# TFI-Report 23-000745-02

## Sound Absorption

| | |
|---|---|
| Customer | SuZhou Tuntex Fiber & Carpet Co. Ltd.<br>No. 28 Cheng Xi South Road<br>TaiCang JiangSu<br>CN |
| Product | Tuntex Loose Lay LVT |

This report includes 8 pages.

**Aachen, 25.09.2023**

Dr. Andreas Zoëga
Head of Testing Laboratory

The present document is provided with an advanced electronic signature.

This report only applies to the tested samples and has been established to the best of our knowledge. Only the entire report shall be reproduced. Under no circumstances, extracts shall be used. Furthermore, we apply the “General Terms and Conditions for the Execution of Contracts” of the TFI Aachen GmbH, also with regard to the order execution.

The test result does not include any addition or deduction for uncertainties due to measurement, sample preparation, sample collection and production tolerances.

# 1 Transaction

| | |
|---|---|
| Order date | 21.06.2023 |
| Order number | 23-000745 - AB2300563 |
| Your reference | Kurt Wu |
| Product designation | Tuntex Loose Lay LVT |
| TFI sample number | 2301063 |
| Date of sample receipt | 28.06.2023 |

**Test order:**

Sound absorption in a reverberation room according to EN ISO 354 [a]

a ... Die mit a gekennzeichnete Prüfung basiert auf nach EN ISO/IEC 17025 akkreditierten Prüfungen./The test marked a are based on tests accredited in accordance with EN ISO/IEC 17025.

**Responsible at TFI:**

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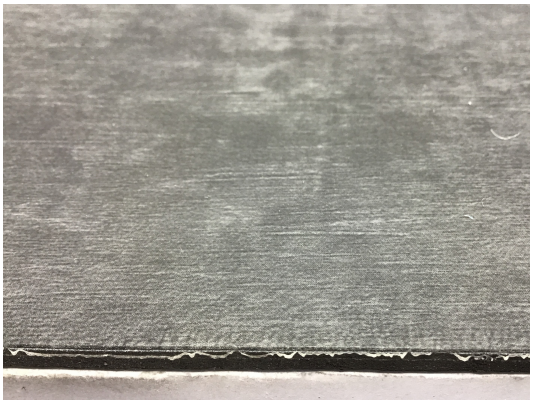
## 2 Product description

**TFI sample number** 2301063



| | | |
|---|---|---|
| Total thickness in mm | * | 5,00 |
| Total mass per unit area in g/m² | * | 9050 |

*Angabe des Auftraggebers/Customer Information





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## 3 Results

Sound absorption $\alpha_w = 0.05$

The measurement results are evaluated without consideration of the measurement uncertainty with reference to compliance with limit values, unless otherwise specified by the test standard.

## 4 Partial Reports

Sound absorption in a reverberation room according to EN ISO 354

**Remark:**

The test specimen consists of three separate deliveries (2301063, 2301421, 2301450) between 28th June 2023 and 14th September 2023.

The material is the same according to the customer and the packaging label.





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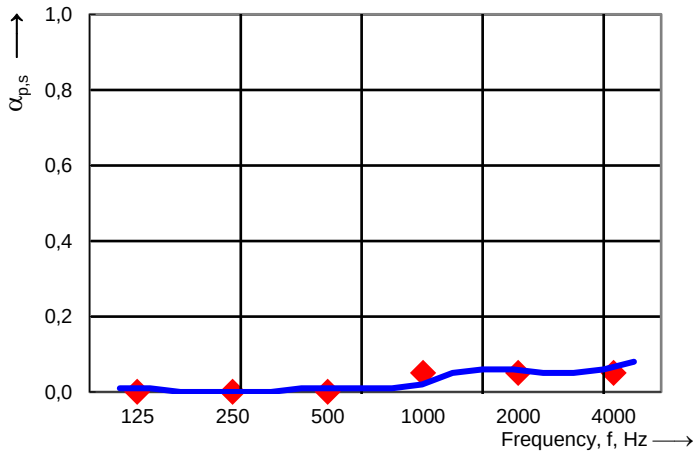
# Partial Report – Sound absorption according to EN ISO 354 and EN ISO 11654

