubt one of the highlights of the season.”</p>	<p>Robert Kubica: “Shanghai is an interesting track with a very long straight and a good chance for passing moves. The circuit offers a mixture of very different corners; there are some slow areas but several high-speed sections as well. The first corner is a real challenge. You stay on the brakes for a long time and then you suddenly get to a left-hander. I haven't had a lot of luck at this GP in the past so I'm hoping that will change in 2009 and I can pick up some World Championship points.”</p>
4 BH	<p>“As a manufacturer of premium cars BMW has much to gain from the Middle East region. We will be looking to finish the first block of overseas races on a positive note in Bahrain. Robert secured his and the BMW Sauber F1 Team's first pole position in 2008 here, allowing us to reach another milestone in the process. Last year we returned to Europe from Bahrain – which was the third race on the calendar – at the top of the Constructors' Championship.”</p>	<p>“The aerodynamic set-up for the car in Bahrain is all about compromise. The many slow corners demand a lot of downforce, but the extra width of the circuit also encourages the drivers to overtake. For this reason, you can't afford to neglect top speed either. Good traction is also important, especially in the turn leading out of the start/finish straight. The sand in Bahrain means we can expect a high level of tyre wear, and that plays an important role in the race strategy.”</p>	<p>Robert Kubica: “I'm looking forward to the race in Bahrain, especially as I took my first F1 pole position there in 2008. The circuit is totally different from Melbourne, Sepang and Shanghai; it has long straights with hard braking zones. Added to which, there are hardly any high-speed corners. The wind can play a big role here. Of course we have to wait and see how the F1.09 will perform at the circuit, but we were very competitive there in 2008.”</p>

GP	Mario Theissen	Willy Rampf	Drivers
5 ES	<p>“The first European race on the calendar is almost like a second start to the season. Barcelona gives Formula One its first opportunity of the year to put its full range of wares on show. The trucks, motorhomes and hospitality facilities not only provide an imposing backdrop, they also make life much easier for everyone. The teams carry out a lot of testing at the Circuit de Catalunya so they know the place inside out. This race will give us a firm idea of where we stand against our rivals.”</p>	<p>“Barcelona is a popular venue for testing, so the teams know the circuit like the back of their hands. However, it always manages to throw up new challenges. Wind can often be a major factor. For this reason, you have to make constant adjustments to car set-up and it is therefore easy to lose your way. The fast and medium-fast bends require considerable downforce. The loads on the tyres are therefore pretty high.”</p>	<p>Nick Heidfeld: “The Circuit de Catalunya is a very different kind of circuit. We’ve covered thousands of kilometres there in testing and the races themselves, but there are still always problems with getting the right set-up. Even the slightest change in the weather or track conditions – due to the amount of rubber laid down – has a big impact. There weren’t very large crowds at Barcelona in the early years, but since Fernando Alonso came onto the scene the stands have been packed and the place generates a great atmosphere. In 2008 I was unfortunately a victim of the Safety Car rules here and had to refuel when the pit lane was closed.”</p>
6 MC	<p>“Monaco is part of the foundations of Formula One. The yachts, parties and glamour are intrinsic characteristics of the GP. The fans lining the streets of the principality experience motor racing up close and personal. Singapore is the only other venue where the spectators are so close to the action – they are practically part of the show. Even the smallest driver error is punished mercilessly here. Monaco has the lowest average speed of any grand prix on the calendar and the engine also has to work well at low revs. Robert picked up some silverware here in 2008 by finishing second and it would be nice if we could secure ourselves a place in the famous royal box once again this year.”</p>	<p>“In Monaco we run the cars with maximum downforce and cooling on account of the circuit’s low average speed. The new aerodynamics regulations for 2009 mean that the cars will have significantly less downforce available to them than last year, but that will be evened out through the slow sections, in particular, by the superior grip of the slick tyres. Achieving good traction is the main priority for the cars under acceleration out of the many slow corners.”</p>	<p>Robert Kubica: “I’m looking forward to Monaco hugely. I was very strong there in 2007 and 2008 and I’m a big fan of tight street circuits with barriers on either side. Monaco is one of these tracks. There are three or four really good corners, such as the swimming pool chicane and the section around the casino. The Monaco circuit is difficult to come to terms with and it isn’t easy to find the right set-up here. The 2008 race was amazing, with extremely tricky track conditions and unexpectedly heavy rain. I had problems with visibility and my tyres throughout the race. But in the end I managed to finish second, which I wasn’t expecting.”</p>

GP	Mario Theissen	Willy Rampf	Drivers
7 TR	<p>"We're very much looking forward to the trip to the Bosphorus, but logistically it's certainly a challenge. Indeed, it is the GP set furthest away from central Europe to which teams still travel in trucks and motorhomes. They've built a top-class facility with a highly successful track design on the Asian side of the buzzing city of Istanbul. If you include Turkey, Formula One will be visiting Asia seven times this year – more than ever before. That shows the importance of the continent."</p>	<p>"The drivers race anti-clockwise at Istanbul Park and the circuit offers plenty of variety and entertainment. There are slow sections where good traction is required. And then there is the spectacular Turn 8, made up of four distinct sections and yet taken in one line at going on for 250 km/h. Given the long – often uphill – straights, the cars must not have too much drag. Good aerodynamic efficiency is the key to setting a good lap time."</p>	<p>Nick Heidfeld: "It was freezing at Istanbul in 2008, even though spring had arrived in central Europe. I'm hoping for a bit more luck with the weather this time around. Turn 8 is the jewel in the crown of this circuit. It has several apexes and is long, fast and challenging. All in all I think this is a great track. However, the daily journey to the circuit can take a while and be rather difficult. It is located on the Asian side of the city, and if you're staying on the European side you have to get through the crowds on the Bosphorus Bridge every day."</p>
8 GB	<p>"Silverstone is one of the classic races on the F1 calendar. The fans here are made of special stuff – purists, who are there for the racing itself rather than the show business and glamour that surrounds it. The weather is typically British and the atmosphere at the 'home of motor racing' always excellent. Britain is the only BMW Group market with production facilities for all three Group brands. Rolls-Royce cars are produced in Goodwood, the MINI in Oxford and BMW car engines at Hams Hall. Great Britain is the third-largest market for the BMW Group after the USA and Germany."</p>	<p>"If you want to be quick at Silverstone you have to be driving a car with extremely good aerodynamic balance. The track is characterised by its many medium and fast corners, and it is important for the drivers to carry as much speed out of them as possible. Maggots-Becketts-Chapel is one of the finest combinations on the F1 calendar. The track surface is pretty rough, which means that tyres come in for a good deal of punishment. We tend to opt for the harder tyre compounds here for that reason."</p>	<p>Robert Kubica: "Silverstone has a lot of tradition and the circuit is excellent. Good downforce is important, especially in the fast first sector. Later on in the lap you get a few slow corners. The circuit is a good mixture from a driver's point of view and asks a variety of different questions. The wind conditions are always a big factor here and can have quite a significant impact on the car in the first sector. The British weather is unpredictable. I didn't make it to the finish in 2008; I'd already been battling with aquaplaning for many laps, then I unfortunately lost the car on one of the straights."</p>

GP	Mario Theissen	Willy Rampf	Drivers
9 DE	<p>"The only F1 race of the year in Germany is something we are looking forward to greatly. Of course, there are no more points on offer at our home race than anywhere else. However, we have a very close connection with the Nürburgring. Every forthcoming BMW production car is tested on the Nordschleife and the brand has celebrated some majestic touring car victories in the Eifel mountains. Plus, it has a Driver Training centre and its BMW Lounge at the track and runs the Nordschleife 'Ring Taxi'. In April 2007 Nick drove a modern F1 car on the Nordschleife – the first time that had been done in 31 years – in front of tens of thousands of spectators. It was a unique experience and we are aiming to give our fans something to celebrate again this year."</p>	<p>"The characteristics of the Nürburgring track mean the cars have a tendency to understeer here. The critical question is therefore: how to set the car up to stop it pushing over the front wheels? That can be resolved by achieving the right aero balance, combined with mechanical modifications to the set-up. The large number of slow and medium-speed corners require a healthy dose of downforce. The track offers good levels of grip, which allows us to run soft tyre compounds."</p>	<p>Nick Heidfeld: "The Nürburgring is my motor racing home. It isn't far from Mönchengladbach, where I was born and grew up, and I have some great childhood memories of the Ring. It was where I learnt to ride a bike, where I went tobogganing in the winter and where I first sat in a kart – with thick cushions up against my back so that I could reach the pedals. In later years I was able to win various races on the track. In 2005 I took my first Formula One pole position there and finished second in the race. In 2007 I drove an F1 car on the Nordschleife. The 2007 GP was dominated by typical Eifel weather conditions and collisions. In the end I finished sixth."</p>
10 HU	<p>"The home race for BMW and our team is followed by a GP practically on Robert's doorstep. We are expecting large numbers of fans to travel to the race in Hungary from neighbouring Poland, just as they've done in the last few years. Robert made an impressive F1 debut at Budapest in 2006 in a wet and very turbulent race. Nick finished third that weekend, giving us our first ever podium, and was third at the Hungaroring again in 2007. Last year, however, we had to be content with a single point from the race. Our aim at the last GP before the summer break is to return to successful ways in Hungary and put on a show not only for our Polish fans."</p>	<p>"After Monaco, the Hungaroring has the lowest average speed of any circuit. One corner follows quickly after another and the start/finish straight is relatively short. Plus, no sooner is the sand cleared from the track one day than it is back again the next, and grip is consequently in short supply. Understeer is therefore a constant threat. As far as the car set-up is concerned, particular attention must be paid to the middle section with its variety of corner combinations. Another factor to consider is that the rear tyres are under heavy loads throughout the race."</p>	<p>Robert Kubica: "The 2008 GP was a difficult one for me. We were very slow and I didn't have enough grip over the race as a whole. One point was better than nothing. There are sure to be a lot of Polish fans at Budapest again in 2009. Hungary is the closest GP to Poland, which makes it a bit like a home race for me. It was also where I had my first F1 race in 2006, so I have a special connection with the track. However, I like it for other reasons as well. You're steering almost constantly, have barely any time for a rest and the straights are very short. The Hungaroring is a challenge, but that's what F1 is all about."</p>

GP	Mario Theissen	Willy Rampf	Drivers
11 EU	<p>“Formula One celebrated a successful premiere at the Valencia portside complex last year. The atmosphere was fantastic and there was a great feeling around the place. Things also went well for us in terms of the race result, with Robert finishing on the podium in third place. BMW also has various ties to Valencia. The Formula BMW Racing Center there serves as a training facility for our junior drivers in the Formula BMW series around the world, and an incentive platform for BMW partners and customers. The roll-out for our new F1 car also traditionally takes place in Valencia. We are looking forward to the very special atmosphere at this street circuit and will be looking to start the second half of the season with a positive result.”</p>	<p>“The race in Valencia was a new addition to the calendar last year and represents a real gain for Formula One. The track is built into the port area of the city and has a unique character all of its own. It is a street circuit, but cannot really be compared with Monaco, for example. Indeed, the Valencia circuit is wider and allows a much higher average speed. Plus, there are generous run-off areas at practically all the potential trouble spots around the track, which guarantees a high level of safety.”</p>	<p>Robert Kubica: “I’m a fan of street circuits, although Valencia is not a typical example. For one thing, there are a lot of run-off areas. The FIA has made great efforts to ensure safety and that’s good, of course. It is important to have a baseline set-up which makes the car easy to drive. You have to go about improvements gradually, and also optimise your line bit by bit. Last year a plastic bag got caught underneath my car and I couldn’t steer for two corners. That was extremely dangerous. Luckily, most of the bag flew off quickly, but I had no confidence for a sector and lost three seconds during this phase. In the end I finished third.”</p>
12 BE	<p>“Spa – three letters which have cemented themselves in motor racing history. Spa is an essential date on the F1 calendar, a fantastic natural race circuit cut into the beautiful, rugged Ardennes. Recent modifications have meant that Eau Rouge is now taken flat out in the dry, creating an extremely long section of full-throttle driving. As this part of the track also rises significantly, engine output and durability are really put to the test. Added to which, you always have to be prepared for sudden changes in the weather. Nick had a fast and furious end to the rain-affected race here in 2008; a brave strategy saw him slip through to second place at the finish.”</p>	<p>“Spa is a natural race track in the classical sense. Most of the drivers love it here – and for good reason. Eau Rouge is one of the most spectacular corners in Formula One, which will now be more of a challenge for the drivers again with the reduction in the cars’ downforce. Spa requires less downforce than most of the other circuits in F1. The big unknown in the Ardennes is always the weather – it can change completely in a matter of minutes, but sometimes only on certain sections of the tracks.”</p>	<p>Nick Heidfeld: “I like circuits – such as Spa – which have a very distinctive character. At seven kilometres, a lap of this rollercoaster track is very long and features some special corners. The most famous is Eau Rouge. It may not be quite as breathtaking as before, but powering through it is still a great feeling. I also recommend this as a place to watch the race from, but make sure you bring your rain gear. The weather is unpredictable. In 2008 I took the line that it would rain quite heavily towards the end of the race, and changing tyres at the right time got me onto the podium.”</p>

GP	Mario Theissen	Willy Rampf	Drivers
13 IT	<p>"The Italian Grand Prix brings the European season to a conclusion. Monza is all about undiluted tradition and high-speed racing. As many people know, Robert moved to Italy at the age of 13 in order to further his career. He's a big fan of Italy and has a lot of friends there who give him great support. This is the last race of the season in which the trucks and motorhomes roll into action, as the remaining GPs of the year all take place overseas. We'll be aiming to leave Europe with a good result under our belt."</p>	<p>"Monza is the last genuine high-speed track left on the calendar. The four long straights mean we run the cars with less downforce here than at any other race. However, the new aerodynamics regulations mean the difference between this and other circuits will not be quite as great as before. The task of the drivers and engineers is to give the cars a mechanical set-up which ensures good braking stability and allows the kerbs to be taken aggressively, as this is essential in setting a fast lap time."</p>	<p>Robert Kubica: "I had a good race at Monza in 2008. Third place was a deserved reward for the team. I served my driving apprenticeship in Italy, so when I go back I am met by many familiar faces and have one or two fans there as well. I'm sure a few Poles will make the journey to Italy too. Monza is also a special venue for me because I had my first podium finish there in 2006 in my third F1 race. The circuit is one of the toughest on the cars as we run the lowest downforce of the season and reach the highest speeds. A key factor is keeping drag low without losing too much downforce and braking stability."</p>
14 SG	<p>"2008 saw the first night race in the history of Formula One. It was a fascinating event which produced spectacular scenes and an electric atmosphere. The Singapore Grand Prix is my new highlight of the season. The whole feel of the occasion is without equal. Our approach of keeping our body clocks on German time turned out to be the right one, and we intend to go about things the same way again this year. We're really looking forward to what promises once again to be a spectacular GP in a booming region."</p>	<p>"Singapore was a highlight in the truest sense of the word in 2008. It was the first ever Formula One night race and turned out to be a truly special event. The circuit has an unusually high corner count, so the drivers have no time to relax. Added to which, it is extremely bumpy in places, to the point where some drivers complained of getting headaches. The predominantly slow corners place severe demands in particular on the cars' traction."</p>	<p>Nick Heidfeld: "The first ever race in Singapore was excellent. We kept to a really quite crazy schedule, but it was one which suited the GP programme perfectly. For example, I set off for my track walkabout on Wednesday at around midnight and went on to a party afterwards. Normally that would just be unthinkable! This is a real street circuit, which means it has practically no run-off areas. I got on well with the track actually, but a few things should be improved for 2009. There were some extreme bumps in the surface and the pit lane entry and exit should not be on the racing line – it was almost impossible to avoid impeding somebody. And that cost me three places on the grid in 2008."</p>

GP	Mario Theissen	Willy Rampf	Drivers
15 JP	<p>"After racing at Fuji for the last two years, Formula One is stopping by at Suzuka once again in 2009. The extremely challenging Suzuka circuit is a lot more popular among the drivers than Fuji. Whatever the venue, though, the Japanese Formula One fans are always great. They put everything into supporting the drivers and teams and are at the circuit early in the morning, regardless of how rough the weather may be. They certainly deserve to have a good show put on for them."</p>	<p>"Getting the right balance for the car is arguably more important at Suzuka than at any other track. The esses shortly after the start of the lap are critical. Here, the car has to be able to change direction quickly and with great precision if you're not to lose too much time. This section presents a real challenge. Suzuka is the favourite circuit of most of the drivers – for good reason. The large number of corners places the tyres under very heavy loads, which is something you need to bear in mind with the car set-up."</p>	<p>Nick Heidfeld: "I can't tell you how pleased I am that my favourite circuit is back on the calendar! Suzuka is for me the greatest track in F1. The esses on the opposite side of the circuit from the pit lane are a particular high point. Here, five fast corners follow one after the other. If you catch them just right, you can flow really nicely through this section. However, if you make a mess of the first in the sequence, you're always struggling. I like Japan quite a lot anyway, but all the more so when we go to Suzuka."</p>
16 BR	<p>"It's impossible to think of São Paulo without the thrilling World Championship deciders of the past couple of years coming to mind. For the sake of the fans I hope that Brazil will not decide the outcome of the season this time around so the title battle can keep going to the last race. The track is rich in variety and so is the weather – as we saw in the heart-stopping finale in 2008. The engines will be pushed particularly hard on the long climb up the start/finish straight. This uphill section also makes for an extremely exciting start."</p>	<p>"The World Championship titles have been decided at Interlagos in recent years. The Brazilian track is one of the few where the cars run anti-clockwise. The crucial part of Interlagos is the middle section, where the turns come thick and fast. This calls for good downforce, traction and balance. Strong engine output is critical in the final sector, in particular, where the start/finish straight climbs steeply. The recent track resurfacing has evened out a lot of the bumps."</p>	<p>Robert Kubica: "It was extremely frustrating to lose third place in the Drivers' World Championship in the last race of 2008, but that's racing. In the last two years we have seen a dramatic end to the season in Brazil, which was really great for the fans. Interlagos is a very challenging and interesting circuit. My first visit there was for a Formula Renault race in 2002, but it wasn't until 2006 that I returned to São Paulo with the BMW Sauber F1 Team. The circuit is very tiring physically, as we are driving anti-clockwise. That's something we aren't used to, especially for our neck muscles."</p>

GP	Mario Theissen	Willy Rampf	Drivers
17 AE	<p>“Abu Dhabi is the only new circuit we’ll be visiting this year. We’re looking forward to the debut GP in a region which offers significant opportunities economically. We can expect a spectacular atmosphere at the marina circuit, which is built on an artificial island given over almost exclusively to leisure activities. Hopefully the battle for the 2009 World Championship will again come down to the last race of the season – and hopefully we’ll play a more prominent role in the race than in Brazil in 2008.”</p>	<p>“I always find it exciting when we come to a new circuit. Because Abu Dhabi is the last race of the season we still have a lot of time to analyse the track in detail. Above all, we will collect a large amount of data over the course of the season, which we can then use in practice. In Abu Dhabi we will be relying one hundred percent on our simulation programs, with which we had very good experiences last season in Singapore and Valencia.”</p>	<p>Nick Heidfeld: “It is good that we will have something new to explore once again in 2009. I always like to visit new venues and circuits, and you can see how quickly the individual drivers become accustomed to the new track. The United Arab Emirates are not totally new to me and the plans gave me an impression of just how colossal this whole project is. I’m very eager to experience the track design and the facility as a whole.”</p>

3. The technology.

3.1 Chassis.



The BMW Sauber F1.09 – fundamentally different.

The winds of change are blowing through Formula One. 2009 sees arguably the most significant rewrite of the F1 technical rulebook in the history of the sport. Whereas up to now the engineers had always been able to use the previous year's car as a basis for the design of their new machine, now they've been asked to start with a clean slate – or, more accurately, a blank computer screen. Completely redefined aerodynamics, the return of treadless tyres (slicks) and the option of fitting KERS (Kinetic Energy Recovery System) technology have literally brought the teams back to the drawing board.

In early 2007 the FIA set up the OWG (Overtaking Working Group) to think up ways of making Formula One more attractive; in other words, to identify areas where change was needed to make overtaking easier.

The principle problem of modern Formula One cars lay in the massive amounts of downforce they lost once the distance to the car in front dropped below around two seconds. This “dirty air” whipped up by the preceding car significantly diminished the effect of the front wing in particular, and this manifested itself in pronounced understeer. As a result, changes in position were more frequently the result of strategies in the pit lane than overtaking manoeuvres out on the track.

The OWG looked into this phenomenon with the help of a series of experimental tests in the wind tunnel and computer-aided airflow simulations, before coming up with a proposal: less aerodynamic downforce combined with more mechanical grip would be the way ahead. Indeed, the OWG recommended reducing downforce by some 40 percent.

This has led to radical changes, especially as far as aerodynamics are concerned. The front wing of the F1.09, for example, has grown in width from 1,400 mm to 1,800 mm, making it as broad as the car as a whole. It is also fixed lower down than before. Added to which, spectators will find the significantly narrower, higher-mounted rear wing takes some getting used to.

The regulations have also limited the use of air deflectors and cooling apertures to a minimum. The result of all these new rules is a totally new look for the F1 cars.

Even more exciting than ever.

