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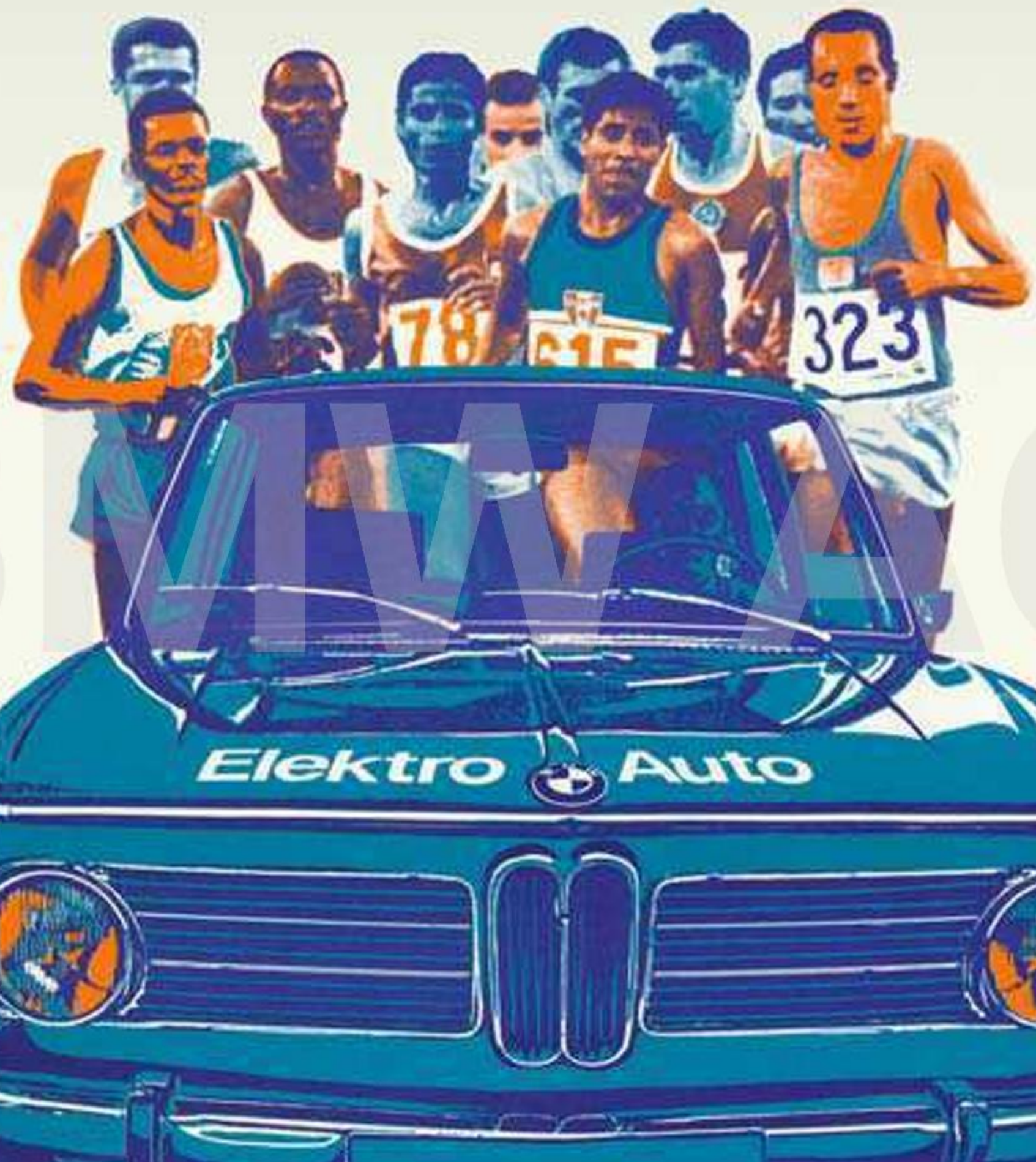
BMW Classic live 01.2009

www.bmwclassic.com
01.2009

BMW Classic live



Innovative, efficient, dynamic

BMW EfficientDynamics from a historical perspective

Lightweight construction, aerodynamics, and engine efficiency have characterized BMW roadsters for 75 years.

30

World Record: Already in 1919, BMW aircraft engines made an impression with high performance and low consumption.

20

A victory for lightweight construction: 1939, BMW dominates the world's most difficult motorcycle race.

26

BMW Welt

BMW Museum
www.bmw-welt.com

Sheer
Driving Pleasure

BMW Museum.

Automobile design is art. An art that BMW has mastered for roughly 80 years. Experience the fascination of the BMW brand in the BMW Museum. The newly designed and considerably expanded museum completes the BMW brand experience at the Munich location that consists of BMW Welt, BMW Home Plant and BMW Museum.

Dear friends of the brand,

The year 2009 looks like being a difficult one for the entire automotive industry. Thus it is all the more important to branch out in new directions and new visions. It is, however, just as important to remember what it is that has made a company such as BMW consistently strong throughout its history.

BMW's EfficientDynamics strategy is such a step. Even though today's innovation package comprises of a variety of cutting-edge technologies, it primarily continues a tradition that has characterized the company ever since it was founded in 1916. From the very outset, BMW has always developed technologies and innovations to render their vehicles more efficient and more dynamic. The World Altitude Record of BMW aircraft engines in 1919, as well as the early successes in racing sports right after BMW started its motorcycle and automobile production, are testimony to this. In this issue, we present the most important stages of BMW's development and go into detail of outstanding events and products, such as the aircraft engine BMW IV and BMW's victory at the Senior TT in 1939 on a works BMW Kompressor motorcycle.

Using the example of a very emotional vehicle type, we want to show you how a vehicle can be dynamic and economical at the same time: The BMW roadsters combine both these qualities to create an extraordinary driving experience. The first self-produced roadster with the blue and white logo, the BMW 315/1, was launched shortly after the beginning of BMW's automobile production 80 years ago. The new BMW Z4 continues this tradition today.

Like the entire BMW Group, BMW Classic also branches out in new directions. Now owners of classic BMW vehicles can take their cars to the new BMW Classic Center in Munich, where, in accordance with the familiar BMW quality standards and high demands for originality and authenticity, their classics will be serviced, repaired, and even completely restored.
With this good news from our house I wish you a successful year and lots of fun with the blue and white brand.

Best wishes,

Karl Baumer
Director BMW Group Classic and BMW Welt

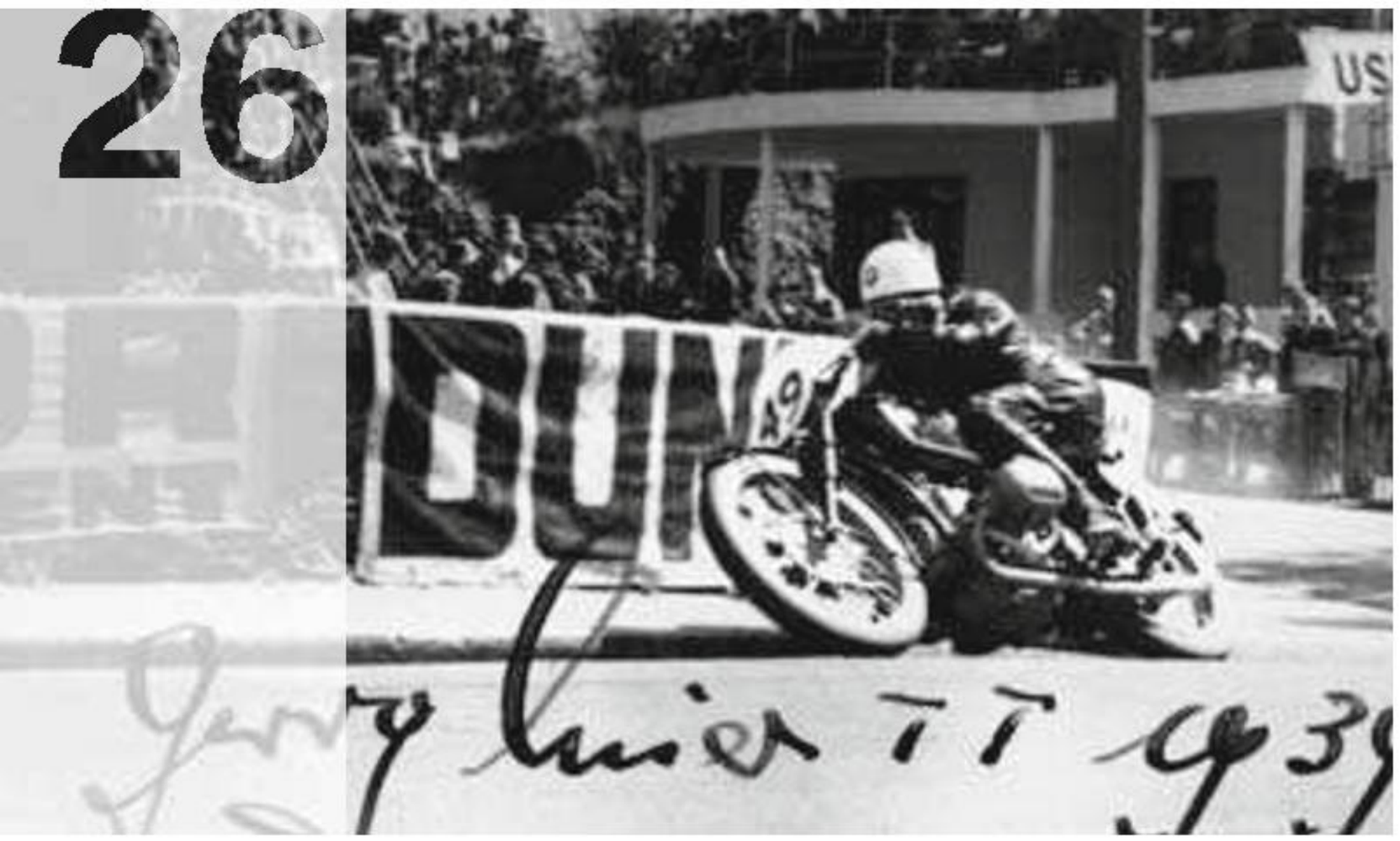
Efficiency and dynamics have been distinctive qualities of the BMW brand and their products for over 90 years.

The first choice for classic BMWs: The new BMW Classic Center offers services of the usual BMW quality.

COVER STORY EfficientDynamics

MORE STORIES

REGULARS



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Events 2009

April

cw	Mo	Tu	We	Th	Fr	Sa	Su
14			1	2	3	4	5
15	6	7	8	9	10	11	12
16	13	14	15	16	17	18	19
17	20	21	22	23	24	25	26
18	27	28	29	30			

May

cw	Mo	Tu	We	Th	Fr	Sa	Su
18					1	2	3
19	4	5	6	7	8	9	10
20	11	12	13	14	15	16	17
21	18	19	20	21	22	23	24
22	25	26	27	28	29	30	31

June

cw	Mo	Tu	We	Th	Fr	Sa	Su
23	1	2	3	4	5	6	7
24	8	9	10	11	12	13	14
25	15	16	17	18	19	20	21
26	22	23	24	25	26	27	28
27	29	30					

July

cw	Mo	Tu	We	Th	Fr	Sa	Su
27			1	2	3	4	5
28	6	7	8	9	10	11	12
29	13	14	15	16	17	18	19
30	20	21	22	23	24	25	26
31	27	28	29	30	31		

April

02 – 05

Techno Classica. Essen. Germany.

This year at the world's biggest Classic Car Show, BMW Group Classic will be represented by the BMW and MINI brands. More than 150,000 visitors and 1,000 exhibitors are expected at the Techno Classica in Essen. The main themes of BMW Group's appearance in hall 12 will be 80 years of BMW and 50 years of MINI. BMW Classic Shop and BMW Classic Center will also present new offers and services for end consumers at the Car Show. As in recent years, BMW will be supported by BMW Clubs and MINI Clubs, both will be showcasing a variety of classic models.

cw 14

April

24 – 26

Concorso d'Eleganza Villa d'Este. Cernobbio. Italy.

This year, the Concorso d'Eleganza Villa d'Este has two reasons to celebrate: Exactly 80 years ago the beauty contest for classic automobiles was held for the first time, and 10 years ago BMW Group assumed the patronage. Today, the Concorso is regarded as the world's most renowned event of its kind. One of the most remarkable vehicles this year will be a BMW 2800 Spicup Coupé from 1969. This Concept Car was first debuted at the Geneva Motor Show forty years ago. Last year, it was discovered in the Netherlands and completely restored. Aside from competition vehicles, BMW Classic will also exhibit highlights of BMW's automobile history, which also began 80 years ago.

On Sunday, the rare classics will be presented to the public in the Villa Erba.

cw 17 www.concorsodeleganza.com

May

13 – 17

Mille Miglia. Brescia. Italy.

At this year's Mille Miglia in Italy, BMW Classic will field nine vehicles, several BMW 328's and one BMW 507. The 1000 mile race takes the participants from Brescia to Rome and back to Brescia. Since Alfa Romeo interrupted BMW's several years of predominance in 2008, the drivers of the blue and white brand are now eager to reconquer the title.

cw 20

52° 43´ N 7° 56´ O. Essen.

47° 48´ N 13° 02´ O. Salzburg.

47° 44´ N 13° 90´ O. Gröbming.

45° 50´ N 09° 04´ O. Cernobbio.

45° 32´ N 10° 14´ O. Brescia.

May

20 – 23

Gaisbergrennen. Salzburg. Austria.

The Salzburg Festival was barely over, when all the attention turned to the racetrack at Gaisberg, the local mountain of Mozart's home town. Exactly 80 years ago, this race took place for the first time. In 2003 a legal restraint was imposed on historical automobiles. In celebration of its anniversary, a special historic regularity race will also be held. BMW Classic will field two vehicles: the famous BMW 328 Berlin-Rom Touring Roadster and one BMW M1 Procar. The four-time European Touring Car Champion Dieter Quester will be at the steering wheel.

cw 21

July

15 – 18

Ennstal-Classic. Gröbming. Austria.

True to the motto "driving in the last paradise", the Ennstal-Classic Rally in Upper Austria has attracted classic-car fans and former racing drivers for many years. The first race in 1993 saw 35 participants, today almost 200 line up. The rally leads through valleys and over mountains, such as the Gröbminger mountain in Stoderzinken and the Dachstein mountain, or through the Schladminger Tauern mountain chain. BMW Group Classic will field four vehicles, including one BMW 2002 TI rallye version from 1969 and one BMW 700 Racing Coupé.

cw 29

www.bmw-classic.com

With the relaunch of their online platform, BMW Classic responds to the increasing demand for classic cars. As of now, friends of the brand and aficionados of classic BMW cars can find detailed and comprehensive information about the history of BMW and the activities of BMW Classic at **www.bmw-classic.com.**

The website is clearly structured and informative. The various offers and services provided by BMW Classic, from new workshop services to classic vehicle rental, are apparent at a glance. “History and new media do not exclude each other, as our target group is very modern. All information available directly from us is simply highly credible”, explains Karl Baumer, Director of BMW Group Classic and BMW Welt.

For the first time, BMW Classic’s overall presence also includes the areas BMW Museum and BMW Group Archives. In this way, all functions concerning BMW’s fascinating history are offered in one package. The database of the BMW Group Archives forms the heart of the platform: Thousands of documents, pictures and films from nine decades of BMW history can be researched here. In BMW Classic’s online shop you can order pictures, purchase selected motifs as high-quality art prints, and design your own personal calendar.

Customers and interested parties who register at **www.bmw-classic.com** have the possibility to research, place orders, and stay posted by regularly receiving a newsletter with information on offers, products, and activities.

