



MODULAR

FULLY ANECHOIC CHAMBER
SEMI-ANECHOIC CHAMBER

MODULAR ANECHOIC CHAMBER

Sonora Technology offers two kinds of anechoic chamber: Fully Anechoic chamber and Semi-anechoic chamber.

- Fully Anechoic chamber (4П)

[Measurement targets] Consumer electronics, compact driving components such as air-conditioner, fan, items not to be placed to use on the floor

[Applicable standard] ISO3745 Acoustics - Determination of sound power levels and sound energy levels of noise sources using sound pressure - Precision methods for anechoic chambers and semi-anechoic chamber.

- Semi-anechoic chamber (2П)

[Measurement targets] Car, car parts, freezer, items to be placed to use on the road or floor

[Applicable standards] ISO3744 Acoustics - Determination of sound power levels of noise sources using sound pressure - Engineering method in an essentially free field over a reflecting plane, ISO 3745, etc.

Examples: Fully Anechoic chamber / Semi-anechoic chamber + auxiliary equipment
chassis dynamometer, wind tunnel testing equipment, vibration testing machine, constant temperature and humidity control system, Various types of acoustic measurement equipment



#1 Low Profile and Space-saving

Sound insulation layer: composed of in-house developed steel sound insulation panels. Only 40mm to 150mm thickness depending on the required sound insulating value. Feasible significant space savings, compared to the concrete layer as conventional construction method. Sound absorbing layer: Composed of in-house developed sound absorbing wedges. High sound absorption despite its low profile. Selected according to the required sound absorption performance. 60% to 80% lesser thickness compared to the conventional products. Space-saving design.

#2 Ready-to-assemble

Modular frames and panels enable dismantling and relocating. It also enables cost savings when changing layouts. Excellent dimensional accuracy due to prefabrication in factories.

#3 High Performance

Sonora Technology guarantees sound insulating value and sound absorption performance. High performance despite low profile. Our anechoic chamber is second to none.

#4 Premium Quality

All component parts are manufactured in factories in Japan. Ensure premium quality with the state-of-the-art equipment. "MADE IN JAPAN."

#5 Competitive Price

Workflow automation in production processes. Competitive price thanks to space-saving design avoiding unnecessary costs. Less expensive than the offered prices by other companies in terms of the same conditions.

#6 Delivery Record

Since 2003, Sonora Technology has achieved to deal with 1,024 companies, mainly among major Japanese companies, and concluded with 3,229 deals during around 20 years.

#7 Expertise and Effective proposals

Sonora Technology has been satisfying clients' requirements as a leading manufacturer of the ready-to-assemble anechoic chamber in the Japanese market. Since our foundation, we have been overcoming various challenges with a strong mind-set. Thanks to that, now we possesses the right expertise, unique technologies and various kinds of strengths. We are confident to make effective proposals.

PARTIAL RECORD OF DELIVERY BY INDUSTRY

✔ Transport Equipment:

- Toyota Motor
- Honda Motor
- Matsuda Motor
- Nissan Motor
- SUBARU
- Aisin Seiki
- Denso
- Toyota Boshoku
- Continental Automotive Japan
- Schaeffler Japan
- and others

✔ Machinery:

- Mitsubishi Heavy Industries
- Kawasaki Heavy Industries
- IHI
- NTN
- Hitachi Construction Machinery
- NSK
- Caterpillar Japan
- THK
- Sinfonia Technology
- Nippon Seiki
- and others

✔ Other Products:

- NHK
- NTT
- Electric Power Development
- TEPCO
- KEPCO
- Tocalo
- Kao
- YKK AP
- Yakult
- ENEOS
- and others

✔ Electrical Equipment:

- Sony Group
- Panasonic
- Canon
- Mitsubishi Electric
- Toshiba
- Hitachi
- NIDEC
- NEC
- Konica Minolta
- Taiyo Yuden
- and others

✔ Precision Equipment:

- Carl Zeiss
- Kurashiki Kako
- Hitachi High-Tech
- Nikon
- Kioxia
- Citizen HD
- Seiko HD
- Nippon Electronics
- Pixie Dust Technologies
- HOYA
- and others

✔ Schools and government agencies:

- The University of Tokyo
- Keio University
- Kyoto University
- National Institute for Materials Science (NIMS)
- Foundation for Promotion of Material Science and Technology (MST)
- Japan Aerospace Exploration Agency (JAXA)
- National Traffic Safety and Environment Laboratory (NTSEL)
- RIKEN
- National Institute of Advanced Industrial Science and Technology (AIST)
- Chemicals Evaluation and Research Institute (CERI)
- and others



Constant temperature and humidity - 40 ~ + 120

Wind tunnel experiment

Vibration test (e.g. rattle noise test)



ANECHOIC CHAMBER+

Various measurement scenarios can be realized by combining an anechoic chamber with measurement system and environmental equipment.



Chassis dynamometer

Indoor pass-by

Various environmental tests





VEHICLE EXTERIOR NOISE MEASUREMENT USING A SEMI-ANECHOIC CHAMBER

Indoor Pass-by / Acoustic Vehicle Alerting System (AVAS)

Regarding the Semi-Anechoic Chamber, there is a growing needs for "vehicle exterior noise measurement".

Vehicle exterior noise (Pass-by noise) refers to the noise generated when the vehicle is running.

In recent years, the development of quieter technologies has contributed to reduce vehicle exterior noise. However, one of the reasons for this is the revision of the United Nations of Four wheel vehicle noise regulation (UN/ECE R51), which requires acoustic evaluation of vehicles in urban driving conditions. (R51.03)

To measure this pass-by noise, vehicle manufacturers may conduct measurements with vehicles in operation on test tracks or similar settings. However, the construction of test tracks requires significant expenses and space. Moreover, there have been challenges related to variations in measurement conditions due to environmental factors such as rainy or windy weather. Therefore, the method of measuring vehicle exterior noise indoors, known as "indoor pass-by" has become a trend and standard in the industry. This involves installing a chassis dynamometer inside a Semi-anechoic chamber to measure vehicle exterior noise within the chamber. This can be described as a method of virtually replicating the outdoor measurement environment indoor.

Sound is measured using microphones, and the sound of a moving vehicle must be picked up from a microphone placed in a specific location, as it is necessary for the vehicle to pass by. Therefore, during indoor pass-by tests, multiple microphones are placed in parallel on both sides of the vehicle running on the chassis dynamometer.

Examples of relevant standards : ISO362-3 Measurement of noise emitted by accelerating road vehicles

