

ISO 3382-1;

ISO 3382-2;

ISO 140-4;

ISO16283-1:2014;

ISO 10140-5



Bedrock BRODEK5 Omni- directional Sound Source **Operating manual**



Contact information and support

The Bedrock BRODEK5 omnidirectional sound source is manufactured under the responsibility of Bedrock Audio BV.

The manufacturer can be contacted at the following address:

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2289 EX RIJSWIJK
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Phone: +31 88 8770700
Fax: +31 88 8770799
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Further documents and updates related to the Bedrock BRODEK5 omnidirectional sound source are released online:

www.bedrock-audio.com/support

NOTE: All product pictures shown in this manual correspond to the Bedrock BRODEK5 omnidirectional sound source with hardware platform 1.0 or higher. If you are using a different device version, the pictures may not fully correspond to your BRODEK5.

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1. Introduction

Congratulations on purchasing your Bedrock BRODEK5 omnidirectional sound source. The BRODEK5 is a versatile and reliable signal source for acoustic measurements, which, together with its accompanying power amplifier, allows you to generate noise for airborne insulation between rooms, reverberation time measurements and others, adhering to ISO standards.

With weights of just 5 kg for the dodecahedron and 1.2 kg for the power supply, and compatibility with most amplification systems on the market, the system simplifies operation and improves safety by meeting health and safety requirements and reducing workplace risk. With BRODEK5, a single technician can carry out airborne sound insulation tests, combining high acoustic output ($L_w = 120,5 \text{ dB}$) with compact size and low weight.

Using the BRODEK5 dodecahedron is quite easy, thanks to its intuitive interface on the power amplifier. Most users will get the hang of doing measurements with the BRODEK5 without spending too much time with this manual. Nonetheless, we strongly recommend that you do read this manual before using your dodecahedron for the first time, in order to get properly acquainted before doing your first measurement. After carefully reading the instructions, we recommend to keep them for future reference.



2. General use and safety precautions

2.1. Protecting your equipment

Your Bedrock BRODEK5 contains high-sensitivity wideband loudspeakers that were calibrated at the factory for accurate control over the reproduced sound pressure levels and frequency transfer function. To make sure that the performance of your dodecahedron and power amplifier remain undegraded over the years, we recommend taking the following precautions:

- Protect the BRODEK5 from dropping, shock and vibration. Use a tripod.
- Before placing the dodecahedron on a tripod, extend the tripod legs sufficiently to ensure stability and prevent tipping.
- Set up the tripod on a level, solid surface. Do not place it on stairs, steps, ramps, or other uneven areas, as this may cause it to tip due to loss of stability or leg support.
- Do not place loads over 8kg and make sure that the center of gravity of the set is always above the center position of the tripod.
- Before moving your equipment, remove the dodecahedron from the tripod and carry it separately to prevent accidental falls and unintended tripod leg closure.
- Take care not to trip over or snag the dodecahedron connection or power supply cables, as this could move the tripod–dodecahedron assembly and cause it to tip over.
- Ensure that the power supply is properly grounded.
- The power supply must be placed in a horizontal position, ensuring that its lid is always fully open and in a vertical position while it is operating. Never cover the front panel with fabrics, paper, or other objects that could prevent proper ventilation and heat dissipation during operation.
- Do not operate at ambient temperatures above 35°C/95°F.
- Do not use close to flames or open fire.
- Do not use in environments where flammable or explosive materials may also be used.
- Do not expose the equipment or its power supply to rain, moisture, humidity greater than 90% or liquids of any kind. Take special care to prevent liquids to permeate into the equipment through the connectors.
- Avoid prolonged exposure of the entire assembly to direct sunlight whenever possible.
- Do not keep the device powered on while unattended for prolonged periods of time.
- During transportation and storage, keep equipment in a suitable casing or container – preferably its original case. The equipment needs to be protected from shocks and vibration (due to transportation or falling), excessive temperatures, liquids and moisture, and any other external conditions that could do damage to the device.

2.2. Protecting yourself and others

Whenever using the Bedrock BRODEK5, take precautions to keep yourself and others safe. In particular, take note of the following warnings related to electrical hazards, eye safety and hearing protection:



The included power supply comes with a power cable suitable for a wide AC voltage range of 90 – 240V (50Hz or 60 Hz). Do not use the power supply if the casing appears cracked or broken, or if it has been exposed to fluids or moisture. Contact with components inside the power supply while this is plugged in may result in serious injury or death. When using a third-party power cable, ensure it is of the type described on the instructions and at the voltage marked on the device.



The Bedrock BRODEK5 is capable of producing (very) high sound levels. Do not hold the ear up to any of the loudspeaker grilles, and observe a distance of at least 0.6m (2ft) between your ears and the dodecahedron when operating. We recommend to alyway

It is strongly recommended to wear safety boots to protect against foot injuries in the event that the tripod–speaker assembly falls.

3. How to use the BRODEK5

The BRODEK5 is a calibrated omnidirectional test signal source for acoustic measurements. Since the dodecahedron contains no internal power supply, it must be driven by a power amplifier. The supplied amplifier provides both the necessary power and control functions, allowing you to operate the dodecahedron safely and effectively.

3.1. Setting up your equipment

All equipment is ready to be used after careful visual inspection. All you have to do, is to deploy the equipment properly, and connect them with the cables. Make sure that you transport your BRODEK5 safely to your measurement location, for example by using the protection case included in your kit.



Once you have arrived to your measurement location, place the BRODEK5 dodecahedron on a strong and solid tripod able to support its weight, such as the tripod included in your kit. Next, place the power amplifier on a well-ventilated, horizontal surface, away from heat sources or direct sunlight or any other source that may cause overheating.

