Vibration Isolation for Automotive Testing Applications

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TABLE OF CONTENTS

Fabreeka: A Leader in Vibration Isolation for Auto Testing

It's a joyous occasion when you purchase your first vehicle. You take it out for a test drive, the salesperson walks you through all the bells and whistles, and after an extensive negotiation process, you're sold. Before you know it, you're cruising down the interstate feeling as though you're on top of the world.

But before you get to this point, had it ever crossed your mind as to what it takes for a vehicle to be authorized on the road? Automotive manufacturers require their vehicles to undergo rigorous testing procedures to evaluate the durability, reliability, comfort, and performance of vehicles before they're ready to sell.

With decades of experience, Fabreeka has gained the expertise to develop all types of vibration isolation projects for automotive testing. It's our mission to get it right the first time, every time. That is why we have successfully partnered with automotive manufacturers for over 30 years now.

The engineers at Fabreeka accompany their customers in all stages of projects and no matter the testing environments. Their in-depth knowledge of products and various applications — from the smallest testing benches to the largest test rigs — makes them qualified for any job that comes their way.

How Does Fabreeka Provide Optimal Isolation for Auto Testing?

Automotive manufacturers utilize testing to ensure that components of the vehicle will not fail under normal road conditions. Testing helps predict and prevent a structural failure, malfunction of certain parts, or discomfort to passengers. Fabreeka's products assist automotive testing facilities in making sure they can successfully test their vehicles for squeak, rattle, and roll, as well as other conditions, without any interference from external vibrations.

To meet the increasing demands of automotive testing in simulated environments, Fabreeka delivers low-frequency vibration isolation systems and design techniques tailored to a wide range of applications. Fabreeka's isolation systems are used on applications such as dynamometers, engine test rigs, road simulators, and shaker tables. Our solutions for automotive testing include the design of test equipment to support foundations with special attention to reaction masses, structural and dynamic analysis, and acceptance testing.

Providing solutions for optimal isolation conditions is a result of varying vibration and shock control products that Fabreeka offers. For instance, when our low-frequency pneumatic isolators are installed under road simulator test rigs — which often have high amplitude and shock frequencies — the isolators can reduce the vibration and shock that would otherwise transmit to the environment.

Each pneumatic isolation system is designed according to project specifications, achieves ultra-low frequency isolation, and is self-leveling. The pneumatic isolators also have adjustable damping so the system can be "tuned" in the field for large reaction forces and dynamic inputs to optimum system response for each test mass. The isolation system design also incorporates a control panel that monitors pressure and allows for load adjustments.

Depending on the testing application, either Fabreeka's PAL Isolators or Rolling Lobe Air Springs (RLA) are used to isolate the equipment. The technical expertise from engineers at Fabreeka can assist testing groups in determining which isolators are most practical depending on the project. For instance, RLA isolators offer a larger piston stroke to handle larger dynamic loads typically seen in vibration testing applications such as shakers and 4-post-shakers without compromising the natural frequency of the system. Also, PAL or RLA pneumatic isolators can support a concrete foundation with the test equipment.

No matter the application, engineers at Fabreeka will even perform dynamic and structural analyses to simulate the isolation system's response for various testing environments. Our expertise and experience are why the top automotive manufacturers in the business trust Fabreeka in providing them with state-of-the-art isolation systems for testing.

Real-World Applications for Automotive Testing

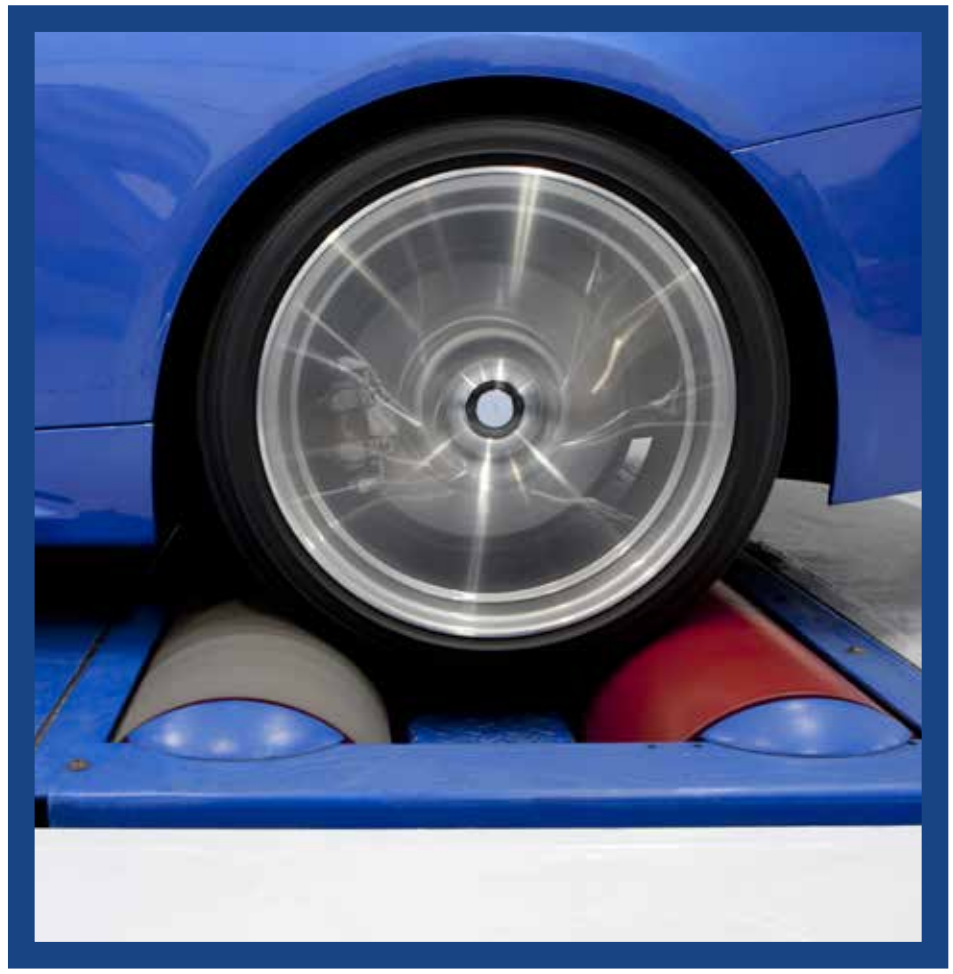
From Mercedes to General Motors, Fabreeka has partnered with automotive manufacturers for more than 30 years now. The success stories from countless projects are proof of Fabreeka's expertise from the initial design stage to the final production model.