For Willy Rampf, the BMW Sauber F1 Team Technical Coordinator and the man responsible for the concept of the BMW Sauber F1.09, and Walter Riedl, Managing Director of BMW Sauber AG – who also heads up the technical department in Hinwil and is responsible for the development of the new car – this project has represented a memorable challenge. “Developing a new Formula One car is always exciting, but this time there was something even more special about it. We really were starting from scratch,” says Rampf.

The combination of the return of slicks with the possible use of KERS technology places particular importance on weight distribution. “First and foremost, the switch from grooved tyres to slicks means more grip, of course, but it also moves the balance of forces further forward: removing the grooves gives the front tyres proportionally a greater contact area and more grip than the rear tyres,” explains Rampf. Consequently, more weight has to be shifted towards the front of the car and the aero balance adjusted likewise.

This is no easy task, especially in conjunction with KERS, as the new system adds extra weight and the engineers have much less scope for juggling ballast. Furthermore, they also have to find a way of packaging the KERS elements – the electric motor/generator, energy storage unit and control unit – which minimises their negative impact on aerodynamics and at the same time ensures there is sufficient cooling for all these components.

Work begins earlier than usual.

The team had to carefully consider all of these practical constraints in the basic concept of the car. Key areas included the definition of parameters such as the wheelbase, weight distribution, position of the engine and gearbox, shape and size of the fuel tank, and the positioning of the KERS elements. “Because the car differs so significantly from its predecessor, we already started work on the first concept studies in February – two months earlier than normal and before the F1.08 had even started its first race,” says Rampf, highlighting the extraordinary nature of the situation.

“Our aim,” continues Rampf, “was to build a car with high aerodynamic efficiency and in so doing claw back as much of the downforce as possible, which the new regulations had taken away.” The first phase of the project involved conducting studies on several different concepts in which the team assessed the interplay of aero balance, tyre requirements and weight distribution. This was followed by an optimisation phase.

The aerodynamics experts invested a great deal of time in the development of the front wing in particular, as this area influences the airflow over the entire car. As far back as February, the BMW Sauber F1 Team specialists used CFD, and thus the assistance of a supercomputer, to look into the functioning of the front wing and, more specifically, its interaction with the underbody. "No longer being allowed to use turning vanes to guide the airflow makes the task a whole lot more difficult," explains Walter Riedl. Another complicating factor is the centre section of the front wing, which is also precisely defined in the regulations and thus imposes further constraints on how much the engineers can do.

The result is a three-element front wing with a very dominant visual presence, which does much to shape the appearance of the car as a whole. Its outer edges are fitted with several auxiliary elements, which are all designed to channel the air as efficiently as possible around the front tyres. The less air hitting the turning wheels directly, the less uncontrolled turbulence occurs.

Another new feature of the regulations allows the drivers to move the flaps on the front wing upwards or downwards. Again, this is intended to make it easier to get up close behind the car in front.

They may have already made admirable progress, but this is just the beginning for the engineers, as Riedl explains. "The complexity inherent in the interaction of the front wing with the open front tyres means there is still a lot of potential for further development here. Indeed, we picked up a wealth of valuable knowledge in this area with the F1.08."

The nose of the car also reveals striking changes and is now considerably higher and, above all, much wider than its predecessors. After a large number of tests, this variant proved to be the most efficient when working in combination with the new front wing.

Severe demands on cooling.

The new regulations have also presented the engineers with a challenge when it comes to the car's cooling concept, as lamellar outlet vents in the engine cover are no longer permitted. For this reason, at the rear of the car the air now flows back centrally through the aperture between the engine cover and the gearbox. The channelling of the airflow takes on particular importance here, as the hot air heats up all the nearby components. Where you used to be able to vary the level of cooling through chimneys and lamellar outlet vents of different sizes, now you can only vary the size of the air outlets.

But that's not all, since the KERS elements also need to be cooled. While the energy storage units fitted with impressive compactness in the two sidepods are kept within the required temperature band by the flow of air, the KERS control unit, which is fitted in the right-hand sidepod, has an integrated cooling system.

The sidepods are high at the front and do not fall away as sharply to the rear as in previous years. As chimneys or lamellar outlet vents may no longer be used as an escape route for the exhaust air, the whole rear area of the car, including the engine cover, has to increase in volume to enable optimum airflow over this section as well.

The rear wing is totally new in terms of both its form and its position. It now measures only 750 mm in width – instead of 1,000 mm, as on last year's car – but is 950 mm in height, up from the previous 800 mm. This change in the regulations means that cars following behind will be subjected to less turbulence. A particularly striking feature are the side endplates, whose form has a major influence on the optimum functioning of the rear wing.

The lower levels of downforce will have an effect on the car's aerodynamic set-up. "In 2009 we'll be running maximum downforce at a lot more circuits than last season," says Rampf.

Something the observer will not be able to spot at first glance are the changes to the diffuser also specified in the regulations. This element now rises over a longer area than before and leads further back along the car. As a result there will no longer be direct interaction between the diffuser and the lower element of the rear wing, which will make the car less sensitive to different airflows.

Making optimum use of tyre potential.

The switch to slick tyres was a central factor in the development of the car's suspension. The team collected initial data with the grooveless tyre, which generates far greater grip than its predecessor, over the course of the summer after Bridgestone delivered the first batch of slicks for testing. It quickly became clear that achieving the right weight distribution would play a critical role. At the front axle the priority was to extract the full potential from the tyre in the various situations. Plus, optimised kinematics and high rigidity should allow it to give the driver high-quality feedback.

Whereas the front axle for the new car shows only minor differences to the one fitted on the F1.08, the rear axle is an all-new design adapted to the changes in tyre characteristics. The aim was to achieve excellent traction, while at the same

time exploiting the lateral force potential of the tyres through an extremely wide band. Added to which, the F1.09 should retain the impressive braking stability of its predecessor.

And, of course, the engineers also placed considerable importance on keeping the weight of the new car as low as possible. Numerous components were further optimised to this end. There were no compromises, however, when it came to rigidity.

“The development of the F1.09 centred on three key areas: aerodynamics, optimum tyre utilisation and the integration of KERS. That’s where our focus has been from the outset and where we have channelled the large reserves of knowledge amassed during the course of last season. The F1.09 contains the combined expertise of a highly motivated team – one which will be pulling out all the stops to fulfil our ambitious aims once again in our fourth year on the F1 grid,” sums up Managing Director, Walter Riedl.

BMW Sauber F1.09 – technical data.

Chassis:	carbon-fibre monocoque	
Suspension:	upper and lower wishbones (front and rear), inboard springs and dampers, actuated by pushrods (Sachs Race Engineering)	
Brakes:	six-piston brake callipers (Brembo), carbon pads and discs (Brembo, Carbone Industrie)	
Transmission:	7-speed quick shift gearbox, longitudinally mounted, carbon-fibre clutch	
KERS	electronic system, BMW Sauber F1 Team	
Chassis electronics:	MES	
Steering wheel:	BMW Sauber F1 Team	
Tyres:	Bridgestone Potenza	
Wheels:	OZ	
Dimensions:	length	4,690 mm
	width	1,800 mm
	height	1,000 mm
	track width, front	1,470 mm
	track width, rear	1,410 mm
Weight:	605 kg (incl. driver, tank empty)	

3.2 Technical background.

The monocoque.

The monocoque is the core of a Formula One car, the driver's workplace and survival cell in one. The engine is flanged on at the rear, the car's nose at the front. The form of the monocoque is shaped by a series of factors, such as the car's wheelbase, the size of its fuel tank, the driver's physique, and aerodynamic requirements.

The first stage in the design process for the monocoque involves the definition of the surface form. Finite-element calculations are then carried out in order to ensure that the safety cell meets the levels of rigidity and strength identified as necessary by the engineers. These requirements are based on the dynamic loads encountered by the car on the one hand, and the safety stipulations of the FIA on the other. The safety standards underpinning the construction of F1 cars have risen constantly over recent years and passive safety for the drivers has, therefore, improved significantly. To this end, the key tests are the frontal crash (with nose section) at a speed of 15 m/s, the side-on impact (with sidepods) at 10 m/s and the stationary load test for the roll-over bar, which has to withstand some twelve tonnes of pressure. A total of four dynamic and ten stationary tests are carried out on the car overall.

The monocoque consists of a carbon fibre/aluminium honeycomb composite. This combination produces extremely high rigidity and strength, yet keeps a lid on weight. The composite engineers work out how many layers of carbon fibre are required in which areas in order to meet the diverse demands placed on the car. In so doing, they can also choose from various different types of carbon fibre, depending on whether forces are exerted from only one direction or from several. In areas subjected to particularly heavy loads, up to 60 layers of carbon may be stacked on top of each other.

A monocoque consists of a total of around 1,500 individual carbon-fibre pieces. It is made from two half shells, into which additional strengthening elements are glued. After several curing stages in the autoclave the half shells are glued together. The final stage involves the assembly of numerous securing components.

Its enormous strength allows the monocoque to offer the driver an extremely high level of protection even in major impacts. And because the fuel tank is

also contained within this structure, dramatic fireballs caused by accidents are a thing of the past. The safety cell can almost always be repaired following a crash.

The BMW Sauber F1 Team produces some five monocoques per year to be used in races, track testing and on the test rig. Every single safety cell must be homologated by the FIA, although only the first example has to pass the full quota of tests.

Seat.

The latest Formula One cars endure lateral acceleration of over 4*g* through corners and as much as 5*g* or more under braking. An F1 race will see these forces exerted on the driver repeatedly over a timeframe of one-and-a-half to two hours. A perfect seating position for the driver is absolutely vital, since the smallest pressure points can lead to pain or muscle cramp. Each driver, therefore, uses a seat which has been tailored precisely to his measurements.

The manufacture of a new seat is based around a basic carbon-fibre shell, which is lined with a polythene bag. This contains either a two-component foam or polystyrene granules, which are then vacuumised. The driver sits in the seat and waits as this mass slowly moulds itself to his body. At the same time, a steady stream of small modifications are being carried out. The position of the steering wheel and pedals are also adjusted. When everything is in the right place, the seat foam or polystyrene granules are left to harden. A seat fitting of this nature will occupy the drivers for between half a day and a whole day. The end result is a transitional seat which will be used for initial testing and serve as a prototype for the permanent version.

The definitive seat is made by first electronically scanning the inner surface of the provisional model. The engineers use the scan to create a mathematical surface, on the basis of which the form is moulded into a tooling block. The seat then takes shape through the application of individual carbon-fibre sheets and is cured in the autoclave. The final manufacturing stage sees the seat given its finish. As part of this process, the apertures for the safety and rescue belts are cut out and a one-millimetre-thick layer of padding added. A finished seat weighs around three kilos.

Carbon fibre.

With the exception of the engine, gearbox and wheel carriers, a Formula One car is made almost exclusively from carbon fibre. High rigidity and strength, coupled with very low weight, are the stand-out attributes of carbon. It boasts a similar level of rigidity to steel, but is around five times lighter. On the

downside, the manufacturing processes involved in making it are highly complex and its material price is considerable. One square metre of pre-impregnated carbon-fibre sheeting costs between 50 and 200 euros.

Carbon fibres have a diameter of five to eight micrometres. Typically, between 1,000 and some 20,000 fibres are brought together into bundles, and these are woven into textile-like structures.

Around 20 different types of carbon-fibre material are used in Formula One. These differ most prominently from one another in their structure and the type of resin with which they are impregnated. Should the forces only be coming in from one direction, unidirectional weave is used. If they are being exerted from various different directions, on the other hand, bidirectional weave is preferred. In order to provide the properties desired, specialist composite engineers establish which weave is required, in which resin and in how many layers.

The manufacturing process involved in making a carbon-fibre part incorporates several stages. First the part is designed using computer-based CAD (Computer Aided Design) techniques. This data is then refined and provides the basis for CAM (Computer Aided Manufacturing). The mould is cut into a tooling block on a five-axis milling machine; this block serves as the positive mould. The laminators place the precisely pre-cut carbon-fibre pieces one after the other onto the tooling block following plans drawn up by the composite engineers. When this stage has been completed, the whole item is packed into a polythene bag, vacuumised and cured for anything between ten and 20 hours in the autoclave at a temperature of around 50 degrees Celsius. After some final touches, the negative mould is then ready to be manufactured into the carbon-fibre part itself.

The laminators lay the pre-moulded carbon-fibre pieces on top of and alongside each other in the negative mould. Depending on the part in question, this can involve as many as several hundred pieces. When everything is ready, the mould – plus carbon-fibre inlay – is also packed into a polythene bag, vacuumised and cured for five to six hours at a temperature of approx. 150 degrees. When the curing process is over, the individual parts are further refined and brought together into finished components. A front wing, for example, consists of around 20 separate carbon-fibre parts.

Components which need to demonstrate particular toughness are made with Kevlar as well as carbon fibre. The Kevlar used by the BMW Sauber F1 Team is produced and supplied by its partner DuPont.

Steering wheel.

The steering wheel in a Formula One car is the driver's control centre. From here he steers the car, operates the clutch, changes gear and can adjust any number of electronic functions using several buttons.

The first stage of the design process sees the engineers set out the functions which the driver will control using buttons or rotary switches. The initial layout is then established, before a provisional version of the steering wheel is made using rapid prototyping. In the next stage, the driver is brought in to assess whether all the controls are in the optimum position. If this is not the case, he expresses how he would like them to be.

Manufacture of the definitive steering wheel can now begin, for which the carbon-fibre "frame" provides the basis. The holes for the switches and buttons are bored into the frame before the foam for the grip is applied. This is then wrapped in carbon fibre once again. The grip of Robert Kubica's steering wheel is covered in leather, while Nick Heidfeld prefers a silicon mass moulded precisely to the form of his hand.

Now it is time for the buttons and switches to be added and wired up to the circuit board before the display is connected. Since 2008 both the circuit board and the display form part of the SECU and are available in standardised form by the FIA.

After all the electronics work has been completed, the specialists set about assembling the mechanical parts – such as the gearshift and clutch paddles – and the quick release mechanism on the reverse side of the wheel. Drivers removing the steering wheel to get in and out of the car and then replacing it has become a familiar sight to F1 fans. The quick release mechanism is also required to pass an FIA test in which the driver has to be able to vacate the cockpit within five seconds.

Before the steering wheel is sent into action it is checked over on the test rig. Only when it has emerged from this testing session with flying colours are the buttons and switches glued onto the reverse side of the frame. It may weigh just one kilo, but this lightweight high-tech steering wheel is now ready for some seriously heavy use.

3.3 Powertrain.

Three-race engine, improved driveability and KERS.

Building something new requires solid foundations. And here, the powertrain of the basic BMW V8 engine, quick shift gearbox, hydraulics and electrics/electronics – all developed in Munich – fits the bill perfectly. Each of these components showed maximum reliability in every one of the 2008 grands prix.

In line with the F1 regulations, the team has only been allowed to develop peripheral aspects of the engine since 2006. For 2008, the development work in Munich centred on tuning the unit to the standard electronics – a new specification at the time – and on raising the service life of the quick shift gearbox introduced in 2007 to four grand prix weekends.

The gearbox will again have to last through four races in 2009. The engine, on the other hand, will need to demonstrate its reliability over at least three successive GPs as opposed to two. Engine lifespan has been doubled. To achieve this aim, the team returned to a successful recipe. As Markus Duesmann, who oversees the development of the powertrain, explains: “The reliability we saw over the 2008 season resulted from a stronger focus on the quality of the parts we were using. We have continually increased the amount of testing we do and the service life goals we set for the parts. For 2009 we’ve had the task of ensuring that the engine can go on performing for 100 percent longer.”

The BMW V8 P86/9 engines are put through their paces in Munich using cutting-edge testing equipment. Each engine specification has to complete an extended run on the dynamic test rigs before it can be signed off for race action. Here, the engineers use a fabricated circuit profile simulating the toughest loads presented by the current batch of race circuits on the F1 calendar. Engines earmarked for transportation to the race venue complete a rather more gentle functioning check on the test rigs followed by quality checks, with the oil undergoing spectrometer analysis to identify any metallic residue.

In addition to the durability of the engine, the development programme for 2009 also placed a high priority on the further optimisation of its driveability. “Peaky” is how racing drivers describe an engine whose power delivery is difficult to control through their reaction times with the accelerator. The torque band was

made more user-friendly through measures applied to those peripheral components which – as before – are not set in stone by the regulations. “We carried out modifications mainly to the exhaust system,” says Duesmann, “in order to give the engine a more even torque band in 2009.”

KERS – the Formula One energy conservation law.

The engineers have broken new ground with the development of KERS. KERS stands for Kinetic Energy Recovery System – a system for the regeneration and storage of kinetic energy, which is then put on tap as an extra source of power under acceleration to complement the output of the V8 engine. The regulations allow the developers creative room for manoeuvre, only setting out guidelines for certain performance parameters. The Formula One energy conservation law, as it could be termed, states that a total of 400 kJ of energy – generating 60 kW of mechanical output – may be supplied to the driven axle under acceleration during the course of a race lap, and the energy storage unit may only be restocked under braking. However, the regulations stop short of stipulating possible technical approaches.

The 2009 season will see the introduction of a Boost button for the drivers. When pressed, this will provide them with an extra 60 kW of output for 6.5 seconds per lap to aid overtaking manoeuvres. However, this advantage should be set against the system’s adverse effects in terms of weight and weight distribution.

The BMW Sauber F1 Team has decided to focus its efforts on an electric solution. The engine cover and sidepods of the F1.09 are designed to allow space for the hybrid system. This comprises a combination of electric motor and generator, the requisite power electronics and an energy storage module

The whole system weighs around 30 kilograms. “This means that the power density of the F1 KERS technology is considerably greater than that of the systems currently used in standard production vehicles,” says Mario Theissen. “We are standing at the threshold between a conventional package of engine and independent transmission and an integrated drive system. The development of KERS will see Formula One take on a pioneering role for series production technologies going forward. F1 will give a baptism of fire to innovative concepts whose service life and reliability have not yet reached the level required for series production vehicles, and their development will be driven forward at full speed. At BMW we have always used the Formula One project as a technology laboratory for series production. With KERS this approach takes on a whole new dimension. Formula One will reposition itself

and undergo a change of image, allowing the sport to take significant strides forward in terms of public acceptance.”

Development running at full throttle.

Once the possibility of KERS being introduced into Formula One had appeared on the radar midway through 2007, the team knew they would have only a short space of time in which to develop a complex hybrid system. Working together with engineers from BMW Forschung und Technik GmbH, the technicians at the BMW Sauber F1 Team investigated the types of hybrid system capable of operating effectively in the extreme conditions of Formula One. “A range of different solutions were put on the table. We analysed electric, mechanical, hydraulic and even pneumatic systems,” explains Duesmann. “After several months of research, it was clear that only an electric system would deliver the required energy, while at the same time combining maximum safety and, above all, the lowest possible weight.”

The team spent the ensuing months developing the electric motor, the electric energy storage unit and the KERS control unit. By March 2008 everything was in place: the first KERS prototype found its way onto the test rig. Duesmann takes up the story: “We focused in particular on the issue of safety. We created a variety of set-ups and equipment which would provide the safest possible conditions for working on the energy storage unit. Added to which, we also developed a catalogue of measures designed to ensure that the people working on the car were in no danger. When it comes to safety, we maintain an intensive exchange of ideas with our colleagues in series development; after all, hybrid systems are playing an increasingly prominent role in this area as well.”

Tale of the unexpected.

Following the successful roll-out of a modified BMW Sauber F1.07 fitted with KERS in early summer of 2008, the BMW Sauber F1 Team ventured further into uncharted territory on 22nd July when Christian Klien took the car out for an official test in Jerez. It was to be a fairly brief outing. Klien brought the F1.07 back into the pits after a short installation run, where he was met by the crew. When one of the mechanics touched the steering wheel and sidepod, he received a powerful electric shock. “At first we couldn’t explain what might have happened. It was a real mystery. None of the more than a thousand sensors on the car were showing any irregularities, but we clearly had to call off the test in the interests of safety,” recalls Duesmann. Fortunately, the mechanic was left with nothing more serious than a few red patches on his left hand and grazing to his left arm caused when he fell to the ground.

In order to gain an understanding of the accident, the team in Munich created a simulation of the conditions in Jerez. After six weeks and almost 2,000 hours studying the course of events, they arrived at a conclusion: "The mechanic suffered an electric shock after touching the sidepod and steering wheel of the car. This was due to a high-frequency AC voltage between these contact points, the cause of which has been traced back to the KERS control unit and a sporadic capacitive coupling from the high-voltage network to the 12-volt network. The voltage ran through the wiring of the 12-volt network to the steering wheel and through the carbon chassis back to the control unit."

In addition to the measures required to tackle the issue at hand, the extremely far-reaching analysis carried out by the experts also gave rise to other recommendations which are of great assistance and value in the development of electric KERS systems. Among the measures arrived at are changes in the design of the control unit to avoid capacitive coupling effects, extended monitoring functions for high frequencies and a conductive connection of the chassis components to avoid any electric potential. The BMW Sauber F1 Team made this safety analysis, complete with suggested measures and recommendations, available to the FIA and the other Formula One teams without delay.

Crucial testing in the spring.

When such a new and complex package of technology has to be brought up to F1 level in such a short space of time, it is important to have a back-up plan at the ready. "We are working flat out on the development of KERS because we think it has a big future," says Theissen. "I'm not sure if the extra output provided by KERS will produce better lap times straightaway. It is our clear intention to use KERS in the GPs, but the car is designed in such a way that components can also be taken out. The decision on whether to run with KERS will be taken in pre-season testing."