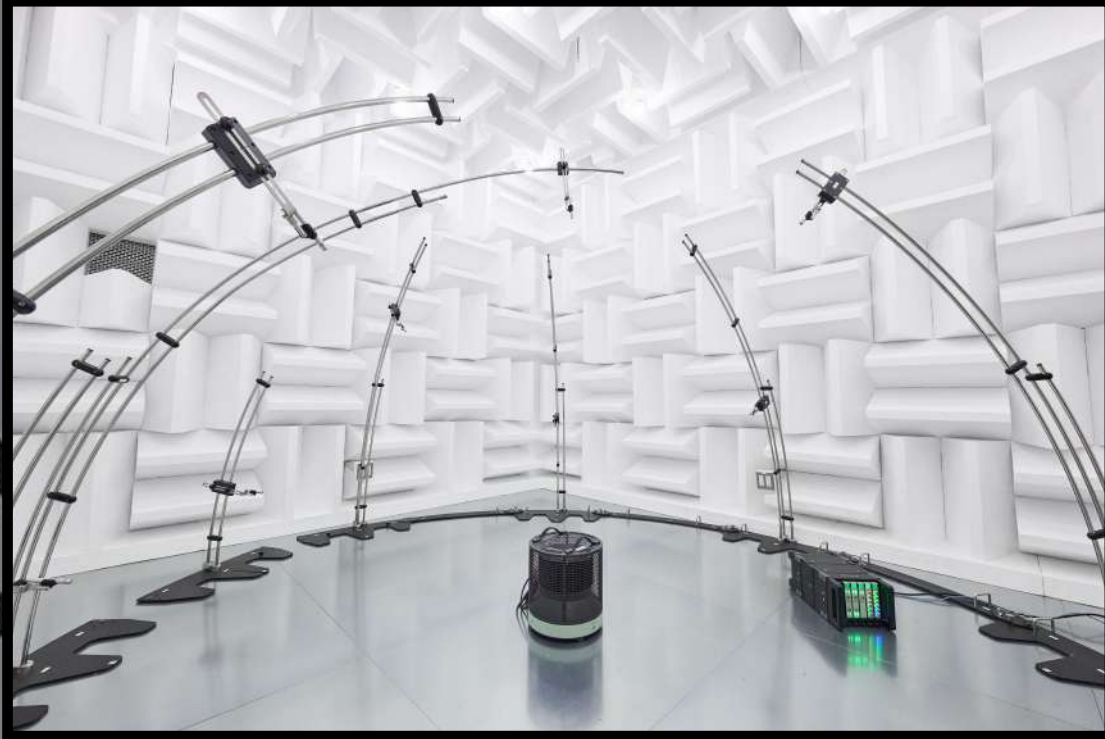
Furthermore, there are also relevant standards for Semi-anechoic chamber regarding other measurement methods.

《Related standards for other measurement methods.》

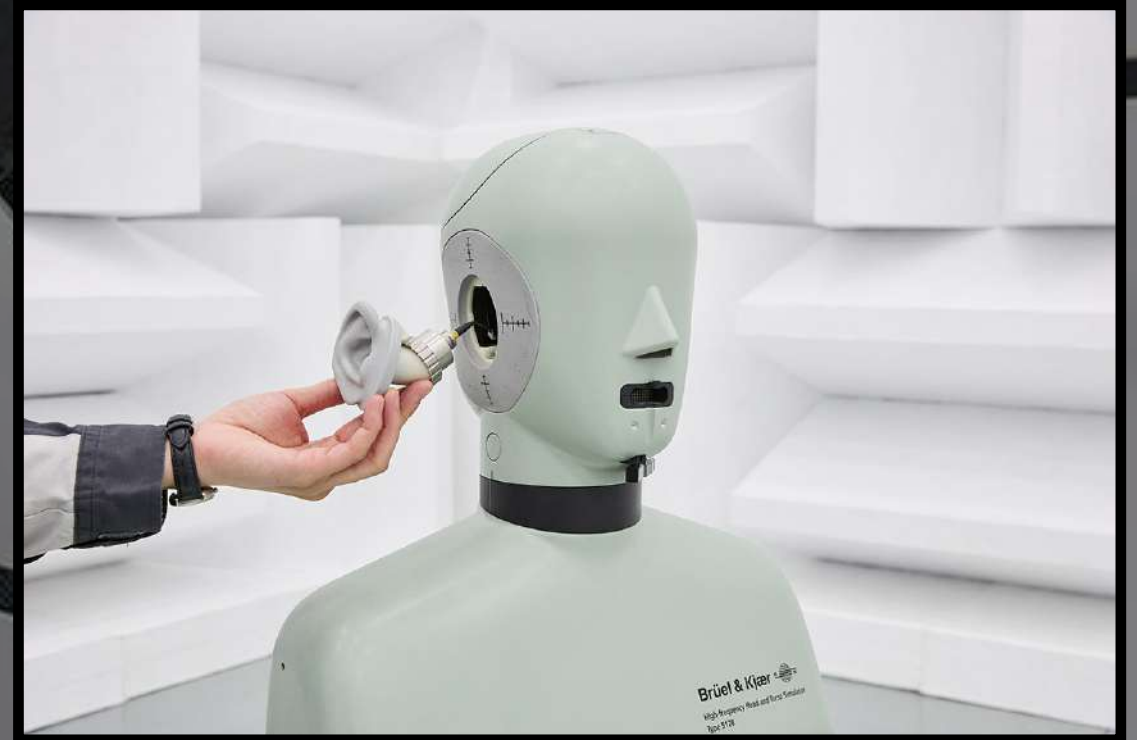
- ISO3745:2012 Acoustics — Determination of sound power levels and sound energy levels of noise sources using sound pressure
- ISO26101-1:2021 Acoustics — Test methods for the qualification of the acoustic environment

