

# SIEMENS

*Ingenuity for life*

Automotive

## 3M China

3M China chooses Simcenter testing solutions to help car makers reduce interior noise

### Product

Simcenter

### Challenges

Developing materials that balance cost, weight and quality

Reducing noise while also reducing the weight of the car

Offering full acoustic engineering solutions

Addressing personalized customer needs

### Keys to success

In-house evaluation of the acoustic material characteristics of products

A customized, complete end-to-end solution that includes advice on specific use of materials

Integrated single platform, equally convenient for lab use and in-field measurements

### Results

Improved competence in regards to noise and vibration testing and R&D

Reduced testing time

Expert support based on adapted equipment, test solutions and expert advice

### 3M China provides automotive OEMs around the world with soundproof materials that build lighter, more fuel efficient, and quieter vehicles

Automotive original equipment manufacturers (OEMs) today focus on reducing the weight of a vehicle's body and chassis to achieve better fuel efficiency: it takes less energy to power a lighter object. Car components must therefore follow the same trend and use ever lighter materials, such as polymers or carbon fibers, for example. Without a doubt, these advanced materials impact fuel economy as well as safety and performance.

Designing lighter automobiles opens the door for a variety of innovative solutions around acoustics. Materials suppliers face yet another new challenge: they must bring solutions to the table that reduce noise effectively without adding content weight to the car. With more than two decades of experience in the field, 3M in China, Shanghai is one such supplier that understands these modern challenges and is perfectly equipped to meet the market's expectations. 3M China counts on Simcenter™ solutions – Simcenter Testlab™ software and Simcenter SCADAS™ Mobile hardware – from Siemens PLM Software to offer increasingly better offerings to their customers.



**“Simcenter Testing Solutions help us conduct complex processes more effectively and efficiently. With the Simcenter solutions and Simcenter technical team, we have extra flexibility to get the material properties faster.”**

Wan Quan  
Product Engineer of Acoustic Team, Automotive Division  
3M China

**Reduced noise, vibration and harshness (NVH) and improved energy**

In order to better evaluate the acoustic material characteristics of its products, 3M decided to open its own research and development (R&D) center. Siemens PLM Software engineers played a key role in setting up the acoustic lab on the 3M premises in Shanghai by providing specialized equipment, test solutions and expert advice. This in-house test facility

substantially reduces the testing time and helps 3M improve its competence in regards to noise and vibration testing as well as R&D.

“Looking at the automotive market and tendencies to date, it is clear that automotive OEMs focus on three fundamental aspects: cost, weight and quality of performance,” says Wan Quan, Product Engineer of Acoustic team in automotive division at

3M China. “Therefore, we do our best to develop products that fit within these requirements. Our noise reduction solutions use materials that fully respond to these criteria and we are happy to say that Simcenter testing solutions brought a tremendous contribution to our service for customers.”

“Ever since we partnered with Siemens PLM Software in China, we discovered we had a more solid offer,” Wan Quan explains. “We do not merely provide OEMs with the products they need, but we give them a



***“Simcenter Testing products and services help us offer solutions that strike an excellent balance among cost-efficiency, weight and performance for vehicles.”***

Wan Quan  
Product Engineer of Acoustic Team, Automotive Division  
3M China

true end-to-end solution, from customized assessment and advice on the specific use of materials to a complete system. With Simcenter Testlab software and Simcenter SCADAS Mobile hardware, we have a scalable suite for noise and vibration testing, an integrated platform that is equally convenient for lab use or in-field measurements.”

3M China opted for sound absorption and transmission loss testing, using both the impedance tube and the room methods as well as modal testing (for computing damping and loss factor). Besides laboratory testing, 3M uses the same Simcenter equipment in-vehicle for sound intensity testing.

Additionally, 3M China used Simcenter testing solutions to analyze and optimize the material content dedicated to vibration damping. The impact hammer, for example, helps 3M determine the loss factor and the damping coefficient of damper materials, which is used as input for simulation models. All of these enable 3M to offer complete end-to-end acoustic engineering solutions.

