



Presse-Information

MERCEDES AMG PETRONAS wins 2014 FIA Formula 1 World Constructors Championship*

ebm-papst supports the successful Formula One team starting with the 2014 season

MERCEDES AMG PETRONAS has won the 2014 FIA Formula 1 World Constructors Championship*. Team partner and fan specialist ebm-papst already made its contribution to MERCEDES AMG PETRONAS winning the championship in their very first collaborative Formula One season. By signing with the successful team, ebm-papst became the first major partner to enter Formula One as a direct consequence of the new efficiency based rules introduced for the 2014 season and beyond.

Head of Mercedes-Benz Motorsport, Toto Wolff, commented: "Formula One is the pinnacle of automotive innovation. As such, it has a duty to push the boundaries of technology. The new regulations not only encourage this innovation but also make the sport more relevant to the direction in which the motoring industry is heading. Our partnership with ebm-papst not only provides the team with the best solutions available to operate our racing cars but it also demonstrates the significance of new and innovative technologies within the sport."

The team of Nico Rosberg and Lewis Hamilton implemented the "efficiency equals performance" theme of the new Formula One regulations perfectly as the team's success clearly shows. The recent victories of the two drivers at the Grand Prix venue in Russia contributed to MERCEDES AMG PETRONAS winning the Championship.

"We are delighted that MERCEDES AMG PETRONAS has won the 2014 FIA Formula 1 World Constructors Championship and that as an Official Team Partner we can celebrate this success with the team. The change of Formula One to more efficiency fits perfectly with our GreenTech philosophy: efficiency through state-of-the-art technology," explains Rainer Hundsdörfer, CEO of ebm-papst. "After all, the Formula One engines now achieve the same lap times using 30 percent less energy." Winner of the 2013 German Sustainability Award (GSA) in the category "Germany's most sustainable companies" – one of the most prestigious prizes of its kind in Europe – ebm-papst has been recognised for its outstanding achievements in sustainability.

ebm-papst has developed off-board cooling solutions for the MERCEDES AMG PETRONAS F1 W05 Hybrid racing cars that constantly cool the temperature-sensitive components of the racing cars to optimal operating conditions between the rounds – an important task when dealing with outside temperatures of up to 40 degrees Celsius at racing locations such as Singapore and Abu Dhabi.

Hauke Hannig
Spokesman
ebm-papst Group

Telefon: +49 7938 81-7105
Telefax: +49 7938 81-97105
Mobil: +49 171 36 24 067
Hauke.Hannig@de.ebmpapst.com

13. Oktober 2014 – page 1 of 5

twitter.com/ebmpapst_news
facebook.com/ebmpapstFANS
youtube.com/ebmpapstDE
www.ebmpapst.com
www.greentech.info/ec-technologie
www.f1.ebmpapst.com



Presse-Information

MERCEDES AMG PETRONAS wins 2014 FIA Formula 1 World Constructors Championship*

ebm-papst supports the successful Formula One team starting with the 2014 season

Furthermore, MERCEDES AMG PETRONAS and ebm-papst work hand-in-hand to improve the garage working environment at Grand Prix venues through innovative, custom-built heat extraction and cooling solutions. The Formula One team and the leading manufacturer in fans also work close together in order to improve the energy efficiency of the team's operational facilities at Brackley (Great Britain), in addition to holding technical working groups to share expertise and best practice on aerodynamics. "In terms of developing speed, we still have a great deal to learn from the work at Formula One," highlights Rainer Hundsdörfer. "And, finally, our customers will benefit from this experience."

Notes to Editors:

MERCEDES AMG PETRONAS and ebm-papst Off-board cooling

ebm-papst has developed, in conjunction with the MERCEDES AMG PETRONAS Formula One™ Team, a highly specialised off-board cooling solution optimised for the sidepod radiators and roll hoop of the F1 W05 race cars, which will be deployed when the car is on the grid and in the garage at all Grands Prix and test sessions.

Ambient temperatures at Formula One races can reach up to 40°C with ambient on-car temperatures up to 75°C and an operating temperature of over 120°C for the sidepod radiators.

In order to achieve the optimal performance for the cars, ebm-papst has used their latest in fan technology. For grid and parc fermé the sidepods and roll-hoop will be cooled with axial fans whose performance curve match the high back-pressure characteristics of the Mercedes system and provide a 518% improvement in delivered airflow. This high performance contained within a small packaging size meets the requirements for a small portable powerful system.

