

A blue sports car is shown in a test chamber, surrounded by white acoustic foam. The car's headlight and front grille are visible. The background is a dark blue gradient.

ACOUSTIC SOLUTIONS

TEST CHAMBERS
TEST ENCLOSURES
ACOUSTIC DOORS
ENGINEERING SERVICES

BEYOND MEASURE.™

 **ETS·LINDGREN**[®]
An ESCO Technologies Company



EXCELLENCE IN ACOUSTIC TEST AND MEASUREMENT

ACOUSTIC SOLUTIONS FROM THE INDUSTRY EXPERT

When it comes to acoustics, performance is everything. Whether you're developing quiet products, minimizing interference from outside noise and vibration, creating ideal conditions for sound recording and listening, ensuring precise audio measurement, or maximizing the performance of building materials – there's only one partner that consistently delivers the solutions you need. ETS-Lindgren – *Performance Beyond Measure.*



That means enabling you to create optimal test environments using ETS-Lindgren products and solutions designed specifically to meet the precision requirements of different industries and applications:

- Acoustics
- Audiology
- Automotive Research
- Building Acoustics and Materials Testing
- Noise Control and Noise Emissions
- Recording and Broadcast

Above all, it means backing our acoustic solutions with more than 40 years of experience in acoustics and engineering services. Our experts will work with you and your team of integrators, architects, engineers, and designers.

PROVEN PERFORMANCE

There's a reason people prefer to work with ETS-Lindgren and it's evident in every product we design, manufacture, install, and maintain, including:

- Full and Hemi-Anechoic Chambers
- Reverberation Chambers
- Predictable and Adjustable Field Enclosures
- VAST (Virtual Acoustic Soundscape Technology) Chambers
- Small Device Enclosures
- Head and Torso Test Enclosures
- Plug-in Doors

Our products, coupled with our unparalleled acoustic services and testing laboratory, guarantee that we are able to deliver outcomes that provide *performance beyond measure*.

TEST CHAMBERS, TEST ENCLOSURES AND DOORS FOR ACOUSTIC TESTING

ETS-Lindgren has a diverse acoustic product line, allowing our customers to select the ideal test solution for their individual project. Each of our products is designed to meet specific test applications and is available in a wide range of sizes to meet your testing needs and host facility conditions. In addition to our standard products, ETS-Lindgren is also a leading designer and manufacturer of custom product solutions. For more information, visit our website at www.ets-lindgren.com.



ANECHOIC TEST CHAMBERS

ETS-Lindgren’s anechoic chambers offer a precision-grade free-field environment used to measure sound source directivity, frequency response, and noise emissions from spherically radiating sound sources. These chambers provide engineered features that achieve outstanding performance results and goals without compromising acoustical concepts and budgets.

FEATURES:

- Low-frequency Cut-off Points 80 Hz to 160 Hz (Custom Cut-off Frequencies Available)
 - 1 m to 2 m Radius Spherical Free-field (Custom Sizes Available)
 - Removable Grating Walking Surface with Pedestals or Tensioned Steel Cable Walking Surface
- Modular Steel or Concrete Vibration Isolated Floor
 - Patented Wedge Clip System
- Ventilation Silencers for HVAC or External Fan Connection (Wall, Ceiling, or Internal Mounting)
 - Acoustic Personnel Door
 - Pendant Lamps
- Acoustically Treated Cable Penetrations
 - Engineered and Designed to Host-site Ambient Conditions
- Design Based on Performance Data that Conforms with ISO 26101 and ISO 3745 Free-field Requirements for both Pure Tone and Broadband Testing

APPLICATIONS:

