

“Test bench” expertise: ARRK Engineering expands its service portfolio with its own acoustics test centre

Service provider for all your acoustic and vibration test needs integrated into the development process

Market shifts and newly implemented legal requirements mean that development service providers in the automotive sector, as well as in other industries such as consumer electronics, must now be able to implement all works independently. Where previously these tests would have taken place using the customer’s test benches, they can now be done just a stone’s throw from ARRK Engineering’s Munich headquarters, where analyses of structural dynamics and structure-borne sound, airborne sound and noise interference acoustics can be carried out. Alongside the already existing acoustic expertise within the company, this allows design, simulation and testing to be combined more seamlessly than ever before.

Simulations give us a better understanding of the physics, allowing prototype set-ups to be optimised accordingly while, in turn, testing serves to improve simulations by replicating previously unknown parameters. The interdependence of these approaches also plays an important role in acoustics and, when both can be done under one roof, leads to time savings as well as significant quality improvements. “One of our top priorities is to maintain an overview of the entire system from the early stages right through to troubleshooting. Based on an external market analysis, we first identified the demand before going on to determine our future service portfolio and the requirements to be fulfilled by the new acoustics testing hall,” explains Daniel Plum, Head of Test & Validation at ARRK Engineering. Any functions not covered by the scope of the new hall will be implemented in cooperation with partners.

More than just state-of-the-art equipment: frequency threshold capacity of up to 50 Hz

At the heart of the acoustic test areas lies a low-reflection, semi-open room with internal dimensions of 10.6 x 6.6 x 4 m which has been certified according to DIN EN ISO3754 and therefore fulfils the requirements of the higher accuracy level. In order to prevent external interferences and the emission of sound and vibrations, the foundations and two-shell construction were built using 80 t of reinforced concrete. The inside of the walls is optimally finished with a view to the room’s intended use, lined with specially-designed 1.5 m long acoustic wedges. The measuring technology equipment also reflects the state of the art: MKII/PAK from Müller BBM and Siemens LMS Test.Lab allow for both the emitted acoustic levels of the vehicle as a whole as well as individual components and modules to be tested up to the room’s lower frequency threshold of 50 Hz. In the future, however, testing of other machines and technical devices such as household goods and consumer electronics will also be carried out.

A smaller acoustic studio is available for less demanding applications requiring only a lower frequency threshold of 500 Hz. This allows for the use of the acoustic shaker, the “transmission loss” test bench and the measurement of smaller components according to DIN EN ISO 3744.

Two shakers test structural dynamics and noise interference

The large shaker system boasts a clamping surface measuring 900 x 900 mm, a payload of 1.3 t and a force vector of 40 kN, enabling triaxial structural dynamics and durability tests to be carried out. Both the separate use and also use in combination with a climatic test chamber are possible; the specially designed chamber covers a volume of 1700 L and a temperature range of -70°C to +180°C. Humidity can be configured from 10 to 95 percent in order to carry out durability or climatic change tests, component ageing tests and modal analyses. “In this way, the vibration resistance and resonances of electrical and mechanical components can be tested – and according to OEM-specific test regulations, too,” explains Plum.

An acoustic shaker with very low operating noise levels of below 27 dB(A) and which can bear a weight of 320 kg thanks to its load frame is available for the analysis of noise interference, with load tests able to be carried out up to 1.2 kN. The frequency range for the vibrations lies between 0 and 2 kHz, allowing noise interference such as rattling or creaking to be more closely investigated. The new hall will not, however, only be used for reliability tests, acoustic analyses and product inspections: “In the future, sound design and psychoacoustics will also form a very important area,” states Dr Marinus Luegmair, Head of CoC Acoustics. ARRK Engineering is already advising its customers in this area and is continuously working on developing new methods and processes.



Caption: Where previously such testing would have taken place using the customer’s test benches, they can now be done just a stone’s throw from ARRK Engineering’s Munich headquarters, where analyses of structural dynamics and structure-borne sound, airborne sound and noise interference acoustics can be carried out.

Source: ARRK Engineering



Caption: An acoustic shaker is available for the analysis of noise interference, allowing critical effects such as rattling or creaking to be more closely investigated.

Source: ARRK Engineering



Caption: The new semi-open room is optimally designed for testing, allowing the noise emitted by entire vehicles as well as individual components and modules to be tested down to a lower frequency limit of 50 Hz. Other machines, technical devices, household goods and consumer electronics can also be tested.

Source: ARRK Engineering