New vehicles in the BMW Museum

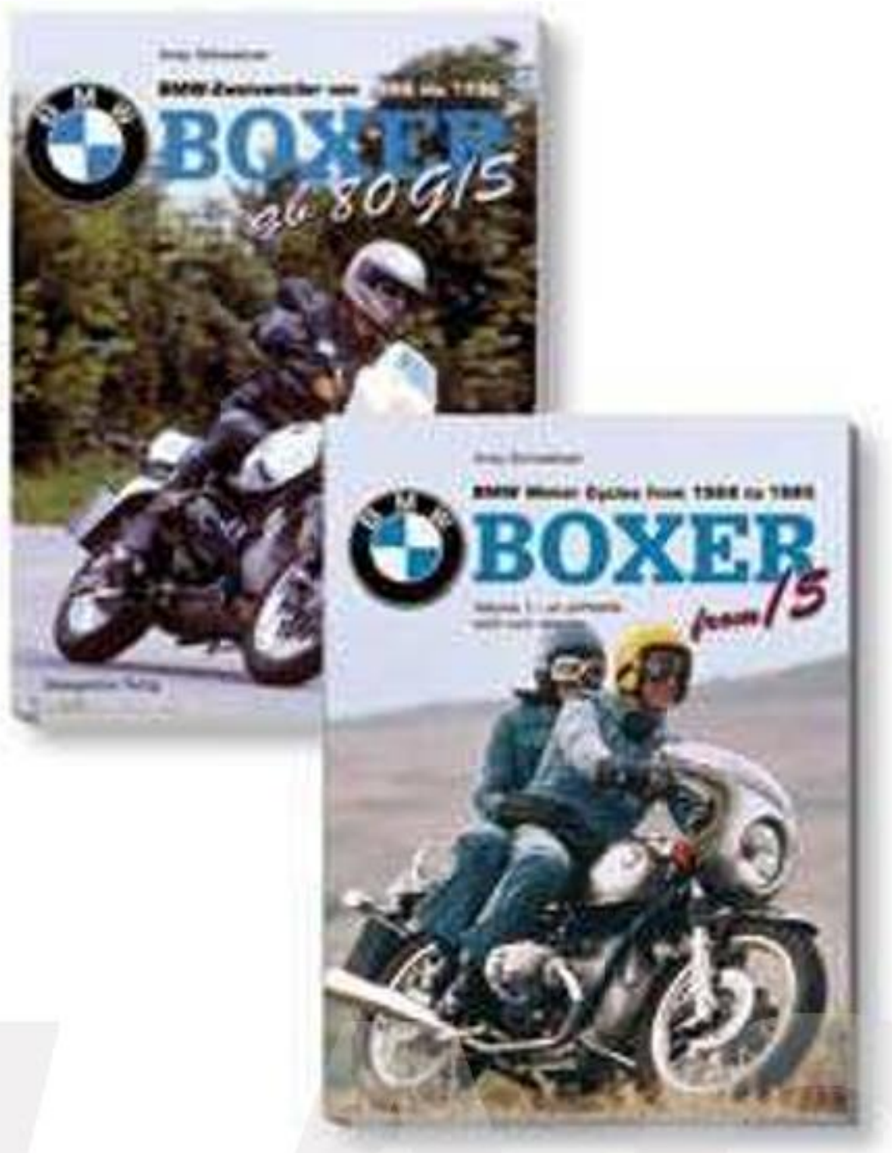
The current temporary exhibition in the BMW Museum is dedicated to BMW Concept Vehicles. So far, the five platforms of the Museum Bowl have been host to eight Concept Cars. From March 2009, they will be joined by two more motorcycle prototypes – the Futuro from 1979 (see on the picture) and a design study from 1991 – and a further developed version of the BMW C1 that can both drive and fly.

The research prototype “C1 Flight” is a project of special interest. In 2002, it made the vision of flying vehicles come true. The “C1 Flight” is a symbiosis between a motorized two-wheeled vehicle and a micro-light airplane. It can be converted from a street vehicle into a plane.

Concept Vehicles are designed independently from the productionvehicle development. They serve to test new ideas and give visionary thoughts a first shape. They often contain very innovative and extraordinary features for future mobility. Although most Concept Vehicles remain unique copies and do not go into production, they often feature single stylistic elements or detailed technical solutions that are incorporated in future vehicle concepts.

BMW Boxer – the two-valve models of 1969 - 1996

BMW's two-valve boxers from the Berlin plant were manufactured between 1969 and 1996. Some models – such as the R 90 S, the original Enduro R 80 G/S, or the R 100 R Classic – are already regarded as classics and are sought-after collector's items today. Andy Schwietzer has compiled the history of these models in a two-volume edition worth reading. As well as numerous interviews with contemporary witnesses revealing many as-yet-unknown aspects of these motorcycles' history, the most impressive part is the comprehensive data collection. The author not only meticulously lists all colour variants, but also describes the most important care procedures for refurbishing the different models. For owners of these vehicles, his book is a reliable guide for restoring BMW motorcycles to their original condition. And those who do not own such a vehicle themselves, can look forward to a fascinating chapter of BMW's motorcycle history.



Volume I
Andy Schwietzer, BMW Boxer Motor Cycles from 1969-1985. All airheads with twin shocks (Vol. 1),
ISBN 978-3-9806631-5-1, First print 2007, Bodensteiner Verlag,
€ 34.00 plus postage at www.bodensteinerverlag.de

Volume II, only available in German:
Andy Schwietzer, BMW Boxer Band 2: Alle Modelle mit Einarmschwinge,
ISBN: 978-3-9806631-6-8, Bodensteiner Verlag,
€ 29.80, postage-free purchase from www.bodensteinerverlag.de

Book review: Modernizing an Icon

The BMW Tower in Munich is regarded as an icon of 20th-century architecture. Its extraordinary and conspicuous shape clearly distinguishes it from the common administrative buildings of its time. It has symbolized the image and the standard of the BMW Group, and at the same time served the city of Munich as an elegant landmark, for over 30 years.
Between 2003 and 2006, the Hamburg architect Peter Schweger took on the complex and difficult task of bringing the heritage-protected tower block up to modern technological standards.
This procedure is described in the book "Modernizing an Icon". The book not only explains the modernization process but also describes the history of the BMW Tower, from the architectural competition and the construction progress to the opening of the "Four-Cylinder" tower.

The book is available in bookshops:
In German/English

Gerwin Zohlen (Ed.)
Modernizing an Icon.
Verlag Niggli AG 2008, 176 pages,
ISBN 978-3-7212-0656-2, € 49.00

Efficiency and Dynamics from the outset

BMW EfficientDynamics

By Florian Moser Photos BMW AG

EfficientDynamics is a development strategy BMW pursues in order to not only render their vehicles more economical, but also more dynamic. For BMW, driving pleasure and economic efficiency are not mutually exclusive – they belong together. A reflection of BMW's history reveals that efficiency and dynamics have been distinctive characteristics of the BMW brand and its products for more than 90 years.

BMW's "EfficientDynamics" strategy sums up all development activities BMW has undertaken to reduce consumption and emission values since 2007. The core strategy is a combination of fuel-efficient technologies consisting of innovative methods to increase the engine efficiency, intelligent lightweight construction, optimization of aerodynamics, and intelligent energy management.

The defining characteristic is that BMW EfficientDynamics is not merely a fuel-saving programme. Rather, its distinctive feature is considerably improved driving dynamics. This results in optimum fuel efficiency and optimum performance. BMW not only strives for its products to be more fuel-efficient than those of competitors offering comparable dynamics, but also to be more dynamic than all competing products which achieve the same fuel efficiency. Therefore, efficiency and dynamics are not only abstract

1917

BMW IIIa – the best aircraft engine of its time

The 6-cylinder in-line engine with a displacement of 19 litres was BMW's first-ever product. A special carburettor enabled the engine to reach a constant output of 185 hp at altitudes up to 2000 metres, thus making the BMW IIIa the most efficient aircraft engine of its time. The aluminium pistons used for the first time in an aircraft engine set benchmarks and established BMW's reputation as experts in casting light metals. In 1919, an improved version delivering more performance, the BMW IV, brought BMW a World Altitude Record. (See article "BMW's first World Record")

from a historical perspective

concepts implied in the term EfficientDynamics but, in fact, every driver can experience them first hand.

BMW EfficientDynamics continues a tradition that can be traced back to the beginning of the company in 1916/1917. On the one hand, the development of innovative technologies has been one of the most important factors of BMW Group's success for more than 90 years. On the other hand, it is as if efficiency and dynamics are in BMW's "genes". Numerous innovations and cutting-edge technologies, world records and successes in motorsports, as well as series produced products which bundle all this know-how into a dynamic driving experience, are testimony to this. Whether you are looking at aircraft engines, motorcycles or automobiles, or whether you are interested in the time prior to or after the Second World War: BMW products have always stood out for their particularly efficient dynamics.

Today's key elements of BMW EfficientDynamics – engine efficiency, lightweight construction, aerodynamics, and improved electrification – have already played an important role in BMW's history. They were, and continue to be today, the decisive components of efficient dynamics. From the very beginning, and throughout its entire history, BMW has always set benchmarks, especially in lightweight construction, by consistently using light metals and innovative manufacturing methods. However, its technological superiority in the fields of engine construction and electronics since the late 1970s, as well as the intensive research of alternative power train engineering, prove that BMW has always ranked among the world's leading engine and vehicle manufacturers.

The following highlights summarize products, technologies and innovations which combine efficiency and dynamics to a great extent. These range from the first aircraft engine (1917), the BMW IIIa, to present-day technology. Looking at them shows that one of the main reasons for BMW's success has always been their ability to combine individual, cutting-edge technological features and ideas to consistently reflect overall concepts – such as in the case of BMW EfficientDynamics.

1924

BMW R 37 – the world's first motorcycle featuring light metal cylinder heads

The BMW R 37 was BMW's first sports motorcycle. It eased to victory at the German Championship. The 2-cylinder boxer engine with the world's first light metal cylinder heads had an output of 16 hp and increased the speed of sports vehicles to 115 km/h. The BMW R 37 established the sporting image of the BMW brand.

1926

Innovative lightweight construction in BMW's V12-cylinder aircraft engine

The BMW VI was BMW's most successful product in the inter-war period. With the engine case made of magnesium and the cylinder pistons made of aluminium it achieved a weight of merely 510 kg. With 585 hp, the power-to-weight ratio was 1.15 hp/kg. The 46.9 litre cylinder capacity renders the BMW VI the strongest aircraft engine BMW has ever mass-produced.

The first World Record fully enclosed

BMW was the first company to dedicate themselves to the aerodynamics of motorcycles. Ernst Jakob Henne's world records were the inspiration for further developments. BMW achieved top performance due to their efficient overall concept – not sheer engine performance. Altogether, BMW had achieved nine absolute world records by 1937.

1936/37

BMW Type 255 Kompressor – BMW's supercharged motorcycle with vertical shaft: light and fast

This racing motorcycle was one of the most successful Grand Prix motorcycles during the pre-war period. The consistent use of light materials is especially eye-catching. Its weight of only 140 kg made it easy for BMW to leave the competition behind. (See article "A victory for lightweight construction")

1936

BMW 328 – the most successful sports car of the late 1930s

The legendary sports car was a real leader in cutting edge technology in its day. A tubular space frame chassis with bolted-on body panels allowed for an unrivalled light construction. Both the sophisticated aerodynamics featuring standard underside panelling and rear wheel covers, and the powerful engine with light metal cylinder heads made the BMW 328 the most successful sports car of the late 1930s. (See article "75 Years of BMW Roadsters")

1943

The world's first aircraft engine with standard exhaust-gas turbo charging

Thanks to innovative exhaust-gas turbo charging and direct gasoline injection – the latter had already been in use since 1934 –, the 14-cylinder double row radial engine BMW 801 delivered an extraordinary take-off performance and performance at altitude (up to 1,810 hp). Moreover, the innovative built-in command device relieved the pilot of numerous duties, and also increased the efficiency and operational safety of the engine.

1940

The BMW 328 „Mille Miglia" Kamm racing saloon

BMW developed this vehicle for the Mille Miglia in 1940. It features everything that is fast and efficient: intelligent lightweight construction, excellent aerodynamics and a powerful engine. The tubular space frame made of electrum and the outer skin made of aluminium reduced the kerb weight down to 760 kg. With a streamlined body optimized by aerodynamics specialist Wunibald Kamm and a 136 hp engine, the sports car achieved a power-to-weight-ratio of 5.6 hp/kg and a maximum speed of 230 km/h.

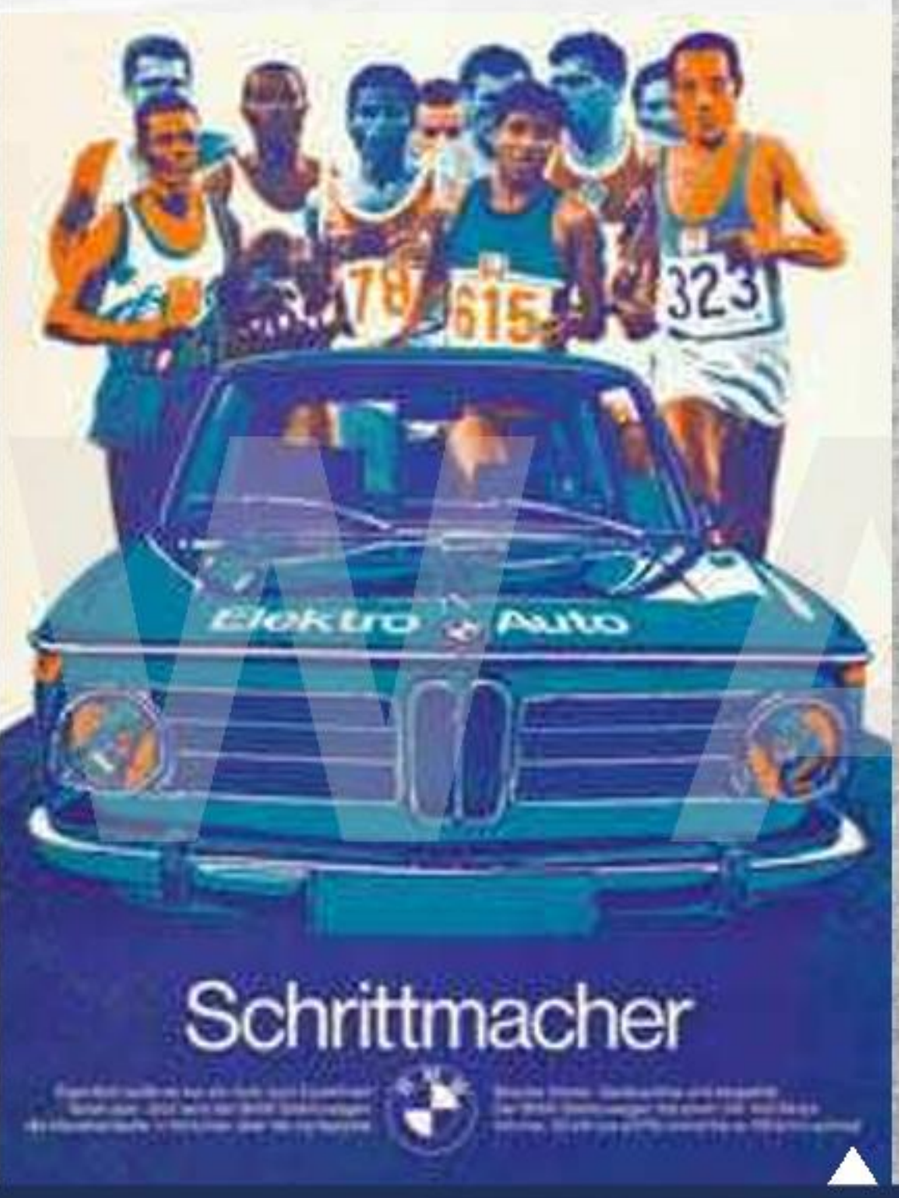
1954

The world's first V8 light metal engine in mass-produced passenger cars

This new development impressively demonstrates BMW's competence in using aluminium. With a weight of about 200 kg, the 2.6 – 3.2 litre engine weighs only 30 kg more than the conventional BMW 6-cylinder engine. The new V8 light metal engine was built into the BMW 502, 503, 507, and 3200 CS. It was characterized by an excellent running smoothness and a potential performance of up to 160 hp.

The BMW 1602 Elektro at the Olympic Games

The BMW 1602 Elektro marks the beginning of BMW's research of the electric power train. The vehicle, equipped with 12V lead batteries, participated in the Olympic Games in 1972 as an escort vehicle. Today, after having developed several generations of electric vehicles, BMW Group is among the leading experts in electric vehicles.