Note: the warranty of the BRODEK5 sound source only can be applied if it is used jointly both with the delivered power amplifier or another generators and amplifiers recommended by Bedrock (contact our technical support in case of doubt).

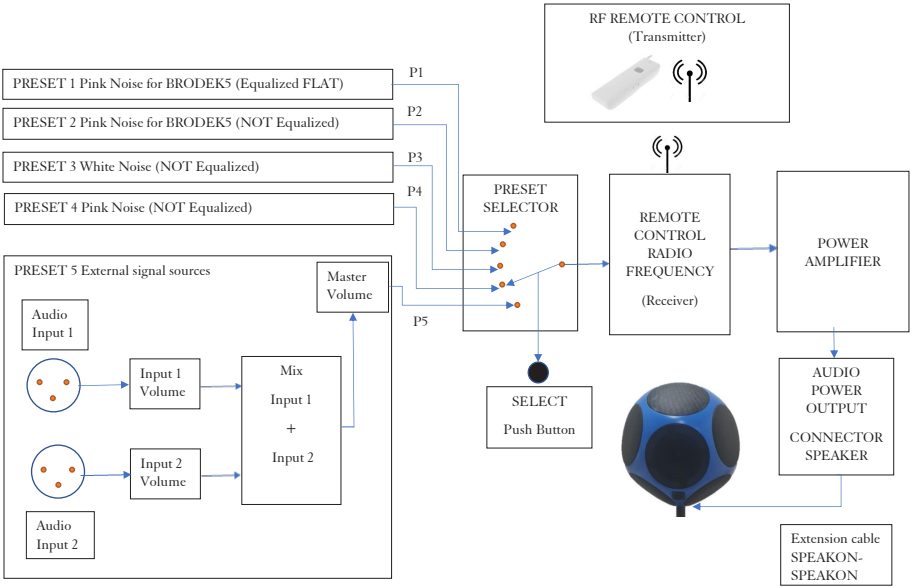
If a power amplifier other than the one specified is used, ensure that its output power does not exceed 250 W RMS into a 4 Ω load. Using higher-power amplifiers without proper precautions may damage the loudspeakers by overdriving them into saturation and operation outside their specified limits. The dodecahedron uses pins +1 and -1 of the speakon connector for its audio output.

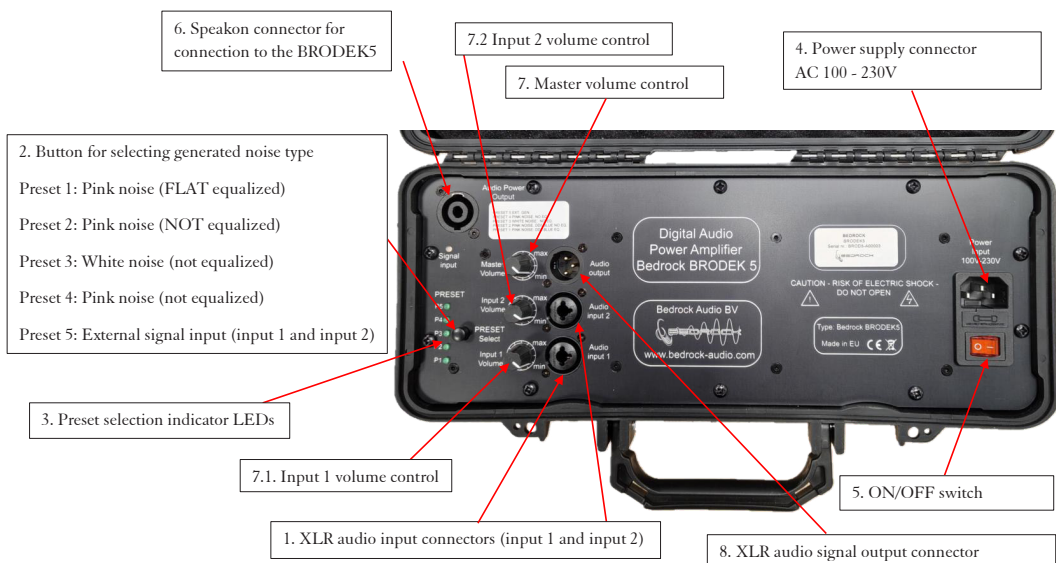
In this manual, we will assume you are using the original power amplifier, which will be explained in the following section.

3.2. Power amplifier interface

The BRODEK5 is entirely controlled through a power amplifier. We recommend to use power amplifier that comes with BRODEK5. This amplifier contains a high quality Class D amplifier with digital signal processor (DSP) designed and adapted specifically for use in conjunction with the BRODEK5 dodecahedral sound source, obtaining maximum performance. The following diagrams show a detailed description of each element to be controlled and/or connected on the amplifier's front panel.

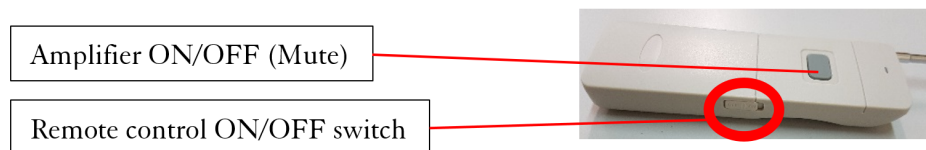
Block diagram, power amplifier Bedrock BRODEK5