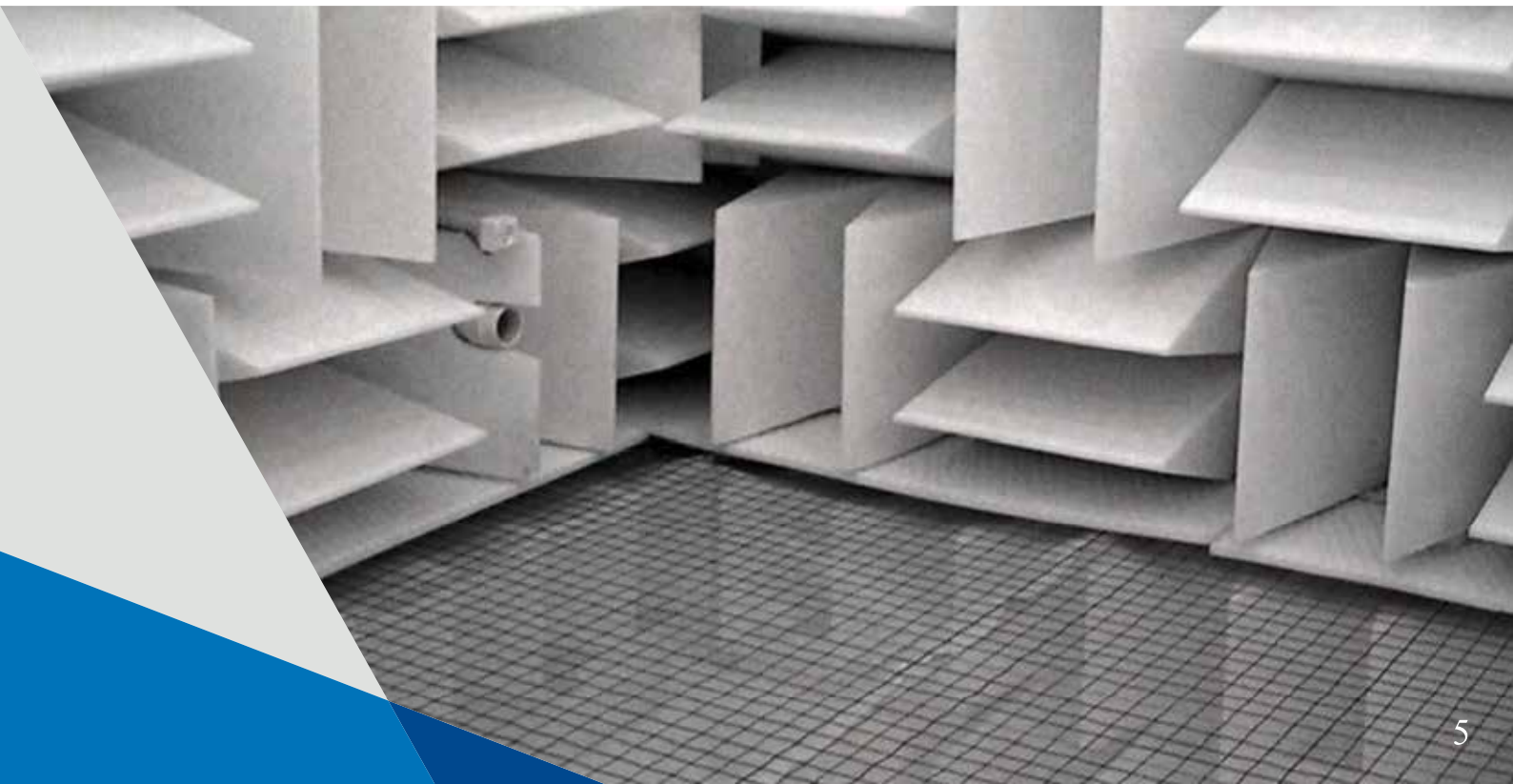
- Precision-grade Testing
 - Audio Testing
 - Noise Emission Testing

These anechoic chambers have a high performance wall panel system that provide the low-noise environment required to test today’s low-noise products. A precision-grade free-field environment is the result of the anechoic chamber’s sound absorption system that consists of melamine wedges installed on a patented clip system that provides fast wedge installation and removal. Unlike other wedge solutions, melamine wedges provide a bright and fiber-free working environment.

Specifications

Model	Standard Compliance		
	of Free-field	Interior Dimensions	Exterior Dimensions ^A
A160-1.0	160 Hz to 20 kHz to 1.0 m	3.35 m x 3.05 m x 2.74 m	4.37 m x 4.06 m x 3.84 m
		11 ft 0 in x 10 ft 0 in x 9 ft 0 in	14 ft 4 in x 13 ft 4 in x 12 ft 7 in
A100-1.0	100 Hz to 20 kHz to 1.0 m	4.47 m x 4.06 m x 3.86 m	6.05 m x 5.64 m x 5.51 m
		14 ft 8 in x 13 ft 4 in x 12 ft 8 in	19 ft 10 in x 18 ft 6 in x 18 ft 1 in
A100-1.5	100 Hz to 20 kHz to 1.5 m	5.49 m x 5.08 m x 4.88 m	7.06 m x 6.65 m x 6.53 m
		18 ft 0 in x 16 ft 8 in x 16 ft 0 in	23 ft 2 in x 21 ft 10 in x 21 ft 5 in
A100-2.0	100 Hz to 20 kHz to 2.0 m	6.5 m x 6.10 m x 5.89 m	8.08 m x 7.67 m x 7.55 m
		21 ft 4 in x 20 ft 0 in x 19 ft 4 in	26 ft 6 in x 25 ft 2 in x 24 ft 9 in
A80-2.0	80 Hz to 20 kHz to 2.0 m	6.60 m x 6.50 m x 6.30 m	8.68 m x 8.28 m x 8.15 m
		21 ft 8 in x 21 ft 4 in x 20 ft 8 in	27 ft 6 in x 27 ft 2 in x 26 ft 9 in

^AExcluding Ventilation Silencers



HEMI-ANECHOIC TEST CHAMBERS

ETS-Lindgren’s hemi-anechoic chambers provide a precise free-field environment used to measure sound sources over a reflecting plane. Typical measurements include product noise testing, sound power, sound source frequency response, and sound source directivity.

These chambers provide engineered features that achieve outstanding performance results and goals without compromising acoustical concepts and budgets. Hemi-anechoic chambers are used to perform precision- and engineering-grade testing on a wide variety of devices ranging from handheld units to large vehicles and equipment.