When the car is in the garage, the sidepods and roll-hoop will be cooled via a larger low-noise forward-curved centrifugal solution where the motor and impellor have been integrated into a bespoke designed scroll housing to fit perfectly on to the car for maximum performance and low noise in the garage environment.

Garage Heat extraction and cooling

As the worldwide leader in efficient fans and motors, ebm-papst have developed a bespoke high efficiency heat extraction and cooling solution for the MERCEDES AMG PETRONAS team. With the garage temperature reaching up to 45°C at tracks

Hauke Hannig
Spokesman
ebm-papst Group

Telefon: +49 7938 81-7105
Telefax: +49 7938 81-97105
Mobil: +49 171 36 24 067
Hauke.Hannig@de.ebmpapst.com

13. Oktober 2014 – page 2 of 5

twitter.com/ebmpapst_news
facebook.com/ebmpapstFANS
youtube.com/ebmpapstDE
www.ebmpapst.com
www.greentech.info/ec-technologie
www.f1.ebmpapst.com



Presse-Information

MERCEDES AMG PETRONAS wins 2014 FIA Formula 1 World Constructors Championship*

ebm-papst supports the successful Formula One team starting with the 2014 season

such as Singapore, ebm-papst will ensure the best possible environment for the MERCEDES AMG PETRONAS team, its' drivers and guests.

Further Technical Working Groups

During 2015, ebm-papst's highly skilled engineers will also design and implement further cooling solutions for the MERCEDES AMG PETRONAS Operations Centre in Brackley, UK. This will enable the team to reduce electricity usage and CO2 emissions to further support the facility's ISO14001 status.

Notes to Editors:

The New Era of F1 in 2014 – Efficiency and Performance

2014 introduces what is widely recognised as the biggest technical revolution in Formula One season since its inaugural season in 1950. However, while probably the most far-reaching, this is far from being the first major upheaval in the history of the sport. For decades, engineers have been pushing the boundaries of performance, extracting the absolute maximum from the technology at their disposal and exploring every avenue of development in the pursuit of automotive perfection, only to have their creations cast into the annals of racing history. Increasingly complex regulations always force fresh innovations to suit constantly evolving sporting and technical requirements.

The revolution of 2014 has subtly different roots, with rules written to encourage rather than restrict new technology. As the automotive industry increasingly demands more from less, efficiency and hybrid technologies become all the more relevant. As the pinnacle of automotive technology and performance, Formula One has a significant role to play in driving these technologies forward.

In years gone by, the term efficiency may have appeared at odds with the ethos of Formula One: a conservative contrast to the 'flat-out' image of the sport. For 2014, however, that perception has changed fundamentally. Put simply, efficiency now equals performance. Where the power of a normally aspirated engine is defined by the amount of air that can be put through it, the performance of the all-new Turbocharged V6 Hybrid Power Unit is now defined by the amount of fuel available to each competitor. The driver who can extract the most performance from the available 100 kg of fuel energy – in other words, achieve the best conversion efficiency – will have a competitive advantage. The more efficiently the Power Unit can convert fuel energy into kinetic energy, the more that advantage will grow.

Hauke Hannig
Spokesman
ebm-papst Group

Telefon: +49 7938 81-7105
Telefax: +49 7938 81-97105
Mobil: +49 171 36 24 067
Hauke.Hannig@de.ebmpapst.com

13. Oktober 2014 – page 3 of 5

twitter.com/ebmpapst_news
facebook.com/ebmpapstFANS
youtube.com/ebmpapstDE
www.ebmpapst.com
www.greentech.info/ec-technologie
www.f1.ebmpapst.com



Presse-Information

MERCEDES AMG PETRONAS wins 2014 FIA Formula 1 World Constructors Championship*

ebm-papst supports the successful Formula One team starting with the 2014 season

Of course, efficiency has long been a key area of development in Formula One. In years gone by, where fuel usage has not been limited, the advantage lay in weight saving. Put simply, the less fuel you carried, the lighter and faster the car: particularly at the start of the race. For 2014, however, the race fuel allowance has been fixed at a maximum of 100 kg, compared to a typical race fuel load of around 150 kg in 2013. To complete the same race distance at similar speeds, the Power Unit has had to become over 30% more efficient: a challenge which demands significant new technologies.

