CONFIDENTIAL

TEST REPORT ON MEASUREMENT OF RANDOM INCIDENCE SOUND ABSORPTION COEFFICIENT OF HORIZON PRO ACOUSTIC PANEL

NVH/3100008821/2020-21/1501 **28th January 2021**

1.0 CUSTOMER NAME : A R Acoustics Limited Liability Partnership
Fifth Floor, 504, Jupiter Gaurav Galaxy Phase 2,
Near Nityanand Nagar, Mira Road East,
Thane - 401107, Maharashtra

2.0 LETTER REF. : E-mail dated 22nd December 2020

3.0 TEST COMPONENT DETAILS : Test sample details given by customer are as follows,

3.1	Sample Name	:	Horizon Pro Acoustic Panel
3.2	Layer construction	:	Fabric + Mineral wool of 96 kg/m^3 density
3.3	Size of one panel	:	595 mm (L) X 595 mm (W) X 50 mm (H) Total 16 panels used for mounting
3.4	Area of test sample	:	2.4 m x 2.4 m
3.5	Type of mounting	:	Type A mounting

4.0 TEST REQUIREMENTS :

Measurement of random incidence sound absorption coefficient on above mentioned test sample as per ASTM C-423 / ISO 354 in reverberation chamber.

5.0 TEST PROCEDURE :

5.1 The random incidence sound absorption coefficient measurement was carried out on above mentioned test sample as per ASTM C-423 / ISO 354.

5.2 Please refer figure 1 for test set up and Annexure 1 for test component details.

5.3 Reverberation chamber is excited with random noise in the range from 100 Hz to 5000 Hz.

5.4 Reverberation time RT_{60} were measured with and without test sample in reverberation chamber at one third octave frequency band.

5.5 The measurement was carried out at temperature 25^{0}C ±1^{0}C and humidity 50%.

6.0 DATE OF EVALUATION :

The random incidence sound absorption coefficient measurement was carried out on above mentioned test sample on 27th January 2021.

An ISO 9001, ISO 14001, ISO 45001, ISO/IEC 27001 Certified and ISO/IEC 17025 Accredited Organization

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NVH/3100008821/2020-21/1501 28th January 2021

7.0 INSTRUMENTATION :

Sr. No.	Instrument Name	Type / Model No	Make	Calibrated on	Calibration due on
1	Multi-channel Data Acquisition System	3560 D	Bruel & Kjaer, Denmark	05-Aug-20	05-Aug-21
2	½" Random Incidence Microphone	378B20	PCB, USA	05-Aug-20	05-Aug-21
3	Power Amplifier	2716	Bruel & Kjaer, Denmark	Does not require separate calibration as it is driven by data acquisition system	
4	Omni directionnel sound source	Omni power 4296	Bruel & Kjaer, Denmark		
5	Reverberation Chambers	80 m^3 and 110 m^3	-	-	-

8.0 TEST RESULTS :

Table 1 and figure 2 shows the values and plot for random incidence sound absorption coefficient of Horizon Pro Acoustic Panel consist of Fabric + Mineral wool of 96 kg/m^3 density and total 50 mm thickness in the frequency range of 100 Hz to 5000 Hz.

9.0 CONCLUSIONS :

9.1 The Noise Reduction Coefficient (NRC) is given by the average value of sound absorption coefficient at 250 Hz, 500 Hz, 1000 Hz and 2000 Hz is calculated as per ASTM C-423.

9.2 Sound Absorption Average (SAA) is given by the average value of sound absorption coefficient from 200 Hz to 2500 Hz and it is calculated as per ASTM C-423.

9.3 The weighted sound absorption coefficient (α_w) and sound absorption class are calculated as per ISO 11654 are given below.

