

BMW 7 Series Days Miramas. Contents.



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1. The BMW Autodrome de Miramas Test Centre: Perfect Conditions for Optimum Driving Dynamics.

Dynamic driving performance is created not only in Development Centres through BMW's engine and suspension specialists, but also on all kinds of test tracks and in various trial areas. This is where all innovations are put through their paces in a long series of tests and under the toughest conditions, where all features are carefully coordinated and refined.

The BMW Group has its own test area in the south of France for particularly intense and thorough testing – Autodrome de Miramas. This former race track located between Marseille and Avignon offers ideal conditions to test and optimise the driving dynamics of a new model so typical of BMW under all kinds of conditions.

The Miramas Test Centre also played a key role in the process of developing the new BMW 7 Series, with a wide range of tests conducted on the new car, applying all kinds of requirements and the toughest standards. In the process the suspension technology of BMW's new luxury performance saloon was put through diverse tests and examinations, the knowledge gained in the process then being implemented in practice in the course of series development.

The result is a standard of driving behaviour able to comply in full with the most stringent demands and requirements made by the development engineers, exceeding the expectations of even the most demanding customer and, therefore, fulfilling all challenges in creating a new BMW in every respect.

BMW has been testing new models and innovative suspension technology in the Miramas Test Centre for more than 20 years. BMW France bought the area covering a total of 473 hectares or 1,168 acres in 1986, the test tracks and facilities being consistently updated and enlarged in the years to come.

Today Miramas offers test tracks measuring more than 52 kilometres or 32 miles in length as well as office workstations for 328 associates. To ensure fast, reliable and secure transmission of data, the development engineers are able to use high-performance permanent landlines connecting the Autodrome de Miramas with the BMW Group's Research and Innovation

Centre (FIZ)
in Munich.

One of the biggest advantages of the site in the south of France is the stable climate allowing year-round use of the facilities for testing purposes. On average, testing operations have to be interrupted only two days a year on account of snowfall, with impairments due to rainfall generally limited to a maximum of 20 days a year.

Thanks to its size, wide range of use and good climatic conditions, the BMW test area in Miramas is an ideal supplement for the testing operations conducted at BMW's Aschheim Test Centre north of Munich, at the Arjeplog Test Centre in the north of Sweden, and in the test processes conducted as a must for all BMW cars on the famous Nordschleife, the Northern Circuit of Nürburgring.

With the Aschheim Test Centre reaching the limits to its capacity in the late '80s, with test schedules becoming increasingly intense and demanding, and with BMW's model range being consistently enlarged, it was simply essential to have an additional Test Centre, this time in Miramas.

Today both BMW cars and motorcycles are tested round-the-year at the Miramas Test Centre, with up to 250 vehicles being put through intense and thorough test schedules every day, covering millions of test kilometres in the course of time.

Accounting for approximately 50,000 man-days a year, the workload at the Miramas Test Centre impressively confirms the significance the BMW Group gives to the development and ongoing optimisation of drivetrain and suspension technology. At the same time the high-speed track as well as the handling circuits in Miramas offer ideal conditions for testing both BMW Sauber F1 Formula 1 racing cars and other BMW motorsport vehicles.

Consistent development into the most advanced testing facility.

The heart of the Miramas Test Centre is the former racing circuit, a five-kilometre-long asphalt ovale. The two straights on the Ovale de Miramas each measuring a kilometre in length and 16 metres in width are connected to one another by two bends, each with a radius of 500 metres or 1,640 feet.

In 1990 und 1991 BMW extended the original race track by adding an Autobahn ring more than 6 kilometres in length. This three-lane circuit comprises a steeply embanked bend with the top lane elevated by 37 per cent to allow speeds of up to 264 km/h or 164 mph, with lateral acceleration of 0.3 g. Clearly, this provides ideal conditions for analysing and optimising the

driving characteristics of prototypes and production-based models throughout the process of development.

Vehicle components may be tested and harmonised in detail under all kinds of conditions on the dynamic test pad opened in 1997. Individual sections of this area measuring approximately 180,000 square metres or almost 45 acres may be sprayed by irrigation units in order to simulate driving conditions in the wet such as aquaplaning.

Special surfaces with particularly low frictional coefficients are also available for analysing steering behaviour and driving stability. This allows the simulation of driving conditions at relatively low speeds otherwise only encountered on conventional road surfaces when the vehicle is travelling much faster.

