Akustikverkstan Lab AB
Kinnegatan 23, 531 33 Lidköping, Sweden, +46 (0)510 - 911 44

carl.nyqvist@akustikverkstan.se
Direct: +46 (0)70 - 938 00 45

SOUND REDUCTION INDEX FOR STEEL STUD FRAME WALL WITH RECOMA PACKWALL WITHOUT INSULATION

CONCLUSION

The sound reduction index for three wall constructions with Recoma PackWall on a steel stud frame without insulation has been measured according to SS-EN ISO 10140-2:2021 and evaluated according to SS-EN ISO 717-1:2020. A summary of the results is presented in table 1 below. Detailed measurement results are presented in measurement protocols M4-M6 belonging to this report.

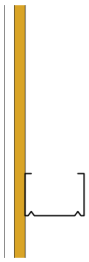
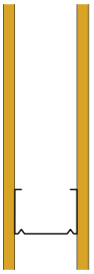
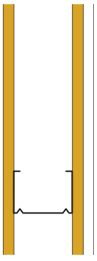
Measurement protocol/ Test object		R_w (dB)	C	C_{tr}	$C_{50\text{-}3150}$
M4: E MR 450 70/70 -/RA M0	 12,5 Standard gypsum board 12 Recoma PackWall 70 Knauf MR steel stud (s450), no insulation	33	-1	-3	-1
M5: E MR 450 70/70 R/R M0	 12 Recoma PackWall 70 Knauf MR steel stud (s450), no insulation 12 Recoma PackWall	40	-1	-6	-2
M6: E MR 450 70/70 AR/RA M0	 12,5 Standard gypsum board 12 Recoma PackWall 70 Knauf MR steel stud (s450), no inulation 12 Recoma PackWall 12,5 Standard gypsum board	50	-2	-7	-4

Table 1: Summary of the tested wall constructions.

1 CLIENT

Recoma AB, Norra Kringelvägen 13, 281 41 Hässleholm, Sweden
Contact: Fredrik Rosenberg, +46 (0)70 – 088 08 94, fredrik.rosenberg@recoma.se

2 ASSIGNMENT

To measure the sound reduction for three wall constructions according to SS-EN ISO 10140-2:2021 and evaluate according to SS EN ISO 717-1:2020

3 TEST OBJECTS

Three wall constructions as described in table 1 on the first page, have been tested. The constructions are made with Knauf 70 mm MR steel stud, gypsum board and Recoma PackWall.

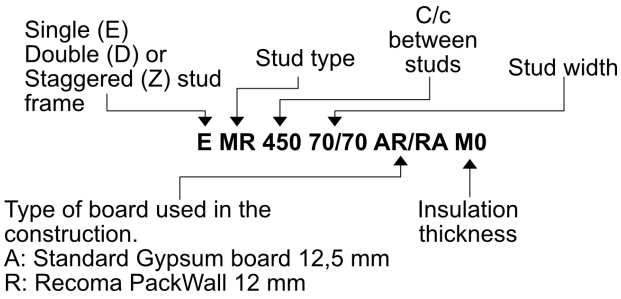
The Recoma PackWall Basic measured 12 mm in thickness. Surface weight was measured to 11.8 kg/m^2. The boards were 2250 x 600 mm and were mounted horizontally.

The gypsum boards were Knauf standard gypsum boards.

70 mm Knauf MR steel studs with c/c 450 mm were used in the frame.

The walls were mounted on the sending room side of the acoustic separation between the test rooms. The edge between test object and the test opening was sealed with acrylic caulk. Where there were gaps between Recoma boards, these were also sealed with caulk. The size of the test opening is 3.65 x 2.74 m.

The walls are named according to Knauf's nomenclature:



Photos from the tests can be found in appendix 4.

