PORTABLE VARIABLE ACOUSTIC DEVICE

P:VAD

THE
NARROWBAND
ABSORBER COMPANY
LIMITED

AWARD WINNING

BETTER SOUND 2020

ISA

INTERNATIONAL SOUND AWARDS

(CATEGORY - RESEARCH AND DEVELOPMENT)

PORTABLE: FLEXIBLE: NATURAL: SUSTAINABLE: EFFECTIVE

P:VAD

PORTABLE VARIABLE ACOUSTICS DEVICE

Created by acoustician Anthony Frost, the award-winning Portable Variable Acoustics Device (P:VAD) is a flexible acoustic box that absorbs and diffuses sound to address the problems created by unwanted frequencies, everywhere from professional recording environments to home cinemas and studios.

Constructed from plywood and insulated with sheep's wool in the box cavity, P:VAD uses sustainable materials to deliver a solution that allows complete flexibility in dealing with the unique acoustic characteristics of any space. Used as a standalone device or configured in multiples, P:VAD adds a precise level of control for professional recording, playback and performance spaces, as well as in the home environment for the discerning audiophile.

P:VAD portability affords users easy transportation of highly effective acoustic treatment, opening up a world of possibilities for a huge range of spaces and applications where permanent installation is not possible or not required.

Patent Pending Numbers UK – GB2103188.5 and GB2003335.3

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P:VAD DIFFUSES AND ABSORBS SOUND TO TAME ANY SPACE

FOR AUDIO ENGINEERS IN THE PROFESSIONAL SPACE

FOR AUDIOPHILES IN THE HOME

CREATED BY

ANTHONY FROST

As a teenager Anthony was inspired by his twin passions, music and electronics. Having initially pursued a hands-on career in electronics, he moved into the world of studio sound where his qualifications were an immediate asset. Obtaining vocational qualifications in sound engineering, whilst engaged in every aspect of studio life, broadened his horizons further still. Anthony's progression though a number of studio production roles led him to work at the Bristol Old Vic Theatre School (BOVTS) where his duties included console maintenance, installing fold-back in the narrator's booth, assisting with sound-proofing and preparing for recording sessions. It was during this period that he came across something that cemented a lifelong interest in acoustics and began the journey to the creation of the Portable Variable Acoustics Device.

It was at BOVTS studios (a former BBC studio) where Anthony saw for the first time in the live room, rotating panels mounted in the wall with a hard surface on one side for lengthening the reverberation time during the recording of stringed instruments, and an absorbent surface on the other side for shortening the reverberation time during the recording of rock and pop music. The rotating panel thus enabled engineers to alter the room's reverberation time, and could be described as a variable acoustics device. It was at this point that Anthony noticed that there appeared to be no portable panels that could do this - the only portable panels being dividing or separating panels…

Continuing to develop his interest in and technical understanding of acoustics, Anthony took a series of higher education level qualifications with the Institute of Acoustics. By then on a path that would take him deep into the science of sound, he furthered his experience and technical qualifications, working first overseas, and then in the U.K. as a research assistant in acoustics at the University of Exeter. An MSc in Applied Acoustics followed and was the launchpad for Sanctuary Acoustics, Anthony's acoustic consultancy which he created in 2011.

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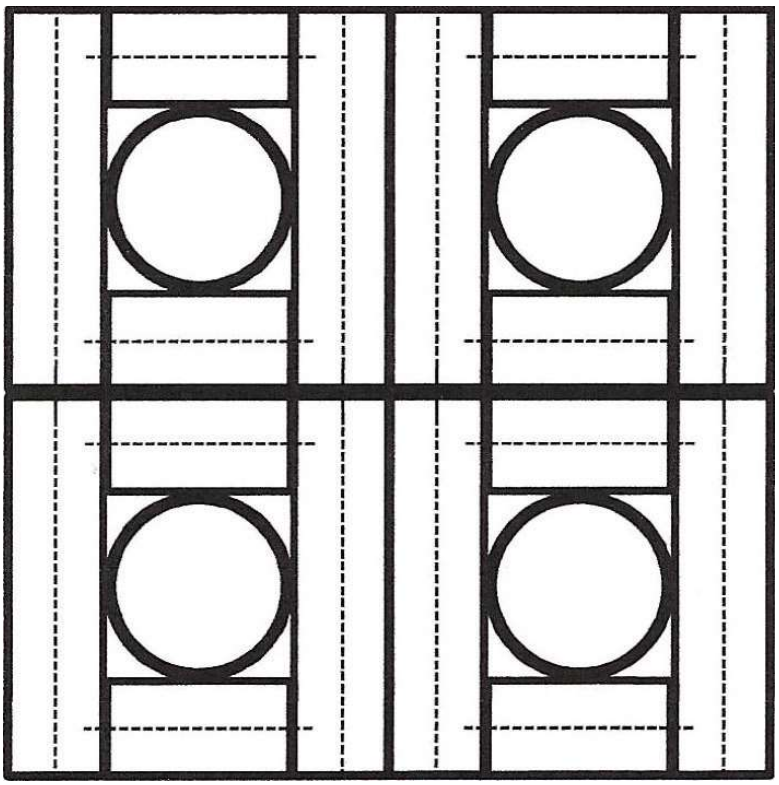
ANTHONY FROST ON P:VAD

