

Test Report

No. 2058-001-24 dated 2nd September 2024

**Impact Sound Reduction by Mounting Systems
in the laboratory**

Client:

J. van Walraven Holding B.V.
Industrieweg 5
3641 RK Mijdrecht
The Netherlands

Test Object:

BIS Yeti[®] Mounting Systems, type A and type A-low
with or without EPS-insulation

Contract:

Determination of the impact sound reduction according to
DIN EN ISO 10140-1 and DIN EN ISO 10140-3 in the laboratory

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1. Definition of project and general details

1.1 Definition of project

J. van Walraven Holding B.V., Mijdrecht, Netherlands, offers, among other things, BIS Yeti® mounting systems of the type A and type A-low, which are intended to elevate ventilation and air conditioning installations on flat and slightly inclined roofs. The mounting systems are to be examined with regard to their acoustic properties in different load conditions and configurations.

To determine the impact sound reduction, sample structures were produced in which a steel plate was screwed onto the BIS Yeti® mounting bases (type A or A-low) to be tested via profile rail bases and profile rails. Depending on the test configuration, the profile rails were subjected to additional loads (load levels: 150 kg per foot) or the test setup with EPS insulation underlay (d = 200 mm, type DAA dm) was tested. The mounting systems were each tested in two lengths - 250 mm and 1000 mm (type A) and 400 mm and 250 mm (type A-low). An identical structure was used as a reference structure, in which concrete slabs were used instead of the BIS Yeti® mounting feet. The sound level was measured in the receiving room below the test ceiling when the steel plate of the respective structure was struck with the standard hammer mechanism. The reference structure was analysed as part of the series of measurements described in test report no. 1762-001-19.

The measurements are carried out in accordance with DIN EN ISO 10140-3. Three measurements were carried out for each test and their results were averaged.

1.2 Manufacturer of the Support System

J. van Walraven Holding B.V.
Industrieweg 5
3641 RK Mijdrecht
The Netherlands

1.3 Client requesting tests

J. van Walraven Holding B.V.
Industrieweg 5
3641 RK Mijdrecht
The Netherlands

1.4 Measurement standards

The tests were carried out in the ceiling test stand by our company's skilled employees in accordance to the following standards and guidelines:

- DIN EN ISO 10140-1 "Acoustics – Laboratory measurement of sound insulation of building elements – Part 1: Application rules for specific products"
(ISO 10140-1:2021); German Version EN ISO 10140-1:2021
- DIN EN ISO 10140-3 "Acoustics – Laboratory measurement of sound insulation of building elements – Part 3: Measurement of impact sound insulation"
(ISO 10140-3:2021); German Version EN ISO 10140-3:2021
- DIN EN ISO 10140-4 "Acoustics – Laboratory measurement of sound insulation of building elements – Part 4: Measuring procedures and requirements"
(ISO 10140-4:2021); German Version EN ISO 10140-4:2021
- DIN EN ISO 10140-5 "Acoustics – Laboratory measurement of sound insulation of building elements – Part 5: Requirements for test facilities and equipment"
(ISO 10140-5:2021); German Version EN ISO 10140-5:2021
- DIN EN ISO 717-2 "Acoustics – Rating of sound insulation in buildings and of building elements – Part 2: Impact sound insulation"
(ISO 717-2:2020); German Version EN ISO 717-2:2020

2. Installation and design layout of the test objects

2.1 Laboratory

The laboratory ceiling is a homogeneously built-up, massive reinforced concrete ceiling which has a thickness of $d = 120$ mm. The surface of the ceiling measures approx. 20.4 m^2 as seen from the receiving room below. The reinforced concrete ceiling is treated with an even smooth coating. The reinforced concrete ceiling corresponds with DIN EN ISO 10140-5, Appendix C, Section C.2.

The standard impact sound level of the reinforced concrete ceiling with stimulus on the ceiling areas amounts to:

Table 1: Standard Impact Sound Level Raw Ceiling (measured on 26.09.2018):

f [Hz]	50	63	80	100	125	160	200	250	315	400	500
$L_{n,0}$	60,0	56,2	64,1	64,0	70,1	67,6	73,4	71,5	71,0	70,6	72,1

f [Hz]	630	800	1000	1250	1600	2000	2500	3150	4000	5000
$L_{n,0}$	72,6	73,0	73,8	75,4	77,2	76,6	76,1	74,2	72,6	69,8

The evaluated standard impact sound level of the raw ceiling amounts to $L_{n,0,w} = 81,6 \text{ dB}$.

2.2 Set-up of test objects

The test set-ups are sample set-ups in which a steel plate (800 mm x 300 mm x 6 mm) was screwed onto the BIS Yeti® mounting feet (type A and type A-low) to be tested via profile rail feet and profile rails. Depending on the test configuration, the profile rails were subjected to additional loads (load levels: 150 kg per foot) or the test setup with EPS insulation underlay (d = 200 mm, type DAA dm) was tested. An identical structure was used as a reference structure, in which concrete slabs were used instead of the BIS Yeti® mounting feet. The reference structure was analyzed as part of the series of measurements presented in test report no. 1762-001-19.

Concrete slabs (500 mm x 500 mm x 60 mm or 400 mm x 400 mm x 50 mm) were placed on the profile rails to produce the different load levels. The test material was delivered to our test stand on 13/08/2024 and then prepared for testing by specialists from the manufacturer and our company.

