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Date
May 18, 2004

Reference
P401469-E

# Determination of sound absorption coefficients in a reverberation room according to ISO 354, EN 20354 and EN ISO 11654

(28 enclosures)

## Test objects

Sound absorbing panels delivered by Gustafs Inredningar i Dalarna AB

## Arrival of test objects

April 28, 2004

## Date of test

May 3-6, 2004

## Results

The sound absorption coefficient ($\alpha_s$) and the practical sound absorption coefficient ($\alpha_p$) are given in enclosure 1-28. The weighted sound absorption coefficient ($\alpha_w$) and the sound absorption classes have been calculated according to EN ISO 11654 and the results are given in table 1-2. The results are valid for the tested objects only.

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"POWYŻSZE MATERIAŁY POCHODZĄ Z FIRMY „INSIDE" SP.J. PRZEDSTAWICIELA I WYŁĄCZNEGO DYSTRYBUTORA MATERIAŁÓW GUSTAFS PANEL SYSTEMS"

SP 302

*Table 1 - Summary of results*

| Test object: | EN ISO 11654 | | Enclosure |
|---|---|---|---|
| | Absorption class | $\alpha_w$ | |
| **Gustafs BF-Panel Dubbelsidig Perforering 3/10 mm with acoustic felt, and 30 mm mineral wool and 30 mm air gap.** Mounting depth: 82,5 mm | E | 0,2(LM) | 1-2 |
| **Gustafs BF-Panel Minislits 8 mm with acoustic felt, and 30 mm mineral wool and 30 mm air gap.** Mounting depth: 82,5 mm | B | 0,85 | 3-4 |
| **Gustafs BF-Panel Minislits 5 mm with acoustic felt, and 30 mm mineral wool and 30 mm air gap.** Mounting depth: 82,5 mm | C | 0,65(LM) | 5-6 |
| **Gustafs BF-Panel Maxslits 8 mm with acoustic felt, and 30 mm mineral wool and 30 mm air gap.** Mounting depth: 82,5 mm | B | 0,80 | 7-8 |
| **Gustafs BF-Panel Maxslits 5 mm with acoustic felt, and 30 mm mineral wool and 30 mm air gap.** Mounting depth: 82,5 mm | C | 0,7(LM) | 9-10 |
| **Gustafs BF-Panel Ribbslits 5 mm with acoustic felt, and 30 mm mineral wool and 30 mm air gap.** Mounting depth: 82,5 mm | C | 0,65(M) | 11-12 |
| **Gustafs BF-Panel Ribbslits 8 mm with acoustic felt, and 30 mm mineral wool and 30 mm air gap.** Mounting depth: 82,5 mm | C | 0,6(LM) | 13-14 |
| **Gustafs BF-Panel Dubbelsidig Perforering 3/10 mm with acoustic felt, and 30 mm mineral wool and 200 mm air gap.** Mounting depth: 252,5 mm | E | 0,25(LM) | 15-16 |
| **Gustafs BF-Panel Minislits 5 mm with acoustic felt, and 30 mm mineral wool and 200 mm air gap.** Mounting depth: 252,5 mm | C | 0,65(L) | 17-18 |
| **Gustafs BF-Panel Minislits 8 mm with acoustic felt, and 30 mm mineral wool and 200 mm air gap.** Mounting depth: 252,5 mm | B | 0,85 | 19-20 |

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*Table 2 - Summary of results*

| | | | |
|---|---|---|---|
| **Gustafs BF-Panel Maxslits 5 mm with acoustic felt, and 30 mm mineral wool and 200 mm air gap.** Mounting depth: 252,5 mm | C | 0,7(L) | 21-22 |
| **Gustafs BF-Panel Maxslits 8 mm with acoustic felt, and 30 mm mineral wool and 200 mm air gap.** Mounting depth: 252,5 mm | B | 0,85 | 23-24 |
| **Gustafs BF-Panel Ribbslits 5 mm with acoustic felt, and 30 mm mineral wool and 200 mm air gap.** Mounting depth: 252,5 mm | C | 0,65(L) | 25-26 |
| **Gustafs BF-Panel Ribbslits 8 mm with acoustic felt, and 30 mm mineral wool and 200 mm air gap.** Mounting depth: 252,5 mm | C | 0,6(L) | 27-28 |

**Measurement method**

The measurements have been carried out according to SS-EN 20354:93 (ISO 354:1985). 4 loudspeakers and 6 microphones have been used giving 24 different combinations. For empty room 3 decays have been used for averaging the time and for test objects 5 decays have been used, for each combination of loudspeaker and microphone.

The absorption coefficient $\alpha_S$ has been evaluated from:

$$\alpha_S = \frac{55.3\ V}{c \cdot S}\left(\frac{1}{T_2} - \frac{1}{T_1}\right)$$

where

| | | |
|---|---|---|
| V | = | Volume of the reverberation room ($m^3$) |
| S | = | Area of the test object ($m^2$) |
| c | = | Speed of sound in air (m/s) |
| c | = | 331 + 0.6t |
| t | = | Temperature in the air (°C) |
| $T_1$ | = | Reverberation time of the room without test object (s) |
| $T_2$ | = | Reverberation time of the room with test object (s) |

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## Measurement uncertainty

From a world wide Round Robin[1)], in which SP took part, with 23 participating laboratories from 11 countries, the following measurement uncertainty has been calculated

| Frequencies | |
|---|---|
| (Hz) | Uncertainty |
| 100-630 | ± 0,15 |
| 800-1250 | ± 0,10 |
| 1600-2500 | ± 0,15 |
| 3150-5000 | ± 0,20 |

[1)] The figures are calculated from twice the standard deviations, rounded to the nearest 0,05. The data from the Round Robin is documented in a letter from the ASTM to the participating laboratories.

## Test room

A reverberation room with the dimensions 7,64 m x 6,16 m x 4,25 m giving the volume 200 m³ and the total surface area 211 m² was used.

## Mounting

The panels were placed on the floor or in a frame with the size 3 x 3,6 m. The edges were sealed with a wooden frame and a tape (made of an elastic woven material) to prevent air leakage. The mounting depth is the distance between the floor and the front surface (upper) of the test objects.

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## List of instruments

| Instrument | Manufacturer | Type | Serial no |
|---|---|---|---|
| Microphone | Brüel & Kjaer | 4943 | 503327 |
| Microphone | Brüel & Kjaer | 4943 | 503326 |
| Microphone | Brüel & Kjaer | 4943 | 503325 |
| Microphone | Brüel & Kjaer | 4943 | 503324 |
| Microphone | Brüel & Kjaer | 4943 | 503323 |
| Microphone | Brüel & Kjaer | 4943 | 503322 |
| Microphone Preamplifier | Brüel & Kjaer | 2619 | 970996 |
| Microphone Preamplifier | Brüel & Kjaer | 2619 | 970948 |
| Microphone Preamplifier | Brüel & Kjaer | 2619 | 469905 |
| Microphone Preamplifier | Brüel & Kjaer | 2619 | 726792 |
| Microphone Preamplifier | Brüel & Kjaer | 2619 | 726825 |
| Microphone Preamplifier | Brüel & Kjaer | 2619 | 970968 |
| Microphone Multiplexer | Norsonic | 834 | 10050 |
| Real-Time Analyzer | Norsonic | 830 | 11533 |
| Sound Level Calibrator | Brüel & Kjaer | 4230 | 1410947 |
| Programme | SP | Absorp | 960627 |
| Power amplifier | PA1 | | |
| Noise generator | NG1 ( white noise ) | | |
| Loudspeakers | SP | HGT2, HGT7, HGT4, HGTtak | |
| Hygrometer | Vaisala | HM 132 | 42154 |
| Temperature meter | Vaisala | HM 132 | 42154 |

**SP Swedish National Testing and Research Institute**
**Energy Technology - Acoustics**

Hans Jonasson
Technical Manager

Mohammad Jalalian
Technical Officer

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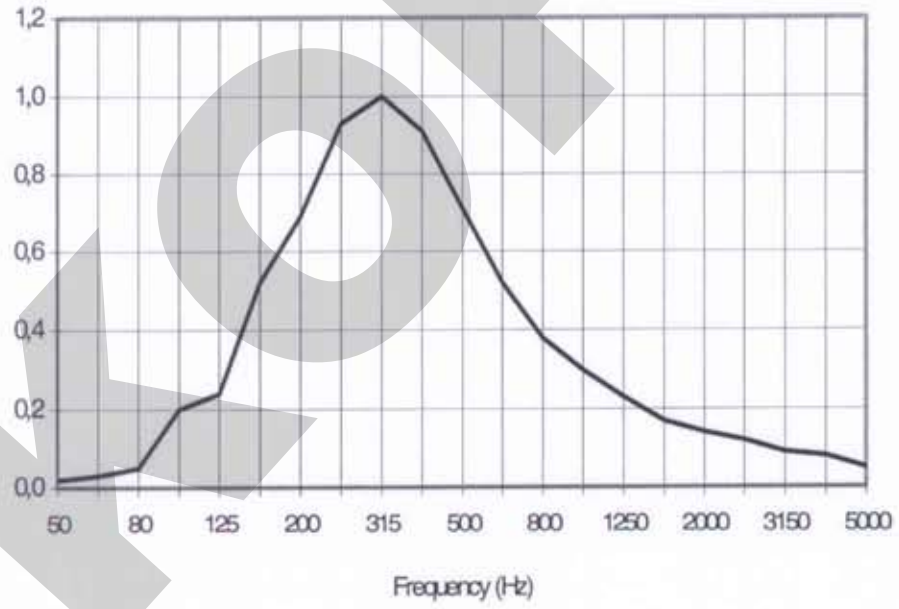
# Measurement of sound absorption coefficient

| | |
|---|---|
| Test | Measurement of sound absorption coefficient in a reverberation room according to SS-EN 20354 (ISO 354). |
| Client | Gustafs Inredningar i Dalarna AB<br>Peter Markoff |
| Object | Gustafs BF-Panel Dubbelsidig Perforering 3/10 mm<br>with acoustic felt, and 30 mm mineral wool and 30 mm air gap.<br>Panel thickness: 12,5 mm.<br>Panel size: 1500 mm x 600 mm. |
| Date of test | May 3, 2004 |
| Conditions | Mounting depth: 82,5 mm.<br>Surface area: 10,8 $m^2$.<br>Room volume: 200 $m^3$.<br>Temperature at measurement on object/in empty room: 22/ 21 °C.<br>Relative humidity at measurement on object/in empty room: 88/ 87 %. |
| Result | Sound absorption class E according to EN ISO 11654.<br>Weighted sound absorption coefficient $\alpha_w$ = 0,2(LM) according to EN ISO 11654. |

Sound absorption coefficient




| Frequency (Hz) | $\alpha_s$ |
|---|---|
| 50 | 0,02 |
| 63 | 0,03 |
| 80 | 0,05 |
| 100 | 0,20 |
| 125 | 0,24 |
| 160 | 0,52 |
| 200 | 0,69 |
| 250 | 0,93 |
| 315 | 1,00 |
| 400 | 0,91 |
| 500 | 0,71 |
| 630 | 0,52 |
| 800 | 0,38 |
| 1000 | 0,30 |
| 1250 | 0,23 |
| 1600 | 0,17 |
| 2000 | 0,14 |
| 2500 | 0,12 |
| 3150 | 0,09 |
| 4000 | 0,08 |
| 5000 | 0,05 |

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# Measurement of sound absorption coefficient

