

ECKEL

NOISE CONTROL TECHNOLOGIES

**Acoustic
Research
& Testing**

**Noise &
Vibration
Control**



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

Anechoic & Hemi-Anechoic Chambers

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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.



6 N+V Reduction

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



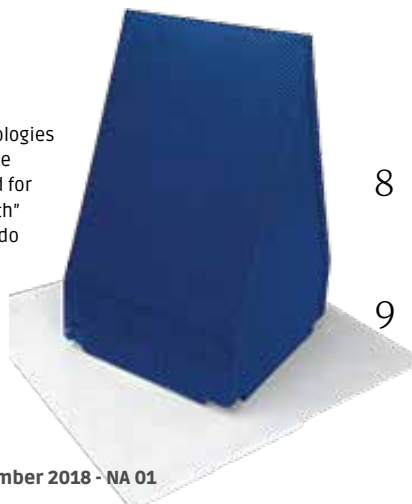
7 Custom Solutions

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.



Overview

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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](#)

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Eckel's Economical SuperSoft Chambers feature a high degree of noise absorption to create "Free Field" testing environments.



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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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Sound Solutions for the Future

Eckel manufactures an array of custom engineered noise control technologies for the most revolutionary industries pushing the envelope of innovation.

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.



Hemi-Anechoic Chambers

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.

Advanced Research

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

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NOISE CONTROL TECHNOLOGIES

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.

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.



Step into the future of noise control technologies



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Noise + Vibration

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

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.

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.

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.

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.

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.

Eckel & Automotive Innovation



N + V assessment in an Eckel Hemi-anechoic chamber



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

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.

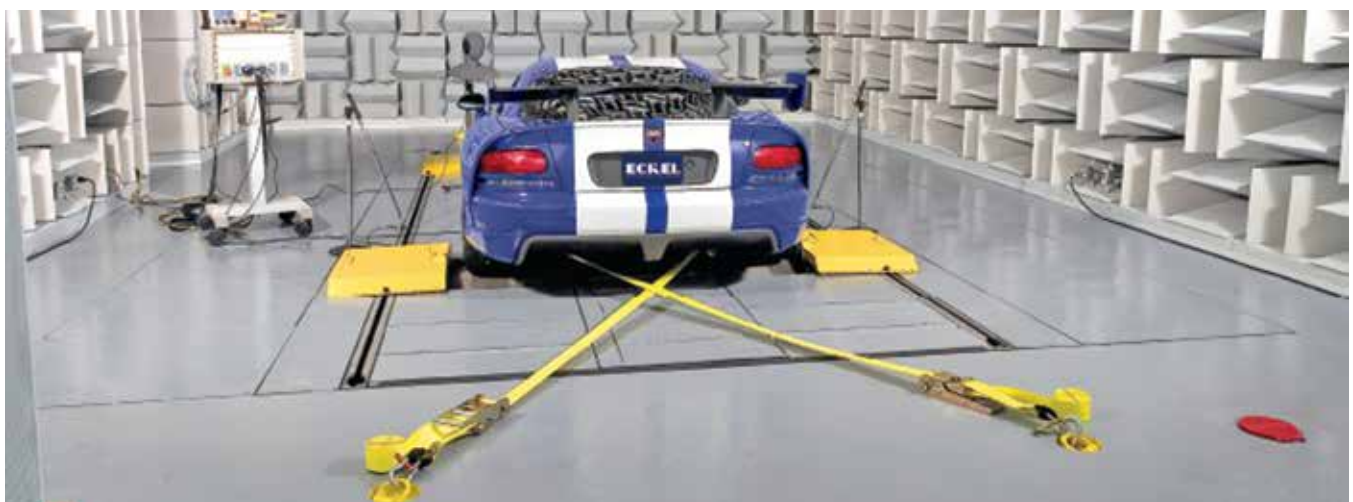
Accordingly, there has been an extensive demand for test facilities utilizing the most state-of-the-art noise control technologies in the market. Eckel's hemi-anechoic chambers help manufacturers to conceptualize and guide new vehicular designs with the goal of promoting safe and comfortable driving.

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.



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.



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.

65+

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.