In detail, the following tests were carried out:

	reference arrangement (set-up with concrete slabs) with rail base (2 pieces), placed on laboratory ceiling appx. 100 kg additional load per foot
Measurement 1:	BIS Yeti® mounting system, type A (2 pieces), length = 1000 mm, placed on laboratory ceiling, appx. 150 kg additional load per foot
Measurement 2:	BIS Yeti® mounting system, type A (2 pieces), length = 1000 mm, placed on laboratory ceiling, placed on EPS-insulation (t = 200 mm) appx. 150 kg additional load per foot
Measurement 3:	BIS Yeti® mounting system, type A (2 pieces), length = 250 mm, placed on laboratory ceiling, appx. 150 kg additional load per foot
Measurement 4:	BIS Yeti® mounting system, type A (2 pieces), length = 250 mm, placed on laboratory ceiling, placed on EPS-insulation (t = 200 mm) appx. 150 kg additional load per foot
Measurement 5:	BIS Yeti® mounting system, type A-low (2 pieces), length = 400 mm, placed on laboratory ceiling, appx. 150 kg additional load per foot

Measurement 6: **BIS Yeti® mounting system, type A-low** (2 pieces), length = 400 mm, placed on laboratory ceiling, placed on EPS-insulation (t = 200 mm) appx. 150 kg additional load per foot

Measurement 7: **BIS Yeti® mounting system, type A-low** (2 pieces), length = 250 mm, placed on laboratory ceiling, appx. 150 kg additional load per foot

Measurement 8: **BIS Yeti® mounting system, type A-low** (2 pieces), length = 250 mm, placed on laboratory ceiling, placed on EPS-insulation (t = 200 mm) appx. 150 kg additional load per foot

The detailed build-up of the constructions can be seen in the manufacturer's construction drawings, appendices 1 to 5. Appendices 6 to 10 contain a photo documentation of the set-up in the laboratory.

3. Measurement and execution of measuring

The measurement of the standardized impact sound level (L_n in dB) and the determination of the impact sound reduction (ΔL in dB) were carried out in accordance with the specifications of DIN EN ISO 10140-1 and DIN EN ISO 10140-3.

To determine the standardized impact sound level of the mounting system, the sound level was determined when the test arrangement was excited on the test stand ceiling with a standardized hammer mechanism at a total of 3 measurement positions in the receiving room below, which meets the requirements of DIN EN ISO 10140-5. The standardized impact sound level was calculated taking into account the reverberation time and the equivalent absorption area A.

The standardized impact sound level $L_{n,0}$ of the bare ceiling was determined in the same way with excitation of the smooth finish without test object. The difference between the impact sound levels with and without the test object represents the impact sound reduction. The single number ΔL_w is obtained by reference to the values of a reference ceiling according to the method specified in DIN EN ISO 717-2. The calculation of the spectrum adjustment values (supplementary assessment method) is also carried out in accordance with DIN EN ISO 717-2. A description of the measurements and the measuring instruments used can be found in Appendix 11.

4. Measurement results

Table 2 below shows the standardized impact sound level of the bare ceiling and the impact sound reductions of the individual superstructures.

Table 2: Impact Sound Reduction in dB, measurements on 13.08.2024

f_{Terz} in Hz	50	63	80	100	125	160	200	250	315	400	500
L _{n,0}	60,0	56,2	64,1	64,0	70,1	67,6	73,4	71,5	71,0	70,6	72,1
ΔL , Measurement 1	16,9	9,7	18,9	13,9	15,2	13,7	20,2	12,5	14,7	14,7	20,9
ΔL , Measurement 2	17,3	7,4	17,4	13,3	22,2	18,0	20,6	20,2	26,8	26,4	26,9
ΔL , Measurement 3	24,9	16,1	25,9	20,4	19,2	19,8	24,1	20,6	17,5	17,6	23,3
ΔL , Measurement 4	26,1	20,3	23,8	17,7	18,0	17,7	16,4	20,1	25,6	27,0	27,7
ΔL , Measurement 5	13,6	2,8	17,4	12,4	13,1	12,1	19,4	18,3	16,1	10,7	10,5
ΔL , Measurement 6	22,5	11,3	22,7	15,6	17,8	16,8	21,5	14,2	18,1	21,5	22,9
ΔL , Measurement 7	12,9	2,6	17,2	12,8	15,3	11,7	19,6	15,1	16,2	13,0	11,2
ΔL , Measurement 8	23,6	14,9	25,9	19,6	18,5	16,1	24,6	19,4	17,6	22,4	23,4

f_{Terz} in Hz	630	800	1.000	1.250	1.600	2.000	2.500	3.150	4.000	5.000
L _{n,0}	72,6	73,0	73,8	75,4	77,2	76,6	76,1	74,2	72,6	69,8
ΔL , Measurement 1	26,0	28,2	28,6	31,0	35,1	31,9	36,9	39,5	38,6	39,2
ΔL , Measurement 2	31,8	32,1	33,3	34,6	36,6	33,6	37,7	40,2	40,6	40,9
ΔL , Measurement 3	27,6	28,0	29,2	32,9	35,1	32,6	37,1	39,6	39,4	39,6
ΔL , Measurement 4	31,6	31,8	33,8	34,7	36,1	33,6	37,8	40,4	40,4	40,6
ΔL , Measurement 5	17,2	26,6	30,6	30,1	32,1	30,6	34,2	37,6	38,5	39,2
ΔL , Measurement 6	29,7	31,6	33,8	33,3	34,5	32,2	37,0	39,6	39,4	39,4
ΔL , Measurement 7	18,9	22,2	28,1	28,1	33,2	31,3	34,3	37,6	38,7	38,5
ΔL , Measurement 8	28,9	29,5	34,2	33,3	35,4	32,1	37,0	39,4	39,4	39,6

The evaluated impact sound reduction ΔL_w according to DIN EN ISO 717-2 for the set-ups amounts to:

reference:	concrete slabs with rail base, 100 kg load per foot	$\Delta L_w = 13 \text{ dB}$
Measurement 1:	BIS Yeti® type A, length = 1000 mm, 150 kg load per foot	$\Delta L_w = 29 \text{ dB}$
Measurement 2:	BIS Yeti® type A, length = 1000 mm, 150 kg load per foot, EPS-insulation	$\Delta L_w = 33 \text{ dB}$
Measurement 3:	BIS Yeti® type A, length = 250 mm, 150 kg load per foot	$\Delta L_w = 32 \text{ dB}$
Measurement 4:	BIS Yeti® type A, length = 250 mm, 150 kg load per foot, EPS-insulation	$\Delta L_w = 33 \text{ dB}$
Measurement 5:	BIS Yeti® type A-low, length = 400 mm, 150 kg load per foot	$\Delta L_w = 27 \text{ dB}$
Measurement 6:	BIS Yeti® type A-low, length = 400 mm, 150 kg load per foot, EPS-insulation	$\Delta L_w = 31 \text{ dB}$
Measurement 7:	BIS Yeti® type A-low, length = 250 mm, 150 kg load per foot	$\Delta L_w = 27 \text{ dB}$
Measurement 8:	BIS Yeti® type A-low, length = 250 mm, 150 kg load per foot, EPS-insulation	$\Delta L_w = 32 \text{ dB}$

The frequency dependent course of the standard impact sound level of the raw ceiling and the impact sound reduction of the set-ups are illustrated in appendices 12 to 19.