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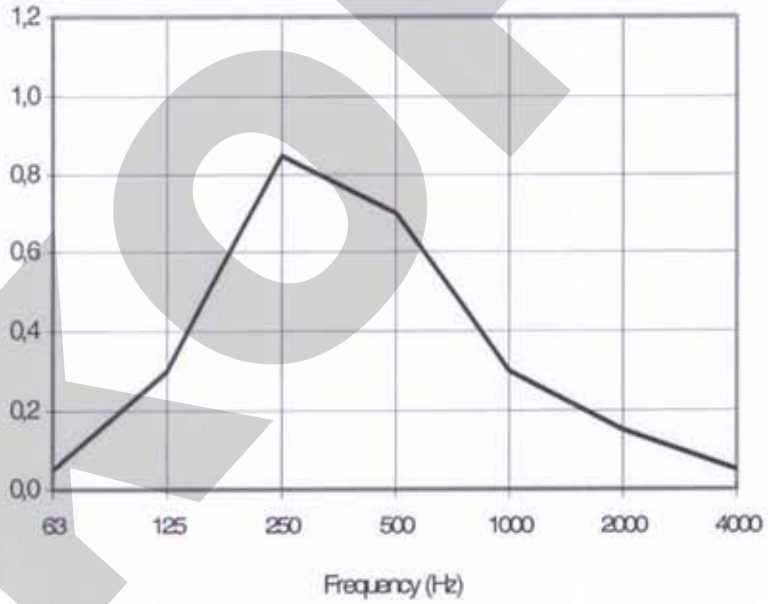
| Client | Gustafs Inredningar i Dalarna AB<br>Peter Markoff |
| Object | Gustafs BF-Panel Dubbelsidig Perforering 3/10 mm<br>with acoustic felt, and 30 mm mineral mineral wool and 30 mm air gap.<br>Panel thickness: 12,5 m m.<br>Panel size: 1500 mm x 600 mm. |
| Date of test | May 3, 2004 |
| Conditions | Mounting depth: 82,5 mm.<br>Surface area: 10,8 $m^2$.<br>Room volume: 200 $m^3$.<br>Temperature at measurement on object/in empty room: 22/ 21 °C.<br>Relative humidity at measurement on object/in empty room: 88/ 87 %. |
| Result | Sound absorption class E according to EN ISO 11654.<br>Weighted sound absorption coefficient $\alpha_w$ = 0,2(LM) according to EN ISO 11654. |

Practical sound absorption coefficient




| Frequency (Hz) | $\alpha_p$ |
|---|---|
| 63 | 0,05 |
| 125 | 0,30 |
| 250 | 0,85 |
| 500 | 0,70 |
| 1000 | 0,30 |
| 2000 | 0,15 |
| 4000 | 0,05 |

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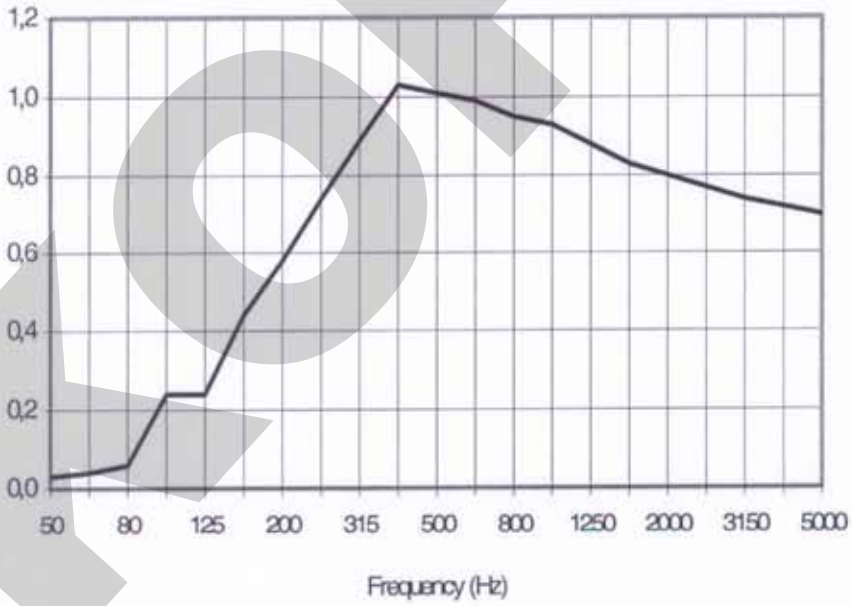
| Conditions | Mounting depth: 82,5 mm.<br>Surface area: 10,8 $m^2$.<br>Room volume: 200 $m^3$.<br>Temperature at measurement on object/in empty room: 21/ 21 °C.<br>Relative humidity at measurement on object/in empty room: 88/ 87 %. |
| Result | Sound absorption class B according to EN ISO 11654.<br>Weighted sound absorption coefficient $\alpha_w$ = 0,85 according to EN ISO 11654. |

Sound absorption coefficient




| Frequency (Hz) | $\alpha_s$ |
|---|---|
| 50 | 0,03 |
| 63 | 0,04 |
| 80 | 0,06 |
| 100 | 0,24 |
| 125 | 0,24 |
| 160 | 0,44 |
| 200 | 0,58 |
| 250 | 0,74 |
| 315 | 0,89 |
| 400 | 1,03 |
| 500 | 1,01 |
| 630 | 0,99 |
| 800 | 0,95 |
| 1000 | 0,93 |
| 1250 | 0,88 |
| 1600 | 0,83 |
| 2000 | 0,80 |
| 2500 | 0,77 |
| 3150 | 0,74 |
| 4000 | 0,72 |
| 5000 | 0,70 |

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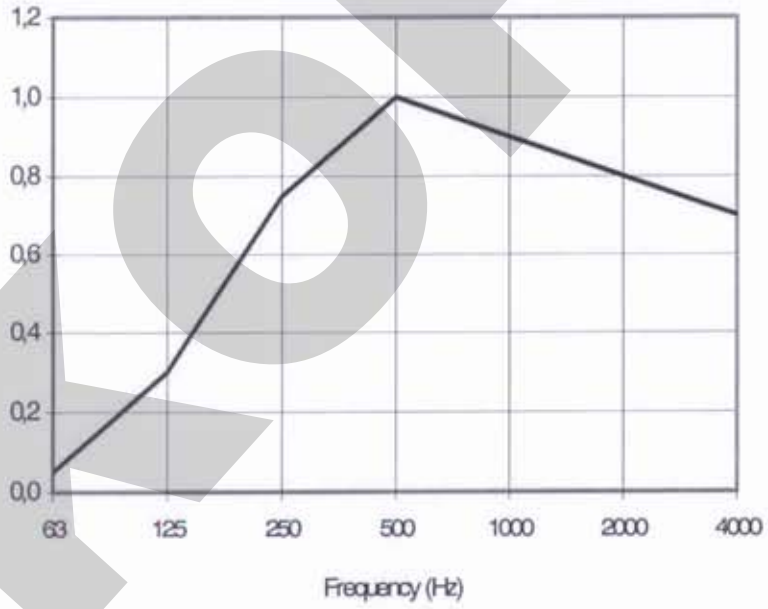
| Date of test | May 3, 2004 |
| Conditions | Mounting depth: 82,5 mm.<br>Surface area: 10,8 $m^2$.<br>Room volume: 200 $m^3$.<br>Temperature at measurement on object/in empty room: 21/ 21 °C.<br>Relative humidity at measurement on object/in empty room: 88/ 95 %. |
| Result | Sound absorption class B according to EN ISO 11654.<br>Weighted sound absorption coefficient $\alpha_w$ = 0,85 according to EN ISO 11654. |

Practical sound absorption coefficient




| Frequency (Hz) | $\alpha_p$ |
|---|---|
| 63 | 0,05 |
| 125 | 0,30 |
| 250 | 0,75 |
| 500 | 1,00 |
| 1000 | 0,90 |
| 2000 | 0,80 |
| 4000 | 0,70 |

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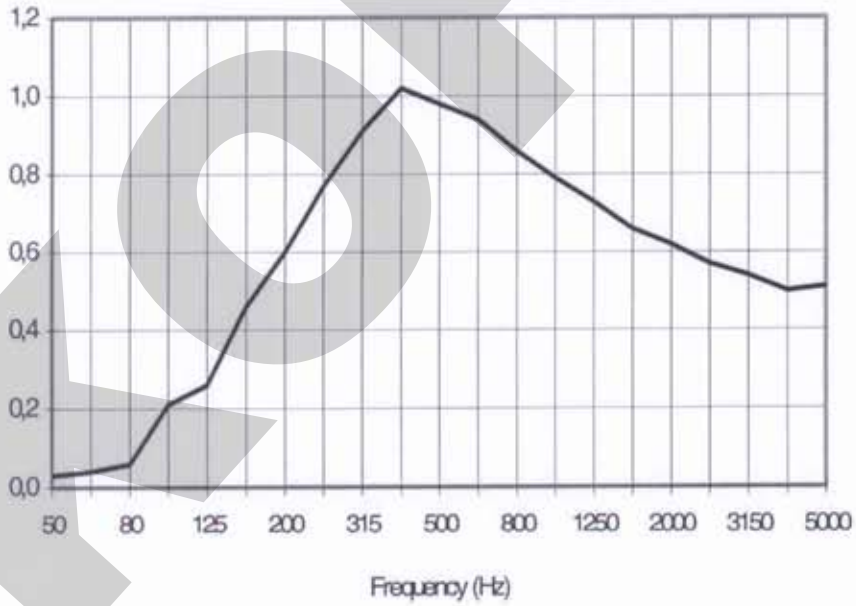
| Object | Gustafs BF-Panel Minislits 5 mm with acoustic felt, and 30 mm mineral wool and 30 mm air gap.<br>Panel thickness: 12,5 m m<br>Panel size: 1500 mm x 600 mm. |
| Date of test | May 3, 2004 |
| Conditions | Mounting depth: 82,5 mm.<br>Surface area: 10,8 $m^2$.<br>Room volume: 200 $m^3$.<br>Temperature at measurement on object/in empty room: 21/ 21 °C.<br>Relative humidity at measurement on object/in empty room: 88/ 87 %. |
| Result | Sound absorption class C according to EN ISO 11654.<br>Weighted sound absorption coefficient $\alpha_w$ = 0,65(LM) according to EN ISO 11654. |

Sound absorption coefficient




| Frequency (Hz) | $\alpha_s$ |
|---|---|
| 50 | 0,03 |
| 63 | 0,04 |
| 80 | 0,06 |
| 100 | 0,21 |
| 125 | 0,26 |
| 160 | 0,46 |
| 200 | 0,60 |
| 250 | 0,77 |
| 315 | 0,91 |
| 400 | 1,02 |
| 500 | 0,98 |
| 630 | 0,94 |
| 800 | 0,86 |
| 1000 | 0,79 |
| 1250 | 0,73 |
| 1600 | 0,66 |
| 2000 | 0,62 |
| 2500 | 0,57 |
| 3150 | 0,54 |
| 4000 | 0,50 |
| 5000 | 0,51 |

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# Measurement of sound absorption coefficient

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|---|---|
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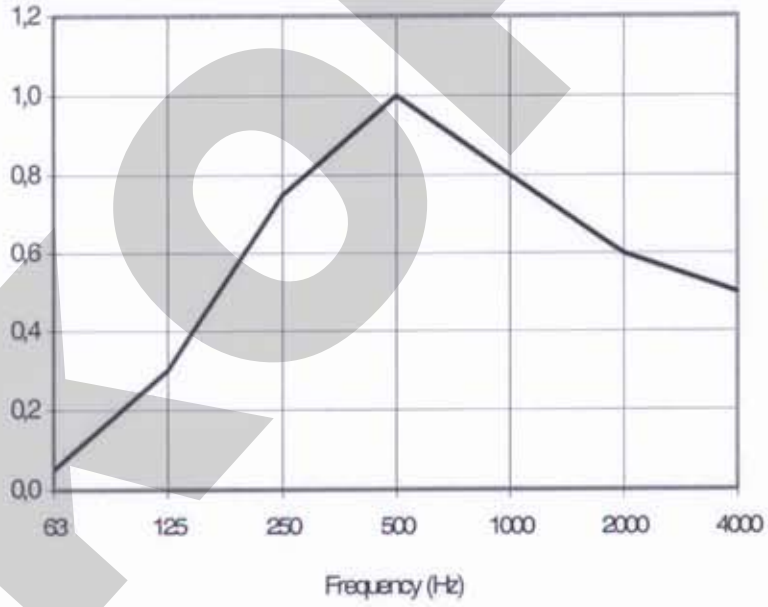
| Object | Gustafs BF-Panel Minislits 5 mm with acoustic felt, and 30 mm mineral wool and 30 mm air gap<br>Panel thickness: 12,5 mm<br>Panel size: 1500 mm x 600 mm. |
| Date of test | May 3, 2004 |
| Conditions | Mounting depth: 82,5 mm.<br>Surface area: 10,8 $m^2$.<br>Room volume: 200 $m^3$.<br>Temperature at measurement on object/in empty room: 21/ 21 °C.<br>Relative humidity at measurement on object/in empty room: 88/ 95 %. |
| Result | Sound absorption class C according to EN ISO 11654.<br>Weighted sound absorption coefficient $\alpha_w$ = 0,65(LM) according to EN ISO 11654. |