Here are just a few of the stories that prove Fabreeka is an integral part of the automotive industry.

Mercedes-Benz

When Mercedes-Benz constructed their research and development facility in Stuttgart, Germany, Fabreeka was called to the job. Fabreeka's task was to provide vibration isolation systems to support multiple reaction masses in the test facility. Hydraulic actuators, road simulation machines (such as the rolling road pictured right), and testbeds were supported by masses ranging from 50 thousand to 1.1 million pounds.

Fabreeka isolated the large masses by providing 248 pneumatic isolators to the test facility, each with natural frequencies ranging from 0.8 to 4.0 HZ. This project marked a momentous milestone for Fabreeka as the provided isolation systems ensured success for Mercedes-Benz in all their research and development endeavors. More importantly, it solidified accurate testing of first-class vehicles for the technological future.



Audi

When Audi needed isolators to provide accurate engine and powertrain testing, Fabreeka was ready to assist.

Pictured to the left is Audi's test configuration facility in Germany which included two dynamometers, a gearbox, and an engine that was placed on base plates. The base plates were supported by Fabreeka's pneumatic isolators, each with a natural frequency of 2.5 HZ.

Western Michigan University

Western Michigan University College of Engineering and Applied Sciences installed a shaker table at their laboratory to conduct automotive testing. For the university to have the shaker table (an example shown left) installed, they needed to have a Fabreeka vibration isolation system to prevent vibrations created by the table from shaking the lab and offices throughout the building.

The shaker table was installed on a structurally and dynamically rigid reaction mass that weighed approximately 85 thousand pounds. The mass was supported by six pneumatic isolators that had a vertical natural frequency of 1.35 HZ and 4 percent damping to minimize vibration transmission from the mass.

North American Auto Show

H.B. Stubbs was asked by General Motors to provide a display for the North American Auto Show which included a four-post shaker table to demonstrate shake, rattle, and roll testing on a full-size pickup truck. A Fabreeka isolation system was needed to isolate the large shock and vibration amplitudes created by the display.

A 20’ by 10’ cut was made on the floor at the exhibition hall and a support structure was installed from the basement up. Four pneumatic isolators (shown right) were needed to isolate the structure. Each could support 25 thousand pounds and had a vertical natural frequency of 1.3 Hz.

Porsche NAP, Weissach Germany

The Porsche Development Center in Weissach, Germany developed a modern test building that combined test benches for conventional, hybrid, and electric vehicles all under one roof. A special feature of the facility is the high-voltage composite test bench, designed for purely electric vehicle testing.

The sports car manufacturer designed 18 new test rigs in their test center which required any transmission of vibration and structure-borne noise to be eliminated. To ensure this requirement, all test rigs were successfully installed on Fabreeka Precision Aire™ leveling PAL pneumatic isolator systems, which were adapted to the respective payload requirements.

RLA Isolators for LiPo Battery Test

LiPo Battery testers use Fabreeka RLA air springs to develop new concepts for electromobility. Battery testing for vibration, shock, temperature, drop, and impact testing for LiPo-batteries is necessary to reach the international standard ECE-R100 — an important European requirement for the approval of road electric vehicles.

To assist with battery testing, Fabreeka aids in the assembly and installation process — from providing the RLA air springs, cast iron T-slot plate, and the complete shaker system (shown left).

Innovative Solutions for the Future of Auto Testing

After 30 years of designing, testing, and implementing isolation systems for automotive testing, Fabreeka can ensure their isolation systems will lead to customer satisfaction. No matter the testing application, Fabreeka engineers know exactly how to solve the problem of unwanted vibration and shock.

With each project presented, engineers can perform dynamic analyses to identify the problems in advance. Engineers keep in mind all automotive testing factors throughout the analysis process — from acceleration amplitude, speed, and various position changes. In turn, Fabreeka will select the best products and systems for the job.

From there, the work has only begun. We make it a point to be a guiding source throughout the testing process. From design reviews, supervision of installation, training of the system on-site, and everything in between, Fabreeka has it covered. This is why auto manufacturers from around the world trust our systems to meet the growing demands of their industry. It is our hope, that we can continue working together on innovative solutions for the future of automotive testing.

Over 100 Years of Experience you can trust!

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