

ACOUSTIC RESEARCH LAB.



Test
TS EN ISO/IEC 17025
AB-1572-T

AB-1572-T
BLX-R-SA-196
12-23

BLX ACOUSTIC RESEARCH LABORATORY

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TEST REPORT

TEST RAPORU

Customer Name Müşterinin Adı	: Stella İstanbul Dekorasyon Ltd.Şti.
Customer Address Müşterinin Adresi	: Dilovası OSB 4 kısım karasu caddesi 135 Ada 5 parsel sokak D4009, Gebze/Kocaeli -Türkiye
Order No Talep Numarası	: 231207
Name and Identity of Test Specimen Numunenin Adı ve Tarifi	: Acoustic Panel
Date of Report Rapor Tarihi	: 20.12.2023
Date of Test Test tarihi	: 20.12.2023
Date of Receiving of Test Item Numunelerin Kabul Tarihi	: 19.12.2023
Number of Pages of the Report Raporun Sayfa Sayısı	: 39

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The test and/or measurement results, the uncertainties (if customer demand) with confidence probability and test methods are given on the following pages which are part of report.

Deney ve / veya ölçüm sonuçları, genişletilmiş ölçüm belirsizlikleri (müşteri talep ettiğinde) ve deney metotları bu sertifikanın tamamlayıcı kısmı olan takip eden sayfalarda verilmiştir.

- BLX ACOUSTIC RESEARCH LABORATORY IS SUB-ORGANIZATION OF KARAKUTU ELECTROACOUSTIC COMPANY.
- BLX AKUSTİK ARAŞTIRMA LABORATUVARI KARAKUTU ELEKTROAKUSTİK FİRMASININ BİR ALT KURULUŞUDUR.

Seal
Mühür

Date
Tarih

Person in charge of test
Deneyi Yapan

Person in charge of reporting
Raporlayan

Approval
Onaylayan



20.12.2023

Salih Okan ERCAN

Altay OZANKAN

Erdal MRA

This report is only valid for the Laboratory Measurement Sound Absorption and Sound Absorption Coefficient in then Reverberation Chamber within the scope of ISO 354 on the date of 20.12.2023 under the conditions of Egemenlik Mahallesi 6106/18 Sokak No:13 Bornova / İzmir made for Stella İstanbul Dekorasyon Ltd.Şti. This report can not be whole or partially copied and reproduced without the permission of the BLX Acoustic Research Laboratory. Unsigned and unsealed reports are invalid. The results of the measurement relate only conditions during measurement.

Test method : TS EN ISO 354:2003 Acoustics - Measurement of sound absorption in the reverberation room
Deney Metodu

Sampling Methods : The report complies with Sample Taken Procedure that coded with number of BLX-PR-28
Numune Alma Prosedürü

Test Results : Acoustic Panel $\alpha_w = 0.25$ was found.
Deney Sonuçları

Environmental conditions : Temperature has been measured as 16.3°C,
Çevre Şartları Relative Humidity has been measured as 61,0 % rH,
Pressure has been measured as 1010.0 hPa.

Measurement uncertainty : The measurement uncertainty is ± 0.17
Ölçüm Belirsizliği

Opinions and interpretations : The whole preparation process for the measurement has been made by BLX Acoustic Research
Görüş ve Yorumlar Laboratory. Technical details of the sample has been obtained by the customer.

* *Conformity with requirements or specifications/Ölçüm sonuçlarının şartnamelere veya standartlara uygunluk beyanı:*

* *Disclaimer/Feragat beyanı:*

* *Definition of Decision Rule/Karar kuralının açık tanımı:*

Rule 1- If the measurement results before and after the consideration the uncertainties are both positive, the test result is positive.

Rule 2- If measurement results are positive but there is a shift to the negative zone when measurement uncertainties are taken into consideration, customer agreement is taken for conformity assessment.

Rule 3- If measurement results are negative but there is a shift to the positive zone when measurement uncertainties are taken into consideration, the result of the tests are negative.

Rule 4- If measurement results are inconvenient and also there is a shift to the negative zone when measurement uncertainties are taken into consideration, the result of tests are negative.

* *Statement that the results are valid for the sample received/Sonuçların teslim alınan numune için geçerli olduğuna dair beyan:*

* *Additions to, deviations, or exclusions from the test method/Deney yönteminden eklemeler, çıkarmalar ve sapmalar:*

"Experiments marked with the """" specified in the report are not covered by Accreditation.

(*Applicable/when necessary))

The uncertainty given in the measurement results is extended uncertainty. Uncertainty is the result of multiplication with the k=2 scope factor, which provide s a 95% reliability level for normal distribution.

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1. INTRODUCTION

On **20.12.2023-**, Measurement results of Sound Absorption and Sound Absorption Coefficient in accordance with TS EN ISO 354 Standard are presented with this report. Measurements were taken between **13:00** and **14:00**

Measurements were made according to the relevant section of TS EN ISO 354 standard. Measurements are made with calibrated with traceability chain in accordance with TS EN ISO/IEC 17025 standard with devices and equipment in accordance with the acceptance criteria of the relevant standard.

Measurement results are presented in Section 6 of the report.

Calibration certificates for all equipment used during measurement are presented in Appendix A.

In Appendix B, the plan drawing of room 1 where the Sound Absorption Test was carried out in the BLX Acoustic Research Laboratory is presented.

The accreditation certificate and attachment of BLX Acoustic Research Laboratory are presented in Appendix C.

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2. ABOUT MEASUREMENT OF SOUND ABSORPTION PARAMETERS

2.1. Terms related to Sound Absorption

Decibel (dB): Decibel (dB) is a relative unit of measurement widely used in acoustics. The dB is a logarithmic ratio between the measured level and a reference (threshold) level of 0 dB.

Background noise level ($L_{p,B}$): Measured sound pressure level in the receiving room from all sources except the loudspeaker in the source room.

Room Sound Absorption Area (A_{1-2}): It is the assumed area of a completely absorptive surface that has the same reverberation time as a given room, free from diffraction effects, as if the room had only the absorber.

Sample Sound Absorption Area (A_T): It is the difference between the equivalent sound absorption areas of the reverberation room when the test sample is in the room and when it is not in the room.

Sound Absorption Coefficient (α_s): It is the ratio of the equivalent sound absorption area of a test sample to the area of the test sample.

Weighted Sound Absorption Coefficient (α_w): Single-number frequency-independent value which equals the value of the reference curve at 500 Hz after shifting it as specified in this International Standard.

Sound Absorption Average (SAA): An odd-numbered rating of a material's sound absorption coefficients, rounded to the nearest 0.01, for 12 1/3 octave bands from 200 to 2500 Hz, measured according to ASTM C423.

Noise Reduction Coefficient (NRC): It is the odd-numbered rating of a material's sound absorption coefficients, rounded to the nearest 0.05, for 4 1/3 octave bands, 250 Hz, 500 Hz, 1000 Hz and 2000 Hz, measured according to ASTM C423.

Reverberation Time (T): Reverberation time is a measure of the time required for reflecting sound to "fade away" in an enclosed area after the source of the sound has stopped. The time it takes a reverberant sound field to decay 60 dB after the source is interrupted.

White Noise: White noise is a random signal having equal intensity at different frequencies, giving it a constant power spectral density.

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Pink Noise: Pink noise is a signal or process with a frequency spectrum such that the power spectral density (power per frequency interval) is inversely proportional to the frequency of the signal. In pink noise, each octave interval (halving or doubling in frequency) carries an equal amount of noise energy.

2.2. Measurement Standard

It was carried out by BLX Acoustic Research Laboratory on **20.12.2023** in accordance with TS EN ISO 354 standard. Below are the standards referenced during the preparation of the report numbered **BLX-R-SA-196**.

- TS EN ISO 354:2003 Acoustics - Measurement of sound absorption in the reverberation room
- TS 1477 EN ISO 266:1997 Acoustic- Preferred frequencies
- TS ISO 9613-1:1993 Acoustic – Reduction of sound as it spreads outside – Part 1: Calculation of the cooling of sound by atmosphere
- TS EN 61260-1:2014 Electroacoustic- Octave tape and fractional tape filters
- ASTM E795-16 Standard Practices for Mounting Test Specimens During Sound Absorption Tests

2.3. Calculation Method

The calculation process was carried out using the formulas specified in ISO 354 standard.

The sound absorption coefficient α_s of a plane absorber or a specified array of test objects shall be calculated using the formula (Formula 1);

$$\alpha_s = \frac{A_T}{S}$$

Formula 1

In this formula;

α : It is the ratio of the equivalent sound absorption area of a test sample to the area of the test sample.

A_T : The equivalent sound absorption area of the test specimen, in square metres.

S : The area, in square metres, covered by the test specimen.