These hemi-anechoic chambers have a high performance wall panel system that provides the low-noise environment required to test today’s low-noise products. A precision-grade free-field environment is the result of the hemi-anechoic chamber’s sound absorption system that consists of melamine wedges installed on a patented clip system that provides fast wedge installation and removal. Unlike other wedge solutions, melamine wedges provide a bright and fiber-free working environment.

FEATURES:

- 80 Hz to 160 Hz Standard Models (Custom Models Available)
- 1 m to 2 m Radius Spherical Free-field (Custom Sizes Available)
- Modular Steel or Concrete Vibration Isolated Floor
- Patented Wedge Clip System (Wall and Ceiling Only)
 - Ventilation Silencers for HVAC or Fan Applications (Wall, Ceiling, or Internal Mounting)
 - Acoustic Personnel Door
 - Pendant Lamps
- Acoustically Treated Cable Penetrations
- Engineered and Designed to Host-site Ambient Conditions
- Design Based on Performance Data that Conforms with ISO 26101 and ISO 3745 Free-field Requirements for both Pure Tone and Broadband Testing

APPLICATIONS:

- Precision-grade Testing
- Engineering-grade Testing
- Noise Emission Testing
- Sound Power Testing
- Low-noise Testing

Specifications

Model	Standard Compliance		
	of Free-field	Interior Dimensions	Exterior Dimensions ^A
HA160-1.0	160 Hz to 20 kHz to 1.0 m	3.05 m x 2.74 m x 2.13 m	4.06 m x 3.76 m x 2.92 m
		10 ft 0 in x 9 ft 0 in x 7 ft 0 in	13 ft 4 in x 12 ft 4 in x 9 ft 7 in
HA100-1.0	100 Hz to 20 kHz to 1.0 m	4.06 m x 3.86 m x 3.66 m	5.64 m x 5.44 m x 4.72 m
		13 ft 4 in x 12 ft 8 in x 12 ft 0 in	18 ft 6 in x 17 ft 10 in x 15 ft 3 in
HA100-1.5	100 Hz to 20 kHz to 1.5 m	5.49 m x 4.88 m x 3.66 m	7.06 m x 6.45 m x 4.72 m
		18 ft 0 in x 16 ft 0 in x 12 ft 0 in	23 ft 2 in x 21 ft 2 in x 15 ft 6 in
HA100-2.0	100 Hz to 20 kHz to 2.0 m	6.71 m x 5.89 m x 4.27 m	8.28 m x 7.47 m x 5.26 m
		22 ft 0 in x 19 ft 3 in x 14 ft 0 in	27 ft 1 in x 24 ft 6 in x 17 ft 3 in

^AExcluding Ventilation Silencers



REVERBERATION TEST CHAMBERS

ETS-Lindgren's reverberation (reverb) chambers reflect sounds to provide a non-directional or diffuse sound field within the chamber. Unlike the sound pressure level produced by a device, the sound level is a property of the device and is independent of the test environment.

These chambers are designed to support precision- and engineering-grade audio and acoustic research measurements including Sound Power Level Determination per ISO 3741 and 3743, ANSI S12.31, S12.51 and S12.53, Building Acoustics per ASTM C423, ASTM E90 and ISO 140, as well as Automotive Test Standards per SAE J1400. Reverberation chambers are also used to measure the sound absorption characteristics of materials or other items such as soft panels, screens or pieces of furniture (e.g. theater seats, chairs, and sofas).

FEATURES:

- Modular Steel Vibration Isolated Floor or Concrete Isolated Floor
- Modular 10.16 cm (4 in) Steel Panels
- Ventilation Silencers for HVAC or Fan Applications (Wall, Ceiling, or Internal Mounting)
- Acoustic Personnel Door
- Diffusers
- Pendant Lamps
- Acoustically Treated Cable Penetrations
- Engineered and Designed to Host-site Ambient Conditions

APPLICATIONS:

- Transmission Loss Testing
- Sound Power Testing
- Sound Absorption Testing
- Noise Reduction Testing

