

Determination and classification of sound absorption coefficient of Visible – Zero Carbon Acoustic Spray

Requested by Invisible Acoustic Ceilings Scandinavia Oy
Reijo Karhulahti
reijo@invisibleacoustic.com
+358 400 444 300
Ahertajankuja 1 A
02100 ESPOO
FINLAND

Order ref. VWZOPT200066-02

Contact person Eurofins Expert Services Oy
Mika Lojander
Kemistintie 3
02150 Espoo
MikaLojander@eurofins.fi

This is new version of report EUFI29-20003616-T1-EN. Appendix 1 changed because of rounding error. No effect on results or classification

Assignment Determination and classification of sound absorption coefficient of 25 mm thick layer of Visible – Zero Carbon Acoustic Spray.

Sample details The customer supplied on 8th September 2020 to the laboratory samples of acoustic spray. The samples consisted of four non-absorbing gypsum boards with 25mm thick layer of acoustic spray. The additional information of the samples delivered by the customer is presented in in Appendix 2

Date and place of testing The samples were tested on 19th September 2020 Eurofins Expert Services Oy research hall 1 (Tekniikantie 15 A, 02150 Espoo).

Installation and measuring The tested sample (11,7m²) was installed by onto the reverberation chamber floor. Samples were enclosed with wooden lists and tape. The boards were slightly distorted and were forced to contact with the test floor with non-absorbing wooden lists attached to the enclosure. Tests were performed by the Eurofins Expert Services Oy Laboratory Technical Expert Ville Joensuu

Method and equipment The sound absorption coefficient, α_s was measured according to the standard SFS EN ISO 354-2003 [1] and the rating of sound absorption (calculation of α_w) was determined according to the standard SFS EN ISO 11654-1997 [2]

Reverberation room dimensions and measuring equipment are presented in Appendix 3.

Result

The sound absorption coefficient α_s in one-third-octave bands and the practical sound absorption coefficient α_p in octave bands are presented in Appendix 1. The weighted sound absorption coefficient α_w and the sound absorption class are presented also in Table 1.

Table 1. Weighted sound absorption coefficient α_w and sound absorption class of Visible - Zero Carbon Acoustic Spray (25 mm thick layer).

| Visible - Zero Carbon Acoustic Spray (25mm) | | | |
|---|---|--|---------------------------|
| Sample | Weight kg/m ² (Only acoustic spray) | Weighted sound absorption coefficient α_w | Sound absorption class |
| Visible – Zero Carbon Acoustic Spray 25 mm | 2,20 | 0,75 (H) | C |

Espoo, 18.2.2021

Mika Lojander
Expert

Ville Joensuu
Senior Technician

The report is electronically signed

Eurofins Expert Services Oy is notified body No. NB 0809

FINAS Finnish Accreditation Service has accredited our laboratory (T001, Eurofins Expert Services Oy) to perform measurements according to standards listed below..

References

- [1] EN ISO 354:2003, Acoustics - Measurement of sound absorption in a reverberation room
- [2] ISO 11654:1997, Acoustics - Sound absorbers for use in buildings - Rating of sound absorption

Appendices

3

Distribution

Customer, electronically approved

Determination of sound absorption and classification

Client: Invisible Acoustic Ceilings Scandinavia Oy

Order: VWZ0PT200066-01 / EUFI29-20003616

Volume of the rev. room: 201 m³

Area of the inner surf.: 209 m²

Test place: Eurofins Expert Services Oy TH1

Sample size: 11,7 m²

Task: Determination of absorption coefficient (EN ISO 354)
Octaves valuation and classification (ISO 11654:1997)