The mounting system BIS Yeti® type A is also available in lengths of 400 mm and 600 mm. The weighted impact sound reduction ΔL_w in accordance with DIN EN ISO 717-2 for these installation variants was interpolated from the measurement results for the lengths of 1000 mm and 250 mm. The weighted impact sound reductions ΔL_w according to DIN EN ISO 717-2 are shown in Table 3.

Table 3: Weighted impact sound reduction

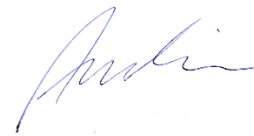
Mounting-system	Length	EPS-Insulation	Load per foot	Impact sound reduction ΔL_w in dB
BIS Yeti® Typ A	1000 mm	no	150 kg	29 dB
	1000 mm	yes	150 kg	33 dB
	600 mm	no	150 kg	30 dB*
	600 mm	yes	150 kg	33 dB*
	400 mm	no	150 kg	31 dB*
	400 mm	yes	150 kg	33 dB*
	250 mm	no	150 kg	32 dB
	250 mm	yes	150 kg	33 dB
BIS Yeti® Typ A-low	400 mm	no	150 kg	27 dB
	400 mm	yes	150 kg	31 dB
	250 mm	no	150 kg	27 dB
	250 mm	yes	150 kg	32 dB

*Values interpolated from measurement results

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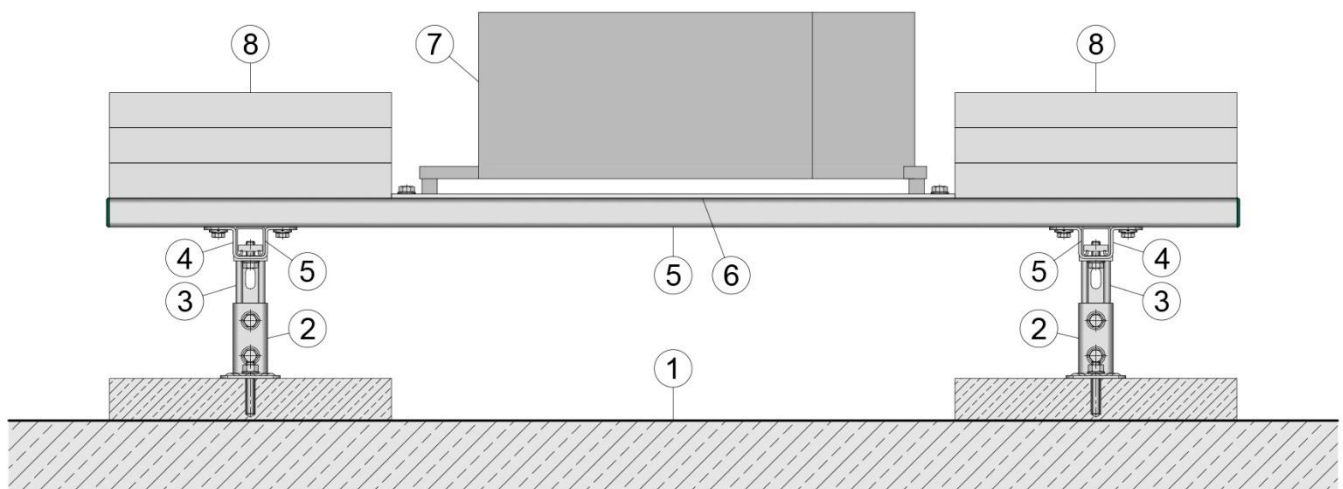


Stefan Grüll

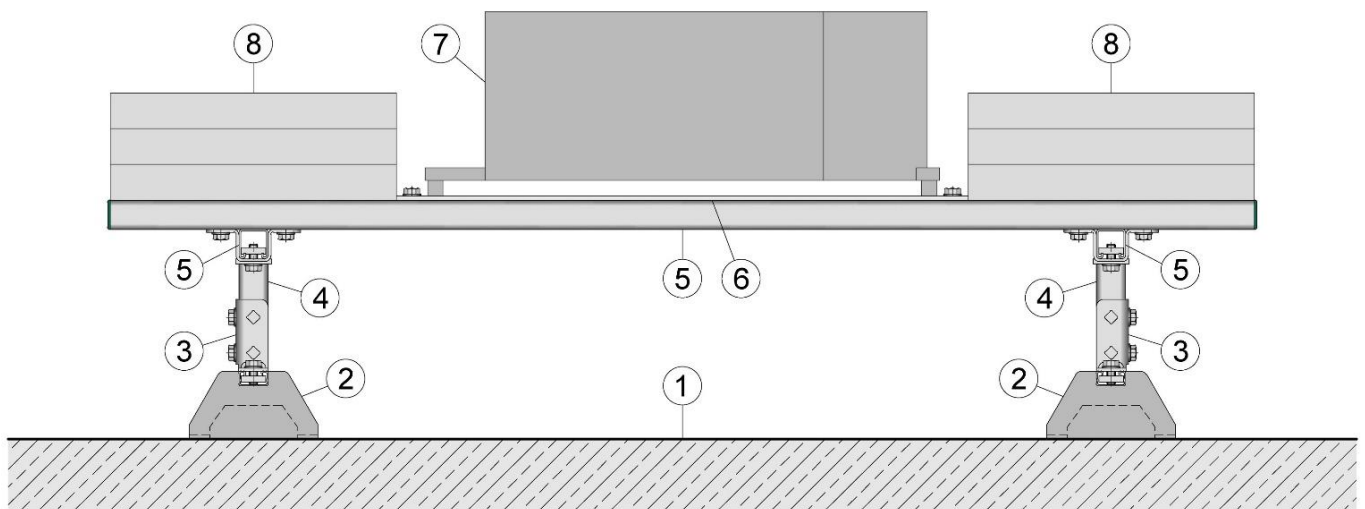


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Test set-up 1: reference arrangement with rail base, 100 kg additional load per foot