4 MEASUREMENT PROCEDURE

The measurements were performed according to SS-EN ISO 10140-2:2021 with two speaker positions in the sending room and with the microphone placed on a rotating boom in each measurement room. Each measurement period was 60 seconds. The reverberation time of the receiving room was measured with two speaker positions and four microphone positions. The measurements were performed in the Akustikverkstan laboratory in Skultorp by Carl Nyqvist 2025-11-06. More information about the laboratory can be found in appendix 1. The measurement equipment is described in appendix 2.

5 RESULTS

The measurements have been evaluated according to SS-EN ISO 717-1:2020. The weighted sound reduction indices, R_w, for the test objects are presented in table 1 in the first page together with the adaptation terms C, C_{tr} and $C_{50\text{-}3150}$. Detailed results for the measurements are available as measurement protocols 4688-M4 to M6.

The results are valid only for the tested specimens. The measurement accuracy is described in appendix 3.

This report should always be used in its complete context, even though the measurement protocols may be used independently.



Carl Nyqvist

Laboratory engineer

Reviewed by Johan Jernstedt, 2025-11-12

APPENDIX 1: INFORMATION ABOUT THE TEST FACILITY

Test room 2 on the 1st floor is rectangular with the dimensions of L x W x H = 5.0 x 6.25 x 3.93 m. The volume of the room is 123 m^3 and the total surface area of walls, ceiling and floor is 151 m^2. This room is used as the sending room during the measurements of the sound reduction indices of the walls.

Test room 1 (reverberation room) on the 1st floor has a rectangular form with the dimensions of L x W x H = 4.65 x 5.85 x 7.35 m. The volume of room is 200 m^3 and the total surface area of walls, ceiling and floor is 209 m^2. This room is used as the receiving room during the measurements of the sound reduction indices of the walls.

A section of the two rooms together with the location of the tested wall are shown in figure A2.1. The test opening is 10 m^2 (3.65 x 2.74 m).

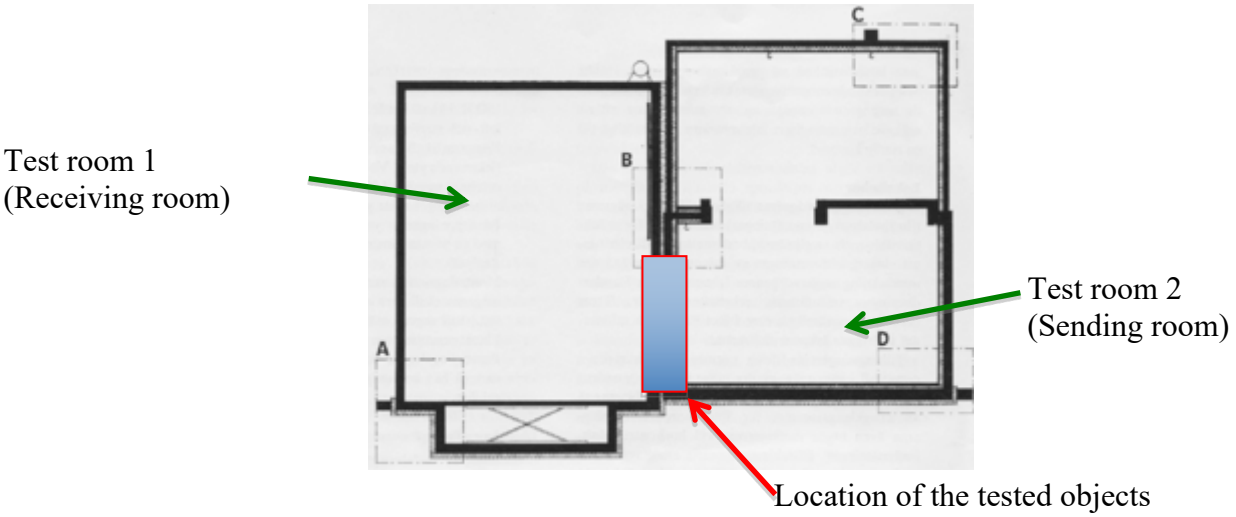


Figure A2.1: Section of the laboratory with the sending room (1st floor) and the reverberation room (1st floor) together with the location of the test specimens.

