

EMI / RF- Shielded EEG Acoustic Booths



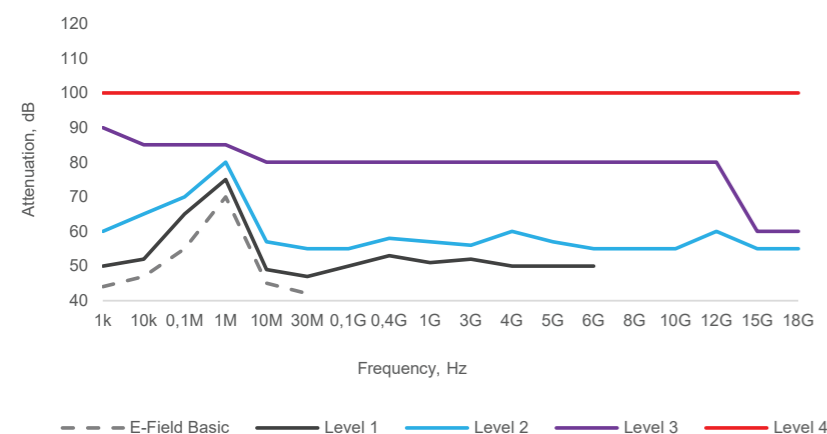
EMI / RF- Shielded EEG Acoustic Booths

Shielding Effectiveness

EMI Waves Attenuation in Audiology Shielded Booths

Shielding effectiveness (SE) testing in the context of electromagnetic compatibility (EMC) fields shares similarities with airborne noise reduction measurements. SE refers to the relative attenuation of various types of electromagnetic radiation, including Electric Fields (E-Fields), Magnetic Fields (H-Fields), and Plane Waves. The standard EN 50147-1 describes the typical method for shield attenuation testing. However, challenges arise when accommodating diverse audiometric and screening procedures such as ERA/BERA or animal brain testing. These specialized applications require an extended frequency range within shielded chambers, compliance with hospital regulations, attention to acquisition system sensors, and other critical factors. With over 50 years of experience in designing shielded rooms for audiology, we offer our valued clients a range of standard and customized shielding solutions, as illustrated in Graphs 1a and 1b.

Graph 1a. Typical shielding effectiveness (E - Field and Plane wave)*

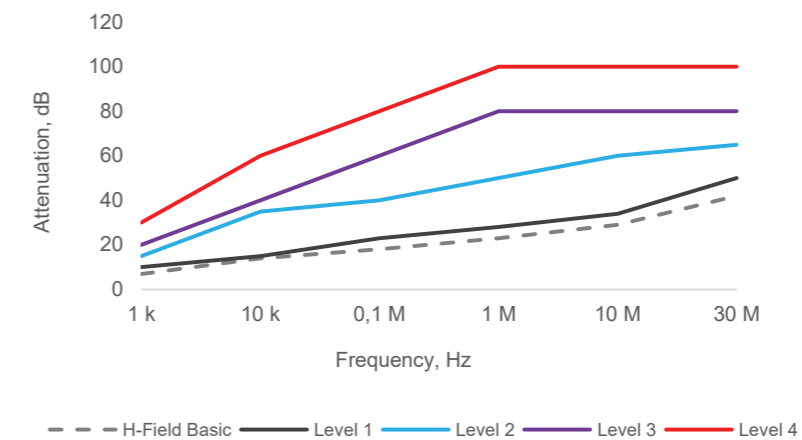


Electromagnetic environment

Consideration of environmental EMI conditions is crucial, particularly for ensuring effective magnetic H-field protection. For shielded EEG rooms used in various human body measurements, the inclusion of shielded windows is often necessary. However, large open areas present challenges regarding the orientation and installation of shielded enclosures at hospital or university sites. Transparent materials such as copper mesh, stainless steel mesh, or shielding foil typically provide insufficient magnetic low-frequency attenuation compared to the superior performance of classic IAC Moduline Noiselock® galvanized panels. The greater the surface area covered by mesh, the higher the risk of unwanted radiation infiltration—potentially compromising measurement accuracy and introducing unwanted artifacts. Therefore, careful consideration must be given to the selection of RF/EMI shielding materials and their impact on the overall magnetic H-field shielding effectiveness under diverse EMI conditions.



