



REPORT

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Noise screening effect of “Nunna” chairs

Client

Strand Design Design AB by Charles Strand.

Test object

“Nunna” chair Strand Design AB.

Pictures of the test object can be seen in the report.

Date of test

July 27, 2016

Measurement procedure

The screening effect of the chair is of interest with respect to reducing the outside noise at the seating position, as well as providing privacy for the seated person by reducing the transmission of speech to the outside. To show these screening effects of the chair, two measurement setups were used. First, the loudspeaker was placed at ear height of a seated person, 2.5 m away from the seating position of the chair, and the noise emitted by the loudspeaker was measured at ear positions inside the chair at two different depths. In the next set of measurements, the loudspeaker was placed inside the chair at a position representing the mouth of a seated person with medium height (170 cm). The microphone was placed outside the chair, at 2.5 m distance, in front of the loudspeaker. The loudspeaker generated pink noise with adjacent third-octave bands difference less than 5 dB.

In order to show the angle-dependent screening effect, the chair was rotated between 0 to 180 degrees in 45° steps and the measurements were repeated for every angle. All measurements were performed at the semi-anechoic laboratory of SP Sound and Vibration.

Results

Table 1 and 2 show the measurement results corresponding to all sets of measurements. The data are presented for two frequency ranges, 50-10000 Hz range which makes the results comparable with the absorption measurement data, and 200-2000 Hz which is a critical frequency range concerning human speech.

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Table 1 – Equivalent A-weighted sound pressure levels at different angles. Noise source outside, and receiver inside the chair.

		Microphone at ear position inside the chair*					
		Angle	0°	45°	90°	135°	180°
		Depth**					
$L_{Aeq, 50-10000}$ (dBA)	15 cm		78.0	73.8	67.3	62.0	61.3
	30 cm		76.3	76.0	74.3	65.4	62.2
$L_{Aeq, 200-2000}$ (dBA)	15 cm		75.6	71.1	64.7	58.6	55.5
	30 cm		72.5	72.1	70.9	62.4	58.8

* The presented value is the average between L_{Aeq} at both ears.

** The depths are measured from the back of the chair.

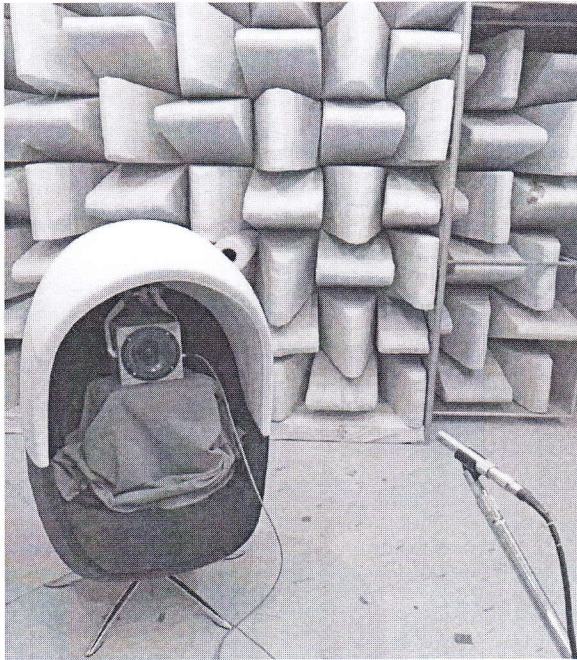
Table 2 – Equivalent A-weighted sound pressure levels at different angles. Sound source inside, and receiver outside the chair.

		Loudspeaker at mouth position inside the chair*					
		Angle	0°	45°	90°	135°	180°
		Range					
$L_{Aeq, 50-10000}$ (dBA)			75.6	66.8	61.6	59.2	58.8
$L_{Aeq, 200-2000}$ (dBA)			72.8	65.6	59.5	56.4	55.6

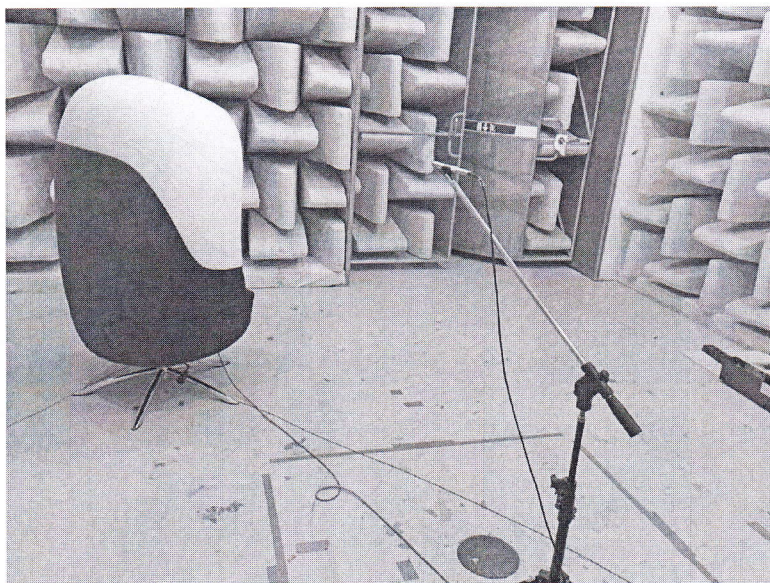
* The loudspeaker was placed at the depth 28 cm from the back of the chair and at 65 cm height from the seating surface.

Pictures of the test object

Picture 1 – Measurement setup with the loudspeaker at mouth position. The picture shows 0° angle.



Picture 2 – 90° angle between the source and the receiver.



**List of instruments**

Instrument	Manufacturer	Type	Serial no/SP no.
Analyzer	Norsonic	140	2749979
Equalizer	Behringer	DEQ2496	S1502490146
Power amplifier	Norsonic	Nor280	2803690
Loudspeaker	SP Sound and Vibration	Calibration	-

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