The walls of Test room 1 are made from 20 cm concrete with a density of 2300-2400 kg/m3. The walls in Test room 2 room are made from bricks (25 cm) with two layers of gypsum board and one layer of wooden fibreboard with 100 mm mineral wool behind. The test opening is acoustically separated in the split line between the rooms.

The laboratory address is Vallmovägen 11, 541 55 Skövde.

The measured R'_{max} for wall elements in the laboratory are stated in figure A2.2 below.

Frequency (Hz)	Sound reduction (dB) Heavy-weight	Light-weight
50		33.8
63		36.2
80		38.7
100	50	46.8
125	53	49.2
160	53	51.5
200	55	57
250	59	62
315	62.5	65
400	68	68
500	76	73
630	81	77.9
800	83	82
1 000	85	85
1 250	88	85
1 600	92	87.2
2 000	95	94.9
2 500	98	95.2
3 150	98	97
4 000		98.7
5 000		101.7
R_w	**71**	**71**

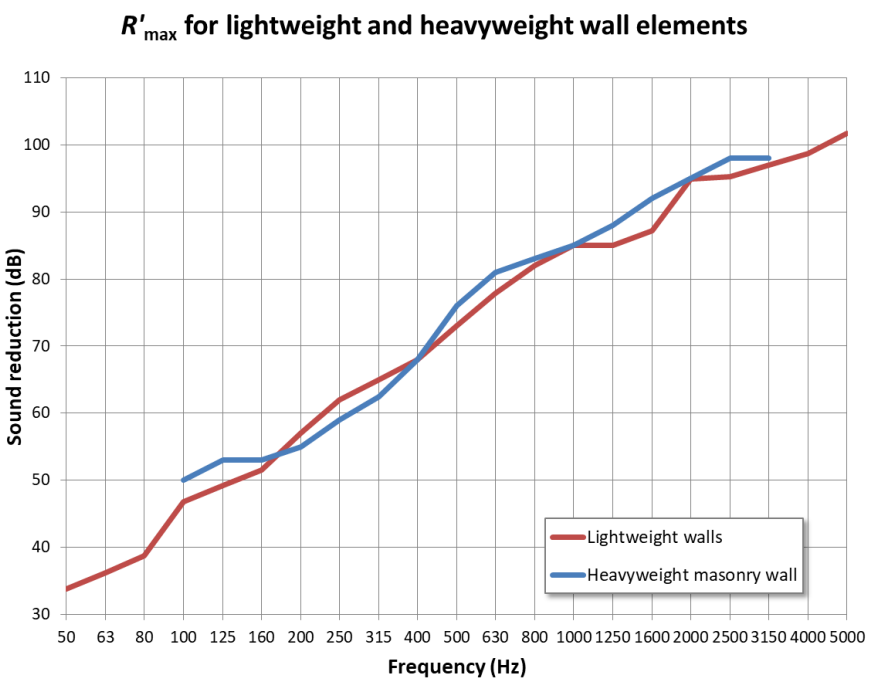


Figure A2.2: Measured R'_{max} for lightweight and heavyweight wall elements.

APPENDIX 2: MEASUREMENT EQUIPMENT

The equipment used during the measurements is presented in Table A2.1. The equipment fulfils class 1 according to IEC 61672-1, 60942 and 61260. Last calibration date is kept in the Akustikverkstan calibration log. A function control using a microphone calibrator is made immediately prior to and after the measurements.

Equipment	Brand and type	Serial number
Analyser	Norsonic 150	15030421
Omnidirectional loudspeaker	IMA Kub 1	8, 9, 10
Microphone cartridges	Norsonic 1225	251310, 271069
Microphone preamplifier	Norsonic 1209	21210, 21195
Microphone calibrator	Norsonic 1256	125626092
Equalizer	Monacor MEQ-2152	-
Amplifier	Denon POA-2200	-

Table A2.1: Used measurement equipment.