BMW Sauber F1 Team enhances BMW Group's hybrid expertise.

The BMW Group already fits Brake Energy Regeneration in many of its series production models as part of its BMW EfficientDynamics strategy, and is also preparing BMW ActiveHybrid technology for introduction into several model series. As Dr Klaus Draeger, BMW's Development Director, reports: "The BMW Group can transfer the knowledge gained within the BMW Sauber F1 Team directly into the development of standard production vehicles. This makes Formula One the ideal pre-development platform for innovative drive technologies. The new regulations give us the opportunity to use innovative hybrid technology under extreme conditions and in so doing to garner crucial expertise for series development as well. BMW customers

stand to benefit as a result. The KERS unit designed for the BMW Sauber F1.09 is a highly effective variant of brake energy regeneration technology, and is similar in the way it works to the ActiveHybrid technology developed for BMW standard production vehicles.”

The BMW P86/9 V8 engine.

In recent years, FIA regulations have imposed drastic restrictions on engine development. The FIA cited safety – i.e. lower top speeds – and cost savings as the reasons behind the changes.

One focus of FIA rule changes has been on engine lifetime, which has been steadily extended since 2002. In 2003, the rules changed to force the teams to use the same engine for qualifying as for the race itself. 2004 saw the introduction of the whole-weekend engine rule, followed by a two-weekend rule in 2005 – i.e. the same engine had to be used for two GP weekends running. This will be extended to at least three weekends in 2009, with a total of just 20 engines available to the team for the entire season, including testing.

The design of the current BMW V8 engine dates back to November 2004, when the regulations stipulated a switch from V10 to V8 powerplants for the 2006 season. The new rules regulated a number of other key engine parameters as well, imposing a displacement limit of 2,400 cc and a mandatory V angle of 90 degrees. The powerplants had to tip the scales at no less than 95 kilograms. This included the intake system up to and including the air filter, fuel rail and injectors, ignition coils, sensors and wiring, alternator, coolant pumps and oil pumps. It did not include liquids, exhaust manifolds, heat shields, oil tanks, accumulators, heat exchangers and the hydraulic pump.

The new regulations stipulated the engine's centre of gravity must be at least 165 millimetres above the lower edge of the oil sump. The longitudinal and lateral position of the V8's centre of gravity had to be in the geometric centre of the engine (± 50 millimetres).

The cylinder bore was limited to a maximum 98 millimetres, with cylinder spacing also fixed in the rulebook – at 106.5 millimetres (± 0.2 mm). The crankshaft centreline was to lie no less than 58 millimetres above the reference plane. Variable intake systems designed to optimise torque have also been banned since 2006.

The power supply to the engine electrics and electronics was limited to a maximum 17 volts and the fuel pump had to be mechanically operated. Only

an actuator was to be used to activate the throttle valve system. With the exception of electrical fuel pumps, engine auxiliaries had to be mechanically

driven directly from the engine. In addition, a long list of exotic materials were prohibited, and the team has since limited itself to working with the conventional titanium and aluminium alloys stipulated in the regulations.

Further restrictions followed in 2007. For example, engine speed was restricted to 19,000 rpm from the start of the season. At the end of 2006 all the teams had to submit sample engines. The only remaining development potential for the engineers lay in peripheral areas such as the cooling, intake and exhaust system and engine auxiliaries. 2009 will see the introduction of further restrictions: the doubling of the engine's lifespan goes hand in hand with the reduction of peak revs to 18,000 rpm.

The BMW G1.09 quick shift gearbox.

The BMW Sauber F1.09 is equipped with a quick shift gearbox, developed and built in Munich, which shifts the gears without interrupting the power flow. First used in 2007, it was then adapted for the 2008 season to take account of the standard electronics unit and the required lifetime of four GP race week-ends. For 2009, further detailed refinements have been made.

The BMW G1.09 has to comply with the four-weekend gearbox rule, which equates to a lifetime of around 2,500 kilometres. Only the gears and dog rings of the individual gear ratios may be changed – once – per event, to adapt them to the particular circuit. Another regulation introduced in 2008 is that the gear ratio pairs must have a minimum weight of 600 grams and a minimum width of 12 millimetres, and that the distance between the main shaft axis and the layshaft axis must be no less than 85 millimetres.

The quick shift gearbox maintains a constant power flow through an ingenious interplay between mechanical, hydraulic and electronic components. In a conventional F1 gearbox, power delivery was interrupted for approximately 50 milliseconds during gearshifts, which means that for this length of time the vehicle is coasting without power. At Formula One speeds, aerodynamic drag during each such time lapse can decelerate the vehicle by up to 1g. In a road car, this would come across as powerful braking. Eliminating this power loss every time the driver changes up – which he will do some 2,000 times over the race distance of the Monaco Grand Prix – adds up to significant time savings, and a gain of several hundred metres by the end of the race.

The gears used in the BMW G1.09 transmission – some of them produced at BMW's Dingolfing plant – are exposed to extremely high stresses. They are made of high-strength steel, while the transmission housing is of cast titanium.

Of course, converting torque and engine revs is just one of the transmission's jobs. It must also be able to absorb the forces generated in the suspension.

Standardised electronics.

In winter 2005, the FIA decided on the future introduction of the SECU (Standard Electronic Control Unit). Since 2008 such systems have been fitted on all Formula One vehicles. Effectively, the teams are supplied with a "black box" with operating instructions and have had to ditch in-house developments on which a lot of time and effort had been spent. Electronic traction control was among the casualties. With the SECU, supplied by McLaren Electronics Systems, both hardware and software are standardised.

The Munich experts deeply regretted this move. Ever since BMW's return to Formula One racing as engine partners in 2000, they had successfully relied on in-house electronic developments, without resorting to suppliers. Nonetheless, with the KERS project, they have found a new challenge where they can continue to achieve synergies between racing and road cars.

Lessons learnt on the race track are transferred to the road.

One of the aims stipulated by BMW for its return to Formula One racing in 2000 was to achieve synergies between racing and road car development. Formula One drivetrain development and electronics development was now systematically integrated into the Munich site. The BMW Research and Innovation Centre (FIZ) plays a key role in this process. The F1 factory was built less than a kilometre away from this "think tank", and the two facilities are closely interconnected. "At the FIZ, elite engineers working in state-of-the-art research and development facilities are shaping BMW technology of the future," says Mario Theissen. "The FIZ is given vast resources, from which we in Formula One development benefit directly. And we give plenty back too – due to the extreme technical challenges and pace of development demanded, the F1 project represents a unique proving ground for the FIZ engineers."

At the FIZ, materials research is conducted at the highest level and shoulder-to-shoulder with the F1 experts. One important focus is development of surface and coating technologies such as DLC (diamond-like carbon). DLC coatings, which are normally no more than a few microns thick, are applied by chemical or physical means, usually in a vacuum. Typical applications are to minimise friction and wear. Since reduced friction normally equates to increased

efficiency, DLC coatings are used in many areas of modern racing engines, for example in the valve timing and crank assemblies, and also in gearboxes and

energy recovery systems. Thanks to continuous process improvement and cost reduction, the use of DLC coatings is now being extended from racing development to high-performance roadgoing vehicles.

The FIZ Rapid Prototyping/Tooling Technology department also provides assistance to speed the development of new components. Commonly, scale models are built before new components and tools go into production. Now, as soon as such components have been designed on a CAD system, computer-guided machines can use laser sintering or 3D printing technology to create scale models from resin, plastic powder, acrylic, wax or metal. This way installation situations and interaction with other systems can be simulated in good time, so that any necessary modifications can be carried out before the final manufacturing process gets underway.

A further application of the FIZ facilities is in troubleshooting work, while in the area of machining technology F1-derived expertise is regularly transferred to cylinder head and crankcase production for road cars and BMW motorcycles.

Casting technology is another area where production models benefit from Formula One. The quality of engine block and cylinder head castings plays a crucial role in determining their performance and durability. Advanced casting techniques, coupled with high-precision process control, allow lightweight components to be produced that also have impressive rigidity. In Landshut, BMW operates a foundry for production models, which in 2001 was joined by a dedicated F1 casting facility. The two departments are jointly managed to ensure a constant exchange of information and expertise. For example the same sand-casting procedure used in the production of the Formula One V8 engine is also used on oil sumps for the M models, the intake manifold for the eight-cylinder diesel engine and prototypes for future engine generations.

Around the same time as the F1 foundry went on stream, an F1 components manufacturing facility based on the same template, i.e. a dedicated facility in close proximity to the standard production process, was set up. Here the F1 team make components such as camshafts and crankshafts for Formula One engines.

BMW P86/9 – technical data.

Type:	naturally aspirated V8	
Cylinder angle:	90 degrees	
Displacement:	2,400 cc	
Valves:	four per cylinder	
Valve train:	pneumatic	
Engine block:	aluminium	
Cylinder head:	aluminium	
Crankshaft:	steel	
Oil system:	dry sump lubrication	
Engine management:	standard ECU (MES)	
Spark plugs:	NGK	
Pistons:	aluminium	
Connecting rods:	titanium	
Dimensions:	length	518 mm
	width	555 mm
	height	595 mm (overall)
Weight:	95 kg	
Max. engine speed:	18,000 rpm	

3.4 Facts and figures.

- Eleven podium places in 2008 were a record for the BMW Sauber F1 Team in its third season. Kubica claimed one win, three second places and three third places. Heidfeld finished in second place four times. Each of the two previous years had twice seen a driver ascend the podium.
- In 2008 no team could match the race lap tally of the BMW Sauber F1 Team. With 1,112 out of a possible 1,117 race laps, Heidfeld topped the driver reliability statistics ahead of Kubica (1,084 laps). The shortfall was not due to any technical faults: Heidfeld brought a damaged car across the finish line in Monaco four laps behind and was lapped at the season final in Brazil. Kubica was involved in an accident in Melbourne (-11), went off in Silverstone due to aquaplaning (-21) and likewise saw the chequered flag in Brazil one lap behind.
- In 2008, six F1.08 chassis were deployed on the track (02 to 07).
- On the 17 race weekends, a total of 26,700 kilometres were covered in the F1.08: 13,716 km by Heidfeld and 12,984 km by Kubica. From the start of 2007 test kilometres were limited to 30,000 per team per year. For 2009 there have been further radical cuts, and test drives during the season are not permitted.
- There are generally six people occupying the “command centre” on the pit wall stand: the drivers’ race engineers, the Chief Race Engineer, Beat Zehnder (Team Manager), Mario Theissen (BMW Motorsport Director) and Willy Rampf (Technical Coordinator). They watch a total of 24 monitors, some of which are split screens offering multiple views. The official FOM pages giving lap times, the weather and news channel and the circuit map are watched by everyone. In addition, the cars’ telemetry data is available, as is the FIA’s marshalling system which tracks the position of all moving cars on the track (shown as coloured dots on the circuit map). Beyond this there is the team’s own car positioning system that enables pit stop forecasts and strategic decisions. On the pit wall, information is also gathered on the time and duration of other teams’ stops and on their tyres. Communication is via a total of six radio channels and seven intercom channels. Radio contact between the drivers and the team must be made accessible to the FIA.

- The transportation fleet for the European grands prix comprises five trucks from Hinwil and one engine truck from Munich.
- A driver sheds an average of two kilos in weight per grand prix.
- The average cockpit temperature is 50 °C.
- A modern Formula One helmet is made of carbon and must not exceed 1,800 grams in weight, as stipulated in the regulations.
- Following the abolition of traction control, the F1.08 accelerated from 0 to 100 km/h in 2.75 seconds and from 0 to 200 km/h in 5.05 seconds. It took 0.75 seconds – equivalent to 50 metres – to brake from 300 to 200 km/h, which equates to 4.5g.
- Carbon brake discs and pads need a minimum operating temperature of 500–650°C. During braking they hit temperatures of over 1,000 °C.
- Some parts of the protective monocoque consist of up to 60 layers of carbon fibre. A single carbon fibre is around six micrometres thick.
- Formula One tyres may heat up to 130 °C. Beyond this level, there is an increased risk of blistering.
- After a race, it takes the team at least eight working hours to dismantle the car, test and replace individual components, and reassemble the car.
- It takes some 120 working hours to assemble the BMW engine, which consists of approximately 1,100 different parts and around 5,000 parts in total.
- Maximum piston acceleration is almost 10,000 times the speed of the earth's rotation. Peak piston speed is 40 metres a second – or from zero to 100 km/h in 0.3 milliseconds. A force of almost three tonnes is exerted on the conrod. The average piston speed is around 25 metres per second.
- The exhaust reaches temperatures of up to 950 °C.
- Over an average race distance of 300 kilometres, the BMW V8 engine undergoes more than six million ignitions per grand prix.

- When the car comes into the pits during practice or qualifying, oil samples are taken for immediate spectrometer analysis. Traces of metal in the oil provide important indications as to the state of the engine.
- It takes around 40 working hours to assemble a new BMW gearbox.
- The G1.09 gearbox and associated hydraulics comprise around 1,500 parts in total, of which 480 are different components.
- In a gearshift process, the existing gear is released and the new one already engaged in a matter of 0.004 seconds. It takes 50 times as long to bat an eyelid.
- High-precision bearings with ceramic rolling elements allow the shafts in the gearbox to operate with a minimum of oil.
- The oil temperature inside the gearbox can rise to 150 °C.



4. The drivers.

4.1 Robert Kubica.

The man who plays his cards right.

He can be challenging at times, although maybe that's not how you'd describe Robert Kubica if you had to sum him up in one word. "Demanding" might be better. Demanding of others, but of himself in particular. The 24-year-old Pole always wants the maximum, and preferably without delay or deviation. Patience is not his forte. And that can sometimes be pretty challenging. They say patience is a virtue, and nowhere is this more true than in Formula One.

However, for anybody who has followed Kubica's life, it is immediately obvious why he is the way he is. If you come from a country without a trace of motor racing tradition yet still refuse to give up on your dream of driving in Formula One; if you leave home in Krakow at 13 for the unfamiliar surroundings of Italy to work in your kart team's garage and sleep above it at night; if you are left seriously injured in a terrible car crash and fear you might lose your right arm yet, with an iron will, start preparing your comeback from your sickbed – and then win a race within a matter of weeks; if you can do all that in just a few years, you just know you can go so much further.

Italian mannerisms.

It may be precisely these life events that have made Kubica the person he is: a man of few words with a modest and unaffected manner, focused and uncompromising on the track. He might have a hard shell, but concealed below the surface is a soft centre. This, however, is reserved for just a handful of people. The guard comes down slightly when you talk to him at greater length, but Kubica always maintains a degree of distance. Although the volume rises when he's chatting away in Italian in his motorhome – complete with essential Mediterranean gesticulation – only a few people know the real man.

It's no surprise that some find him brusque and taciturn on occasion. But that tends to be because he is concentrating fully on the job in hand and never lets himself be deflected from what he needs to do to meet his goals – sooner rather than later. "He has an unbending will to win in everything he does," says his manager Daniele Morelli. Kubica is not a big fan of the razzmatazz of Formula One. He accepts that commitments for sponsors, partners and the media are part of the package, as are photo sessions and autograph signings.

But if he had his way he would be in the car from dawn till dusk, be it testing or racing. That's his life, that's where he feels at peace. "He is very focused," says BMW Motorsport Director Mario Theissen. "I'm just a normal guy," counters Kubica.

Poker and bowling.

Really? Anybody who likes to spend his few days off alone or with his girlfriend at a rally or on the kart track must really be bitten by the motor sport bug. Anybody who, when asked what car he would most like to pull up in at his wedding, singles out a Formula One two-seater must be cut from a very special cloth. And anybody who chooses a car, tyres and fuel as his luxuries to take onto a desert island is wired up slightly differently from the man in the street. But for Robert this is all just normal. As normal as a game of poker or an evening at the bowling alley, two of his other passions.

Which explains how he thought nothing of putting himself on a radical diet ahead of the 2008 season. The team had told him it could have a positive effect on the balance of the car if he was a few kilos lighter. And that was all they needed to say: by the opening race of the season the already slimline Kubica had shed seven kilos. It was another example of his self-discipline and readiness to do anything in pursuit of success.

The move to Italy.

Kubica does not come from a racing family, but his father Artur was a fan of the sport and bought his son a small car when he was just four. "It was a Christmas and birthday present in one. It had a four-stroke engine and not a lot of power, but somehow it did 40 km/h. I used to spend half the day in it and never wanted to get out and go home," he recalls, but he had to bide his time before he could compete in his first race. "I would drive it around in car parks," he says. "Two-and-a-half years later I was given a kart. I practised in it for hour after hour but had to wait until I was 10 before I could get a racing licence." Once the necessary paperwork had arrived, on 7th December 1994, there was nothing more to hold him back. After three years of kart racing in Poland he had outgrown the competition. To take the next step up he would have to leave his home country. His father travelled with him to Italy, where the young racer quickly hit top gear: "I was lucky because we were working with one of the best Polish mechanics," Kubica explains. "So I was able to start my first race in Italy on pole and finish the race itself in second." The move abroad was now inevitable. He returned home and promptly packed his bags. Once in Italy, he met the people who would play such an important role in his career, such as his manager Morelli.

Titles and triumphs.

Kubica was 13 when he left Poland to live in Italy, far away from family and friends. Italian kart constructors CRG spotted his talent and gave him a chance to show what he could do. For many young teenagers, finding themselves on their own in a foreign country and having to learn a new language and culture would have been a discouraging experience. But not for this one. He took to Italy, and Italy returned the compliment.

Kubica added further success in his adopted country to the six titles he had amassed on the kart track in Poland. By the time he was ready to take the step into formula motor sport in 2001, his name was already on Morelli's books. Progress from here was swift, as the rising star moved up through Formula Renault 2000, the Formula 3 Euro Series and the World Series by Renault. There he not only won the title, but also earned himself a Formula One test.

From test driver to race driver.

However, it wasn't Renault who signed him up as a test driver in the end, but the BMW Sauber F1 Team. The deal was concluded in December 2005, giving Kubica a very special Christmas present. "Of course it was a risk, as Robert had never driven an F1 car for us before," admits Theissen. Happily, the gamble paid off. In 2006 Kubica embraced his latest challenge and the team was only too happy to give its rookie test driver important tasks. By the end of the season he had racked up over 25,000 kilometres of testing, and unseated Canadian former World Champion Jacques Villeneuve in the race car for the final six GPs of 2006. A podium finish at Monza in only his third F1 race was the highlight.

In 2007, however, things did not go quite as planned for Robert. And then there was his involvement in an incident at the Canadian Grand Prix which left the whole of Formula One holding its breath. On lap 27 at Montreal, Kubica was at the centre of one of the most spectacular accidents in recent F1 history. A coming together with Jarno Trulli's Toyota ripped off his front wing, the car left the ground, smashed uncontrollably into a wall, ricocheted back onto the track, somersaulted several times – scattering debris over the track – and hit another wall. There appeared to be no way Kubica could emerge from the wreckage of the car without serious injury. However, his guardian angel was clearly watching over him and he escaped with nothing worse than a sprained ankle.

Historic victory.

Returning to Montreal almost a year to the day after the crash, Kubica wrote a new chapter in motor racing history. At the 2008 Canadian GP on 8th June, Kubica recorded the BMW Sauber F1 Team's historic maiden victory, becoming the first Polish driver ever to stand on the top step of the podium in the process.

His team-mate Nick Heidfeld crossed the line in second to wrap up a fantastic one-two for the team. Kubica, though, wanted more. After all, he left Canada on top of the World Championship standings and was in no mood to give up his lead: his sights were set on becoming World Champion in just his second full season in Formula One. Ultimately, though, the ice-cool card player from Krakow was forced to accept that McLaren and Ferrari were too strong and his was not a championship-winning car. Yet. 2009 must be a different story: that is what Robert Kubica demands – of himself and of the team.

Interview.

Questions to Robert Kubica:

How far will driving in Formula One change in the 2009 season compared to 2008?

Aerodynamics will be reduced by around 40 or 50 percent, so the downforce level of the cars will be much lower. Taking this into account, Formula One will be influenced much more mechanically than aerodynamically. Nevertheless, aerodynamics will still play a big role. I expect quite big differences between the cars – especially at the beginning of the season. The return of slick tyres is one of the best things to happen in Formula One in the last five or six years. I guess that all drivers prefer slicks to grooved tyres and are pretty happy. Finally, the introduction of KERS is a major change. However, at the moment it is hard to predict how much it will affect driving.

What are the attributes/characteristics a good Formula One driver needs?

First of all performance – you have to be quick. Additionally, understanding the technical side of the sport and being able to give good feedback to the engineers. Also, the driver's experience and the way he works with the team are important. There are many factors that make a good Formula One driver. However, if I have to choose one attribute, it is definitely performance.

Away from Formula One you like to play poker and snooker and go bowling. How do they compare with F1?

They don't compare with Formula One at all. That's why I like them. In my job, I spend a lot of time with a lot of action, high speed and noise. By contrast, poker and bowling are quite steady. You don't have to put in too much effort. Especially when I am bowling I can completely switch off my brain and relax. During the winter break I took part in some tournaments. I have some friends who play at a very high level in Europe. I really enjoy playing with them.