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3. SAMPLE INFORMATION

3.1. General

All technical specifications of the sample measured were obtained by the customer, In order to prepare the sample for measurement, the shipment and assembly operations were carried out by **Stella İstanbul Dekorasyon Ltd.Şti.**

The layering detail of the sample measured has been reported Stella İstanbul Dekorasyon Ltd.Şti.

The measurement was taken by placing the sample parallel to the floor of the test room. The measurement was carried out within the scope of the ISO 354 standard.

The area of sample which had been placed directly in the reverberation room (Type A Mounting) is **10.0 m²**.

The dimensions of the sample are shown in Figure 3.1 and Figure 3.2.

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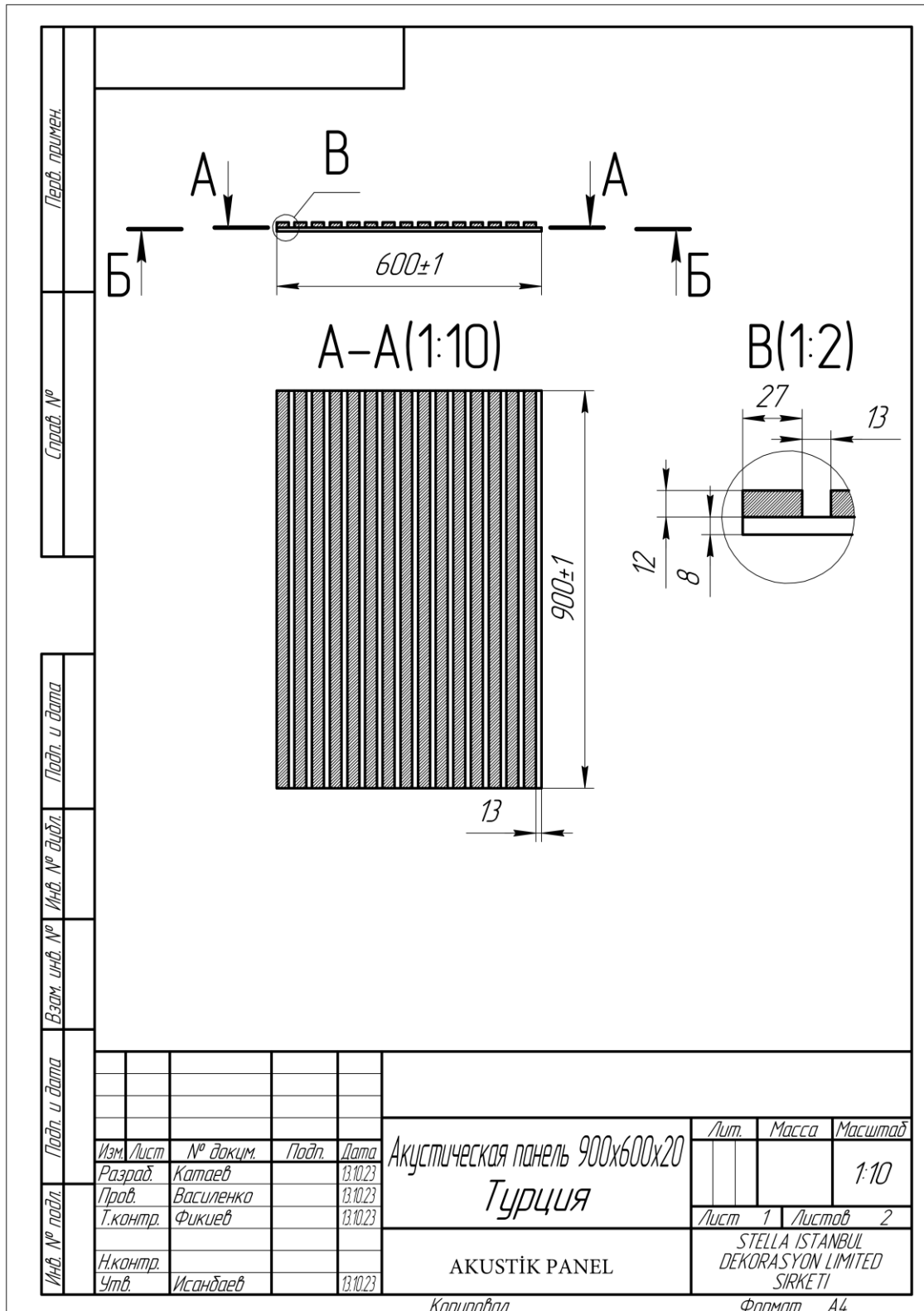


Figure 3.1 Technical drawings

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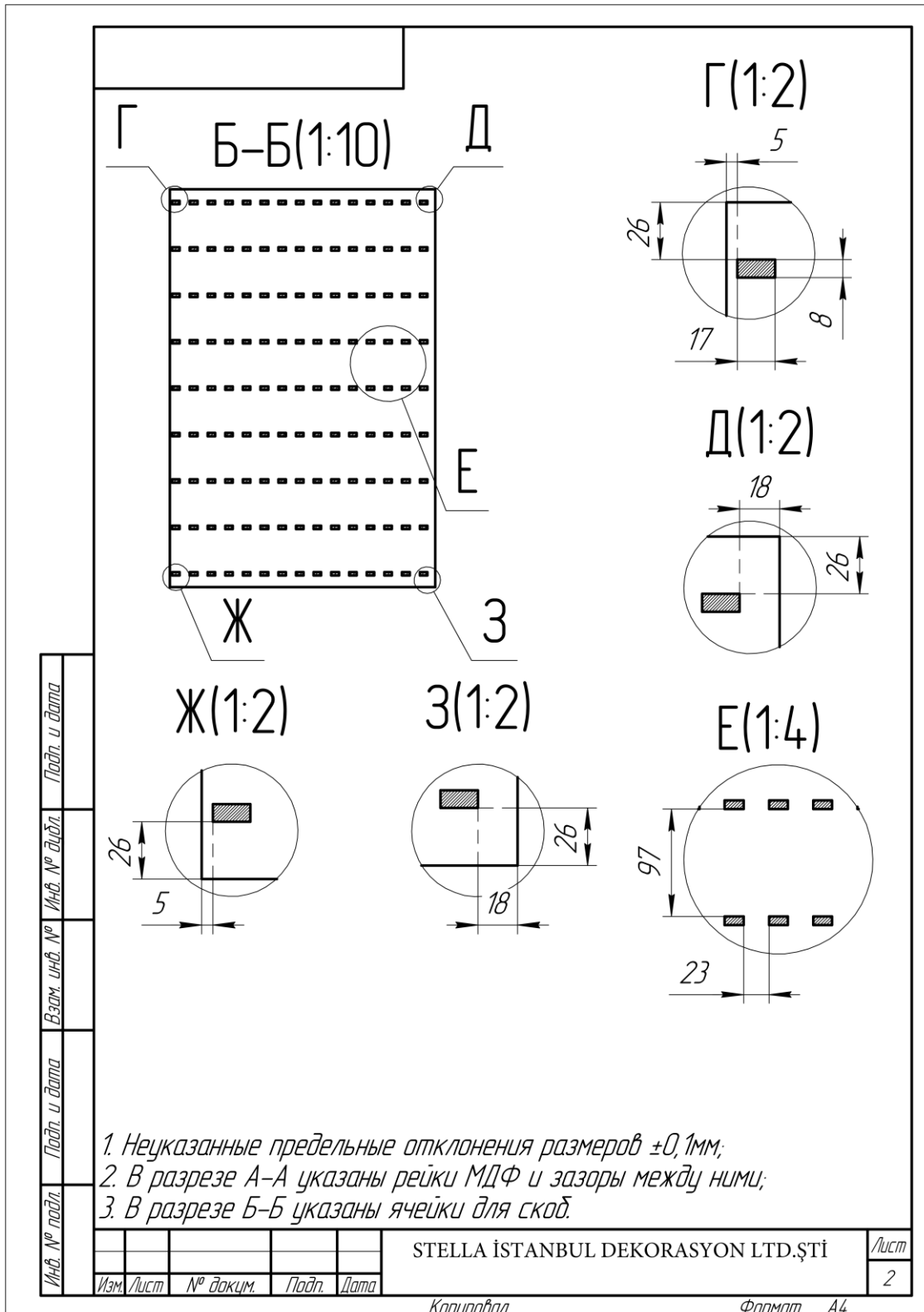


Figure 3.2 Technical drawings 2

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Application detail photographs of the sample in preparation for measurement are given in Figure 3.3 to 3.5.



