

United States NVH Testing Market By Offering (Hardware, Software), By Application (Impact Hammer Testing and Powertrain NVH Testing, Environmental Noise Measurement, Noise Source Mapping, Pass-by Noise Testing, Others), By End-Use (Automotive and Transportation, Aerospace and Defense, Industrial, Consumer Appliances, Others), By Region, Competition, Forecast and Opportunities, 2019-2029F

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Abstracts

United States NVH Testing Market was valued at USD 2.4 billion in 2023 and is anticipated to project robust growth in the forecast period with a CAGR of 6.4% through 2029F. The United States NVH (Noise, Vibration, and Harshness) Testing Market is experiencing significant growth and is poised for further expansion in the coming years. NVH testing plays a crucial role in the automotive industry, ensuring optimal vehicle performance, comfort, and customer satisfaction. The market's rise can be attributed to several key factors. There is a growing demand for enhanced vehicle comfort, with consumers increasingly seeking quieter and smoother driving experiences. Stringent regulations on noise pollution have prompted automotive manufacturers to invest in NVH testing to meet compliance standards. The industry's focus on improving overall vehicle performance and reducing vibrations has further fueled the demand for NVH testing services. The United States, being a major hub for automotive manufacturing and innovation, offers a conducive environment for the growth of the NVH testing market. With advancements in technology and the increasing adoption of electric vehicles, the market is expected to witness sustained growth, presenting lucrative opportunities for NVH testing service providers in the United States.

Key Market Drivers

Stringent Regulatory Compliance

One of the primary drivers of the NVH testing market in the United States is the ever-increasing stringency of regulatory requirements. As governments at various levels continue to raise the bar for noise and vibration standards, automotive manufacturers, construction equipment producers, and other industrial sectors must invest in advanced NVH testing solutions to ensure compliance. Federal and state agencies, such as the Environmental Protection Agency (EPA) and the Department of Transportation (DOT), regularly update and tighten regulations related to vehicle noise emissions, making NVH testing a critical element of their product development and quality control processes. Manufacturers need to meet these strict regulatory standards, as non-compliance can result in significant financial penalties, damaged reputations, and loss of market share. This drives a continuous demand for NVH testing equipment and services that help companies measure and mitigate noise and vibration levels, ultimately ensuring they are in compliance with the law.

The United States strives to reduce noise pollution in urban areas, leading to the implementation of more noise control ordinances and regulations. This further fuels the NVH testing market, as companies must adapt to meet these requirements or risk facing legal challenges and community backlash. To remain competitive and maintain a strong market presence, businesses in the United States must invest in NVH testing solutions that facilitate compliance with these evolving and increasingly strict regulatory standards. Consequently, the NVH testing market continues to thrive, driven by the ongoing need for advanced testing technologies and services.

Advancements in Automotive and Manufacturing Technologies

The United States NVH testing market is significantly driven by continuous advancements in automotive and manufacturing technologies. As the automotive and manufacturing sectors evolve and innovate, the demand for NVH testing equipment and services grows in tandem. The development of electric and hybrid vehicles, advanced materials, lightweight components, and the increasing focus on enhancing fuel efficiency and vehicle performance have heightened the complexity of NVH testing. NVH testing has expanded beyond traditional combustion engines to encompass the unique challenges presented by electric motors and battery systems. The market has also seen an increase in the use of innovative materials and designs, which affect the acoustic and vibrational characteristics of products. These complexities necessitate the

use of cutting-edge NVH testing solutions that can accurately assess and address the nuances of these technologies.

As manufacturers aim to reduce production costs and optimize efficiency, NVH testing is integrated into the production line to identify and rectify issues at an early stage, preventing costly rework and recalls. This integration is made possible through real-time monitoring and automation, which are integral components of advanced NVH testing equipment. With the relentless drive for innovation in the automotive and manufacturing sectors, NVH testing continues to be instrumental in ensuring that new technologies and materials meet the high standards for noise and vibration, thereby bolstering the growth of the NVH testing market in the United States.

Increasing Demand for Improved Vehicle Comfort and Performance

One of the key drivers of the United States NVH (Noise, Vibration, and Harshness) Testing Market is the increasing demand for improved vehicle comfort and performance. As consumers become more discerning and seek enhanced driving experiences, automotive manufacturers are under pressure to deliver vehicles that offer superior comfort, reduced noise levels, and minimal vibrations. NVH testing plays a crucial role in evaluating and optimizing the acoustic and vibration performance of vehicles, ensuring a quiet and smooth driving experience. By conducting comprehensive NVH testing, manufacturers can identify and address sources of noise and vibration, leading to improved vehicle comfort and customer satisfaction. The growing emphasis on vehicle comfort and performance is driving the demand for NVH testing services and solutions in the United States.