Specifications

Standard Compliance				
Model	of Reverberant Field	Volume	Interior Dimensions	Exterior Dimensions
R160-1	160 Hz to 10 kHz ISO 3741 Annex E (Broadband)	120 m ³	5.84 m x 4.67 m x 3.66 m	6.05 m x 4.88 m x 3.94 m
	100 Hz to 8 kHz ISO 3473	4,238 ft ³	19 ft 2 in x 15 ft 4 in x 12 ft 0 in	19 ft 10 in x 16 ft 0 in x 12 ft 11 in
	100 Hz to 5 kHz (Building Acoustic ISO 140, ASTM C423, ASTM E90)			
R125-1	125 Hz to 10 kHz ISO 3741 Annex E (Broadband)	172 m ³	6.68 m x 5.33 m x 4.22 m	6.88 m x 5.54 m x 4.50 m
	100 Hz to 8 kHz ISO 3473	6,074 ft ³	21 ft 11 in x 17 ft 6 in x 13 ft 10 in	22 ft 7 in x 18 ft 2 in x 14 ft 9 in
	100 Hz to 5 kHz (Building Acoustic ISO 140, ASTM C423, ASTM E90)			
R100-1	100 Hz to 20 kHz ISO 3741 Annex E (Broadband)	198 m ³	7.34 m x 5.84 m x 4.62 m	7.54 m x 6.05 m x 4.90 m
	100 Hz to 8 kHz ISO 3473	6,992 ft ³	24 ft 1 in x 19 ft 2 in x 15 ft 2 in	24 ft 9 in x 19 ft 10 in x 16 ft 1 in
	100 Hz to 5 kHz (Building Acoustic ISO 140, ASTM C423, ASTM E90)			
R80-1	80 Hz to 10 kHz ISO 3741 Annex E (Broadband)	254 m ³	8.03 m x 6.30 m x 5.03 m	8.23 m x 6.50 m x 5.36 m
	80 Hz to 8 kHz ISO 3473	8,970 ft ³	26 ft 4 in x 20 ft 8 in x 16 ft 6 in	27 ft 0 in x 21 ft 4 in x 17 ft 7 in
	80 Hz to 5 kHz (Building Acoustic ISO 140, ASTM C423, ASTM E90)			
R63-1	63 Hz to 10 kHz ISO 3741 Annex E (Broadband)	324.43 m ³	8.43 m x 7.01 m x 5.49 m	8.64 m x 7.21 m x 5.82 m
	63 Hz to 8 kHz ISO 3473	11,457 ft ³	27 ft 8 in x 23 ft 0 in x 18 ft 0 in	28 ft 4 in x 23 ft 8 in x 19 ft 1 in
	63 Hz to 5 kHz (Building Acoustic ISO 140, ASTM C423, ASTM E90)			



PREDICTABLE FIELD TEST ENCLOSURES

ETS-Lindgren's predictable field enclosures provide an acoustically quiet environment with high test repeatability. To approximate the sound field found in a hemi-anechoic chamber without the use of wedges, the walls and ceiling in a predictable field enclosure are manufactured with several inches of sound absorbing material. Predictable field enclosures provide an engineering- or survey-grade sound field (dependent on enclosure size) for sound power testing. While precision-grade sound power testing requires a hemi- or full-anechoic chamber, a predictable field enclosure provides an economical solution for engineering- or survey-grade tests specified by many standards. Predictable field enclosures can be installed with or without acoustical floors; however, for maximum sound isolation performance, an isolated floor system should be used.

FEATURES:

- Modular 10.16 cm (4 in) Steel Panels; 15.24 cm (6 in) optional
- Ventilation Silencers for HVAC or Fan Applications (Wall, Ceiling, or Internal Mounting)
- Acoustic Personnel Door
- LED Lighting
- Acoustically Treated Cable Penetrations
- Optional Modular Steel Vibration Isolated Floor System

APPLICATIONS:

- Quality Assurance Sound Pressure Level Measurements (Product Line)
- Sound Quality Measurements and Evaluation of Components
- Sound Power
- Sound Pressure Measurements of Product Noise Emissions Allows Comparative Measurements to be made with a Reference Design or Reference Sound Source
- Computer Sound Level Emissions
- Pass/Fail Quality Control of Small or Medium Sized Electrical, Audio, or Mechanical Parts
- Engineering Design where a Precision-grade Sound Field is Not Required
- Audio Production
- Critical Listening
- Noise Isolation

