Microsoft Sets World Record for the Quietest Place on Earth with Eckel Anechoic Chamber

Acoustic Research & Testing

Noise & Vibration Control

Anechoic & Hemi-Anechoic Chambers
Eckel Hemi-Anechoic Chambers Driving Auto-Industry R&D 4–9

Eckel Noise Control Technologies is the Automotive Industry’s premiere supplier of hemi-anechoic chambers.

Eckel’s Full and Hemi-Anechoic Chambers are custom-engineered structures designed to create the ideal acoustic environment in which to conduct testing and research within an array of industries and disciplines.

Overview

4 Building for the Future
Advanced Noise Control Technologies for the World’s Most Innovative Industries

5 Anechoic Chambers
Acoustic treatment on the walls, ceilings and floors, designed for:
- Loudspeakers, Microphones
- Electrical Components
- Telecommunications
- Computer Equipment
- Clinical Audiology Research

Hemi-Anechoic Chambers
Acoustic treatment on the walls and ceilings only, designed for:
- Automobiles
- Construction Equipment
- ATVs
- Major Appliances, Washers, Dryers, Refrigerators

6 N+V Reduction

Control noise and minute vibration with Eckel Hemi-Anechoic Chambers.

7 Custom Solutions

Custom engineered noise control solutions for product testing.

For the Record

Eckel Noise Control Technologies helped Microsoft to achieve the Guinness World Record for the “Quietest Place on Earth” ... Imagine what Eckel can do for your industry.

8 Wedge Performance

Individual wedges tested to verify design, materials and cut-off frequency

9 Chamber Performance

Measurements taken in full room configurations
**Features**

**Supersoft Panelled Chambers**
Eckel’s Economical SuperSoft Chambers feature a high degree of noise absorption to create “Free Field” testing environments.

**Electronics & Innovative Technologies**
Anechoic chambers, portable anechoic chambers (PACs) and Electronic Listening Rooms incorporate acoustic design elements to create optimal sound environments suitable for virtually any type of acoustic testing or research.

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**Welcome**

Eckel Noise Control Technologies is synonymous with the highest standards in building acoustic research and testing facilities.

Our history began with the work of my grandfather, Oliver C. Eckel, in close association with Leo Beranek and his team at Harvard’s Cruft Laboratories. The team produced anechoic wedges for the world’s first anechoic chamber. Later, in 1952, Eckel Industries was founded.

Eckel Noise Control Technologies has since earned its top-tier reputation as the world’s pre-eminent supplier of noise control technologies. Eckel designs, fabricates and installs full anechoic and hemi-anechoic chambers to precise specifications for government laboratories, the automotive industry, industrial testing facilities and leading research institutions.

Eckel remains grateful for the demonstrated trust in our capabilities by major national and international clients including Boeing, Bosch, Bose, BMW, Chrysler, General Electric, Hewlett-Packard, IBM, McDonald Douglas, Pratt & Whitney, Raytheon, Tata Motors, Skull Candy, NASA, Qualcomm and many more.

Today, Eckel engineered noise control products and systems are ubiquitous throughout the world. Our valued clients rely on our dependable and proven technologies to control noise in a wide array of industries.

Eckel Noise Control Technologies helped Microsoft achieve a World Record for the ‘Quietest Place on Earth.’ What can we do for you?

Alex Eckel, President
Eckel Noise Control Technologies
Anechoic Chambers

Custom Engineered Industry Solutions
Eckel built facilities can be found worldwide. For over 65 years, we have provided an array of noise control solutions to customers within the automotive, telecommunications, consumer product, aircraft/aerospace, audio, high-tech and academic communities.

Building for the future
Advanced Noise Control Solutions for the World’s Most Innovative Industries

Eckel anechoic and hemi-anechoic chambers are echo-free enclosures with high performance sound energy absorption levels of 99% to 100% or a reflected sound pressure level of 10% or less.

Low Frequency Cutoff
The frequency at which the energy absorption drops below 99% or the pressure exceeds 10%, is known as low-frequency cut-off. Sound absorption is obtained by lining the walls, ceiling and floor with Eckel wedges or other sound absorbing elements or compact panel absorbers, depending on the performance level required and desired low frequency cut-off.

Chamber Linings
Eckel hemi-anechoic and anechoic chamber linings represent the most advanced technical development in noise control design and construction.

Eckel provides fiberglass and perforated metallic sound wedges, as well as, E-element and compact panel absorbers to accommodate the widest range of testing environments.

Chamber Configuration
The dimensions of hemi-anechoic and anechoic chambers depend on the nature of the tests to be conducted. Eckel hemi-anechoic chambers are the preferred choice of the world’s leading automobile manufacturers.

A hemi-anechoic in the testing facilities of a world-leading manufacturer in China.
Advanced Research

Advancements in noise control are made possible using Eckel anechoic and hemi-anechoic chambers.

Hemi-Anechoic Chambers

Anechoic chambers feature acoustic treatment on the walls, ceilings and floors. Anechoic chambers are designed for: loudspeakers, microphones, electrical components, telecommunications, computer equipment and clinical audiology research.