Figure 3.3 The specimen

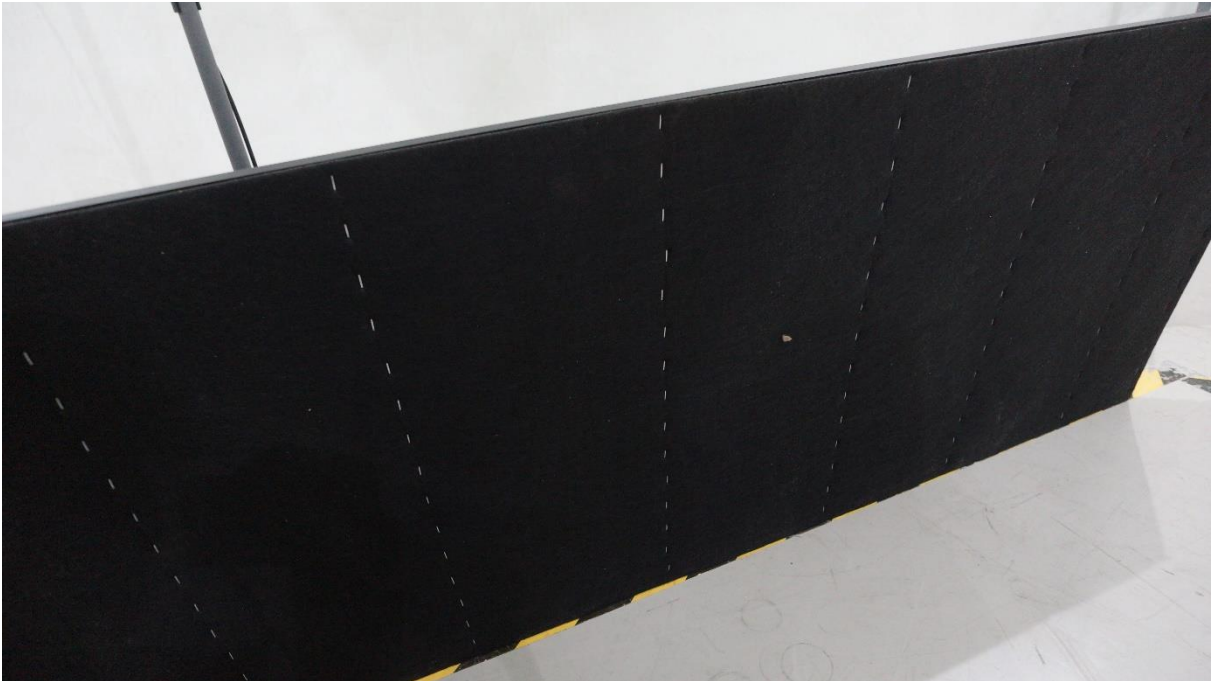


Figure 3.4 Specimen rear face

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Şekil 3.1 The specimen detail

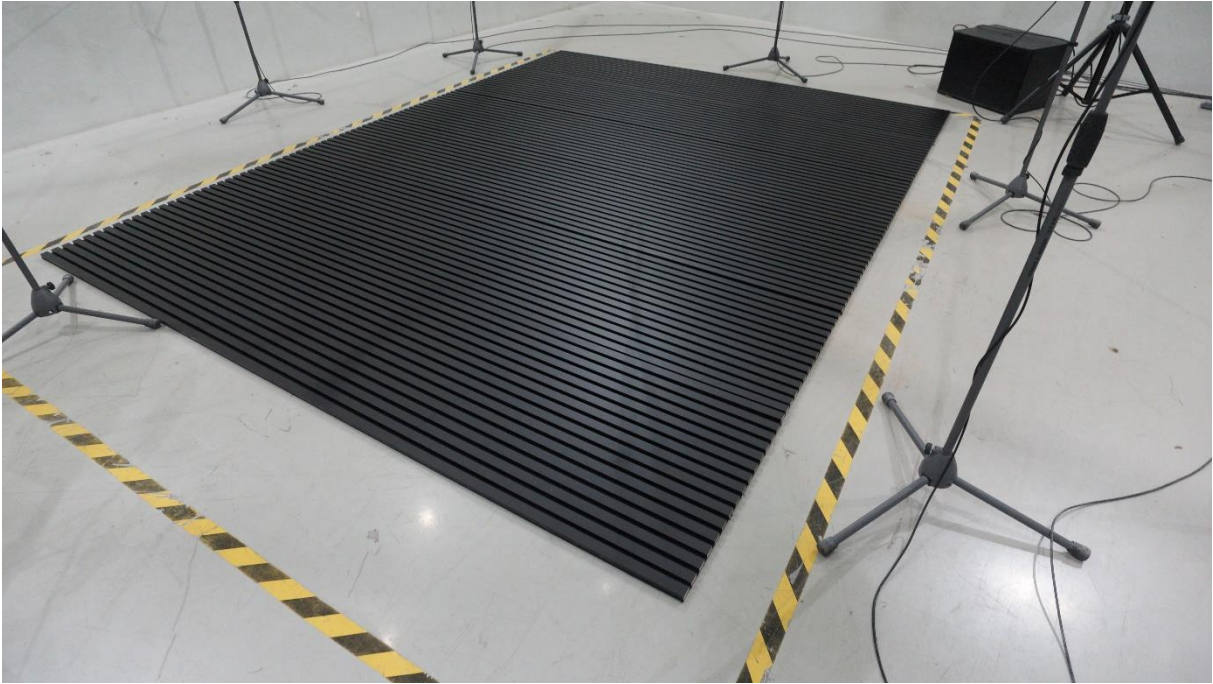


Figure 3.5 Sample photograph inside the reverberation room

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4. DEVICE INFORMATION USED IN MEASURING VOLUME AND MEASUREMENT

The volume of the reverberation chamber where the measurement is made has a volume of **223.2 m³**. At the time of measurement, the temperature is **16.3 °C**, the pressure is **1010.0 hPa**, and the relative humidity is **61.0 %**. The measurement was carried out depending on the numbers specified by the relevant standard.

Measurement within the scope of ISO 354 Standard, A total of 48 measurements were taken for suitable source and microphone positions, and the average of these measurements was calculated.

Symmetry is avoided in the selection of microphone positions.

The heights, locations and directions of the 8 microphones used in the measurement are different from each other.

All the processes that took place during the preparation process and the measurement period of the sample are recorded with camera.

The properties of the reverberation room :

- The floor area of the reverberation room is **44.5** square meters and its height is **5** meters.
- There are **18** diffuser panels of **5.5 kg/m²**, each of which is **5.5 m²** in the reverberation room where the measurement is taken.
- The average sound absorption performance between **500-5000 Hz** is **1.20**
- According to ISO 9613 standard, environmental conditions are controlled at the beginning and end of the measurement and adaptation to ambient conditions is ensured.

4.1. DEVICE INFORMATIONS

- SINUS Apollo Lite 8D
- NTI Audio DS3 Dodecahedron Omnidirectional Loudspeakers
- I-Tech HD Power Amplifier
- GRAS 46AQ 1/2" CCP Microphone Set
- RCF S 12 Bass Reflex Subwoofer
- Microphone Rotation Boom
- Grass 42AG Microphone Calibrator
- Grass 42AG Acoustic Calibrator-Temperature / Humudity Meter
- Stanley Tape Measure
- Extech EN 100 – Barometer

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5. MEASUREMENT PROCESS

TYPE A MOUNTING

The test sample is mounted or placed directly opposite the surface of a room, for example, on the floor of the reverberation room.

If necessary, adhesives or mechanical stabilizers can be used to hold the test sample during the experiment without leaving the slightest air gap.

The perimeter edges of the test sample should be closed or coated to prevent sound absorption of these edges.

The perimeter edges of the test sample may be acoustically sealed or coated with a reflective frame.

The mounting type of the sample is shown in Figure 5.1.



FIG. 1 Type A Mounting

Figure 5.1 Mounting type indication of the specimen

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The photograph of the measured room and the process of measurement are shown in Figure 5.2 to Figure 5.4.



Figure 5.2 Preparation process of measurement



Figure 5.3 Preparation process of measurement

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Figure 5.4 Measurement of sound absorption

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6. RESULTS OF MEASUREMENT

Measurement result are given in Figure 6.1.