Specifications

Model	Interior Dimensions	Baseline Enclosure	Exterior Dimensions ^{A, B}
P1-4	1.83 m x 1.22 m x 2.31 m	2.03 m x 1.42 m x 2.59 m	2.03 m x 1.42 m x 2.41 m
	6 ft 0 in x 4 ft 0 in x 7 ft 7 in	6 ft 8 in x 4 ft 8 in x 8 ft 6 in	6 ft 8 in x 4 ft 8 in x 7 ft 11 in
P1-6	1.83 m x 1.22 m x 2.31 m	2.13 m x 1.52 m x 2.69 m	2.13 m x 1.52 m x 2.46 m
	6 ft 0 in x 4 ft 0 in x 7 ft 7 in	7 ft 0 in x 5 ft 0 in x 8 ft 10 in	7 ft 0 in x 5 ft 0 in x 8 ft 1 in
P2-4	2.44 m x 1.83 m x 2.31 m	2.64 m x 2.03 m x 2.59 m	2.64 m x 2.03 m x 2.41 m
	8 ft 0 in x 6 ft 0 in x 7 ft 7 in	8 ft 8 in x 6 ft 8 in x 8 ft 6 in	8 ft 8 in x 6 ft 8 in x 7 ft 11 in
P2-6	2.44 m x 1.83 m x 2.31 m	2.74 m x 2.13 m x 2.69 m	2.74 m x 2.13 m x 2.41 m
	8 ft 0 in x 6 ft 0 in x 7 ft 7 in	9 ft 0 in x 7 ft 0 in x 8 ft 10 in	9 ft 0 in x 7 ft 0 in x 8 ft 1 in
P3-4	3.05 m x 2.44 m x 2.31 m	3.25 m x 2.64 m x 2.59 m	3.25 m x 2.64 m x 2.41 m
	10 ft 0 in x 8 ft 0 in x 7 ft 7 in	10 ft 8 in x 8 ft 8 in x 8 ft 6 in	10 ft 8 in x 8 ft 8 in x 7 ft 11 in
P3-6	3.05 m x 2.44 m x 2.31 m	3.35 m x 2.74 m x 2.69 m	3.35 m x 2.74 m x 2.46 m
	10 ft 0 in x 8 ft 0 in x 7 ft 7 in	11 ft 0 in x 9 ft 0 in x 8 ft 10 in	11 ft 0 in x 9 ft 0 in x 8 ft 1 in
P4-4	3.66 m x 3.05 m x 2.31 m	3.86 m x 3.25 m x 2.59 m	3.86 m x 3.25 m x 2.41 m
	12 ft 0 in x 10 ft 0 in x 7 ft 7 in	12 ft 8 in x 10 ft 8 in x 8 ft 6 in	12 ft 8 in x 10 ft 8 in x 7 ft 11 in
P4-6	3.66 m x 3.05 m x 2.31 m	3.96 m x 3.35 m x 2.69 m	3.96 m x 3.35 m x 2.46 m
	12 ft 0 in x 10 ft 0 in x 7 ft 7 in	13 ft 0 in x 11 ft 0 in x 8 ft 10 in	13 ft 0 in x 11 ft 0 in x 8 ft 1 in
P5-4	4.27 m x 3.66 m x 2.31 m	4.47 m x 3.86 m x 2.59 m	4.47 m x 3.86 m x 2.41 m
	14 ft 0 in x 12 ft 0 in x 7 ft 7 in	14 ft 8 in x 12 ft 8 in x 8 ft 6 in	14 ft 8 in x 12 ft 8 in x 7 ft 11 in
P5-6	4.27 m x 3.66 m x 2.31 m	4.57 m x 3.96 m x 2.69 m	4.57 m x 3.96 m x 2.46 m
	14 ft 0 in x 12 ft 0 in x 7 ft 7 in	15 ft 0 in x 13 ft 0 in x 8 ft 10 in	15 ft 0 in x 13 ft 0 in x 8 ft 1 in
P6-4	4.88 m x 4.27 m x 3.05 m	5.08 m x 4.47 m x 3.33 m	5.08 m x 4.47 m x 3.15 m
	16 ft 0 in x 14 ft 0 in x 10 ft 0 in	16 ft 8 in x 14 ft 8 in x 10 ft 11 in	16 ft 8 in x 14 ft 8 in x 10 ft 4 in
P6-6	4.88 m x 4.27 m x 3.05 m	5.18 m x 4.57 m x 3.43 m	5.18 m x 4.57 m x 3.20 m
	16 ft 0 in x 14 ft 0 in x 10 ft 0 in	17 ft 0 in x 15 ft 0 in x 11 ft 3 in	17 ft 0 in x 15 ft 0 in x 10 ft 6 in

^AExcluding ventilation silencers applies to baseline and without isolated floor system dimensions.

^BCustom sizes available. Contact ETS-Lindgren for details.



ADJUSTABLE FIELD TEST ENCLOSURES

ETS-Lindgren’s adjustable field enclosures provide an acoustically quiet environment with high test repeatability. The enclosure is designed to provide adjustable reverberation times to tailor the acoustic field to the test being performed. It is designed to optimize the engineering and design requirements needed for an end-product application.

FEATURES:

- Modular Steel Vibration Isolated Floor
 - 15.24 cm (6 in) Steel Panels
- Ventilation Silencers for HVAC or Fan Applications (Wall, Ceiling, or Internal Mounting)
 - Acoustic Personnel Door
 - LED Lighting
- Acoustically Treated Cable Penetrations
- Removable Acoustic Sound Absorbing Panels
- Adjustable Reverberation Times

APPLICATIONS:

- Speech Intelligibility Testing of Devices
 - Speaker Phone Testing
- Sound Quality Measurements and Evaluations of Components
 - Sound Power Testing
 - Low-noise Testing
 - Critical Listening

The enclosure provides field compliant testing with ETSI EG 202 396-1.1.2 and other related test standards. The enclosure can be configured to provide reverberation times throughout the ETSI standard’s range as well as times outside that range, which can be used for additional research and development testing. Removable acoustic sound absorbing panels attach to the solid inner surface with magnets. This allows the enclosure’s reverberation times to be adjusted quickly for testing.