BMW 700 RS – the king of alpine sports

The successful racing vehicle features an extreme lightweight construction. The tubular space frame and the aluminium bodywork enabled a kerb weight of 630 kg. The purpose-built 2-cylinder boxer engine has two overhead camshafts per cylinder driven via vertical shafts. With 70 hp, the "racing flea" can accelerate to up to 160 km/h.

1961

1971

1972

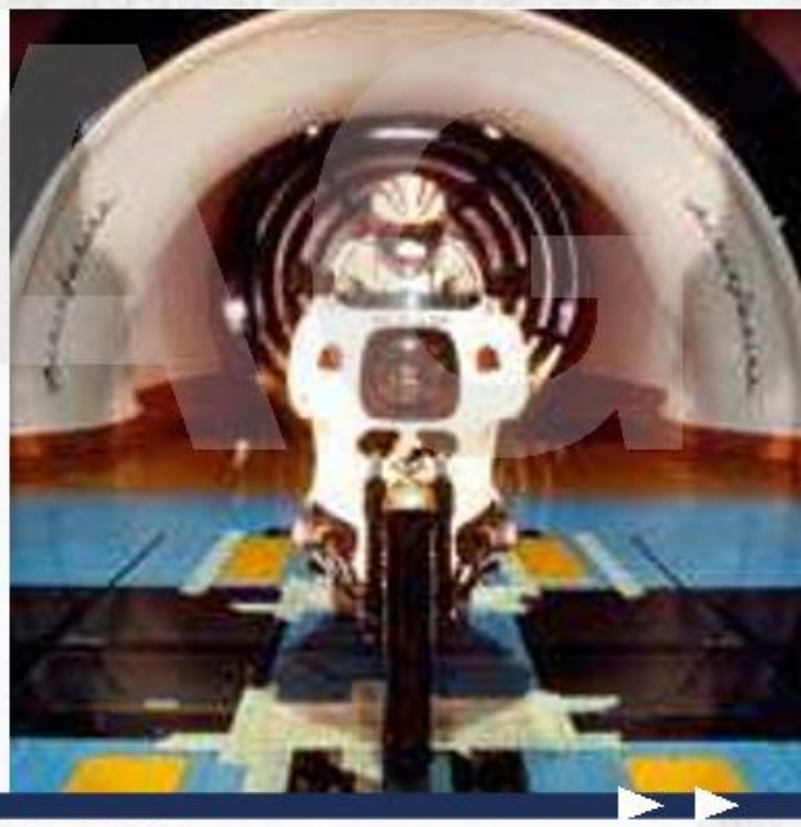
BMW 3.0 CSL – unadulterated efficiency and dynamics

The coupé combines lightweight construction and innovative aerodynamics in a special way. Aluminium contained in the bonnet and in the outer skin of the doors, a special kind of thin glass, and very basic equipment components reduce the car's weight by up to 250 kg. Air duct profiles on the wings and on the spoiler improve its aerodynamics and road performance. Six titles at the European Touring Car Championship speak for themselves.

1976

The BMW R 100 RS with world's first wind-tunnel developed full fairing

This motorcycle is a milestone. It was the first time that not only aerodynamics, but also weather protection and road performance were extensively tested and optimized in the wind tunnel. The BMW R 100 RS marks the beginning of comprehensive aerodynamic research in motorcycle construction and initiated the tourer tradition, which continues to be popular to this day.



1973

The BMW 2002 Turbo as Europe's first mass-produced vehicle with turbo technology

When BMW introduced the turbo technology to the mass-production of automobiles, it assumed a pioneering role. The powerful engine boasting 170 hp enabled the lightweight BMW 2002 Turbo to achieve a road performance similar to that of sports cars. Further milestones reinforcing BMW's leading position in turbo technology today – which is crucial to efficiency and dynamics – were set in 1983, when BMW became the first Formula One World Champion with a turbo engine and launched the BMW 524 td, the world's fastest mass-produced turbo-diesel.

1979

Europe's first digital engine electronics in the BMW 732i

Increased efficiency due to the application of electronics. The new digital motor electronics prevented, for example, unnecessary burning of fuel during coasting mode. The result: zero consumption during coasting mode. BMW assumed a pioneering role in the field of electronics, which has consistently been confirmed by numerous new innovations.

1981

The world's first direct energy control in the BMW 5 Series

In 1981, BMW put a technology into practice which has been an important constituent of BMW EfficientDynamics to this day. The display of the actual fuel consumption sensitizes the driver and encourages them to drive efficiently. Most importantly the driver can actively contribute to a noticeable reduction of fuel consumption.

1980

BMW as a pioneer of hydrogen technology

Since the early 1980s, BMW has assumed the pioneering role in researching and developing the hydrogen-powered combustion engine. The test vehicles of each generation BMW 7 Series have always established state-of-the-art technology due to the combination of environmental compatibility and sporting dynamics. In 2006, BMW presented the BMW Hydrogen 7 – the world's first hydrogen-powered vehicle that went through the complete process of mass-production development.

The BMW eta concept for a new economical driving pleasure

Starting in 1981, BMW broke new ground with the eta engines for the BMW 3 Series and BMW 5 Series. The innovative drive concept significantly lowered fuel consumption. The engine, based on the 2-litre 6-cylinder power plant, now featured 2.7 litres displacement and was designed for maximum torque at low rotational speed. Compared to the BMW 520 I, the BMW 525 consumed 9% less fuel and had improved acceleration values.

The BMW K 1 – a milestone of motorcycle construction

The BMW K 1 set benchmarks in several respects: best aerodynamic values by applying the first full fairing developed in the wind tunnel, improved efficiency by employing the world's first digital engine electronics in a motorcycle, and environmental compatibility by realizing the world's first regulated catalyst for motorcycles (1991). Moreover, the K 1 is the first BMW motorcycle with 4-valve technology.

1989

1983

The BMW 524td – the world's fastest mass-produced turbo-diesel

It was a real milestone in the history of diesel. With strong road performance despite low fuel consumption and exceptionally high running smoothness, the first BMW diesel engine set benchmarks from the outset. The BMW 524td was "best-in class" concerning dynamics and efficiency.

1991

The first thoroughbred and fully-fledged electric car of recent times

The BMW E1 is a special kind of test car. The lightweight aluminium bodywork achieves a kerb weight of 960 kg and has room for four passengers. The electric motor, initially powered by a high energy sodium sulphur battery, has been powered by a sodium nickel chloride battery since 1993 and outputs 45 hp during continuous operation. The electro powered BMW E1 also treats its drivers to absolute driving pleasure.

The world's first fully variable valve timing VANOS in the BMW M3

This innovation reduces fuel consumption and increases performance. At first, VANOS only provided a continuously variable timing control of the inlet valves depending on the accelerator pedal position and the engine speed. Since 1995, Double VANOS has added the same functionality to the exhaust valves, too. Since 2001, all BMW gasoline engines have been standard-equipped with Double VANOS.

The introduction of VALVETRONIC worldwide in the BMW 316ti

The fully variable control of the valve lift leads to increased performance and reduced fuel consumption, particularly in the partial load operational range. The fuel consumption advantage compared to the predecessor's is 12%. Nowadays, almost all of BMW's spark ignition engines are equipped with VALVETRONIC. One of the advantages of this technology is that it works with any fuel quality and can, therefore, be used worldwide.

1992

1995

The BMW 5 Series as in the upper middle class leader in cutting-edge technology

Thanks to intelligent lightweight construction, the fourth generation BMW 5 Series weighs 30 kg less than its predecessor. The world's first mass-produced undercarriage completely made of light metal with a 30% weight reduction, as well as full aluminium engines, a c_d-value of 0.28, and the world's first cooling system related to the engine map (in the 8-cylinder models) also underline the efficiency and dynamics of the BMW 5 Series.

2001

2007

Start of the BMW EfficientDynamics technology package

The innovation package was launched at the Geneva Motor Show in the BMW 1 Series and BMW 5 Series. The package consisted of innovative engine technology, aerodynamic optimization, intelligent lightweight construction, and improved energy management. The concept has been awarded numerous prizes since its introduction, and is today offered as standard in all series production models. More than one million automobiles equipped with BMW EfficientDynamics packages have already been delivered.

BMW EfficientDynamics
Less emissions. More driving pleasure.

Stop at the red light.

Stop because of a traffic jam.

Stop for an old lady crossing the street.

Stop wasting fuel, when you have to stop.

BMW. Drive, what's next.

With Auto Start Stop Function your BMW switches off the engine automatically as soon as you put your car into neutral and release the clutch – for example when waiting at traffic lights, railroad crossings or stuck in traffic jams - and starts it up again when you step on the clutch. Which means fuel is only consumed when it is really needed. Just one of the innovations that makes BMW the leader in driving technology. Experience it at the BMW What's-Next-Tour together with the latest BMW engines such as the BMW 123d, which is the first serial car worldwide with more than 200 horsepower and CO_2 emission below 140g/km (138g/km).
Apply at www.bmw.com or at your local BMW dealer.

BMW 1 Series

www.bmw.com

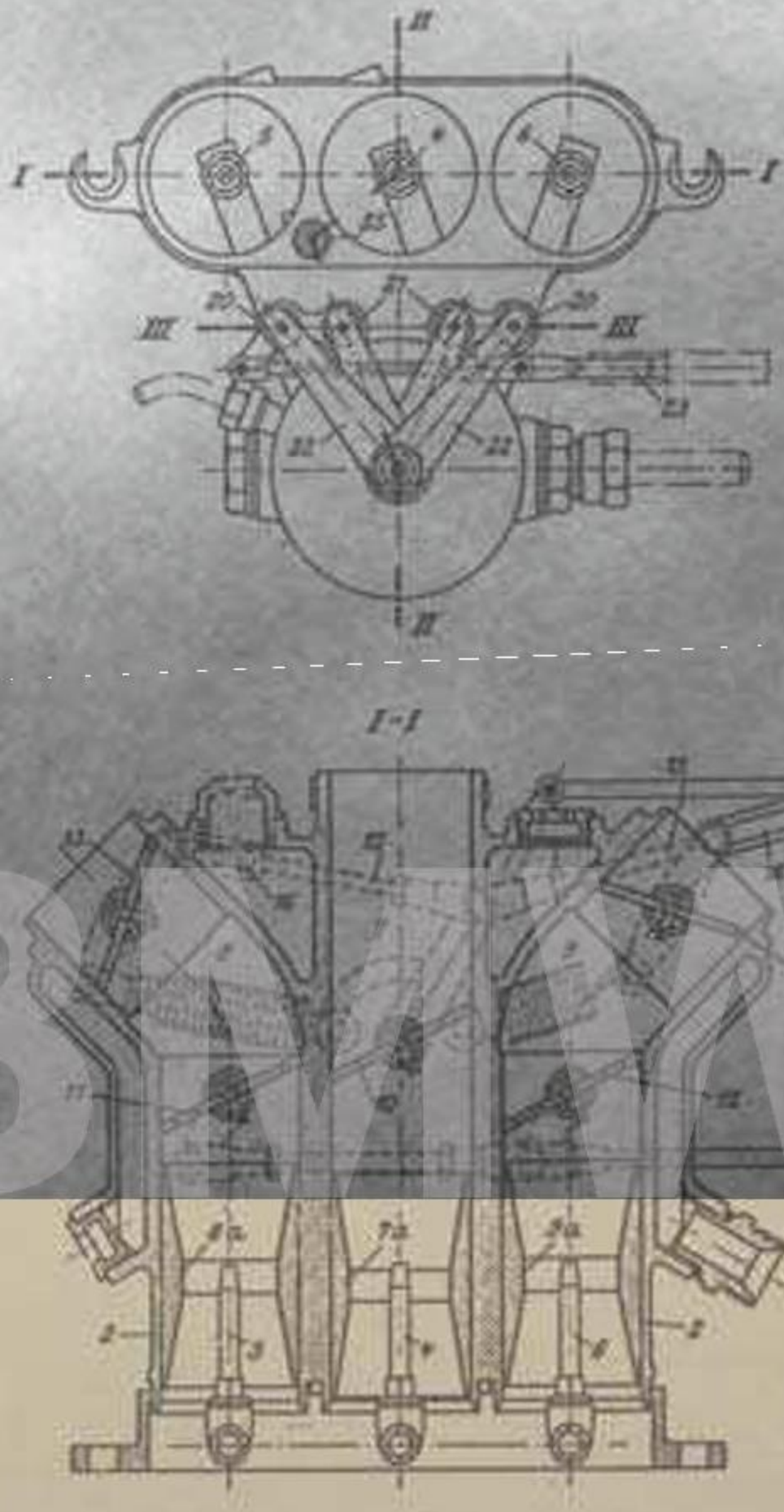
Sheer Driving Pleasure

Fuel consumption BMW 123d: out of city 4,4l/100 km; intermediate 5,2l/100 km; in city 6,5l/100 km; CO_2 emission: 138g/km

Ascending to unimaginable heights
BMW's first World Record

By Fred Jakobs Photos BMW AG

Today, the cruising altitudes of modern commercial aircraft range between ten and twelve kilometres. It is hard to imagine that a pilot could already reach such heights 90 years ago. On 17 June 1919, a BMW engine carried the pilot Franz Zeno Diemer up to 9,760 metres. Nobody had ever flown a plane so high before, and if the fact that BMW's aircraft engines were as brilliant as they were simple still needed proof, it was definitely provided that day in the summer of 1919 on Munich's Oberwiesenfeld air field.



Since the end of the First World War, there had been a race for the absolute world altitude record in Europe, for which French and German companies especially had competed. In the summer of 1919, BMW joined this competition: On 17 June, Diemer took off for his record-breaking flight on Munich's Oberwiesenfeld. His DFW F 37/III, an airplane especially developed by Deutsche Flugzeugwerke (a German aircraft manufacturer of the early twentieth century), was powered by a BMW IV aircraft engine that was based on the tried and tested BMW IIIa. An extension of bore and stroke by 10 mm each achieved an increased power output of 185 to 230 hp. The consistently excellent performance the engine delivered on this sunny summer's day allowed Diemer to go higher and higher. After 87 minutes, he reached an altitude of 9,760 metres – an altitude no airplane had ever reached before. Later, Diemer stated that the engine had even more potential, but that he himself had reached his limits. After all, his body not only had to put up with temperatures as low as - 50° Celsius in the open-air pilot seat, but also with the low oxygen content of the air at that altitude.

What gave Diemer a hard time during this world record flight was also the central problem all aircraft engines were fac-

ing during the First World War: power loss in higher altitudes. Normally, an airplane needs the strongest performance on the ground, in order to take off at all. The use of airplanes by the military, however, changed the demands. Now, engine output at high altitudes was also crucial to survival, for instance, to escape hostile squadrons in rapid climbing flight. Whilst at the beginning of the war most manoeuvres still took place at altitudes of less than 3,000 metres, the average altitude for fighting rose to about 6,000 metres towards the end of the war.

The continuous decrease in air density with increasing height caused the power of the engines to drop (see table on the right). To counteract the power drop in the thin air, two different concepts were explored. Some manufacturers such as Daimler opted for supercharger technology where air needs to be supplied to the carburettor by means of a supercharger. This technology was, however, too complex to be put into mass-production in a short time and, therefore, was only able to establish itself during the 1930s. When BMW's chief designer Max Friz designed BMW's first aircraft engine – the predecessor of the world record engine BMW IV – he decided in favour of an over-dimensional and over-compressed engine. This construction principle had been implemented for the first time in 1916 by Maybach; it entailed increasing the displacement as well as increasing the compression ratio. To prevent overloading the engine, it had to be throttled during take-off and when flying at low altitudes.