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Measurement of sound absorption in a reverberation room ISO 354

Laboratory measurements of the sound absorption coefficient in a reverberation room

Manufacturer: Stella İstanbul Dekorasyon Ltd.Şti.
 Client: Stella İstanbul Dekorasyon Ltd.Şti.
 Test specimen mounted by: BLX-ARL
 Description of test specimen: Acoustic Panel

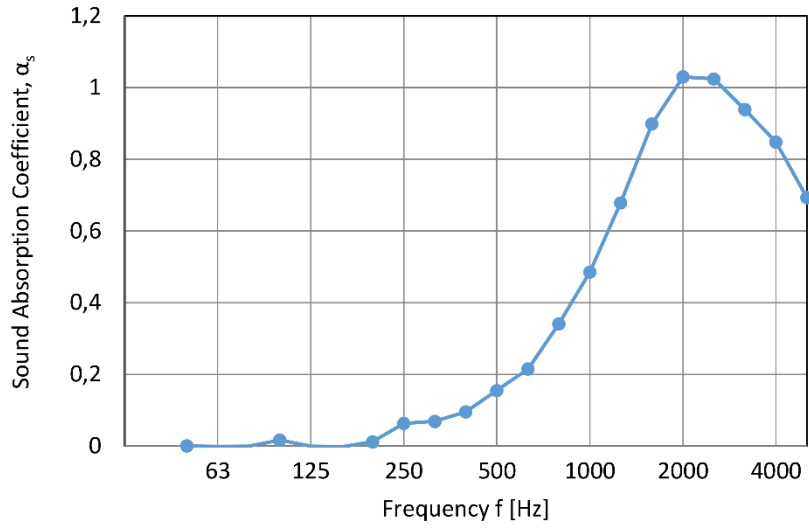
Date of test: 20.12.2023



Without specimen: θ [°C] 16,4 rH[%] 63 P[hPa] 1010
 With specimen: θ [°C] 16,3 rH[%] 61 P[hPa] 1010

Room: 01
 Volume: 223.2 m³
 Specimen Area: 10 m²

Frequency f [Hz]	α_s 1/3 Octave	α_p Octave
50	0,0	
63	0,0	0,00
80	0,0	
100	0,0	
125	0,0	0,00
160	0,0	
200	0,0	
250	0,1	0,05
315	0,1	
400	0,1	
500	0,2	0,15
630	0,2	
800	0,3	
1000	0,5	0,50
1250	0,7	
1600	0,9	
2000	1,0	0,98
2500	1,0	
3150	0,9	
4000	0,8	0,83
5000	0,7	



α_s Sound absorption coefficient according to ISO 354

α_p Practical sound absorption coefficient according to ISO 11654

Rating according to ISO 11654:

Weighted sound absorption coefficient

$\alpha_w = 0,25$

Sound absorption class:

E

Rating according to ASTM C423:

Noise Reduction Coefficient NRC = 0,4

Sound Absorption Average SAA = 0,42

No of Test Report: BLX-R-SA-196

Name of test institute: BLX ACOUSTIC RESEARCH LAB.

Tested by

Salih Okan ERCAN

Reported by

Altay OZANKAN

Approved by

Erdal KARA



Figure 6.1 Measurement result of the sample

7. MEASUREMENT RESULTS

- The relevant result is presented in Figure 6.1.
- No visible damage was detected on the test sample during the test.

8. APPENDIX

- Calibration certificates for the devices used during measurement are presented in Appendix-A.
- In Appendix-B, a plan and cross-section drawings from the BLX Acoustic Research Laboratory are presented.
- In Appendix-C, an accreditation certificate and supplement from the BLX Acoustic Research Laboratory are presented.

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AB-0089-K

231638

05-23

KALİBRASYON SERTİFİKASI

Calibration Certificate

Cihazın Sahibi Customer Name	:	KARAKUTU ELEKTROAKUSTİK PROJE VE UYGULAMA SAN. VE TİC. LTD. ŞTİ. ADALET MAH. ANADOLU CAD. NO.40 K.4 OFİS.401 TEPEKULE İŞ MERKEZİ BAYRAKLI / İZMİR
İstek Numarası Order No.	:	T-0323-151
Makine / Cihaz Instrument / Device	:	Mikrofon / Ön Yükseltici Microphone / Preamplifier
İmalatçı Manufacturer	:	G.R.A.S / G.R.A.S
Tip Type	:	40AQ / 46AQ
Seri Numarası Serial number	:	396907 / 427874
Kalibrasyon Tarihi Date of calibration	:	10.05.2023
Sertifika Sayfa Sayısı Number of pages	:	4

Bu kalibrasyon sertifikası, Uluslararası Birimler Sisteminde (SI) tanımlanmış birimleri realize eden ulusal ölçüm standartlarına izlenebilirliği belgeler.

This calibration certificate documents the traceability to national standards, which realize the unit of measurement according to the International System of Units (SI).

Kalibrasyon laboratuvarı olarak faaliyet gösteren AVL Kalibrasyon Laboratuvarı, TÜRKAK'tan AB-0089-K dosya numarası ile TS EN ISO/IEC 17025-2017 standardına göre akredite edilmiştir.

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The measurements, the uncertainties with confidence probability and calibration methods are given on the following pages which are part of this certificate.

Mühür / Kaşe
Seal



Yayın Tarihi
Publication Date

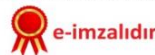
10.05.2023

Kalibrasyonu Yapan
Calibrated By

Fatma SOLGUNTEKİN

Kalibrasyon Personeli

Calibration Responsible



Onaylayan / Tarih
Approval / Date

Younes NEVAYESHİRAZİ / 10.05.2023

Laboratuvar Müdürü

Laboratory Manager



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AB-0089-K

231639

05-23

KALİBRASYON SERTİFİKASI

Calibration Certificate

Cihazın Sahibi <i>Customer Name</i>	:	KARAKUTU ELEKTROAKUSTİK PROJE VE UYGULAMA SAN. VE TİC. LTD. ŞTİ. ADALET MAH. ANADOLU CAD. NO.40 K.4 OFİS.401 TEPEKULE İŞ MERKEZİ BAYRAKLI / İZMİR
İstek Numarası <i>Order No.</i>	:	T-0323-151
Makine / Cihaz <i>Instrument / Device</i>	:	Mikrofon / Ön Yükseltici Microphone / Preamplifier
İmalatçı <i>Manufacturer</i>	:	G.R.A.S / G.R.A.S
Tip <i>Type</i>	:	40AQ / 46AQ
Seri Numarası <i>Serial number</i>	:	396897 / 427875
Kalibrasyon Tarihi <i>Date of calibration</i>	:	10.05.2023
Sertifika Sayfa Sayısı <i>Number of pages</i>	:	4

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Mühür / Kaşe
Seal



Yayın Tarihi
Publication Date
10.05.2023

Kalibrasyonu Yapan
Calibrated By
Fatma SOLGUNTEKİN
Kalibrasyon Personeli
Calibration Responsible



Onaylayan / Tarih
Approval / Date
Younes NEVAYESHİRAZİ / 10.05.2023
Laboratuvar Müdürü
Laboratory Manager



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KALİBRASYON SERTİFİKASI
Calibration Certificate

Cihazın Sahibi Customer Name	:	KARAKUTU ELEKTROAKUSTİK PROJE VE UYGULAMA SAN. VE TİC. LTD. ŞTİ. ADALET MAH. ANADOLU CAD. NO.40 K.4 OFİS.401 TEPEKULE İŞ MERKEZİ BAYRAKLI / İZMİR
İstek Numarası Order No.	:	T-0323-151
Makine / Cihaz Instrument / Device	:	Mikrofon / Ön Yükseltici Microphone / Preampifier
İmalatçı Manufacturer	:	G.R.A.S / G.R.A.S
Tip Type	:	40AQ / 46AQ
Seri Numarası Serial number	:	396843 / 427876
Kalibrasyon Tarihi Date of calibration	:	10.05.2023
Sertifika Sayfa Sayısı Number of pages	:	4

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Yayın Tarihi
Publication Date
10.05.2023

Kalibrasyonu Yapan
Calibrated By
Fatma SOLGUNTEKİN
Kalibrasyon Personeli
Calibration Responsible



Onaylayan / Tarih
Approval / Date
Younes NEVAYESHİRAZİ / 10.05.2023
Laboratuvar Müdürü
Laboratory Manager



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KALİBRASYON SERTİFİKASI

Calibration Certificate

Cihazın Sahibi Customer Name	:	KARAKUTU ELEKTROAKUSTİK PROJE VE UYGULAMA SAN. VE TİC. LTD. ŞTİ. ADALET MAH. ANADOLU CAD. NO.40 K.4 OFİS.401 TEPEKULE İŞ MERKEZİ BAYRAKLI / İZMİR
İstek Numarası Order No.	:	T-0323-151
Makine / Cihaz Instrument / Device	:	Mikrofon / Ön Yükseltici Microphone / Preamplifier
İmalatçı Manufacturer	:	G.R.A.S / G.R.A.S
Tip Type	:	40AQ / 46AQ
Seri Numarası Serial number	:	396814 / 427877
Kalibrasyon Tarihi Date of calibration	:	10.05.2023
Sertifika Sayfa Sayısı Number of pages	:	4

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Yayın Tarihi
Publication Date
10.05.2023

Kalibrasyonu Yapan
Calibrated By
Fatma SOLGUNTEKİN
Kalibrasyon Personeli
Calibration Responsible



