

Test Report No. 7191201823-MEC19-EMK_CR1
dated 16 Jan 2019

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SUBJECT:

Laboratory measurement of noise reduction of enclosure submitted by Exsto Asia Pte Ltd on 11 Jan 2019.

TESTED FOR:

INAPOD

DATE OF TEST:

14 Jan 2019

DESCRIPTION OF SAMPLES:

The following enclosure was installed in the reverberation room.

Model	:	Acoustic Booth
Product Name	:	Phone Booth
External Dimension	:	1000mm (width) x 1000mm (depth) x 2170mm (height)
Internal Dimension	:	800mm (width) x 920mm (depth) x 2000mm (height)

The technical drawing of the phone booth submitted by the company was shown in Appendices.

Amendments (31 Jan 2019): Page 1 (SUBJECT and DESCRIPTION OF SAMPLES)



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METHOD OF TEST:

The test was conducted in accordance with the following test standards.

- a) ASTM E596-96 (Reapproved 2009) "Standard test method for Laboratory Measurement of Noise Reduction of Sound-Isolating Enclosures"
- b) ASTM E413 - 04 "Classification for Rating Sound Insulation"


TEST EQUIPMENT:

The following instruments were used for the test.

- 1) LAN-XI Data Acquisition Unit (B & K Type 3160-A-042) with Pulse Labshop (v.16)
- 2) 1 units of 4-channel sound & vibration analyser (SVAN 958).
- 3) One units of loudspeaker (JBL MPro MP415)
- 4) 5 sets of ½" free-field microphone (B & K Type 4943) and pre-amplifier (B & K Type 2669)
- 5) A sound pressure level calibrator (Norsonic Type 1251)
- 6) A sound source amplifier (Crown model CE 1000)

TEST PROCEDURES:

- 1) The enclosure and test equipment were set up inside a reverberation room as shown in Figure 2.
- 2) Measurement system was calibrated.
- 3) Sound pressure level inside the phone booth was measured at 4 different microphone locations.
- 4) Sound pressure level outside the phone booth was measured at 8 different microphone locations.
- 5) A loudspeaker was placed at 2 separate different locations outside the phone booth to generate white noise for the measurement.
- 6) Noise reduction (NR) values was determined for each 1/3 octave frequency band from 100Hz to 5kHz based on the mean values of 2 different loudspeaker positions.
- 7) Noise Isolation Class (NIC) was determined at 500Hz frequency of the shifted reference curve according to ASTM E413.



Test Report No. 7191201823-MEC19-EMK_CR1
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TEST RESULTS:

The test results were tabulated in the following tables.

- a) Table 1 shows the background noise level inside the phone booth
- b) Table 2 shows the noise reduction level (NR) of the phone booth
- c) Table 3 shows the measured noise reduction, NR and values of the shifted reference curve.

Table 1: Background Noise Level inside Phone Booth

1/3 Octave Frequency (Hz)	Background Noise Level (dBL)	
	1/3 Octave Band	1/1 Octave Band
100	46.0	43
125	42.9	
160	41.7	
200	36.3	29
250	36.2	
315	25.0	
400	29.5	17
500	18.5	
630	13.8	
800	10.6	9
1000	8.4	
1250	8.9	
1600	8.9	9
2000	8.2	
2500	8.8	
3150	9.0	10
4000	10.0	
5000	11.0	



RESULTS: (Con't)

Table 2 : Noise Reduction Level of Phone Booth

1/3 Octave Frequency (Hz)	Noise level (dBL)		Noise Reduction Level, NR (dBL)
	Outside Phone Booth	Inside Phone Booth	
100	80.65	73.46	7.2
125	83.31	66.17	17.1
160	84.23	67.73	16.5
200	85.15	64.59	20.6
250	85.40	63.01	22.4
315	83.52	54.98	28.5
400	81.94	52.75	29.2
500	82.87	51.94	30.9
630	84.45	52.35	32.1
800	84.30	51.30	33.0
1000	83.56	51.03	32.5
1250	81.79	49.13	32.7
1600	82.17	50.63	31.5
2000	84.15	50.29	33.9
2500	82.82	45.86	37.0
3150	85.18	45.29	39.9
4000	84.35	43.97	40.4
5000	83.43	43.70	39.7
Overall Linear (dBL)	96.2	75.9	20.4

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Test Report No. 7191201823-MEC19-EMK_CR1
dated 16 Jan 2019



RESULTS: (Con't)

Table 3 : Measured Noise Reduction, NR and values of the shifted reference curve for NIC= 32

1/3 Octave Band Frequency (Hz)	Measured Noise Reduction, NR, (dB)	Shifted Reference Curve NIC = 32 dB	Deficiency
100	7.2	13	5.8
125	17.1	16	0.0
160	16.5	19	2.5
200	20.6	22	1.4
250	22.4	25	2.6
315	28.5	28	0.0
400	29.2	31	1.8
500	30.9	32	1.1
630	32.1	33	0.9
800	33.0	34	1.0
1000	32.5	35	2.5
1250	32.7	36	3.3
1600	31.5	36	4.5
2000	33.9	36	2.1
2500	37.0	36	0.0
3150	39.9	36	0.0
4000	40.4	36	0.0
5000	39.7	36	0.0
Total deficiency (125Hz – 4000Hz)			24

The values in Table 1 were plotted as shown in Figure 1.