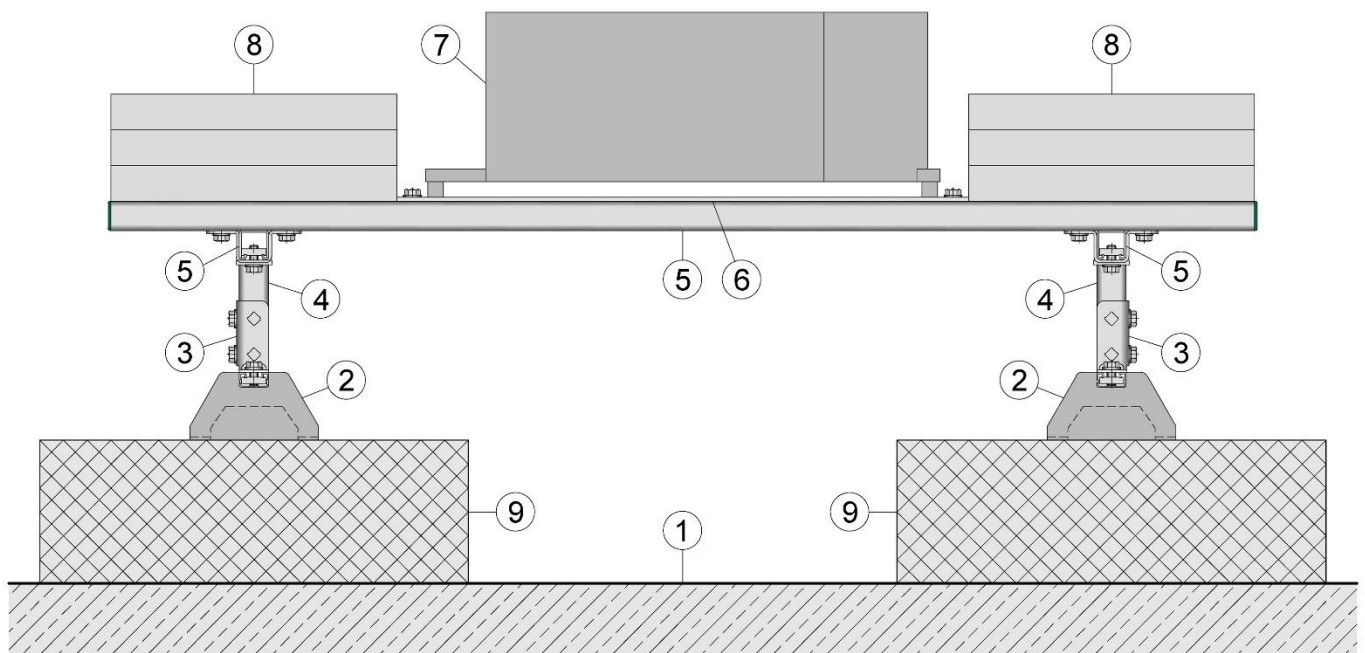


- | | | |
|-------------------------------|----------------------------|--------------------------------|
| ① Messdecke | ④ Kreuzverbinder | ⑦ Norm-Hammerwerk |
| ② Schienenfuß auf Betonplatte | ⑤ C-Profil Montageschiene | ⑧ Ballastierung (Betonplatten) |
| ③ C-Profil Schienenkonsole | ⑥ Stahlplatte 800x300x6 mm | |

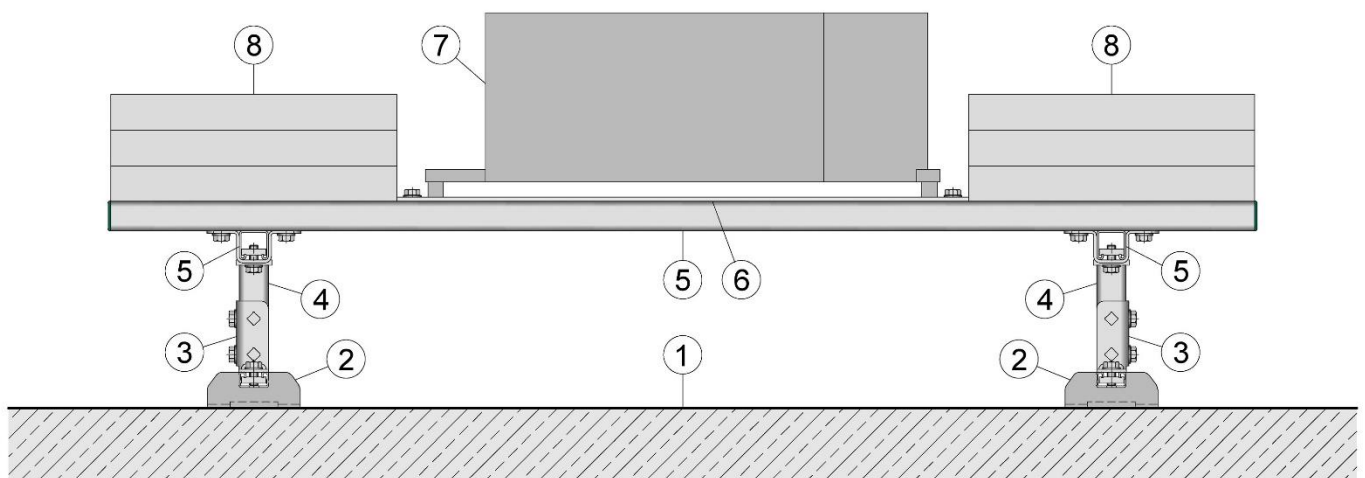
Test set-up 2: Type A, 150 kg additional load per foot

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|---------------------------|----------------------------|--------------------------------|
| ① Messdecke | ④ C-Profil Schienenkonsole | ⑦ Norm-Hammerwerk |
| ② Yeti® Type A Montagefuß | ⑤ C-Profil Montageschiene | ⑧ Ballastierung (Betonplatten) |
| ③ T-Schienenfuß | ⑥ Stahlplatte 800x300x6 mm | |