Onaylayan / Tarih
Approval / Date
Younes NEVAYESHİRAZİ / 10.05.2023
Laboratuvar Müdürü
Laboratory Manager



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İstek Numarası Order No.	:	T-0323-151
Makine / Cihaz Instrument / Device	:	Mikrofon / Ön Yükseltici Microphone / Preampfier
İmalatçı Manufacturer	:	G.R.A.S / G.R.A.S
Tip Type	:	40AQ / 46AQ
Seri Numarası Serial number	:	396834 / 427878
Kalibrasyon Tarihi Date of calibration	:	10.05.2023
Sertifika Sayfa Sayısı Number of pages	:	4

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Yayın Tarihi
Publication Date
10.05.2023

Kalibrasyonu Yapan
Calibrated By
Fatma SOLGUNTEKİN
Kalibrasyon Personeli
Calibration Responsible



Onaylayan / Tarih
Approval / Date
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Laboratuvar Müdürü
Laboratory Manager



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İstek Numarası Order No.	:	T-0323-151
Makine / Cihaz Instrument / Device	:	Mikrofon / Ön Yükseltici Microphone / Preampfier
İmalatçı Manufacturer	:	G.R.A.S / G.R.A.S
Tip Type	:	40AQ / 46AQ
Seri Numarası Serial number	:	396824 / 427879
Kalibrasyon Tarihi Date of calibration	:	10.05.2023
Sertifika Sayfa Sayısı Number of pages	:	4

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Yayın Tarihi
Publication Date

10.05.2023

Kalibrasyonu Yapan
Calibrated By

Fatma SOLGUNTEKİN
Kalibrasyon Personeli
Calibration Responsible



Onaylayan / Tarih
Approval / Date

Younes NEVAYESHİRAZİ / 10.05.2023
Laboratuvar Müdürü
Laboratory Manager



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KALİBRASYON SERTİFİKASI

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İstek Numarası Order No.	:	T-0323-151
Makine / Cihaz Instrument / Device	:	Mikrofon / Ön Yükseltici Microphone / Preampfier
İmalatçı Manufacturer	:	G.R.A.S / G.R.A.S
Tip Type	:	40AQ / 46AQ
Seri Numarası Serial number	:	460558 / 469414
Kalibrasyon Tarihi Date of calibration	:	10.05.2023
Sertifika Sayfa Sayısı Number of pages	:	4

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Yayın Tarihi
Publication Date
10.05.2023

Kalibrasyonu Yapan
Calibrated By
Fatma SOLGUNTEKİN
Kalibrasyon Personeli
Calibration Responsible



Onaylayan / Tarih
Approval / Date
Younes NEVAYESHİRAZİ / 10.05.2023
Laboratuvar Müdürü
Laboratory Manager



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AB-0089-K

231640

05-23

KALİBRASYON SERTİFİKASI

Calibration Certificate

Cihazın Sahibi Customer Name	:	KARAKUTU ELEKTROAKUSTİK PROJE VE UYGULAMA SAN. VE TİC. LTD. ŞTİ. ADALET MAH. ANADOLU CAD. NO.40 K.4 OFİS.401 TEPEKULE İŞ MERKEZİ BAYRAKLI / İZMİR
İstek Numarası Order No.	:	T-0323-151
Makine / Cihaz Instrument / Device	:	Mikrofon / Ön Yükseltici Microphone / Preampfier
İmalatçı Manufacturer	:	G.R.A.S / G.R.A.S
Tip Type	:	40AQ / 46AQ
Seri Numarası Serial number	:	460546 / 469418
Kalibrasyon Tarihi Date of calibration	:	10.05.2023
Sertifika Sayfa Sayısı Number of pages	:	4

Bu kalibrasyon sertifikası, Uluslararası Birimler Sisteminde (SI) tanımlanmış birimleri realize eden ulusal ölçüm standartlarına izlenebilirliği belgeler.

This calibration certificate documents the traceability to national standards, which realize the unit of measurement according to the International System of Units (SI).

Kalibrasyon laboratuvarı olarak faaliyet gösteren AVL Kalibrasyon Laboratuvarı, TÜRKAK'tan AB-0089-K dosya numarası ile TS EN ISO/IEC 17025-2017 standardına göre akredite edilmiştir.

AVL Kalibrasyon Laboratuvarı is accredited by TÜRKAK under registration number AB-0089-K for TS EN ISO/IEC 17025-2017 as test laboratory.

Türk Akreditasyon Kurumu (TÜRKAK) deney raporlarının tanınması konusunda Avrupa Akreditasyon Birliği (EA) ve Uluslararası Laboratuvar Akreditasyon Birliği (ILAC) ile karşılıklı tanınma antlaşmasını imzalamıştır.

The Turkish Accreditation Agency (TÜRKAK) is signatory to the multilateral agreements of the European co-operation for the Accreditation (EA) and of the International Laboratory Accreditation (ILAC) for the Mutual recognition of test reports.

Ölçüm sonuçları, genişletilmiş ölçüm belirsizlikleri ve kalibrasyon metotları bu sertifikanın tamamlayıcı kısmı olan takip eden sayfalarda verilmiştir.

The measurements, the uncertainties with confidence probability and calibration methods are given on the following pages which are part of this certificate.

Mühür / Kaşe
Seal



Yayın Tarihi
Publication Date

10.05.2023

Kalibrasyonu Yapan
Calibrated By

Fatma SOLGUNTEKİN
Kalibrasyon Personeli
Calibration Responsible



Onaylayan / Tarih
Approval / Date

Younes NEVAYESHİRAZİ / 10.05.2023
Laboratuvar Müdürü
Laboratory Manager



Bu sertifika 5070 sayılı kanununa göre güvenli elektronik imza ile imzalanmıştır. Belge teyidi için sayfalarda yer alan karekodu okutabilirsiniz.

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AB-0089-K

231645

05-23

KALİBRASYON SERTİFİKASI

Calibration Certificate

Cihazın Sahibi Customer Name	:	KARAKUTU ELEKTROAKUSTİK PROJE VE UYGULAMA SAN. VE TİC. LTD. ŞTİ. ADALET MAH. ANADOLU CAD. NO.40 K.4 OFİS.401 TEPEKULE İŞ MERKEZİ BAYRAKLI / İZMİR
İstek Numarası Order No.	:	T-0323-151
Makine / Cihaz Instrument / Device	:	Akustik Kalibratör Acoustic Calibrator
İmalatçı Manufacturer	:	GRAS
Tip Type	:	42AG
Seri Numarası Serial number	:	280620
Kalibrasyon Tarihi Date of calibration	:	10.05.2023
Sertifika Sayfa Sayısı Number of pages	:	4

Bu kalibrasyon sertifikası, Uluslararası Birimler Sisteminde (SI) tanımlanmış birimleri realize eden ulusal ölçüm standartlarına izlenebilirliği belgeler.
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The measurements, the uncertainties with confidence probability and calibration methods are given on the following pages which are part of this certificate.

Mühür / Kaşe
Seal



Yayın Tarihi
Publication Date

10.05.2023

Kalibrasyonu Yapan
Calibrated By

Fatma SOLGUNTEKİN
Kalibrasyon Personeli

Calibration Responsible



Onaylayan / Tarih
Approval / Date

Younes NEVAYESHİRAZİ / 10.05.2023

Laboratuvar Müdürü

Laboratory Manager



Bu sertifika 5070 sayılı kanununa göre güvenli elektronik imza ile imzalanmıştır. Belge teyidi için sayfalarda yer alan karekodu okutabilirsiniz.

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AB-0089-K
231646
05-23

KALİBRASYON SERTİFİKASI

Calibration Certificate

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Talep Numarası: Order No:	T-0323-151 / 2 - L17
Makina / Cihaz: Instrument / Device:	Akustik Kalibratör - Sıcaklık / Nem Ölçer Acoustic Calibrator - Temperature / Humidity Meter
İmalatçı: Manufacturer:	GRAS
Tip: Type:	42AG
Seri No / Cihaz Kodu: Serial No / Product Code:	280620
Kalibrasyon Tarihi: Date of Calibration:	10.05.2023
Sertifikanın Sayfa Sayısı: Number of Pages:	4

Bu kalibrasyon sertifikası, Uluslararası Birimler Sisteminde (SI) tanımlanmış birimleri realize eden ulusal ölçüm standartlarına izlenebilirliği belgeler.

This calibration certificate documents the traceability to national standards, which realize the unit of measurement according to the International System of Units (SI).

Kalibrasyon laboratuvarı olarak faaliyet gösteren AVL AKUSTİK VİBRASYON KALİBRASYON LAB. LTD. ŞTİ, TÜRKAK'tan AB-0089-K dosya numarası ile TS EN ISO/IEC 17025-2017 standardına göre akredite edilmiştir.