Temperature and relative humidity of rev. room

Empty: 19,7 °C 55,9 %

Sample: 19,7 °C 58,2 %

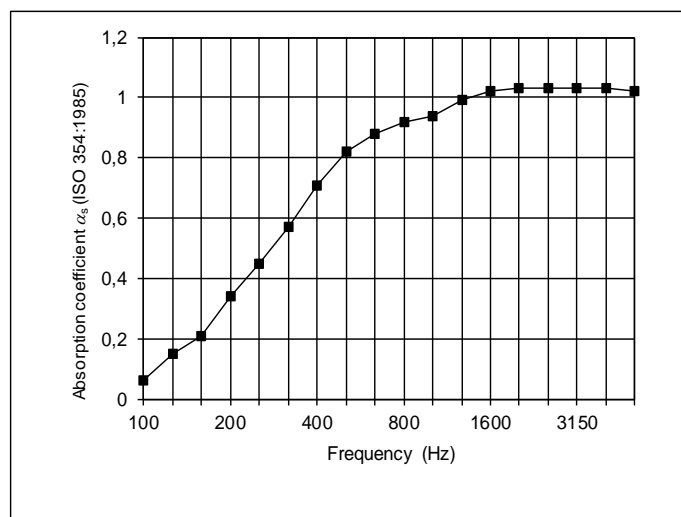
Test date: 19.9.2020

Sample: Visible - Zero Carbon Acoustic Spray (25mm thick layer of acoustic spray on gypsum board)

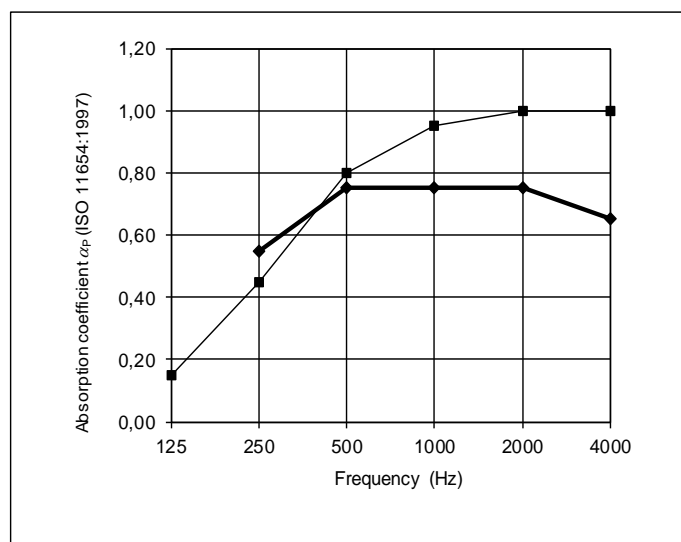
Board size: 4pcs (1200 x 2500)

Surface mass: 12,54 kg/m² (gypsum board 10,34kg/m² + acoustic spray 2,20kg/m²)

Arrangements: Type A



| Frequency (Hz) | T ₁ (s) | T ₂ (s) | α _s |
|----------------|--------------------|--------------------|----------------|
| 100 | 5,62 | 4,98 | 0,06 |
| 125 | 5,23 | 4,07 | 0,15 |
| 160 | 5,42 | 3,87 | 0,21 |
| 200 | 5,18 | 3,17 | 0,34 |
| 250 | 5,83 | 3,01 | 0,45 |
| 315 | 5,68 | 2,61 | 0,57 |
| 400 | 5,08 | 2,21 | 0,71 |
| 500 | 4,92 | 2,00 | 0,82 |
| 630 | 5,09 | 1,94 | 0,88 |
| 800 | 5,12 | 1,89 | 0,92 |
| 1000 | 5,14 | 1,87 | 0,94 |
| 1250 | 4,85 | 1,78 | 0,99 |
| 1600 | 4,39 | 1,68 | 1,02 |
| 2000 | 4,05 | 1,62 | 1,03 |
| 2500 | 3,70 | 1,56 | 1,03 |
| 3150 | 3,21 | 1,47 | 1,03 |
| 4000 | 2,77 | 1,37 | 1,03 |
| 5000 | 2,25 | 1,24 | 1,02 |



Octave values and classification - ISO 11654

| Frequency (Hz) | Reference Curve | α _p |
|----------------|-----------------|----------------|
| 125 | | 0,15 |
| 250 | 0,55 | 0,45 |
| 500 | 0,75 | 0,80 |
| 1000 | 0,75 | 0,95 |
| 2000 | 0,75 | 1,00 |
| 4000 | 0,65 | 1,00 |

Weighted

absorption coefficient, α_w: 0,75 (H)