“At various stages of my career as an acoustics consultant, I’ve been required to test or design studio and performance spaces. I noticed that the market lacked a cost-effective portable acoustic device which engineers could carry with them between different locations, or if kept in situ, be moved around a room or building to meet the needs of a specific instrument or performer.

“I therefore wanted to create a device that was more than just a bass trap which sat in the corner of a room and would absorb, in most cases, sound down to 80Hz/100Hz - that’s what many bass traps currently on the market are limited to. I wanted to create something that would go lower if required but still provide a diffusive element in the mid-high frequencies - 500Hz/630Hz upwards - where by adjusting or rotating the device, the diffusive frequency bands could be adjusted to cater for the space or sound being recorded.

“The P:VAD absorbs down to 63Hz/80Hz, and with multiple devices (x3), the use of the plug-in will take the absorption down to 40Hz/50Hz. The larger the space, the more devices are required for effective sound control, so where 2 or 3 will suffice for a small to medium size control room, proportionally more devices will be required for larger spaces.”



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THE PROFESSIONAL VIEW

STEVE RISPIN

Steve Rispin is a vastly experienced U.K. audio professional operating in the field of live and recorded music. His most recent work has seen him on tour with rock legends Yes and Steve Hackett, whilst his studio engineering services remain in demand from artists across a wide spectrum of genres.

“I was pleased to experiment with a couple of the devices in different settings. I would describe the devices as being of the turned enclosure type with a large front facing port surrounded by diffusers. The resonant frequency can be tuned somewhat with the additions of plug-in inserts, but as standard the peak absorption is at 80Hz with a second harmonic at 160Hz.

“The devices seem quite efficient for their size and stacking them in the middle of my performance room produced an immediate deadening effect. On a rock project I was working on, the drums and bass seemed much more controlled with the devices in the room. It has a couple of known hotspots, and I found I could turn the monitors up louder than normal without exciting the nodes! In recording some acoustic guitar parts with the devices surrounding the microphone, the difference was more subtle but clear nonetheless.

“Although of substantial construction, the devices are easily portable. A pair fitted comfortably into an average car boot, as I discovered when travelling to trial them at a friend’s studio. In this instance the room was much larger and although more units would have demonstrated the absorption characteristics to greater effect, the diffusion feature came into play with excellent results. The front of the device features four diffusing shapes with a parabolic section. These are sized principally to work in the mid and highs. When recording male and female vocals in a ‘dead’ booth, the introduction of the devices raised up on chairs livened things up nicely.

“Put simply, the absorber and diffuser elements work exactly as Anthony had said, and the tunability should make them suitable for a wide range of rooms in static installation. I can see a huge market, not only in studios but also in HiFi listening rooms and home cinema installations. Convenient portability means you can take them with you to treat any room you may be working in, and also use them as part of the creative process by modifying the acoustics around an instrument or mic.

“This is a great product which deserves to do very well.”