Growing Emphasis on Customer Satisfaction

Customer satisfaction is a driving force behind the United States NVH Testing Market. Automotive manufacturers recognize the importance of delivering vehicles that meet or exceed customer expectations in terms of comfort, refinement, and overall driving experience. NVH testing plays a critical role in evaluating and optimizing the noise and vibration levels in vehicles to ensure a pleasant and enjoyable driving experience for customers. By conducting comprehensive NVH testing, manufacturers can identify and address sources of noise and vibration that may impact customer satisfaction. This includes evaluating and optimizing components such as engine mounts, suspension systems, insulation materials, and interior trims. The growing emphasis on customer satisfaction is driving the demand for NVH testing services and solutions that enable manufacturers to deliver vehicles that meet the highest standards of comfort and

refinement.

Increasing Focus on Electric and Hybrid Vehicles

The increasing focus on electric and hybrid vehicles is a significant driver of the United States NVH Testing Market. As the automotive industry shifts towards more sustainable and environmentally friendly transportation solutions, the adoption of electric and hybrid vehicles is on the rise. These vehicles have unique NVH characteristics compared to traditional internal combustion engine vehicles, requiring specialized testing methods and solutions. NVH testing plays a crucial role in evaluating and optimizing the acoustic and vibration performance of electric and hybrid vehicles, ensuring a quiet and comfortable driving experience. The integration of battery systems, electric drivetrains, and regenerative braking systems introduces new sources of noise and vibration that need to be addressed. The growing demand for electric and hybrid vehicles is driving the need for specialized NVH testing services and solutions that cater to the unique NVH requirements of these vehicles, further fueling the growth of the NVH Testing Market in the United States.

Key Market Challenges

Increasing Complexity of Vehicle Designs

One of the key challenges faced by the United States NVH (Noise, Vibration, and Harshness) Testing Market is the increasing complexity of vehicle designs. As automotive manufacturers strive to meet evolving customer demands and regulatory requirements, vehicles are becoming more sophisticated and technologically advanced. This complexity poses challenges for NVH testing, as it requires specialized equipment, software, and expertise to accurately measure and analyze noise and vibration levels in these complex systems. The integration of new components, such as electric drivetrains and advanced infotainment systems, introduces additional sources of noise and vibration that need to be addressed. NVH testing providers must continuously invest in research and development to keep pace with the evolving vehicle designs and develop innovative testing solutions that can effectively evaluate the NVH performance of these complex systems.

Evolving Regulatory Landscape

The United States NVH Testing Market faces the challenge of an evolving regulatory landscape. Governments and regulatory bodies are imposing stricter regulations on

noise pollution and vehicle emissions, which directly impact the NVH requirements for automotive manufacturers. Compliance with these regulations requires comprehensive NVH testing to ensure that vehicles meet the specified noise and vibration limits. However, the challenge lies in keeping up with the constantly changing regulatory landscape, as new regulations are introduced, and existing ones are updated. NVH testing providers must stay updated with the latest regulations and adapt their testing methodologies and equipment accordingly. This includes investing in advanced testing equipment and software that can accurately measure and analyze noise and vibration levels to ensure compliance with the evolving regulatory standards.

Integration of NVH Testing in the Product Development Cycle

Integrating NVH testing effectively into the product development cycle poses a significant challenge for the United States NVH Testing Market. Traditionally, NVH testing was conducted as a separate and standalone activity, often at the later stages of vehicle development. However, to address NVH issues early in the design process and minimize costly iterations, NVH testing needs to be integrated into the overall product development cycle. This requires close collaboration between NVH testing teams, design engineers, and other stakeholders throughout the development stages. NVH testing providers must work closely with automotive manufacturers to establish effective communication channels and ensure that NVH testing is conducted at the appropriate stages of the product development cycle. This integration also requires the adoption of advanced simulation and modeling techniques that can predict and optimize NVH performance during the design phase, reducing the reliance on physical prototypes and accelerating the development process.