Please describe yourself in three words.

Determined. Easy-going. Distanced.

What has been your greatest success so far?

Winning the Italian Karting Championship back in 1998.

How do you deal with set-backs?

Losing is part of life. You have to take the positive aspects from winning and the positive aspects from losing. Set-backs can make you much stronger. Actually, you can profit much more from losing than from winning. The years in my life I learnt most were the years when I was not able to achieve my goals. During these times I became a lot stronger. Of course, I enjoy the times when everything is running smoothly. But life is always changing – sooner or later you will have to deal with difficulties again. It is important to conquer these difficulties in the right mood and to learn from them.

What does family mean to you?

Family is very important for me. My family have given me a lot of support during my entire career, but also away from my job as a racing driver. They are one of the most valuable, if not the most valuable part of my life.

What does home mean to you?

A lot of people who meet me tend to say I would be half Italian because I've spent a lot of time in my life in Italy. I therefore understand the Italian mentality and like Italy a lot. However, I am 100 percent Polish. My hometown is Krakow and I feel absolutely at home whenever I am there. Unfortunately, I haven't been able to spend a lot of time in Poland lately due to my busy calendar.

When is Robert Kubica satisfied?

Never.

Biography.

Robert Kubica.

Born:	7 th December 1984/Krakow (POL)
Nationality:	Polish
Residence:	Krakow
Website:	www.kubica.pl
Marital status:	Single
Height:	1.84 m
Weight:	72 kg
Hobbies:	Bowling, snooker, poker, karting
Favourite food:	Pasta
Favourite drink:	Orange juice
Favourite circuit:	Macau
First race:	1995, Poznan, Polish Kart Championship
First win:	First race

Career highlights.

1995–1997	Six-times Polish Kart Champion (Juniors)
1998	1 st place Italian Kart Championship (Juniors); 2 nd place European Kart Championship (Juniors); 1 st place Monaco Kart Cup
1999	1 st place Italian Kart Championship (Juniors); 1 st place German Kart Championship (Juniors); 1 st place Monaco Kart Cup; winner of the Margutti Trophy
2000	4 th place European Kart Championship (Formula A); 4 th place World Kart Championship (Formula A)
2001	First races in Italian Formula Renault 2000
2002	2 nd place Italian Formula Renault 2000, four wins
2003	First races in the Formula 3 Euro Series, one win; 1 st place Formula 3 Masters in Sardinia

2004	7 th place Formula 3 Euro Series; 2 nd place Formula 3 Grand Prix Macau
2005	1 st place World Series by Renault, four wins; 2 nd place Formula 3 Grand Prix Macau
2006	16 th place Formula One World Championship (BMW Sauber F1 Team – 12 outings as Friday test driver, 6 races)
2007	6 th place Formula One World Championship (BMW Sauber F1 Team)
2008	4 th place Formula One World Championship (BMW Sauber F1 Team)

Formula One statistics pre-2009.

First grand prix	Hungarian GP, Budapest, 2006
GP starts	40
Disqualifications	1 (Hungarian GP 2006)
Pole positions	1 (Bahrain GP 2008)
Wins	1 (Canadian GP 2008)
Podium places	8 3 rd place Italian GP 2006 2 nd place Malaysian GP 2008 3 rd place Bahrain GP 2008 2 nd place Monaco GP 2008 1 st place Canadian GP 2008 3 rd place European GP 2008 3 rd place Italian GP 2008 2 nd place Japanese GP 2008
World Championship points	120 2006: 6 2007: 39 2008: 75
Fastest race laps	–

4.2 Nick Heidfeld.

Disarming self-confidence.

When a driver can look the television camera in the eye and say “My result was a catastrophe!”, even the most critical reporters’ questions tend to die in their throats. For Nick Heidfeld, 2008 proved to be the most difficult season of his entire 20-year career. But whatever the setbacks, he always faced the music. His problems warming up the tyres in qualifying may have cost him points, but they didn’t cost him his self-confidence and disarming frankness. He spoke calmly and collectedly about the complexities of getting the best out of the tyres on a single lap, and remained just as cool on the track, never being tempted into “going for broke”. Most importantly, he always worked on the problems and sorted them out with the help of the engineers.

Heidfeld’s frankness is based on realism and self-confidence. When asked during the summer of 2008 whether he was worried about losing his job, he always parried with: “No, I’m worried about my qualifying performance. If I can get that up to the level of my race performance, everything will come together.”

Heidfeld’s races are a joy to watch. He pulled off five of the best overtaking moves of 2008 – each of them a double pass. Even when he’s going through a difficult patch, his boss has always praised his skill as a duellist and his racing savvy. He does his dream job with both passion and intelligence – and with an unflappability that comes from experience.

The shaggy-haired driver maintains his poise in interviews too – when questions veer off the race track into areas such as art, fashion, travel or family. He manages to protect his family, yet at the same time doesn’t feel the need to hide them from view. He has them with him as often as possible, and he talks readily about Patricia, his partner, and their offspring. “Children are simply the greatest thing you can have,” he enthuses, laughing about his son Joda, born in summer 2007, and his awkward attempts to walk, or the antics of daughter Juni, who is two years older. “I have a hard time being strict when necessary,” he admits, “and it was something I had to learn.”

The balance between self-discipline and freedom is something that’s also important to him on tour. Although he is often the last Formula One driver to leave the track on a Friday evening, never satisfied until he has analysed and discussed every last piece of data with the engineers, afterwards he enjoys

doing his own thing. He likes exploring his surroundings wherever the job takes him. He enjoys strolling, shopping and visiting art galleries as much as larking about with the family at Disney World. Good food is a passion, but intensive workouts in the gym ensure there is never any risk of the muscular, jockey-sized driver ruining his figure. He is also quite a party animal. In 2008, he invited friends from home and the paddock to a spectacular bash on Lake Zurich. And having German band Fanta 4 come and perform was a dream fulfilled.

Heidfeld finished all 18 of his grand prix races in 2008, and scored four second-place finishes. Indeed, on second placings he holds a somewhat dubious honour: no other Formula One driver has scored as many without ever winning a race. Only once was he in with a genuine chance, and that was in the Canadian GP in 2008. He was on a one-stop strategy and perfectly positioned. Nothing could have stopped him – had it not been for team-mate Kubica, who came from behind in a car which for strategic reasons was lighter than his.

Relentless ascent into Formula One.

As a child, Heidfeld lost no time earning the nickname “Quick Nick”. He was racing his brothers Sven and Tim in Motocross even before the age of five. Parents Angelika and Wolfgang encouraged their sons where others might have held up their hands in horror. The first time he drove a hire kart – on the old Nürburgring kart track – he had to be propped up with plenty of thick cushions behind his back. But although his feet could hardly reach the pedals, he soon left his father trailing. He received his first kart of his own at the age of eight, and went on to win club championships in Kerpen-Manheim and races at national level, as well as competing in European and World Championship races.

At the age of 17, Heidfeld won eight out of nine races to take the German Formula Ford 1600 Championship title. The next year he went on to win Formula Ford 1800. In 1996, at the age of 19, he was the youngest competitor on the grid of German Formula 3. It was a strong debut: he walked away with three race wins and came third in the championship. He also secured pole position and a race win in the Formula 3 World Final in Macau, and third place in the Masters in Zandvoort.

In 1997 Heidfeld’s first Formula One test drive with McLaren Mercedes saw him being heralded by the media as an up and coming superstar. Unfazed by the new pressures and expectations, he went on to win the German Formula 3 championship with five race wins. He also won the F3 Grand Prix in Monaco. In 1998 and 1999, he competed in international Formula 3000, picking up three

race wins and second place in the championship in his first year, and taking four race wins and the championship title in the course of a dominating second-year performance. In parallel with this he was also testing for Formula One.

Gruelling years in motor sport's crowning discipline.

Since 2000 Heidfeld has been a regular driver in Formula One, although he had a long wait before being able to drive a competitive car. The situation in Alain Prost's team showed little promise and in 2001 he transferred to Peter Sauber's private team. His team-mate that year was Kimi Räikkönen, followed by Felipe Massa in 2002. He surpassed both of them – and learnt how to live with the inevitable comparisons newcomers were subjected to: "If you're faster than some wunderkind, it's normal. If you're slower, you're an idiot. It's a no-win situation, so you just have to carry on working in a focused way."

It was with the Sauber team that he achieved his first podium place, in Brazil in 2001, and he remained with the team for three years. "It was a good time," says Heidfeld, who now swapped his Monaco apartment for a house in Stäfa, Switzerland. This old, lovingly restored house boasts modern artworks and a gym. It also offers plenty of opportunities for cycling in the surrounding countryside. Above all, Heidfeld can lead a sheltered private life here, not to mention being only a relatively short distance from Zurich.

When his contract with Sauber was not renewed at the end of 2003, Heidfeld just managed to climb on board at a late stage with the struggling Jordan team. One year later, he had an even more stressful time looking for a new stable. Frank Williams wanted him, but took a long time deciding which of two candidates – Heidfeld and Antonio Pizzonia – he would prefer to have as race driver and which as test driver. At the end of a shoot-out that had gone on for months, it was the German who eventually won the race seat in the BMW Williams F1 team, and over the course of the 2005 season also won the respect of Mario Theissen.

With BMW since 2005.

In the Williams BMW, Heidfeld secured one pole position and three podium places in 2005, despite the season ending prematurely for him due to an accident in testing in Monza, caused by a broken wheel suspension, and a subsequent cycling mishap. Heidfeld was in on the BMW Sauber F1 Team project from its birth, in June 2005, and has been on board ever since. "No team in Formula One has ever got off to such an impressive start," he says. "We've now been meeting, if not beating, our goals for the past three years."

In the course of the debut season in 2006, he secured the first podium place for the newly formed team when he came third in Hungary. Then, in 2007, he secured the first front-row start as well as two more podium places. In 2008 he drove the team's first two fastest race laps and scored four second-place finishes. For 2009 he is hoping that "our car will be in with a chance and that we can be title contenders despite the sweeping rule changes". Nick Heidfeld has always had a strong will to win.

Interview.

Questions to Nick Heidfeld:

How important is talent in F1, and how much of the driver's art can be learnt?

Talent, to me, means good instincts, good vehicle control, enjoying what you're doing and, last but not least, being very fast. Those aren't things you can learn, and to that extent talent is the most important thing a driver needs. But you still have to put a lot of work in to get the best out of yourself. Data recording now covers pretty much everything and it can teach you a lot. But interpreting the data and drawing the right conclusions takes time and concentration.

What's the most important thing you learnt in 2008?

That it pays to keep a cool head in any situation.

What difference do you expect the reintroduction of slicks to make?

In previous years I've always said that slicks were the first change I would like to see. So I'm happy to see them come back. F1 cars belong on slicks. They look better too. I never liked the idea of making compromises at the one and only interface between the power and capabilities of a Formula One car and the track surface. I think slicks will help my driving style. Then again, Formula One cars, particularly with the forthcoming changes, are extremely complex, and so are tyres. So I can't really say anything for sure until we've got some experience under our belts with the F1.09 and have measured ourselves against the competition.

How far do you think you and the team can go in 2009?

It's been impressive the way we achieved our goals in 2006, 2007 and 2008. Normally I would say we would be sure to do it again in 2009, and be in with a fighting chance of winning the title. But all the new rules for next season could potentially create a whole new ballgame. I very much hope, though, that we'll put in a strong performance.

You're interested in art – do you have a favourite piece?

Yes, it's a work by the Canadian artist Zilon, called "Demons", and it's been hanging above our dining table for a number of years. At first sight it looks rather chaotic, just coloured lines and thick splotches of paint. But gradually you start to discover the faces of the demons – at first just one in the centre of the picture, then more and more of them, until finally they're everywhere. It's an

exciting piece. I bought it in Montreal, where there are some great galleries in the old quarter. That's one of the reasons I hope to get back there again some time soon!

Your own personal fleet of cars is growing. What models do you own?

I've got a BMW M3, which I really enjoy driving, and an X5, which we can also pack the children and the dog into. The X5 is not just very spacious, it's also ideal in the Swiss mountains, where we often have snow. Patricia is still driving a MINI Cooper S. We've also got some classics, like a 1967 Beetle convertible. I'm extremely fond of that car. My mother has always driven a Beetle convertible, and still does. To my mind the whole sound, and the memories it brings back, make it the best convertible in the world. I also like the styling of the Ford Mustang – I own a 1965 fastback. There's a 1966 Fiat 500 in our garage as well.

No sports cars?

Oh yes. But if I say I've got a Ferrari, a Porsche or a Lotus, people think I'm boasting. And that's not my thing.

Do you ever feel afraid?

On the race track I'm hardly ever afraid – except if I'm involved in a spin or an accident and waiting for the impact. Obviously that's a moment when you do feel scared. Otherwise, when I think back to my childhood, everybody used to say I didn't know the meaning of the word fear. If there was something to climb or something else to get up to, there was no holding me back.

Biography.

Nick Heidfeld.

Born:	10 th May 1977/Mönchengladbach (DE)
Nationality:	German
Residence:	Stäfa (CH)
Website:	www.nickheidfeld.com
Marital status:	Engaged to Patricia Papen, daughter Juni, son Joda
Height:	1.67 m
Weight:	61 kg
Hobbies:	Sport, eating
Favourite food:	Foie gras
Favourite drink:	Virgin pina colada, testarossa
Favourite circuits:	Suzuka and Macau
First race:	1986, Kerpen-Manheim karting track
First win:	1987, Kerpen-Manheim karting track

Career highlights.

1988–1993	Karting successes, first at a national level, then qualified for European and World Championship
1994	Winner of the German Formula Ford 1600 Championship, eight wins out of nine races
1995	Winner of the International German Formula Ford 1800 Championship, four wins
1996	3 rd place German Formula 3 Championship, three wins; pole position and race win at the Formula 3 World Final in Macau; 3 rd place Formula 3 Masters in Zandvoort
1997	Winner of the German Formula 3 Championship, five wins; winner of the F3 Grand Prix Monaco. Formula One test (McLaren-Mercedes)
1998	2 nd place European Formula 3000 Championship, three wins; Formula One test driver (McLaren-Mercedes)

1999	Winner of the European Formula 3000 Championship, four wins; Formula One test driver (McLaren-Mercedes)
2000	Formula One World Championship (Prost Peugeot), no points
2001	8 th place Formula One World Championship (Sauber Petronas)
2002	10 th place Formula One World Championship (Sauber Petronas)
2003	14 th place Formula One World Championship (Sauber Petronas)
2004	18 th place Formula One World Championship (Jordan Ford)
2005	11 th place Formula One World Championship (BMW WilliamsF1 Team)
2006	9 th place Formula One World Championship (BMW Sauber F1 Team)
2007	5 th place Formula One World Championship (BMW Sauber F1 Team)
2008	6 th place Formula One World Championship (BMW Sauber F1 Team)

Formula One statistics pre-2009.

First grand prix	Australian GP, Melbourne, 2000
GP starts	152
Disqualifications	1 (European GP 2000)
Pole positions	1 (European GP 2005)
Wins	–
Podium places	11 3 rd place Brazilian GP 2001 3 rd place Malaysian GP 2005 2 nd place Monaco GP 2005 2 nd place European GP 2005 3 rd place Hungarian GP 2006 2 nd place Canadian GP 2007 3 rd place Hungarian GP 2007 2 nd place Australian GP 2008 2 nd place Canadian GP 2008 2 nd place British GP 2008 2 nd place Belgian GP 2008
World Championship points	200 2001: 12 2002: 7 2003: 6 2004: 3 2005: 28 2006: 23 2007: 61 2008: 60
Fastest race laps	2 Malaysian GP 2008 German GP 2008

4.3 Christian Klien.

The third man.

What does a test and reserve driver get up to during a race weekend while his team colleagues are battling it out on the track? It's a question Christian Klien answers with a mischievous smile and another question: "How long have you got?" According to the Austrian, who will turn 26 in February, "Some people think a test driver spends the whole weekend sitting in the sun, hoping one of the drivers will eat something that disagrees with him. The reality today though is that there's so much going on during a race weekend that it takes three fully qualified Formula One drivers to handle it all – at least if you mean business."

Christian Klien, who has already spent three years as a Formula One race driver, has long since got used to his role. "For me, it doesn't make much difference if I come to a grand prix weekend as a race driver or as a test driver for the BMW Sauber F1 team. I train just as intensively either way, and mentally as well I have to be as strong as the other two. Because you never know what's going to happen – and when you'll be called on to show you're a professional. If you have to stand in for somebody and are not prepared, or not physically fit, things can go horribly wrong."

In his native Vorarlberg in Austria, Klien spends every spare minute working on his fitness. His personal coach makes sure that the training programme is as varied as possible. "We go mountain biking and skiing, and I train on the ergometer, or sharpen my balance with an ingenious exercise programme. After all, as a Formula One driver all your senses come into play." Top scores in the fitness check, which the team of coaches carry out on the drivers several times a year, confirm that Klien is in tip-top condition.

Always ready for action.

Every race weekend brings an intensive schedule of technical briefings and debriefings, meetings with the media and strategy discussions. On the Thursday before the race, the first meetings with the tyre firm and the engineers are held. Other fixtures include initial interviews with newspapers and television, and team meetings to cover all the bases for the coming weekend. There's also the ritual of walking the track and identifying every bump or irregularity. Klien, like the two race drivers, is involved in all these various processes. And when the first practice session starts, he's there in the pits

listening in on the team radio. Few working days are less than twelve hours, and often it's more. And right up to the start of qualifying practice, the reserve driver has to be ready to jump in and take over from a regular driver at a moment's notice. A spare helmet, overalls and seat shell are always laid out ready.

Youth and experience combined.

According to the official tally, Klien has driven 47 grand prix races (or 48 including Indianapolis 2005, when like most of the field he had to turn off into the pit lane with tyre problems after the formation lap). His climb into F1 was meteoric. After an apprenticeship in Formula BMW, at 19 he had his rookie season in the Formula 3 Euro Series where – as in all the other junior formula series – he was soon winning race after race. The rookie also left all his rivals trailing on his way to winning the prestigious Marlboro Masters in Zandvoort. This helped secure Klien a place in Formula One when he was barely out of his teens – the first among his old sparring partners from Formula Renault and Formula 3 days, like Rosberg, Hamilton, Kubica, Piquet and Glock.

It was a somewhat daunting move, going from the 200-horsepower performance of Formula 3 to Formula One in the space of just a few weeks. Klien's "first steps" were impressive: "I had my first test in the Jaguar at 19. Suddenly you've got 900 horsepower behind you, and the steering wheel has so many buttons, you'd need a whole shelf of instruction manuals to understand them all. But the engineers were satisfied. I had a super-fast teammate in Mark Webber, and facing up to comparisons with him was always a challenge. A few weeks later I found myself – a Formula 3 rookie from Vorarlberg – in Melbourne, and the whole town seemed to know who I was. That was when it started to dawn on me what I was letting myself in for."

To begin with, his lack of experience was a handicap. But Klien was still able to display his talent by finishing his races, doing hardly any damage to the car – and also bringing home some points. "That debut year was incredibly difficult. The regulations didn't allow us much in the way of practice laps. Often I only had 15 or 20 laps to get to know a track and somehow find the right set-up. Then it was straight on to qualifying." As far as the car was concerned, too, Klien was introduced to Formula One the hard way. Looking back, he feels the experience stood him in good stead: "My first F1 car drove pretty much like a bus compared with the BMW Sauber F1.08. There's just no comparison. But that's the sort of experience you need to be a good driver. If you never experience the job's darker sides, you sometimes have a harder job breaking through into the good times."

Klien “version 2.0”.

Currently, the world of Formula One is seeing Christian Klien in another role, one that he himself jokingly refers to as “version 2.0”. After a further two years in the Red Bull team, it was time for version 1 – the talented rookie – to move over. Turbulent years in a very volatile world had caused him to mature quickly. Still much too young, at 23, to think of retiring, Klien now made a name for himself as a test driver for the Honda works team, before moving in early 2008 to the BMW Sauber F1 team to take up the same role. “These aren’t very rosy times for test drivers,” he openly admits. The number of test days is strictly limited. “Only a few years ago, some test drivers could clock up 30,000 kilometres and more. Today we have to make the best use of each lap. That’s why it’s all the more important to have someone with experience in the job, because these days you can’t afford to waste a single kilometre.”

But on his free weekends Christian Klien is still keeping his hand in as a bona fide race driver – in 24-hour racing. In 2008 he made his debut in the legendary Le Mans 24 Hours, and picked up a podium place straightaway. From time to time he even led the field. This all helps him stay race-fit, and also makes a welcome change: “24-hour racing is the next best thing after Formula One. In Le Mans there were eight active or former F1 drivers on my team alone. It’s an incredibly good way of keeping your reflexes in top shape. In the course of one 24-hour race, each car clocks up 6,000 kilometres. That’s more than a Formula One car manages in a whole year. I’m very grateful to the BMW Sauber F1 team for allowing me the opportunity to rack up important racing miles in other competitions. It’s great that between GP events Mario Theissen has no objection to his reserve driver going in for races where you overtake something like 600 to 700 times, at speeds of up to 350 km/h.”

But his main focus is and remains on F1. “I’m in a top team and have a very important role, which I’m totally happy with at present. But being a racing driver is all about ‘driving races’, so I shall continue to be one hundred percent focused on getting another chance at a Formula One race seat.”