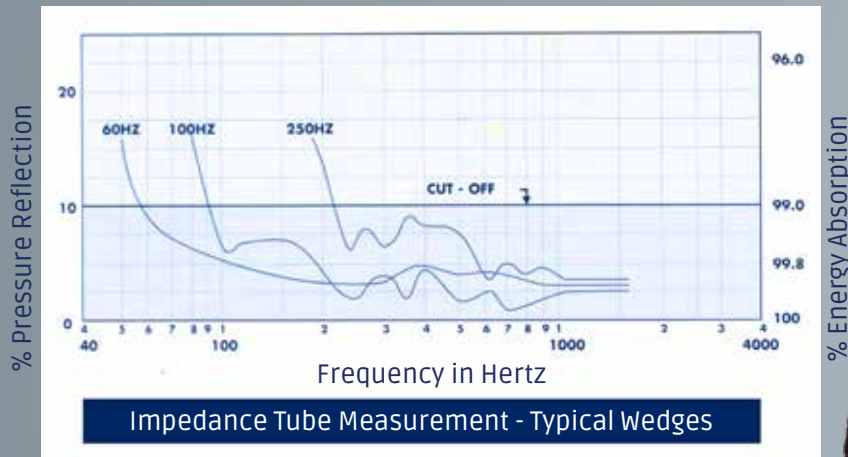
Anechoic & Hemi Anechoic Chambers

Ensure acoustic integrity, lasting durability, utility & performance with Eckel

Wedge Performance

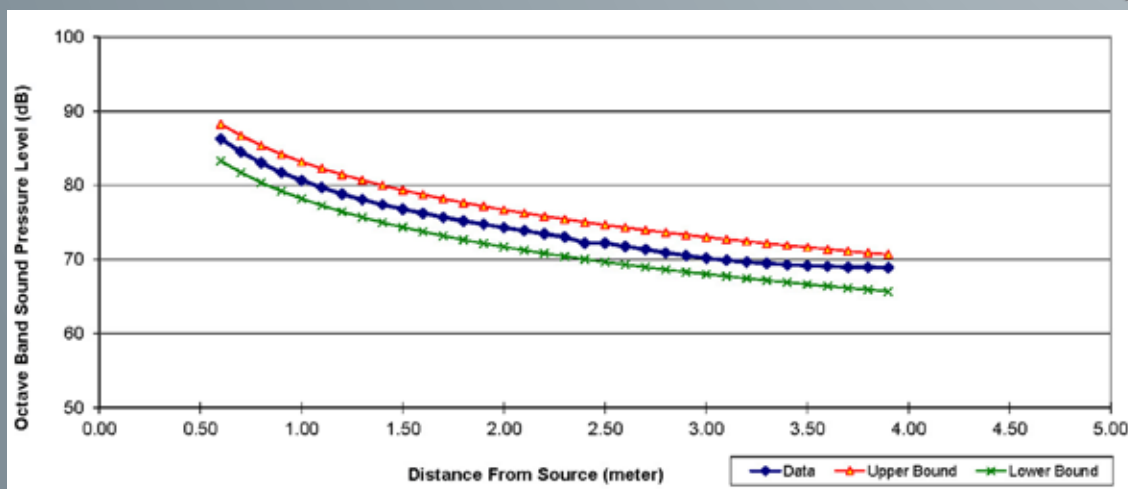
Impedance Tube Method: ASTM-C 384-90a

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



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 Craft 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. ■

Frequency Hz	63	125	250	500	1000	2000	4000	8000
Noise Reduction	25	38	58	59	60	62	64	65

Single Wall Panel Chamber Noise Reduction Data

Measured noise reduction through a 4" (100mm) Eckoustic Panel Anechoic Chamber

Frequency Hz	63	125	250	500	1000	2000	4000	8000
Noise Reduction	45	59	80	90	92	95	90	90

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.



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.



A state of the art testing facility utilizing SuperSoft panel enclosures.

Design

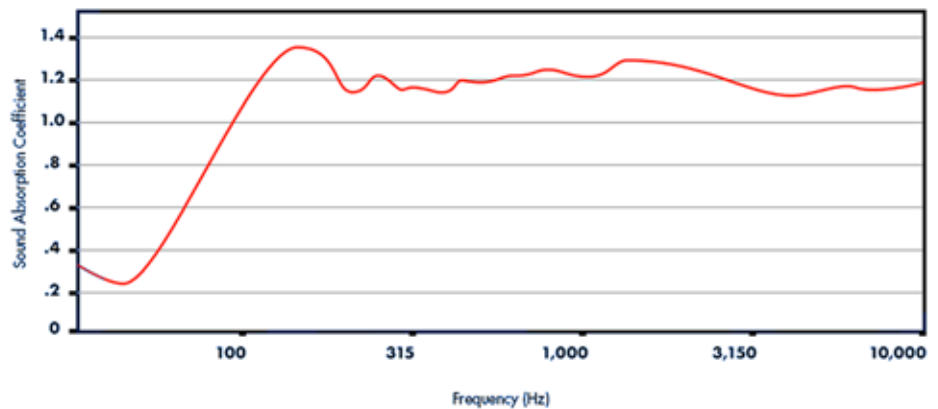
SuperSoft panel linings can be installed in a new or existing structure. They cover the walls and ceiling using a track and batten system. Fill density and panel spacing from the walls determine the acoustic performance. The "V" ridge facing design of the perforated metal panels enhances acoustic performance 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 Panel Typical Performance



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



SuperSoft chambers are ideal for testing industrial machinery.



Research & Development

Eckel anechoic chambers have been a part of innovations in aeronautics and space exploration where research and discoveries at facilities, such as the Glenn Research Center, have since contributed far more to science than the space program originally intended. Many of the same technologies that propelled mankind to the moon, now make our world a better place.



Electronics & Innovative Technologies

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 supports 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.

PAC Boxes



Portable Anechoic Chambers (PACs) are full anechoic chambers scaled to custom sizes.



Eckel for Innovation

A full anechoic chamber at
Wright Patterson Air Force Base



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.

Reverberation Rooms (Continued)

Eckel Reverberation Rooms satisfy reverberant test and specific interior sound level requirements necessary for accurate test measurement.



Reverberation & Listening Rooms

Eckel reverberation chambers are designed to create a diffuse or random incidence sound field.

NASA Glenn Research Center Hemispherical Anechoic Chamber develops technologies to further space exploration and air travel

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**

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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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