AVL AKUSTİK VİBRASYON KALİBRASYON LAB. LTD. ŞTİ is accredited by TÜRKAK under registration number AB-0089-K for TS EN ISO/IEC 17025-2017 as calibration laboratory.

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The measurements, the uncertainties with confidence probability and calibration methods are given on the following pages which are part of this certificate.

Mühür / Kaşe Seal	Yayın Tarihi Publication Date	Kalibrasyonu Yapan Calibrated by	Onaylayan / Tarih Approval / Date
	10.05.2023	Mehmet GÜVENDİ Kalibrasyon Personeli Calibration Responsible	Younes NEVAYESHİRAZİ / 10.05.2023 Laboratuvar Müdürü Laboratory Manager

Bu sertifika laboratuvarın izni olmadan kısmen kopyalanıp çoğaltılamaz. Sertifika 5070 sayılı kanununa göre güvenli elektronik imza ile imzalanmıştır. Kare kodsuz veya elektronik imzasız sertifikalar geçersizdir. Sertifikada yer alan kare kod mobil cihazlardan okutulularak sertifika doğrulanabilir.

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UMS ANKARA KALİBRASYON LABORATUVARI

UMS Ankara Kalibrasyon Müh. Müş. Müm. San. Tic. Ltd. Şti.

Örnek Sanayi Sitesi 1267/1 Sok. No: 5 06374 Ostim / Ankara

T: (0312) 385 50 78 F: (0312) 385 50 93

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Kalibrasyon
TS EN ISO/IEC 17025
AB-0012-K

AB-0012-K

2323571

05-23

KALİBRASYON SERTİFİKASI

Calibration Certificate

Cihazın Sahibi / adresi: Customer / Address:	KARAKUTU ELEKTROAKUSTİK PROJE VE UYGULAMA SAN. VE TİC. LTD. ŞTİ. Adalet Mah. Anadolu Cad. No:40 Kat:4 Ofis:401 Tepekule İş Merkezi Bayraklı / İZMİR		
İstek Numarası: Order No:	T-23-4713 / 1 - L01		
Makina / Cihaz: Instrument / Device:	Barometre		
İmalatçı: Manufacturer:	EXTECH		
Tip: Type:	EN100		
Seri No / Cihaz Kodu: Serial No / Product Code:	657125		
Kalibrasyon Tarihi: Date of Calibration:	10.05.2023	Laboratuvara Kabul Tarihi: Receipt Date of Product:	10.05.2023
Sertifikanın Sayfa Sayısı: Number of Pages:	3		

Bu kalibrasyon sertifikası, Uluslararası Birimler Sisteminde (SI) tanımlanmış birimleri realize eden ulusal ölçüm standartlarına izlenebilirliği belgeler.

This calibration certificate documents the traceability to national standards, which realize the unit of measurement according to the International System of Units (SI).

Kalibrasyon laboratuvarı olarak faaliyet gösteren UMS Ankara Kalibrasyon Müh. Müş. Müm. San. Tic. Ltd. Şti., TÜRKAK'tan AB-0012-K dosya numarası ile TS EN ISO/IEC 17025-2017 standardına göre akredite edilmiştir.

UMS Ankara Kalibrasyon Müh. Müş. Müm. San. Tic. Ltd. Şti. is accredited by TÜRKAK under registration number AB-0012-K for TS EN ISO/IEC 17025-2017 as calibration laboratory.

Türk Akreditasyon Kurumu(TÜRKAK) kalibrasyon sertifikalarının tanınması konusunda Avrupa Akreditasyon Birliği (EA) ve Uluslararası Laboratuvar Akreditasyon Birliği (ILAC) ile karşılıklı tanıma antlaşmasını imzalamıştır.

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The measurements, the uncertainties with confidence probability and calibration methods are given on the following pages which are part of this certificate.

Mühür / Kaşe

Seal



Yayın Tarihi

Publication Date

10.05.2023

Kalibrasyonu Yapan

Calibrated by

Miraç TAŞ

Kalibrasyon Personeli
Calibration Responsible



Onaylayan / Tarih

Approval / Date

Emrah BECERİK / 10.05.2023

Laboratuvar Yöneticisi
Laboratory Manager



Bu sertifika laboratuvarın izni olmadan kısmen kopyalanıp çoğaltılamaz. Sertifika 5070 sayılı kanununa göre güvenli elektronik imza ile imzalanmıştır. Teyit için kapak sayfasında yer alan karekodu okutabilirsiniz. Karekodsuz veya elektronik imzasız sertifikalar geçersizdir.

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FRM 3-0-01/02.01.2020/Rev.02

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MMO KALMEM



Kalibrasyon Laboratuvarı ve Metroloji Eğitim Merkezi

Kalibrasyon Sertifikası
Calibration Certificate

AB-0070-K
22.BOY.2520
07.2022

Cihaz / Ekipman Device / Equipment	: ŞERİTMETRE Measuring Tape	<p>Bu kalibrasyon sertifikası, Uluslararası Birimler Sisteminde (SI) tanımlanmış birimleri realize eden ulusal ölçüm standartlarına izlenebilirliği belgeler. Kalibrasyon laboratuvarı olarak faaliyet gösteren MMO KALMEM, TÜRKAK'tan AB-0070-K ile TS EN ISO/IEC 17025:2017 standardına göre akredite edilmiştir. Türk Akreditasyon Kurumu(TÜRKAK) kalibrasyon sertifikalarının tanınırlığı konusunda Avrupa Akreditasyon Birliği(EA) ile Çok Taraflı Anlaşma ve Uluslararası Laboratuvar Akreditasyon Birliği(ILAC) ile karşılıklı tanıma anlaşması imzalamıştır. Ölçüm sonuçları, genişletilmiş ölçüm belirsizlikleri ve kalibrasyon metotları bu sertifikanın tamamlayıcı kısmı olan takip eden sayfalarda verilmiştir.</p> <p>This calibration certificate documents the traceability to national standards, which realize the unit of measurement according to the International System of Units (SI). MMO KALMEM accredited by TÜRKAK under registration number AB-0070-K for TS EN ISO/IEC 17025:2017 as Calibration Laboratory. Turkish Accreditation Agency (TÜRKAK) is a signatory to the European co-operation for Accreditation (EA) Multilateral Agreement (MLA) and to the International Laboratory Accreditation Cooperation (ILAC) Mutual Recognition Arrangement (MRA) for the recognition of calibration certificates. The measurements, the uncertainties with confidence probability and calibration methods are given on the following pages which are part of this certificate.</p>
Üretici Firma Manufacturer	: STANLEY	
Seri No Serial No	: 009855	
Tip / Model Tip / Model	: 30-457/CEP TİPİ	
Talep Eden / Adresi Issued For /Address	: KARAKUTU ELEKT. PROJ. UYG. SAN. TİC. LDT. ŞTİ. ADALET, MAH. ANADOLU CAD. NO:40 OFIS NO:401 BAYRAKLI İZMİR	
Talep Numarası Order no	: EK22001053/1	
Kalibrasyon Tarihi Date of Calibration	: 14.07.2022	
Sertifika Sayfa Sayısı Page Number	: 2	



Onay ve Yayın Tarihi
Date of Issue
18.07.2022
10:48:43

Kalibrasyonu Yapan
Calibrated by
ERDEM ZIYLAN

Laboratuvar Müdürü
Head of the Calibration Laboratory
ÇAĞLAR ÇİMEN

Elektronik olarak imzalanmıştır.
İmzalayan: ERDEM ZIYLAN
Seri No:16464662075329004513

Elektronik olarak imzalanmıştır.
İmzalayan: ÇAĞLAR ÇİMEN
Seri No:13792901917155819757

Sertifikanın doğruluğunu karekod ile kontrol edebilirsiniz:



EKG.02.30 04.04.2014 Rev:00

Bu sertifika MMO KALMEM'in yazılı izni olmadan kısmen çoğaltılıp kopyalanamaz. İmzasız ve mühürsüz sertifikalar geçersizdir.
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Adalet Mah. Anadolu Cad. No:40 K:2 Bayraklı / İZMİR - Turkey (0232) 348 40 50 (0232) 486 20 60 www.kalmem.org kalmem@mimo.org.tr

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AB-0070-K
22.BOY.2520
07.2022

Sayfa No: 2/2
Page Number

1. Kalibrasyonda Kullanılan Referans:

Cihaz / Ekipman	Üretici	Seri No	İzlenebilirlik
Çelik Cetvel (1 m)	PREISSER	02.17	AB-0003-K/21M06640/09.2021
Çelik Cetvel (2 m)	PREISSER	02.32	AB-0003-K/21M06641/09.2021
Sıcaklık ve Nem Takip	DORUKAN	05.92	AB-0070-K/21.SCK.0271/02.2021

2. Kalibre Edilen Cihazın Özellikleri:

Cihazın Adı	Ölçüm Aralığı	Skala Bölüntüsü / Okunabilirlik
30-457/CI Şerit metre	0 - 8 m	1 mm / 0,2 mm

3. Ortam Şartları : Sıcaklık : (20 ± 1) °C Bağıl Nem % (45 ± 15)

4. Kalibrasyon Yöntemi ve Prosedürü Şerit metrenin kalibrasyonu, KALMEM Boyut Laboratuvarı tarafından TS 9505 standardı esas alınarak hazırlanan EKT.02.17 No'lu "Şerit metre Kalibrasyonu talimatı" gereğince gerçekleştirilmiştir.