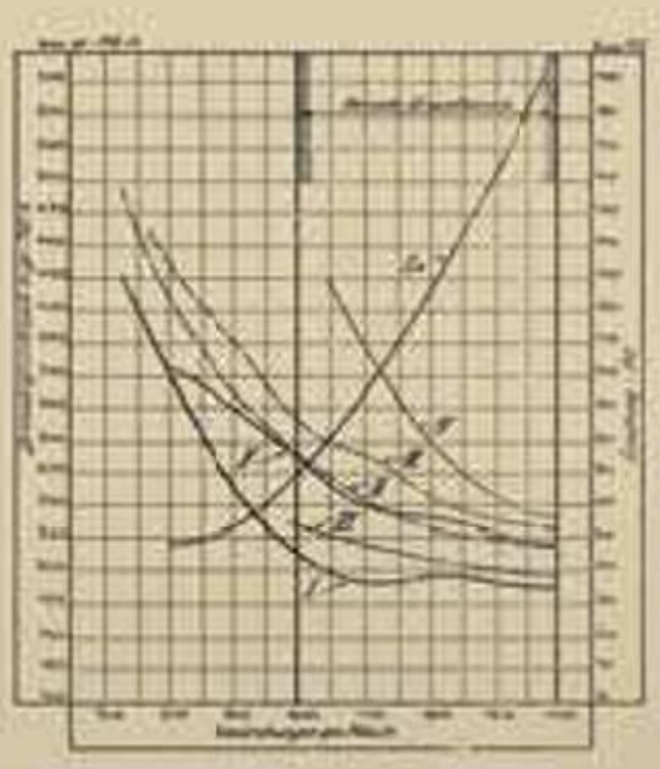
To meet the demands of an aircraft engine, Max Friz designed a special carburettor to deliver a constant loading weight and a constant air-fuel ratio even in decreasing air density. The carburettor was controlled via two levers, one for normal gas and one for height gas. By operating these two levers, the pilot was able to regulate the throttle valves of the BMW carburettor in order to obtain the most favourable air-fuel mixture for the respective flying altitude. The throttle valves were only completely opened at altitudes of 3500 to 4000 metres. Thanks to this construction, the power loss of the IIIa in the air was lower than that power loss of other engines. Pilots as well as foreign observers regarded the BMW IIIa as the best German aircraft engine of the First World War.

One of the first supporters of the engine was Franz Zeno Diemer, an experienced pilot who had already taken his pilot examination in 1913. During the First World

↙ LEFT Franz Zeno Diemer in his record airplane – a DFW F37/III.

→ RIGHT Pilot Diemer and the designer of the BMW aircraft engine, Max Friz (on the left.)

↓ BELOW Graphic taken from an English magazine published in 1919: The BMW aircraft engine has the lowest consumption.



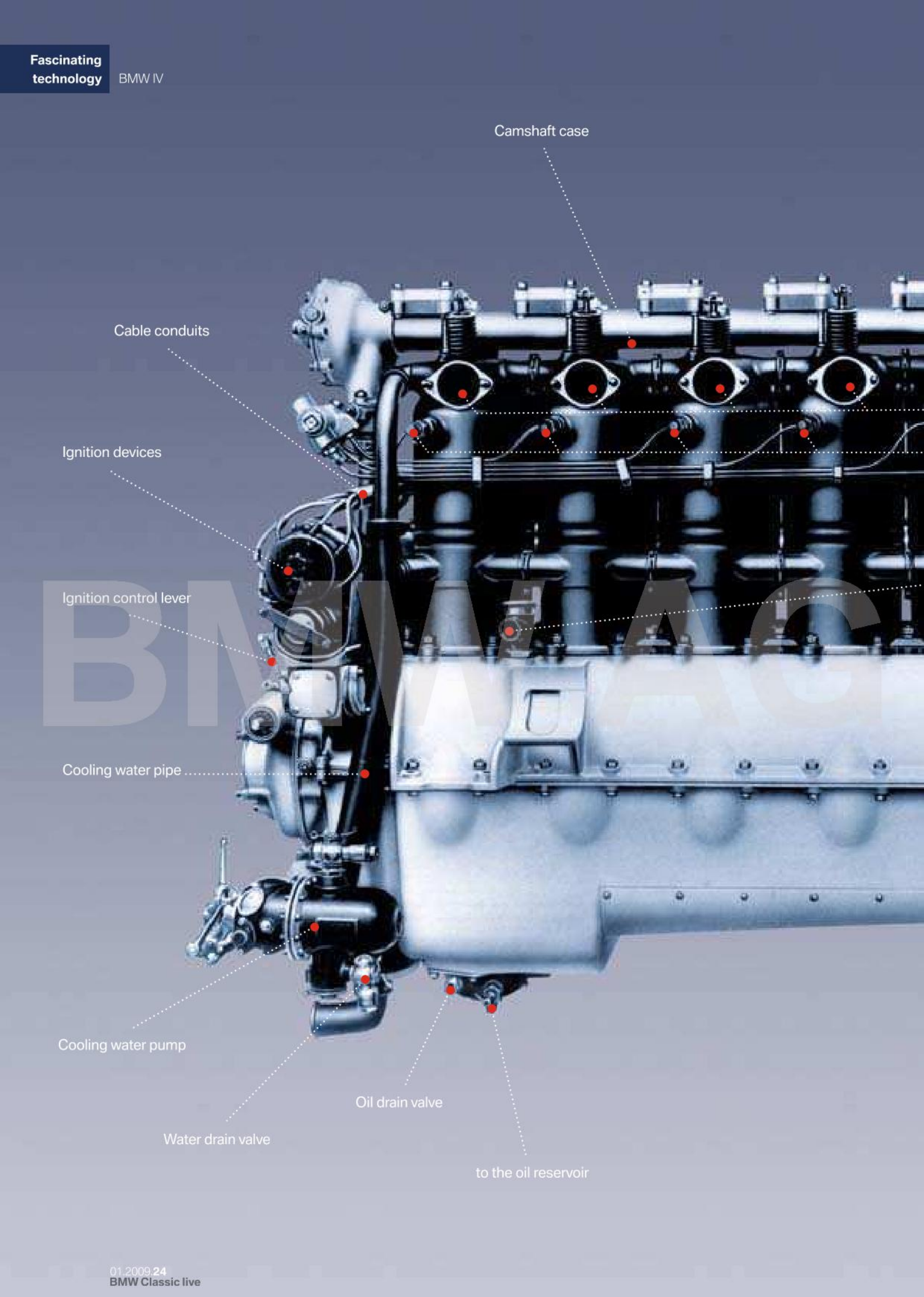
Altitude above sea level	Air pressure in mbar	Air density in kg/m³	Oxygen density in %	Temperature in °C
0	1013	1.226	100	15.0
2,000	795	1.007	73	2.0
4,000	616	0.819	65	-11.0
6,000	472	0.660	52	-24.0
8,000	356	0.525	42	-37.0
10,000	256	0.413	34	-50.0

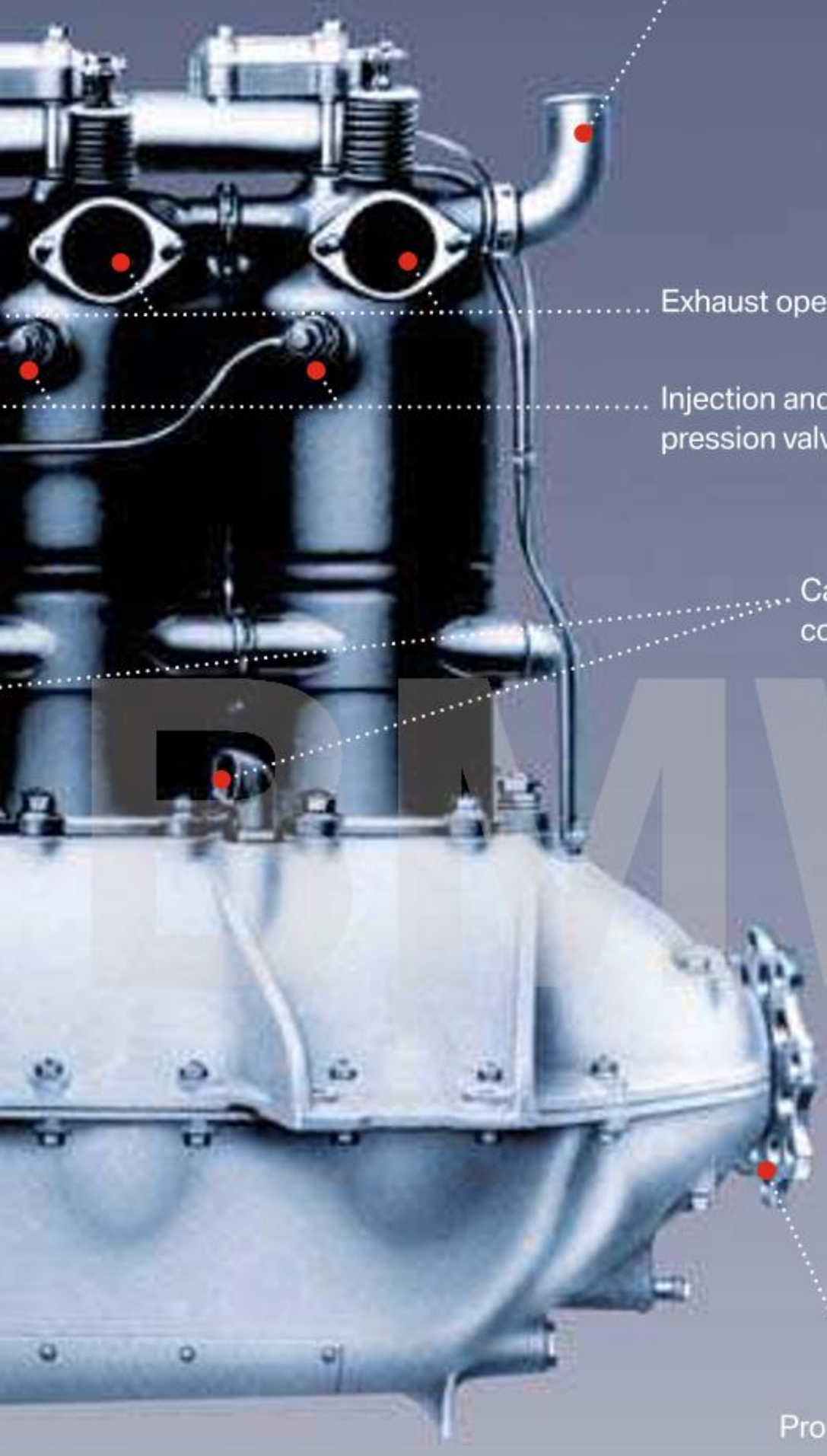
War, he served as a test-pilot on the Bavarian airforce. He came into contact with BMW in 1917, when he tested the BMW IIIa aircraft engine. His record flight in the summer of 1919 attracted international attention, even though it was not officially recognized. To be valid, all aeronautical records had to be approved by the Fédération Aéronautique Internationale (FAI), and Germany was, although it had been one of the founding members, excluded from the FAI due to the First World War. Therefore, Diemer's record could not be accepted in the official record lists. Nevertheless, his ascent to almost 10,000 metres was, also without a document, sensational proof of the potential of BMW's aircraft engines.

Even then, BMW engines did not only stand out for their excellent performance, but also due to their economic consumption. The first BMW IIIa already contained light construction elements. Both the crankcase and the pistons were made of aluminium, which allowed for a weight of only 285 kg and a weight-to-power-ratio of 1.54 kg/hp. Diemer's record engine, the BMW IV, even achieved 1.24 kg/hp.

The graphic taken from the magazine "Illustrierte Flug-Welt" of 1920 shows the superiority of the BMW engine compared to those of the competition with regard to fuel consumption. When throttling the performance to around 1050 rpm, the BMW IIIa consumed 200 grams of fuel per hp and hour, which was more than a third less than a "normal" aircraft engine of this engine-power class category consumed. De facto, this means that with a fuel quantity of 200 kg, that is about 260 litres, an airplane equipped with the BMW IIIa had a cruising radius of 1200 km, whereas for a normal engine, this amount of fuel only lasted for about 730 km.

The BMW IIIa also had advantages over other means of transportation: In one of his test flights, Diemer flew from Augsburg over Leipzig, to Döberlitz in just under four hours. The BMW IIIa engine in his airplane only needed 84 litres of fuel. At that time, an automobile needed 14 to 16 hours and 100 to 120 litres of fuel for the same distance.

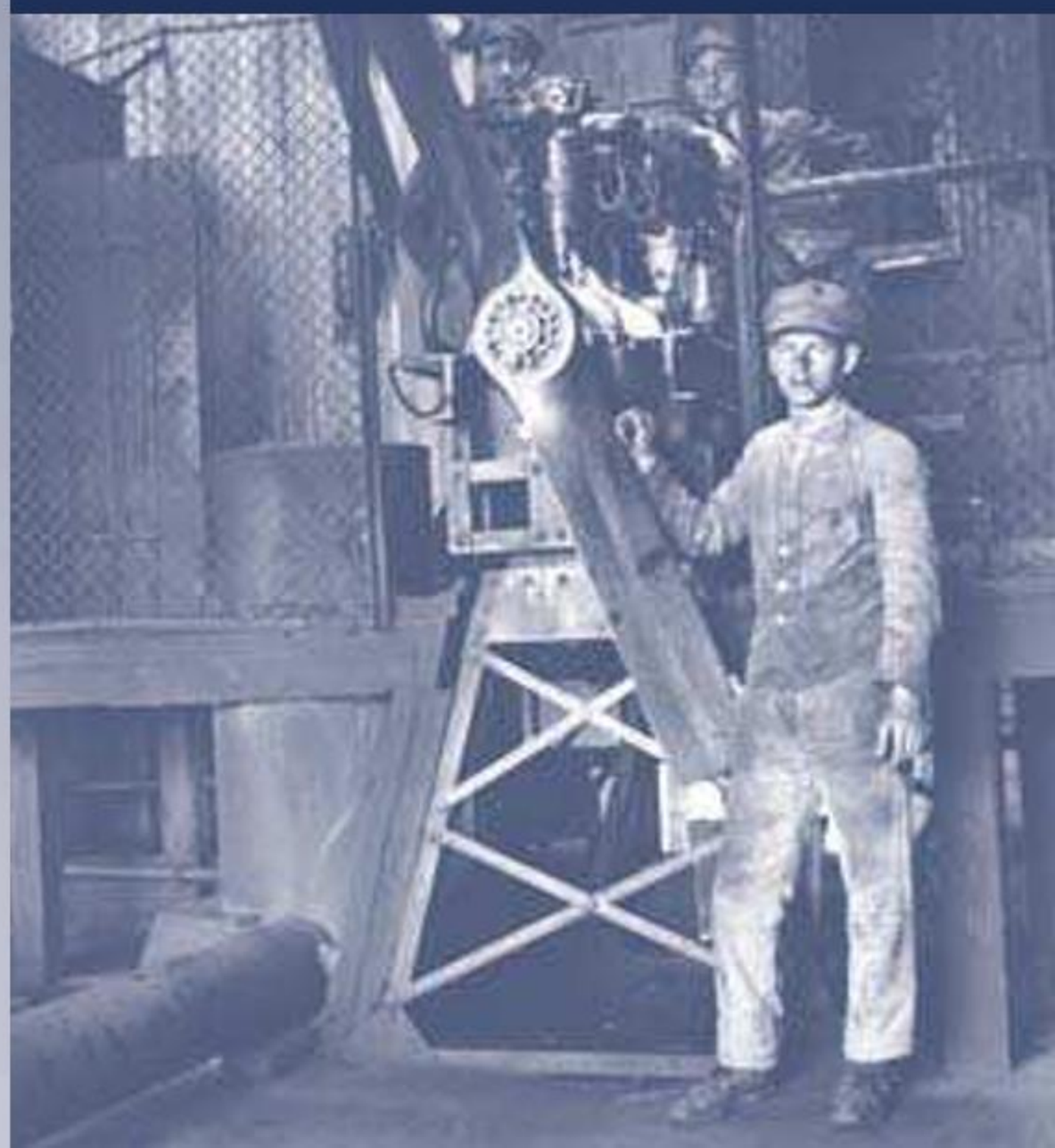

Camshaft case
Cable conduits
Ignition devices
Ignition control lever
Cooling water pipe
Cooling water pump
Water drain valve
Oil drain valve
to the oil reservoir



BMW IV

In 1918, Max Friz began developing the BMW IV aircraft engine, of which only a few units were manufactured before the end of the war. Shortly after Franz Zeno Diemer achieved his spectacular world altitude record with the BMW IV, the Treaty of Versailles took effect and brought an end to all aeronautic activities in Germany. The end of the production ban for aircraft engines 1923 initiated the economic success of the BMW IV. The engine became the standard power unit for civilian aviation in Germany, which was just taking off. It was used for the Junkers F13 – the world's first all-metal commercial aircraft – as well as in the flying boat Rohrbach "Seal", and the biplane Heinkel HD 22. Although the pilots of these machines definitely appreciated the power reserves of the BMW IV, the reliability of the 6-cylinder in-line engine was far more important to them.