APPENDIX 3: MEASUREMENT ACCURACY

The measurement accuracy of the weighted sound reduction index, R_w, is typically within 1.2 dB compared to other testing facilities.

The measurement accuracy of the sound reduction index is frequency dependent and background noise dependent. The measurement uncertainty for single one-third octave bands is shown in Table A3.1. The value represents one standard deviation of the measurement reproducibility.

50 Hz	**63 Hz**	**80 Hz**	**100 Hz**	**125 Hz**	**160 Hz**	**200 Hz**
± 6.8 dB	± 4.6 dB	± 3.8 dB	± 3.0 dB	± 2.7 dB	± 2.4 dB	± 2.1 dB
250 Hz	**315 Hz**	**400 Hz**	**500 Hz**	**630 Hz**	**800 Hz**	**1 kHz**
± 1.8 dB	± 1.8 dB	± 1.8 dB	± 1.8 dB	± 1.8 dB	± 1.8 dB	± 1.8 dB
1.25 kHz	**1.6 kHz**	**2.0 kHz**	**2.5 kHz**	**3.15 kHz**	**4.0 kHz**	**5.0 kHz**
± 1.8 dB	± 1.8 dB	± 1.8 dB	± 1.9 dB	± 2.0 dB	± 2.4 dB	± 2.8 dB

Table A3.1: Measurement accuracy for sound reduction index, without background noise.

In case of too high background noise levels, the sound reduction index is at least the presented value, giving a one-sided positive uncertainty from background noise.

The measurement accuracy of other parameters is found in table A3.2.

Parameter	Uncertainty
R_w	± 1.2 dB
Temperature	± 0.5° C
Humidity	± 3% units
Static pressure	± 0.5 kPa

Table A3.2: Measurement uncertainties.

APPENDIX 4: PHOTOS



Figure A4-1: Mounting Recoma PackWall on sending room side.



Figure A4-2: Mounting Recoma PackWall on receiving room side.



Figure A4-3: Edges against test opening and gaps between boards sealed with latex sealant.

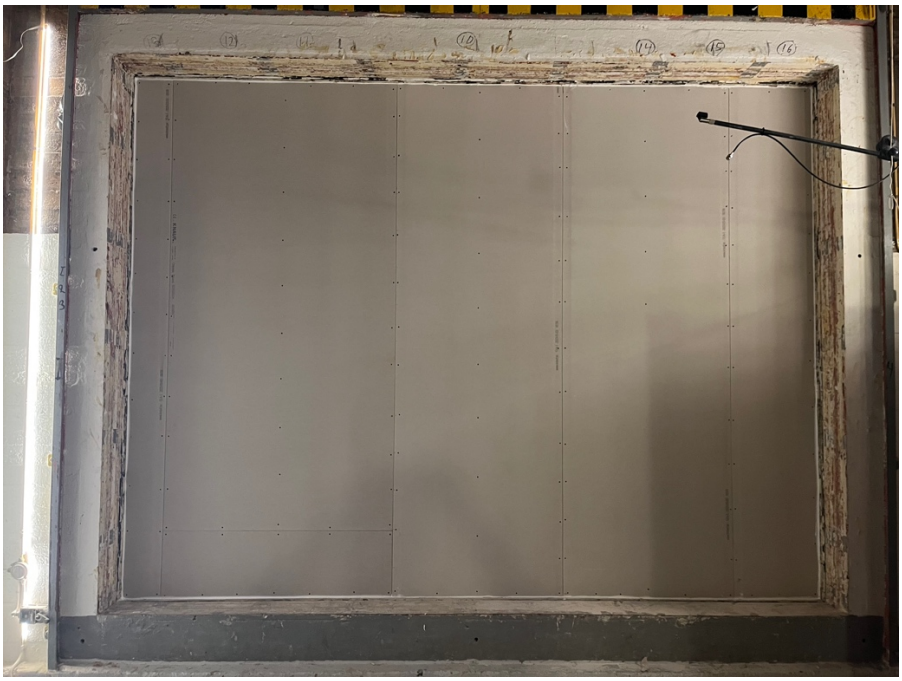


Figure A4-4: Gypsum boards over Recoma board. Seen from receiving room side.



