TEST REPORT

2023AU0758

DATE OF RECEPTION
Date Format: dd/MM/yyyy 21/11/2023

DATE TESTS
Starting: 28/11/2023
Ending: 28/11/2023

APPLICANT

ACTIU BERBEGAL Y FORMAS, S.A.
P.T. ACTIU; AUTOVIA CV.80 SALIDA ONIL-CASTALLA
ES-03420 Castalla (Alicante/Alacant)
España

Att. Pablo Miró Aparisi

IDENTIFICATION AND DESCRIPTION OF SAMPLES

Reference by AITEX	Reference by customer	AITEX sample description
2023AU0758-S01	QYOS100	Material

TESTS CARRIED OUT

- VOICE LEVEL REDUCTION MEASUREMENT.

Rev.1 This revision cancels and replaces the previous
Reference error

SAMPLE/S DESCRIPTION

Reference
2023AU0758-S01

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RESULTS

VOICE LEVEL REDUCTION MEASUREMENT

Standard
ISO 23351-1:2020

Measurement date
08/11/2023

Material tested
2023AU0758-S01

Instrument used
Bruel and Kjaer sound level meter type 2270. SN:3011089
Bruel & Kjaer micro ½" type 4189. SN:3180898
Bruel & Kjaer preamplifier SN 28138
Bruel & Kjaer micro ½" type 4231. SN:3019977
Bruel & Kjaer dodecahedron source OmniPower 4296. SN:2498653.
Bruel & Kjaer Stage amplifier 2716. SN:2551039.

Aim of the test
This study was carried out in the reverberation chamber of the Escuela Politècnica Superior de Gandia of the Universitat Politècnica de Valencia.
The main aim of the study was to measure using the ISO 23351-1:2020 Standard.
Acoustics — Measurement of speech level reduction of furniture ensembles and enclosures — Part 1:
Laboratory method.
The standard stipulates a laboratory method to facilitate the comparison of furniture and enclosure units with respect to their ability to reduce the speech level of the occupant speaking inside the product.
In this method, the sound strength level is measured in two scenarios:
1) without the product and
2) with the product.
During scenario 1), the test signal is reproduced by the sound source in an empty reverberation chamber without the product.
During scenario 2), the test signal is reproduced by the sound source inside the product in the position of the occupant.
Level reduction is the difference in the measured sound strength levels in the two scenarios in octave frequency bands from 125 Hz to 8 000 Hz.
Speech level reduction is a single number that expresses the corresponding reduction in the A-weighted sound strength level of standard speech over the entire frequency range from 125 Hz to 8 000 Hz.
The method is applicable for complete furniture assemblies or enclosures which form a unit for the use of one or more occupants, and which are also used to provide greater speech privacy.

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Procedure

This test was carried out in the reverberation chamber of the Escuela Politècnica Superior de Gandia (EPSG) of the Universitat Politècnica de Valencia on 8 November 2023.
The environmental conditions were normal with no sudden changes in temperature or humidity.
The tests with an empty chamber showed a temperature of 21.3º C and 50.6% relative humidity and the tests with the two configurations showed a temperature of 22.8º C and 45.1% relative humidity.
Figures 1 and 2 show details of the reverberation chamber set up with only the source and inside the booth.
The test took place inside the reverberation chamber and two sound strength level measurements were taken, one without the booth and one with the booth.
The sound strength level of the sound source $L_{W,P,1}$ with the booth and $L_{W,P,2}$ without the booth was measured, and the level reduction of both Di was obtained.
Using the above values, the reduction in speech level ($D_{S,A}$) was calculated.

Figure 1: Reverberant chamber assembly with source only

Figure 2: Assembly with booth configuration 1

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Sound strength measurement

The sound strength measurements are shown below in WITHOUT-BOOTH and WITH-BOOTH
The determination of sound strength was carried out according to standard UNE-EN ISO 3741:2011. Acoustics. Determination of the sound strength levels and sound energy levels of noise sources from sound pressure. Laboratory methods in reverberation chambers. (ISO 3741:2010).
The following table shows the sound strength level results according to UNE-EN ISO 3741:2011 without cabin and with booth, for CONFIGURATION 1: 2023AU0758-S01

f (Hz)	LW (dB) without booth	LW (dB) With booth
100	95.1	68.6
125	98.3	71.6
160	102.5	84.6
200	104.5	82.8
250	105.6	85.3
315	106.6	81.1
400	106.2	78.3
500	105.3	71.3
630	104.6	66.7
800	104.4	63.0
1000	103.8	60.5
1250	102.1	57.7
1600	103.9	61.1
2000	103.4	60.6
2500	103.2	59.3
3150	102.2	56.2
4000	101.2	53.4
5000	98.6	50.1
6300	99.0	50.4
8000	97.8	48.3
10000	91.1	39.6