In production 1918-1919, 1924-1928
No. of units Several hundred
Engine 6-cylinder in-line engine
Displacement 23.0 litres
Max. output 221 kW/300 hp



→ RIGHT A BMW IV with test propeller on the engine test bed in the BMW Munich plant, 1926.

1

BMW AG

01.2009.**26**
BMW Classic live

By Fred Jakobs **Photos** BMW AG

A victory for lightweight construction: Georg Meier's TT success 70 years ago

Georg Meier continues to be regarded as one of the greatest talents in the history of motorcycle racing to date. In his first season in 1938, he took the lead in European motorcycling sports, and, just one year later, he achieved a historic victory on the British Isle of Man. Meier was, however, not only an excellent rider, but he also rode the outstanding racing motorcycle of the 1930s – the works BMW Kompressor, a masterpiece of lightweight construction.

When Georg Meier set out for the Isle of Man together with his teammates Karl Gall and Jock West in 1939, he was not the presumed favourite to win, in spite of the fact that in his first season in 1938 he had already won the Grand Prix Races of Belgium, Holland, Italy, and Germany and therefore the European Champion Title, which for the first time was obtained throughout an entire season. At the Senior TT on the Isle of Man, none of this counted.

Since 1907, when the race took place for the first time, only British riders had won the championship. This was certainly due to the difficult circuit: The distance of one lap was exactly 37.73 miles, that is about 60 kilometres. Therefore, a good knowledge of the route was a prerequisite for success on this island. The British riders knew very well how to make use of their home advantage. In the recent years, however, the British dominance had begun to falter. 1935 saw the first non-English manufacturer win the race when Stanley Woods claimed victory on a Moto-Guzzi; in 1938, Ewald Kluge showed up the British competition on his DKW as the first non-British participant in the lightweight class to step up to the winner's podium. However, in the Senior TT, the premier class, it really was unthought-of to have a non-British winner.

The BMW team had already painfully experienced the peculiarities of the Isle of Man in 1938: Karl Gall had not even been able to line up for the race due to a severe accident during training, and Meier had dropped out due to a technical defect before even completing his first lap. Jock West, the British rider in the BMW team, had been the only one to finish the race at all, achieving a respectable fifth place. In 1939, the BMW team had, therefore, prepared themselves better for the race: The team had toured the island on fast BMW R 66 production models before the race to memorize the idiosyncrasies and perils of the long circuit. Legend has it that Georg Meier even took a hammer and removed a piece of an overhanging rock because it was projecting into his racing line.

However, initially BMW's luck in 1939 again seemed to be star-crossed. The official training ended in tragedy. Karl Gall had another accident in a similar spot to the year before and died from his injuries. At

first, BMW wanted to withdraw Meier and West from the race, but eventually they decided to line up anyway. The BMW riders were expected only to have outside chances, if any. The Norton riders Freddie Frith and last year's winner Harold Daniell as well as Stanley Woods on Velocette were regarded as the favourites.

Even when Meier achieved the best practice time by far, the British were still not concerned but rather suspected a tactical calculation behind the practice times of their fellow countrymen. They were, however, not bluffing at all, they just simply could not go faster, as became apparent during the actual race. After the first lap, Meier already had a lead of 52 seconds which he was able to hold in the following laps. When he reached the finishing line after seven laps or 2:57:19, he was 2 minutes and 20 seconds ahead of his teammate Jock West. 32 seconds later, Frith came in third, right before Woods.

With this victory, Georg Meier made racing history and BMW achieved the last title in international street racing that they

Frame

The frame is manufactured from conically drawn oval pipes and subjected to shielding gas arc welding. This way, the heavy cast sleeves can be spared.

Weight saving: 3 kg

Rims

The rims are manufactured from an aluminium alloy adopted from aircraft construction (Al-Cu-Mg4). This hollowly rolled and riveted material weighs less than half of the weight of the production model yet it exhibits the same resistance.

-1,2 kg of rotating mass per wheel

Spoke nipples

The spoke nipples are not made of brass but forged from an aluminium alloy.

-100 grams of rotating mass per wheel

1939 Isle of Man

Senior Tourist Trophy

had been missing. What was the secret to this success though? On the one hand, of course, Meier's excellent driving skills, but on the other hand, in racing sports the best talent is of no use if the material is not right. And Meier rode the perfect racing motorcycle of that time.

Delivering an output of 60 hp, BMW's supercharged engine with vertical shaft was designed in a rather conservative way, after all, the power unit with increased charging pressure in Ernst Henne's record motorcycle temporarily delivered more than 100 hp. The chassis featuring telescopic fork front suspension and the recently developed plunger rear suspension also supported this performance on the road under bad road conditions. On the bumpy circuit of the Isle of Man, Meier achieved average lap speeds of more than 90 miles per hour. His competitors had also come up with good chassis constructions and powerful engines though. So what was the secret of Meier's BMW works machine? A look into the 1939 TT edition of the English magazine "Motorcycle" sheds some light

Handlebars

The smaller diameter and the use of a high-strength aluminium alloy reduce the weight compared to the production model.

-350 grams

Engine block

The engine case is also manufactured from a magnesium alloy.

Telescopic fork

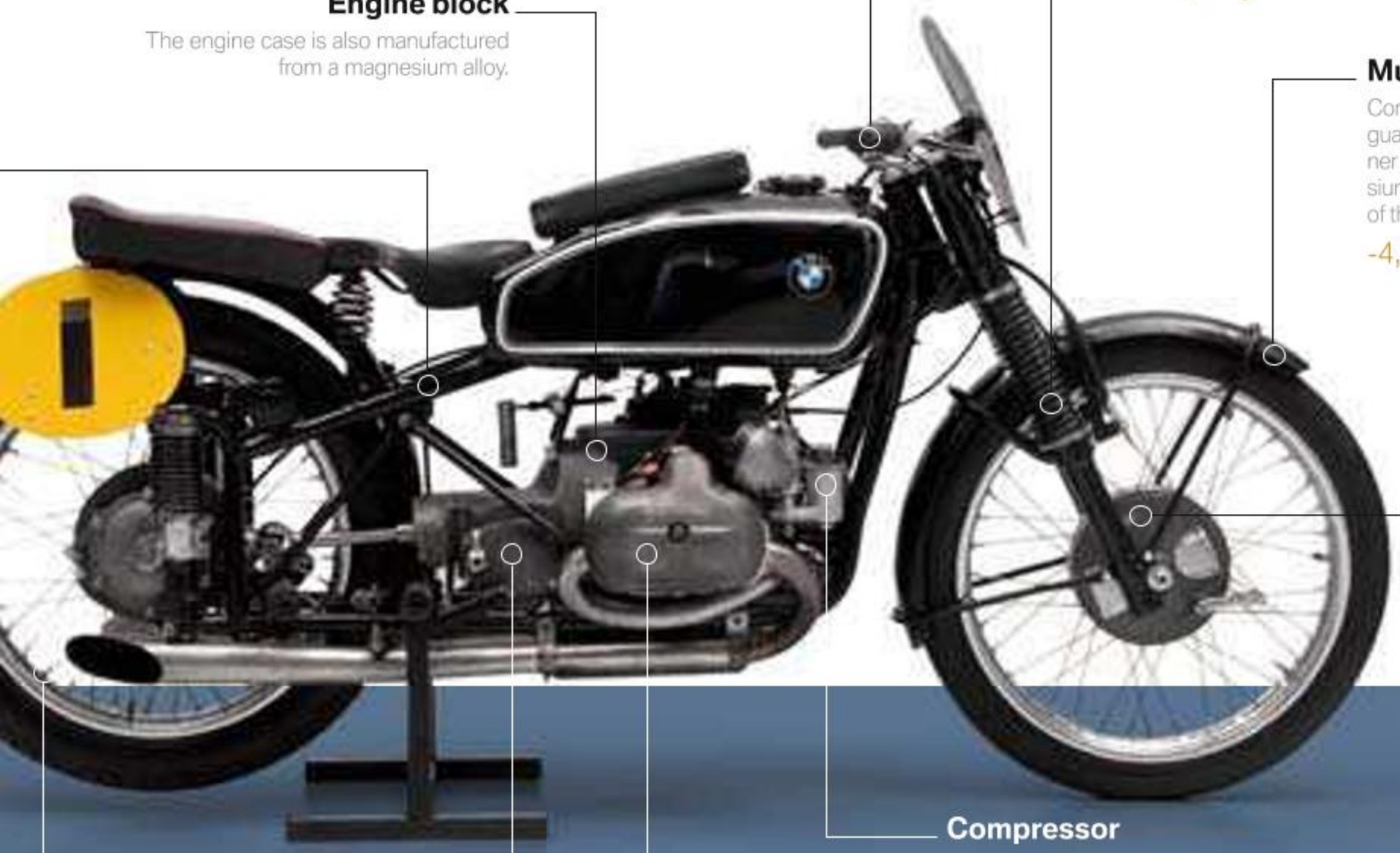
Unlike the production fork that is made of steel, the fork bridges and immersion tubes are made of aluminium.

-2,1 kg

Mudguards

Compared to the production model, the mudguards are not only narrower, shorter and thinner but also consist of electrum, a light magnesium alloy. As a result, they weigh a mere 10% of the production model's weight.

-4,5 kg



Wheel hubs

Parts put under heavy strain such as the hub gear and wheel bearing carriers are fabricated from a forged aluminium alloy.

-4 kg of rotating mass

Compressor

The case is cast from a magnesium alloy. The extremely thin-walled rotor is made of milled aluminium.

Transmission

Magnesium was used as case material.

-950 grams

Cylinders

The cylinders are manufactured from aluminium instead of from gray cast iron, the piston runs in a thin bearing surface, the cylinder head covers are made of magnesium.

-2 kg per cylinder

← LEFT Second-place Jock West (on the right) compliments teammate Georg Meier on his victory.

→ RIGHT The score board showed number 49 as the continuing leader in every lap, followed by number 35 – Jock West.

on this. It lists all motorcycles that lined up for the race including their weight. With only 137 kg, Meier's BMW was by far the lightest motorcycle in the Senior class. Freddie Frith's Norton, on the other hand, tipped the scales at 152 kg, and Stanley Woods' Velocette at 153 kg. Even in the smaller 350 lightweight class, only four motorcycles were lighter than Meier's BMW.

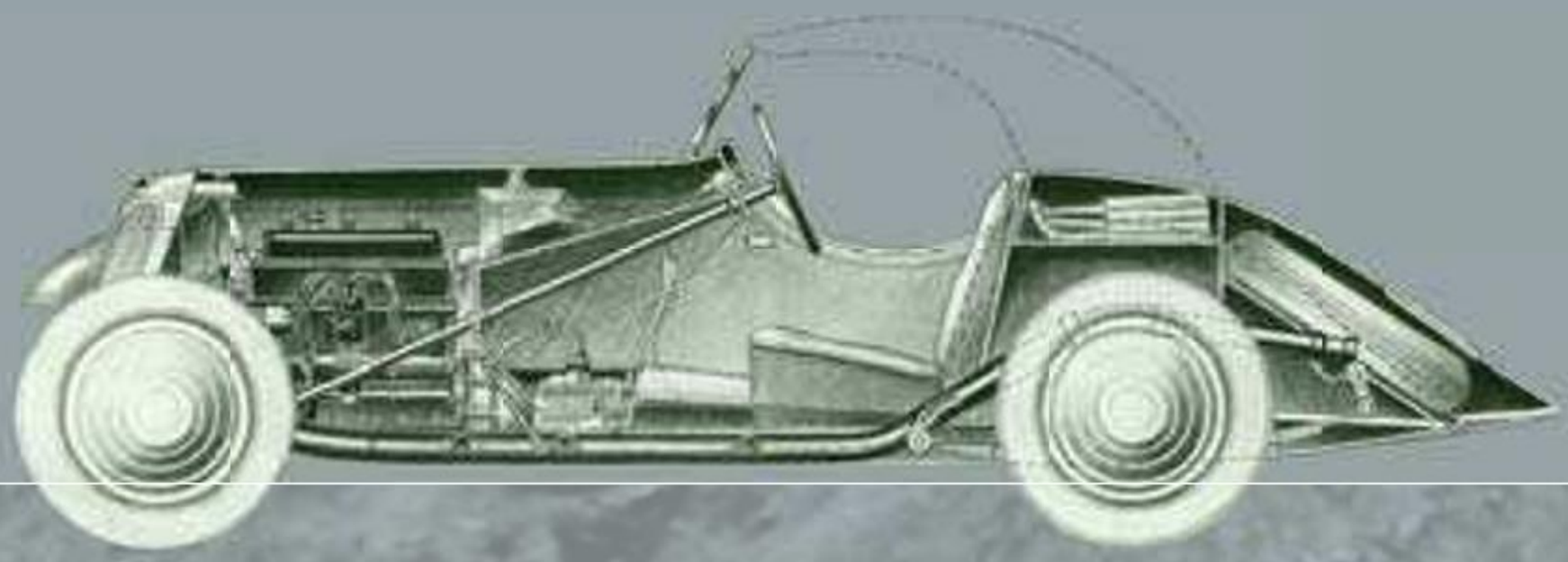
This weight reduction was achieved with "intelligent" lightweight construction, by combining state-of-the-art construction principles with deliberate use of material. The double cradle-type framework was built from electrically welded conical oval pipes, mainly made of light materials such as magnesium and aluminium. Whether it was about saving several kilograms, as in the case of the engine housing, or only a few grams, as in the case of the spoke nipples, BMW's engineers did not disregard any detail, as can be seen in the accompanying picture. Its supercharged models with vertical shaft had not only taken BMW to the top of European's racing sports, but had, thanks to their development of intelligent lightweight construction as early as the 1930s, also made an important contribution to dynamics and efficiency.

Efficient and dynamic – **the BMW Roadsters**

By Niklas Drechsler **Photos** BMW AG

BMW has been manufacturing roadsters for more than 75 years – a vehicle type that unites the main characteristics of BMW. Throughout their entire history, BMW roadsters have not only fascinated with their exceptional design, powerful engine output, and unique driving experience, but they have also been examples of efficient automobiles, thanks to lightweight construction, aerodynamics, or innovative technologies. The combination of dynamics and efficiency in BMW roadsters enhances the driving pleasure.

→ RIGHT The BMW 315/1 at the race on the Stilfser Yoke, 1934.



↓ BELOW The design of BMW's first roadster already focused on the essentials.

1934-1936

BMW 315/1, BMW 319/1

▸ Efficiency

Even the first roadster built by BMW featured constructions that made the vehicle lighter and therefore more efficient. The most remarkable innovation was the special tubular frame chassis, patented by BMW in 1933 and later adopted by other automobile manufacturers. In the 1930s, BMW assumed a pioneering role by systematically analyzing the advantages of light-weight construction and introducing it to mass production. The chassis frames of the BMW 315/1 and BMW 319/1 were only reinforced in places where they were really exposed to high bending moments. Wherever lower forces acted on the frames, the cross-sections of the tubes were appropriately decreased. This design principle, which was applied for the first time to the BMW 303, saved a considerable amount of weight. Eventually, the kerb weight of a BMW 315/1 only added up to around 750 kg.

▸ Driving Pleasure

In the 1930s, the model designation BMW 315/1 was only used internally; the car was sold as the BMW 1.5 Liter Sport. The almost identically designed model with a more powerful engine was officially called BMW 2 Liter Sport. These names hit the mark, since the roadsters really were sports cars, because of such features as the qualities of the running gear. Test drivers praised the "flawless" road holding, the handling characteristics "unprecedented in Germany", as well as the excellently safe brakes. These models were regarded as "sports cars of the purest kind". The magazine "Motor und Sport" commented 1936 on the dynamics of the BMW 2 Liter Sport (BMW 319/1) as follows: "This car will probably be the fastest mass-produced sports car of its class for years to come".

→ RIGHT The tubular space frame chassis of the BMW 328 was only reinforced where it was particularly necessary – just as that of the BMW 315/1 had been.