Interview.

Questions to Christian Klien:

Was Formula One your childhood dream?

As a child, I was involved in all sorts of sports. Football, skiing ... whatever was on offer in the Vorarlberg, I did it. As far as motor sport was concerned, I was about eight years old when things really clicked. In 1991 I met my great role model Ayrton Senna. My father and I had slipped into the paddock through a hole in the fence. We were hardly inside before I ran straight into Senna. I was wearing a Harley Davidson T-shirt and a Salzburgring baseball cap. Ayrton spontaneously came over and asked my father to take a photo of the two of us. He was very patient and seemed to know that was what we wanted, even though we would never have dared to ask. That was a moment that pointed me in a whole new direction. From then on I was a committed motor sport fan and soon took up karting. I've still got the photo of Ayrton Senna and me up on the wall at home, taking pride of place.

How did you get from there into Formula One?

We were completely clueless to begin with – not like your typical motor sport family. In any case, originally we saw it more as a pastime than anything else. The whole family came along to kart races in the caravan, and we ended up travelling all over central Europe. My mother cooked, my sister played with other girls and my father in those days acted as mechanic and team owner in one. Everywhere there were the professionals, with their motorhomes and hugely expensive equipment. And then there was us – the tinkerers. To me it was all pretty much of a game, though when I kept on picking up trophies, it became clear not everybody saw it that way. From that time on one thing was clear: now I had found something I actually seemed to be good at – and that was also loads of fun. Robert Kubica and his family were in the same boat as us, incidentally – tinkerers that other folk tended to make fun of.

Can anyone be a Formula One driver nowadays, provided they get the right training?

There are two things every driver needs: talent and the right support at the right time. If there's no talent there, then all the support in the world will be pointless. On the other hand, there have been many drivers in the past who had the talent but got the wrong support, or no support at all – and so they never made it anywhere near Formula One. I spent a number of years in the Red Bull driver development programme, where the pressure was enormous. In the end I was the first driver this programme launched into Formula One. I will always be

grateful to Red Bull for that. Even though we later went our separate ways, I still have an excellent relationship with the key people at Red Bull. Now I have a new home though, with the BMW Sauber F1 team. I feel fully integrated here and it's good to be able to contribute my experience.

What's your relationship with your team colleagues?

As I said, I've known Robert since our karting days. We competed against each other many times, and that carried on later into Formula Renault and Formula 3. He was always very fast. We have a lot of respect for each other – though in my spare time I'm no poker ace like him, but tend to go in for proper sport, like skiing in the Arlberg. Nick of course has been in the game a lot longer. He was already testing for Formula One when Robert and I were still karting. But we work together very professionally and he has huge experience.

Has Formula One changed your life?

I always try to keep both feet on the ground. People from the Vorarlberg have a reputation for being very down-to-earth and industrious, so "fame" was never a problem for me. When I started out in Formula One, it was a bit of a shock to begin with to have total strangers recognise you and come up to you in the street. Plus it came just a few weeks after giving up my job as a sheet metal worker, so it was all pretty sudden. The main change was in my lifestyle: one moment I was going to work by moped, then the next, and ever since, I was spending hundreds of hours travelling to work – here, there and everywhere – by air. The important thing is to stay the same person. I hope I've been able to do that.

Do you ever feel afraid?

Not in the cockpit, not really. Otherwise I couldn't do this job. I just sometimes have an uneasy feeling if there's something I find I'm not in control of. As a child, I was really afraid of rollercoasters. You still won't get me on one even today. Being a helpless passenger on something like that – no thanks!

What was the maddest thing you've ever done?

Actually it was something on exactly those lines. In Budapest, Hannes Arch talked me into going up with him as a passenger in his two-seater stunt plane. That was pretty extreme. As a racing driver you're used to g-forces, but looping the loop head down a few metres above the Danube was a whole different ballgame. The main thing was I held on to my breakfast. That's something Formula One drivers don't always manage to do.

Biography.

Christian Klien.

Born:	7 th February 1983/Hohenems (AT)
Nationality:	Austrian
Residence:	Diepoldsau (CH)
Website:	www.christian-klien.com
Marital status:	Single
Height:	1.68 m
Weight:	69 kg
Hobbies:	Skiing, ice hockey, mountain biking
Favourite food:	Italian cuisine
Favourite drink:	Elderberry juice
Favourite circuit:	Monaco and Spa
First race:	1995, kart race in Osogna (Ticino), Liechtenstein Kart Championship
First win:	1996, Locarno, Swiss Kart Championship (Mini category)

Career highlights.

1996–1998	Karting successes in Switzerland, Austria, Germany and Italy; Swiss Champion in the Mini 60 cc category
1999	Debut season in Formula racing, first Formula win on the Sachsenring; 4 th place Formula BMW Junior Cup, four wins
2000	10 th place Formula BMW ADAC, 3 rd place rookie rankings
2001	3 rd place Formula BMW Germany, five wins
2002	1 st place German Formula Renault 2000, five wins, 13 podiums, five pole positions; 5 th place Formula Renault Eurocup and best rookie; 3 rd place Formula Renault Wintercup Italia

2003	2 nd place Formula 3 Euro Series, Rookie of the Year, four wins, six pole positions; winner of the Marlboro Masters in Zandvoort
2004	16 th place Formula One World Championship (Jaguar Racing)
2005	15 th place Formula One World Championship (Red Bull Racing)
2006	18 th place Formula One World Championship (Red Bull Racing)
2007	Formula One test and reserve driver (Honda Racing)
2008	Formula One test and reserve driver (BMW Sauber F1 Team); 3 rd place 24 Hours of Le Mans (Peugeot 908), 2 nd place Petit Le Mans in Road Atlanta (Peugeot 908)

Formula One statistics pre-2009.

First grand prix	Australian GP, Melbourne, 2004
GP starts	47
Best placing	5 th (Chinese GP 2005)
Pole positions	–
Wins	–
World Championship points	14 2004: 3 2005: 9 2006: 2
Fastest race laps	–



5. The management.

5.1 Mario Theissen – BMW Motorsport Director.

Analyst with an emotional side.

Cheering in the pit lane, hugging team members, shedding tears of joy and revelling in the champagne-soaked celebrations until he was drenched from head to toe – there are few occasions when you see Prof. Dr.-Ing. Mario Theissen that worked up in public. But the BMW Sauber F1 team's one-two finish in the Canadian Grand Prix on 8th June 2008 was one of them.

“It was incredibly emotional,” he recalls, “and a fantastic reward for all the hard work we’d put in – an absolute milestone. All along it had been our goal to get our first grand prix win in 2008. That was quite bold, because in Formula One there’s so much you can’t plan for; even quite small things can put paid to all your careful preparations and cause you to fall at the last fence.”

Theissen is not afraid to set ambitious goals. And it’s his job to make them happen. To do so he must take care of both the technical side of things and the people side, and take crucial decisions during the event. At the end of the day it is BMW’s Motorsport Director who takes responsibility for all the company’s motor racing projects – from promoting junior drivers in the various Formula BMW series, to touring car and sports car activities, to the Formula One involvement. All these challenges he has actively embraced, not least of which was setting up the BMW Sauber F1 Team in 2006.

But for all his passion for the sport, his leadership style is above all down-to-earth. It certainly wasn’t the glamour, the celebrities and the paddock small talk that attracted him to Formula One. For him, those are all unwelcome distractions that must never be allowed to get in the way of efficient planning and action. Theissen is an engineer and an analyst. He never puts anything down to good or bad luck. Progress or stagnation, breakdowns or accidents – everything, in his book, has a reason, a reason from which the team can and must learn.

His technical interest in engine construction and his professional as well as private enthusiasm for motor sport accompanied him throughout his mechanical engineering studies and subsequently took him straight to BMW. He joined the company in 1977, his first posting being in engine analysis. Later he took on managerial responsibilities.

In 1999, he landed his dream job in which everything came together – his passions for sport, engineering and complex management tasks. Since April of that year he has been BMW Motorsport Director, initially heading up the group's motorsport involvement jointly with Gerhard Berger. For Mario Theissen, BMW's victory in the 1999 Le Mans 24 Hours against one of the strongest fields in the history of that marathon event remains unforgettable.

Since October 2003 Theissen, who has a doctorate in mechanical engineering and in 2005 acquired an honorary professorship, has been BMW's sole Motorsport Director.

His career at BMW has spanned many different positions at many different locations. Not surprisingly, therefore, taking a broader view and working in an interconnected world is what Theissen would term "a controllable everyday process". The Motorsport Director has offices in both Munich and Hinwil.

Theissen's talent for flexibility comes in handy in his private life too. "There the processes are not always quite so controllable," he admits with a grin. The Theissen family is based in Munich, and while he commutes back and forth, and his three children spend time studying abroad, his wife Ulrike holds the fort and keeps everything on an even keel at home. Ulrike is the love of his life, and his family his most treasured asset.

When you live a life like this, time is always at a premium. Not surprisingly, therefore, Theissen can only make occasional flying visits to his home town where he grew up – Monschau in the Eifel. "The people there are rough as the climate, but warmhearted, dependable and straight as a die," he says. Monschau lies not only in a picturesque setting but halfway between the Nürburgring and Spa. Both these tradition-steeped circuits were among his favourite haunts in his youth.

At the age of 13 Theissen bought his first car, a Fiat 500, for which he paid a hundred marks. It was mainly used for test purposes before being replaced by a road-legal car when he came of age. These days he has no time to tinker with cars any more, but he regards daily sport as a "constitutional right". On free weekends, he does twelve-kilometre runs through the countryside. On weekday mornings it's five kilometres, or else he visits the fitness centre built at his initiative years ago in Munich for BMW Motorsport staff.

Biography.

Prof. Dr.-Ing. Mario Theissen.

Born:	17 th August 1952 in Monschau/Eifel (DE)
Nationality:	German
Marital status:	Married to Ulrike, one son and two daughters
Residence:	Munich (DE)
Hobbies:	Sport, especially running, cycling and skiing
1971–1977	Engineering degree at Aachen University of Technology (RWTH), diploma in engineering
June 1977	First BMW job in engine analysis
1989	Doctorate at the Ruhr University in Bochum
1991	Director of Product Concepts at BMW AG
1992	Director Advance Drivetrain Development at BMW
1994	Managing Director of BMW Technik GmbH
1998	Head of Technik GmbH and responsible for setting up the BMW Technology Office in Palo Alto, California (USA)
1 st April 1999	Appointed BMW Motorsport Director alongside his colleague Gerhard Berger
From October 2003	Sole BMW Motorsport Director after Berger's departure
July 2005	Honorary Professorship for Innovative Vehicle Development in the Mechanical Engineering/Process Engineering faculty of the University of Applied Sciences in Dresden
From 1 st January 2006	As BMW Motorsport Director now also responsible for the BMW Sauber F1 Team

5.2 Walter Riedl – Managing Director.

Once a BMW man, always a BMW man.

Walter Riedl's career as a bass player has definitely hit the buffers. Since he took over as Managing Director at BMW Sauber AG in Hinwil on 1st January 2006, he's hardly had a moment to pursue his favourite hobby. So it was a foregone conclusion that Vollgas Johnny, the 70s rock band he founded with work colleagues from BMW, would decide to hire someone else. Since then, any bit of strumming Riedl has been able to fit in has been confined to his flat in Lachen, Switzerland. And there's less and less time even for that. Formula One is a hard taskmaster.

But apart from that, the 49-year-old has little to complain about: "I really enjoy my job. It's very absorbing, and the team I'm in charge of here is just great. The atmosphere is open, constructive and team-oriented." This is where he plays – or calls – the tunes now.

In the second half of last year Riedl assumed further responsibilities. Willy Rampf – previously the team's Technical Director – was keen to reduce his work schedule, and so Walter Riedl is now also responsible for the operational management of the technical department, as well as for vehicle development. Willy Rampf continues to be responsible for vehicle concepts, and will lead the team at the track.

"This new arrangement is already working well," says Riedl. The BMW Sauber F1.09 is the first car developed under this new constellation.

Anyone looking at Walter Riedl's career would see it as proof of the adage that "once a BMW man, always a BMW man". Riedl was still studying mechanical engineering at Munich's University of Applied Sciences when he had his first contact with BMW. That was between November 1982 and March 1983, when he came to BMW to write his thesis on gas exchange systems. His mentor at BMW was one Mario Theissen.

Riedl was taken on by BMW in July 1983 and has remained with the company ever since. He worked in various capacities in engine development, among other things as a test and simulation specialist. He was also responsible for six-cylinder engine performance development and between 1995 and 1999 was head of exhaust and cooling systems development.

1999 marked a crucial turning point for Riedl, when an opportunity arose to play a leading part in the new Formula One project. Riedl seized the opportunity with both hands and assumed responsibility for project management, purchasing and quality control. In this role he kept in touch with all areas of BMW's motorsport operations.

When BMW took a majority stake in the former Sauber team and someone was needed to head up the newly formed BMW Sauber AG in Switzerland, it didn't take long to find a suitable candidate: Walter Riedl. By the second half of 2005 Riedl was already commuting regularly between Munich and Hinwil, even though he only officially took over his new job as Managing Director on 1st January 2006.

And it's a job that he's thrown himself into heart and soul. "I'll soon have been involved in Formula One at BMW for ten years – first in the engine partnership with Williams and now in the BMW managed team. My big ambition is to win a world championship with this team. Of course, I know full well that that's an ambitious goal, but I'm one hundred percent focused on it every day."

In that good cause, he even puts in some work on his own power-to-weight stats, heading off three lunchtimes a week to the fitness studio. On his free weekends he commutes between Hinwil and Germany, since his wife and 16-year-old daughter still live in Unterbachern, about 25 kilometres from Munich. "When I'm off duty," says Riedl, "I make the most of the time I get to spend with my family." That's when he gets the chance to recharge his batteries and restore himself to peak condition.

Biography.

Walter Riedl.

Born:	7 th January 1960 in Aub (DE)
Nationality:	Austrian
Marital status:	Married to Christiane, daughter Stephanie (16)
Residence:	Lachen (CH)
Hobbies:	Playing bass guitar, keeping fit, family
1978–1983	Engineering studies at Munich University of Applied Sciences, degree: Dipl.-Ing. (FH) Vehicle Technology
July 1983	Appointed by BMW in Munich as an engineer in engine development
1983–1987	Test engineer advanced development gas exchange systems
1987–1991	Group manager method development
1991–1995	Group manager performance development six-cylinder engines
1995–1999	Department head exhaust and cooling systems
1999–2005	BMW Motorsport. Responsible for project management, purchasing and quality control
January 2006	Managing Director of BMW Sauber AG in Hinwil
From November 2008	Additionally responsible for the technical department

5.3 Willy Rampf – Technical Coordinator.

A dream comes true.

Willy Rampf spent eight years as Technical Director in Formula One. He started the job in April 2000, initially at the former Sauber team and then with BMW Sauber F1. With these eight years under his belt, the Bavarian became the longest-serving Technical Director in Formula One.

The idea of cutting back professionally had been growing in Rampf's mind for some time. But it was also clear to him that it would not be possible while the new team was still in the middle of the all-important and intensive initial set-up phase. By late last year, however, the time was ripe, and in November 2008 operational management of the technical department passed from Rampf to Walter Riedl, who is also responsible for vehicle development.

Rampf, meanwhile, is focusing once again on his original technical responsibilities. He will continue to be in charge of vehicle concepts and to lead the team at the track.

The 55-year-old is very satisfied with this new working arrangement. "I spoke to Mario Theissen about it quite some time ago and I'm glad that we were jointly able to work out a good solution," he says.

Of course, the secret of success is a good team. "Good, motivated people are the most important asset in Formula One," says Rampf. True to this motto, during his eight-year tenure in Hinwil he built up a competent and efficient staff for whom well-oiled teamwork is the order of the day.

Rampf is a dyed-in-the wool racer who has always been drawn to the competitive arena. In 1987 he took five weeks holiday to join the BMW Motorrad team as a mechanic for the Paris-Dakar Rally. He also entered Enduro races, though with moderate success as he sees it.

Bavarian born and bred, Rampf studied automotive engineering at Munich's University of Applied Sciences and joined BMW in Munich in 1979 as a development engineer in the chassis department.

Between 1989 and 1993 he worked for BMW in South Africa, and it was there that he came into contact with Formula One for the first time. "Peter Sauber and his team had their Formula One debut in Kyalami in 1993 and he invited me to the race," recalls Rampf.

Intrigued by the technology and perfection of the Formula One cars, he applied for a job as a race engineer six months later and was taken on by Peter Sauber.

In the four years that followed, Rampf worked as a race engineer for Heinz-Harald Frentzen and others, before returning to BMW. "I was looking for a new challenge," says Rampf. Back in Munich, he headed BMW's motorcycle involvement in the Paris-Dakar Rally. It was a successful venture, with BMW rider Richard Sainct taking a commanding victory in the legendary desert rally.

At the end of 1999, Rampf embarked on his second career at Sauber, with the aim of becoming Technical Director in Hinwil. The rest of the story is well known.

Before the 2009 season gets underway Rampf will fulfil a long-held dream: he will be taking several months off, a few weeks of which he will spend back in South Africa, enjoying the country's beauty at his leisure and in the company of his family.

Biography.

Willy Rampf.

Born:	20 th June 1953 in Maria Thalheim, Bavaria (DE)
Nationality:	German
Marital status:	Married to Maria, children: Peter (25), Andrea (22) and Katharina (19)
Residence:	Pfäffikon (CH)
Hobbies:	Motorcycling, cooking
1975–1979	Studied vehicle engineering at Munich University of Applied Sciences; degree: Dipl.-Ing. (FH) Vehicle Technology
1979–1989	First joined BMW in Munich as a development engineer
1989–1993	Test engineer at BMW in South Africa
1994–1996	Race engineer for Heinz-Harald Frentzen at Sauber in Hinwil
1997	Race engineer for Nicola Larini, Norberto Fontana and Gianni Morbidelli at Sauber
1998–1999	Headed the motorcycle involvement in the Paris-Dakar Rally at BMW in Munich
End of 1999	Head of the racing and test team at Sauber
April 2000	Technical Director at Sauber
January 2006	Technical Director Chassis of the BMW Sauber F1 Team
July 2006– November 2008	Technical Director of the BMW Sauber F1 Team
November 2008	Technical Coordinator of the BMW Sauber F1 Team

5.4 Markus Duesmann – Head of Powertrain.

A natural decision-maker.

Mechanical engineer Markus Duesmann always dreamt of working in Formula One. This ambitious, high-stakes environment regularly attracts people with ambitious ideals. Formula One is about extreme speed – not just on the race track but also on the development front. Quick, clear decisions are essential, and it's often only days, or even just hours, before they hit home in terms of points won or lost. This is the sort of environment in which Duesmann thrives. He is averse to dithering: "You can't keep all your options open forever," the 39-year-old says. For someone who likes things to be clear-cut, the lack of clarity surrounding the future regulations is all the more frustrating. Having to put up with uncertainties along a planned route is quite a handicap for Duesmann and his Formula One powertrain development and production team.

Looking back, 30th August 1992 is a date that will always remain etched in Duesmann's mind. Already an engineer, working in engine design at Mercedes, he was among spectators on the long straight at Spa-Francorchamps, watching the Belgian Grand Prix. The sound of the twelve-cylinder engines Ferrari was using at the time got under his skin. "I still feel a shiver down my spine when I think of the sound those engines made as they went roaring past at full throttle." That was the moment Duesmann knew that some day he wanted to work in Formula One.

Duesmann's first active involvement in racing was in the Nürburgring 24 Hours. A native of Rheine in the Münsterland region of Westphalia, he joined FEV Motorentechnik in Aachen at the age of 26. As well as working in engine development at FEV, he also formed a racing team. The hardware was donated by the company and the manpower was provided by Duesmann and his colleagues in their spare time.

After an eight-year break from Daimler, Duesmann rejoined the company – or DaimlerChrysler AG as it was then – and in 2005 fulfilled his dream of working in Formula One by becoming head of F1 engine development in Brixworth, England.

Despite a tally of ten wins during his time in the job, dream and reality drifted apart and Duesmann soon departed again for pastures new. For some time he had been following the formation of the new BMW Sauber F1 Team with interest. The idea of bringing team and engine supplier together into one unified set-up caught his imagination. He picked up the telephone – and struck lucky. The post of head of Formula One powertrain in Munich had just become vacant. The timing could not have been better. Duesmann's mix of passion for racing, his experience and his understanding of corporate structures were just what the team wanted.

What Duesmann likes about the BMW Sauber F1 Team in particular is that it's "a great team with transparent management structures" under and around BMW Motorsport Director, Mario Theissen. A lean hierarchy allows decisions to be taken and implemented quickly. Duesmann, a systematic delegator, sums up the attraction of a managerial position as follows: "What you have to do is allow every employee to make the best possible use of his strengths. I try to make sure that everybody gets as much responsibility as they can handle. Every day it's a pleasure to be able to work with so many top people."

Then again, it's not every day that Duesmann has that pleasure. In 2008 he spent only around half the grand prix weekends at the track. The other times he was watching in front of his television set at home. "It's a nightmare," he admits, "not being able to intervene – not having data access and radio contact. Sometimes I can hardly watch – it's terrible."

But it could be argued that he's only got himself to blame: it was because neither the engines nor the quick shift gearboxes gave any trouble during the 2008 season that the boss was sometimes freed up to remain in Munich, dealing with current development issues and future challenges.