Practical sound absorption coefficient




| Frequency (Hz) | $\alpha_p$ |
|---|---|
| 63 | 0,05 |
| 125 | 0,30 |
| 250 | 0,75 |
| 500 | 1,00 |
| 1000 | 0,80 |
| 2000 | 0,60 |
| 4000 | 0,50 |

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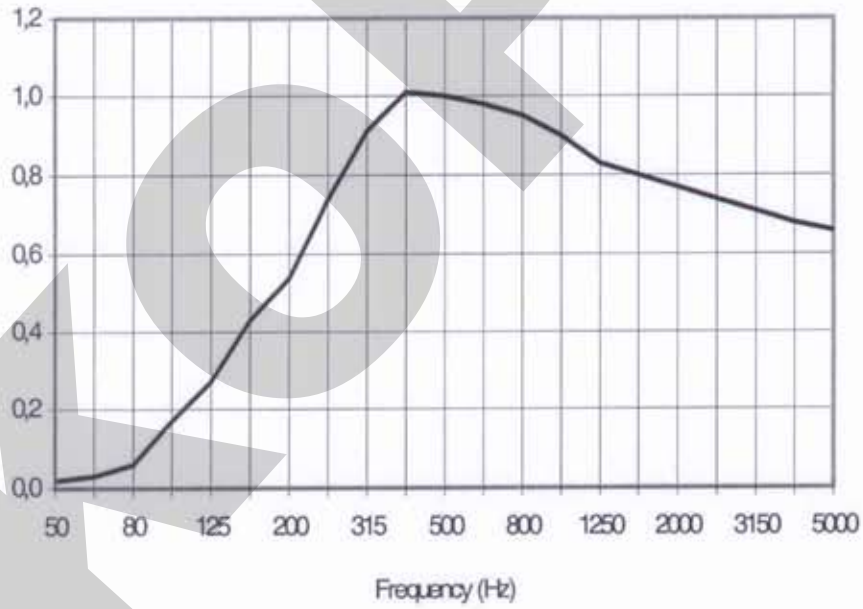
| Date of test | May 4, 2004 |
| Conditions | Mounting depth: 82,5 mm.<br>Surface area: 10,8 $m^2$.<br>Room volume: 200 $m^3$.<br>Temperature at measurement on object/in empty room: 21/ 21 °C.<br>Relative humidity at measurement on object/in empty room: 88/ 87 %. |
| Result | Sound absorption class B according to EN ISO 11654.<br>Weighted sound absorption coefficient $\alpha_w$ = 0,8 according to EN ISO 11654. |

Sound absorption coefficient




| Frequency (Hz) | $\alpha_s$ |
|---|---|
| 50 | 0,02 |
| 63 | 0,03 |
| 80 | 0,06 |
| 100 | 0,17 |
| 125 | 0,27 |
| 160 | 0,43 |
| 200 | 0,54 |
| 250 | 0,74 |
| 315 | 0,91 |
| 400 | 1,01 |
| 500 | 1,00 |
| 630 | 0,98 |
| 800 | 0,95 |
| 1000 | 0,90 |
| 1250 | 0,83 |
| 1600 | 0,80 |
| 2000 | 0,77 |
| 2500 | 0,74 |
| 3150 | 0,71 |
| 4000 | 0,68 |
| 5000 | 0,66 |

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# Measurement of sound absorption coefficient

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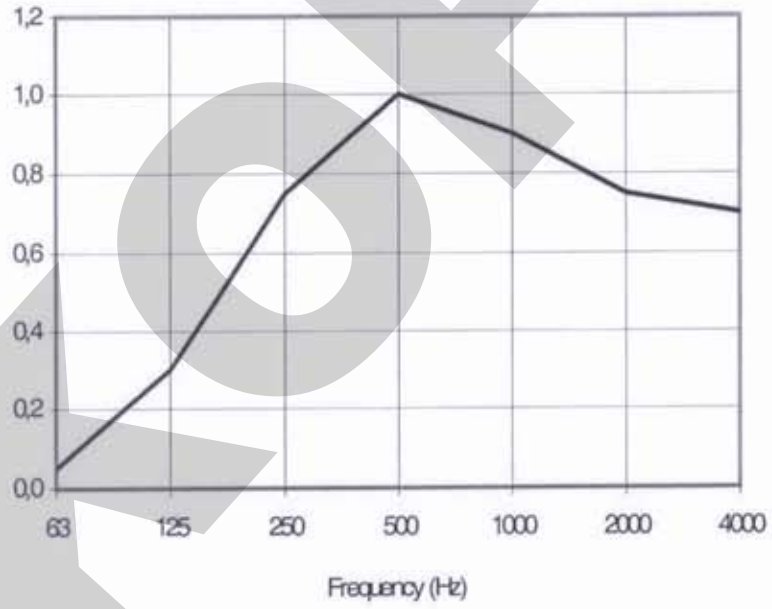
| Result | Sound absorption class B according to EN ISO 11654.<br>Weighted sound absorption coefficient $\alpha_w$ = 0,8 according to EN ISO 11654. |

Practical sound absorption coefficient




| Frequency (Hz) | $\alpha_p$ |
|---|---|
| 63 | 0,05 |
| 125 | 0,30 |
| 250 | 0,75 |
| 500 | 1,00 |
| 1000 | 0,90 |
| 2000 | 0,75 |
| 4000 | 0,70 |

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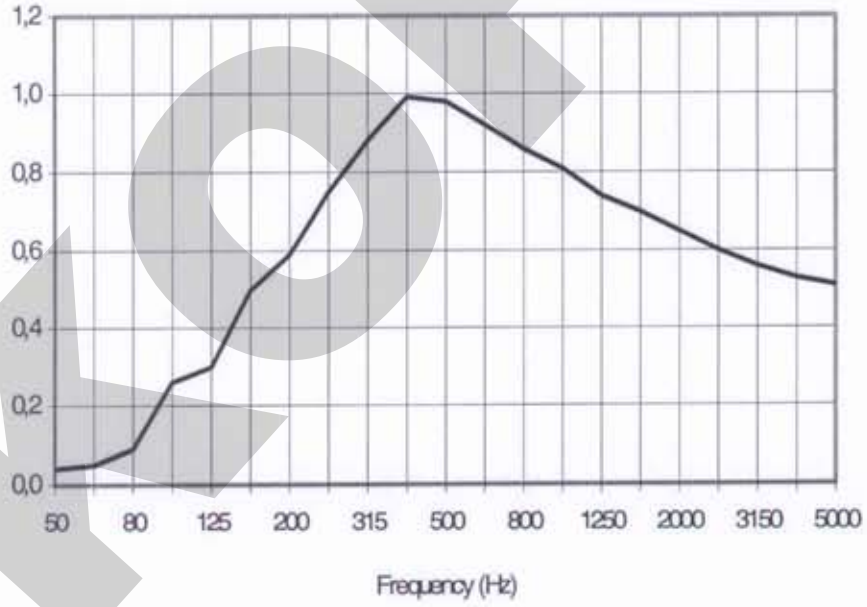
| Result | Sound absorption class C according to EN ISO 11654.<br>Weighted sound absorption coefficient $\alpha_w$ = 0,7(LM) according to EN ISO 11654. |

Sound absorption coefficient




| Frequency (Hz) | $\alpha_s$ |
|---|---|
| 50 | 0,04 |
| 63 | 0,05 |
| 80 | 0,09 |
| 100 | 0,26 |
| 125 | 0,30 |
| 160 | 0,50 |
| 200 | 0,59 |
| 250 | 0,75 |
| 315 | 0,88 |
| 400 | 0,99 |
| 500 | 0,98 |
| 630 | 0,92 |
| 800 | 0,86 |
| 1000 | 0,81 |
| 1250 | 0,74 |
| 1600 | 0,70 |
| 2000 | 0,65 |
| 2500 | 0,60 |
| 3150 | 0,56 |
| 4000 | 0,53 |
| 5000 | 0,51 |

KOPIA

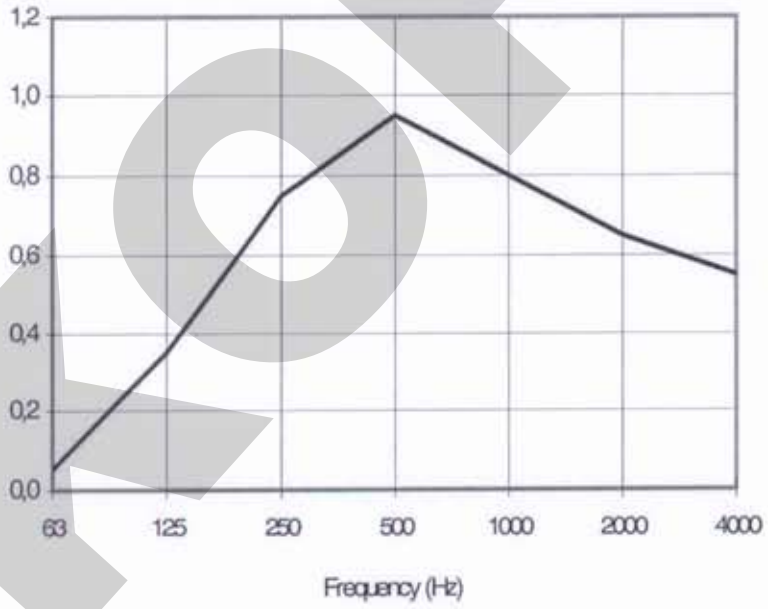
SP 511

"POWYŻSZE MATERIAŁY POCHODZĄ Z FIRMY „INSIDE" SP.J.
PRZEDSTAWICIELA I WYŁĄCZNEGO DYSTRYBUTORA MATERIAŁÓW
GUSTAFS PANEL SYSTEMS"

# Measurement of sound absorption coefficient

| | |
|---|---|
| Test | Measurement of sound absorption coefficient in a reverberation room according to SS-EN 20354 (ISO 354). |
| Client | Gustafs Inredningar i Dalarna AB<br>Peter Markoff |
| Object | Gustafs BF-Panel Maxslits 5 mm with acoustic felt, and 30 mm mineral wool and 30 mm air gap.<br>Panel thickness: 12,5 mm<br>Panel size: 1500 mm x 600 mm. |
| Date of test | May 4, 2004 |
| Conditions | Mounting depth: 82,5 mm.<br>Surface area: 10,8 $m^2$.<br>Room volume: 200 $m^3$.<br>Temperature at measurement on object/in empty room: 21/ 21 °C.<br>Relative humidity at measurement on object/in empty room: 88/ 87 %. |
| Result | Sound absorption class C according to EN ISO 11654.<br>Weighted sound absorption coefficient $\alpha_w$ = 0,7(LM) according to EN ISO 11654. |

Practical sound absorption coefficient




| Frequency (Hz) | $\alpha_p$ |
|---|---|
| 63 | 0,05 |
| 125 | 0,35 |
| 250 | 0,75 |
| 500 | 0,95 |
| 1000 | 0,80 |
| 2000 | 0,65 |
| 4000 | 0,55 |