Furthermore, measurements of AVAS are also increasingly made in Semi-anechoic chambers in order to ensure that hybrid and motorized vehicles are perceived as sound by pedestrians and other vehicles. The frequency (Hz) and sound pressure level (dB) of proximity warning sound is specified by mandates.

Sonora Technology offers Semi-anechoic chambers that comply with these standards. We have already supplied several semi-anechoic chambers for vehicle exterior noise measurement to major automobile manufacturers in Japan.



ACOUSTIC MEASURING INSTRUMENTS + ANECHOIC CHAMBERS
TOTAL PROPOSAL SOLUTION





HBK  **HOTTINGER
BRÜEL & KJÆR**

G.R.A.S. 

SIEMENS

ONOSOKKI

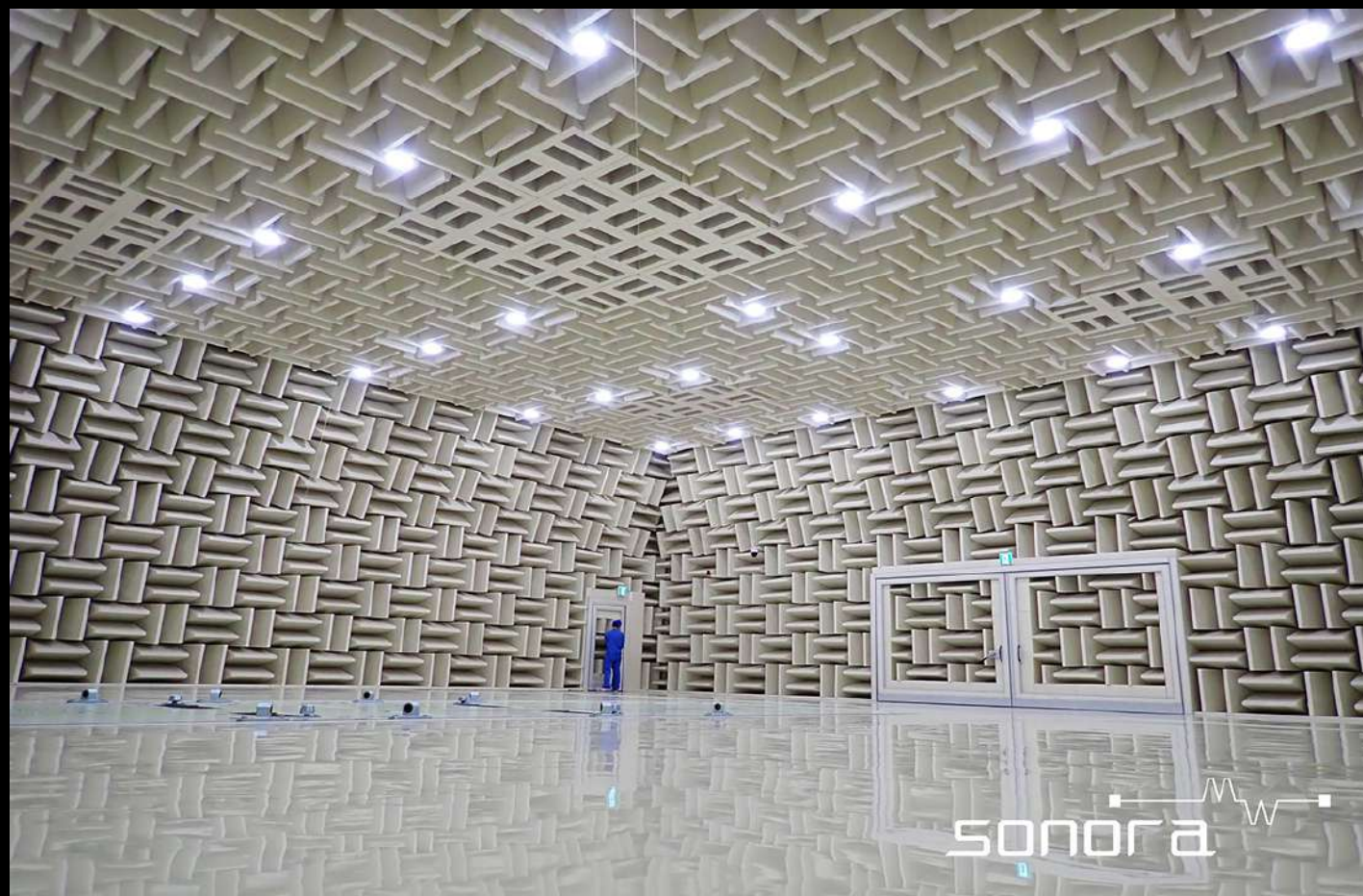
 **RION**

CASE STUDIES

Semi-anechoic chamber: Indoor pass-by

- Size: W20m×L20m×H7m
- Sound Insulation Layer: Steel Panel
- Sound absorption layer: WedgeT-850
- Door A: W5.4m×H2.6m
- Door B: W1.05m×H2.1m

→ Car manufacturing company



100Hz

Measurable lower limit frequency

$o_A 10.6dB$

Indoor background noise (A)



Semi-anechoic chamber for vehicle sound measurement

→ CAE consulting, contract testing company

w9,500 × L14,500 × H6,300

Indoor background noise

10.4 dB(A)

單位 dB(A特性)

Hz	AP	63	125	250	500	1000	2000	4000	8000
室内暗騒音	10.4	7.8	1.5	-10.3	-6.5	-3.6	-2.5	-3.1	-4.0