↓ BELOW In the late 1930s, the BMW 328 dominated the 2 litre class worldwide. Here it is at the Tourist Trophy 1938 in Donington.

1936-1940

BMW 328

▸ Efficiency

As well as lightweight construction, the BMW 328 featured sophisticated aerodynamics. The press release called it a "zephyr-like construction". It is definitely remarkable that the BMW 328 already had an almost full underside paneling at that time. Overall, the BMW 328 had a very aerodynamic bodywork, exemplified by the rear wheel covers, compared to other production-vehicles of its era.

Aside from the aerodynamics, the low weight of less than 800 kg was also decisive when the BMW 328 was ranked among the fastest German sports cars of the late 1930s. The considerably higher air resistance of other manufacturers' sports cars forced them to use larger supercharged engines to achieve the BMW 328's maximum speed of 155 km/h.

▸ Driving Pleasure

To this day, the BMW 328 is regarded as one of the most legendary BMW models. The engine of the BMW 328 strongly contributed to this reputation. The standard 6-cylinder in-line engine, which delivered a maximum output of 80 hp, was sufficient for this model to dominate the 2-litre class races in the late 1930s.

How simple and yet brilliant the design was! This was proven with specially constructed BMW 328 competition vehicles which lined up at the Mille Miglia in 1940: Their standard bodyworks had been exchanged for tailor-made lightweight constructions fitted with engines with an output of 136 hp. This improved performance by 70 percent compared to the standard engine. These vehicles drove from Munich to Brescia on their own wheels, won the "Gran Premio delle 1000 Miglia", and then returned to Munich. The solid, efficient engine design of the BMW 328 provided the basis for BMW's racing sports activities until well into the Fifties.

↓ BELOW The BMW 507 – one of the most beautiful BMWs of all times.

1956-1959

BMW 507

▸ Efficiency

The use of aluminium made the BMW 507 particularly light. The engine, an impressive proof of BMW's competence in casting technology, particularly with regard to aluminium, was a sensation: It was the world's first mass-produced V8 engine with not only its cylinder heads, but also its engine block, completely made of aluminium. As a result, the 8-cylinder engine tipped the scales at about 30 kg more than the traditional 6-cylinder engine. The light engine helped to break the cycle at a crucial point: If the engine was heavier, the undercarriage components would have to be stronger; the excess weight would require bigger and heavier brakes, and therefore more engine output. For this reason, the light engine allowed for a light vehicle. To save additional weight, the BMW 507's bodywork was also made of aluminium.

▸ Driving Pleasure

The BMW 507's engine was not only particularly light, but also featured other remarkable qualities. In a sporty roadster, you not only look for performance, but also at the way the performance develops. The BMW 507 not only delivered strong performance of 150 hp, but the performance was also very harmonious. The excellent running smoothness and the powerful engine sound of the V8 engine also played an important role for the luxurious roadster. The press celebrated the 507 as "Dream of the Isar" and "BMW sensation". This roadster model, which was driven by celebrities such as Elvis Presley, is regarded as one of the most beautiful sports cars of its time. Most of the 251 produced cars are still in good condition today.

↑ ABOVE The power unit of the BMW 507 was the world's first mass-produced light metal V8 engine.

1988-1991

BMW Z1

▶ Efficiency

The small batch series BMW Z1 was a leader in innovative technology. A self-supporting monocoque chassis made of hot-dip galvanized steel profiles formed the base of the BMW Z1. The framework, with an outer skin of synthetic material, saved a considerable amount of weight. The aerodynamics were also very progressive for that time. The underfloor was completely smooth, to minimize swirling. The exhaust's rear silencer had a wing profile and was part of a rear diffuser that generated contact pressure. A spoiler lip provided stability at high speed and considerably improved air resistance. The average fuel consumption of 9.2 litres of regular gas per 100 km was an impressive achievement at the end of the Eighties.

▶ Driving Pleasure

The pleasure of driving the BMW Z1 was primarily based on its progressive running gear technology. It anticipated the technology that later turned into one of BMW's main sales criteria, as used, for example, in the third generation BMW 3 Series. The rear Z axle provides very agile handling, directional stability, and easy controllability even during extreme load cycle changes. The front mid-engine concept also supports these impressive handling qualities. The engine is located between the front axle and the driver, and therefore causes a perfect balance of the vehicle's weight between the front and the rear axles. Another reason for the special position the BMW Z1 takes in the BMW product history is its exceptional design, featuring retractable doors.

↑ ABOVE The BMW Z1 was allowed to be driven with retracted doors in public traffic.

↓ BELOW The monocoque construction is the heart of the BMW Z1.

← LEFT Efficiency was a key element of the BMW Z3's overall technical concept.

1995-2002

BMW Z3

▸ Efficiency

Thanks to the combination of its low weight and the available engine types, the BMW Z3 was a comparatively fuel-efficient vehicle. At first, it came with economical 4-cylinder engines, before 6-cylinder engines added a new innovative technology to it. The 6-cylinder models with fully variable control of the valve opening time (VANOS), and later with Double VANOS, enabled higher torque at low rotational speed with the same fuel consumption. Even the BMW M Roadster, equipped with the same engine as the BMW M3, can be regarded an economical vehicle with regard to its road performance. It also featured VANOS, which improved fuel efficiency.

▸ Driving Pleasure

One feature that heightens driving pleasure runs like a thread through the history of BMW roadsters and is especially noticeable in the BMW Z3: The seat position. It is surprisingly similar in all roadsters. Whether you take a seat in the BMW 315/1 of 1934, in the BMW 507 of 1955, or in the BMW Z3, you always have a long bonnet in front of you and feel exceptionally close to the road. Granted, in the older BMW roadsters, you sit a little higher than in the modern models, but the basic feeling is very similar. This far-back seat position, just in front of the rear axle, conveys sheer driving pleasure. One can feel from the drive wheels exactly what is happening with them. This feeling makes it possible to take immediate action and gives incredible driving pleasure.

← LEFT The aluminium space frame construction of the BMW Z8 saves a lot of weight.

1999-2003

BMW Z8

Z8's kerb weight only came to 1585 kg despite its powerful V8 engine and numerous technology features. Similar products from competitors, such as the Jaguar XKR Convertible and the Mercedes SL 55 AMG, were considerably heavier.

▸ Efficiency

Throughout the history of BMW roadsters, two main strategies were continuously employed to increase efficiency: the use of aluminium and weight saving frame constructions. The BMW Z8 featured both elements: It was the first-ever BMW composed of an aluminium space frame construction. This bodywork frame, made of aluminium extrusions, considerably reduced the weight: The unpainted bodywork of the BMW Z8 without boot lid, bonnet, doors, and window glass weighs 216 kg; had it been made of sheet steel with similar stability, it would have tipped the scales at almost 300 kg. In some places the aluminium walls were noticeably thicker than the steel walls, so the technicians needed less sound isolation material. Moreover, the good corrosion qualities of aluminium removed the need for galvanized sheet metal, thick underfloor protection, and cavity seals. Thanks to all these measures, the BMW

▸ Driving Pleasure

The design, modelled on the 507, is not the only feature that makes the BMW Z8 the ultimate roadster. Back then, the V8 power unit, taken from the BMW M5, represented the highlight of mass engine production: 5 litre displacement, 500 Nm maximum torque, 400 hp output, four valves per cylinder, Double VANOS, one throttle valve per cylinder. The result was an unbelievably spontaneous development of performance and an engine sound that gives you goose bumps. The powerful engine accelerates the vehicle from 0 to 100 km/h within 4.7 seconds. Even James Bond was assured of the driving pleasure of this sports car in "The World is not Enough". The combination of an engine with racing genes and an elegant, luxurious roadster gave a unique driving experience.

↓ BELOW The first generation BMW Z4 roadster stands out due to its characteristic design.

↓ BELOW RIGHT Dynamic Driving Control can be activated via the sports button.

2002-2008

BMW Z4 1st Generation

▸ Efficiency

The first generation BMW Z4 featured a variety of innovations for increased engine efficiency that paved the way for today's BMW EfficientDynamics strategy. For example, this model line, except for the M model, was equipped with engines featuring VALVETRONIC. This fully variable control of the inlet valve lift lowers fuel consumption considerably. By stepping on the accelerator, the driver no longer controls the throttle valve(s), but directly controls the inlet valves instead, which helps to avoid unnecessary throttle losses. Therefore the engine can "breathe" more freely, and fuel is used much more efficiently than in engines without this technology.

▸ Driving Pleasure

The pleasure of driving the first generation BMW Z4 results from its basic conception which, as in the case of all BMW roadsters, is purely focused on the driving.

The BMW Z4 does not want to transport, it does not want to spoil with comfort – it just wants to be driven. Equipped with powerful 4- and 6-cylinder engines and special sound engineering, the BMW Z4 guarantees pure roadster feeling. Dynamic Driving Control (DDC) allows spontaneous throttle response and more dynamic programme switching. A broad trace, an extremely low centre of gravity, and an optimum axle load distribution of 50:50, together with steering precision (Electric Power Steering), support the outstanding agility of the BMW Z4.

as from 2009

BMW Z4 2nd Generation

▸ Efficiency

The new generation BMW Z4 features the complete technology package of BMW's EfficientDynamics strategy. All models have brake energy regeneration. By stepping off the gas, the driver activates a generator that charges the battery without consuming any fuel. In addition, the steering mechanism is supported by an electromotor which consumes energy only during steering. The oil pump, controlled according to the engine map also operates only when actually needed. Similarly, the control of the pressure regulated fuel pump is demand-activated, depending on fuel consumption. Tyres with reduced rolling resistance save further fuel. In the top-of-the-line model, High Precision Injection provides a more exact preparation of the air-fuel ratio, a more precise ignition, and lower temperatures. This leads to better performance without the additional consumption typical of turbo technology.

▸ Driving Pleasure

The new generation BMW Z4 conveys driving pleasure thanks to a new interpretation of the roadster principle: the design is modern and aesthetic, the materials are of high quality, and the feeling is very genuine and yet puristic. One of this vehicle's advantages is that the driver is given the freedom to choose between either a comfortable or a sporty way of driving. You could also say that the new BMW Z4 demands less and offers more. In this model, more attention was paid to convenience. The retractable hardtop makes it a roadster for everyday use, and the storage space and loading possibilities have been designed accordingly. The objective of the new BMW Z4 is to preserve driving pleasure and increase convenience.

↑ ABOVE The grace of the new roadster's material is unique in this class.

↓ BELOW The new BMW Z4 seamlessly continues the tradition of BMW's dynamic and efficient roadsters.

BMW Individual

Seite 23

Freude am Fahren

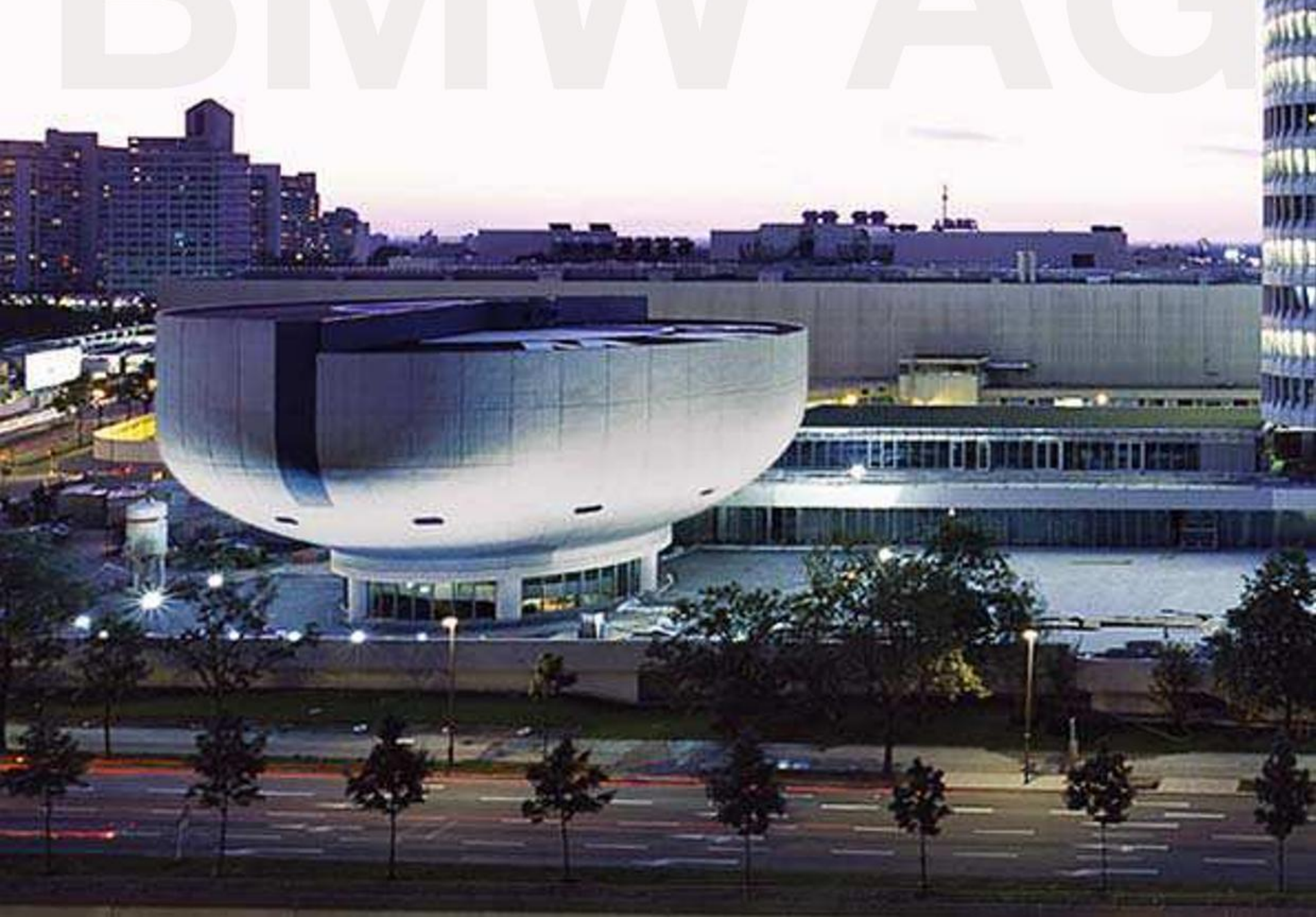
Kontraste mit Sinn für eigene Konturen.
Der BMW Individual Z8.

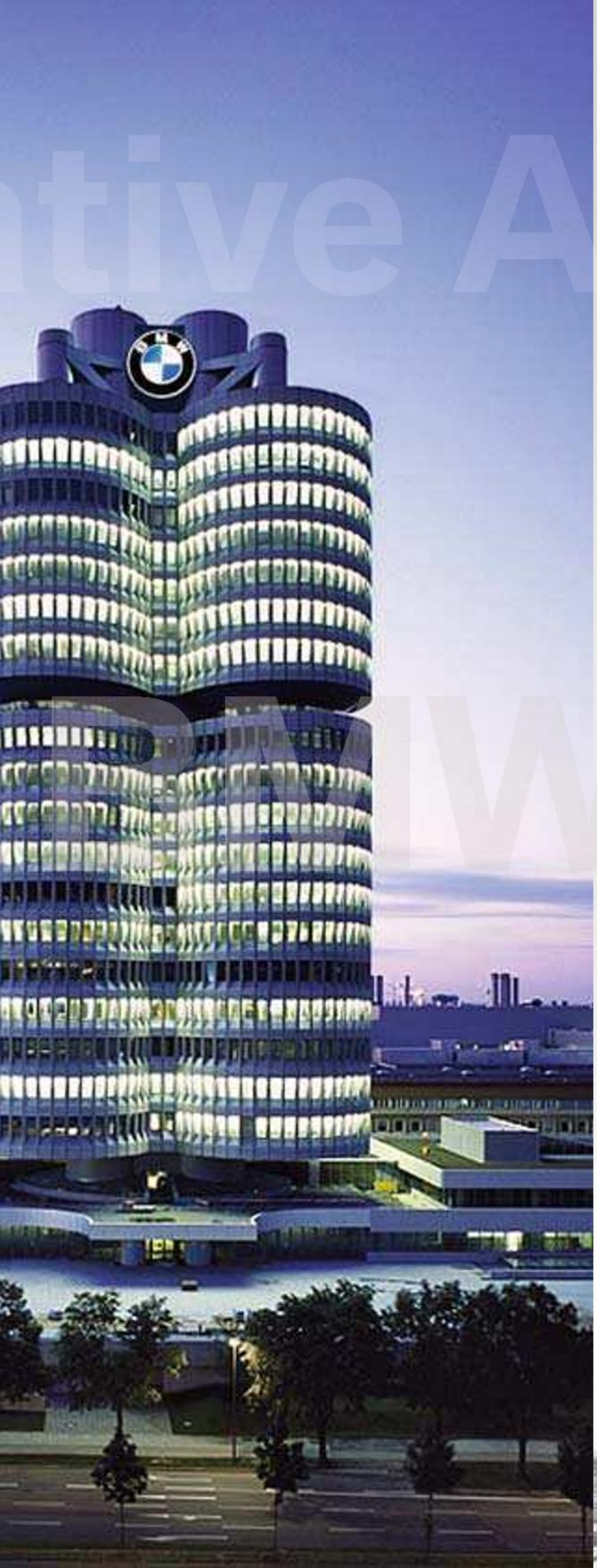
BMW Individual

Communicative Architecture

By Nicole Bergmann Photos BMW AG

At the end of the Sixties, BMW developed an architectural philosophy, which continues to be applied to this day. Based on the concept of "Communicative Architecture", this architectural philosophy not only represents the BMW company to the outside, but also affects the workflow within the company. It aims to improve direct and personal communication between BMW Group's employees with short walking distances between departments. This architectural arrangement of work space has strongly contributed to the efficiency of the entire company.