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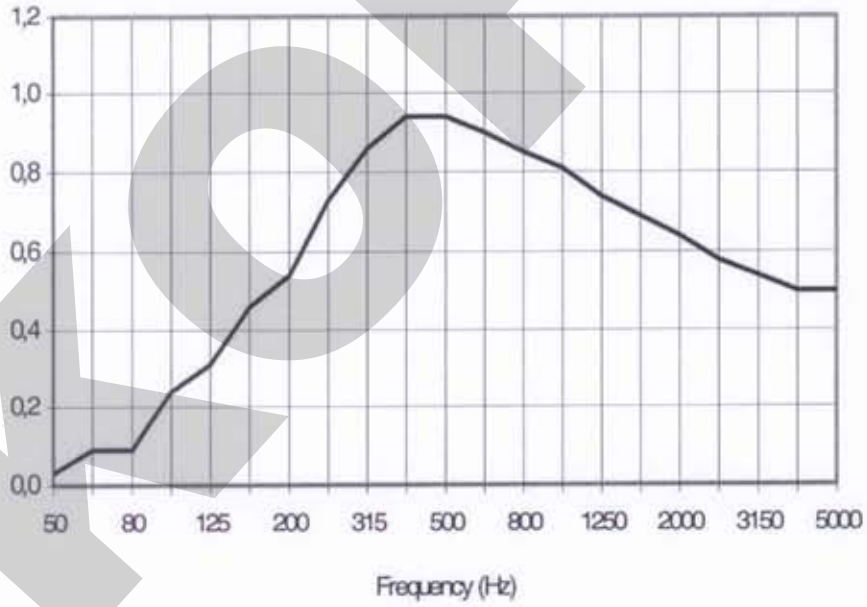
"POWYŻSZE MATERIAŁY POCHODZĄ Z FIRMY „INSIDE" SP.J.
PRZEDSTAWICIELA I WYŁĄCZNEGO DYSTRYBUTORA MATERIAŁÓW
GUSTAFS PANEL SYSTEMS"

# Measurement of sound absorption coefficient

| | |
|---|---|
| Test | Measurement of sound absorption coefficient in a reverberation room according to SS-EN 20354 (ISO 354). |
| Client | Gustafs Inredningar i Dalarna AB<br>Peter Markoff |
| Object | Gustafs BF-Panel Ribbslits 5 mm with acoustic felt, and 30 mm mineral wool and 30 mm air gap.<br>Panel thickness: 12,5 mm<br>Panel size: 1500 mm x 600 mm. |
| Date of test | May 4, 2004 |
| Conditions | Mounting depth: 82,5 mm.<br>Surface area: 10,8 $m^2$.<br>Room volume: 200 $m^3$.<br>Temperature at measurement on object/in empty room: 21/ 21 °C.<br>Relative humidity at measurement on object/in empty room: 88/ 87 %. |
| Result | Sound absorption class C according to EN ISO 11654.<br>Weighted sound absorption coefficient $\alpha_w$ = 0,65(M) according to EN ISO 11654. |

Sound absorption coefficient




| Frequency (Hz) | $\alpha_s$ |
|---|---|
| 50 | 0,03 |
| 63 | 0,09 |
| 80 | 0,09 |
| 100 | 0,24 |
| 125 | 0,31 |
| 160 | 0,46 |
| 200 | 0,54 |
| 250 | 0,73 |
| 315 | 0,86 |
| 400 | 0,94 |
| 500 | 0,94 |
| 630 | 0,90 |
| 800 | 0,85 |
| 1000 | 0,81 |
| 1250 | 0,74 |
| 1600 | 0,69 |
| 2000 | 0,64 |
| 2500 | 0,58 |
| 3150 | 0,54 |
| 4000 | 0,50 |
| 5000 | 0,50 |

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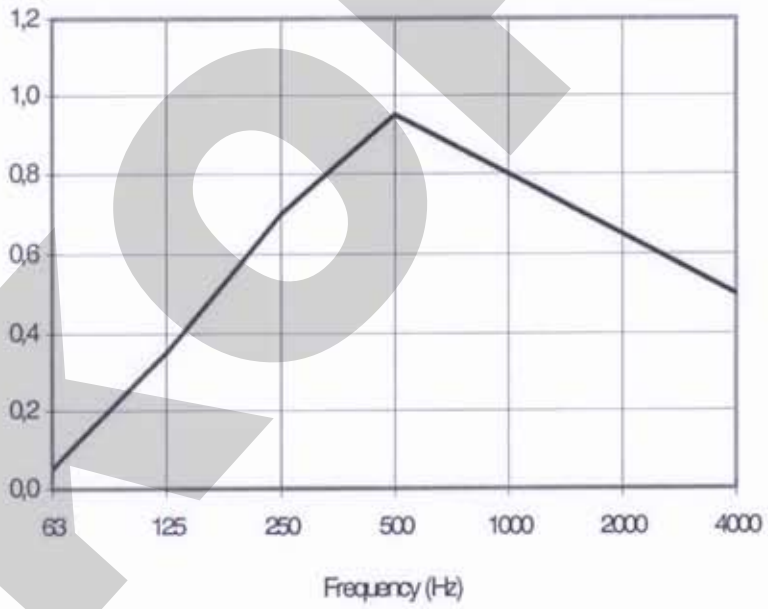
"POWYŻSZE MATERIAŁY POCHODZĄ Z FIRMY „INSIDE" SP.J.
PRZEDSTAWICIELA I WYŁĄCZNEGO DYSTRYBUTORA MATERIAŁÓW
GUSTAFS PANEL SYSTEMS"

# Measurement of sound absorption coefficient

| | |
|---|---|
| Test | Measurement of sound absorption coefficient in a reverberation room according to SS-EN 20354 (ISO 354). |
| Client | Gustafs Inredningar i Dalarna AB<br>Peter Markoff |
| Object | Gustafs BF-Panel Ribbslits 5 mm with acoustic felt, and 30 mm mineral wool and 30 mm air gap.<br>Panel thickness: 12,5 mm<br>Panel size: 1500 mm x 600 mm. |
| Date of test | May 4, 2004 |
| Conditions | Mounting depth: 82,5 mm.<br>Surface area: 10,8 $m^2$.<br>Room volume: 200 $m^3$.<br>Temperature at measurement on object/in empty room: 21/ 21 °C.<br>Relative humidity at measurement on object/in empty room: 88/ 87 %. |
| Result | Sound absorption class C according to EN ISO 11654.<br>Weighted sound absorption coefficient $\alpha_w$ = 0,65(M) according to EN ISO 11654. |

Practical sound absorption coefficient




| Frequency (Hz) | $\alpha_p$ |
|---|---|
| 63 | 0,05 |
| 125 | 0,35 |
| 250 | 0,70 |
| 500 | 0,95 |
| 1000 | 0,80 |
| 2000 | 0,65 |
| 4000 | 0,50 |

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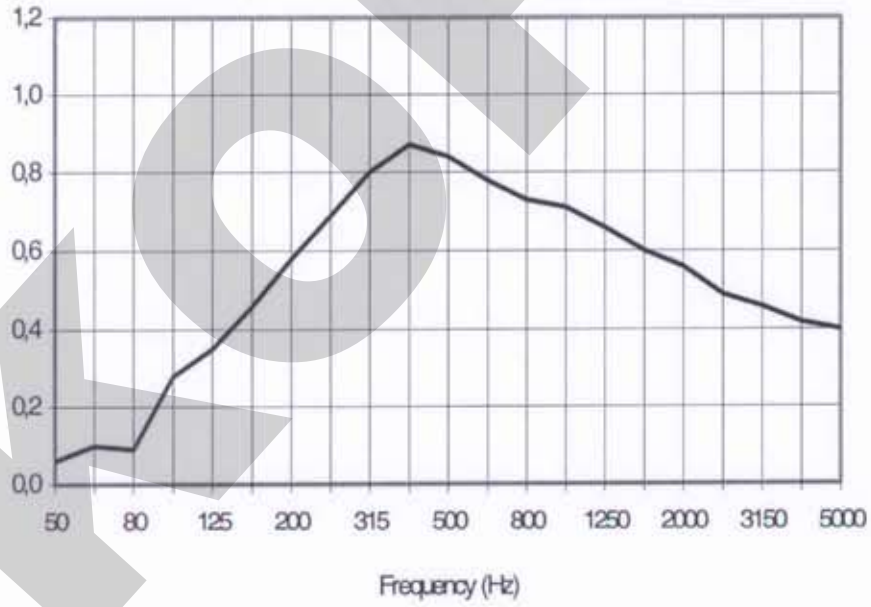
"POWYŻSZE MATERIAŁY POCHODZĄ Z FIRMY „INSIDE" SP.J.
PRZEDSTAWICIELA I WYŁĄCZNEGO DYSTRYBUTORA MATERIAŁÓW
GUSTAFS PANEL SYSTEMS"

# Measurement of sound absorption coefficient

| | |
|---|---|
| Test | Measurement of sound absorption coefficient in a reverberation room according to SS-EN 20354 (ISO 354). |
| Client | Gustafs Inredningar i Dalarna AB<br>Peter Markoff |
| Object | Gustafs BF-Panel Ribbslits 8 mm with acoustic felt, and 30 mm mineral wool and 30 mm air gap.<br>Panel thickness: 12,5 mm<br>Panel size: 1500 mm x 600 mm. |
| Date of test | May 4, 2004 |
| Conditions | Mounting depth: 82,5 mm.<br>Surface area: 10,8 $m^2$.<br>Room volume: 200 $m^3$.<br>Temperature at measurement on object/in empty room: 22/ 21 °C.<br>Relative humidity at measurement on object/in empty room: 88/ 87 %. |
| Result | Sound absorption class C according to EN ISO 11654.<br>Weighted sound absorption coefficient $\alpha_w$ = 0,6(LM) according to EN ISO 11654. |

Sound absorption coefficient




| Frequency (Hz) | $\alpha_s$ |
|---|---|
| 50 | 0,06 |
| 63 | 0,10 |
| 80 | 0,09 |
| 100 | 0,28 |
| 125 | 0,35 |
| 160 | 0,46 |
| 200 | 0,58 |
| 250 | 0,69 |
| 315 | 0,80 |
| 400 | 0,87 |
| 500 | 0,84 |
| 630 | 0,78 |
| 800 | 0,73 |
| 1000 | 0,71 |
| 1250 | 0,66 |
| 1600 | 0,60 |
| 2000 | 0,56 |
| 2500 | 0,49 |
| 3150 | 0,46 |
| 4000 | 0,42 |
| 5000 | 0,40 |

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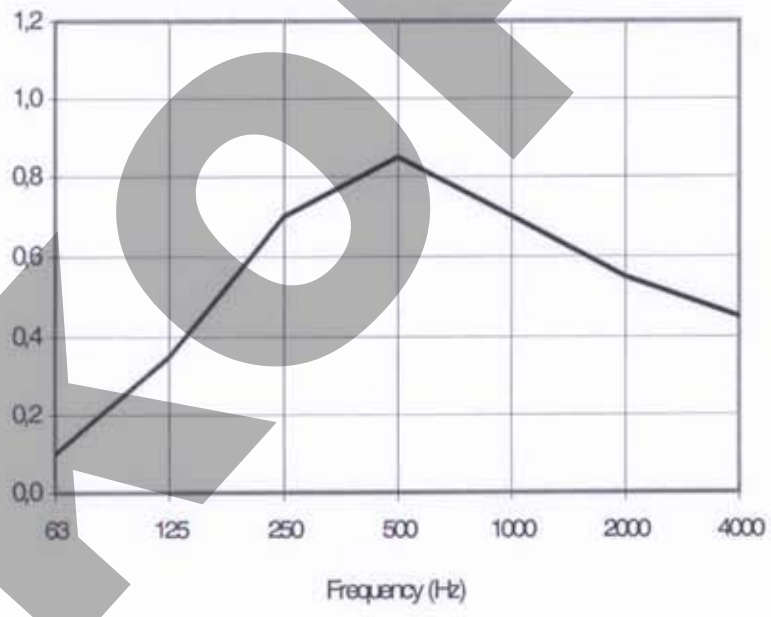
"POWYŻSZE MATERIAŁY POCHODZĄ Z FIRMY „INSIDE" SP.J.
PRZEDSTAWICIELA I WYŁĄCZNEGO DYSTRYBUTORA MATERIAŁÓW
GUSTAFS PANEL SYSTEMS"