**A piece of the “Nordschleife” in the south of France:
reproduction of the Nürburgring “Karusell”.**

One of the more recent test areas at the BMW’s Miramas Test Centre is a copy of the famous “Karusell” on Nürburgring. This part of the Nürburgring Nordschleife also known as the Caracciola Bend was built true to the original in the process of renewing the 1,365-metre (4,477-feet) long Petit Ovale in the middle of the Miramas Test Centre.

Given its special geometry, the “Karusell” offers unique possibilities to set up the components of a car under the most demanding conditions. This particular section of the track comprises an asphalt lane higher up and at a lower angle and a steep bend further to the inside, with a gradient of 30 per cent. In testing this allows a lane change between the low outer edge of the bend and the inner, steeper embankment, provoking a roll motion of the vehicle around its longitudinal axis – a testing scenario which demands the utmost of both the mechanical suspension components and the vehicle’s electronic control systems.

With a total of four handling tracks either built anew or comprehensively modernised, Miramas offers further areas and facilities for optimising steering and bend behaviour, driving stability and damping comfort. These specific facilities are used for both suspension and tyre tests, while the most demanding and, at the same time, practical road conditions are simulated inter alia on a particular section of the track either very dirty or covered by dust.

The various bends, route profiles and surface conditions on the individual handling tracks again offer ideal conditions for testing and setting-up a racing car. One example is the analysis of wet handling for which purpose a complete section of the track measuring approximately 1.5 kilometres or 0.9 miles in length may be permanently inundated by the irrigation system.

Gradient hill and rough surface route for complex endurance tests.

When put through their paces at the Miramas Test Centre, both BMW cars and motorcycles are optimised not only in terms of driving dynamics and stability, but also under extreme conditions going far beyond the usual standards in everyday motoring. As a result, the vehicles are subjected within just a short time to a level of strain and fatigue normally encountered only after many years of driving in everyday traffic. A large number of poor road and off-road sections serve to test the reliability of vehicles under the toughest conditions and, respectively, to optimise the particular qualities of all-wheel-drive cars and enduro motorcycles.

The gradient hill completed in 2002 offers an unusually wide range of test conditions with no less than six different gradient sections, four of them with an asphalt surface, the other two finished in concrete. The gradients are 5, 8, 12, 20, 32 and, at the steepest point, 58 per cent. A further feature is the serpentine section with a gradient of 10 per cent.

The gradient sections serve to test the set-off behaviour of cars and motorcycles when driving both up- and downhill. Low-friction surfaces made of glass stone are integrated half the way up the four asphalt stretches and may be covered with water for even more demanding tests creating a surface coefficient equal to that of polished ice.

Special test tracks are available in Miramas particularly for testing enduro motorcycles, allowing the simulation of virtually all surface conditions encountered beyond the beaten track. These include riverbed fords and water crossings as well as jump sections, stretches of cobblestone and special sections simulating railway lines, mud, gravel and slabs of rock. Again, both individual and long-term endurance tests are conducted under these conditions.

Workshops and offices with the most advanced technology.

Just like the offices of the development engineers, the workshops at BMW's Miramas Test Centre are equipped with the most advanced and sophisticated technology allowing modification and, if necessary, repair of test vehicles quickly and efficiently on the spot whenever necessary.

A Control Centre complete with a Control Tower serves to supervise and coordinate test operations. A rolling road has also been in use in Miramas ever since 1999, allowing measurement and testing processes at speeds of up to 300 km/h or 186 mph.

A special workshop for hydrogen vehicles together with a hydrogen filling station entered operation in 2004. Indeed, this new facility was inaugurated in a special record event, the BMW H2R prototype setting up no less than nine world speed records for hydrogen-powered cars in Miramas in September 2004.

Before building the site in Miramas, the BMW Group commissioned experienced experts and specialists in many areas to conduct comprehensive surveys and topographic tests serving, among other things, to ensure optimum ecological compatibility. Hence, the building plans take all the findings of experienced biologists into account, naturally providing an appropriate habitat for animals and plants in the area.

Independent, non-partisan experts regularly confirm that the BMW Group shows particular responsibility in preserving the natural resources at the site which, despite its industrial use, is still acknowledged as ecologically significant.

Contrary to other automobile and motorcycle test areas, the Autodrome de Miramas Test Centre is available exclusively to the BMW Group and its suppliers. Access to the area is carefully supervised by way of barriers and entry scanners in the interest of top security.

The ongoing development of the Test Centre and its various test tracks shows clearly how the BMW Group consistently enhances its internal testing processes to reflect both the high quality standards of the Company and the constant change in conditions to be fulfilled by modern vehicles in today's world. Testing and confirming innovations in the area of suspension technology time and again, therefore, the BMW Miramas Test Centre is becoming an increasingly significant highlight in the overall process of development.