Remark:

The tested Phone Booth achieved

- a) Noise Reduction, NR = 20dB
- b) Noise Isolation class, NIC = 32


Francis Ee Min Kuen
Testing Officer


Lem Chee Meng
Product Manager
Acoustics
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RESULTS: (cont'd)

Figure 1 : Noise Isolation Performance of Phone Booth
(NIC 32)

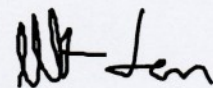
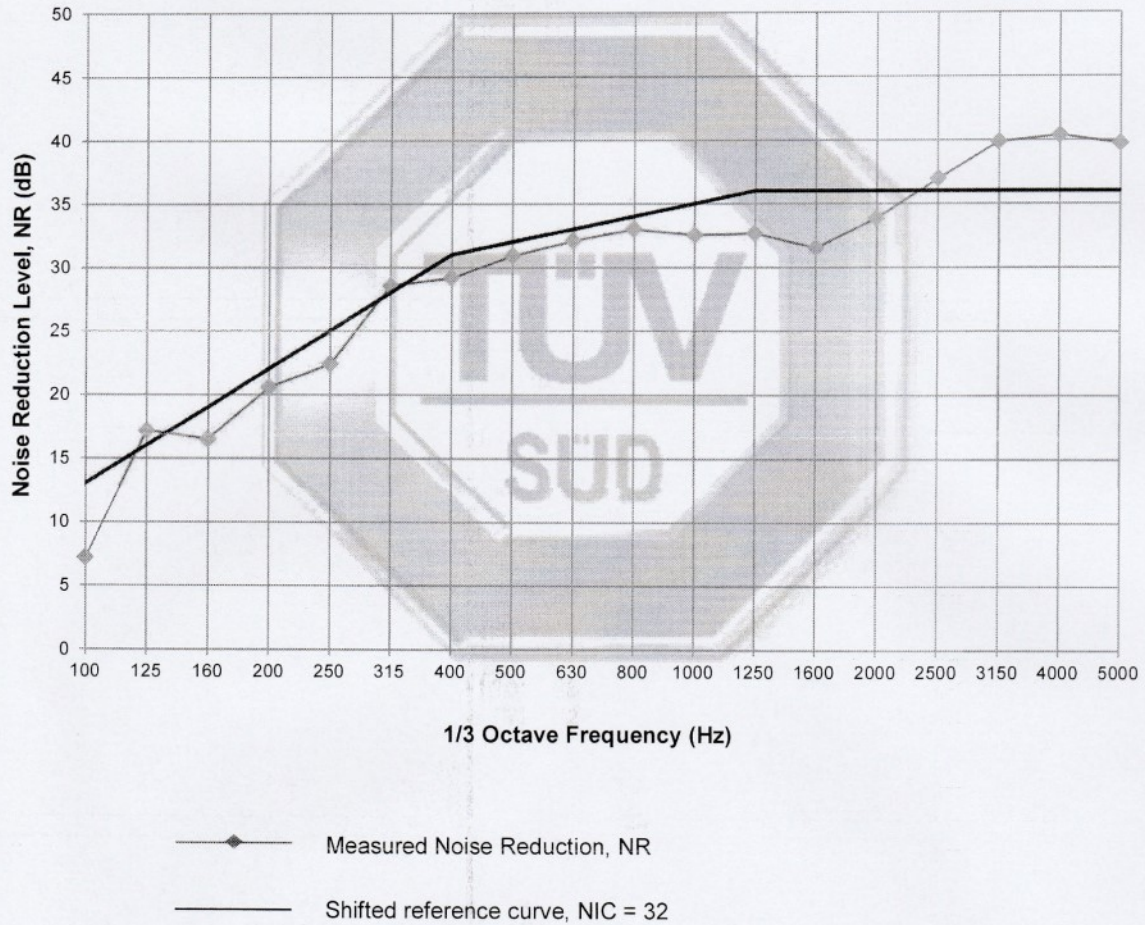
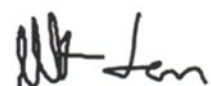
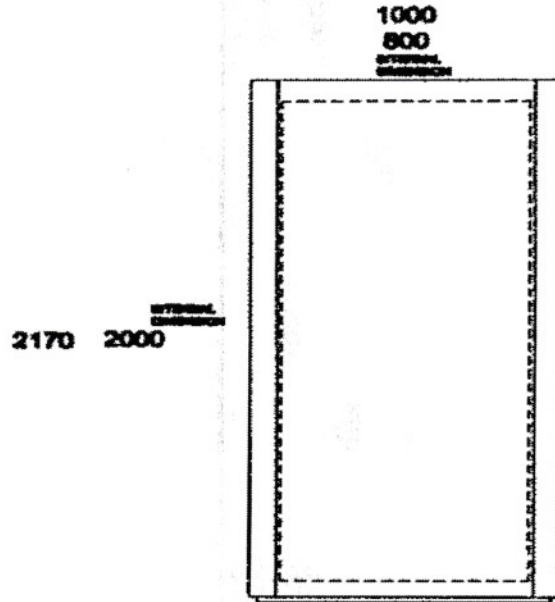