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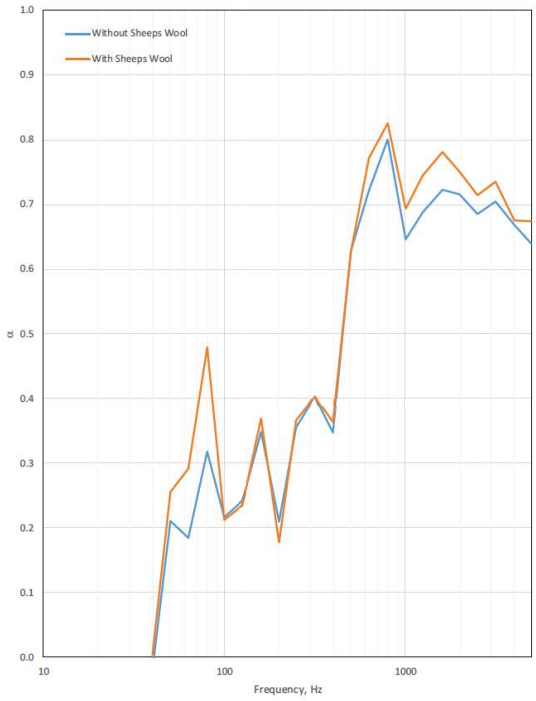
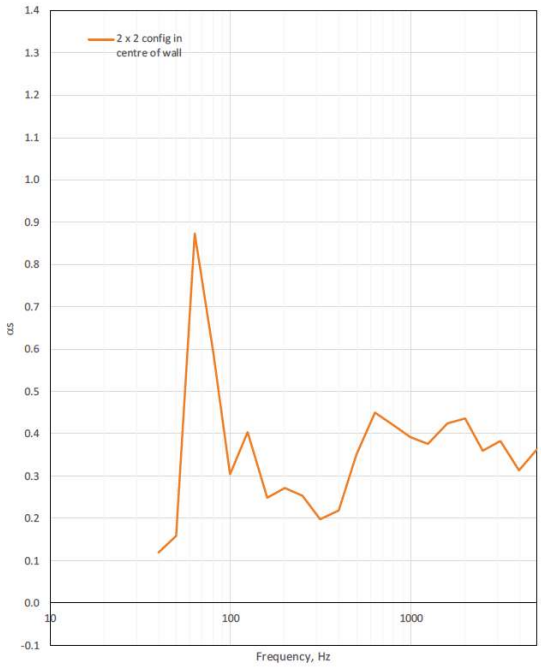
TESTING

ABSORPTION TESTING

Sound absorption tests were undertaken on the product with guidance taken from *BS EN ISO 354:2003 Acoustics – Measurement of sound absorption in a reverberation room*. The boxes were absorption tested in a reverberation chamber as per guidance provided in the standard. Therefore, these tests are benchmark tests conducted in an acoustically treated room. In addition to the University of Salford absorption tests, further absorption tests were conducted in a studio control room at Soundhub, Denmark by Schacoustics. Although the studio control room had built-in acoustic treatment, the measured absorption results did correlate with the earlier University of Salford absorption tests.

Initial tests were conducted with reference to *BS EN ISO 354:2003 – Measurement of sound absorption in a reverberation room* in the small reverberation chamber at the University of Salford on six boxes arranged across the floor of the chamber. This showed absorption at 80Hz with and without 50mm thick sheep's wool placed in the box cavity. The absorption coefficient was improved with sheep's wool in the cavity. The overall absorption class for the product with sheep's wool placed in the cavity was Class C. Without sheep's wool in the cavity the product behaved overall as a Class D absorber.

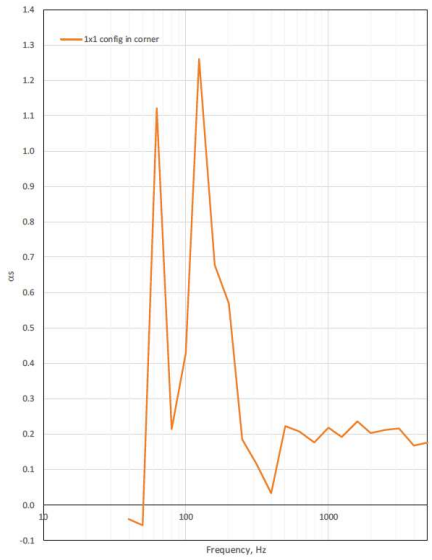




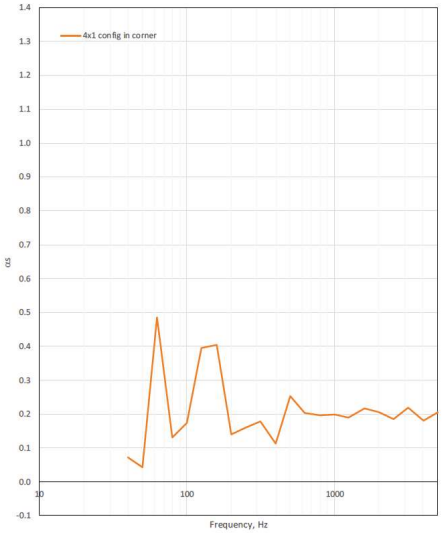
Further acoustic tests were conducted on the boxes at alternate locations in the reverberation chamber in an attempt to replicate a real world scenario. With four boxes arranged in a 2x2 formation along the back wall the fundamental frequency absorption was 63Hz.