#### **The right NVH solutions with the right partner**

One of the biggest challenges that 3M has to meet as a supplier in a demanding and fast-changing industry is addressing individual customer needs.

“Our activities are built on our continuous efforts to understand and offer the most adapted products to suit a customer’s business,” says Wan Quan. Every OEM is different and the smallest change in the car design might have a significant impact on the end product. This is why it is essential to carry out sufficient measurements that cover various scenarios in order to create and give the best possible advice.”

“As we customize our offer, the systems put in place by Simcenter testing solutions help us conduct complex processes more effectively and efficiently,” Wan Quan continues. “To go through the simulation phase, for instance, we need a lot of input parameters. With the Simcenter solutions, we have extra flexibility to get the material properties faster. We then feed them into the vibro-acoustic simulation process and finally bring them to our customers in full confidence.”

*“Simcenter Testing Solutions brings tremendous contribution to our service for customers. We are now able to give OEMs a true end-to-end solution, from customized assessment and advice on the specific use of materials to a complete system.”*

Wan Quan  
Product Engineer of Acoustic Team, Automotive Division  
3M China

## Solutions/Services

Simcenter Testlab  
[www.plm.automation.siemens.com/global/en/products/simcenter/testlab.html](http://www.plm.automation.siemens.com/global/en/products/simcenter/testlab.html)

Simcenter SCADAS  
[www.plm.automation.siemens.com/global/en/products/simcenter/scadas.html](http://www.plm.automation.siemens.com/global/en/products/simcenter/scadas.html)

Simcenter Testing Solutions  
[www.plm.automation.siemens.com/global/en/products/simcenter/testing](http://www.plm.automation.siemens.com/global/en/products/simcenter/testing)

## Customer's primary business

3M produces more than 1,000 products for the automotive industry for body, paint, chassis, vehicle exterior and interior applications. 3M is unmatched in the application of polymers, composites, ceramics, fluoromaterials, nanomaterials and other materials. 3M scientists can draw on analytical strengths during all phases of product development, from conception through manufacturing to commercialization. 3M excels in the development and modification of low-volume, high-value materials both for its customers and for its own use and has extensive expertise in strong, lightweight, metal-matrix composites.  
[www.3m.com.cn](http://www.3m.com.cn)

## Customer location

Shanghai  
China

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To perfect the products, various diagnostics are carried out in the acoustic rooms. There, acoustic engineers take measurements to help optimize the acoustic characteristics of components. The intent is to have a clearer view on how the noise propagates through the components that have a specific type of acoustic behavior. By using Simcenter testing solutions such as intensity mapping, 3M China can also have a more accurate understanding of acoustical weak spots.

"The color map showing the different noise sources and weak spots saves us the cost and effort of having to re-engineer the entire product," says Wan Quan. "It also helps us keep the promise we make to our customers every single day: offering them solutions that strike an excellent balance among cost-efficiency, weight and performance for their vehicles."

## The future is lightweight

As the trend of lightweighting in vehicle design continues its journey, 3M's use of the test-dedicated Simcenter solutions from Siemens PLM Software also moves forward.

"Our goal is to continue to put all efforts into developing competitive lightweight solutions for the acoustic market," says Wan Quan. "But there are many other areas where we believe we can and should evolve, acoustically speaking, and Simcenter testing solutions will play a central role in those too. As the quest to improve fuel efficiency grows and the techniques to send power from the engine to the axle expand, the need for innovative materials raises."

Wan Quan hopes to see a growing partnership and continued use of Simcenter solutions in the future. "In 3M China, our highly skilled engineers make sure that we supply strong, quality products," he says. "The majority of the proven capabilities of our products come through Simcenter evaluation systems. We would like to see our collaboration growing further as we continue to work together for improved industry solutions that help 3M accomplish our greatest mission: 3M Technology advancing every company, 3M Products enhancing every home, 3M Innovation improving every life."

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