3.3. Connecting and operating the power amplifier

1. To reiterate, before powering on and connecting external elements to the amplifier, ensure that the power switch (no. 5) is in the “O” (off) position.
2. Set the volume knobs (no. 7-7.2) to the minimum level (“min” position).
3. Connect the “Speakon-to-Speakon” speaker cable to the audio power output speakon connector (no. 6) on the amplifier. Connect the other end to the BRODEK5.
4. Connect the AC power cable to connector no. 4 (Power input). Connect the other end to a mains outlet.
5. Turn on the power amplifier by setting switch no. 5 to the “I” position.
6. Select the desired preset by pressing button no. 2 repeatedly. Choose the preset that best suits your signal generation needs:
 - **Preset 1:** Equalized “FLAT” pink noise for the BRODEK5 (pink noise specially equalized to obtain flat free-field response with the Bedrock BRODEK5 source)
 - **Preset 2:** Non-equalized BRODEK5 pink noise
 - **Preset 3:** Non-equalized white noise
 - **Preset 4:** Non-equalized pink noise
 - **Preset 5:** External signal input from Input 1 and Input 2
7. Increase the volume level using volume knobs no. 7, 7.1, and 7.2 until the desired sound level is reached, ensuring that no distortion is audible.
8. Once your desired noise is generated, it can be interrupted or reactivated immediately using the amplifier’s mute function via the supplied remote control. The remote control has a small switch on its right side to prevent the internal 9 V battery from discharging; therefore, ensure the remote is switched ON before use.



9. (Optional) To connect an external signal source (audio signal generator, music player such as MP3 or CD, or an external equalizer), select “Preset 5” (“GEN EXT”). First, connect the appropriate cable (typically XLR–XLR) to one of the amplifier’s XLR input connectors (Input 1 or Input 2). The external signal generator must be switched on and set to the minimum output level or to “Mute.” Note that the audio power delivered by the amplifier depends on the input voltage level applied to the XLR connector (Input 1 or Input 2) and the position of the volume controls (potentiometers no. 7, 7.1, and 7.2). Output volume must therefore be controlled both from the external device and from the amplifier.

The amplifier can be used as a small mixing console. Two signals (e.g., stereo music, L and R) can be applied to Input 1 and Input 2, adjusted individually per channel, and mixed into a single mono signal for amplification. Refer to the block diagram at the beginning of Chapter 3.2.



Speakon-to-Speakon connection cable

XLR-to-XLR audio cable

Remote control



Bedrock BRODEK5 omnidirectional sound source

External signal input (optional)



3.4. Precautions during operation

If the power amplifier volume is set to maximum, it is always ready to deliver maximum power. Any signal transients at the input (e.g., during connection or disconnection of cables or equipment connected to Input 1 or Input 2) will be amplified and delivered to the connected loudspeaker. Therefore, the following precautions are essential:

- **Always** connect or disconnect equipment or cables connected to Input 1 or Input 2 only when the amplifier power switch is in the “**O**” (off) position, or when the volume controls are set to minimum (“min”).
- Before switching the amplifier to the “**T**” position, the external signal generator must be set to the minimum output level or to “Mute.” After powering on, gradually increase the external signal level and the amplifier volume controls until the desired level is reached without distortion.
- While the amplifier is operating, do not close the case lid, as the device must dissipate heat through its front panel. Allow natural ventilation and avoid placing objects that obstruct airflow.

In the event of overheating, the device will automatically shut down and resume normal operation once the temperature returns to acceptable levels. Do not be alarmed if the amplifier stops operating after running at maximum power for an extended period.

4. Technical specifications

4.1. BRODEK5 dodecahedron

Functionality	Playback of calibrated omnidirectional acoustic test signals via a dodecahedral loudspeaker driven by an external power amplifier. Supported signals: equalized pink noise (FLAT) optimized for the BRODEK5, non-equalized pink noise, and non-equalized white noise. Playback of external analog audio signals via balanced XLR inputs, amplified and radiated omnidirectionally by the BRODEK5. Controllable by an RF remote control.
Standards compliance	Omnidirectional and uniform radiation according to section: 4.2.1 of ISO 3382-1 and ISO 3382-2; annex A1 of ISO 140-4; annex A2 of ISO16283-1:2014 and annex D2 of ISO 10140-5, among others.
Specs acoustic output	Sound power level: 120.5 dB(C) ref 1 pW (pink noise) Frequency range: 50 Hz – 12 kHz Maximum power frequency range: 100 Hz – 10 kHz adiation pattern: omnidirectional Number of loudspeakers: 12
Specs electric output	Maximum electrical power: 300 W RMS Nominal impedance: 5.3 Ω Input connector: Speakon
Environmental	Temperature: 5 -35°C (41-95F) Relative humidity: 0% - 90% (non-condensing)
Mechanical specs	Dimensions: 25 cm (distance between opposite faces). Mass: 5.0 kg (without tripod) Bottom-mounted tripod adapter
Bundled items	Ultra-light aluminium tripod (1.5 kg, expandable from 0.57m to 2.00m), lightweight trolley (3 kg) with telescopic handle and wheels, AC power supply cable, speakon-to-speakon cable (3m), wireless RF remote control.

4.2. Power amplifier

Functionality	High-quality Class D power amplifier with integrated digital signal processor (DSP), specifically designed for use with the BRODEK5 dodecahedral sound source. Generation and amplification of internal test signals and amplification of external audio signals. Supported presets: internal equalized pink noise (FLAT), non-equalized pink noise, non-equalized white noise, and external balanced analog inputs with independent channel level control.
Specs electric output	Output power (RMS): • 400 W @ 4 Ω • 250 W @ 8 Ω Frequency response: 10 Hz – 20 kHz (+0 dB / –3 dB) Input sensitivity: 0.94 V / 1.7 dBu Maximum input level: 15 dBu Input impedance: 10 kΩ (balanced) Total harmonic distortion (THD): $\leq 0.05\%$ at maximum power Efficiency: 82% at maximum power Power supply: 100–240 V AC, 50–60 Hz Speaker output connector: Speakon Audio input connectors: Balanced XLR (Input 1 and Input 2)
Signal generation / pre-sets	Preset 1: Internal pink noise generator for BRODEK5 (equalized, FLAT frequency response) Preset 2: Internal pink noise generator for BRODEK5 (not equalized) Preset 3: Internal white noise generator (not equalized) Preset 4: Internal pink noise generator (not equalized) Preset 5: External balanced XLR inputs (bi-channel) with independent volume control
Environmental	Temperature: 5 -35°C (41-95F) Relative humidity: 0% - 90% (non-condensing)
Mechanical specs	Size approx. 370 × 160 × 110 mm (W × L × H) Mass: 1.2 kg (including carrying case)