Sound absorption class: C

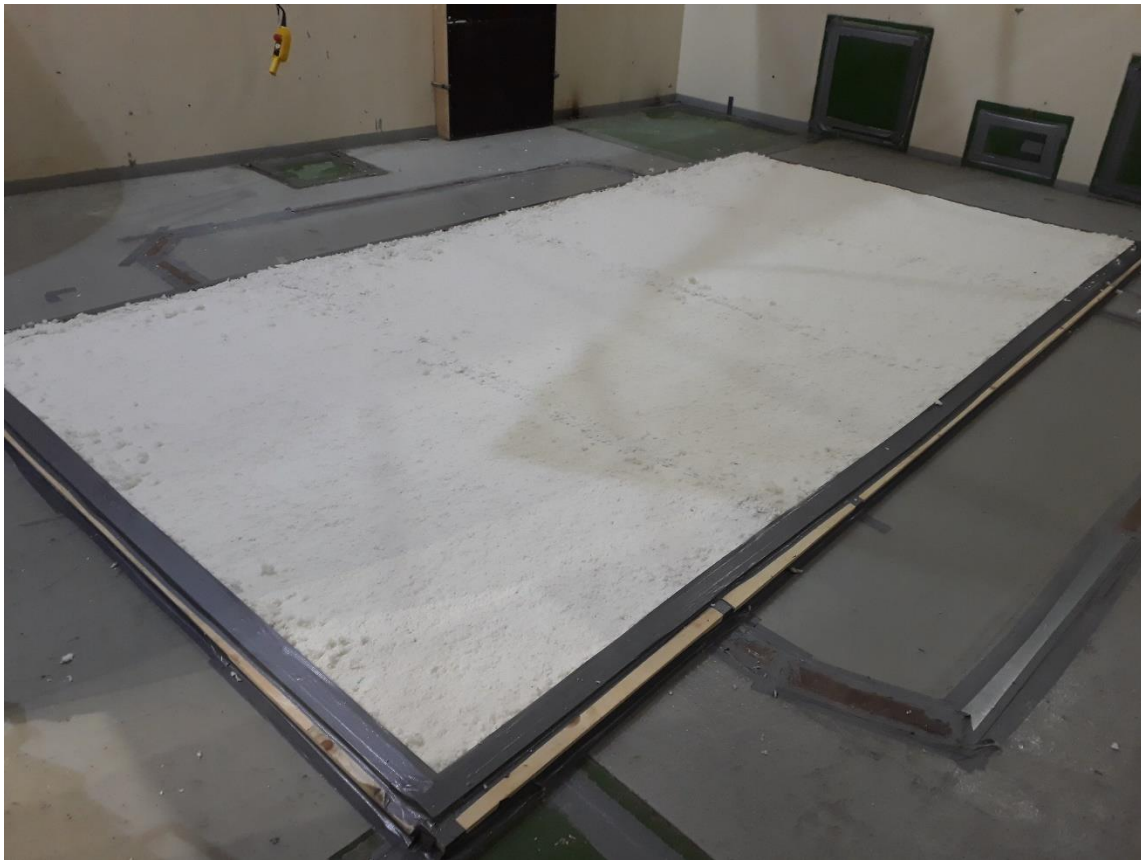
Absorption classes: A, B, C, D, E and no classification.

Visible - Zero Carbon Acoustic Spray

Visible - Zero Carbon Acoustic Spray is including 100 % recycled cellulose fibers, fire protection substances and adhesive.

Dry weight: approx. 87-89 kg/m³

Picture 1. Sample installed to reverberation room.



Measuring equipment and reverberation room dimensions

| Measuring equipment | Name | Serial No. |
|--------------------------|-------------------------|------------|
| Condenser microphone | B&K (Brüel & Kjær) 4134 | 2527717 |
| Microphone preamplifier | B&K 2669 | 2554550 |
| Rotating microphone boom | B&K 3923 | 2630663 |
| Power amplifier | Yamaha MX-1000 | |
| Loudspeakers | Sinmarc V121L | |
| Real-time analyser | Nor 830 | 31429 |
| Sound calibrator | B&K 4228 | 3063558 |

| Reverberation room dimensions: | Floor | Height | Volume |
|--------------------------------|---------------|--------|--------------------|
| (KH 3) | 5.95 m x 7.2m | 4.7 m | 201 m ³ |

Thickness of the concrete wall, floors and ceiling of the reverberation room is 0,25 m