# Measurement of sound absorption coefficient

| | |
|---|---|
| Test | Measurement of sound absorption coefficient in a reverberation room according to SS-EN 20354 (ISO 354). |
| Client | Gustafs Inredningar i Dalarna AB<br>Peter Markoff |
| Object | Gustafs BF-Panel Ribbslits 8 mm with acoustic felt, and 30 mm mineral wool and 30 mm air gap.<br>Panel thickness: 12,5 mm.<br>Panel size: 1500 mm x 600 mm. |
| Date of test | May 4, 2004 |
| Conditions | Mounting depth: 82,5 mm.<br>Surface area: 10,8 $m^2$.<br>Room volume: 200 $m^3$.<br>Temperature at measurement on object/in empty room: 22/ 21 °C.<br>Relative humidity at measurement on object/in empty room: 88/ 87 %. |
| Result | Sound absorption class C according to EN ISO 11654.<br>Weighted sound absorption coefficient $\alpha_w$ = 0,6(LM) according to EN ISO 11654. |

Practical sound absorption coefficient




| Frequency (Hz) | $\alpha_p$ |
|---|---|
| 63 | 0,10 |
| 125 | 0,35 |
| 250 | 0,70 |
| 500 | 0,85 |
| 1000 | 0,70 |
| 2000 | 0,55 |
| 4000 | 0,45 |

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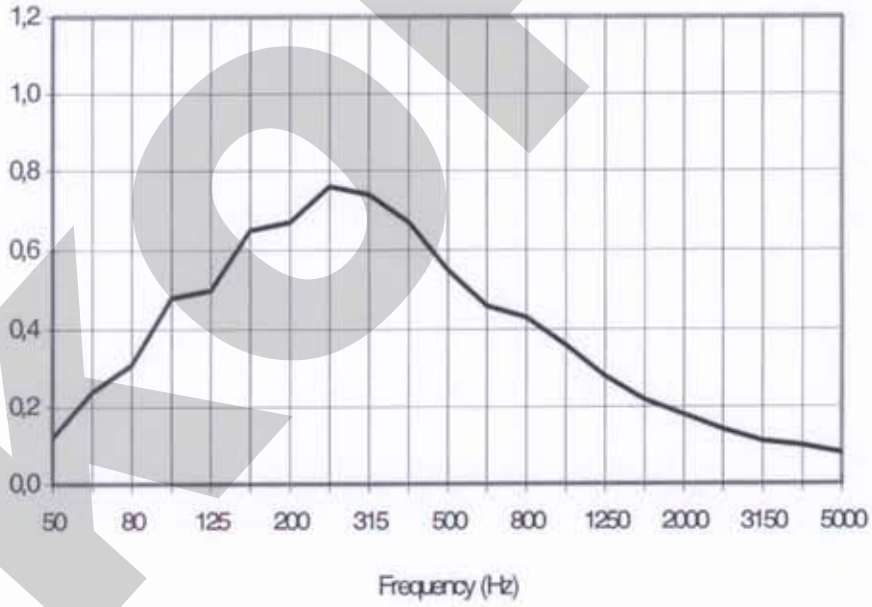
"POWYŻSZE MATERIAŁY POCHODZĄ Z FIRMY „INSIDE" SP.J.
PRZEDSTAWICIELA I WYŁĄCZNEGO DYSTRYBUTORA MATERIAŁÓW
GUSTAFS PANEL SYSTEMS"

# Measurement of sound absorption coefficient

| | |
|---|---|
| Test | Measurement of sound absorption coefficient in a reverberation room according to SS-EN 20354 (ISO 354). |
| Client | Gustafs Inredningar i Dalarna AB<br>Peter Markoff |
| Object | Gustafs BF-Panel Dubbelsidig Perforering 3/10 mm<br>with acoustic felt, and 30 mm mineral wool and 200 mm air gap.<br>Panel thickness: 12,5 mm<br>Panel size: 1500 mm x 600 mm. |
| Date of test | May 5, 2004 |
| Conditions | Mounting depth: 252,5 mm.<br>Surface area: 10,8 $m^2$.<br>Room volume: 200 $m^3$.<br>Temperature at measurement on object/in empty room: 22/ 21 °C.<br>Relative humidity at measurement on object/in empty room: 89/ 87 %. |
| Result | Sound absorption class E according to EN ISO 11654.<br>Weighted sound absorption coefficient $\alpha_w$ = 0,25(LM) according to EN ISO 11654. |

Sound absorption coefficient




| Frequency (Hz) | $\alpha_s$ |
|---|---|
| 50 | 0,12 |
| 63 | 0,24 |
| 80 | 0,31 |
| 100 | 0,48 |
| 125 | 0,50 |
| 160 | 0,65 |
| 200 | 0,67 |
| 250 | 0,76 |
| 315 | 0,74 |
| 400 | 0,67 |
| 500 | 0,55 |
| 630 | 0,46 |
| 800 | 0,43 |
| 1000 | 0,36 |
| 1250 | 0,28 |
| 1600 | 0,22 |
| 2000 | 0,18 |
| 2500 | 0,14 |
| 3150 | 0,11 |
| 4000 | 0,10 |
| 5000 | 0,08 |

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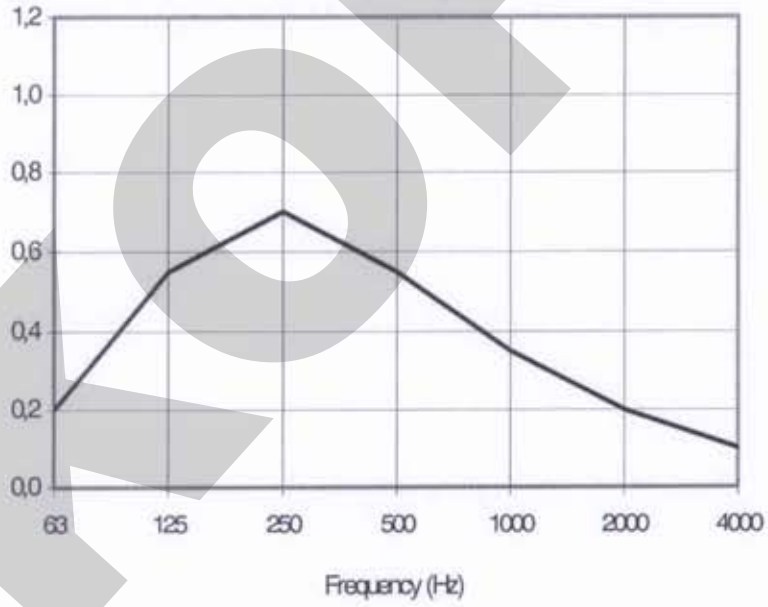
"POWYŻSZE MATERIAŁY POCHODZĄ Z FIRMY „INSIDE" SP.J.
PRZEDSTAWICIELA I WYŁĄCZNEGO DYSTRYBUTORA MATERIAŁÓW
GUSTAFS PANEL SYSTEMS"

# Measurement of sound absorption coefficient

| | |
|---|---|
| Test | Measurement of sound absorption coefficient in a reverberation room according to SS-EN 20354 (ISO 354). |
| Client | Gustafs Inredningar i Dalarna AB<br>Peter Markoff |
| Object | Gustafs BF-Panel Dubbelsidig Perforering 3/10 mm<br>with acoustic felt, and 200 mm mineral wool and 200 mm air gap.<br>Panel thickness: 12,5 mm.<br>Panel size: 1500 mm x 600 mm. |
| Date of test | May 5, 2004 |
| Conditions | Mounting depth: 252,5 mm.<br>Surface area: 10,8 $m^2$.<br>Room volume: 200 $m^3$.<br>Temperature at measurement on object/in empty room: 22/ 21 °C.<br>Relative humidity at measurement on object/in empty room: 89/ 95 %. |
| Result | Sound absorption class E according to EN ISO 11654.<br>Weighted sound absorption coefficient $\alpha_w$ = 0,25(LM) according to EN ISO 11654. |

Practical sound absorption coefficient




| Frequency (Hz) | $\alpha_p$ |
|---|---|
| 63 | 0,20 |
| 125 | 0,55 |
| 250 | 0,70 |
| 500 | 0,55 |
| 1000 | 0,35 |
| 2000 | 0,20 |
| 4000 | 0,10 |

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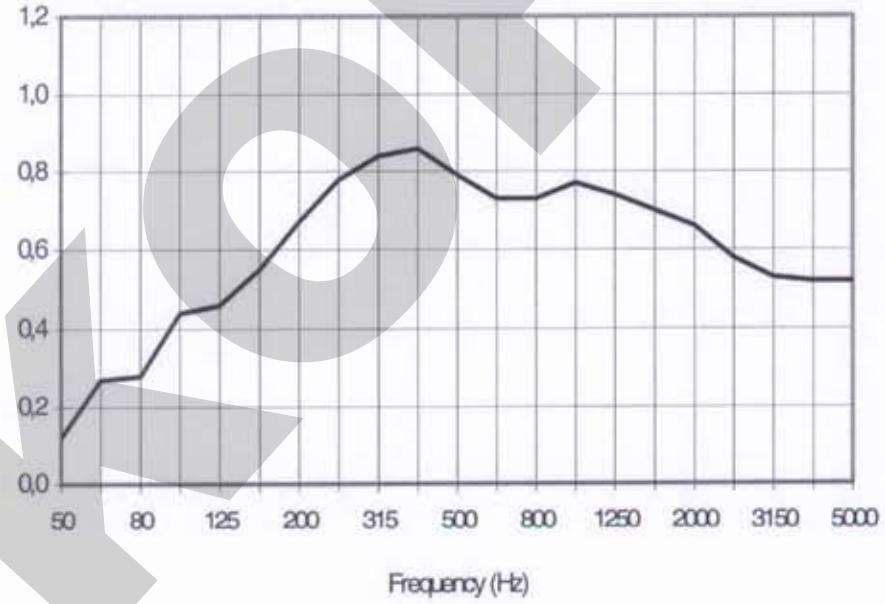
"POWYŻSZE MATERIAŁY POCHODZĄ Z FIRMY „INSIDE" SP.J.
PRZEDSTAWICIELA I WYŁĄCZNEGO DYSTRYBUTORA MATERIAŁÓW
GUSTAFS PANEL SYSTEMS"

# Measurement of sound absorption coefficient

| | |
|---|---|
| Test | Measurement of sound absorption coefficient in a reverberation room according to SS-EN 20354 (ISO 354). |
| Client | Gustafs Inredningar i Dalarna AB<br>Peter Markoff |
| Object | Gustafs BF-Panel Minislits 5 mm with acoustic felt, and 30 mm mineral wool and 200 mm air gap.<br>Panel thickness: 12,5 mm.<br>Panel size: 1500 mm x 600 mm. |
| Date of test | May 5, 2004 |
| Conditions | Mounting depth: 252,5 mm.<br>Surface area: 10,8 $m^2$.<br>Room volume: 200 $m^3$.<br>Temperature at measurement on object/in empty room: 22/ 21 °C.<br>Relative humidity at measurement on object/in empty room: 89/ 87 %. |
| Result | Sound absorption class C according to EN ISO 11654.<br>Weighted sound absorption coefficient $\alpha_w$ = 0,65(L) according to EN ISO 11654. |

Sound absorption coefficient




| Frequency (Hz) | $\alpha_s$ |
|---|---|
| 50 | 0,12 |
| 63 | 0,27 |
| 80 | 0,28 |
| 100 | 0,44 |
| 125 | 0,46 |
| 160 | 0,55 |
| 200 | 0,67 |
| 250 | 0,78 |
| 315 | 0,84 |
| 400 | 0,86 |
| 500 | 0,79 |
| 630 | 0,73 |
| 800 | 0,73 |
| 1000 | 0,77 |
| 1250 | 0,74 |
| 1600 | 0,70 |
| 2000 | 0,66 |
| 2500 | 0,58 |
| 3150 | 0,53 |
| 4000 | 0,52 |
| 5000 | 0,52 |