Figure A4.5: Single sided wall (Standard gypsum board + Recoma PackWall) seen from receiving room side.

AKUSTIKVERKSTAN

Sound reduction index according to ISO 10140-2

Laboratory measurements of airborne sound insulation of building elements

No.of test report:	4688-M4
Date of report:	2025-11-13
Date of test:	2025-11-06
Name:	Carl Nyqvist

Client: Recoma
Manufacturer: Recoma
Test specimen mounted by: Akustikverkstan Montage

Test room identification:

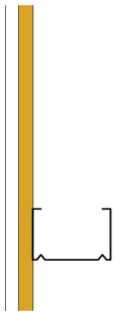
Test room 2 (sending room) to Test room 1 (receiving room)

Product identification:

E MR 450 70/70 -/RA M0

Description of the specimen:

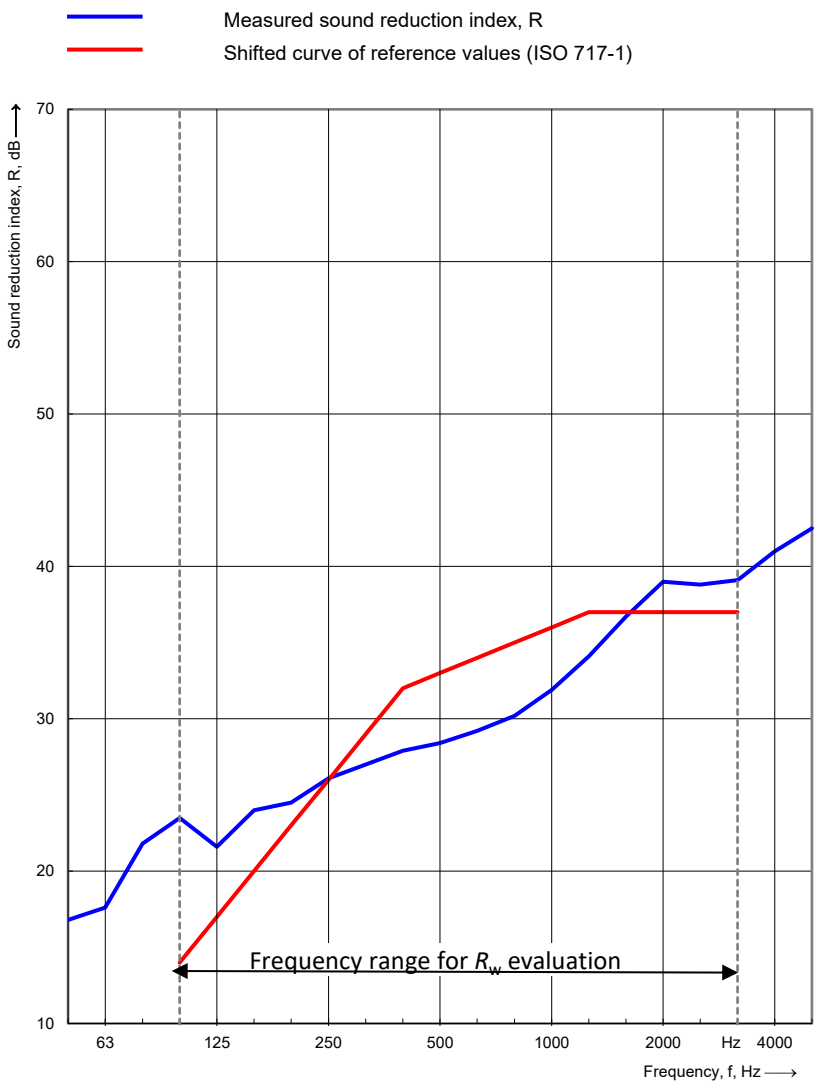
12.5 Standard gypsum board
12 Recoma PackWall
Knauf steel stud MR70, no insulation