Hemi-anechoic chambers are ideal for heavy equipment with acoustic treatment on the walls and ceilings but not the floor. Hemi-anechoic chambers are designed for a wide range of industries including automotive, heavy equipment, ATVs, and major household appliances such as washers, dryers and refrigerators.

Automotive Noise Control Specialists

The 1950s Golden Age of Automobiles promised a future of advancement, luxurious comfort and the ultimate driving experience. The future is now. Eckel Hemi-Anechoic Chambers helped to deliver this future by providing noise control solutions to the world’s leading automobile manufacturers.

Hemi-anechoic chambers are used to test noise levels of automobiles and their component systems. The research promotes innovative designs for safer, more efficient vehicles while keeping drivers & passengers insulated from unwanted noise.

Step into the future of noise control technologies
Eckel’s cutting-edge technologies support research pertaining to automobile noise and vibration control. Our technologies are among those in highest demand, industry wide. Designing an automobile requires strict observance of industry-wide standards with the ultimate goal of improving the comfort and safety of drivers and passengers.

Reducing interior and exterior noise is of key importance to modern automotive designers. Integrated passive/active noise and vibration control solutions provide attenuation in new and hybrid vehicle designs, boasting substantial reductions in noise and vibrations levels.

Since the dawn of the automotive industry, motor vehicles have undergone extensive research and development to maintain performance while becoming lighter, more fuel efficient and to reduce CO2 emissions.

Eckel Hemi-Anechoic Chambers Driving Auto-Industry R & D

The auto-industry is an industry of constant development. Auto makers perennially strive to adapt new technologies and incorporate the R&D discovered in Eckel Hemi-anechoic chambers to reduce noise and vibration in their products.

Noise + Vibration

Hemi-anechoic Chambers help auto manufacturers meet and exceed expectations of comfort, vehicle safety, and compliance with legislation concerning noise and vibration.

N + V Reduction

Leading manufacturers take advantage of Eckel Hemi-anechoic Chambers to help achieve both low noise and minute vibration levels in their products.
Eckel & Automotive Innovation

Trusted partnerships with the world’s leading automobile manufacturers have led to technological advancements which benefit passenger comfort and safety. Eckel hemi-anechoic chambers have helped the industry to perfect the driving experience.

Eckel for Innovation
Hybrid, electric and autonomous automobile innovations are radically changing consumer’s conceptions of how a car is supposed to sound.

Anticipating future innovation, leading automotive manufacturers proactively adopt strategies to further develop road and vehicle noise control systems using revolutionary NVH technologies unique to cutting-edge vehicle design.

Accordingly, there has been an extensive demand for test facilities utilizing the most state-of-the-art noise control technologies in the market. Eckel’s hemi-anechoic chambers help manufacturers to conceptualize and guide new vehicular designs with the goal of promoting safe and comfortable driving.

Custom Engineered Solutions
Since the golden age of automobiles, Eckel partnerships with vehicle and component manufacturing industries have helped to make our world a quieter place. With the help of Eckel Noise Control technologies, industries will continue to develop optimum noise and vibration control systems without sacrificing vehicular performance or comfort.

High performance automobiles require high performance noise-controlled testing environments to help identify unwanted noise and vibration.

N + V assessment in an Eckel Hemi-anechoic chamber
Achieve Optimum Performance
A production sample of individual wedges is tested to verify design, materials and cut-off frequency.

Depend on the Eckel Experience
Expertise and proven quality that only Eckel Noise Control Technologies can provide.

Anechoic & Hemi Anechoic Chambers
Ensure acoustic integrity, lasting durability, utility & performance with Eckel

Wedge Performance
Impedance Tube Method: ASTM-C 384-90a
A production sample method of individual wedges is tested to verify design, materials and cut-off frequency.

Chamber Performance
Design based on Performance Data that Conforms with ISO 3745 Free-Field Requirements. Measurements taken in full room configurations.

For over 65 years, the familiar form of Eckel Wedges and Sound Absorbing Elements have been a part of the technological progress achieved by the world’s largest industries including automotive, hi-tech, industrial testing, clinical research, aerospace & aviation.
Eckel’s Wedge

Eckel wedges and sound absorbing elements have a low frequency cut-off Hertz. Above this frequency, they have a 0.99 coefficient of absorption, or the ratio of reflected sound pressure to incident sound pressure of 10% or less.

Wedges & sound absorbing elements were established at Harvard University’s Cruft Laboratory in 1943. Oliver Eckel, our company founder, helped lay the groundwork for anechoic testing by assisting in the top-secret research project to build the world’s first anechoic chamber.

Eckel Noise Control Technologies has since continued to be a pioneer in the field of acoustic research and to build testing facilities designed for advanced acoustic analysis. Eckel’s unique, patented wedge design provides an optimum level of sound absorption, allowing precise, repeatable acoustic measurements.

Achieve Optimum Performance
Eckel Noise Control Technologies remains firmly committed to maintaining the high standards we have set for ourselves and the industry. Eckel will continue to develop and introduce innovative products that will allow our clients to conduct testing and research projects in perfect confidence. Eckel produces the world’s best anechoic chambers. Speak with an Eckel representative to learn more.