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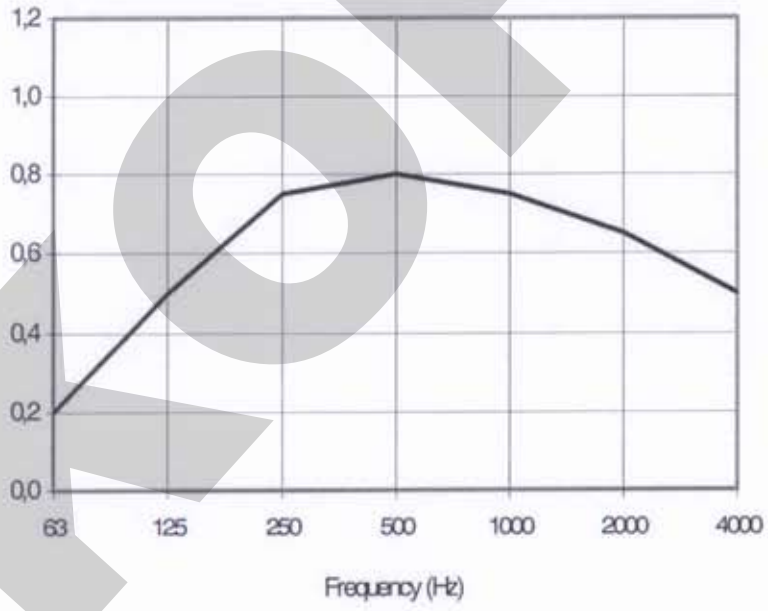
"POWYŻSZE MATERIAŁY POCHODZĄ Z FIRMY „INSIDE" SP.J.
PRZEDSTAWICIELA I WYŁĄCZNEGO DYSTRYBUTORA MATERIAŁÓW
GUSTAFS PANEL SYSTEMS"

# Measurement of sound absorption coefficient

| | |
|---|---|
| Test | Measurement of sound absorption coefficient in a reverberation room according to SS-EN 20354 (ISO 354). |
| Client | Gustafs Inredningar i Dalarna AB<br>Peter Markoff |
| Object | Gustafs BF-Panel Minislits 5 mm with acoustic felt, and 30 mm mineral wool and 200 mm air gap.<br>Panel thickness: 12,5 mm.<br>Panel size: 1500 mm x 600 mm. |
| Date of test | May 5, 2004 |
| Conditions | Mounting depth: 252,5 mm.<br>Surface area: 10,8 $m^2$.<br>Room volume: 200 $m^3$.<br>Temperature at measurement on object/in empty room: 22/ 21 °C.<br>Relative humidity at measurement on object/in empty room: 89/ 87 %. |
| Result | Sound absorption class C according to EN ISO 11654.<br>Weighted sound absorption coefficient $\alpha_w$ = 0,65(L) according to EN ISO 11654. |

Practical sound absorption coefficient




| Frequency (Hz) | $\alpha_p$ |
|---|---|
| 63 | 0,20 |
| 125 | 0,50 |
| 250 | 0,75 |
| 500 | 0,80 |
| 1000 | 0,75 |
| 2000 | 0,65 |
| 4000 | 0,50 |

**SP Swedish National Testing and Research Institute**
**Acoustics**

Hans Jonasson
Technical Manager

Mohammad Jalalian
Technical Officer

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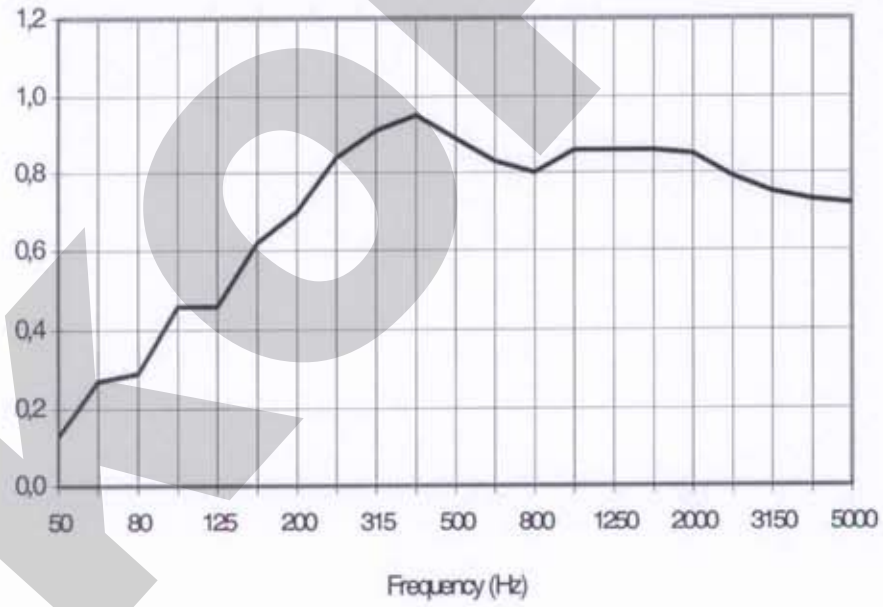
SP 511

"POWYŻSZE MATERIAŁY POCHODZĄ Z FIRMY „INSIDE" SP.J.
PRZEDSTAWICIELA I WYŁĄCZNEGO DYSTRYBUTORA MATERIAŁÓW
GUSTAFS PANEL SYSTEMS"

# Measurement of sound absorption coefficient

| | |
|---|---|
| Test | Measurement of sound absorption coefficient in a reverberation room according to SS-EN 20354 (ISO 354). |
| Client | Gustafs Inredningar i Dalarna AB<br>Peter Markoff |
| Object | Gustafs BF-Panel Minislits 8 mm with acoustic felt, and 30 mm mineral wool and 200 mm air gap.<br>Panel thickness: 12,5 mm.<br>Panel size: 1500 mm x 600 mm. |
| Date of test | May 5, 2004 |
| Conditions | Mounting depth: 252,5 mm.<br>Surface area: 10,8 $m^2$.<br>Room volume: 200 $m^3$.<br>Temperature at measurement on object/in empty room: 22/ 21 °C.<br>Relative humidity at measurement on object/in empty room: 89/ 87 %. |
| Result | Sound absorption class B according to EN ISO 11654.<br>Weighted sound absorption coefficient $\alpha_w$ = 0,85 according to EN ISO 11654. |

Sound absorption coefficient




| Frequency (Hz) | $\alpha_s$ |
|---|---|
| 50 | 0,13 |
| 63 | 0,27 |
| 80 | 0,29 |
| 100 | 0,46 |
| 125 | 0,46 |
| 160 | 0,62 |
| 200 | 0,70 |
| 250 | 0,84 |
| 315 | 0,91 |
| 400 | 0,95 |
| 500 | 0,89 |
| 630 | 0,83 |
| 800 | 0,80 |
| 1000 | 0,86 |
| 1250 | 0,86 |
| 1600 | 0,86 |
| 2000 | 0,85 |
| 2500 | 0,79 |
| 3150 | 0,75 |
| 4000 | 0,73 |
| 5000 | 0,72 |

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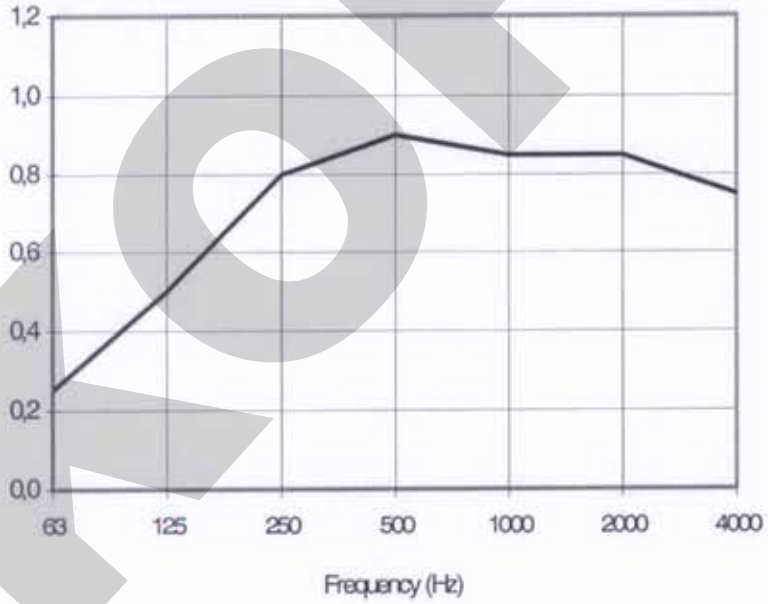
"POWYŻSZE MATERIAŁY POCHODZĄ Z FIRMY „INSIDE" SP.J.
PRZEDSTAWICIELA I WYŁĄCZNEGO DYSTRYBUTORA MATERIAŁÓW
GUSTAFS PANEL SYSTEMS"

# Measurement of sound absorption coefficient

| | |
|---|---|
| Test | Measurement of sound absorption coefficient in a reverberation room according to SS-EN 20354 (ISO 354). |
| Client | Gustafs Inredningar i Dalarna AB<br>Peter Markoff |
| Object | Gustafs BF-Panel Minislits 8 mm with acoustic felt, and 30 mm mineral wool and 200 mm air gap.<br>Panel thickness: 12,5 mm<br>Panel size: 1500 mm x 600 mm. |
| Date of test | May 5, 2004 |
| Conditions | Mounting depth: 252,5 mm.<br>Surface area: 10,8 $m^2$.<br>Room volume: 200 $m^3$.<br>Temperature at measurement on object/in empty room: 22/ 21 °C.<br>Relative humidity at measurement on object/in empty room: 89/ 87%. |
| Result | Sound absorption class B according to EN ISO 11654.<br>Weighted sound absorption coefficient $\alpha_w$ = 0,85 according to EN ISO 11654. |

Practical sound absorption coefficient




| Frequency (Hz) | $\alpha_p$ |
|---|---|
| 63 | 0,25 |
| 125 | 0,50 |
| 250 | 0,80 |
| 500 | 0,90 |
| 1000 | 0,85 |
| 2000 | 0,85 |
| 4000 | 0,75 |

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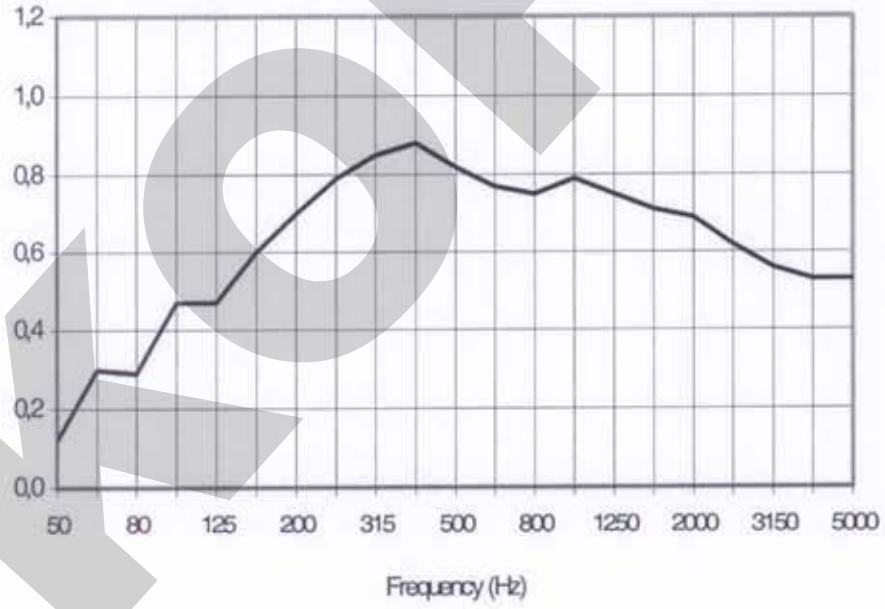
"POWYŻSZE MATERIAŁY POCHODZĄ Z FIRMY „INSIDE" SP.J.
PRZEDSTAWICIELA I WYŁĄCZNEGO DYSTRYBUTORA MATERIAŁÓW
GUSTAFS PANEL SYSTEMS"

# Measurement of sound absorption coefficient

| | |
|---|---|
| Test | Measurement of sound absorption coefficient in a reverberation room according to SS-EN 20354 (ISO 354). |
| Client | Gustafs Inredningar i Dalarna AB<br>Peter Markoff |
| Object | Gustafs BF-Panel Maxslits 5 mm with acoustic felt, and 30 mm mineral wool and 200 mm air gap.<br>Panel thickness: 12,5 mm<br>Panel size: 1500 mm x 600 mm. |
| Date of test | May 5, 2004 |
| Conditions | Mounting depth: 252,5 mm.<br>Surface area: 10,8 $m^2$.<br>Room volume: 200 $m^3$.<br>Temperature at measurement on object/in empty room: 22/ 21 °C.<br>Relative humidity at measurement on object/in empty room: 89/ 87 %. |
| Result | Sound absorption class C according to EN ISO 11654.<br>Weighted sound absorption coefficient $\alpha_w$ = 0,7(L) according to EN ISO 11654. |