TESTING

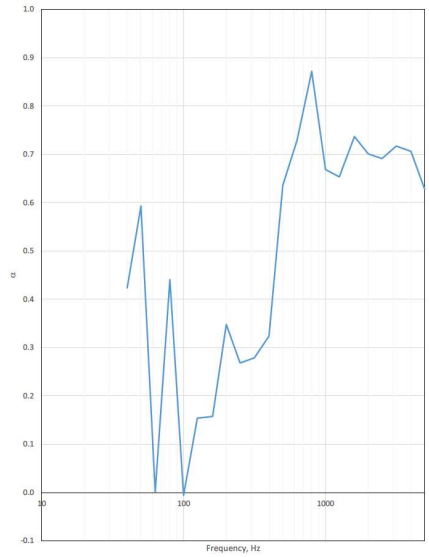
ABSORPTION TESTING



With one box arranged diagonally facing into the room in one corner, the fundamental frequency absorption was 63Hz with further second harmonic absorption at 125Hz.



With four boxes arranged in the corner of the room in a column formation facing into the room, absorption was evident in the frequency bands 63Hz, 125Hz and 160Hz.



The initial tests with 6 x boxes arranged in the centre of the floor were later repeated with the plastic plug-in inserts placed into the central funnels of the boxes. This was found to lower the low frequency absorption down to 50Hz.

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TESTING

DIFFUSION TESTING

Diffusion tests were conducted using 3D models at a scale of 5:1. Due to the size of the boxes, as a test room to undertake diffusion tests would need to be the size of a sports hall. The tests were undertaken at the University of Salford in their small, semi-anechoic chamber. Tests were performed to *BS ISO 17497-2:2012 –Measurement of the directional diffusion coefficient in a free field.*

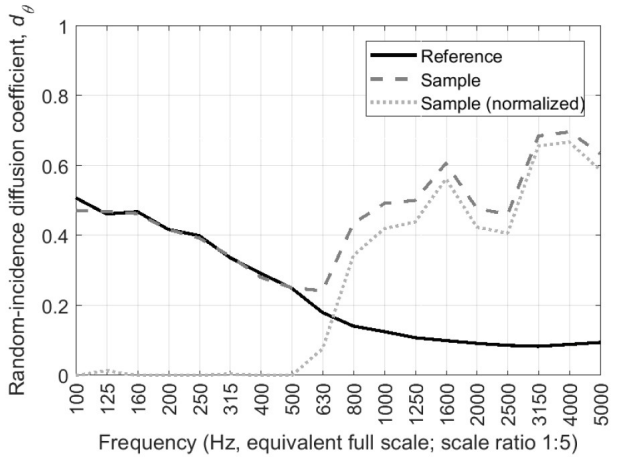
The tests were conducted on 8 x scaled boxes in two different orientations; Orientation A with the boxes rotated so that the long convex curves were in a vertical position and Orientation B with the boxes rotated so that the long convex curves were in a horizontal position.

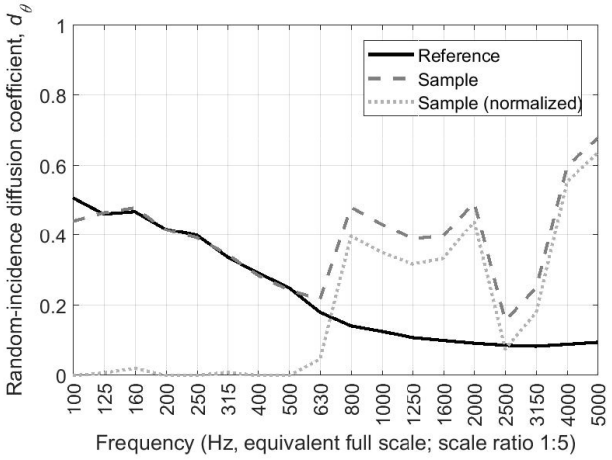
A boundary plane method was used, with the scattering measured in the plane being defined by the hard concrete floor of the semi-anechoic chamber. The measurements were made using 37 microphones arranged in an arch shape, spanning from -90° to 90° with angle steps of 5°. The loudspeaker source angles used were 0°, +30° and +60°.

The 62-page diffusion report contains many graphs and polar plots from 100Hz to 5kHz.

Diffusion varies between frequencies dependent upon the angle of the source, the angle of the device, and the orientation of the box.

The following graphs show the far-field diffusion coefficient for both Orientation A and Orientation B, firstly with the random incidence diffusion coefficient (normalised and non-normalised).