12,5 Standard gypsum board
12 Recoma PackWall
70 Knauf MR steel stud
(s450), no insulation

Barometric pressure:	99,1	kPa
Size of test opening:	10,0	m^2
Mass per unit area:	13	kg/m^2
Temperature:	18	°C
Air humidity:	56	%
Source room volume:	123	m^3
Receiving room volume:	200	m^3

Frequency f [Hz]	R 1/3 octave [dB]
50	16,8
63	17,6
80	21,8
100	23,5
125	21,6
160	24,0
200	24,5
250	26,1
315	27,0
400	27,9
500	28,4
630	29,2
800	30,2
1000	31,9
1250	34,1
1600	36,7
2000	39,0
2500	38,8
3150	39,1
4000	41,0
5000	42,5



Rating according to ISO 717-1

$R_w(C;C_{tr})$ = 33 (-1 ; -3) dB

$C_{50\text{-}3150}$ =	-1	dB	$C_{50\text{-}5000}$ =	0	dB	$C_{100\text{-}5000}$ =	0	dB
$C_{tr,50\text{-}3150}$ =	-4	dB	$C_{tr,50\text{-}5000}$ =	-4	dB	$C_{tr,100\text{-}5000}$ =	-3	dB

Sum of unfavourable deviations: 27,6 dB

Evaluation based on laboratory measurement results obtained in one-third-octave bands by an engineering method.

AKUSTIKVERKSTAN

Sound reduction index according to ISO 10140-2

Laboratory measurements of airborne sound insulation of building elements

No.of test report: 4688-M5
Date of report: 2025-11-11
Date of test: 2025-11-06
Name: Carl Nyqvist

Client: Recoma
Manufacturer: Recoma
Test specimen mounted by: Akustikverkstan Montage

Test room identification:

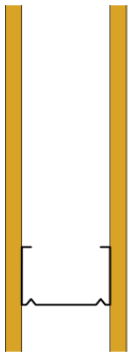
Test room 2 (sending room) to Test room 1 (receiving room)

Product identification:

E MR 450 70/70 R/R M0

Description of the specimen:

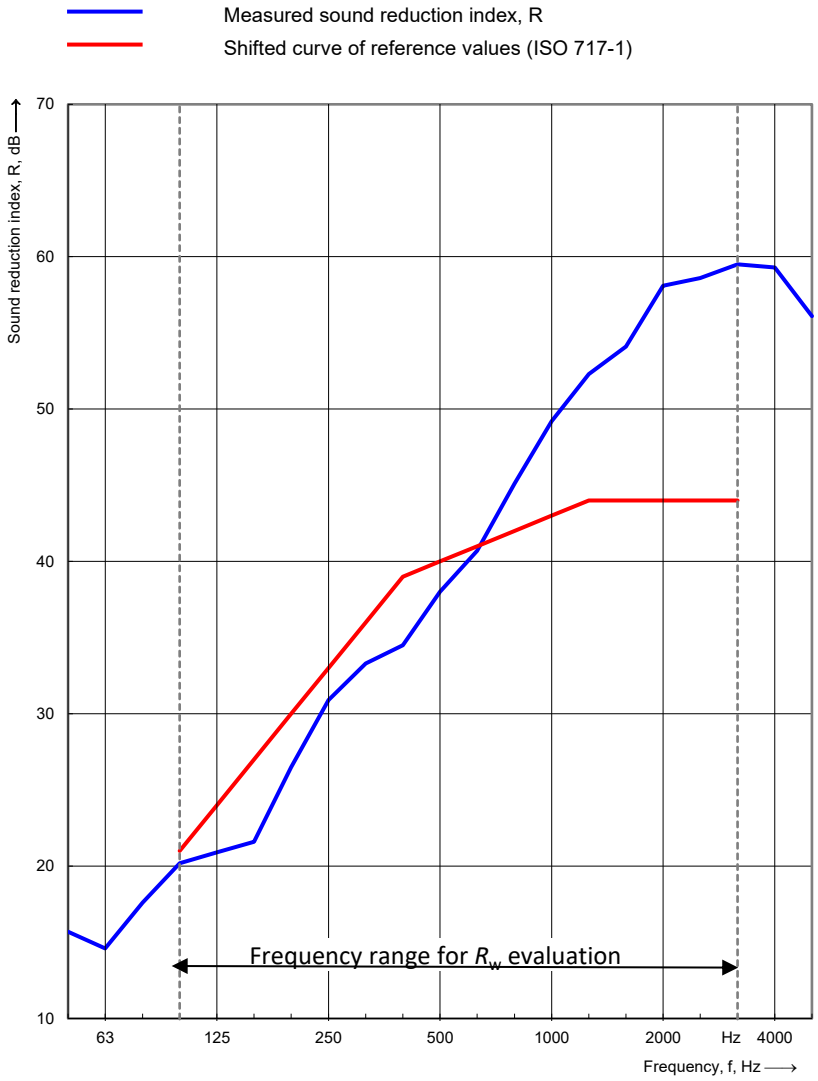
12 Recoma PackWall
Knauf steel stud MR70, No insulation.
12 Recoma PackWall