Measurement of sound absorption coefficient in a reverberation room

| | | | |
|---|---|---|---|
| TFI sample number: | 2301063, 2301421, 2301450 | Testing period: | 19.09.2023 |
| Installed by: | TFI Aachen GmbH | Installation: | 19.09.2023 |
| Mounting type: (ISO 354 Annex B) | A, the test object is attached directly to a room surface or applied to it<br>The sides of the set-up were closed with a metal frame. | | |
| Remarks: | - | | |
| Object set-up: (if multi-parted; from top to bottom) | - | | |

| | | |
|---|---|---|
| Surface area: | 12,00 | m² |
| Room volume: | 222,30 | m³ |
| Total room area $S_t$: | 223,60 | m² |

| Frequency f [Hz] | $\alpha_p$ Oktave |
|---|---|
| 100<br>125<br>160 | 0,00 |
| 200<br>250<br>315 | 0,00 |
| 400<br>500<br>630 | 0,00 |
| 800<br>1000<br>1250 | 0,05 |
| 1600<br>2000<br>2500 | 0,05 |
| 3150<br>4000<br>5000 | 0,05 |




Weighted sound absorption coefficient according to ISO 11654

$\alpha_w$ = 0,05

It is strongly recommended to use this single-number rating in combination with the complete sound absorption coefficient curve.





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# Sound absorption according to EN ISO 354 and EN ISO 11654

Measurement of sound absorption coefficient in a reverberation room

Weighted sound absorption coefficient according to ISO 11654

$\alpha_w$ = 0,05

It is strongly recommended to use this single-number rating in combination with the complete sound absorption coefficient curve.

| Frequency [Hz] | $\alpha_p$ | $\alpha_s$ | | T1 [s] | T2 [s] |
|---|---|---|---|---|---|
| 50 | | -0,01 | | 9,28 | 9,50 |
| 63 | 0,00 | 0,00 | | 10,54 | 10,53 |
| 80 | | 0,00 | | 11,49 | 11,69 |
| 100 | | 0,01 | | 12,67 | 12,40 |
| 125 | 0,00 | 0,01 | | 12,43 | 12,03 |
| 160 | | 0,00 | | 13,29 | 13,17 |
| 200 | | 0,00 | | 14,09 | 13,95 |
| 250 | 0,00 | 0,00 | | 14,28 | 14,12 |
| 315 | | 0,00 | | 13,53 | 13,39 |
| 400 | | 0,01 | | 12,34 | 12,07 |
| 500 | 0,00 | 0,01 | | 11,70 | 11,37 |
| 630 | | 0,01 | | 11,18 | 10,97 |
| 800 | | 0,01 | | 10,31 | 10,12 |
| 1000 | 0,05 | 0,02 | | 9,20 | 8,69 |
| 1250 | | 0,05 | | 8,00 | 7,11 |
| 1600 | | 0,06 | | 7,12 | 6,16 |
| 2000 | 0,05 | 0,06 | | 6,07 | 5,43 |
| 2500 | | 0,05 | | 5,10 | 4,72 |
| 3150 | | 0,05 | | 4,33 | 4,05 |
| 4000 | 0,05 | 0,06 | | 3,61 | 3,36 |
| 5000 | | 0,08 | | 2,79 | 2,60 |

Reverberation room without sample:

| | | |
|---|---|---|
| Relative humidity: | 55,8 | % |
| Temperature: | 22,8 | °C |
| Barometric pressure: | 99,4 | kPa |

Reverberation room with sample:

| | | |
|---|---|---|
| Relative humidity: | 55,8 | % |
| Temperature: | 22,8 | °C |
| Barometric pressure: | 99,4 | kPa |

Remarks:

-

TFI sample number: 2301063, 2301421, 2301450

Rev 1





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# **Procedure description** – Sound absorption in a reverberation room according to EN ISO 354