Part of the efficiency gain comes from the V6 Internal Combustion Engine (ICE): a smaller capacity 'down-sized' engine running at lower speeds than its predecessor. The power output and therefore efficiency is enhanced by turbocharging: allowing additional power to be extracted from the same quantity of fuel energy. The really clever part, though, comes in the form of the ERS Hybrid system. In 2014, there are up to seven possible energy journeys to re-use energy within the vehicle. The target: to achieve the same power output – around 750 hp – using around one third less fuel.

While areas of 'familiar' technology (bore size, crankshaft centre line, etc.) have been specified, technical freedom has been left in the areas likely to generate gains in overall efficiency. It's a formula designed to encourage innovation in the pursuit and development of cutting-edge technologies that are ultimately relevant to the everyday motorist.

As always, weight is a key factor in performance. While the regulations stipulate a new maximum weight limit for the car of 691 kg – up from 642 kg in 2013 – this is now far more difficult to achieve. The Power Unit itself must have a minimum weight of 145 kg, while the additional cooling requirements of both the turbocharger and Hybrid systems only add to the challenge.

From an aerodynamic perspective too, innovation has been stretched to the limit. Fundamentally, there are two key elements to a fast Formula One car: having the most power possible to accelerate down the straight, plus good mechanical and aerodynamic performance to allow for quick cornering. The 2014 regulations bring with them a new set of challenges not only relating to the more visually obvious elements of the car, but more fundamentally in terms of packaging.

Hidden from view, the integration of the Power Unit and related systems into the chassis provides a significant aerodynamic challenge. The Power Unit itself takes a

Hauke Hannig
Spokesman
ebm-papst Group

Telefon: +49 7938 81-7105
Telefax: +49 7938 81-97105
Mobil: +49 171 36 24 067
Hauke.Hannig@de.ebmpapst.com

13. Oktober 2014 – page 4 of 5

twitter.com/ebmpapst_news
facebook.com/ebmpapstFANS
youtube.com/ebmpapstDE
www.ebmpapst.com
www.greentech.info/ec-technologie
www.f1.ebmpapst.com



Presse-Information

MERCEDES AMG PETRONAS wins 2014 FIA Formula 1 World Constructors Championship*

ebm-papst supports the successful Formula One team starting with the 2014 season

completely different shape to its predecessor, while more hybrid systems, a more complex exhaust system, plus an intercooler required for the pressure charging system are all contributing factors to the cooling requirements of the car. Managing heat is not only necessary in terms of car integrity but also performance and efficiency. Two opposing influences thereby exist: one focused on ensuring that each of these components operates within an optimal temperature range, the other on packaging the related cooling systems in such a way as not to detract from the aerodynamic efficiency of the car.

Overall, then, it is clear that Formula One in 2014 presents a fresh set of challenges to designers, engineers, drivers and spectators alike. As has been the case throughout generations of the sport, the introduction of new rules serves to encourage innovation and showcase Formula One as the cutting-edge of new technology: adding a level of intrigue which is relevant not only for the interest of spectators, but the automotive industry as a whole. As the latest phase of an evolutionary process that continues to position Formula One at the heart of contemporary technology, 2014 truly puts the 'motor' back into 'motorsport'.

About ebm-papst

The ebm-papst Group is the world's leading manufacturer of fans and motors. Since it was founded, the technology company has continuously set global market standards. Developments have ranged from electronically controlled EC fans, through aerodynamic improvements of fan blades, and on to the resource-conserving selection of materials, with bio-materials being just one option. In fiscal year 2013/14, the company achieved a turnover of €1.5 billion. Throughout the world, ebm-papst employs around 11,500 people at 18 production sites (including in Germany, China and the USA) and in 57 sales offices. Fans and motors from the global market leader can be found in many industries, including ventilation, air conditioning and refrigeration, household appliances, heating, IT and telecommunications, as well as automotive and commercial vehicles.

<http://www.ebmpapst.com/en/>

ebm-papst press contact:

Hauke Hannig

T: +49 (0) 7938 81 7105

E: Hauke.Hannig@de.ebmpapst.com

For more information: www.f1.ebmpapst.com

Hauke Hannig
Spokesman
ebm-papst Group

Telefon: +49 7938 81-7105
Telefax: +49 7938 81-97105
Mobil: +49 171 36 24 067
Hauke.Hannig@de.ebmpapst.com

13. Oktober 2014 – page 5 of 5

twitter.com/ebmpapst_news
facebook.com/ebmpapstFANS
youtube.com/ebmpapstDE
www.ebmpapst.com
www.greentech.info/ec-technologie
www.f1.ebmpapst.com