Whenever Duesmann has a window of spare time, he always knows how to fill it. He takes part in some sort of sporting activity every day, and is a big fan of the triathlon disciplines of running, cycling and swimming. He has also taken part in seven marathons. His three BMW motorcycles can always do with exercising, and occasionally he heads off into the mountains for some hiking or snowboarding. And even in his spare time, motorsport is never far away: he also likes to chill out chasing lap times in his own racing kart.

Biography.

Markus Duesmann.

Born:	23 rd June 1969 in Heek, Münsterland (DE)
Nationality:	German
Marital status:	Married to Sabine
Residence:	Munich (DE)
Hobbies:	Endurance sports, triathlon, motorcycling, snowboarding
1988–1991	Studied mechanical engineering at Münster University of Applied Science, gained a diploma in engineering
1999–2004	Part-time business administration studies at the Distance University of Hagen
1992–1995	Designer in the internal combustion engine department at Mercedes-Benz AG
1995–2003	Various posts at FEV Motorentechnik in Aachen: group manager diesel engine design, project manager EMVT combustion engine, department head design and engine mechanics, initiator and technical manager FEV Racing Team, project manager for the development of a 4.4-litre V8 diesel engine, division head engine mechanics combustion and diesel engines
2004–2006	Various posts at DaimlerChrysler AG: head of engine design (advanced development cars), head of development new diesel engines (production cars), head of development Formula One (Brixworth, GB)
Since January 2007	Head of Formula One Powertrain at BMW AG in Munich

6. The sponsors.



Philosophy of partnership.

Formula One is a perfect mix of high-tech, sport, show and business, and as such has always occupied a pivotal position in sports sponsoring. In recent years the BMW Sauber F1 Team has established itself at the top of motor-sport's crowning discipline, providing its partners with the perfect platform for presenting their own brands to all the relevant markets around the world with the assurance of a huge public and a high media impact. Success at the international race tracks thus invariably turns the public spotlight on the partners as well.

On the way to the top of Formula One, the partners play a crucial role for the BMW Sauber F1 Team. From Premium Partners to Promotional Suppliers, all sponsors establish a close affiliation with the team from Munich and Hinwil.

A partnership with the BMW Sauber F1 Team is based on four fundamentals: exclusivity, transparency, individuality and service. These four performance attributes are also what bring the team's sponsors into the heart of the partnership and create the basis for a thriving collaboration. After all, success for the BMW Sauber F1 Team is shared by all the partners as well.

Exclusivity.

"Quality not quantity" is an important principle underlying the sponsoring philosophy of the BMW Sauber F1 Team. The team deliberately restricts itself to a maximum of ten partners featured on the race car. This limited number ensures the best possible visibility for each sponsor on the car and the team clothing. It is a strategy that benefits the partners above all, since a strictly limited number of sponsors ensures enhanced exposure for the individual brand. In this way partners benefit from heightened recognition and the transfer of the BMW Sauber F1 Team image onto the relevant brand.

The BMW Sauber F1 Team offers its partners a range of sponsoring models. The categories Premium Partner (PETRONAS) as well as Official Corporate Partner (Intel) and Technical Partner (Bridgestone) comprise a single partner in each case. Together with seven further sponsors, the group of Official Partners numbers a maximum of ten brands. Similarly, the Official Suppliers and Promotional Suppliers to the team each form an exclusive club of ten companies at most.

The conditions a partner is required to fulfil for any collaboration with the BMW Sauber F1 Team are as straightforward as they are ambitious. Both sides must share high aspirations with regard to products and marketing. That is why the team from Munich and Hinwil can only consider premium brands. The rule is that the team selects just one sponsor from each branch. That way the BMW Sauber F1 Team guarantees its partners branch exclusivity and the opportunity to clearly set themselves apart from direct competitors in their marketing communications.

Transparency.

The most comprehensive market and media analyses in Formula One demonstrate just how successful a partnership with the BMW Sauber F1 Team is. These detailed results and evaluations form the benchmark for motorsport's leading discipline and are made available to each individual partner. This allows each sponsor to focus on the positive impact an involvement with the BMW Sauber F1 Team brings with it.

When it comes to measuring the tremendous media impact of Formula One, and particularly that of the BMW Sauber F1 Team, the team relies on the experience of independent, internationally renowned partner institutes. While Formula One casts its spell on many millions of people around the world on each race weekend, for the Karlsruhe company IFM Medienanalysen GmbH it signals a round-the-clock job of evaluating media data from TV and print publications. The same goes for the Cologne-based Sport+Markt AG on the market research side.

This data survey spans the entire Formula One season and 17 international markets. When it comes to TV analysis, the specialists don't miss a single second: this is a 24/7 operation, carried out around the clock on seven days a week. Whereas for TV broadcasts the focus is on criteria such as range of coverage, broadcasting time or analysis of team and sponsor visibility, the analysis of print media examines aspects like circulation, article length, naming and photos of sponsors.

In a partnership with the BMW Sauber F1 Team, great store is set by the transparency of the results of these various analyses and surveys. In the course of a season, the team provides its sponsors with a variety of comprehensive reports. This ranges from a quick summary after a race to the final end-of-season report with partner-specific data on TV and print media analysis, as well as on market research. A partner could hardly receive more precise feedback on the efficiency of its sponsoring involvement than that.

Individuality.

One focus of the team's collaboration with its partners is on the individuality of each cooperative relationship. The BMW Sauber F1 Team gives top priority to the sponsors' particular marketing goals, and the relevant offers always consider the detailed marketing strategies in question. The aim is to meet the targets of the partners and to jointly implement shared visions. To ensure this succeeds, the BMW experts fully embrace the aims of the partners, whether in the area of F1 marketing, co-marketing with BMW or even extended business relations with BMW.

When it comes to business with BMW, the potential is analysed within BMW AG and contacts are made with the relevant specialist departments on behalf of the partners. Co-marketing, on the other hand, compares the interests of the partner with those of BMW and initiates possible joint marketing projects. All the communications threads concerning the BMW Sauber F1 Team project are pulled together in the Business Relations department. This is also home to the reciprocal services offered to the sponsors, which include advertising rights and branding. These ensure the global spread of the partner brands. Beyond this, there are numerous incentives to choose from in connection with the grand prix appearances of the BMW Sauber F1 Team. Partners can attend the team's test sessions or get to know drivers and team managers at "meet and greet" events. The BMW Sauber F1 Team also lends a unique flair to partner events away from the race track. Whether it be a visit to the wind tunnel in Hinwil, taking part in BMW Driver Training or exhibiting one of the BMW Sauber F1 Team's race cars at a partner event – the possibilities of joint events are virtually unlimited.

Service.

The BMW Sauber F1 Team guarantees all its partners a comprehensive range of services. Thus a Sponsoring Services Manager is allocated to each partner. He or she is their personal representative, ensuring that the contractually agreed services are carried out and providing data and information on the particular partnership. In addition, sponsors may use royalty-free photos and video footage of the BMW Sauber F1 Team for their own communications. Sponsors can access all media and market analyses online from specially constructed databases. Regular workshops, finally, allow partners and representatives of the BMW Sauber F1 Team to compare notes and discuss current issues relating to every aspect of sponsoring. These wide-ranging services ensure that partners of the BMW Sauber F1 Team are always in pole position.

7. The history.

7.1 BMW Motorsport.



Sports is the agenda.

BMW has scored racing successes around the globe with its motorcycles, touring and sports cars, at rallies, in Formula 2 and in Formula One. Yet never has the company lost sight of the importance of promoting young racing talent. Innovative technology for sporting competitions and record-breaking attempts have been an integral aspect of the BMW identity since the company's fledgling years. It has defined BMW production cars – and made motor sport history.

The beginnings – BMW's aircraft propeller touches down.

The stylised propeller in the BMW logo recalls the world records achieved with aircraft engines early on in the company's history. Following numerous championship titles won on motorcycles, BMW also began to make a name for itself in car racing. In 1940 it claimed a one-two result with the BMW 328 in Italy's legendary Mille Miglia road race. The post-war years in Germany initially saw touring car racing take a back seat while motorcycle racer and record-breaker, Schorsch Meier, rose to folk hero status on BMW Boxer bikes. It was with its Boxer engines, too, that BMW collected 19 World Championship titles in sidecar racing between 1953 and 1973.

Touring cars – a key pillar of BMW motorsport.

In the 1960s, touring car racing became the central pillar of BMW's motorsport activities. Hans Stuck Senior, at the wheel of a BMW 700, took the German Championship title in 1960. In 1964, Hubert Hahne drove the BMW 1800Ti to victory in the German Circuit Championship. Following the launch of the BMW 2000Ti, Josef Schnitzer carried off the German Touring Car Championship two years later. The BMW 2002 in which Dieter Quester claimed the European Touring Car Championship in 1968 and 1969 marked the first use of a turbocharger, and between 1973 and 1979, another six European Touring Car Championship titles were taken with the BMW 3.0 CSL. Formula One greats such as Chris Amon, Ronnie Peterson and Niki Lauda drove BMW touring cars. At the wheel of the BMW 320 fielded by the Schnitzer Team, Harald Ertl won the German Motor Racing Championship in 1978.

In the mid-1980s, the impressive BMW 635 CSi Coupé was the force to be reckoned with in the European Touring Car Championship. Following individual race wins in 1985, Italian driver Roberto Ravaglia secured the

European Championship in 1986. 1987 saw the slim-line, earthy successor to the 6 Series Coupé lining up on the grid: the BMW M3 was a driving machine with a 2.5-litre power unit that packed 355 bhp. In its first year on the race track, BMW managed to take the World Championship title (Ravaglia), the European Championship (Winni Vogt) and nine further titles. The M3 became legendary, whether competing in the Asia-Pacific Championship, the European Hill-Climb Championship or in rally events. By the end of 1992, BMW M3 drivers had secured more than 1,500 individual wins and over 50 international titles.

Super touring cars – stars of the 1990s.

For the introduction of a new category of near-production touring cars – initially known as Class 2 or the two-litre class, later Super Touring Cars or STC for short – BMW set about building another superlative touring car: the BMW 320i. From 1993 through to 1998, this 320i (E36) won BMW 29 championship titles around the world, including three in Germany.

Revival of the European Touring Car Championship.

After a gap of 13 years, the FIA once again gave its sanction to the European Championship in 2001. BMW followed developments with great interest and made its mark on the series. Peter Kox (NL) immediately took the 21st European Touring Car Championship title in 2001, driving a BMW 320i fielded by Ravaglia Motorsport. From 2002 onwards, the European Touring Car Championship (ETCC) was a firm fixture of BMW's motor racing agenda, though not as a traditional factory involvement: the competitors were backed by various national subsidiaries, which put up to five country teams on the grid. In 2002, BMW Team Deutschland (Schnitzer-Motorsport) fared best of all with BMW works drivers Jörg Müller and Dirk Müller finishing second and fourth in the European Championship, while BMW came runner-up in the manufacturers' standings.

In 2003, BMW managed to secure the Manufacturers' title in the penultimate race. In the battle for the Drivers' title, Jörg Müller had to concede defeat just one point short of the winner's score. BMW again took the Manufacturers' title before the close of the 2004 season. This time the Driver's Championship also went to BMW courtesy of Andy Priaulx (GB), bringing BMW's total of European titles in touring car racing to 24.

BMW world touring car champions again in 2005, 2006 and 2007.

2005 saw the staging of another world championship in touring car racing for the first time since 1987. The FIA World Touring Car Championship (WTCC) was launched to replace the ETCC. In 1987 the winner was Roberto Ravaglia in

a BMW. In 2005, 2006 and 2007, Andy Priaulx of BMW Team UK/RBM took the World Championship title, driving a BMW 320i in 2005 and the new BMW 320si WTCC in 2006 and 2007. Thanks to the strong performance of the other national teams, BMW also secured the Manufacturers' World Championship in all three years. BMW ended the 2008 WTCC season without a title for the first time.

Marathon men – Nürburgring, Spa and Le Mans.

BMW is by far the most successful marque in the 24 Hour Race on the Nordschleife. In 1970, when the event was first launched, Hans-Joachim Stuck was part of the winning team, as he was in 1998 when BMW became the first manufacturer to win a marathon of this kind with a diesel-powered car. In 2004 too, Stuck was on board the M3 GTR with which BMW claimed its 17th overall victory in the "Green Hell". In 2005 the BMW M3 GTRs scored an 18th overall victory with a second consecutive one-two finish. In the Spa-Francorchamps 24 Hours, meanwhile, BMW touring cars managed to collect 21 wins by the end of the 1998 season.

On 13th June 1999, BMW took its first overall victory in the Le Mans 24 Hours, beating one of the strongest fields of starters in the history of this classic marathon. After the closed-top McLaren F1 GTR sports car driven by the BMW V12-cylinder had won the event back in 1995, 1999 saw the celebration of the first victory in an open-topped car with a later evolution of the engine. The winners, Joachim Winkelhock (DE), Pierluigi Martini (IT) and Yannick Dalmas (FR), had completed 366 laps of 13.6 kilometres each in the BMW V12 LMR. Back in the BMW pit garage it was celebrations all round, along with a good deal of commiseration: after 18 hours in the lead, the second BMW V12 LMR with Tom Kristensen (DK), JJ Lehto (FI) and Jörg Müller (DE) was forced to abandon the race with just four hours to go following an accident.

Sports cars in Europe and overseas.

What had begun in the mid-1990s with the McLaren F1 GTR and its BMW twelve-cylinder engine was to continue in 1999 with the BMW V12 LMR. If the FIA GT Championship was the arena for the successful factory deployment of the closed racer (runner-up in the 1997 championship), it was the American Le Mans Series (ALMS) that became the stomping ground of the BMW V12 LMR. With its uprated 580 bhp six-cylinder V12, it scored six wins in the ALMS in 1999 and 2000.

In 2001, BMW switched from the Prototype to the GT Class of the ALMS. Under the management of Charly Lamm, as before, the muscly BMW M3 GTR swept the board in all disciplines. BMW works driver Jörg Müller won the

Drivers' title, BMW Motorsport came top of the team classification and BMW took the Manufacturers' Championship in the company's most important export market.

Early talent promotion in and around Formula racing.

In the period from 1973 to 1982, the BMW four-cylinder engine was the benchmark for the Formula 2 junior league. Jean-Pierre Jarier became champion in 1973, Patrick Depailler in '74, Jacques Laffite in '75, Bruno Giacomelli in '78, Marc Surer in '79 and Corrado Fabi in '82. All of them later made the leap into Formula One, where Formula 2 was usually held as part of the support programme.

BMW implemented a new concept in 1979 and 1980 which was similarly tied to the grand prix events: the Procar Series. In this high-class, one-make series featuring the fast BMW M1 road-going sports car, talented juniors regularly pitted their skills against the top five qualifiers from Formula One. The BMW Junior Team (Eddie Cheever, Marc Surer and Manfred Winkelhock) made a name for themselves in the late 1970s as the "Wilde Reiter GmbH" (Wild Riders Ltd).

Formula BMW – today's benchmark for junior talent promotion.

1991 saw the launch of a joint talent promotion scheme in Formula racing run by BMW and the ADAC. It was here that Formula One drivers such as Ralf Schumacher, Nico Rosberg, Timo Glock, Sebastian Vettel, Adrian Sutil and Christian Klien learnt the fundamentals of Formula racing. From 1998 to 2001, the series comprised two racing categories. In 2002, radical changes were implemented and the new Formula BMW vehicle made its debut. A small Formula racing car with an ultramodern carbon-fibre monocoque, it matches Formula One standards in several respects, is propelled by a 140 bhp BMW motorcycle engine and sets standards in terms of safety. This junior class provides an opening for talented young kart racers, some as young as 15, who are taken through a comprehensive training course. The coaching programme includes driving technique and strategy, vehicle dynamics and chassis set-up, fitness training and nutrition, media and PR, as well as sponsoring and sports management.

The most promising young drivers, along with the best rookie of the previous year, are each granted a scholarship. In Germany's Formula BMW ADAC Championship alone this is worth 50,000 euros per scholarship driver.

Since then, the Formula BMW concept has gone global. 2003 saw the introduction of Formula BMW Asia, to which was added the Formula BMW UK Championship and Formula BMW USA in 2004. All of the series, except the UK, ran races as part of the F1 grand prix support programme. Since 2005 the season has culminated in the Formula BMW World Final, an international race-off for the various series. The winners earn themselves a test in a BMW Sauber F1 Team Formula One car. 2008 saw the launch of Formula BMW Europe, which replaced the German and British series. Most of the races in the new series take place on the support programme for the European Formula One races.

Formula One with sheer power.

On 24th April 1980, BMW announced the company's first foray into Formula One as an engine supplier. Paul Rosche took a four-cylinder production engine block and rebuilt it to create a 16-valve unit reduced in size to 1.5 litres. Running on a special fuel mixture, and with the help of an exhaust gas turbocharger, the unit started with an output 650 bhp. Later this was increased to reach 1,400 bhp.

On 23rd January 1982, Nelson Piquet and Riccardo Patrese entered the season's first race at Kyalami in a Brabham BMW from the front row of the grid. However, both had to retire early due to an accident and loss of oil respectively.

On 9th May 1982, in the fifth race for the new engine, Piquet picked up the first World Championship points when he finished fifth in the Belgian GP. The Brazilian claimed his first win on 13th June of the same year in Montreal and his first pole position on 15th August in Zeltweg, Austria.

For the 1983 World Championship, Brabham's designer Gordon Murray had managed to respond with remarkable speed to new technical regulations. BMW's turbo power, moreover, had been given a further boost, and Piquet won the season's curtain raiser in São Paulo. Apart from Piquet and Patrese, this was the first time a third BMW turbo driver appeared in the race: Manfred Winkelhock in an ATS BMW.

World Championship after 630 days.

The 1983 season proved to be a nailbiter. It took twelve races and exactly half a year before Piquet carried off another win. But in the meantime he managed to hold his nerve and was busy scoring points. The team perfected Murray's idea of the "planned pit stop" – the designer with the hippyish looks knew how to clock improved lap times on a reduced fuel load. Piquet managed to pick up wins in Monza and Brands Hatch, and at the final in Kyalami a third-placed

finish was enough to secure the World Championship title. It was exactly 630 days since the BMW engine had premiered on the race track.

In 1984, Piquet ended the World Championship in fifth place. Also competing for Brabham during that season were Manfred Winkelhock and the Fabi brothers, Teo and Corrado. Gerhard Berger made his Formula One debut in an ATS BMW. 1985 saw Berger driving an Arrows BMW alongside Thierry Boutsen. The best-placed BMW driver was again Piquet in a Brabham BMW, who finished eighth in the World Championship. In 1986, Berger was to replace him as the best-placed BMW-powered competitor: the Austrian driver came seventh in the World Championship. In Mexico he took the final win for the BMW four-cylinder in a Benetton. At the end of 1987, construction of these BMW F1 engines was halted – the turbo era of Formula One was over.

Gearing up for a Formula One comeback.

On 8th September 1997, BMW announced at the Frankfurt Motor Show (IAA) that, following a twelve-year absence, it would be returning to Formula One in 2000 in partnership with WilliamsF1.

Paul Rosche designed the first BMW Formula One V10-cylinder unit of the new era and oversaw the building of the new engine factory in Munich, which was erected close to BMW's Research and Innovation Centre (FIZ).

On 1st October 1998, Gerhard Berger took up his post as BMW Motorsport Director. In April 1999, engineering expert Dr Mario Theissen joined him as the second BMW Motorsport Director. In December 1998, BMW signed up Jörg Müller as a Formula One test driver. By the summer of 1999, the team had swelled to almost 200. Rosche, who had built BMW racing engines for 42 years, retired at the end of 1999. Starting at 9.26 hrs on 27th April 1999, BMW began its first track test of the Formula One engine, initially at the company's own test site in Miramas, France. A 1998 chassis from WilliamsF1 served as a test bed, and Müller was behind the wheel. The start of the official FIA testing on 1st December 1999 in Jerez marked the beginning of the BMW WilliamsF1 Team story.

Accelerating out of the blocks.

The joint venture of BMW and WilliamsF1 kicked off with a sensation: on 12th March 2000 in Australia, Ralf Schumacher ended the first grand prix of the German-British partnership in third place, making it the most successful Formula One debut of an engine manufacturer since 1967. Extreme reliability and unstinting development work were the hallmarks of the season.

Schumacher and the young British driver Jenson Button made it into the points 14 times. Schumacher climbed onto the podium three times, and the BMW WilliamsF1 Team claimed 36 points in its debut season to finish third in the Constructors' Championship.

A winning team by season 2001.

In 2001 the team exceeded its own expectations. Nobody had reckoned on four superior wins. Ralf Schumacher and his Colombian team-mate Juan Pablo Montoya were now up among the front-runners, claiming nine podium finishes between them. With a tally of 80 points, the BMW Williams F1 Team made its mark by claiming third place among the leading teams.

World Championship runner-up in year three.

In the third year of the partnership, the team achieved the next stage of its goal: second place in the Constructors' World Championship. McLaren-Mercedes had been outflanked, but Ferrari's superiority was almost overwhelming. By season's end the Italian World Champions had 221 points – as many as all the other teams put together.