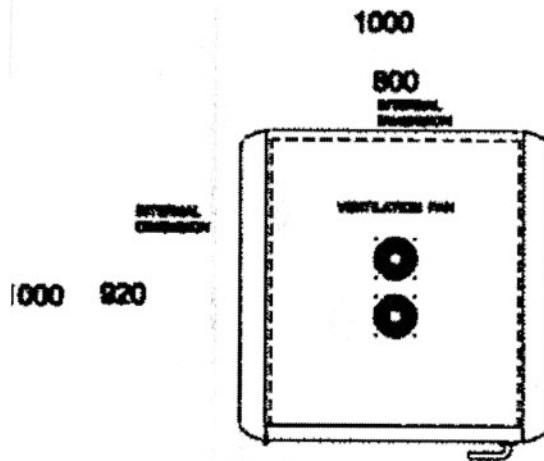


Figure 2 : Test Setup of Phone Booth inside reverberation room





REAR VIEW



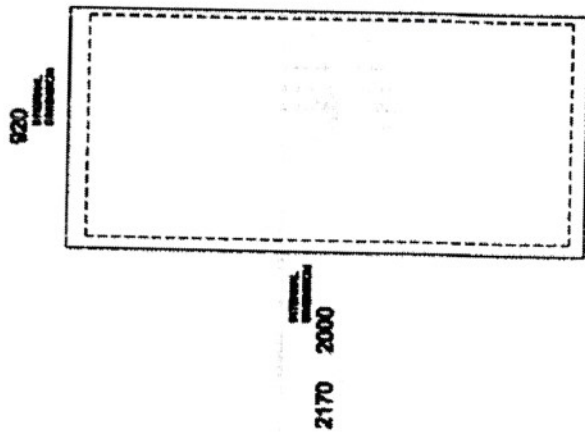
PLAN VIEW

Appendix 1 : Technical drawing of Phone Booth

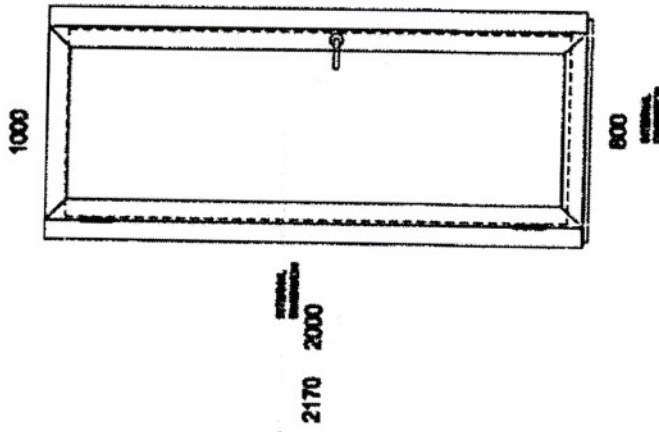
Test Report No. 7191201823-MEC19-EMK_CR1
dated 16 Jan 2019



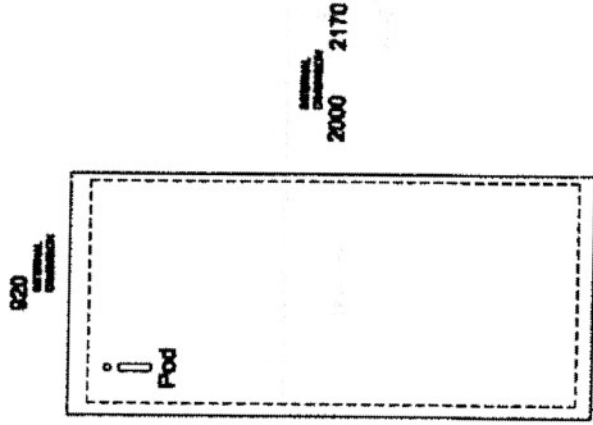
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SIDE VIEW



FRONT VIEW



SIDE VIEW

Appendix 2 : Technical drawing of Phone Booth

Test Report No. 7191201823-MEC19-EMK_CR1
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July 2011