5. Fonksiyon ve Göz Kontrolü Fonksiyon ve göz kontrolünde hasar veya eksiklik görülmemiştir.

6. Kalibrasyon Sonuçları

Referans mm	Şeritmetre (mm)	
	Ölçüm	Sapma
0,0	0,0	0,0
1000,0	1000,2	0,2
2000,0	2000,2	0,2
3000,0	3000,4	0,4
4000,0	4000,4	0,4
5000,0	5000,4	0,4

Rev:00
04.04.2014
EK.C.02.30

7. Kalibrasyon Belirsizliği

Kalibrasyonun toplam belirsizliği genişletilmiş belirsizlik olup, bileşik belirsizlikten kapsam faktörü k=2.0 kullanılarak elde edilmiştir. Güvenilirlik düzeyi % 95'tir. Ölçümlerde hesaplanan toplam ölçüm belirsizliği:

$$(210+15.L) \mu\text{m [L: m]}$$

8. Açıklamalar

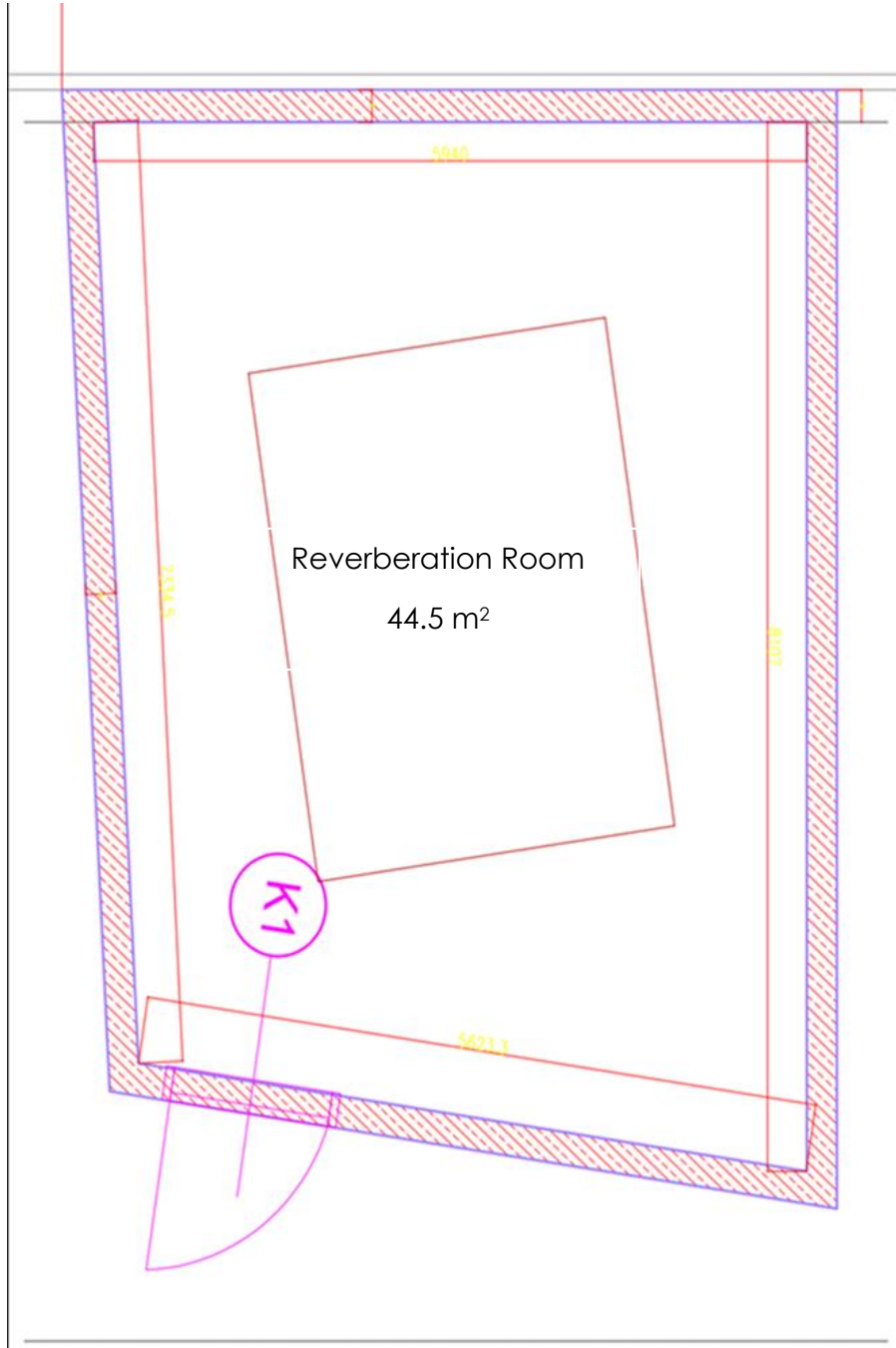
Kalibrasyon sonuçları sadece yukarıda belirtilmiş şerit metreye ait olup, kalibrasyon tarihinden itibaren ve sertifikada belirtilmiş şartlarda geçerlidir.

9. Kalibrasyon Etiketinin Yeri

Kalibrasyon etiketi şerit metrenin arka tarafına yapıştırılmıştır.

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	TURKISH ACCREDITATION AGENCY
<h2>ACCREDITATION CERTIFICATE</h2>	
As a Testing Laboratory	
KARAKUTU ELEKTROAKUSTİK PROJE VE UYGULAMA SANAYİ VE TİCARET LİMİTED ŞİRKETİ	
Central Address: EGEMENLİK MAH. 6106/18 SOK. NO:13-1 BORNOVA / İZMİR İzmir/Türkiye	
is accredited in accordance with TS EN ISO/IEC 17025:2017 standard within the scope given in Annex following the assessment conducted by TURKAK.	
Accreditation Number : AB-1572-T	
Accreditation Date : 15.09.2020	
Revision Date / Number : 17.11.2023 / 02	
This certificate shall remain in force until 14.09.2024 , subject to continuing compliance with the standard TS EN ISO/IEC 17025:2017 , related regulations and requirements.	
Gülden Banu Müderrisoğlu Secretary General	
	
<small>Turkish Accreditation Agency (TURKAK) is a signatory to the European co-operation for Accreditation (EA) Multilateral Agreement (MLA) and International Laboratory Accreditation Cooperation (ILAC) Mutual Recognition Agreement (MRA) in the scope of ISO/IEC 17025.</small>	
<small>This document has been signed by Gülden Banu Müderrisoğlu with a secure electronic signature in accordance with the electronic signature law numbered 5070. Use the QR code to verify the e-signed document.</small>	
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 <p>TÜRKAK TS EN ISO/IEC 17025 AB-1572-T</p>	KARAKUTU ELEKTROAKUSTİK PROJE VE UYGULAMA SANAYİ VE TİCARET LİMİTED ŞİRKETİ	
	Accreditation Nr: AB-1572-T Revision Nr: 02 Date: 17.11.2023	
Testing Laboratory		
Address : EGEMENLİK MAH. 6106/18 SOK. NO:13-1 BORNOVA / İZMİR İzmir/Türkiye		Phone : +90 232 462 0666 Fax : Email : info@blx-arl.com Website : www.blx-arl.com