Schumacher and Montoya celebrated their first one-two result in Malaysia, followed by a further eleven podium places. In the 16th of 17 GPs, the team secured an early second place in the World Championship. Montoya's seven pole positions also commanded respect in 2002. During qualifying at Monza, the Colombian smashed a 17-year record when he clocked the fastest average lap speed ever achieved in an F1 racing car. The BMW WilliamsF1 Team, moreover, claimed top honours in the reliability league by completing more race laps than any other team.

2003 title chances up to the final.

The FW25 was an innovative new development. A shortened wheelbase was the main reason why the team had to abandon all its previous data. Despite disappointing tests, faith in the new concept remained unbroken. A concerted effort under the pressure of the ongoing season shaped the FW25 into a winning car. In Monaco the racer powered by the BMW P83 engine proved invincible: Schumacher took pole while Montoya won the prestigious grand prix event. Canada saw both drivers up on the podium, while on the Nürburgring and in Magny-Cours they carried off one-two results, and in Hockenheim Montoya won with more than 65 seconds to spare.

With a four-point lead in the Constructors' Championship, the team headed off for the two final GPs in the USA and Japan. Although the BMW P83 engine reached a speed of 19,200 rpm, a penalty and a heavy downpour in

Indianapolis put paid to Montoya's chances of winning the title. In Japan, the second retirement of the season due to a technical fault put him out of the race from the lead and also buried all hopes of winning the Constructors' title. Even so, with a final score of 144 points this was a clear improvement on the previous year's result. In 2002, 92 World Championship points had sufficed to place the team second in the Constructors' World Championship.

Below par for the first time in 2004.

After the BMW WilliamsF1 Team had consistently exceeded its targets for four years, it fell short of expectations for the first time in 2004. The FW26 with its new aerodynamic concept and striking nose cone had given rise to great hopes during winter testing, but in the first races it soon became clear that the design drawbacks outweighed the benefits identified during simulation tests.

The low point of the season came with the Canadian and US GPs. In Montreal both drivers were disqualified. In Indianapolis, Montoya was disqualified and Schumacher had a serious accident, forcing him to drop out of six GPs while Marc Gené and Antonio Pizzonia took over.

Not until the second half of the season did things start looking up again thanks to a radically modified chassis. The Italian GP also saw the final evolutionary stage of the BMW P84 engine introduced, which made an instant impact by claiming two world records: in prequalifying, Montoya achieved the highest ever average speed in F1 at 262.242 km/h. In the race, Pizzonia recorded a top speed of 369.9 km/h. Montoya's win in the final in Brazil brought a consolatory end to the season.

Finale and new beginning.

2005 turned out to be the second difficult season in succession: the FW27 proved uncompetitive. The BMW WilliamsF1 Team failed to win any races and dropped to fifth place in the Constructors' Championship. The highlights of the season were the races in Monaco and at the Nürburgring. In the Mediterranean principality, German driver Nick Heidfeld and his Australian team-mate Mark Webber stepped onto the podium in second and third places. In the Eifel a week later, Heidfeld took the team's only pole position and again finished second. Prior to that, Heidfeld had claimed a third-placed finish in Malaysia.

The sixth season together, and the longest in F1 history with 19 grands prix, marked the end of the partnership with WilliamsF1. The final tally after the six years from 2000 until 2005: ten wins, three of them one-two finishes, a total of 45 podium places and 17 pole positions in 104 races.

BMW took over the Swiss Sauber Team in mid-2005 and ran its own F1 team in 2006. The new BMW Sauber F1 Team made it into fifth place in its debut season, helped by two podium places – one by Heidfeld, the other by young Polish driver Robert Kubica. A BMW Sauber F1.06 made it into the points a total of 15 times. 2007 saw the young team exceed all expectations in establishing itself as consistently the third-fastest outfit on the World Championship grid. Heidfeld and Kubica made it into the top ten qualifying shootout at every one of the season's grands prix, and on each occasion at least one of the drivers picked up points on race day. Another two podium finishes – one second and one third place courtesy of Heidfeld – were among the highlights of the season. The exclusion of the McLaren Mercedes team from the Constructors' World Championship allowed the BMW Sauber F1 Team to finish its second season – also its second development year – as high as second in the standings.

In 2008 the team again met its ambitious goals. The target was a first race win, which turned out to be a one-two: Kubica won the Canadian Grand Prix ahead of Heidfeld. In total, the BMW Sauber F1 Team claimed eleven podium places. Kubica secured his first pole position in Bahrain, while Heidfeld added to the statistics with the first two fastest race laps. The team proved to be the most reliable of all, making it through all 18 GPs without any technical faults, as well as clocking the fastest pit stops. They finished third in the World Championship with 135 points.

BMW chronology of success.

- | | |
|------------|--|
| 17.6.1919 | BMW's first world record – flying a plane powered by a BMW six-cylinder, Zeno Diemer reaches an altitude of 9,760 metres or 32,013 feet. |
| 1925–1926 | The BMW R37 motorcycle claims more than 200 wins and two German championships. |
| 28.11.1937 | World motorcycle speed record – riding a BMW, Ernst Jakob Henne reaches a speed of 279.5 km/h (173.29 mph) on an autobahn near Frankfurt. |
| 1936–1953 | Schorsch Meier wins seven motorcycle championships on a BMW boxer. |
| 1940 | The BMW 328 finishes 1 st , 2 nd , 4 th and 5 th in the Mille Miglia road race in Italy. |
| 1954–1973 | Winning sidecars: racing boxer motorcycles with fuel injection, BMW wins 19 World Championships in motorcycle sidecar racing. |
| 1960 | Hans Stuck senior wins the German Hill-Climb Championship in a BMW 700. |
| 1964 | Hubert Hahne wins the German Circuit Championship in a BMW 1800Ti. |
| 1966 | Josef Schnitzer wins the German Touring Car Championship at the wheel of a BMW 2000Ti;
racing a BMW 2000Ti, Hubert Hahne becomes the first driver to lap the north circuit of the Nürburgring (22.835 km/14.16 miles) in less than ten minutes; his exact time is 9:58.5 min. |
| 1968 | The radial four-valve power unit named after BMW designer Karl Apfelbeck makes its debut in Formula 2 and in the BMW Monti.
Running on nitromethane, the engine sets up no fewer than eight world records;
Dieter Quester driving a BMW 2002 wins the European Touring Car Championship. |
| 1969 | Dieter Quester again wins the European Touring Car Championship at the wheel of a BMW 2002 powered for the first time by a turbocharged engine. |
| 1970 | Hans-Joachim Stuck wins the 24 Hours of the Nürburgring at the wheel of a BMW 2002Ti;
BMW's 1600 cc Formula 2 engine scores its first victory in Salzburg, with Jacky Ickx at the wheel. |

1973	Toine Hezemans wins the European Touring Car Championship in a BMW 3.0 CSL; Achim Warmbold/Jean Todt win the Austrian Alpine Race for the World Rally Championship, driving a BMW 2002.
1973–1982	Six drivers win the European Formula 2 Championship with BMW four-cylinder power: Jean-Pierre Jarier (1973), Patrick Depailler (1974), Jacques Laffite (1975), Bruno Giacomelli (1978), Marc Surer (1979), Corrado Fabi (1982).
1974	Hans-Joachim Stuck sets up a new lap record at the Nürburgring with a BMW 3.0 CSL – 8:09.6.
1977	The BMW Junior Team – Eddie Cheever, Marc Surer and Manfred Winkelhock – make their debut in the BMW 320.
1978	Driving for Team Schnitzer, Harald Ertl wins the German Motor Racing Championship at the wheel of a BMW 320 Turbo.
up to 1979	The BMW 3.0 CSL wins a total of six European championships.
1979–1980	Formula One and touring car drivers contest the Procar Series at grand prix events, introducing a top-class brand trophy featuring the BMW M1 sports car.
1980–2004	BMW Team Schnitzer score ten wins in the Macau Touring Car Race: 1980, 1981, 1983, 1987, 1988, 1991, 1992, 1994, 1998, 2004.
1980	Siegfried Müller jun, Team Eggenberger, wins the European Touring Car Championship in a BMW 635 CSi.
1981	Helmut Kelleners/Umberto Grano bring home the European Touring Car Championship in a BMW 635 CSi; Hubert Auriol riding a BMW R80 wins the motorcycle category in the Paris-Dakar Rally.
1982	Piquet and Riccardo Patrese at the wheel, score their first Formula One points on 9 th May in Zolder at the Belgian Grand Prix (Piquet finishing 5 th); first GP wins in Montreal on 13 th June in the Canadian GP (fifth race, Piquet); first pole position in Zeltweg on 15 th August, in the Austrian GP (Piquet).
1983	Nelson Piquet wins the Drivers' Formula One World Championship at the wheel of a Brabham BMW; first appearance of the BMW Formula One engine with the ATS Team (Manfred Winkelhock).

- 1983 Dieter Quester, Team Schnitzer, wins the European Touring Car Championship in a BMW 635 CSi;
Hubert Auriol riding a BMW R80 wins the motorcycle category in the Paris-Dakar Rally.
- 1984 Volker Strycek, Team Gubin, wins the German Touring Car Championship (DTM) at the wheel of a BMW 635 CSi;
Nelson Piquet finishes 5th in the Formula One World Championship in a Brabham BMW;
Teo Fabi, Corrado Fabi, and Manfred Winkelhock also drive a Brabham BMW; Gerhard Berger and Manfred Winkelhock drive an ATS BMW;
Gaston Rahier wins the motorcycle category of the Paris–Dakar Rally on a BMW R80.
- 1985 Nelson Piquet finishes 8th in the Formula One World Championship at the wheel of a Brabham BMW;
François Hesnault and Marc Surer drive a Brabham BMW,
Gerhard Berger and Thierry Boutsen drive an Arrows BMW;
Gaston Rahier wins the motorcycle category of the Paris–Dakar Rally on a BMW R80.
- 1985–1995 BMW Team Schnitzer wins the 24 Hours of Spa-Francorchamps no fewer than five times: 1985, 1986, 1988, 1990, 1995.
- 1986 BMW supplies engines to the Brabham (Riccardo Patrese, Elio de Angelis, Derek Warwick), Arrows (Marc Surer, Thierry Boutsen, Christian Danner), and Benetton (Gerhard Berger, Teo Fabi) Formula One teams;
Berger brings home the last grand prix win for a BMW 1.5-litre four-cylinder turbo in Mexico and finishes 7th in the World Championship;
Roberto Ravaglia, Team Schnitzer, wins the European Touring Car Championship in a BMW 635 CSi.
- 1987 Roberto Ravaglia, BMW M Team, wins the World Touring Car Championship in a BMW M3;
Winni Vogt, BMW M Team, wins the European Touring Car Championship in a BMW M3;
Eric van de Poele, BMW Junior Team, wins the German Touring Car Championship (DTM);
the BMW M3 wins the FIA Manufacturers' Trophy for Group A cars in the European Hill-Climb Championship;
Helmut König wins the Austrian Touring Car Championship in a BMW M3;
Per Gunnar Andersson wins the Swedish Touring Car Championship in a BMW M3;
Hansueli Ulrich wins the Swiss Touring Car Championship in a BMW M3.

- 1987 Bernard Beguin/Jean-Jacques Lenne, Team ProDrive, win the Corsica race for the World Rally Championship in a BMW M3;
Jose Maria Ponce/Jose Carlos Deniz win the Spanish Rally Championship in a BMW M3;
Xavier Riera wins the Spanish Touring Car Hill-Climb Championship in a BMW M3;
Matthias Moosleitner/Margit Tüchler win the Mitropa Rally Cup in a BMW M3;
Brabham (Riccardo Patrese, Andrea de Cesaris, Stefano Modena) still uses BMW engines in the Formula One World Championship; by the end of the turbo era, BMW engines look back at 91 starts, nine wins and 15 pole positions.
- 1988 Roberto Ravaglia, Team Schnitzer, wins the European Touring Car Championship in a BMW M3;
Trevor Crowe wins the Asian-Pacific Championship in a BMW M3;
Francis Dosierès wins the European Touring Car Hill-Climb Championship in a BMW M3;
Jim Richards wins the Australian Touring Car Championship in a BMW M3;
Fabien Giroix wins the French Touring Car Championship in a BMW M3;
Mika Arpiainen wins the Finnish Touring Car Championship in a BMW M3;
Arthur van Dedem wins the Dutch Touring Car Championship in a BMW M3;
'Pequepe' wins the Portuguese Touring Car Championship in a BMW M3.
- 1989 Roberto Ravaglia, Team Schnitzer, wins the German Touring Car Championship (DTM) in a BMW M3;
Johnny Cecotto wins the Italian Touring Car Championship in a BMW M3;
Frank Sytner wins the English Touring Car Championship in a BMW M3;
Harri Toivonen/Heikki Salmenautio win the Finnish Touring Car Championship in a BMW M3;
Jean Pierre Malcher wins the French Touring Car Championship in a BMW M3;
Arthur van Dedem wins the Dutch Touring Car Championship in a BMW M3;
"Pequepe" wins the Portuguese Touring Car Championship in a BMW M3;
Lennart Bohlin wins the Swedish Touring Car Championship in a BMW M3;
Marc Duez/Alain Lopes win the Belgian Rally Championship in a BMW M3.

- 1989 François Chatriot/Michel Perin win the French Rally Championship in a BMW M3;
Giuseppe Zarpellon wins the Italian Hill-Climb Championship in a BMW M3.
- 1990 Roberto Ravaglia, Team Schnitzer, wins the Italian Touring Car Championship in a BMW M3;
Jean-Michel Martin wins the Belgian Touring Car Championship in a BMW M3;
Heikki Salmenautio wins the Finnish Touring Car Championship in a BMW M3;
Per Gunnar Andersson wins the Swedish Touring Car Championship in a BMW M3;
Josep Bassas/Antonio Rodrigues win the Spanish Rally Championship in a BMW M3;
Xavier Riera wins the Spanish Touring Car Hill-Climb Championship in a BMW M3.
- 1991 Will Hoy wins the British Touring Car Championship in a BMW M3;
Tony Longhurst wins the Australian Amscar Series in a BMW M3;
Jean-Pierre Malcher wins the French Touring Car Championship in a BMW M3;
Roberto Ravaglia wins the Italian Touring Car Championship in a BMW M3;
Cor Euser wins the Dutch Touring Car Championship in a BMW M3;
Francis Dosierès wins the French Touring Car Hill-Climb Championship in a BMW M3;
Hansueli Ulrich wins the Swiss Touring Car Championship in a BMW M3;
Peter Zakowski wins the Private Drivers' category in the German Touring Car Championship (DTM) in a BMW M3;
Formula Junior, BMW's and ADAC's joint talent programme, enters its first season.
- 1992 Johnny Cecotto, Team Fina Motorsport, finishes 4th in the German Touring Car Championship (DTM) in a BMW M3;
Team Bigazzi wins the 24 Hours of Spa with a BMW 320i.
- 1993 Johnny Cecotto, Team Warthofer, wins the ADAC GT Cup in a BMW M3 GTR;
Joachim Winkelhock, Team Schnitzer, wins the British Touring Car Championship in a BMW 318i.
- 1994 Johnny Cecotto, Team Warthofer, wins the ADAC Touring Car Cup in a BMW 320i;
Joachim Winkelhock, Team Schnitzer, wins the Asian-Pacific Championship in a BMW 318is.

- 1994 Tony Longhurst wins the Australian Touring Car Championship in a BMW 318i;
Thierry Tassin, Team Valier, wins the Belgian Touring Car Championship in a BMW 318is;
Shaun van der Linde wins the South African Touring Car Championship in a BMW 318is;
Roberto Ravaglia/Alexander Burgstaller/Thierry Tassin, Team Bigazzi, win the 24 Hours of Spa in a BMW 320i.
- 1995 Joachim Winkelhock, Team Schnitzer, wins the ADAC Super Touring Car Cup in a BMW 320i;
Steve Soper, Team Schnitzer, wins the Japanese Touring Car Championship in a BMW 320i;
Paul Morris wins the Australian Touring Car Championship in a BMW 318i;
Thierry Tassin wins the Belgian Touring Car Championship in a BMW 318is;
Yvan Muller, Team Oreca, wins the French Touring Car Championship in a BMW 318is;
Per Gunnar Andersson wins the Scandinavian Touring Car Championship in a BMW 318is;
JJ Lehto/Yannick Dalmas/Masanori Sekiya win the 24 Hours of Le Mans in a BMW V12-powered McLaren Formula One GTR;
Roberto Ravaglia/Alexander Burgstaller/Marc Duez, Team Bigazzi, win the 24 Hours of the Nürburgring in a BMW 320i;
Joachim Winkelhock/Steve Soper/Peter Kox, Team Schnitzer, win the 24 Hours of Spa in a BMW 318is.
- 1996 Eric Cayrolle wins the French Touring Car Championship in a BMW 318is;
Alexander Burgstaller/Thierry Tassin/Jörg Müller, Team Fina Bastos, win the 24 Hours of Spa in a BMW 318is.
- 1997 The BMW 320i wins the FIA Touring Car World Cup;
Paul Morris wins the Australian Touring Car Championship in a BMW 320i;
Didier de Radiguès wins the Belgian Touring Car Championship in a BMW 320i;
Heikki Salmenautio wins the Finnish Touring Car Championship in a BMW 320i;
Eric Cayrolle wins the French Touring Car Championship in a BMW 320i;
Emanuele Naspetti wins the Italian Touring Car Championship in a BMW 320i;
Duncan Huisman wins the Dutch Touring Car Championship in a BMW 320i;
Craig Baird wins the New Zealand Touring Car Championship in a BMW 320.

- 1997
- Oscar Larrauri wins the South American Touring Car Championship in a BMW 318is;
Charles Kwan wins the South-East-Asian Touring Car Championship in a BMW 320i;
Bill Auberlen, Tom Milner Racing, wins the Exxon Supreme GT Series Drivers' and Manufacturers' Championship, GT3 Class, in a BMW M3;
- Didier de Radiguès/Eric Hélary/Marc Duez, Team Fina Bastos, win the 24 Hours of Spa in a BMW 320is;
Steve Soper, Team Bigazzi, wins the Macau Touring Car Race in a BMW 320i;
Sabine Reck/Johannes Scheid/Peter Zakowski, Team Scheid, win the 24 Hours of the Nürburgring in a BMW M3;
Geoff and David Brabham win the Bathurst 1000 in a BMW 320i;
JJ Lehto/Steve Soper, Team BMW Motorsport, finish 2nd in the FIA GT Championship in a McLaren BMW;
Jean Marc Gounon/Anders Olofsson/Pierre-Henri Raphanel, Gulf Team Davidoff, Peter Kox/Roberto Ravaglia/Eric Hélary, Team BMW Motorsport, finish 2nd and 3rd in the 24 Hours of Le Mans in a McLaren BMW (McLaren Formula One GTR with a BMW V12);
Joachim Winkelhock, BMW Team Bigazzi, finishes 2nd in the ADAC Super Touring Car Cup in a BMW 320i.
- 1998
- Johnny Cecotto, BMW Motorsport Team Schnitzer, wins the German Super Touring Car Championship (STW) in a BMW 320i;
Fredrik Ekblom, BMW Dealer Team, wins the Swedish Touring Car Championship in a BMW 320i;
Charles Kwan, Team EKS Motorsport, wins the South-East-Asian Touring Car Championship in a BMW 320i;
Eric Cayrolle, Team Sda, wins the French Touring Car Championship in a BMW 320i;
Oscar Larrauri, Team Proas, wins the South American Touring Car Championship in a BMW 320i;
Sinisa Kosutic, Team Valier, wins the Croatian Touring Car Championship in a BMW 320i;
Arto Salmenautio, OS Motorsport, wins the Finnish Sport 2000 Touring Car Championship in a BMW 320i;
Brett Riley wins the New Zealand Touring Car Championship in a BMW 320i;
Luca Capellari, Team Duller, wins the International Group N above 3000 cc in a BMW M3;
Cameron McLean wins the Private Drivers' category in the Australian Touring Car Championship in a BMW 320i;
Mark Peters wins the Private Drivers' category in the Bankfin Touring Car Championship South Africa in a BMW 318is.

- 1998
- Thomas Winkelhock, Brinkmann Motorsport, wins the German Touring Car Challenge in a BMW 320i;
Sabine Reck/Johannes Scheid, Team Scheid, win the German Veedol Nürburgring Endurance Trophy in a BMW M3;
Mark Simo, PTG M3 Team, wins the Drivers', Constructors' and Team categories in the US Professional Sports Car Series in a BMW M3 GT3;
Ross Bentley, PTG M3 Team, wins the Drivers', Constructors' and Team categories in the US Road Racing Championship in a BMW M3 GT3;
Tim Sugden/Steve O'Rourke win the English GT Championship in a BMW V12-powered McLaren Formula One GTR;
Hans-Joachim Stuck/Christian Menzel/Marc Duez/Andreas Bovensiepen, Team Warthofer, win the 24 Hours of the Nürburgring in a BMW 320d;
Bill Auberlen/Marc Duez/Boris Said, PTG M3 Team, win the GT3 Class in the 24 Hours of Daytona in a BMW M3;
Alain Cudini/Marc Duez/Eric van de Poele, Team Juma, win the 24 Hours of Spa in a BMW 320i;
Joachim Winkelhock, Team Schnitzer, wins the Macau Touring Car Race in a BMW 320i;
Markus Moufang/Rüdiger Hähner win the German Rally Challenge in a BMW M3;
Otokar Kramski wins the European Touring Car Hill-Climb Championship in a BMW M3;
Eric Pernot wins the French Touring Car Hill-Climb Championship in a BMW M3.
- 1999
- Yannick Dalmas/Pierluigi Martini/Joachim Winkelhock, BMW Motorsport, win the 24 Hours of Le Mans in a BMW V12 LMR;
Tom Kristensen/JJ Lehto/Jörg Müller, Team BMW Motorsport, win the 12 Hours of Sebring in a BMW V12 LMR;
JJ Lehto/Steve Soper, Team BMW Motorsport, win the Sears Point, Laguna Seca and Las Vegas races for the American Le Mans Series in a BMW V12 LMR;
BMW Team PTG wins the GT Class Team Cup in the American Le Mans Series with a BMW M3;
Cor Euser wins the Dutch Touring Car Championship in a BMW 320i DTC;
Vladimir Soukhov wins the Russian Touring Car Championship in a BMW 320i DTC;
Jason Richards wins the New Zealand Touring Car Championship in a BMW 320i DTC;
Paul Morris wins the Australian Touring Car Championship in a BMW 320i;
Charles Kwan wins the South-East-Asian Touring Car Championship in a BMW 320i.