Cost and Time Constraints

Cost and time constraints pose a significant challenge for the United States NVH Testing Market. NVH testing requires specialized equipment, software, and skilled personnel, which can be costly to acquire and maintain. Conducting comprehensive NVH testing can be time-consuming, especially when multiple iterations and refinements are required to achieve the desired NVH performance. Automotive manufacturers often face tight development schedules and cost constraints, which can limit the resources allocated to NVH testing. NVH testing providers must find a balance between cost-effectiveness and the need for accurate and reliable testing results. This may involve optimizing testing methodologies, leveraging advanced simulation techniques, and adopting efficient data analysis processes to streamline testing procedures and reduce testing time. Collaboration between NVH testing providers and

automotive manufacturers is crucial to identify cost-effective solutions that meet the desired NVH performance targets within the given time and budget constraints.

Key Market Trends

Increasing Demand for Electric Vehicles (EVs) and Hybrid Vehicles

The United States NVH (Noise, Vibration, and Harshness) Testing Market is witnessing a significant trend of increasing demand for electric vehicles (EVs) and hybrid vehicles. As the automotive industry shifts towards more sustainable and environmentally friendly transportation solutions, the adoption of EVs and hybrid vehicles has gained momentum. This transition presents unique challenges in terms of NVH testing. EVs, for example, have different noise characteristics compared to traditional internal combustion engine vehicles. The absence of engine noise and the presence of electric motor noise require specialized testing methods to ensure optimal NVH performance. The integration of battery systems and electric drivetrains in hybrid vehicles introduces new sources of vibration and noise that need to be addressed. NVH testing plays a crucial role in evaluating and optimizing the acoustic and vibration performance of these vehicles, ensuring a quiet and comfortable driving experience. As the demand for EVs and hybrid vehicles continues to grow, the United States NVH Testing Market is expected to witness an increased focus on developing specialized testing solutions and methodologies to cater to the unique NVH requirements of these vehicles.

Advancements in NVH Testing Software and Simulation Tools

The United States NVH Testing Market is experiencing significant advancements in software and simulation tools used for NVH testing. These advancements are driven by the need for more efficient and accurate testing methods, as well as the increasing complexity of vehicle designs. NVH testing software solutions now offer advanced analysis capabilities, data visualization tools, and simulation capabilities, allowing manufacturers to identify and address NVH issues early in the design process. Simulation tools enable virtual testing, reducing the reliance on physical prototypes and accelerating the product development cycle. This trend towards software-driven NVH testing is expected to continue, with further enhancements in areas such as artificial intelligence (AI) and machine learning (ML) algorithms for predictive analysis and optimization. The integration of software and simulation tools with other testing equipment and systems also enables seamless data exchange and comprehensive analysis, further enhancing the efficiency and effectiveness of NVH testing processes.

Growing Emphasis on Interior Noise and Vibration Reduction

In recent years, there has been a growing emphasis on reducing interior noise and vibration levels in vehicles. As consumers demand quieter and more comfortable driving experiences, automotive manufacturers are focusing on improving the NVH performance of their vehicles' interiors. This trend is driven by factors such as increased competition, customer expectations, and the desire to enhance overall vehicle quality and customer satisfaction. NVH testing plays a crucial role in evaluating and optimizing interior noise and vibration levels. Manufacturers are investing in advanced testing equipment and methodologies to identify and address sources of noise and vibration within the vehicle cabin. This includes analyzing and optimizing components such as seats, door panels, insulation materials, and HVAC systems. The United States NVH Testing Market is witnessing a surge in demand for specialized testing services and equipment that cater to interior noise and vibration reduction, as manufacturers strive to deliver a premium and comfortable driving experience to their customers.

Integration of NVH Testing with Vehicle Development Process

Another significant trend in the United States NVH Testing Market is the integration of NVH testing with the overall vehicle development process. Traditionally, NVH testing was conducted as a separate and standalone activity, often at the later stages of vehicle development. However, there is a growing recognition of the importance of early and continuous NVH testing throughout the design and development process. By integrating NVH testing at the early stages, manufacturers can identify and address potential NVH issues before they become costly and time-consuming to rectify. This trend is driven by advancements in testing equipment, software, and simulation tools that enable real-time monitoring, data analysis, and predictive modeling. Manufacturers are adopting a more holistic approach to NVH testing, incorporating it into the overall vehicle development timeline and collaborating closely with design and engineering teams. This integration allows for faster iterations, improved design optimization, and ultimately, better NVH performance in the final product.