Sound strength levels (dB) for CONFIGURATION 1: 2023AU0758

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Results

The following table shows the calculations according to APPENDIX A of ISO 23351-1:2020 for CONFIGURATION 1: 2023AU0758-S01

1/1 octave frequency band	Unweighted values		Dj	Unweighted values		Ai	A-weigthed values	
Hz	$L_{w,P,1,i}$ (dB)	$L_{w,P,2,i}$ (dB)	dB	$L_{w,S,1,i}$ (dB)	$L_{w,S,2,i}$ (dB)	dB	$L_{w,S,A,1,i}$ (dB)	$L_{w,S,A,2,i}$ (dB)
125	104,4	84,9	19,5	60,9	41,4	-16,1	44,8	25,3
250	110,4	88,2	22,2	65,3	43,1	-8,6	56,7	34,5
500	110,2	79,3	30,9	69,0	38,1	-3,2	65,8	34,9
1000	108,3	65,7	42,6	63,0	20,4	0,0	63,0	20,4
2000	108,2	65,2	43,1	55,8	12,7	1,2	57,0	13,9
4000	105,7	58,7	47,0	49,8	2,8	1,0	50,8	3,8
8000	101,8	52,7	49,1	44,5	-4,6	-1,1	43,4	-5,7

Calculations according to ISO 23351-1:2020

The overall results are as follows:

$L_{w,P,1}$ (dB)	116,3
$L_{w,P,2}$ (dB)	90,3
$L_{w,S,1}$ (dB)	71,8
$L_{w,S,2}$ (dB)	46,1
$L_{w,S,A,1}$ (dB)	68,4
$L_{w,S,A,2}$ (dB)	38,0

D (dB)	26,1
D_S (dB)	25,7
$D_{S,A}$ (dB)	**30,4**

CLASS	**A**

The sound strength level of the source without booth Lw,p,1 was 116.3 dB while with booth it was 90.3 dB, giving a booth D reduction level of 26.1 dB. The standardised speech strength level without booth was $L_{W,S,1}$ and with booth $L_{W,S,2}$ was 71.8 dB and 46.1 dB respectively, giving a standardised speech reduction Ds of 25.7 dB. The A-weighted speech strength level without booth $L_{W,S,A,1}$ and with booth $L_{W,S,A,2}$ is 68.4 dB and 38.0 dB giving a speech level reduction $D_{S,A}$ of 30.4 dB.

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•• CONFIGURATION 1: 2023AU0758-S01, the summary of which is:

Frecuencia Frequency	Nivel de reducción de habla Speech level reduction
f (Hz)	D (dB)
125	*19,5*
250	*22,2*
500	*30,9*
1000	*42,6*
2000	*43,1*
4000	*47,0*
8000	*49,1*
$D_{s,A}$	***30,4***
CLASE/CLASS	***A***

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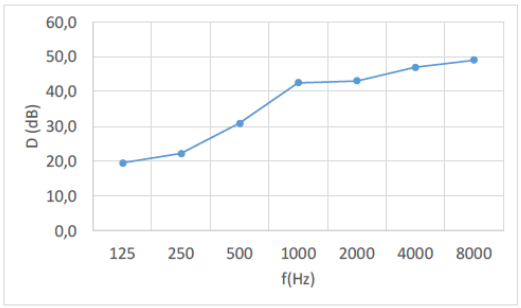
APPENDIX 1. DATA SHEETS ACCORDING TO ISO STANDARD ISO 23351-1: 2020

Solicitante: ACTIU			
Muestra Ensayada:	**QY100-ACUS**	**Fecha ensayo:**	08/11/2023
		Fecha informe:	10/11/2023

Cálculos acordes a norma / Calculations according to norm

Frecuencia Frequency	Nivel de reducción de habla Speech level reduction
f (Hz)	D (dB)
125	*19,5*
250	*22,2*
500	*30,9*
1000	*42,6*
2000	*43,1*
4000	*47,0*
8000	*49,1*
$D_{S,A}$	***30,4***
CLASE/CLASS	***A***



f 1/1 banda de frecuencias de octava / 1/1- octave frequency band (Hz)
D nivel de reducción / level reducción (dB)
$D_{S,A}$ Nivel de reducción del habla / speech level reduction (dB)

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Ana Alarcon
Head of Automotive & Transports Division

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