Sound absorption coefficient




| Frequency (Hz) | $\alpha_s$ |
|---|---|
| 50 | 0,12 |
| 63 | 0,30 |
| 80 | 0,29 |
| 100 | 0,47 |
| 125 | 0,47 |
| 160 | 0,60 |
| 200 | 0,70 |
| 250 | 0,79 |
| 315 | 0,85 |
| 400 | 0,88 |
| 500 | 0,82 |
| 630 | 0,77 |
| 800 | 0,75 |
| 1000 | 0,79 |
| 1250 | 0,75 |
| 1600 | 0,71 |
| 2000 | 0,69 |
| 2500 | 0,62 |
| 3150 | 0,56 |
| 4000 | 0,53 |
| 5000 | 0,53 |

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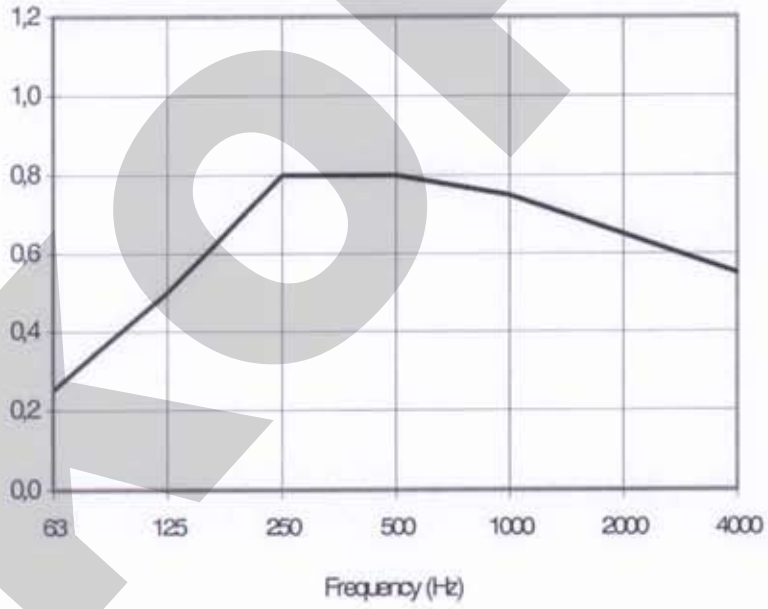
"POWYŻSZE MATERIAŁY POCHODZĄ Z FIRMY „INSIDE" SP.J.
PRZEDSTAWICIELA I WYŁĄCZNEGO DYSTRYBUTORA MATERIAŁÓW
GUSTAFS PANEL SYSTEMS"

# Measurement of sound absorption coefficient

| | |
|---|---|
| Test | Measurement of sound absorption coefficient in a reverberation room according to SS-EN 20354 (ISO 354). |
| Client | Gustafs Inredningar i Dalarna AB<br>Peter Markoff |
| Object | Gustafs BF-Panel Maxslits 5 mm with acoustic felt, mineral wool and 200 mm air gap.<br>Panel thickness: 12,5 mm<br>Panel size: 1500 mm x 600 mm. |
| Date of test | May 5, 2004 |
| Conditions | Mounting depth: 252,5 mm.<br>Surface area: 10,8 $m^2$.<br>Room volume: 200 $m^3$.<br>Temperature at measurement on object/in empty room: 22/ 21 °C.<br>Relative humidity at measurement on object/in empty room: 89/ 87 %. |
| Result | Sound absorption class C according to EN ISO 11654.<br>Weighted sound absorption coefficient $\alpha_w$ = 0,7(L) according to EN ISO 11654. |

Practical sound absorption coefficient




| Frequency (Hz) | $\alpha_p$ |
|---|---|
| 63 | 0,25 |
| 125 | 0,50 |
| 250 | 0,80 |
| 500 | 0,80 |
| 1000 | 0,75 |
| 2000 | 0,65 |
| 4000 | 0,55 |

KOPIA

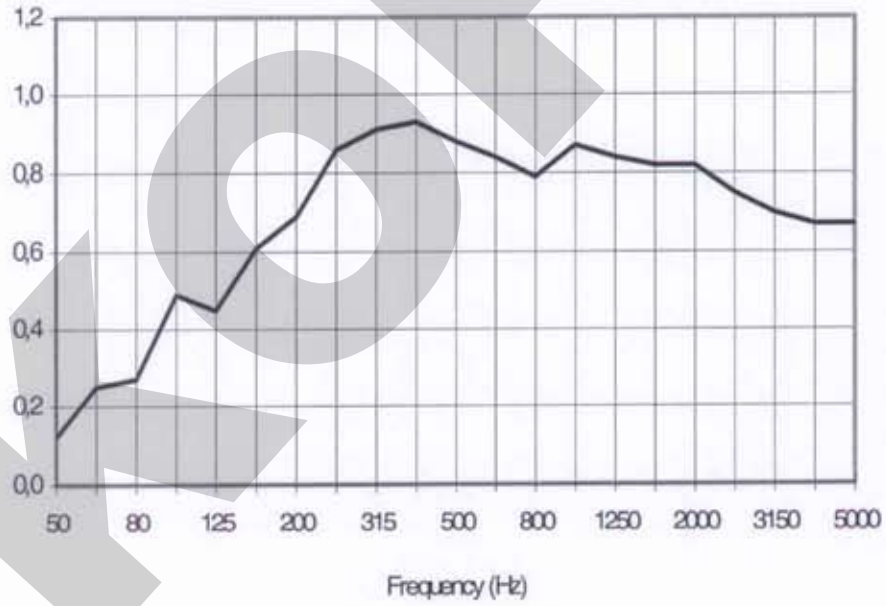
SP 511

"POWYŻSZE MATERIAŁY POCHODZĄ Z FIRMY „INSIDE" SP.J.
PRZEDSTAWICIELA I WYŁĄCZNEGO DYSTRYBUTORA MATERIAŁÓW
GUSTAFS PANEL SYSTEMS"

# Measurement of sound absorption coefficient

| | |
|---|---|
| Test | Measurement of sound absorption coefficient in a reverberation room according to SS-EN 20354 (ISO 354). |
| Client | Gustafs Inredningar i Dalarna AB<br>Peter Markoff |
| Object | Gustafs BF-Panel Maxslits 8 mm with acoustic felt, and 30 mm mineral wool and 200 mm air gap.<br>Panel thickness: 12,5 mm.<br>Panel size: 1500 mm x 600 mm. |
| Date of test | May 6, 2004 |
| Conditions | Mounting depth: 252,5 mm.<br>Surface area: 10,8 $m^2$.<br>Room volume: 200 $m^3$.<br>Temperature at measurement on object/in empty room: 21/ 21 °C.<br>Relative humidity at measurement on object/in empty room: 90/ 87 %. |
| Result | Sound absorption class B according to EN ISO 11654.<br>Weighted sound absorption coefficient $\alpha_w$ = 0,85 according to EN ISO 11654. |

Sound absorption coefficient




| Frequency (Hz) | $\alpha_s$ |
|---|---|
| 50 | 0,12 |
| 63 | 0,25 |
| 80 | 0,27 |
| 100 | 0,49 |
| 125 | 0,45 |
| 160 | 0,61 |
| 200 | 0,69 |
| 250 | 0,86 |
| 315 | 0,91 |
| 400 | 0,93 |
| 500 | 0,88 |
| 630 | 0,84 |
| 800 | 0,79 |
| 1000 | 0,87 |
| 1250 | 0,84 |
| 1600 | 0,82 |
| 2000 | 0,82 |
| 2500 | 0,75 |
| 3150 | 0,70 |
| 4000 | 0,67 |
| 5000 | 0,67 |

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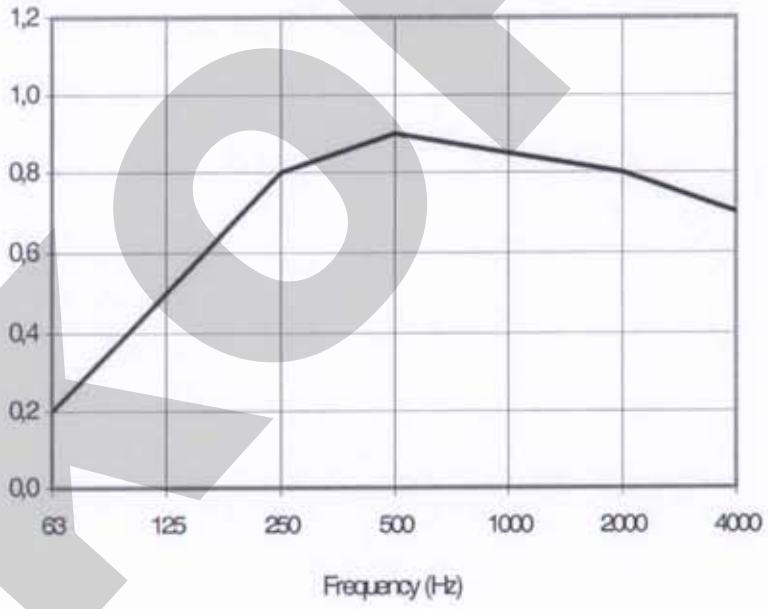
PRZEDSTAWICIELA I WYŁĄCZNEGO DYSTRYBUTORA MATERIAŁÓW
GUSTAFS PANEL SYSTEMS"

# Measurement of sound absorption coefficient

| | |
|---|---|
| Test | Measurement of sound absorption coefficient in a reverberation room according to SS-EN 20354 (ISO 354). |
| Client | Gustafs Inredningar i Dalarna AB<br>Peter Markoff |
| Object | Gustafs BF-Panel Maxslits 8 mm with acoustic felt, and 30 mm mineral wool and 200 mm air gap.<br>Panel thickness: 12,5 mm.<br>Panel size: 1500 mm x 600 mm. |
| Date of test | May 6, 2004 |
| Conditions | Mounting depth: 252,5 mm.<br>Surface area: 10,8 $m^2$.<br>Room volume: 200 $m^3$.<br>Temperature at measurement on object/in empty room: 21/ 21 °C.<br>Relative humidity at measurement on object/in empty room: 90/ 87 %. |
| Result | Sound absorption class B according to EN ISO 11654.<br>Weighted sound absorption coefficient $\alpha_w$ = 0,85 according to EN ISO 11654. |

Practical sound absorption coefficient




| Frequency (Hz) | $\alpha_p$ |
|---|---|
| 63 | 0,20 |
| 125 | 0,50 |
| 250 | 0,80 |
| 500 | 0,90 |
| 1000 | 0,85 |
| 2000 | 0,80 |
| 4000 | 0,70 |

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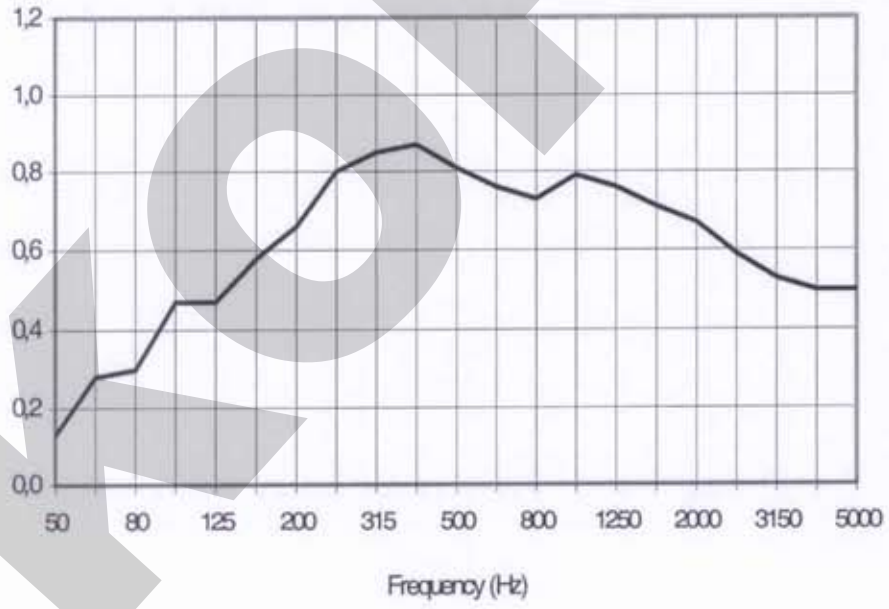
"POWYŻSZE MATERIAŁY POCHODZĄ Z FIRMY „INSIDE" SP.J.
PRZEDSTAWICIELA I WYŁĄCZNEGO DYSTRYBUTORA MATERIAŁÓW
GUSTAFS PANEL SYSTEMS"