Graph 1b. Typical shielding effectiveness (H - Field)*



Typical applications for IAC Shielded Cabins

- Brainstem Evoked Response Audiometry (BERA)
- Electrical Response Audiometry (ERA)
- Auditory Brainstem Response (ABR)
- Visual Reinforced Audiometry (VRA)
- Electroencephalography (EEG)
- Electroneurogram (ENG)
- Electrocardiogram (ECG)
- Electromyography (EMG)
- Elevated episcleral venous pressure (EvP)
- Common physiotherapy and neurology
- Test and research for human and animal booth
- EMC / EMI / EMS test and measurement
- R&D and telecom RF and acoustic tests

Shielded Floor Construction

IAC Acousti-flote™ floors are available in 50 mm or 90 mm heights and are structurally reinforced. All floors are fully carpeted, with average weights of no less than 90 kg/m². The floors are floated on properly loaded vibration isolators, rated for a natural frequency of 6.5 Hz, ensuring maximum elimination of structural noise. Discover our flexible solutions tailored to meet each client's specific needs. By combining and utilizing various shielding materials and raised floor systems, we help you achieve the desired level of EMI/RF shielding performance.

Soundproof RF-Shielded Doors

IAC Acoustics offers a comprehensive range of products designed for architectural, industrial, medical and security applications. IAC Acoustics Noise-Lock® and Noishield doors feature:

- Performance ratings up to STC-64/Rw63
- Real flexibility with custom sizes or designs
- Manual or automatic versions are available
- UL, BS and EN fire ratings and blast-resistance
- Single / double leaf swing doors and sliding doors
- Radio frequency shielding up to 120 dB

Most Common Standards for Medical Rooms in Hospitals

- Interference threshold limits according to IRPA 1990 - For wearers of implants (hearing aids and other)
- Rooms used for medical purposes, patient rooms, in accordance with DIN/VDE 0100-710
- Power installations in hospitals and medically used rooms outside hospitals ÖNORM E8007
- Low-voltage electrical installations - Part 7-710: Requirements for special installations or locations - Medical locations IEC 60364-7-710:2021
- Occupational health and safety, BGV B11
- Plant limit value AGW according to NISV
- Reference values for public exposure to alternating electric and magnetic fields. Public Health (ICNIRP)

EMI Filters and Shielded Penetration Panels

IAC Acoustics offers a wide range of EMI and RF filters for both AC and DC power supplies, as well as specialized shielded penetrations for water, liquids, gas, high-pressure air, and more. We also provide a variety of signal cable penetrations, including fiber optic, BNC, N-type, DIN, USB, and other shielded connectors. If you're unsure how to configure a suitable shielded I/O panel, our experts are ready to help you find the optimal solution.

Silenced Circulating Air System

Our RF-shielded cabins are equipped with an integrated, shielded, and silenced ventilation system built directly into the panel structure. All medical facilities using a circulating air system must ensure installation in rooms with adequate ventilation to maintain air quality and system performance.

...and no more compromise

With IAC's shielded acoustic test chambers, there is no longer a need to compromise between 40A series noise reduction, sound absorption, and EMI/RF shielding. Our technically proven solutions, refined over decades, have become the gold standard for clinics, universities, and research institutions. IAC delivers unmatched quality, reliability, and comfort—enabling precise and interference-free research.

*NOTES AND REFERENCES

- all measurements were carried out on the basis and in the essential points in accordance with the following international and national standards: EN 50147-1 and IEEE 299.
- shielding attenuation is defined as the ratio, expressed in decibels [dB], of two magnetic or electric field strengths measured on opposite sides of a shielded enclosure. These field strengths are determined by means of two measurements (M0 - reference measurement without shielding, M1 - measurement with shielding), which are subsequently used to calculate the shielding attenuation with ± 3 dB instrument accuracy.
- measurement was carried out by an independent accredited test company for shielding effectiveness measurements in the laboratory conditions
- our customers can choose test report type, required attenuation values as well as test points location
- low frequency extension option is available below 1 kHz or even for DC electric and magnetic fields
- microwave frequency extension option is available up to 40 GHz

Contact

**IAC Acoustics GmbH**

Hanns- Martin- Schleyer- Str. 2
D-41199 Mönchengladbach
Germany

T: +49 (0) 2166 68598 0

E: deutschland@iac-gmbh.de

W: www.iac-gmbh.de

**IAC Acoustics Nordic**

Jernholmen 44
2650 Hvidovre
Denmark

T: +45 36 77 88 00

E: mail@iac-nordic.dk

W: www.iac-nordic.com