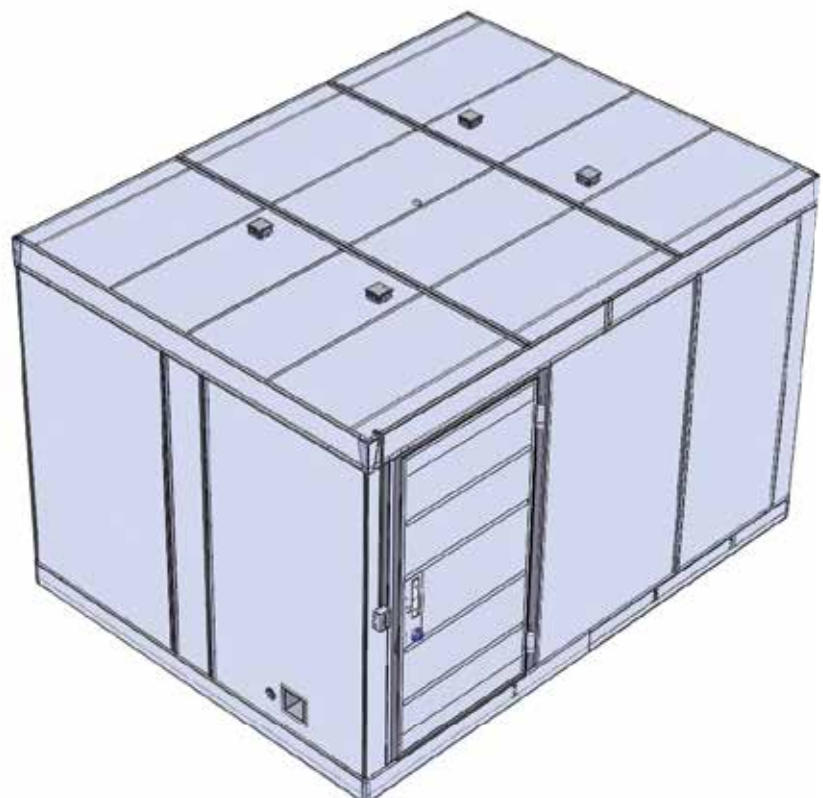
As per ETSI EG 202 396-1.1.2, this enclosure allows for reverberation times of 0.2 to 0.7 seconds for each octave band between 125 Hz and 8 kHz. Custom ranges are available.

Specifications

Model	Interior Dimensions	Exterior Dimensions ^{A, B}
AF1	2.44 m x 3.55 m x 2.13 m	2.74 m x 3.66 m x 2.51 m
	8 ft 0 in x 11 ft 0 in x 7 ft 0 in	9 ft 0 in x 12 ft 0 in x 8 ft 3 in
AF2	4.00 m x 3.50 m x 2.50 m	4.32 m x 3.81 m x 9.42 m
	13 ft 2 in x 11 ft 6 in x 8 ft 2 in	14 ft 2 in x 12 ft 6 in x 9 ft 5 in

^A Excluding Ventilation Silencers

^B Custom sizes available. Contact ETS-Lindgren for details.



HIGH PERFORMANCE HEAD AND TORSO TEST ENCLOSURES

FEATURES:

- Acoustic Walls, Ceiling, and Floor
- 20.4 cm (8 in) Acoustic Wall Panels
- 30.5 cm (12 in) Acoustic Wedges
 - Acoustic Door
 - Incandescent LED Lamps
- Vibration Isolated Floor System
 - Two Cable Ports
 - Slide-out Steel Tray

APPLICATIONS:

- Head and Torso Testing of:
 - Cell Phones
 - Telephone Handset
 - Hearing Aids
 - Headphones
 - In-ear Devices
- Quality Assurance/Comparative Analysis
 - Small Parts or Components Noise Emissions Testing
 - IT Product Noise Testing

ETS-Lindgren’s High Performance Head and Torso (HPHATS) enclosures provide a free-field environment for making head and torso measurements on small devices such as cell phones and hearing aids. HPHATS test enclosures are an option when large anechoic chamber noise reduction and sound absorption performance is required, but a full-size anechoic chamber is not feasible.

The high performance baseline enclosure design provides an essentially free-field environment with a frequency range of 250 Hz to 20 kHz. The chamber uses the same wall panel and absorber system as our larger A160-1.0, walk-in, full-anechoic chamber. It is well equipped for quality control and comparative analysis applications.

ETS-Lindgren’s high performance test enclosures are an affordable solution when precision-grade testing is not required. Tests can be conducted in high performance enclosures using either a single microphone or a small array of microphones.

Specifications

Model	Interior Dimensions	Exterior Dimensions
HP Head and Torso Chamber	122 cm x 122 cm x 122 cm 4 ft 0 in x 4 ft 0 in x 4 ft 0 in	224 cm x 224 cm x 224 cm 7 ft 4 in x 7 ft 4 in x 7 ft 4 in



SPLIT-APART HEAD AND TORSO TEST ENCLOSURES

FEATURES:

- Acoustic Walls, Ceiling, and Floor
- 15.24 cm (6 in) Acoustic Wedges
 - Acoustic Door
 - Incandescent Lamps
- Acoustically Treated Cable Penetrations
- Vibration Isolated Stand with Casters
 - Tool-free Split-in-half Design
 - Two Cable Ports

APPLICATIONS:

- Head and Torso Testing of:
 - Cell Phones
 - Telephone Handset
 - Hearing Aids
 - Headphones
 - In-ear Devices
- Quality Assurance/Comparative Analysis
 - Small Parts or Components Noise Emissions Testing
 - IT Product Noise Testing

ETS-Lindgren's Split-Apart Head and Torso (HATS) enclosures provide a free-field environment for head and torso testing of mobile phones and other handheld audio devices. The enclosure is an affordable solution when precision-grade testing is not required. Tests can be conducted using a head and torso simulator, single microphone, or a small array of microphones.