12 Recoma PackWall
70 Knauf MR steel stud (s450), no insulation
12 Recoma PackWall

Barometric pressure: 99,1 kPa
Size of test opening: 10,0 m^2
Mass per unit area: 25 kg/m^2
Temperature: 18 °C
Air humidity: 56 %
Source room volume: 123 m^3
Receiving room volume: 200 m^3

Frequency f [Hz]	R 1/3 octave [dB]
50	15,7
63	14,6
80	17,6
100	20,2
125	20,9
160	21,6
200	26,5
250	30,9
315	33,3
400	34,5
500	38,0
630	40,7
800	45,1
1000	49,2
1250	52,3
1600	54,1
2000	58,1
2500	58,6
3150	59,5
4000	59,3
5000	56,1



Rating according to ISO 717-1

$R_w(C;C_{tr})$ = 40 (-1 ; -6) dB

$C_{50\text{-}3150}$ =	-2	dB	$C_{50\text{-}5000}$ =	-1	dB	$C_{100\text{-}5000}$ =	0	dB
$C_{tr,50\text{-}3150}$ =	-9	dB	$C_{tr,50\text{-}5000}$ =	-9	dB	$C_{tr,100\text{-}5000}$ =	-6	dB

Sum of unfavourable deviations: 24,4 dB

Evaluation based on laboratory measurement results obtained in one-third-octave bands by an engineering method.

AKUSTIKVERKSTAN

Sound reduction index according to ISO 10140-2

Laboratory measurements of airborne sound insulation of building elements

No.of test report: 4688-M6
Date of report: 2025-11-11
Date of test: 2025-11-06
Name: Carl Nyqvist

Client: Recoma
Manufacturer: Recoma
Test specimen mounted by: Akustikverkstan Montage

Test room identification:

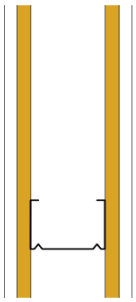
Test room 2 (sending room) to Test room 1 (receiving room)

Product identification:

E MR 450 70/70 AR/RA M0

Description of the specimen:

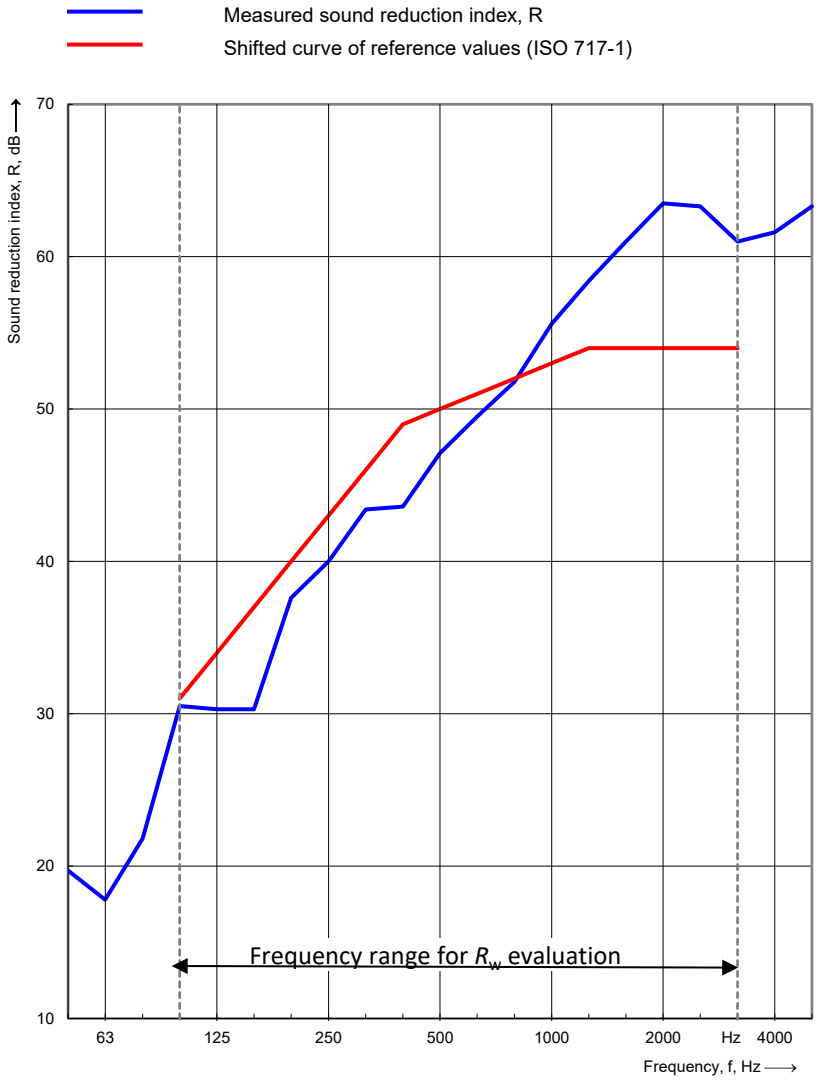
12.5 Standard gypsum board
12 Recoma PackWall
Knauf steel stud MR70, no insulation.
12 Recoma PackWall
12.5 Standard gypsum board



12,5 Standard gypsum board
12 Recoma PackWall
70 Knauf MR steel stud
(s450), no inulation
12 Recoma PackWall
12,5 Standard gypsum board

Barometric pressure: 99,1 kPa
Size of test opening: 10,0 m^2
Mass per unit area: 43 kg/m^2
Temperature: 18 °C
Air humidity: 56 %
Source room volume: 123 m^3
Receiving room volume: 200 m^3

Frequency f [Hz]	R 1/3 octave [dB]
50	≥ 19,7
63	17,8
80	21,8
100	30,5
125	30,3
160	30,3
200	37,6
250	40,0
315	43,4
400	43,6
500	47,1
630	49,5
800	51,8
1000	55,6
1250	58,4
1600	61,0
2000	63,5
2500	63,3
3150	61,0
4000	61,6
5000	63,3



≥ indicates R-value within 15 dB from R'max

Rating according to ISO 717-1

$R_w(C;C_{tr})$ = 50 (-2 ; -7) dB

$C_{50\text{-}3150}$ = -4 dB $C_{50\text{-}5000}$ = -3 dB $C_{100\text{-}5000}$ = -1 dB
$C_{tr,50\text{-}3150}$ = -13 dB $C_{tr,50\text{-}5000}$ = -13 dB $C_{tr,100\text{-}5000}$ = -7 dB
Sum of unfavourable deviations: 28,9 dB

Evaluation based on laboratory measurement results obtained in one-third-octave bands by an engineering method.