※空調、換氣装置非稼働時

Measurement frequency

100 Hz ~ 12500 Hz

Inward

W 7,000 × L 20,300 × H 3,150 mm

Semi-anechoic chamber for vehicle sound measurement

National Traffic Safety and Environment Laboratory



Semi-anechoic chamber for vehicle sound measurement

→ Auto parts manufacturer

W20,500 × L11,200 × H7,150





NVH Semi-anechoic chamber

Sinfonia Technology: Chassis dynamo manufacturer

w10,850 × L14,950 × H7,350





Anechoic chamber

→ Pixie Dust Technologies

W5,700 × L7,200 × H6,700



W4,000 × L4,500 × H4,000



**Fully Anechoic chamber
&
Reverberation chamber**

→ Auto parts manufacturer

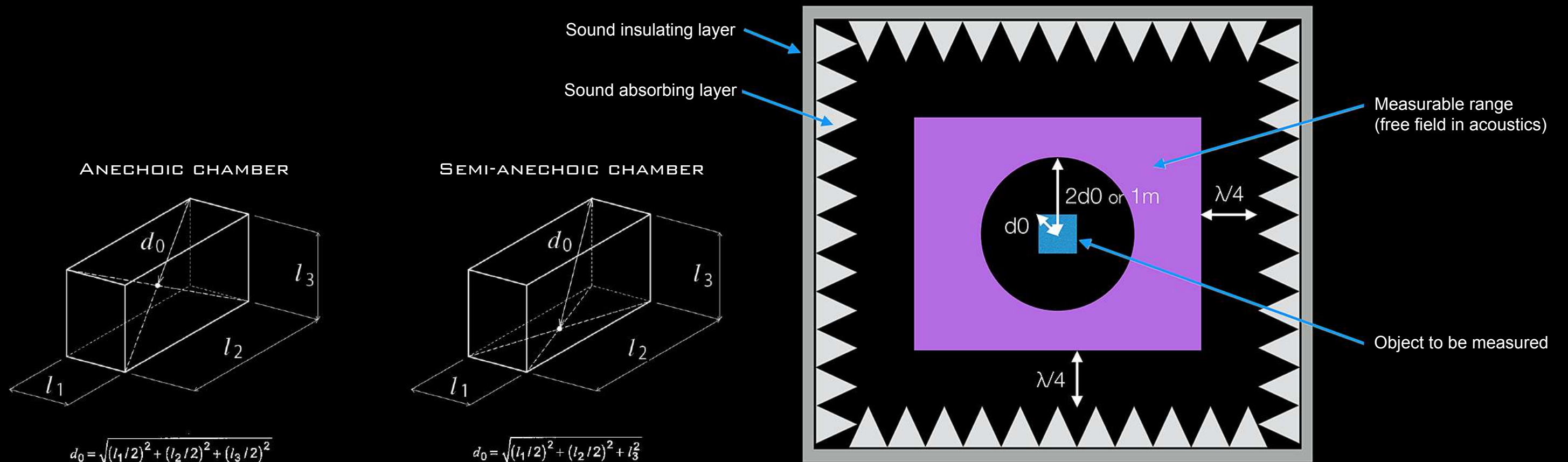


Fully Anechoic Chamber



For measuring the sound power level of water heaters and bathtubs

#1 Dimensions of anechoic chamber, measurement target, setting of lower frequency limit to be measured
 Setting according to the ISO3745 : setting from measurable range



This section explains the measurable range (free field in acoustics) of an anechoic / Semi-anechoic chamber. The area shaded in pink in the above-mentioned plan view indicates the measurable range.

- [1] the range $\lambda/4$ away from the sound absorbing layer (sound absorbing wedges)
 Wavelength of targeted frequency x 1/4 (approximately 560mm for 150Hz)
- [2] the range excluding a radius of $2d_0$ or 1m from the center point

The calculation method for d_0 differs between anechoic chamber and Semi-anechoic chamber. As shown in the diagram above.*

*ISO3745:2012(E) Figure1 – Reference box, centre for the measurement surface (when using the geometric centre of the source) and characteristic source dimensions for application in an anechoic and a Semi-anechoic chamber.

According to the ISO3745:2012, not 2a nor 1 is used as standard, but it has been revised as:
 Anechoic chamber -the distance from the center of the measurement target to the diagonal