Environmental Tests		
Tested Materials / Products	Name of Test	Testing Method (National, International Standards, In-house Methods)
Acoustic-Noise	Description, measurement and assessment of environmental noise-Part 1: Basic quantities and assessment procedures	TS ISO 1996-1
Acoustic-Noise	Description, measurement and assessment of environmental noise-Part 2: Determination of sound pressure levels	TS ISO 1996-2
Acoustic-Noise	Field measurement of sound insulation in buildings and of building elements - Part 1: Airborne sound insulation	TS EN ISO 16283-1
Acoustic-Noise	Field measurement of sound insulation in buildings and of building elements - Part 2: Impact sound insulation	TS EN ISO 16283-2
Acoustic-Noise	Field measurement of sound insulation in buildings and of building elements - Part 3: Façade sound insulation	TS EN ISO 16283-3
Acoustics	Measurement of room acoustic parameters - Part 1: Performance spaces	TS EN ISO 3382-1
Acoustic-Noise	Measurement of room acoustic parameters ($L_{eq, T}$)- Part 2: Reverberation time in ordinary rooms	TS EN ISO 3382-2 and TS EN ISO 3382-2/AC
Acoustic-Noise	Measurement of room acoustic parameters - Part 3: Open plan offices	TS EN ISO 3382-3
Acoustic-Noise	Determination of sound power levels and sound energy levels of noise sources using sound pressure - Precision methods for reverberation test rooms	TS EN ISO 3741
Acoustic-Noise	Determination of sound power levels of noise sources using sound pressure - Engineering methods for small, movable sources in reverberant fields - Part 2: Methods for special reverberation test rooms	TS EN ISO 3743-2
Acoustic-Noise	Determination of sound power levels and sound energy levels of noise sources using sound pressure - Engineering methods for an essentially free field over a reflecting plane	TS EN ISO 3744
Acoustic-Noise	Determination of sound power levels and sound energy levels of noise sources using sound pressure - Survey method using an enveloping measurement surface over a reflecting plane	TS EN ISO 3746
Acoustic-Noise	Laboratory and field measurement of flanking transmission for airborne, impact and building service equipment sound between adjoining rooms - Part 2: Application to Type B elements when the junction has a small influence	TS EN ISO 10848-2 and TS EN ISO 10848-2/AC
Acoustic-Noise	Laboratory and field measurement of flanking transmission for airborne, impact and building service equipment sound between adjoining rooms - Part 3: Application to Type B elements when the junction has a substantial influence	TS EN ISO 10848-3
Acoustic - Noise	Acoustic quality criteria for music rehearsal rooms and spaces	ISO 23591: 2021
Acoustic - Noise	Acoustics — Acoustic quality of open office spaces	ISO 22955: 2021
Acoustic-Noise	Determination of sound power levels and sound energy levels of noise sources using sound pressure - Engineering/survey methods for use in situ in a reverberant environment	TS EN ISO 3747
Acoustic-Noise	Acoustics - Measurement of sound pressure level from service equipment in buildings - Engineering method	ISO 16032

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	Accreditation Nr: AB-1572-T Revision Nr: 02 Date: 17.11.2023	
Testing Laboratory		
Address : EGEMENLİK MAH. 6106/18 SOK. NO:13-1 BORNOVA / İZMİR İzmir/Türkiye		Phone : +90 232 462 0666 Fax : - Email : info@blx-arf.com Website : www.blx-arf.com
Acoustic-Noise	Attenuation of sound during propagation outdoors – Part 1: Calculation of the absorption of sound by atmosphere	TS ISO 9613-1
Acoustic-Noise	Attenuation of sound during propagation outdoors - Part 2: General method of calculation	TS ISO 9613-2
Acoustic-Noise	Determination of sound power levels (ΔL_p , ΔL_F , ΔL_M , ΔL_G , L_{pA} , L_w) of multisource industrial plants for evaluation of sound pressure levels in the environment	TS ISO 8297

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KARAKUTU ELEKTROAKUSTİK PROJE VE UYGULAMA SANAYİ VE TİCARET LİMİTED ŞİRKETİ		
 <p>Accreditation Nr: AB-1572-T Revision Nr: 02 Date: 17.11.2023</p>		
Construction Materials, Products and Buildings		
Tested Materials / Products	Name of Test	Testing Method (National, International Standards, In-house Methods)
Doors and Windows	Acoustics - Laboratory Measurement of Sound Insulation of Building Elements - Measurement of Airborne Sound Insulation	TS EN ISO 10140-2
Thermal Insulation Materials - Acoustics	Measurement of Sound Absorption in a Reverberation Room	TS EN ISO 354
Acoustic - Noise	Measurement of speech level reduction of furniture ensembles and enclosures Part 1: Laboratory method	ISO 23351-1
Doors and Windows	Acoustics - Rating of Sound Insulation in Buildings and of Building Elements - Airborne Sound Insulation	TS EN ISO 717-1
Windows, Doors, Walls, Ceilings, Panels	Acoustics - In-Situ Determination of Insertion Loss of Outdoor Noise Barriers of all Types	ISO 10847
Screens, Furniture and Single Objects intended for Interior Use	Acoustics - Rating of Sound Absorption and Sound Reduction of Elements based on Laboratory Measurements	ISO 20189
Sound Insulation Materials	Acoustics - Determination of Sound Absorption Coefficient and Impedance in Impedance Tubes - Part 2: Transfer-Function Method	TS EN ISO 10534-2
Windows, Doors, Walls, Ceilings and Panels	Rating of Sound Insulation in Buildings and of Building Elements - Part 2: Impact Sound Insulation	TS EN ISO 717-2
Cabins	Acoustics-Determination of Sound Insulation Performance of Cabins-Laboratory and in Situ Measurements	TS EN ISO 11957
Enclosures	Acoustics - Determination of Sound Insulation Performances of Enclosures	TS EN ISO 11546-1

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Tested Materials / Products	Name of Test	Testing Method (National, International Standards, In-house Methods)
Household and similar electrical appliances	Household and similar electrical appliances - Test code for the determination of airborne noise - Part 1: General requirements	TS EN 60704-1 EN 60704-1 IEC 60704-1
Household and similar electrical appliances	Household and similar electrical appliances - Test code for the determination of airborne acoustical noise - Part 2-1: Particular requirements for vacuum cleaners (IEC 60704-2-1:2000) / Note: Applies only in conjunction with EN 60704-1 (1997)	TS EN 60704-2-1 EN 60704-2-1 IEC 60704-2-1
Household and similar electrical appliances	Household and similar electrical appliances - Test code for the determination of airborne acoustical noise - Part 2-3: Particular requirements for dishwashers	TS EN 60704-2-3 EN 60704-2-3 IEC 60704-2-3
Household and similar electrical appliances	Household and similar electrical appliances - Test code for the determination of airborne acoustical noise - Part 2 - 4: Particular requirements for washing machines and spin extractors	TS EN 60704-2-4 EN 60704-2-4 IEC 60704-2-4
Household and similar electrical appliances	Household and similar electrical appliances - Test code for the determination of airborne acoustical noise - Part 2-6: Particular requirements for tumble dryers	TS EN 60704-2-6 EN 60704-2-6 IEC 60704-2-6
Household and similar electrical appliances	Household and similar electrical appliances - Test code for the determination of airborne acoustical noise - Part 2-9: Particular requirements for electric hair care appliances (IEC 60704-2-9:2003) / Note: Endorsement notice	TS EN 60704-2-9 EN 60704-2-9 IEC 60704-2-9
Household and similar electrical appliances	Household and similar electrical appliances - Test code for the determination of airborne acoustical noise - Part 2-10: Particular requirements for electric cooking ranges, ovens, grills, microwave ovens and any combination of these	TS EN 60704-2-10 EN 60704-2-10 IEC 60704-2-10
Household and similar electrical appliances	Household and similar electrical appliances - Test code for the determination of airborne acoustical noise - Part 2-14: Particular requirements for refrigerators, frozen-food storage cabinets and food freezers	TS EN 60704-2-14 EN 60704-2-14 IEC 60704-2-14
Fire detection and alarm systems	Fire detection and alarm systems — Part 19: Design, installation, commissioning and service of sound systems for emergency purposes	ISO 7240-19

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 <p>TÜRKAK Tsi TS EN ISO/IEC 17023 AB-1572-T</p>	<p>KARAKUTU ELEKTROAKUSTİK PROJE VE UYGULAMA SANAYİ VE TİCARET LİMİTED ŞİRKETİ</p> <p>Accreditation Nr: AB-1572-T Revision Nr: 02 Date: 17.11.2023</p>	
5000 Ballistics and Explosives		
Tested Materials / Products	Name of Test	Testing Method (National, International Standards, In-house Methods)
Ducted silencers and air-terminal units	TS EN ISO 7235 ISO 7235 Laboratory measurements for silencers and air termination devices mounted on the ventilation duct - Attachment loss, flow noise, and total pressure loss. Measurement frequency range: 100 Hz - 6300 Hz in 1/3 Octave bands. Determination of insertion loss by measuring sound pressure levels on a surface surrounding the open end of the silencer channel.	TS EN ISO 7235 ISO 7235 Clause 6.2.1
Silencers	TS EN ISO 11820 ISO 11820 Measurements on silencers in situ Measuring range: 1/3 or 1/1 octave bands 100 Hz to 6300 Hz Transmitted sound pressure level difference Insertion sound pressure level difference Transmission loss Insertion loss	TS EN ISO 11820 ISO 11820 Clause 3.1 Clause 3.2 Clause 3.3 Clause 3.4

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