4.3. Acoustic power features of the Bedrock BRODEK5

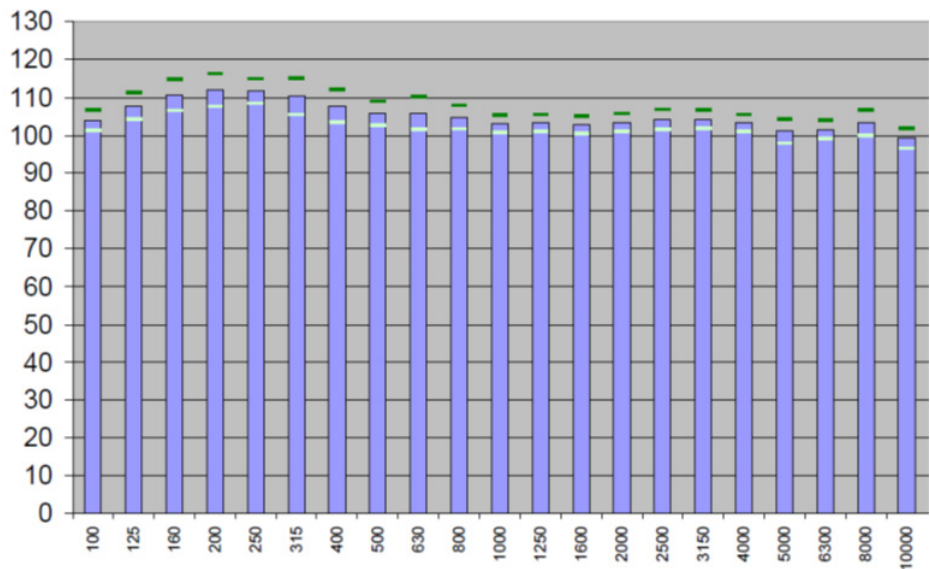
Below is the graph of the acoustic power spectrum, from the sound source BRODEK5, made by an independent external laboratory, accredited by ENAC (if you wish, we can send you the complete test report B15008, contact support@bedrock-audio.com).



INFORME DE ENSAYO
Test report

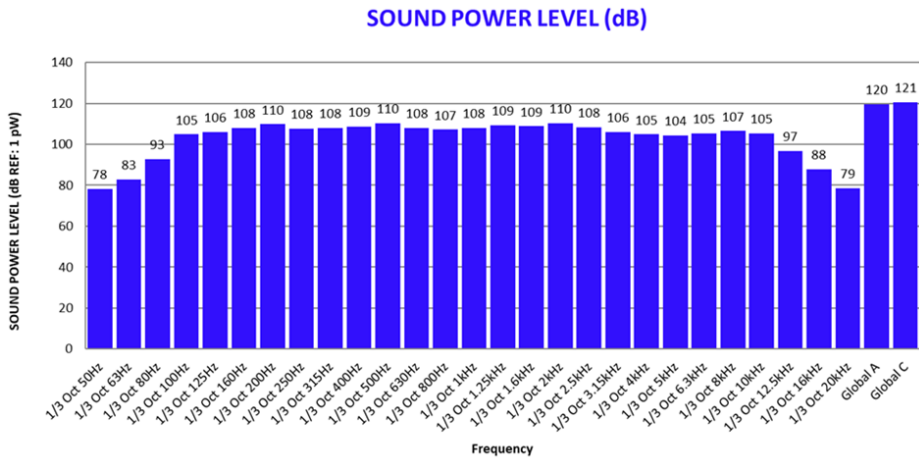
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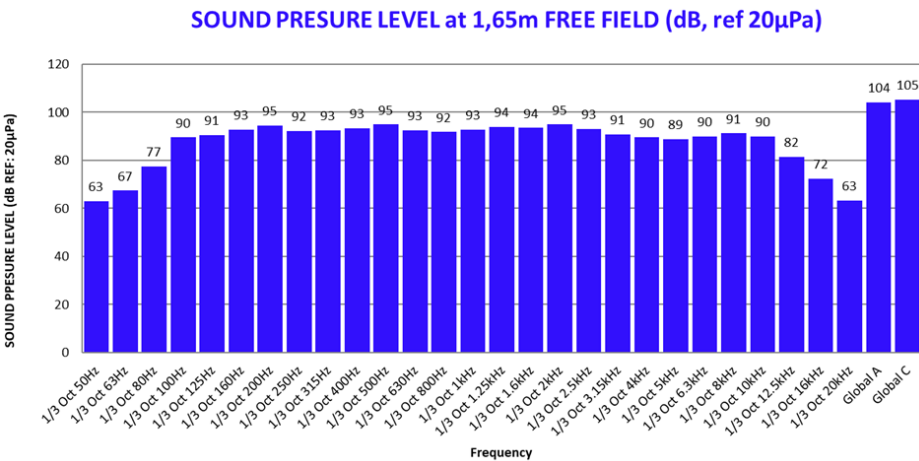


LwCref,atm	UNE-EN-ISO 3744:2011 dBC	INCERTIDUMBRE EXPANDIDA K=2 dBC
120,5		± 2,0

The sound power levels (50Hz – 12 KHz) of the sound source Bedrock BRODEK5 + supplied power amplifier, generating pink noise, are the following:

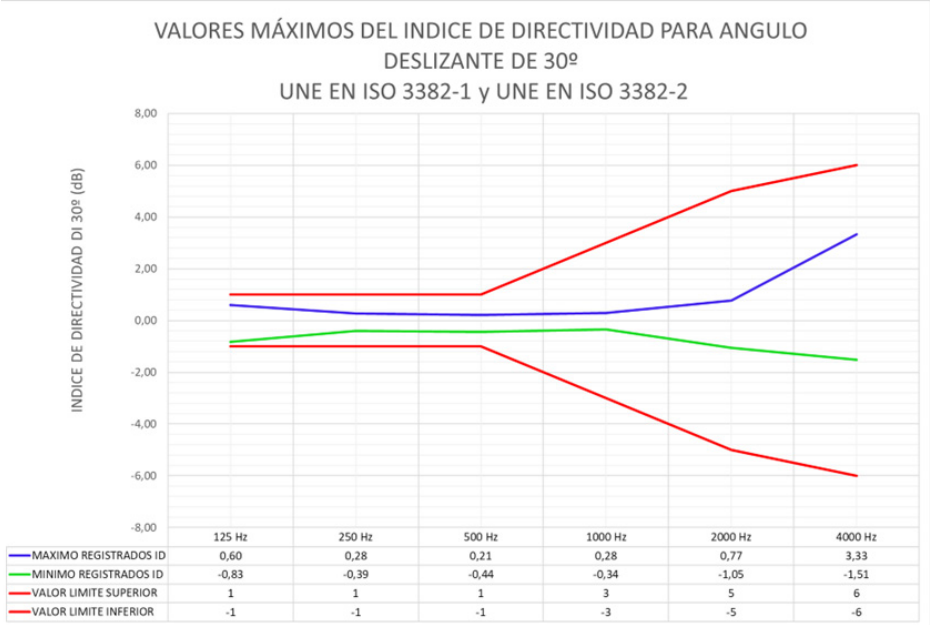
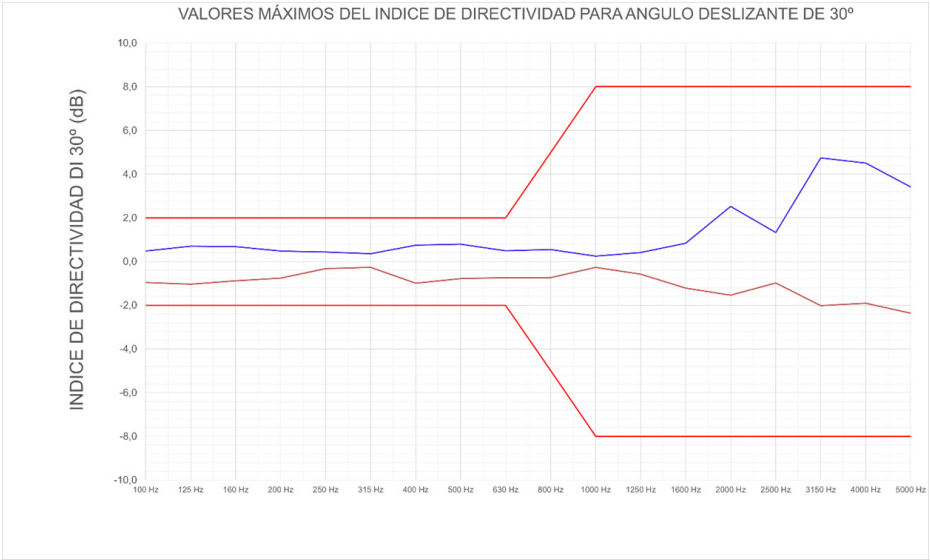


The sound pressure levels at 1.5m from the sound source BRODEK5, on the outside, connected to the power amplifier, in the range of the 50Hz to 12 KHz, generating pink noise, are shown below:

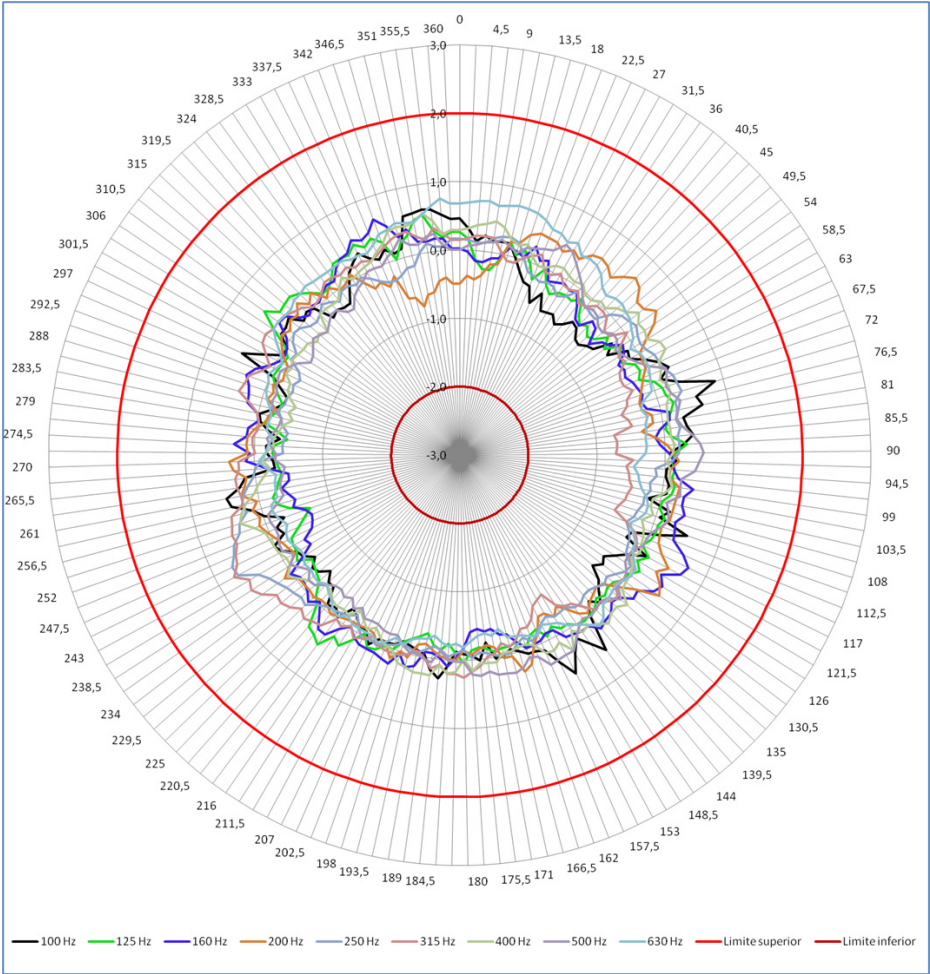


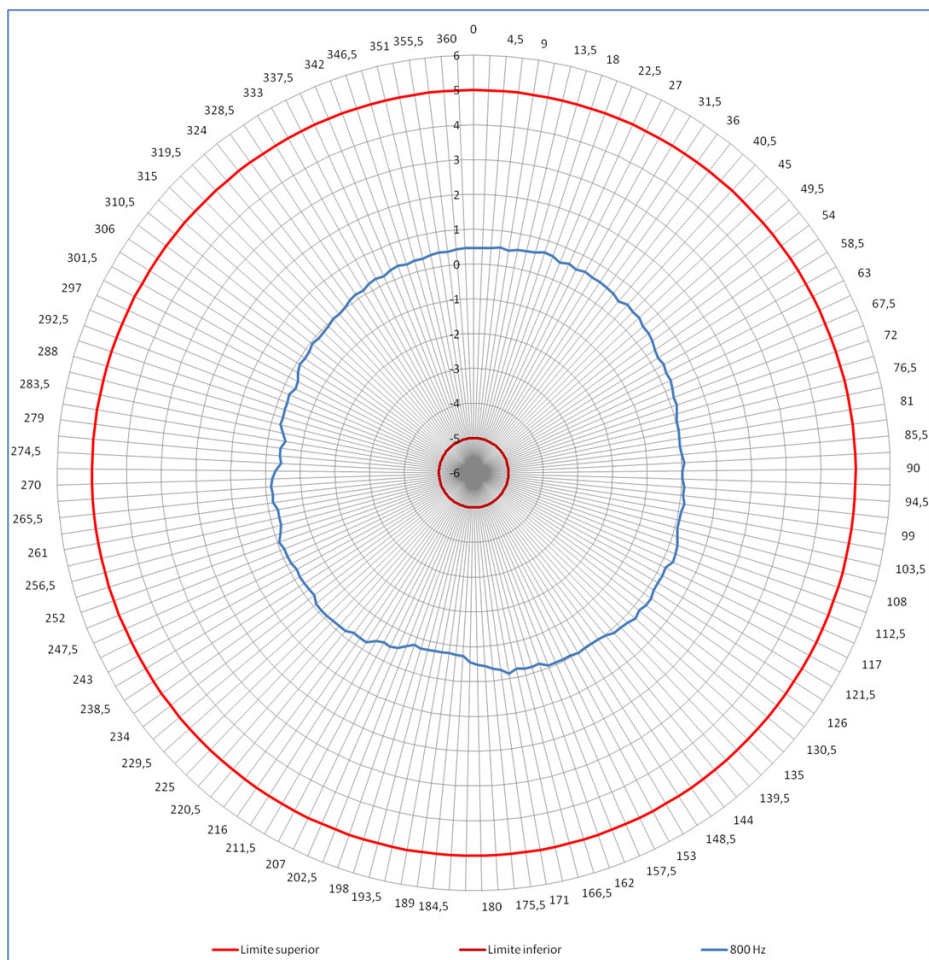
4.4. Directivity features of the Bedrock BRODEK5

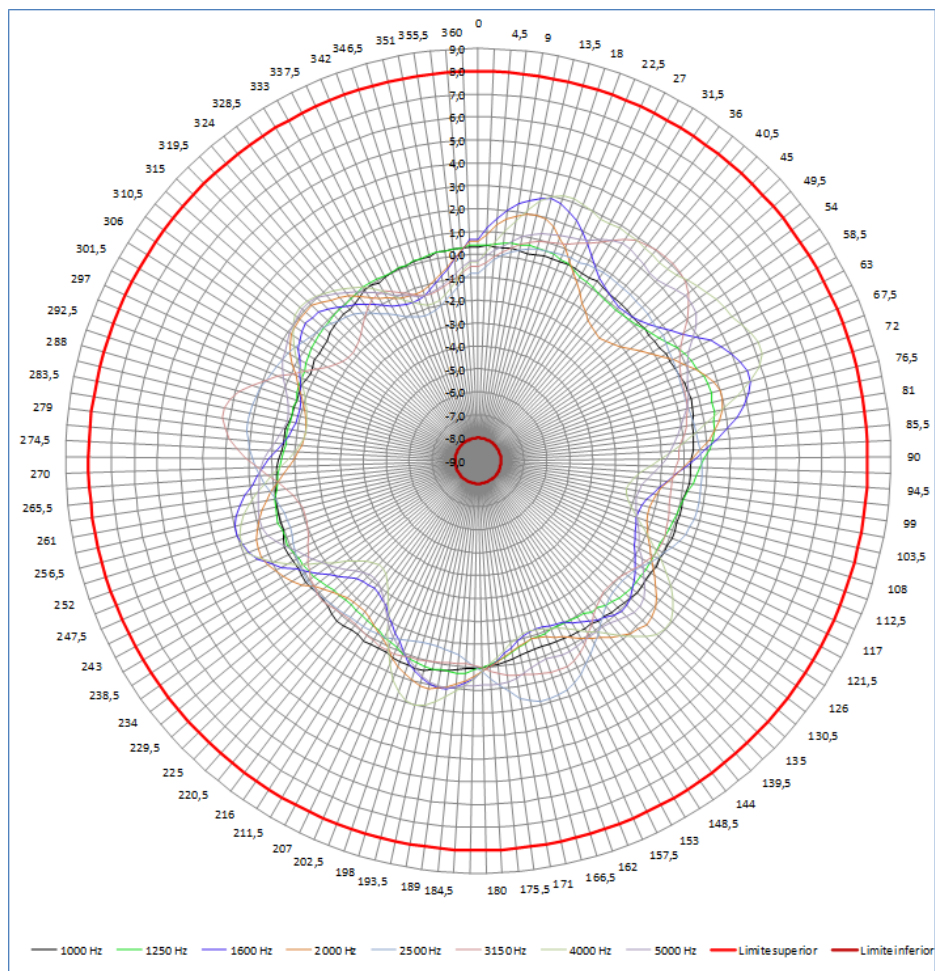
The BRODEK5 fulfils the sound pressure level fluctuations, 30° sliding angle, in the frequency domain, according to ISO 140-4, ISO16283-1, ISO16283-3, ISO 10140-5, ISO 3382-1 and ISO 3382-2 standards, as shown in the following charts:



4.5. Directivity (sliding angle) of Bedrock BRODEK5 to different frequencies







4.6. Temporal stability of sound level generated by Bedrock BRODEK5

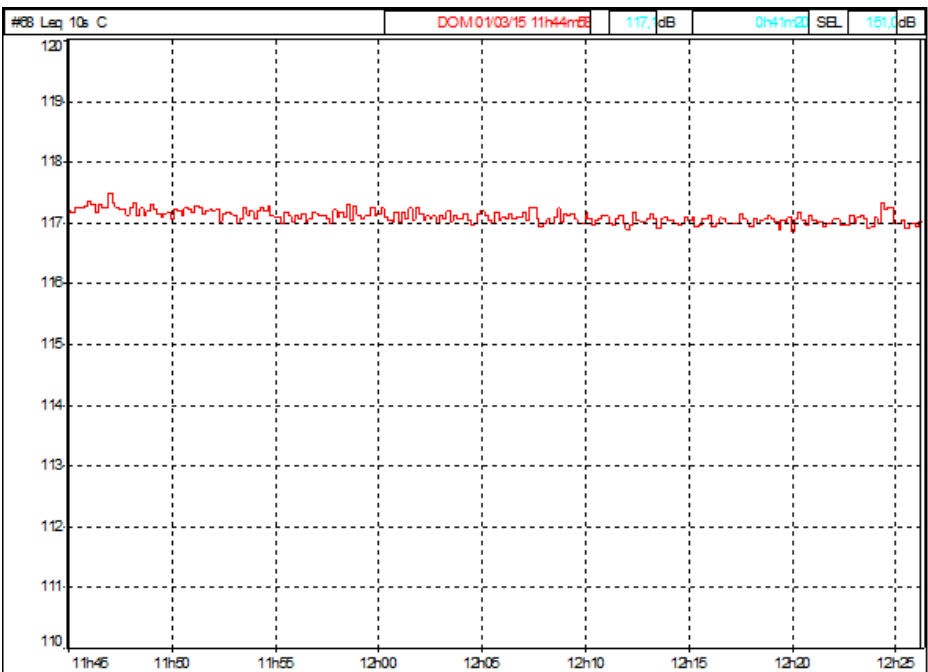
For acoustic insulation tests there is a need to have a noise generated in the emitter room that is stable and uniform over time.

The Bedrock BRODEK5 sound source has been tested at 117 dB to verify the stability of the sound level over time.

The results of two types of stability tests are shown below, one in continuous operation mode and the other in intermittent operation mode (more used in the insulation testing process)

Stability in continuous operation

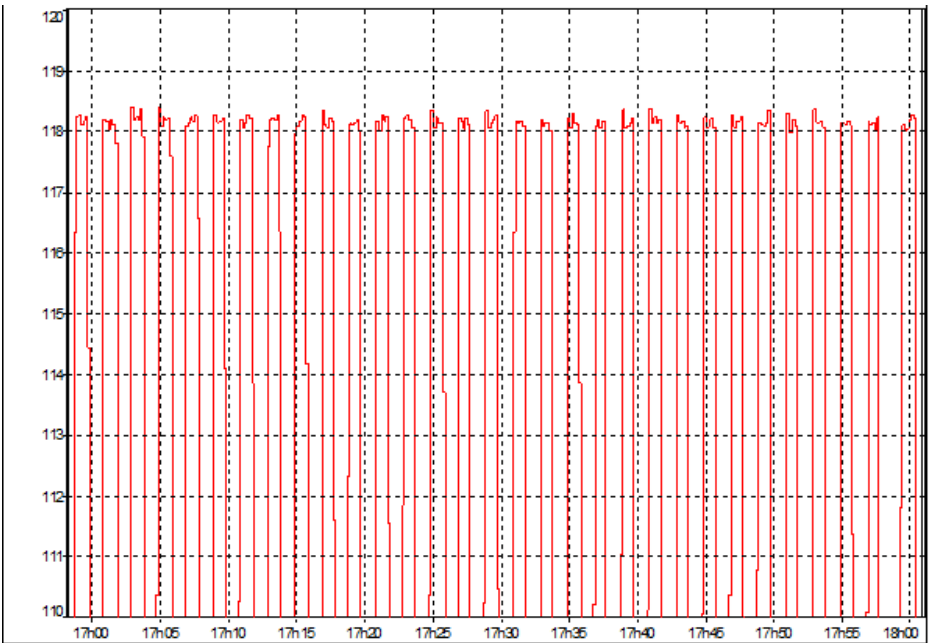
The following graph shows a temporal recording of the variations of the sound power level L_{Ceq} 10s, during 40 minutes in continuous operation of the BRODEK5 at a power level of approximately 117 dB(C). It has been verified that the sound level variations do not exceed 0.5dB during this test interval.