Test set-up 3: Type A, 150 kg additional load per foot, with EPS-insulation (t = 200 mm)

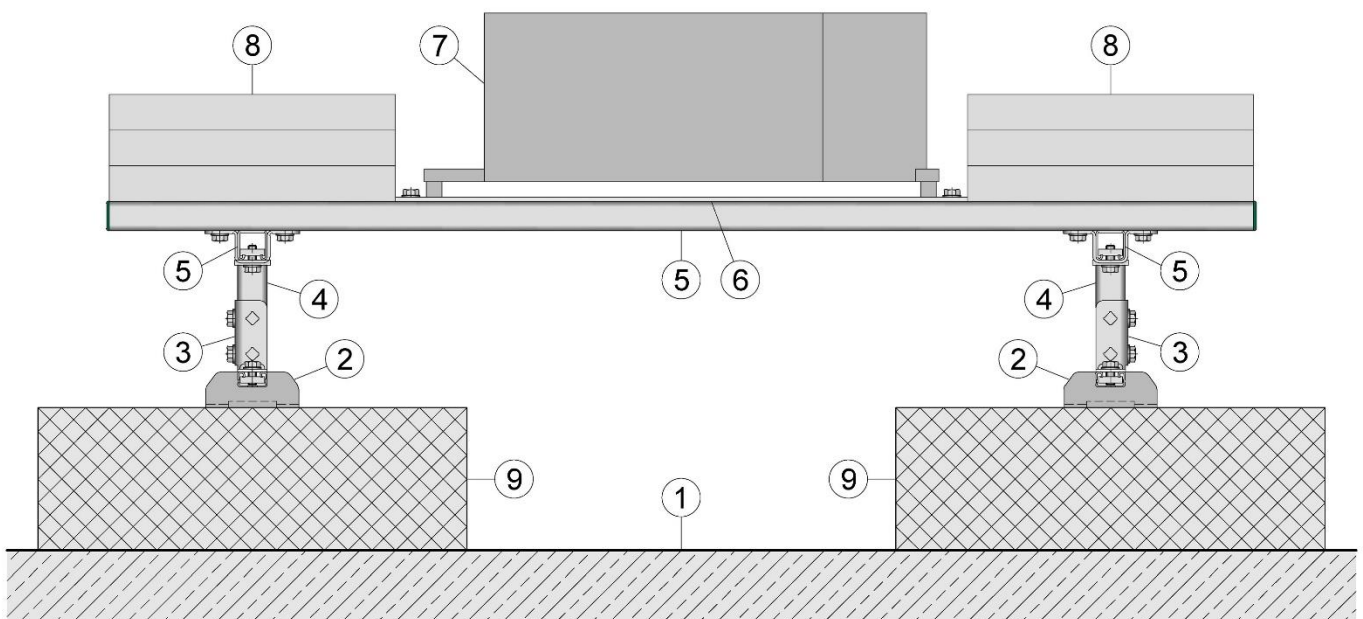


- | | | |
|---------------------------|----------------------------|--------------------------------|
| ① Messdecke | ④ C-Profil Schienenkonsole | ⑦ Norm-Hammerwerk |
| ② Yeti® Type A Montagefuß | ⑤ C-Profil Montageschiene | ⑧ Ballastierung (Betonplatten) |
| ③ T-Schienenfuß | ⑥ Stahlplatte 800x300x6 mm | ⑨ Dämmung EPS DAA dm |

Test set-up 4: Type A-low, 150 kg additional load per foot

- | | | |
|-------------------------------|----------------------------|--------------------------------|
| ① Messdecke | ④ C-Profil Schienenkonsole | ⑦ Norm-Hammerwerk |
| ② Yeti® Type A-low Montagefuß | ⑤ C-Profil Montageschiene | ⑧ Ballastierung (Betonplatten) |
| ③ T-Schienenfuß | ⑥ Stahlplatte 800x300x6 mm | |

Test set-up 5: Type A-low, 150 kg additional load per foot, with EPS-insulation (t = 200 mm)



- | | | |
|-------------------------------|----------------------------|--------------------------------|
| ① Messdecke | ④ C-Profil Schienenkonsole | ⑦ Norm-Hammerwerk |
| ② Yeti® Type A-low Montagefuß | ⑤ C-Profil Montageschiene | ⑧ Ballastierung (Betonplatten) |
| ③ T-Schienenfuß | ⑥ Stahlplatte 800x300x6 mm | ⑨ Dämmung EPS DAA dm |

Photo 1: Ceiling of Laboratory without floor covering (Raw Ceiling)

