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Climatic wind tunnel helps Audi at Le Mans

- **Only three weeks before the 24 Hours of Le Mans**
- **New Audi R18 TDI tested extensively in climatic wind tunnel**
- **Valuable findings for cockpit, windscreen and windscreen wiper**

Ingolstadt, May 19, 2011 – Premiere for Audi Sport: the Audi R18 TDI, with which Audi Sport Team Joest contests the 24 Hours of Le Mans on June 11/12, is the first Audi race car to be developed with the aid of the new climatic wind tunnel.

Since the beginning of 2008 the climatic wind tunnel completes the Audi Wind Tunnel Center in Ingolstadt. It creates temperatures between minus 25 and plus 55 degrees Celsius and allows engineers to generate freezing cold and blisteringly hot wind speeds of up to 300 kilometers per hour. The simulation of sunlight and rain are also possible.

Especially for the Audi R18 TDI, the opportunity to use the climatic wind tunnel operated by their production colleagues was extremely valuable for the Audi Sport technicians. The new LMP1 is Audi's first closed Le Mans sports car since the R8C in 1999. "The climatic wind tunnel is an example of the extensive cooperation with Technical Development (TE)," explains Dr. Martin Mühlmeier, Head of Technology at Audi Sport. "The TE develops constantly and as part of TE Audi Sport is allowed to use these resources. Conversely, our colleagues from production development benefit from our findings from motorsport."

Work on the R18 TDI in the climatic wind tunnel focused on three areas: optimized airflow through the cockpit, the windscreen and testing the windscreen wiper. "In this case we can rely on the findings from the climatic wind tunnel – it's a great benefit to have such an extremely high quality tool available," says Christopher Reinke, Technical Project Leader for the R18 TDI. "The results of everything which we have tested in the climatic wind tunnel up to now have been confirmed during testing on the race track."

In the climatic wind tunnel ventilation of the closed cockpit was optimized to such an extent that the R18 TDI will manage without air-conditioning at Le Mans. As this costs both weight and power the engineers were happy to exclude the use of such a system. The deposit of rain water or solid materials such as sand, rubber pick-up and stones was also simulated. "We made many valuable discoveries in this area on the full scale car in the climatic wind tunnel and modified several things and especially in the airflow area," says Dr. Martin Mühlmeier. "The reflective film on the roof was also validated with findings from the climatic wind tunnel. These are all important details to guarantee a good climate around the driver in the cockpit."

The silver film helps to prevent the cockpit heating up too much due to the solar radiation. The Automobile Club de l'Ouest (ACO) regulations stipulate that the cockpit temperature must not exceed 32 degrees Celsius when driving if the maximum ambient temperature is 25 degrees. If it is warmer the cockpit temperature may climb by a maximum of seven degrees. The R18 TDI complies with these strict requirements thanks to extensive work in the climatic wind tunnel.

The new Le Mans sports car's single-arm windscreen wiper was also developed in the Audi Wind Tunnel Center. "This subject is not as trivial as it would perhaps appear," says Dr. Martin Mühlmeier. "We do indeed have experience from the DTM. However, the windscreen wiper is hardly ever used here. Also, a DTM car reaches 250 km/h and not 330. The demands on the windscreen wiper are considerably higher at Le Mans."

Fogging and soiling of the complexly formed windscreen which, in contrast to a production car, is curved in not just one direction but two, is manufactured from plastic and was also tested in the climatic wind tunnel. The screen is heated to prevent fogging. For possible soiling a three-stage plan was developed which, subject to the level of soiling, allows for simple wiping, wiping with detergent or the removal of one of several layers of rip-off films.

Windscreen soiling is one of the concept specific disadvantages which a closed Le Mans sports car brings. However, as a result of work in the Audi climatic wind tunnel the disadvantages were minimized as much as possible.



The Audi Group sold around 1,092,400 cars of the Audi brand in 2010. The Company posted revenue of €35.4 billion and an operating profit of €3.3 billion in 2010. Audi produces vehicles in Ingolstadt and Neckarsulm (Germany), Győr (Hungary), Changchun (China) and Brussels (Belgium). Aurangabad in India saw the start of CKD production of the Audi A6 at the end of 2007, of the Audi A4 in early October 2008 and of the Audi Q5 in July 2010. Production of the new Audi A1 has been running at the Brussels plant since May 2010. The Company is active in more than 100 markets worldwide. AUDI AG's wholly owned subsidiaries include AUDI HUNGARIA MOTOR Kft., Automobili Lamborghini Holding S.p.A. in Sant'Agata Bolognese (Italy) and quattro GmbH in Neckarsulm. Audi currently employs around 60,000 people worldwide, including around 46,600 in Germany. Between 2011 and 2015 the brand with the four rings is planning to invest around €11 billion, mainly in new products, in order to sustain the Company's technological lead embodied in its "Vorsprung durch Technik" slogan. By 2015, Audi plans to increase the number of models in its portfolio to 42.

Audi has long been fulfilling its social responsibility on many levels – with the aim of making the future worth living for generations to come. The basis for Audi's lasting success is therefore formed by environmental protection, the conservation of resources, international competitiveness and a forward-looking human resources policy. One example of AUDI AG's commitment to environmental issues is the newly established Audi Environmental Foundation.