Adoption of Advanced Testing Techniques and Standards

The United States NVH Testing Market is witnessing an increased adoption of advanced testing techniques and standards to ensure accurate and reliable NVH measurements. As the automotive industry becomes more globalized, manufacturers are aligning their testing practices with international standards to ensure consistency and comparability of results. Standards such as ISO 3745 for sound power

measurement and ISO 10816 for vibration measurement provide guidelines and procedures for conducting NVH testing. Manufacturers are adopting advanced techniques such as operational deflection shape analysis, modal analysis, and psychoacoustic testing to gain deeper insights into the NVH behavior of their products. These techniques enable manufacturers to identify and address specific noise and vibration issues, leading to improved vehicle performance and customer satisfaction. The adoption of advanced testing techniques and standards also facilitates better collaboration and benchmarking among manufacturers, enabling them to stay competitive in the global automotive market. As the United States NVH Testing Market continues to evolve, the adoption of advanced testing techniques and adherence to international standards will play a crucial role in ensuring accurate and reliable NVH measurements.

Segmental Insights

Application Insights

The powertrain NVH testing segment dominated the United States NVH (Noise, Vibration, and Harshness) Testing Market and is expected to maintain its dominance during the forecast period. Powertrain NVH testing involves the evaluation and analysis of noise and vibration levels generated by the powertrain components of vehicles, such as engines, transmissions, and drivelines. This dominance can be attributed to several factors. The powertrain is a critical component of any vehicle, and ensuring its optimal performance and minimizing noise and vibration levels are of utmost importance to automotive manufacturers. Powertrain NVH testing helps identify and address issues related to engine noise, transmission vibrations, and driveline harmonics, enabling manufacturers to enhance the overall vehicle performance and customer satisfaction. The increasing demand for electric vehicles (EVs) has further propelled the growth of powertrain NVH testing. EVs have unique NVH characteristics compared to traditional internal combustion engine vehicles, and thorough testing is required to ensure a quiet and smooth driving experience. Stringent regulations on noise pollution and the growing emphasis on reducing vehicle emissions have also contributed to the dominance of powertrain NVH testing. By accurately measuring and analyzing noise and vibration levels, manufacturers can ensure compliance with regulatory standards and develop more environmentally friendly vehicles. With the ongoing advancements in powertrain technology and the increasing adoption of EVs, the powertrain NVH testing segment is expected to maintain its dominance in the United States NVH Testing Market during the forecast period.

Regional Insights

The region that dominated the United States NVH (Noise, Vibration, and Harshness) Testing Market was the Midwest region, and it is expected to maintain its dominance during the forecast period. The Midwest region, often referred to as the 'Automotive Belt,' is home to several major automotive manufacturers and suppliers, making it a hub for automotive research, development, and production. This dominance can be attributed to several factors. Firstly, the Midwest region has a strong automotive manufacturing base, with states like Michigan, Ohio, and Indiana hosting numerous automotive plants and research facilities. The presence of these manufacturing facilities drives the demand for NVH testing services, as automotive manufacturers strive to ensure the highest levels of vehicle performance, comfort, and customer satisfaction. The Midwest region has a rich talent pool of engineers and technicians with expertise in NVH testing, further supporting the growth of the market. The region's proximity to major automotive OEMs (Original Equipment Manufacturers) and suppliers allows for efficient collaboration and quick turnaround times in NVH testing projects. This geographical advantage enhances the region's dominance in the market. Furthermore, the Midwest region's commitment to innovation and technological advancements in the automotive industry contributes to its continued dominance in NVH testing. With ongoing investments in research and development, the region is well-positioned to cater to the evolving needs of automotive manufacturers and maintain its leadership in the United States NVH Testing Market during the forecast period.

Key Market Players

HEAD acoustics, Inc.

National Instruments Corporation

Siemens Corporation

Dewesoft LLC

Autoneum Holding AG

OROS Inc.

Signal.X Technologies LLC

Axiometrix Solutions

Report Scope:

In this report, the United States NVH Testing Market has been segmented into the following categories, in addition to the industry trends which have also been detailed below:

United States NVH Testing Market, By Offering:

Hardware

Software

United States NVH Testing Market, By Application:

Impact Hammer Testing and Powertrain NVH Testing

Environmental Noise Measurement

Noise Source Mapping

Pass-by Noise Testing

Others

United States NVH Testing Market, By End-use:

Automotive and Transportation

Aerospace and Defense

Industrial

Consumer Appliances

Others

United States NVH Testing Market, By Region:

South US

Midwest US

North-East US

West US

Competitive Landscape

Company Profiles: Detailed analysis of the major companies present in the United States NVH Testing Market.

Available Customizations:

United States NVH Testing Market report with the given market data, TechSci Research offers customizations according to a company's specific needs. The following customization options are available for the report:

Company Information

Detailed analysis and profiling of additional market players (up to five).

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