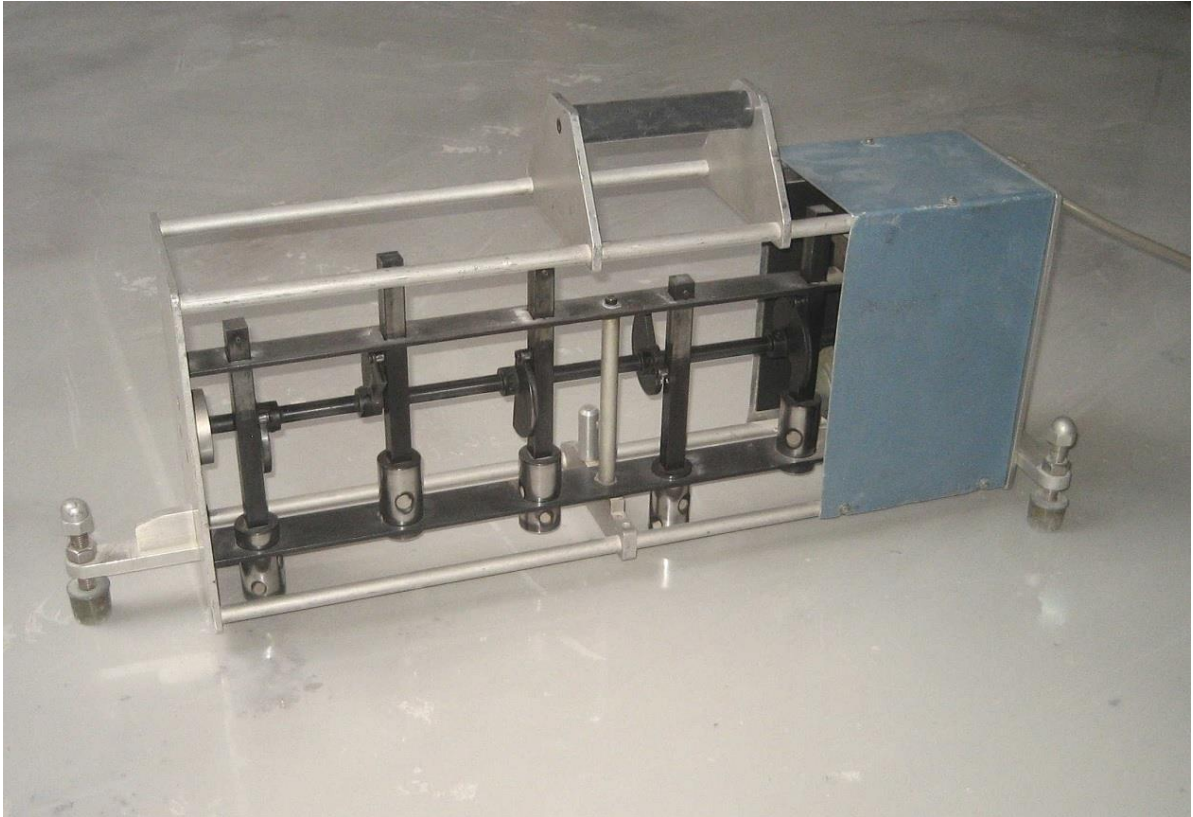


Photo 2: Reference construction, concrete slabs with rail base, 100 kg load per foot



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Photo 3: Type A, Length = 1000 mm, 150 kg weight per foot

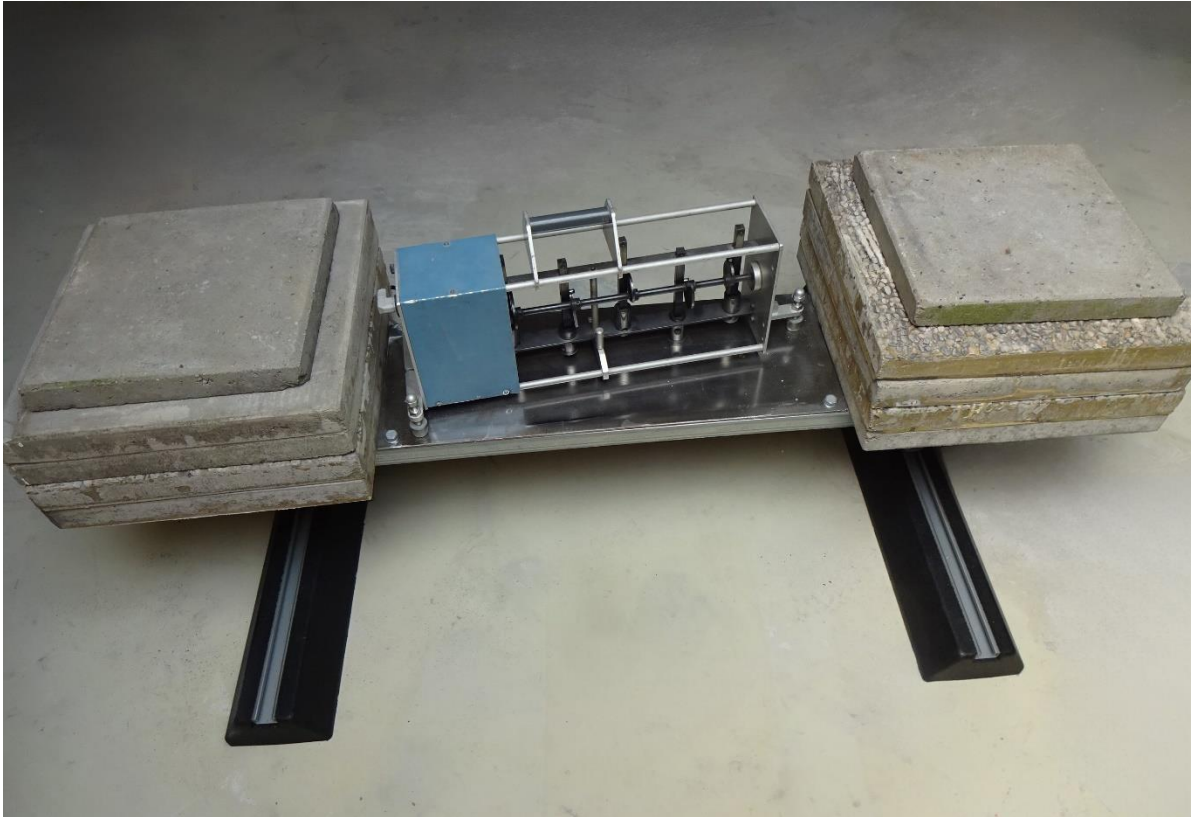
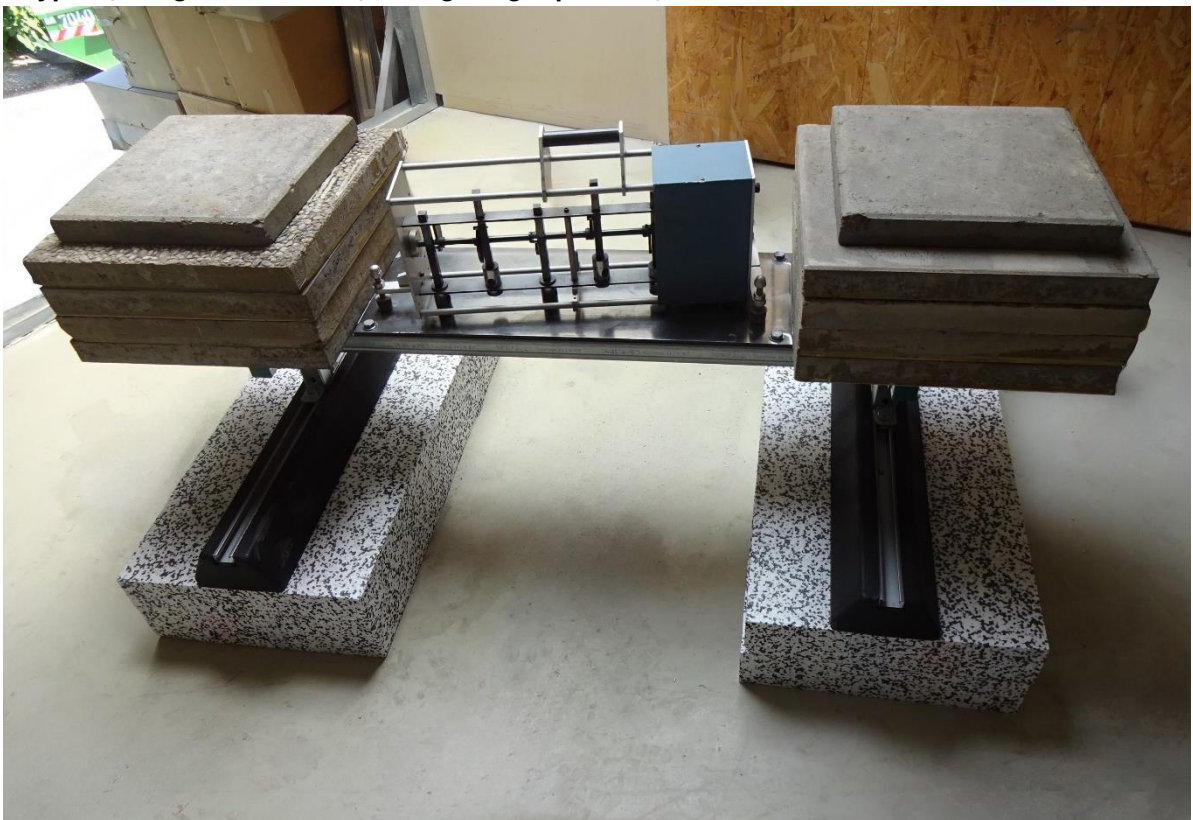