- 1999
- Kim Esbjug wins the Private Drivers' category in the Swedish Touring Car Championship in a BMW 320i;
Otokar Kramski wins the Czech Touring Car Championship in a BMW M3;
Dagmar Suster wins the Slovenian Touring Car Championship in a BMW M3;
Niko Pulic wins the European Touring Car Hill-Climb Championship in a BMW M3;
Georg Plasa wins the German Touring Car Hill-Climb Championship in a BMW 320i;
Slavko Dekleva wins the Slovenian Touring Car Hill-Climb Championship in a BMW M3;
Eric Pernot wins the French Touring Car Hill-Climb Championship in a BMW M3;
Robert Brooks/Robert Wilson win the International Special Car Series in a BMW M3;
Richard Saint wins the Motorcycle category of the Granada-Dakar Rally on a BMW F 650.
- 2000
- Niko Pulic wins the FIA European Touring Car Hill-Climb Championship, Group A, in a BMW M3;
Franz Tschager wins the FIA Sports Car Hill-Climb Championship in an Osella BMW;
Franz Engstler wins the German Touring Car Challenge in a BMW 320i E46 DTC;
Mikhail Ukhov wins the Russian Touring Car Championship in a BMW 320i E36 DTC;
Duncan Huisman wins the Dutch Touring Car Championship in a BMW 320i E46 DTC;
Jason Richards wins the New Zealand Touring Car Championship in a BMW 320i DTC;
Alessandro Bertei wins the Italian Touring Car Championship, Group N1, in a BMW M3 E36 Group N;
Paolo La Neve wins the Italian Touring Car Championship, Group N2, in a BMW 325i E36 Group N;
Stefano Valli wins the Italian Touring Car Championship, Group N3, in a BMW 320i Group N;
Georg Severich/Luc Pensis win the Touring Car category of the Belgian Championship in a BMW 320i STC;
Xavier Riera Vilarrasa wins the Spanish Hill-Climb Championship in a BMW 320i;
1st, 2nd, 3rd and 4th places in the motorcycle category of the Paris–Dakar-Cairo Rally go to Richard Saint, Oscar Gallardo (both on BMW F 650 RR), Jimmy Lewis (BMW R 900 RR) and Jean Brucy (BMW F 650 RR) respectively; Jimmy Lewis wins the Dubai Rally (BMW R 900 RR).
3rd place FIA Formula One Constructors' World Championship, BMW WilliamsF1 Team, Ralf Schumacher and Jenson Button.

- 2001
- Manufacturers', Team and Drivers' Championship American Le Mans Series, Jörg Müller, Team BMW Motorsport, BMW M3 GTR; Peter Kox, Ravaglia Motorsport, wins the FIA European Super Production Championship in a BMW 320i E46 SPC; Niko Pulic wins the FIA European Hill-Climb Championship for Touring Cars, Group A, in a BMW M3; Franz Tschager wins the FIA European Hill-Climb Championship for Sports Cars in an Osella BMW; Markus Gedlich wins the German Touring Car Challenge in a BMW 320i E46 DTC; Sandor van Es wins the Dutch Touring Car Championship in a BMW 320i E46 DTC; Stefano Valli, wins the Italian Touring Car Championship, Group N1, in a BMW M3; Alessandro Bernasconi wins the Italian Touring Car Championship, Group N2, in a BMW 320i; Yvan Lebon wins the ST class French Super Touring Car Championship in a BMW 320i STC; 3rd place FIA Formula One Constructors' World Championship, BMW WilliamsF1 Team, Ralf Schumacher and Juan Pablo Montoya (four wins, four pole positions).
- 2002
- 2nd place FIA Formula One Constructors' World Championship, BMW WilliamsF1 Team, Juan Pablo Montoya (3rd place) and Ralf Schumacher (4th place), one one-two finish (Schumacher ahead of Montoya in Malaysia), seven pole positions (Montoya); 2nd place Drivers' and Manufacturers' rankings of the FIA European Touring Car Championship (ETCC), BMW Team Germany (Schnitzer-Motorsport), Jörg Müller, BMW 320i; Franz Tschager wins the FIA European Hill-Climb Championship for Sports Cars in an Osella BMW; Duncan Huisman wins the Dutch Touring Car Championship in a BMW 320i; Massimo Pigoli wins the Italian Touring Car Championship (Super Production) in a BMW 320i; Komarov Grigory wins the Russian Touring Car Championship in a BMW 320i; Alberto Cerrai wins the Campionato Italiano Velocità Turismo in a BMW M3; Mario Merten wins the Nürburgring Endurance Championship in a BMW 320i; Herbert Stenger wins the German Hill-Climb Championship in a Stenger BMW; Duncan Huisman wins the Macau Touring Car Race in a BMW 320i.

- 2003
- 2nd place FIA Formula One Constructors' World Championship, BMW WilliamsF1 Team, Juan Pablo Montoya (3rd) and Ralf Schumacher (5th), two one-two finishes (Schumacher ahead of Montoya, European and French GP), two single victories (Montoya, Monaco and Germany), four pole positions (Schumacher three, Montoya one);
- Manufacturers' Championship FIA European Touring Car Championship (ETCC) and 2nd place Drivers' Championship, BMW Team Germany (Schnitzer-Motorsport), Jörg Müller, BMW 320i;
- Claudia Hürtgen wins the German Touring Car Challenge (DTC) in a BMW 320i DTC;
- Mikhail Ukhov wins the Russian Touring Car Championship in a BMW 320i (E46);
- Bill Auberlen wins the Speed World Challenge for Touring Cars in the US in a BMW 325i;
- Herbert Stenger wins the German Hill-Climb Championship, Group CN sports cars, in a Stenger BMW;
- Jörg Weidinger wins the DMSB Mountain Trophy for Touring Cars, Group G, in a BMW 318is;
- Duncan Huisman wins the Macau Touring Car Race in a BMW 320i.
- 2004
- Manufacturers' and Drivers' Championship FIA ETCC, BMW Team Great Britain (RBM), Andy Priaulx, BMW 320i;
- 1st and 2nd place 24 Hours of the Nürburgring, Dirk Müller/Jörg Müller/Hans-Joachim Stuck, Team BMW Motorsport (Schnitzer Motorsport), BMW M3 GTR;
- 4th place FIA Formula One Constructors' World Championship, BMW WilliamsF1 Team, Juan Pablo Montoya (5th), Ralf Schumacher (9th), Antonio Pizzonia (15th), one win (Montoya, Brazil), one pole position (Schumacher, Canada);
- Robert Senkyr wins the FIA European Hill-Climb Championship in a BMW M3;
- Giulio Regosa wins the Category 2 FIA European Hill-Climb Championship in an Osella BMW;
- Dirk Müller/Jörg Müller/Hans-Joachim Stuck, Team BMW Motorsport (Schnitzer Motorsport), win the Group 2 24 Hours of Spa in a BMW M3 GTR;
- Claudia Hürtgen wins the DMSB Production Car Championship in a BMW 320i;
- Richard Göransson wins the Swedish Touring Car Championship in a BMW 320i;
- Casper Elgaard wins the Danish Touring Car Championship in a BMW 320i;
- Patrick Belien wins the Belcar Championship in a BMW M3;
- Grigory Komarov wins the Russian Touring Car Championship in a BMW 320i.

- 2004
- Bill Auberlen wins the Grand Am Rolex Sports Car Series in a GT Class BMW M3 GTR;
Will Turner wins the Speed World Challenge for Touring Cars USA in a BMW 325i;
Alessandro Bernasconi wins the Campionato Italiano Velocita Turismo in a BMW 320i;
Arnd Meier/René Wolff wins the Endurance Championship Nürburgring in a BMW 318ti compact;
Herbert Stenger wins the German Hill-Climb Championship for Racing Cars in a Stenger BMW;
Carlos Hernandez wins the Spanish Hill-Climb Championship in a BMW 320i;
Jörg Müller wins the Touring Car Race in Macau in a BMW 320i.
- 2005
- Manufacturers' and Drivers' Championship FIA WTCC, BMW Team Great Britain (RBM), Andy Priaulx, BMW 320i;
1st and 2nd place 24 Hours of the Nürburgring, Pedro Lamy/Duncan Huisman/Andy Priaulx/Boris Said ahead of Dirk Müller/Jörg Müller/Hans-Joachim Stuck, Team BMW Motorsport (Schnitzer Motorsport), BMW M3 GTR;
5th place FIA Formula One Constructors' World Championship, BMW WilliamsF1 Team, Mark Webber (10th), Nick Heidfeld (11th), Antonio Pizzonia (22nd), four podium places, one pole position (Heidfeld, European GP);
Jörg Weidinger wins the FIA European Hill-Climb Championship in a BMW M3;
Alessandro Zanardi wins the Italian Touring Car Championship in a BMW 320i;
Franz Engstler wins the Asian Touring Car Championship in a BMW 320i;
Vladimir Nechaev wins the Russian Touring Car Championship in a BMW 320i;
Richard Göransson wins the Swedish Touring Car Championship in a BMW 320i;
Richard Göransson wins the European Touring Car Cup in Vallelunga in a BMW 320i;
Casper Elgaard wins the Danish Touring Car Championship in a BMW 320i;
Claudia Hürtgen wins the Endurance Championship Nürburgring in a BMW 320i;
Herbert Stenger wins the German Hill-Climb Championship for Sports Cars in a Stenger BMW.
- 2006
- Manufacturers' and Drivers' Championship FIA WTCC, BMW Team UK/RBM, Andy Priaulx, BMW 320si;
5th place FIA Formula One Constructors' World Championship, BMW Sauber F1 Team, Nick Heidfeld (9th), Jacques Villeneuve (15th), Robert Kubica (16th), two podium places.

- 2006
- Jörg Weidinger wins the FIA European Hill-Climb Championship in a BMW M3;
Franz Engstler wins the Asian Touring Car Championship in a BMW 320i;
Vladimir Labazov wins the Russian Touring Car Championship in a BMW 320i;
Elgaard Casper wins the Danish Touring Car Championship in a BMW 320i;
Marc Hennerici wins the Junior Endurance Championship Nürburgring in a BMW 120d;
Will Turner wins the GrandAm Cup (USA) in a BMW M3;
Duller Motorsport (Hans-Joachim Stuck, Dieter Quester, Philipp Peter, Toto Wolff) win the 24 Hours of Dubai in a BMW M3;
Duller Motorsport (Dirk Werner, Dieter Quester, Jamie Campbell-Walter) win the 24 Hours of Silverstone in a BMW Z4 M Coupé;
Markus Moufang/Hartmut Walch win the HJS Diesel Masters in a BMW 120d;
Bonk-Motorsport (Wolf Silvester/Mario Merten) win the VLN Endurance Championship Nürburgring in a BMW 318is.
- 2007
- Manufacturers' and Drivers' Championship FIA WTCC,
BMW Team UK/RBM, Andy Priaulx, BMW 320si;
2nd place FIA Formula One Constructors' World Championship,
BMW Sauber F1 Team, Nick Heidfeld (5th), Robert Kubica (6th),
two podium places;
Farique Bin Hairuman wins the Asian Touring Car Championship in a BMW 320i;
Alessandro Bernasconi wins the Italian Touring Car Championship (CIT) in a BMW 320i;
Fredrik Eklund wins the Swedish Touring Car Championship (STCC) in a BMW 320si;
Patrick Belien and Dimitri Cuyvers win the Belgian Touring Car Championship (BTCS) in a BMW 120d;
Team Essex tops the team standings in the Danish Touring Car Championship (DTC) with a BMW 320i;
ADAC Procar Manufacturers' and Drivers' Championship,
Engstler Motorsport, Franz Engstler, BMW 320i;
Stian Sørli wins the Junior Endurance Championship Nürburgring (VLN) in a BMW 120d;
Duller Motorsport (Dieter Quester, Philipp Peter, Dirk Werner, Jamie Campbell-Walter) win the 24 Hours of Dubai in a BMW Z4 M Coupé;
Duller Motorsport (Dieter Quester, Dirk Werner, Johannes Stuck, Jamie Campbell-Walter) win the 24 Hours of Silverstone in a BMW Z4 M Coupé.

2008

3rd place FIA Formula One Constructors' World Championship, BMW Sauber F1 Team, Robert Kubica (fourth place), Nick Heidfeld (sixth place), a one-two win, eleven podium places, one pole position, two fastest race laps;

2nd place FIA WTCC Manufacturers' Championship;
1st place Swedish Touring Car Championship, Richard Göransson, BMW 320si;

1st place Danish Touring Car Championship, Jan Magnussen, BMW 320si;

1st place FIA WTCC Independence Trophy, Sergio Hernández, BMW 320si;

1st place Portuguese Touring Car Championship, César Campanico, BMW 320si;

1st place Endurance Championship Nürburgring, Matthias Unger, Alexander Böhm, BMW 325i;

1st place ADAC Rallye Junior Cup, Konstantin Keil, BMW 120d;

1st place Super Taikyu Series Japan, Petronas Syntium Team,

Johan Adzmi, Nobuteru Taniguchi, Tatsuya Kataoka, BMW Z4 Coupé.

7.2 Sauber.

Beetling along.

It all began by chance. Peter Sauber wasn't really interested in motor sport, but a friend persuaded him to have some tuning work done on his VW Beetle. In 1967 Sauber entered a few club races with it, but it was above all his interest in tinkering with cars that was sparked – so strongly, indeed, that in 1970 the qualified electrician decided to set himself up independently as a constructor of open two-seater race cars. He designed the Sauber C1 in the cellar of his parents' house and took the initial letter of his wife Christiane's name as the model designation. In the same year he won the Swiss Championship with the C1, but subsequently only raced on and off.

By the time Sauber strapped on his helmet for the last time in 1973, his focus had already turned entirely to the construction side. The "C" was retained as a trademark, and by 2005 he had got as far as the C24. On linguistic grounds there was no C10 (which sounds odd in German), but along the way appeared a sports car named the C291.

One-two in Le Mans.

The first major successes began in the late 1980s after Sauber had managed to persuade Mercedes to return to international racing. Highlights of the partnership with the Stuttgart carmaker were a one-two finish in the 1989 Le Mans 24 Hours as well as winning the Manufacturers' and Drivers' title twice in the World Sports Car Championship of the time (1989 and 1990).

Among the drivers who earned their racing spurs under Sauber's aegis were three who went on to become Formula One aces: Michael Schumacher, Heinz-Harald Frentzen and Karl Wendlinger.

Sauber began preparations for Formula One in 1991. When the Mercedes-Benz and PP Sauber AG partnership were debating their racing future in the early 1990s with the demise of the World Sports Car Championship in prospect, it was decided over the summer of 1991 to turn Formula One into a joint project. Preparations in Stuttgart and Hinwil were making good progress and initially there seemed no reason not to embark on this new venture. It thus came as a severe blow to Peter Sauber when, in November 1991, the Mercedes executive board decided against a Formula One involvement for the foreseeable future.

Leap into the unknown.

So what was to become of the recently completed high-tech facility in Hinwil, the far-reaching racing expertise and the staff already hired with the Formula One project in mind? In January 1992 Peter Sauber decided to go it alone – albeit with financial and technical support from Mercedes, but at the same time taking on a considerable personal risk.

Nevertheless, on 14th March 1993 two Sauber C12 cars were on the Kyalami grid, as planned, ready for the start of the South African GP. JJ Lehto's fifth-placed finish made it a debut to celebrate. Prior to that, just four teams in the history of Formula One had picked up points in their maiden race.

Contracts with Red Bull and Petronas provided a solid foundation from 1995 on, enabling the Swiss team to establish itself as a firm fixture of Formula One.

2001 – a bumper year.

It took some time for the breakthrough to come, but then in 2001 three highlights in the team's history followed in quick succession: the partnership with the major Swiss bank Credit Suisse, confirmation of fourth place in the Constructors' Championship in mid-October and, a few days later, the groundbreaking ceremony for the company's own wind tunnel.

When Sauber entered Formula One in 1993, it had a workforce of fewer than 70. In 2005, 275 specialists were working exclusively on Formula One at the 6,900-square-metre Hinwil development centre and the adjacent wind tunnel. Moreover, numerous suppliers in the region were benefiting from commissions coming from the racing team. Compared to 1993, the annual budget had grown fourfold within a decade.

From 1993 through to 2005 the Sauber Team entered 216 out of 218 grands prix. The two races they missed were the 1994 Monaco GP, following Karl Wendlinger's serious accident, and the 2000 Brazilian GP, from which the team withdrew for safety reasons after rear wing fractures were found during practice.

Balanced against 257 completed races, 93 of which brought in championship points, there were 169 retirements. Eight of these occurred at such a late stage that the drivers were nevertheless classified – JJ Lehto even coming fourth at Imola in 1993.

Theoretically the total line-up of 17 Sauber drivers should be able to claim a tally of 432 race starts, but they only managed 428 as there were four occasions

when only one driver entered the race. A convalescing Karl Wendlinger missed out on the Spanish GP in 1994, while Johnny Herbert had to watch the restart in Australia in 1996 from the trackside after previously being involved in a pile-up. Gianni Morbidelli missed out on the Japanese GP in 1997 because of a hand injury sustained during practice, and in 2003 Heinz-Harald Frentzen failed to make the restart in Austria due to a clutch failure.

Six podium places.

The team's best results are three third places. On two occasions victory seemed within grasp: at the 1996 Monaco GP, Heinz-Harald Frentzen was in a promising position but ended up in fourth place after colliding with Eddie Irvine's Ferrari while trying to pass him, and later dropping further back on account of two extra pit stops. At the 1999 French Grand Prix, Jean Alesi spun off a wet track and out of the race just before the Safety Car came out.

Statistics (1993 to 2005).

Driver	Grands prix for Sauber	Points for Sauber
JJ Lehto (FI/1993–1994)	18	5
Karl Wendlinger (AT/1993–1995)	25	11
Heinz-Harald Frentzen (DE/1994–1996/2002–2003)	64	42
Andrea De Cesaris (IT/1994)	9	1
Jean-Christophe Boullion (FR/1995)	11	3
Johnny Herbert (GB/1996–1998)	48	20
Nicola Larini (IT/1997)	5	1
Gianni Morbidelli (IT/1997)	7	0
Norberto Fontana (AR/1997)	4	0
Jean Alesi (FR/1998–1999)	32	11
Pedro Diniz (BR/1999–2000)	32	3
Mika Salo (FI/2000)	16	6
Nick Heidfeld (DE/2001–2003)	50	25
Kimi Räikkönen (FI/2001)	17	9
Felipe Massa (BR/2002/2004–2005)	53	27
Giancarlo Fisichella (IT/2004)	18	22
Jacques Villeneuve (CA/2005)	19	9
Total	428	195

Championship points and Constructors' Championship placings.

Season	Grands prix	Points	Position
1993	16	12	7 th
1994	16	12	8 th
1995	17	18	7 th
1996	16	11	7 th
1997	17	16	7 th
1998	16	10	6 th
1999	16	5	8 th
2000	17	6	8 th
2001	17	21	4 th
2002	17	11	5 th
2003	16	19	6 th
2004	18	34	6 th
2005	19	20	8 th
Total	216 (428 starts)	195	

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Media website.

At www.press.bmw-motorsport.com (no password required) you will find:

- all press releases and press kits
- current and archive picture material
- shot lists and order options for TV footage
- radio soundbites

Press mailing list.

Formula One press releases can be sent to you in HTML, PDF or Text Only format. Fax transmission is also an option.

Any requests for changes to the mailing list and address updates should be sent to Heike Hientzsch, bmw@heikehientzsch.de.

Previews are generally sent out on the Friday nine days before a GP. In the case of back-to-back races, they go out on the Sunday evening.

Practice, qualifying and race reports are sent out daily on race weekends around 60 minutes after the final session or the end of the race.

Test reports containing key data are sent out on a daily basis.

Season press kits in English and German are bound and sent out by post. They are available for download in a total of five languages (also including French, Italian and Spanish) at www.press.bmw-motorsport.com.

As well as the media website, two further addresses provide relevant information:

Formula One: www.bmw-sauber-f1.com

Other motor sport involvements: www.bmw-motorsport.com