Named for its ability to split into two halves without tools, the enclosure is designed to fit through a standard door opening, allowing for easy relocation. The HATS enclosure features a high performance design with high performance walls, acoustic wedges, and an isolated stand with casters. A slide-out perforated-steel tray allows easy access and adjustment to the device under test.

Specifications

Model	Interior Dimensions	Exterior Dimensions
Head and Torso Chamber	91 cm x 92 cm x 107 cm 3 ft 0 in x 3 ft 1 in x 3 ft 6 in	142 cm x 145 cm x 166 cm 4 ft 8 in x 4 ft 9 in x 5 ft 5 in



SMALL DEVICE TEST ENCLOSURES

ETS-Lindgren's Small Device (SD) test enclosures provide a free-field environment for making survey- and engineering-grade measurements on small devices. SD test enclosures are an affordable option when precision-grade testing is not required, including testing the acoustic (sound power, sound pressure) levels of automotive components, computer hard drives, fans, pumps, and small mechanical and electrical assemblies.

FEATURES:

- Reflective Panelized Floor (Sound Absorbing Perforated Steel Floor Optional)
- Sound Absorbing Perforated Steel Walls/Ceiling
 - Acoustic Door with Optional Window
 - Floor Vibration Pads (SD and SD1)
 - Floor Vibration Rails (SD2 and SD3)
 - Two Cable Ports

APPLICATIONS:

- Automotive Components
- Quality Assurance/Comparative Analysis
- Telephone Handsets or Mounted Transducers for Noise Quality Testing
- Insertion Measurements of Hearing Aids
- Evaluation Testing of Microphone Preamps for Noise Cancellation, Conductivity and Emissions
 - Small Parts/Components Noise Emissions Testing
 - Head/Torso Testing (SD3)
 - Computer Components
 - IT Product Noise Testing

SD series enclosures are also the perfect solution for academic research requiring a acoustically isolated environment for auditory and brainwave response studies. Options such as integrated ventilation and interior lighting are perfect when research involves a living subject.

Testing can be conducted using either a single microphone, or a small array of microphones. SD enclosures can also be used with vibration test equipment when required. Four sizes of SD enclosures are available to accommodate most small test objects.

The SD series isolates and controls acoustic energy to provide the ideal testing environment for small electronics, computer equipment, hearing aids and automotive components. With minimum 10.2 cm (4 in) thick acoustic walls and sound absorbing floor and ceiling, the SD enclosures are ideal for making survey- and engineering-level measurements on small devices.

Specifications

Model	Interior Dimensions	Exterior Dimensions ^A
SD	66.0 cm x 71.1 cm x 71.1 cm	86.4 cm x 91.4 cm x 91.4 cm
	26 in x 28 in x 28 in	34 in x 36 in x 36 in
SD1	91.4 cm x 91.4 cm x 91.4 cm	111.8 cm x 111.8 cm x 111.8 cm
	36 in x 36 in x 36 in	44 in x 44 in x 44 in
SD2	121.9 cm x 121.9 cm x 132.1 cm	152.4 cm x 152.4 cm x 162.6 cm
	48 in x 48 in x 52 in	60 in x 60 in x 64 in
SD3	106.7 cm x 106.7 cm x 213.4 cm	127.0 cm x 127.0 cm x 241.3 cm
	42 in x 42 in x 84 in	50 in x 50 in x 95 in

^A Custom sizes available. Contact ETS-Lindgren for details.



SOUNDSECURE™ PLUG-IN DOORS

FEATURES:

- Durable Construction Throughout
- Fully Assembled and Tested at Factory
- Optional Window in Standard and Custom Sizes
- Perfect for New or Existing Construction
- Acoustic Plug-in Door with Trim Ring:
 - 10.16 cm (4 in) to 15.24 cm (6 in) Walls
 - Optional Trim Ring Sizes Available:
 - 15.24 cm (6 in) to 30.48 cm (12 in) Walls

ETS-Lindgren's SoundSecure plug-in doors are an integral component of all ETS-Lindgren test chambers, sound isolation rooms, and audiometric booths. SoundSecure doors are available with excellent acoustical ratings. The plug-in assemblies bring ETS-Lindgren's sound isolation to conventional construction.

Designed for acoustical consultants, architects and engineers, ETS-Lindgren's SoundSecure doors are an effective means of providing superior sound isolation in new construction and renovation projects. SoundSecure doors are faced with 16-gauge steel; feature mortised, cam-lift butt hinges; and are sealed with magnetic gaskets at the head and jambs.

SoundSecure doors are designed and manufactured with durability and performance in mind. Our double-sealed gaskets, tight bend radius, and uninterrupted seals around the hinges provide a tight and complete seal.

The doors are furnished with chrome-plated die-cast zinc handles mounted on heavy duty push plates and can be hung to swing either in or out. All exposed surfaces of the door and frames are powder coated with a paintable powder coat. While ETS-Lindgren offers a standard powder coat color, we can also provide colors to match or accent existing decor or to create an additional interior design element.