Horizon Pro Acoustic Panel consist of Fabric + Mineral wool of 96 kg/m^3 density and total 50 mm thickness	
Noise Reduction Coefficient (NRC)	0.85
Sound Absorption Average (SAA)	0.86
Weighted sound absorption coefficient α_w	0.90
Sound Absorption Class	Class A

Report Prepared By:	Reviewed By:	Approved By:
P. P. Kamble	M. P. Joshi	S. K. Jain
Engineer	Dy. General Manager	General Manager

NVH/3100008821/2020-21/1501

28th January 2021

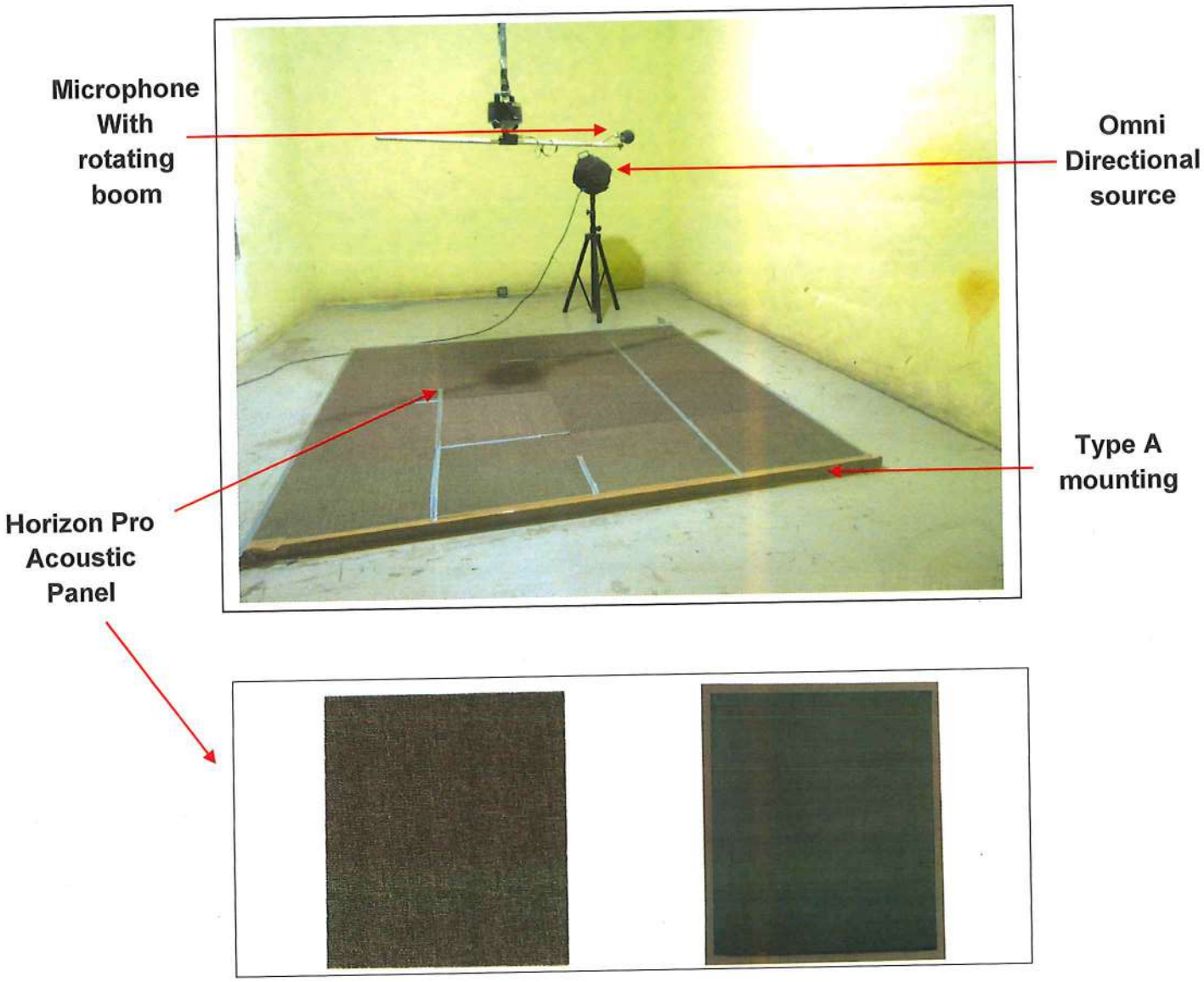
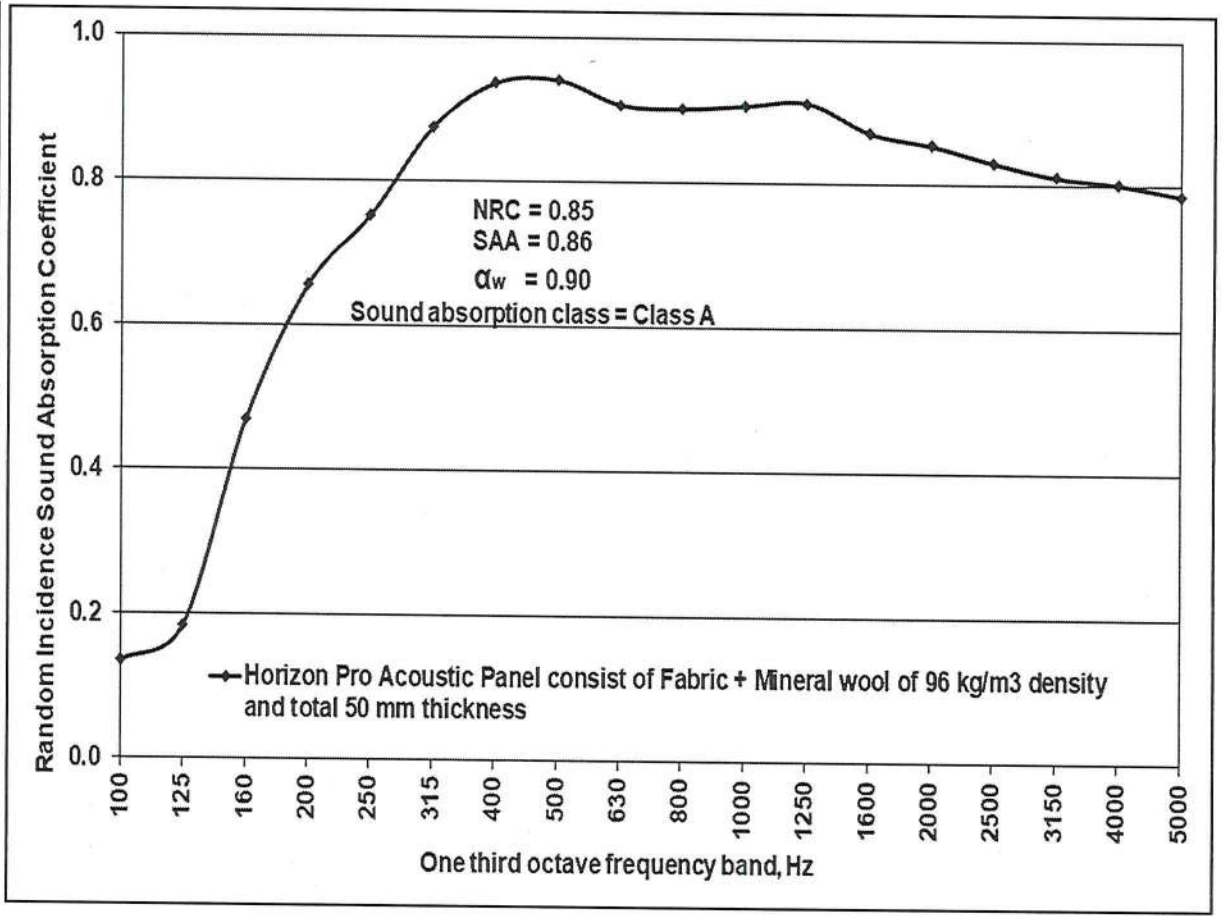