Photo 4: Type A, Length = 1000 mm, 150 kg weight per foot, with additional EPS-insulation



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Photo 5: Type A, Length = 250 mm, 150 kg weight per foot

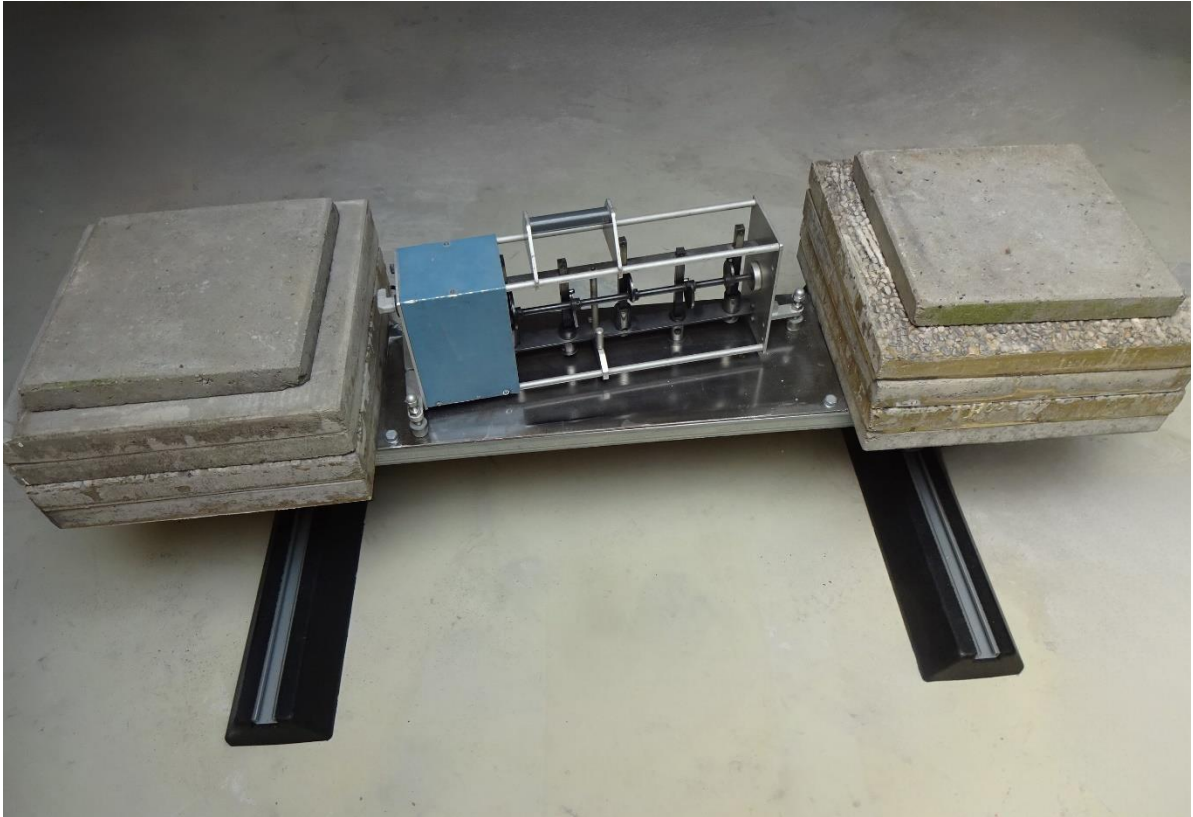
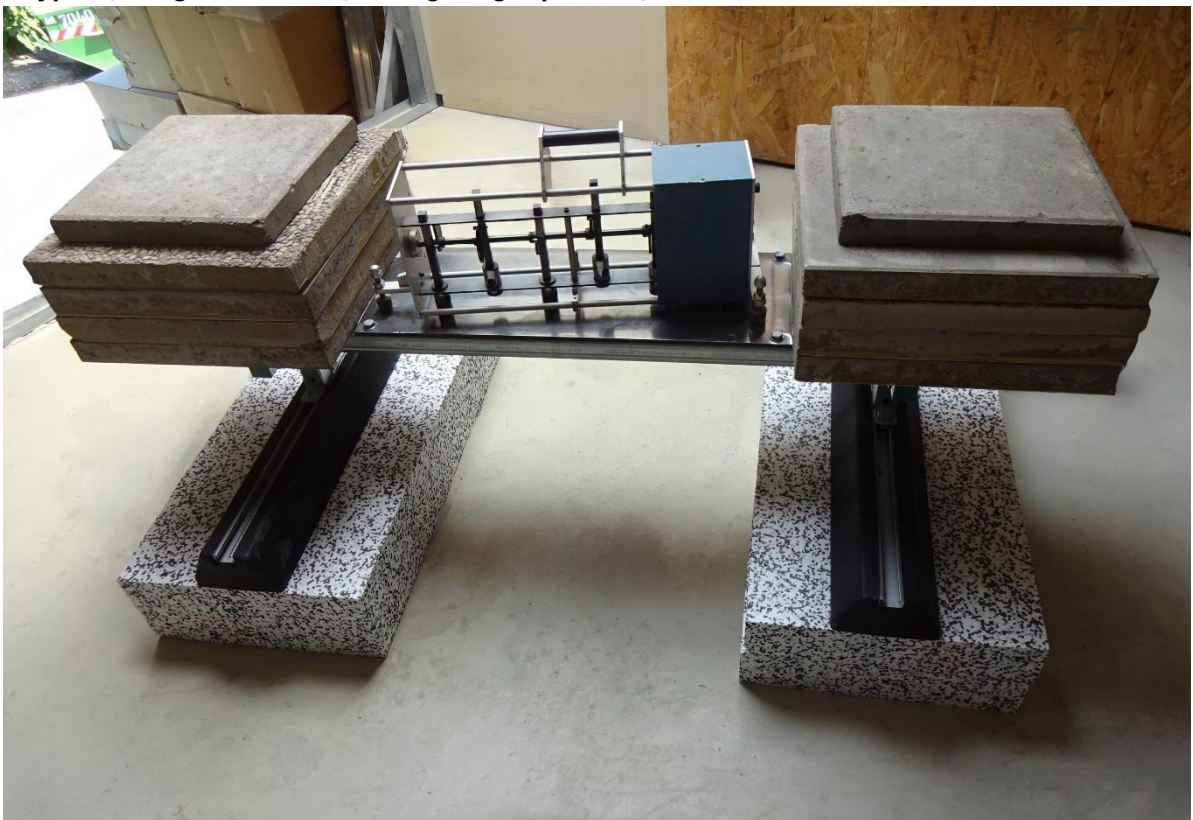