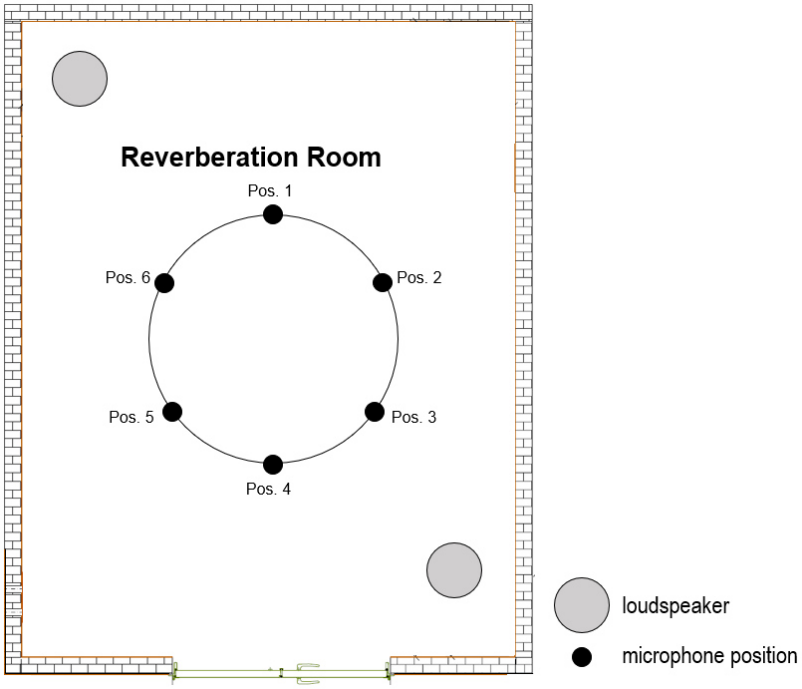
## 1 Test method / Requirements

| | |
|---|---|
| EN ISO 354:2003 | Acoustics - Measurement of sound absorption in a reverberation room |
| EN ISO 11654:1997 | Acoustics - Sound absorbers for use in buildings - Rating of sound absorption |
| ISO 12999-2:2020 | Acoustics - Determination and application of measurement uncertainties in building acoustics - Part 2: Sound absorption |

## 2 Laboratories

| | |
|---|---|
| Test rooms: | TFI Aachen GmbH, Charlottenburger Allee 41, 52068 Aachen |
| Test method: | reverberation room method |
| Volume: | V = 7,60 m x 5,91 m x 4,95 m = 222,33 m³ |
| Total surface: | $S_t$ = 223,60 m² |
| Floor plan: | rectangular |
| Diffusors: | 15 |

Plan of the reverberation room:





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## 3 Measuring devices

| | |
|---|---|
| Real-time analyzer: | 1 Norsonic Nor140 |
| Microphone: | 1 Norsonic Type1209 |
| Loudspeaker: | 2 Norsonic Nor229 |

## 4 Measuring operation

| | |
|---|---|
| Test noise: | broadband noise |
| Receive filter: | one-third octave band filter |
| Measurement: | 2 loudspeaker positions<br>6 microphone positions |

## 5 Evaluation

The decay curves are determined using the interrupted noise method. A minimum of one decay curve is measured at each of the 6 microphone positions. The decays are averaged for every microphone position to enhance reproducibility. The reverberation time of the room is expressed by the arithmetic mean derived from the total number of all reverberation time measurements in each frequency band.

The equivalent sound absorption area of the test specimen $A_T$ is calculated as the difference between the equivalent sound absorption area of the reverberation room with test specimen $A_2$ and the equivalent sound absorption area of the empty reverberation room $A_1$ without test specimen.

The equivalent sound absorption coefficient $\alpha_s$ describes the ratio of the equivalent sound absorption area $A_T$ of a test specimen divided by the area of the test specimen.

The evaluated sound absorption coefficient $\alpha_w$ is a single-number frequency-independent value which equals the value of the reference curve at 500 Hz after shifting it.

## 6 Note

The results are based on measurements performed under laboratory conditions with artificial excitation (standard procedure). The test results are applicable in due consideration of the national provisions and the local circumstances and/or constructions.





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