 Semi-anechoic chamber -the distance from the center of the floor surface where the measurement target is placed to the diagonal

NEED A QUOTATION?

PLEASE GET IN TOUCH WITH US AS SOON AS YOU PREPARE THE FOLLOWING INFORMATION!

#2 Information on planned installation site

Where the anechoic chamber/s is/are installed:

- Floor loading capacity (kg/m²)
- Which floor: first floor or second floor or?
- Need a floor foundation work or use the existing floor foundation surface?
- Vibration data on the floor surface: dB, Hz *if no such data is available, we will set the guaranteed sound insulating value.
- On-site acoustic data: dB, Hz *if no such data is available, we will set the guaranteed sound insulating value.
- On-site carry-in route...etc.

#3 Information on ancillary equipment

- Acoustic measuring instrument, methods for measurement
- Ancillary equipment inside/outside anechoic chamber: equipment for carry-in/carry-out of measuring object/s such as door, surface plate, crane, device for lifting
- Electrical and air-conditioning facilities: lightings, AC plugs, camera, air-conditioner
- Safety equipment: fire alarm, oxygen concentration meter, fire extinguishing equipment, revolving safety warning light, buzzer...etc.

#4 Terms and conditions of transaction

- Guaranteed performance value: guaranteed sound insulating value, guaranteed performance of sound absorption (inverse square law), guaranteed value of background noise
- Delivery date
- Payment conditions
- Required documents

The following service is provided free of charge:

- Quotations, conception drawings, specifications
- Meetings

For further clarification, please feel free to contact us.

- In case of no available data
- Selection of measuring instruments
- Distributor or agent
- and other requirements



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