This operating mode represents an extreme case in airborne sound insulation testing, since the sound source is normally stopped when repositioning or changing enclosures. The more representative scenario is shown below.

Stability in intermittent operation

The following graph shows a time record of sound power level variations, L_{Ceq} (10 s), over approximately one hour, consisting of cycles of 50 seconds of continuous operation of the BRODEK5 sound source at a level close to 118 dB(C), followed by 60 second intervals with the source switched off. This test simulates a typical operating cycle in airborne sound insulation measurements. The sound level variations are verified to remain within 0.3 dB over the test period.

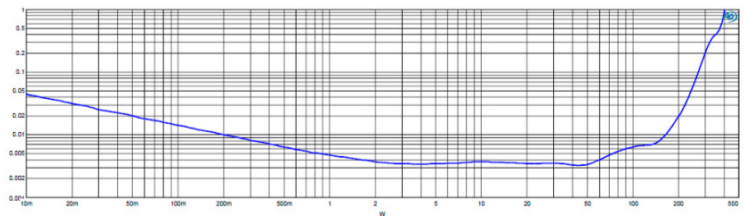


Note that the observed level variations, although small, are mainly due to the inherent randomness of the electrical output of the pink noise generator, particularly at low frequencies, and to a lesser extent to variations in the sound pressure level produced by the source.

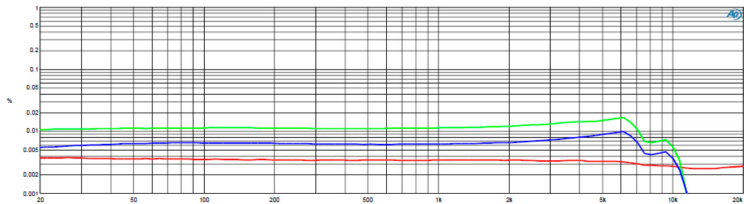
The results shown were obtained using a sound reproduction system consisting of the BRODEK5 sound source and the power amplifier. Measurements were performed with a SOLO sound level meter manufactured by 01dB.

4.7. Performance curve power amplifier

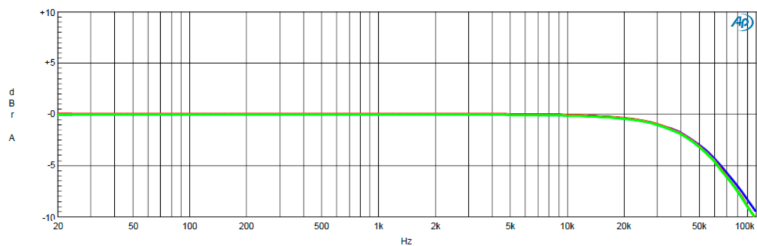
THD vs. Power (1 kHz, 4 Ω)



THD vs. Frequency (8 Ω). 40 W green, 10 W blue, 1 W red



Frequency response (8 Ω, 4 Ω, and open circuit):



5. Product warranty

The device is covered by a full-service, worldwide pick-up & return warranty until 24 months after the date of purchase. Please direct all warranty claims to:

Bedrock Audio BV
Patrijsweg 18
2289 EX Rijswijk
THE NETHERLANDS
warranty@bedrock-audio.com

Please email us and wait for our response (typically within a business day) before shipping your hardware back. We may ask you to fill out an RMA form, and we will supply you with a reference number for your warranty claim. If you can provide a complete statement of the problems you are experiencing, this will help us solve your hardware issues as soon as possible. Always provide the ID number of your device (found on the bar code label on the back of the device), your name and address, and your date of purchase. If you did not purchase directly from the Bedrock webshop, also include dated proof of your purchase.

In general, our warranty programme covers all defects except for those resulting from accidents, misuse (including improper electrical connections) and improper maintenance. The following is explicitly excluded from product warranty:

- Any damage resulting from dropping, falling or excess vibration
- Any damage done by liquids, including damage resulting from excessive use of screen cleaning liquids
- Any damage resulting from incorrect electric connections to the device through external connectors
- Any damage done by power surges or overvoltage on the USB connector, power supply and/or audio connectors
- Any mechanical damages to the display caused by mechanical forces applied to the screen surface, such as scratches.
- Normal wear and tear

The following voids warranty:

- Repair attempts by an unauthorized party
- Removal of product stickers, tamper proof seals, bar codes or serial numbers
- Attempts to install firmware from any other source than the manufacturer, or firmware intended for a different device model.

Malfunctions that are found to result from any of the above conditions are not covered by warranty. Repairs will take place only at the expense of the owner. If claimed under warranty, an examination fee may be charged and transportation costs will be charged to the owner.

Please do not attempt to open your Bedrock BRODEK5 or the power amplifier yourself, as there are no user-serviceable parts inside. If you do see a legitimate need to open the device yourself, please contact us at warranty@bedrock-audio.com first, so we can discuss preserving your warranty rights. Please be aware that the product is protected by tamper-proof seals.

A worldwide pick-up&return service is included in the warranty. This means that we will have the defective unit picked up at your location at no charge, provided that it is presented in its original equipment case, packed in a cardboard box with suitable cushioning material.