Every SoundSecure door can be designed to include a window. These windows are available in both standard and custom sizes and are produced with a desiccant material that prevents condensation. A sound absorber is installed between the two glass panes to improve acoustical performance.



VIRTUAL ACOUSTIC SOUNDSCAPE TECHNOLOGY (VAST™) CHAMBERS

FEATURES:

- SoundSecure Chamber Panels
- Touch-screen Control Interface Standard; Customized Interface Optional
- Walk-in or Reach-in Configurations
 - Virtual Soundscape
- Active System Allows for Unlimited Sound Field Options
 - Quick Change
 - Live Augmentation

APPLICATIONS:

- Speech Recognition Testing
 - Noise Rejection Testing
- Research and Development
- Speech Intelligibility Testing
 - Music Rehearsal

Many devices require testing in acoustically controlled environments with specific reverberation times and background noise levels. These spaces are either designed for a single purpose with no testing flexibility or require manual reconfiguration using a variety of furnishings and acoustic treatments to change the sound field characteristics. Often, real world rooms are the only available test space when a properly engineered environment is not available. These solutions present a compromise in repeatability, facility utilization, or time.

To solve these problems, ETS-Lindgren developed a new chamber called VAST™ (Virtual Acoustic Soundscape Technology). VAST is built on ETS-Lindgren's SoundSecure™ chamber panel system. The panels are embedded with arrays of microphones and loudspeakers that are processed through a high-performance real time DSP engine to provide a virtual soundscape inside the chamber. VAST can simulate any room that is larger than the physical dimensions of the chamber. If specific reverberation times are desired, those can be programmed as well. The soundscape can be changed instantly using a touch screen interface. (Note: Custom interface and software integration is available.) Background noise and other acoustic signals can be played back through the system to comply with various test standards or to simulate real-world environments.

Two standard models of VAST chambers are available: a walk-in and a reach-in version. The walk-in version can simulate any environment larger than the chamber's physical dimensions. The reach-in version can simulate smaller environments such as automobile interiors. Custom VAST chambers can also be designed to meet specific applications or design goals.

Specifications

Model	Interior Working Area	Exterior Dimensions
Walk-in	4.27 m x 3.66 m x 2.74 m	4.78 m x 4.17 m x 3.18 m ^{A, B}
	14 ft 0 in x 12 ft 0 in x 9 ft 0 in	15 ft 8 in x 13 ft 8 in x 10 ft 5 in
Reach-in	1.73 m x 1.73 m x 1.65 m	2.24 m x 2.24 m x 2.24 m
	68 in x 68 in x 65 in	88 in x 88 in x 88 in

^A Excludes wall or ceiling mounted ventilation silencers; allow an additional 30.5 cm (12 in).

^B Excludes optional seismic bracing; allow an additional 35.6 cm (14 in) around the perimeter.





SERVICE SOLUTIONS FOR ACOUSTICS

From consulting to chamber relocation, testing to custom product design, ETS-Lindgren has dedicated experts committed to the success of our customers. ETS-Lindgren understands how downtime can impact our customers' product development, production and testing schedules. With more than 800 professionals in locations in the Americas, Europe, the Middle East and Asia, ETS-Lindgren has the global experts to provide you with the best service possible. When it comes to service, put your trust in ETS-Lindgren.

CONSULTING AND CUSTOM PRODUCT DESIGN SERVICES

ETS-Lindgren is the expert in isolating and controlling acoustic energy. We work with your local systems integrator, architects, engineers, and you to produce the best acoustic solution possible. We partner with these professionals to promote project accuracy and seamless integration into the host facility, reducing the potential for costly delays. ETS-Lindgren offers many diverse choices in size and feature packages; however, if you require a customized solution, we have the proven experience to design an optimal solution.

MAINTENANCE SERVICES

Periodic maintenance pays for itself in reduced downtime and unexpected expense. Our extensive network of local sales and service representative are available to provide you with ongoing support for the life of your chamber.

CHAMBER RELOCATION

Whether you are moving a few hundred feet or hundreds of miles, our local network of sales and service experts can provide relocation services customized to fit your needs.

IN-HOUSE AND FIELD TESTING SERVICES

ETS-Lindgren's Acoustic Research Laboratory (ARL), located within our Cedar Park, Texas facility offers acoustic testing services in accordance with a wide range of standardized test methods. ARL is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP Lab Code 100286-0) administered through the National Institute of Standards and Technology (NIST), United States Department of Commerce.

In addition to in-house testing, ETS-Lindgren also provides acoustic field testing services at customer sites globally. These services include qualification of anechoic and hemi-anechoic chambers in accordance with ISO 3745, ISO 3744 and ISO 26101, qualification of reverberation chambers in accordance with ISO 3741, ASTM C423 and other reverberation chamber-based standards, environmental noise surveys, and in situ testing of sound barriers or sound isolating enclosures. Portable microphone positioning systems, sound sources, and laptop-based data acquisition systems allow for precision testing at your location.

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