← LEFT BMW Headquarters in Munich: The BMW Tower and the neighbouring BMW Museum, 2006.

↓ BELOW Construction of the BMW Tower: Erection of the building core with a height of 99.5 metres, 1970.

It all began in 1968 when the Viennese architect Prof. Karl Schwanzer presented his design model in the architectural competition for the BMW Tower in Munich. From the very beginning, Schwanzer's proposal stood out from the competition due to its exceptional architecture. He won the competition and his concept for the building of the new BMW Headquarters was realized between 1970 and 1973 south of the Munich BMW plant.
The unique construction of the BMW Tower catches one's attention immediately. It was the first "hanging" tower building built in Germany. Four 22-storey piston-like hanging towers are suspended from a four-armed girder cross at almost 100 metres. Thanks to this remarkable shape as well as its silvery-gray shimmering facade, the new BMW Tower, together with the neighbouring bowl-shaped BMW Museum, soon became not only a symbol of BMW but also a landmark of the city of Munich.

The inside of the BMW Tower is characterized by its cloverleaf-shaped ground plan. Each storey is comprised of four circular segments which mainly host open-plan offices. These so-called "team offices" are connected by two corridors which run through the storey core forming a cross. The short walking distances created by the architectural structure facilitate the close, fast, and efficient cooperation of employees.

The office structure in the tower block also corresponds to BMW's principle of flat hierarchies. From the trainee up to the head of department, each department works side by side in one team office. Individual offices are scarce. These flat hier-

↗ ABOVE Team offices with short walking distances: 1973 and today.

→ RIGHT BMW Tower: Model of a storey segment, 1968.

FIZ

↑ ABOVE The honeycomb structure of BMW's Research and Innovation Centre (FIZ) with connecting walks, 2006.

archies stimulate teamwork, which BMW places great importance on.

Teamwork is also encouraged in BMW Group's Research and Innovation Centre (FIZ). Designed by the Munich architect Gunter Henn, construction of the FIZ began in 1983, and it was officially opened in 1990. This is the centre for all specialist departments involved in product development, from the first design study to production planning. The crucial integration of the different departments and projects is supported by a special honeycomb structure. This is especially evident when looking at the research centre from above.

In the FIZ, workshops, laboratories, design studios and offices are arranged in immediate proximity to each other. This arrangement is a fundamental precondition for organizing the complete manufacturing flow of a new product in one place.

Another key component of the "Communicative Architecture" realized in the FIZ are the connecting corridors and bridges, which enable employees to contact each other quickly and directly to discuss relevant development topics on-site.

Around 7,000 designers, model makers, bodywork technicians, engineers, computer experts, technicians and scientists specializing in different areas work side by side in the Research and Innovation Centre. They are supported by employees from the logistic, controlling, and human resources departments, whose offices are also located in the FIZ. Process-oriented teamwork and fast communication, in short, efficient work are the top priority here.

In 2004 the FIZ was extended to include the project house, which complements the pre-existing buildings harmoniously due to its numerous connecting corridors and bridges. Within two years, a nine-storey building hosting offices, studios and conference rooms was built on a floor space of 12,000 m². The building bases itself on the principles of "Communicative Architecture" and, featuring an open gallery and an atrium, it has become the new centre of the FIZ.

The concept of "Communicative Architecture" was also adopted for the central building of the BMW Leipzig Plant, designed by the London architect Zaha Hadid. Serving as the administration and communication centre, it

unites modern geometric design with multifaceted functionality by connecting surrounding production areas and creating space for encounters.

The Leipzig Plant premises mainly comprise of production halls and auxiliary buildings in classic industrial architecture, with the central building embedded in their centre. A conveyor belt running through the middle of the administration and communication departments connects the three core production stages – bodywork construction, paint shop and assembly. Thus, both the bodyshells and the painted bodyworks repeatedly pass through the central building along a total of 600 metres of purpose-built conveyor paths. This allows employees and visitors to follow and experience the production progress at very close range. Therefore, all processes are highly transparent. But there is more to it: Just how closely production and administration areas are intertwined with each other is made clearly visible. Workers and employees meet quite naturally and can, therefore, constantly communicate and exchange ideas. The central building itself houses additional office spaces, laboratories, workshops and conference rooms, many of which take the principle of transparency and efficiency into account by featuring large glass walls.

The architecture of the central building characterizes the visual impression of the plant. Zaha Hadid's building won the renowned German Architecture Award in 2005, as well as a number of other prizes for architecture. At the award ceremony, Dr. Norbert Reithofer, Chairman of BMW AG's Board of Management, explained: "We have never considered architecture an end in itself, but rather it always performs a clear function. Good architecture supports the workflows, of both the people and the process chains."

The central building of the Leipzig Plant, completed in 2005, is an illustrative example of BMW continuing to pursue the "Communicative Architecture" architectural philosophy and to constantly set new standards. Buildings hosting different departments, such as administration, development, and production are consistent with BMW's guiding principles of short distances, transparency, efficiency, and an open employee culture – this is exemplified by the BMW Tower, the Research and Innovation Centre as well as the central building of the Leipzig Plant.

→ RIGHT Side by side: Office workspaces and conveyor belt in the central building of the BMW Leipzig Plant, 2005.

← LEFT Production in motion: Visualization of the BMW Leipzig Plant.

BMW Leipzig Plant

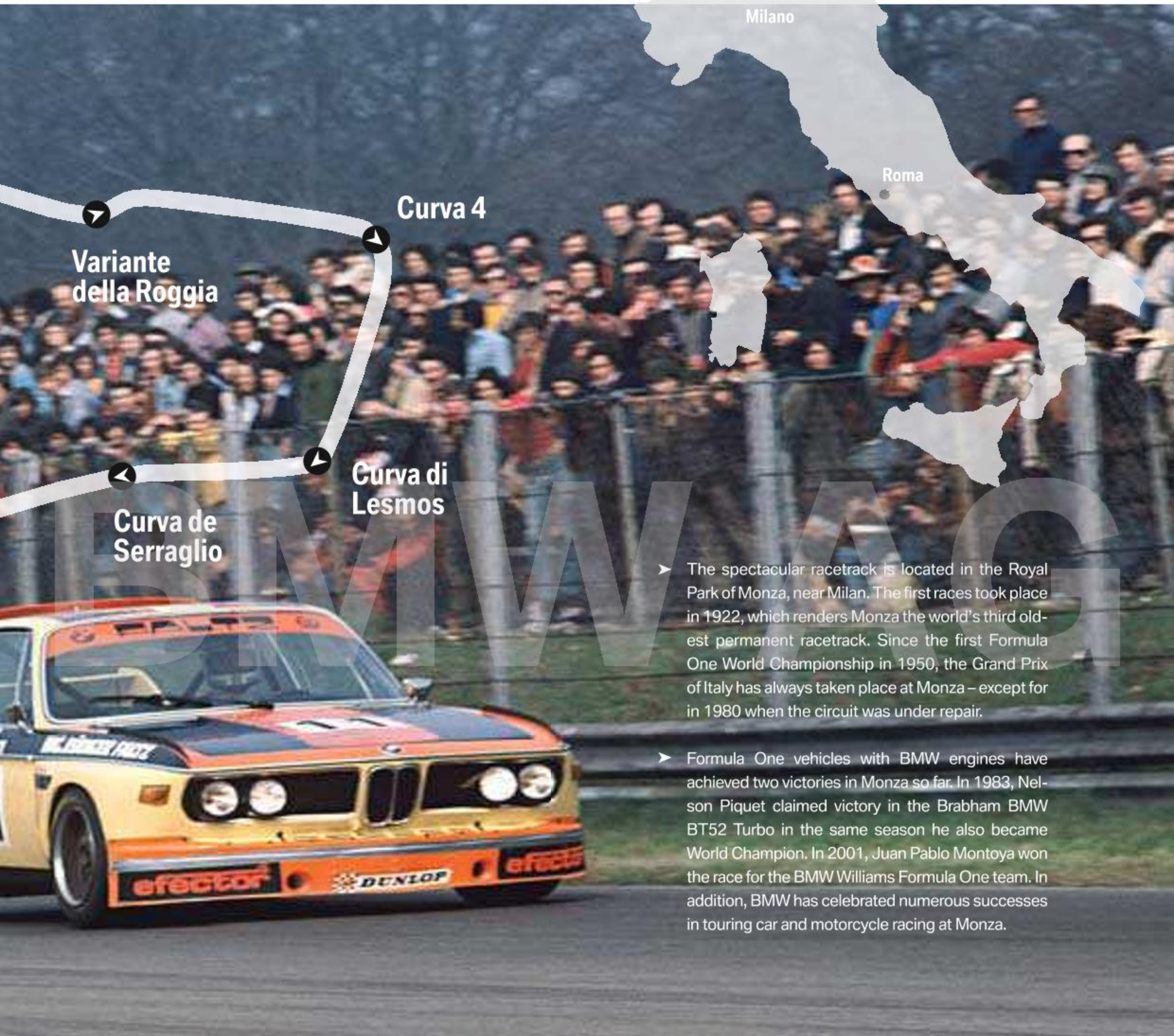
BMW Leipzig Plant

Historic
race tracks

Autodromo Nazionale di Monza

The side car team Noll/Cron at the Italian GP in Monza, 1954. Hans Stuck and his son in Monza, 1973. Leto di Priolo und Ottavio Pradoni in a BMW 700 at the second Trofeo Alberto Ascari in Monza. (clockwise)

The “Autodromo Nazionale di Monza” still ranks among the world’s fastest racetracks. Modern Formula One vehicles can drive with full throttle on about 80 percent of the circuit. At Monza, the actual maximum speed of a vehicle is more decisive for victory or defeat than at any other Formula One track in the world.



- The spectacular racetrack is located in the Royal Park of Monza, near Milan. The first races took place in 1922, which renders Monza the world’s third oldest permanent racetrack. Since the first Formula One World Championship in 1950, the Grand Prix of Italy has always taken place at Monza – except for in 1980 when the circuit was under repair.

- Formula One vehicles with BMW engines have achieved two victories in Monza so far. In 1983, Nelson Piquet claimed victory in the Brabham BMW BT52 Turbo in the same season he also became World Champion. In 2001, Juan Pablo Montoya won the race for the BMW Williams Formula One team. In addition, BMW has celebrated numerous successes in touring car and motorcycle racing at Monza.

Juan Pablo Montoya’s victory in a WilliamsF1 BMW FW23 in 2001, in front of Michael Schumacher in a Ferrari. Hans-Joachim Stuck und Walter Brun in a BMW 635CSi Group A at the European Touring Car Championship in 1983. Jörg Müller for the BMW Team Germany Schnitzer Motorsport a the ETCC 2004. BMW touring car driver Andy Priaulx’s victory, 2003. (from left to right)

Company history

All from one source

By Max Bauer Photos BMW AG, Nina Hornung

A golden opportunity for those who appreciate their classic BMW vehicles. The new BMW Classic Center gives top priority to quality, originality, and above all the customer's wishes. With the manufacturer's specific know-how and comprehensive infrastructure, as well as the long-standing experience and passion from employees, BMW Classic is setting out to conquer the market.

↓ BELOW Ralf Vierlein and Richard Wenzel of BMW M GmbH are examining the exposed bodywork of a BMW M1 series model belonging to a Malaysian customer.

Ralf Vierlein, General Manager Development and Technologies BMW Classic, is watching over the BMW M1 like a hawk. Several experts are immersed in restoring the classic vehicle, taking great care over every detail. As the preservation of originality is of utmost importance to this project, Vierlein keeps tabs on every part of it. The M1 belongs to a customer from Malaysia who had it shipped to Munich – by sea, well wrapped in a container – to have it completely restored by the BMW Classic Center.

"For many years, this vehicle was practically sitting in the jungle exposed to harsh climatic conditions, so on its arrival the classic really looked quite battered. The underbody was covered with termites' nests; not a single rubber part remained undamaged. First, the vehicle was completely cleaned and freed from all 'residents'. Now we're taking the vehicle to pieces, to completely reassemble it", explains Vierlein, the former Head of Aftersales of branch office BMW Essen.

Vierlein and his team expect the restoration of the BMW M1 to take between one and one and a half man-years. This rare item from Malaysia is just one of several orders already placed in 2008. Aside from a BMW M1 Procar and a BMW R 69 S motorcycle, a BMW 3.0 CSi is also awaiting its turn. The owner wants to replace the manual transmission with automatic transmission – a difficult task which requires the competence of the original manufacturer. This was probably the reason why the custom-

← LEFT At first, the BMW M1 was taken to pieces. Many spare parts are custom-built, e.g. by the prototype construction department of BMW M GmbH. After the restoration, the BMW M1 will be more valuable than when it left the production line at the end of the 1970s.

er was previously rejected at several other workshops.

For many years, the workshop had primarily been involved in in-house work, Vierlein explains. "We prepared our own classic vehicles for trade fairs, races, and photo shoots. With this experience, passion, and competence from our employees, as well as the manufacturer's infrastructure, we now want to conquer the free market." The construction of the BMW Classic Center is part of the redirection that began when BMW Mobile Tradition was renamed BMW Classic, and is now setting another milestone by giving noticeably more attention to customers and service.

At present, there are more than 200,000 classic BMW automobiles and about 70,000 classic BMW motorcycles worldwide. These figures are rapidly increasing, as more and more generations of high-volume model lines of the BMW 3 Series, 5 Series, and 7 Series are now old enough to count as classic cars. At the same time, more and more customers want to drive a classic vehicle without foregoing the service of the original manufacturer. BMW Classic meets this desire for reliable maintenance, in accordance with familiar BMW quality standards, with the BMW Classic Center, a customer workshop for classic BMWs. The range of services on offer has been expanded considerably: For example, in addition to restoration and repair work, BMW Classic now offers a vehicle-expertise service, as well as advice on purchasing and selling classics.

The range of services is aimed at all owners of classic BMW vehicles, both automobiles and motorcycles. "The great advantage for customers who take their vehicles to the original manufacturer is that they receive all services from one source. We have the theoretical knowledge about the vehicles, the technical know-how, the original BMW spare parts, and the adequate infrastructure to synthesize all this systematically", Vierlein reasons.

The theoretical knowledge is stored in the BMW Group Archives, a separate department that is located in the same building as the workshop, and can therefore be of assistance easily and quickly. The archives accommodate thousands of documents and pictures, many of which are also available digitally. If a detail is not clear or a part is missing, you can always consult original operating and repair instructions, or identify details in the pictures. The disposition and aftermarket production of original BMW parts for classic vehicles is also carried out in-house.