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Single Wall Panel Chamber Noise Reduction Data
Measured noise reduction through a 4" (100mm) Eckoustic Panel Anechoic Chamber

Double Wall Panel Chamber Noise Reduction Data
Measured noise reduction through a 4" (100mm) Eckoustic Panel and 8" (200mm) masonry wall.
SuperSoft Eckoustic Panels

SUPERSOFT for Heavy Duty

Eckel's SuperSoft panels provide a unique and economical design for environments requiring a high degree of noise absorption to create a “Free Field” testing environment when the use of a conventional hemi-anechoic chamber may be impractical or unfeasible.

SuperSoft Eckoustic Panels, from Eckel, provide superior acoustical treatment where economic or space restrictions make the erection of anechoic wedges unviable.

SuperSoft chambers utilize proprietary low-profile corrugated panels as the interior acoustic treatment to achieve baseline performance that meets ISO 3744 test standards and can also be engineered to meet lab grade testing criteria of ISO 3745.
Design
SuperSoft panel linings can be installed in a new or existing structure. They cover the walls and ceiling using a track and batten system. Fill density and panel spacing from the walls determine the acoustic performance. The “V” ridge facing design of the perforated metal panels enhances acoustic performance by reflecting unabsorbed energy back into the acoustic treatment rather than back into the host room.

Application
SuperSoft chambers are suitable for a range of acoustic test facility projects where a lab grade full or hemi-anechoic chamber is not needed or is cost-prohibitive. They are particularly useful for testing products that will be used on a solid surface, such as standard and heavy-duty vehicles, construction machinery and major appliances.

SuperSoft solutions are an affordable option when an anechoic chamber is not in the budget or when available space is constrained.

SuperSoft Panel Overview
Panels are fabricated from V-ridged 22ga with dual density acoustic fill and are attached to supporting framework with 20 ga battens.
Eckel manufactures an array of custom engineered noise control technologies for the most revolutionary industries pushing the envelope of innovation. From aviation and aerospace to cutting-edge technologies such as computer electronics and mobile devices - Eckel products support R&D like no other.

**Portable Anechoic Chambers**

Our Portable Anechoic Chambers (PACs) are ideal for a range of uses including acoustic testing of products, calibration of microphones, free field response testing of loudspeakers and behavioral studies of small animals.

PACs provide an optimal acoustic environment within which to perform a range of R&D tests related to the effect of noise and vibration on product performance and can reliably establish quality control benchmarks of mechanical and electric components and component systems.

PACs also provide the ideal environment to test and evaluate a range of performance metrics and sound output levels of small audio devices such as cell phones, tablets and laptop computers.

**Reverberation Rooms**

Eckel Reverberation Rooms are designed for the determination of the power level of noise sources, transmission loss of partitions, insertion loss of silencers, and random incidence sound absorption coefficients of materials.
Trusted partnerships with leading manufacturers have led to technological advancements which benefit end-user comfort, safety and communication. Eckel hemi and full anechoic chambers have helped a variety of industries to perfect their products.

Electronic Technologies Listening Rooms
Today’s technologies have never sounded so great, thanks in part, to Eckel Listening Rooms. ‘Branded’ sounds have iconically come to represent a product and its functions.

Our Electronic Device Listening Rooms are ideal for testing larger house-hold appliances as well as smaller devices such as cell phones, computers, speakers, and other personal electronic devices.

Ensure positive end-user satisfaction by capturing the perfect chirp, tweet, beep, pitch and tone of your electronic device, utilizing Eckel’s innovative Listening Rooms.

Custom Engineered Solutions
Whether for aerospace or auto manufacturing, next generation technologies or general appliances, Eckel Hemi-, Full and Portable Anechoic Chambers help promote research and design using an array of custom engineered solutions to provide noise and vibration control to the world’s leading industries.

Eckel Reverberation Rooms, Listening Rooms and PAC Boxes are utilized by leading companies to control noise and vibration and ultimately, to produce products that appear ubiquitous to consumers.
Sound Solutions for the future

Eckel’s advanced technologies control the effect of noise and vibration on product performance in support of R&D testing.

Our valued customers can reliably establish quality control benchmarks of mechanical/electric components and component systems.

Eckel products and systems are used to test and evaluate a range of performance metrics and sound output levels of audio enabled devices such as automobile components, cell phones, tablets, computers and the software that runs them.
Innovative Technologies to Better the Human Experience
Noise & Vibration Control

Anechoic & Hemi-Anechoic Chambers

Standard & Custom Engineered Solutions

Eckel Technologies to Better the Human Experience

Anechoic Chambers  Portable Anechoic Chambers  SuperSoft Chambers
Control Rooms  Absorption Panels & Treatments  Industrial Enclosures
Audiology Booths, Rooms & Suites  Studios, Practice Rooms & Voiceover Booths
Acoustic Door Sets  Specialist Acoustic Products  Other Products & Services

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