Figure 1: Test set up for mounting and testing of Horizon Pro Acoustic Panel with Type A mounting in reverberation chamber

Table 1 and Figure 2: Values and plot for random incidence sound absorption coefficient of Horizon Pro Acoustic Panel consist of Fabric + Mineral wool of 96 kg/m^3 density and total 50 mm thickness at one third octave frequencies

One third octave frequency, Hz	Random Incidence Sound Absorption Coefficient	Standard Deviation
100	0.14	0.02
125	0.18	0.02
160	0.47	0.00
200	0.66	0.02
250	0.75	0.01
315	0.88	0.02
400	0.94	0.02
500	0.94	0.02
630	0.91	0.02
800	0.90	0.01
1000	0.91	0.01
1250	0.91	0.02
1600	0.87	0.01
2000	0.85	0.00
2500	0.83	0.01
3150	0.81	0.01
4000	0.80	0.01
5000	0.79	0.00



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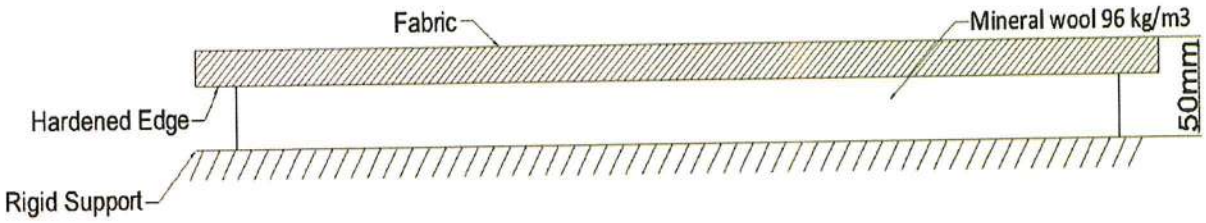
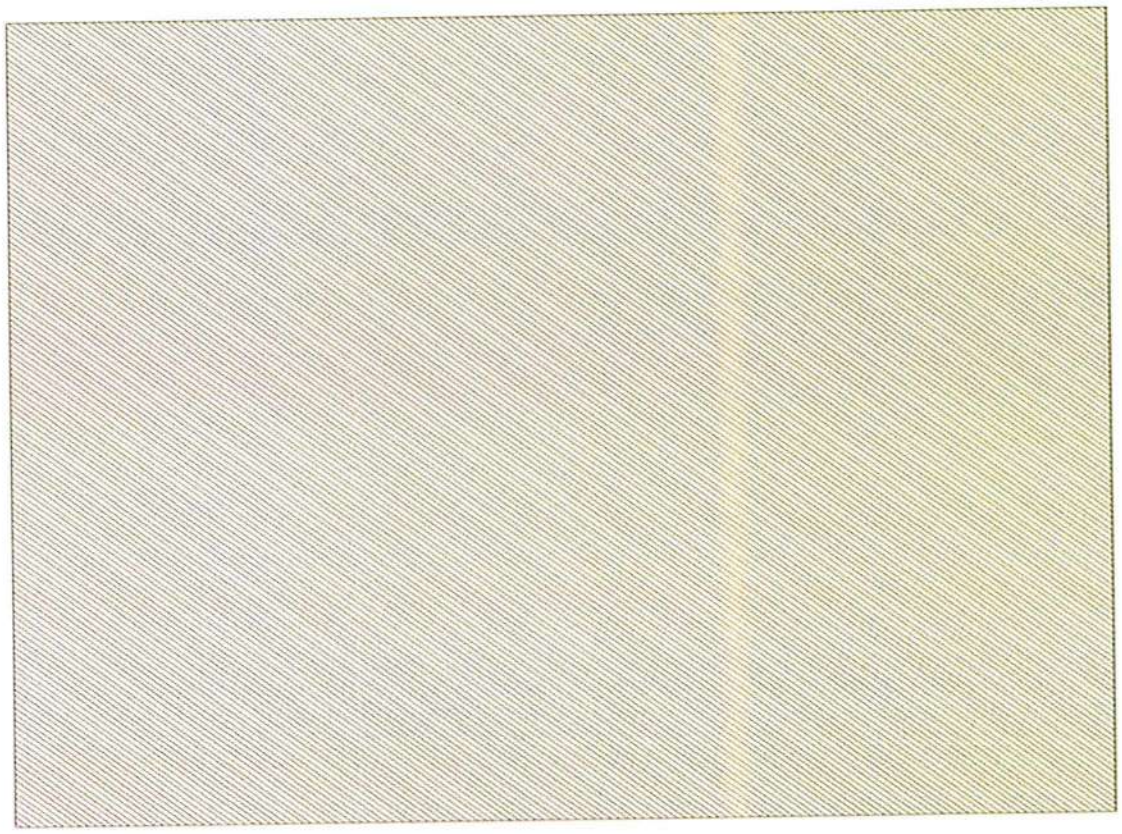
28th January 2021

Annexure 1



Side View



Top View