"Mechanical and electrical repair works are carried-out here in Munich. Everything

BMW Vehicle Expertise

The protection and maintenance of classic BMW automobiles and motorcycles are fundamental concerns of BMW Classic. For this reason, BMW Classic offers the BMW Vehicle Expertise service, including an extensive technical inspection.
The Vehicle Expertise service provides you with information about the originality and the condition of your classic vehicle. Modifications caused by repairs or restoration work over the years are often difficult to recognize. Therefore, in order to provide this service, experts from the BMW Classic Center work closely with their colleagues from the BMW Group Archives, where key information is held regarding a vehicle's history, which can be useful for reconstruction.
BMW Classic is one of the few manufacturers which, offers expert service for their classics. The BMW Vehicle Expertise service assists you in accurately assessing the market value of your classic BMW, and ensures that you are able to buy and sell with absolute certainty.

For further information and prices visit: **www.bmw-classic.com**

concerning bodywork is outsourced to the body shop or paint shop at the BMW plant in Dingolfing. Motorsport vehicles are passed directly to colleagues at BMW Motorsport GmbH, and if M models are concerned – as in this case the M1 – we team up with the M GmbH," Vierlein explains. The restoration of the BMW M1, for example, is so specific and extensive that BMW entrusted a graduand just to work on the M1's control unit. The know-how of different departments is systematically combined. This way, BMW Classic Center can guarantee that their services will meet BMW's familiar quality standards.

At present, BMW Classic is working on the general set-up for the new services. The former Historical Customer Workshop, which until now has mainly carried out in-house work, is being converted into the modern BMW Classic Center, featuring both a reception area and a work area, which complies with BMW's Corporate Identity Standards and offers necessary state-of-the-art technology such as a brake-test stand.

Moreover, BMW Classic is presently reviewing its cooperation with other BMW dealers and classic vehicle markets. "This has really been catching on. We've been contacted by Romania, Spain, and even by a collector from Brazil who wants to discuss restoration work. Now, we need local partners for future cooperation," explains Dr. Thomas Tischler, Project Manager, BMW Classic Center. Last year, BMW Classic entered into the first cooperative arrangement with the BMW branch office in Zurich-Dielsdorf. The Swiss branch office reported a high number of classic BMW vehicles and a consequent high demand for adequate service in Switzerland. Aside from support in the service sector, BMW Classic is also considering cooperative arrangements with regard to events and exhibitions.

According to Vierlein and Tischler, the U.S. market is especially important. The BMW Car Club of America has more than 70,000 members and the BMW Motorcycle Owners of America Association has about 50,000 members, each of whom, ac-

↑ ABOVE BMW Classic's motor vehicle specialists are examining a BMW 328 from 1938.

↙ LEFT A look into the BMW Classic Center: The first orders for the restoration of private vehicles have already been placed.

cording to an internal study, owns an average of three to four vehicles. Now BMW Classic wants to approach this large target group more systematically. Vierlein again: "We are planning on establishing a Classic Center in the USA, providing its own parts and distributing to both industrial consumers and private customers." He says that the first steps have already been taken, and that specialist contacts have already been established.

With these plans for expansion, the new range of workshop services, and much improved distribution of parts, BMW Classic feels ready to confront the upcoming challenges head-on. For BMW, this ambitious project is certainly paying off: The company makes additional revenue, and many BMW classic vehicles remain well preserved thanks to the high-quality service.

Interview with Ralf Vierlein
General Manager Development and Technologies BMW Classic

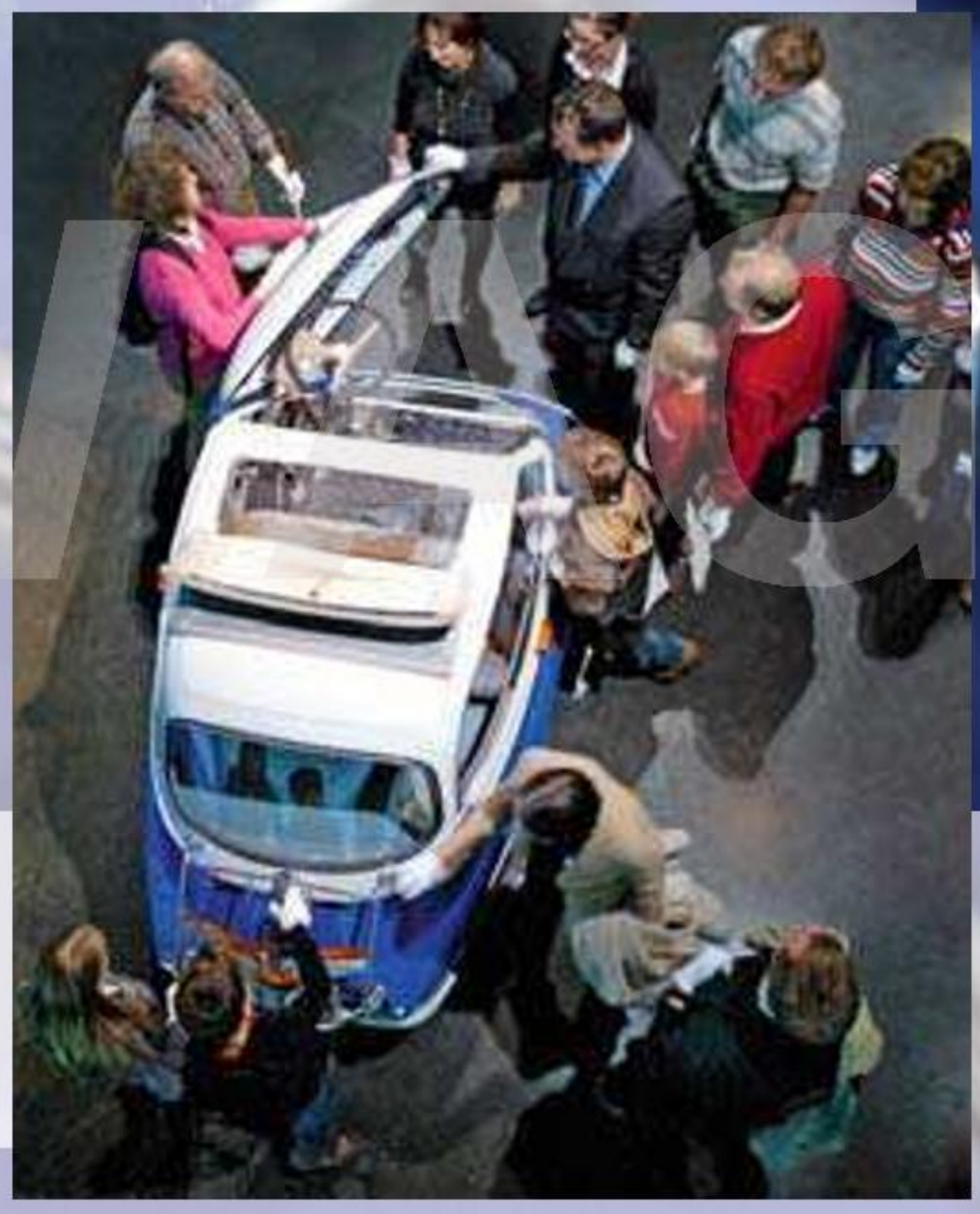
You joined BMW Classic in September. What do you consider to have been your biggest challenge so far?
We are starting a completely new business sector. We have to define our range of services and products, remodel our premises, and train our employees. We are in the middle of this process and there's still a lot to be done.

Why should I have my classic BMW repaired by BMW Classic?
We strongly embed our brand in the classic market, and can therefore provide high-quality service in this segment. As the manufacturer, we have the necessary skills and know the vehicles' history. Our experts are specialized in these products. We manufacture, we restore, we repair – in cooperation with other BMW plants, we do everything ourselves; more authenticity isn't possible. Moreover, we handle our own parts-distribution with a wide range of products; and – in case something particular should be missing – we also maintain very good relationships with our suppliers to guarantee the provision of aftermarket parts.

How has this new service been received by the customers?
The customers' feedback has been very positive. We manufacture the vehicles, they know us. Besides, we have the advantage that we cooperate with numerous BMW clubs worldwide, which represent a large part of our market. We've also received positive feedback on the price-performance ratio. The over-proportional order quantity reveals that we are able to compete on the market.

A feast for the fingers

The BMW Museum at your fingertips



By Dr. Andreas Braun

Photos BMW AG, Gudrun Muschalla

The “Night of the White Gloves” at the BMW Museum was a memorable evening. 1500 visitors streamed through the urban architecture, carefully touching the valuable exhibits in the BMW Museum with great enthusiasm and interest. The last guests left the exhibition after midnight – rewarding the museum for this courageous idea.

↑ ABOVE The BMW Museum as a world of adventure: A fascinating experience for children and an exciting search for details for aficionados of the first roadster, the BMW 3/15 DA 3 Typ Wartburg. On the right, a scene from the mime demonstration "A Night at the Opera".

His young eyes were lit up as if Christmas, Easter and his birthday were all happening at once. Still not really trusting the exceptional offer, he gave his mother a questioning look and asked her "Am I really allowed to touch this?". The young boy was one of about 1500 guests who did not want to miss the "Night of the White Gloves" on this cold November evening. Simple white linen gloves, such as those worn by restorers, allowed the visitors to touch almost all of the valuable vehicles that evening.

Everybody knows that temples of the muses of this kind – whether they are art or technology museums – do not allow their exhibits to be touched. Usually, the BMW Museum, which owns treasures on two, three and four wheels worth millions of euros, does not allow its visitors to touch its some 120 exhibits from BMW's 90 year history either.

The night was a success and also a very special experience. Despite the lousy weather conditions, BMW fans and employees, as well as families with children, young couples, mechanical engineering students, and design enthusiasts came to visit the BMW Museum. The gloves, which were given out together with the tickets, obviously had a positive effect on the visitors who not only showed great curiosity and desire to learn, but also great respect for the classic vehicles. They traced shapes and profiles with their fingers, explored radiator grills, stroked lamps, backrests, and steering wheels, and paid great attention to the explanations of the museum staff, who pointed out style features and functionalities and enabled the visitors to look at interior equipment, as well as engine and luggage compartments.

The evening's program was topped off with interviews with BMW experts: Dr. Ralf Rodepeter, Director of the BMW Museum, talked about the daily routine and experiences entailed in his job. Ralf Vierlein, General Manager Development and Technologies, BMW Group Classic, answered all kinds of questions on the world of vehicle restoration. Jürgen Steinle and Martina Starke addressed aspects of BMW Design, which turned out to attract the most attention. The presentation of the GINA Concept Car, a vision of future material and design, was especially popular amongst the visitors. Those more interested in technology and power train engineering got their

Press commentary

Sueddeutsche.de, 24 November 2008

"A time to stroke, to pat, to fondle and to fumble; a night when nothing goes untouched. It is the great night of love for BMW enthusiasts, one night without talk of the economic crisis, government guarantees and extended holiday shutdowns. And, if at the beginning of the night some of the exhibits were a little dusty here or there, they definitely were not at midnight when the doors closed."

money's worth going for a short spin in a BMW Hydrogen 7.

Last but not least, the mime artist Maria Ramer and her deaf student Amadeus Rodermund treated the visitors to a journey through the 1920s, 50s and 80s. They converted the BMW Square in the new part of the museum into an action stage.

One group of visitors especially enjoyed it, as they were completely in their element sensing objects by touching them: Blind and visually impaired persons were able to feel the exhibits around them to "grasp" them – a preview of a programme which the BMW Museum will offer on a regular basis from spring 2009.

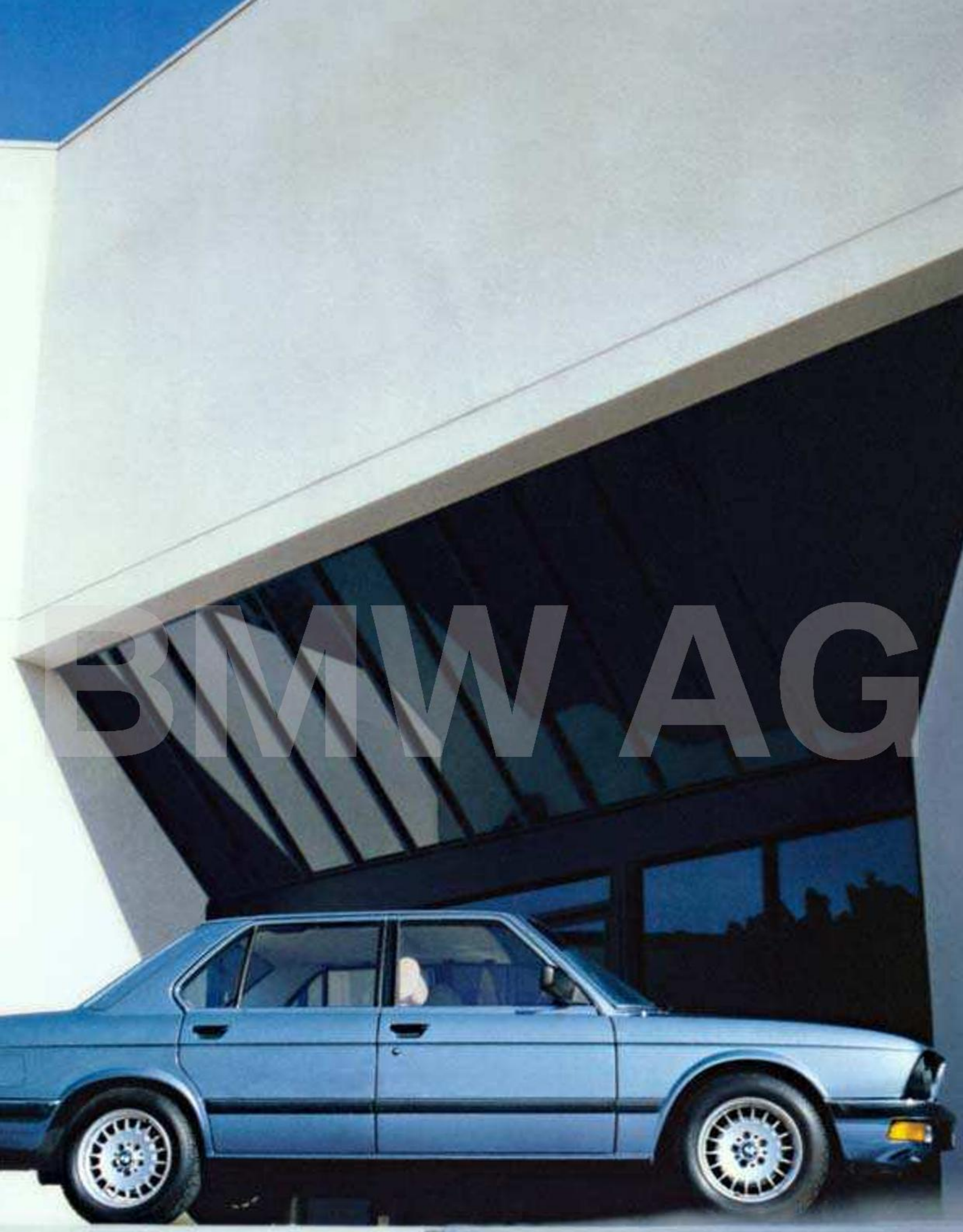
Both media representatives and visitors were fascinated and impressed. The idea was so well accepted that the "Night of the White Gloves" will be repeated 20 November 2009.

↓ BELOW Technology at your fingertips: On this evening, visitors were even allowed to touch rare exhibits such as the BMW Turbo study (above left), the BMW 3/15 DA 3 Typ Wartburg (below left), or one of the latest 6-cylinder in-line engines.

Hier kommt die beste Alternative zu BMW.

eta-Energie: Die zweite Kraft für die Freude am Fahren.

eta ENERGIE


BMW AG

Introducing the emotionally stirring BMW Z4 Roadster. To unveil our latest work of art, we gave visionary artist Robin Rhode a 306-horsepower paintbrush to create the ultimate Expression of Joy. A stunning evolution from its predecessor, the all-new Z4 Roadster offers an elegantly lavish interior, retractable hardtop, best-in-class chassis and an excess of inspiration. **To witness this creation, visit bmw.com/z4.**

The new
BMW Z4 Roadster

bmw.com/z4

**Sheer
Driving Pleasure**

Your 306-horsepower paintbrush.