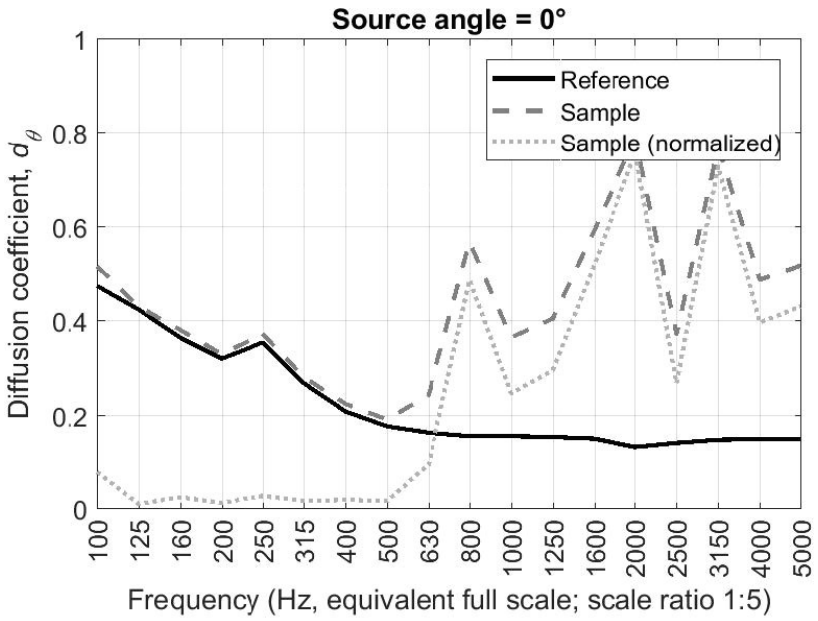


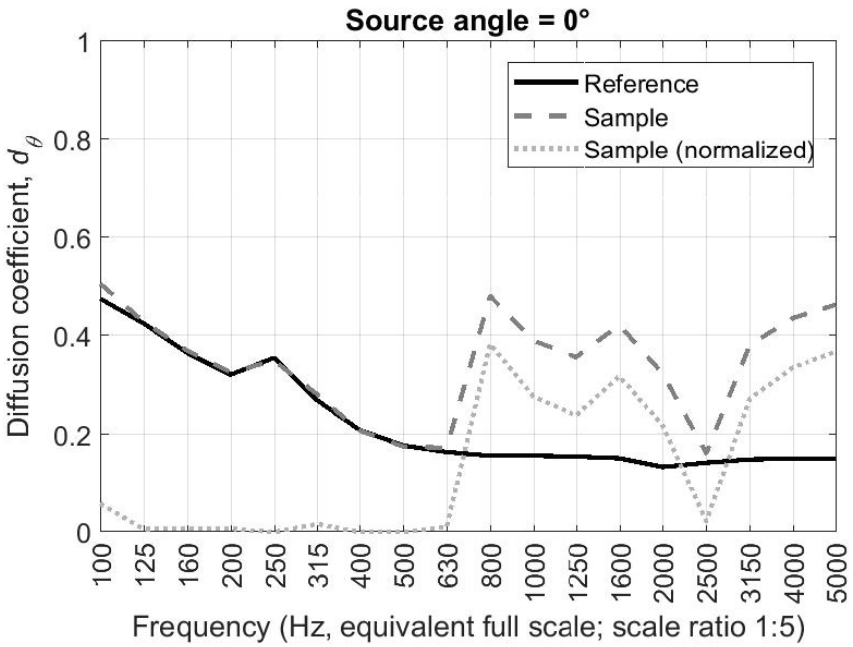


TESTING

DIFFUSION TESTING

The following graphs show the far-field diffusion coefficient for both Orientation A and Orientation B, firstly with the directional diffusion coefficient (normalised and non-normalised).





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PORTABLE VARIABLE ACOUSTIC DEVICE

P:VAD

TECHNICAL SPECIFICATIONS:	
Dimentions	525mm x 525mm x 360mm,
Weight	Approx 14kg
Patent Pending nos UK	GB2103188.5 GB2003335.3
Colours	Black and Natural
Tests	University of Salford – 04189/1/R2
	University of Salford – 04189/Supplement
	University of Salford – 04320/3 to 5
	University of Salford – 04984/3 to 5
	University of Salford – 04984/02
	University of Salford – 04339/R1
	Schacoustics (Sound Hub, Denmark) – Measurement Session #001
	Schacoustics (Sound Hub, Denmark) – Measurement Session #002
	Schacoustics (Sound Hub, Denmark) – Measurement Session #003
	Schacoustics (Sound Hub, Denmark) – Measurement Session #006
	Schacoustics (Sound Hub, Denmark) – Measurement Session #007
	FIRA International – TFFLF91427

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