# Measurement of sound absorption coefficient

| | |
|---|---|
| Test | Measurement of sound absorption coefficient in a reverberation room according to SS-EN 20354 (ISO 354). |
| Client | Gustafs Inredningar i Dalarna AB<br>Peter Markoff |
| Object | Gustafs BF-Panel Ribbslits 5 mm with acoustic felt, and 30 mm mineral wool and 200 mm air gap.<br>Panel thickness: 12,5 mm<br>Panel size: 1500 mm x 600 mm. |
| Date of test | May 6, 2004 |
| Conditions | Mounting depth: 252,5 mm.<br>Surface area: 10,8 $m^2$.<br>Room volume: 200 $m^3$.<br>Temperature at measurement on object/in empty room: 21/ 21 °C.<br>Relative humidity at measurement on object/in empty room: 89/ 87 %. |
| Result | Sound absorption class C according to EN ISO 11654.<br>Weighted sound absorption coefficient $\alpha_w$ = 0,65(L) according to EN ISO 11654. |

Sound absorption coefficient




| Frequency (Hz) | $\alpha_s$ |
|---|---|
| 50 | 0,13 |
| 63 | 0,28 |
| 80 | 0,30 |
| 100 | 0,47 |
| 125 | 0,47 |
| 160 | 0,58 |
| 200 | 0,66 |
| 250 | 0,80 |
| 315 | 0,85 |
| 400 | 0,87 |
| 500 | 0,81 |
| 630 | 0,76 |
| 800 | 0,73 |
| 1000 | 0,79 |
| 1250 | 0,76 |
| 1600 | 0,71 |
| 2000 | 0,67 |
| 2500 | 0,59 |
| 3150 | 0,53 |
| 4000 | 0,50 |
| 5000 | 0,50 |

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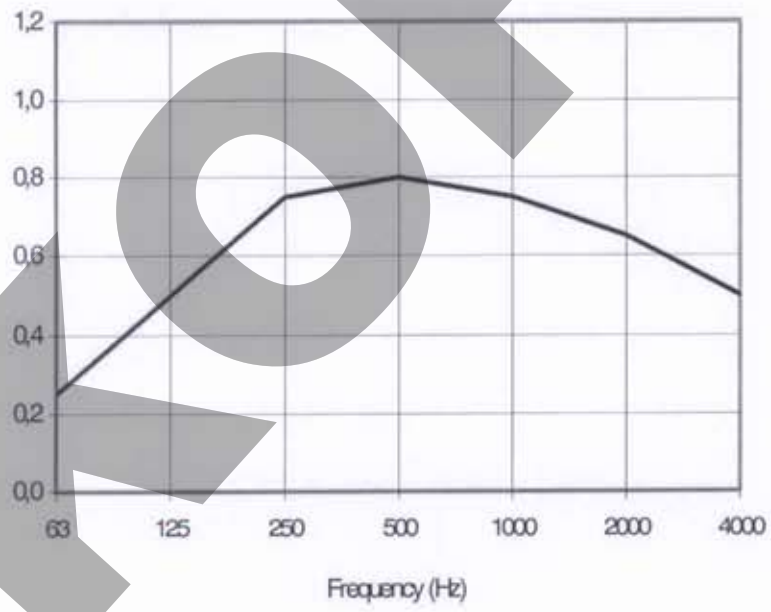
PRZEDSTAWICIELA I WYŁĄCZNEGO DYSTRYBUTORA MATERIAŁÓW
GUSTAFS PANEL SYSTEMS"

# Measurement of sound absorption coefficient

| | |
|---|---|
| Test | Measurement of sound absorption coefficient in a reverberation room according to SS-EN 20354 (ISO 354). |
| Client | Gustafs Inredningar i Dalarna AB<br>Peter Markoff |
| Object | Gustafs BF-Panel Ribbslits 5 mm with acoustic felt, mineral wool and 200 mm air gap.<br>Panel thickness: 12,5 mm<br>Panel size: 1500 mm x 600 mm. |
| Date of test | May 6, 2004 |
| Conditions | Mounting depth: 252,5 mm.<br>Surface area: 10,8 $m^2$.<br>Room volume: 200 $m^3$.<br>Temperature at measurement on object/in empty room: 21/ 21 °C.<br>Relative humidity at measurement on object/in empty room: 89/ 87 %. |
| Result | Sound absorption class C according to EN ISO 11654.<br>Weighted sound absorption coefficient $\alpha_w$ = 0,65(L) according to EN ISO 11654. |

Practical sound absorption coefficient




| Frequency (Hz) | $\alpha_p$ |
|---|---|
| 63 | 0,25 |
| 125 | 0,50 |
| 250 | 0,75 |
| 500 | 0,80 |
| 1000 | 0,75 |
| 2000 | 0,65 |
| 4000 | 0,50 |

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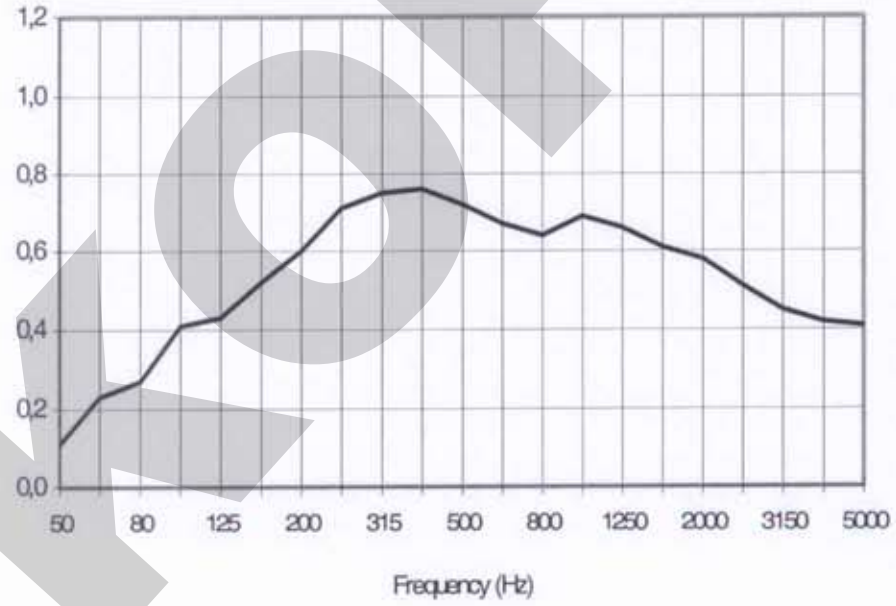
"POWYŻSZE MATERIAŁY POCHODZĄ Z FIRMY „INSIDE" SP.J.
PRZEDSTAWICIELA I WYŁĄCZNEGO DYSTRYBUTORA MATERIAŁÓW
GUSTAFS PANEL SYSTEMS"

# Measurement of sound absorption coefficient

| | |
|---|---|
| Test | Measurement of sound absorption coefficient in a reverberation room according to SS-EN 20354 (ISO 354). |
| Client | Gustafs Inredningar i Dalarna AB<br>Peter Markoff |
| Object | Gustafs BF-Panel Ribbslits 8 mm with acoustic felt, and 30 mm mineral wool and 200 mm air gap.<br>Panel thickness: 12,5 mm<br>Panel size: 1500 mm x 600 mm. |
| Date of test | May 6, 2004 |
| Conditions | Mounting depth: 252,5 mm.<br>Surface area: 10,8 $m^2$.<br>Room volume: 200 $m^3$.<br>Temperature at measurement on object/in empty room: 22/ 21 °C.<br>Relative humidity at measurement on object/in empty room: 88/ 87 %. |
| Result | Sound absorption class C according to EN ISO 11654.<br>Weighted sound absorption coefficient $\alpha_w$ = 0,6(L) according to EN ISO 11654. |

Sound absorption coefficient




| Frequency (Hz) | $\alpha_s$ |
|---|---|
| 50 | 0,11 |
| 63 | 0,23 |
| 80 | 0,27 |
| 100 | 0,41 |
| 125 | 0,43 |
| 160 | 0,52 |
| 200 | 0,60 |
| 250 | 0,71 |
| 315 | 0,75 |
| 400 | 0,76 |
| 500 | 0,72 |
| 630 | 0,67 |
| 800 | 0,64 |
| 1000 | 0,69 |
| 1250 | 0,66 |
| 1600 | 0,61 |
| 2000 | 0,58 |
| 2500 | 0,51 |
| 3150 | 0,45 |
| 4000 | 0,42 |
| 5000 | 0,41 |

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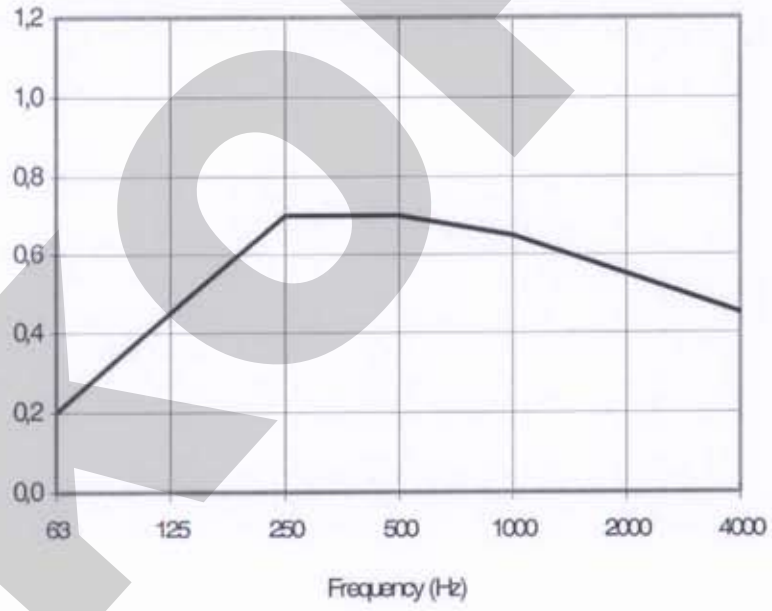
GUSTAFS PANEL SYSTEMS"

# Measurement of sound absorption coefficient

| | |
|---|---|
| Test | Measurement of sound absorption coefficient in a reverberation room according to SS-EN 20354 (ISO 354). |
| Client | Gustafs Inredningar i Dalarna AB<br>Peter Markoff |
| Object | Gustafs BF-Panel Ribbslits 8 mm with acoustic felt, and 30 mm mineral wool and 200 mm air gap.<br>Panel thickness: 12,5 mm.<br>Panel size: 1500 mm x 600 mm. |
| Date of test | May 6, 2004 |
| Conditions | Mounting depth: 252,5 mm.<br>Surface area: 10,8 $m^2$.<br>Room volume: 200 $m^3$.<br>Temperature at measurement on object/in empty room: 22/ 21 °C.<br>Relative humidity at measurement on object/in empty room: 88/ 87 %. |
| Result | Sound absorption class C according to EN ISO 11654.<br>Weighted sound absorption coefficient $\alpha_w$ = 0,6(L) according to EN ISO 11654. |

Practical sound absorption coefficient




| Frequency (Hz) | $\alpha_p$ |
|---|---|
| 63 | 0,20 |
| 125 | 0,45 |
| 250 | 0,70 |
| 500 | 0,70 |
| 1000 | 0,65 |
| 2000 | 0,55 |
| 4000 | 0,45 |

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