Photo 6: Type A, Length = 250 mm, 150 kg weight per foot, with additional EPS-insulation



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Photo 7: Type A-low, Length = 400 mm, 150 kg weight per foot

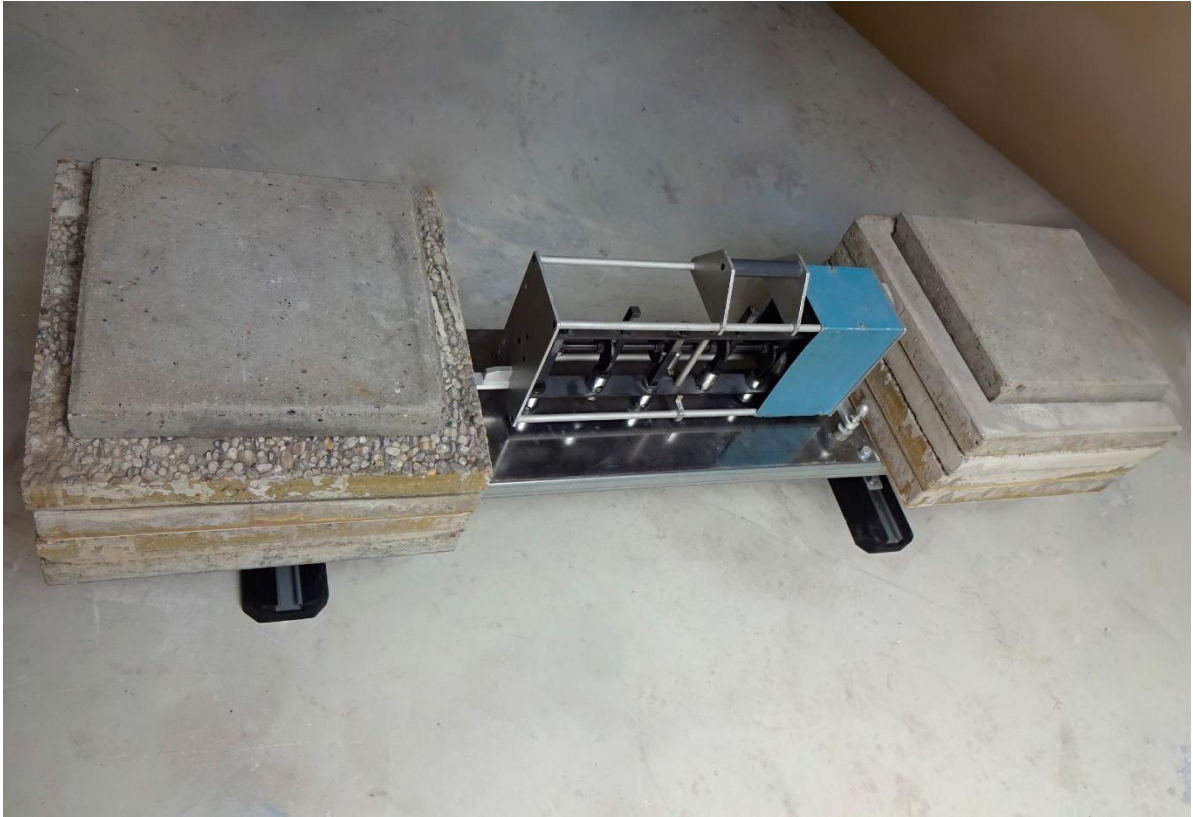
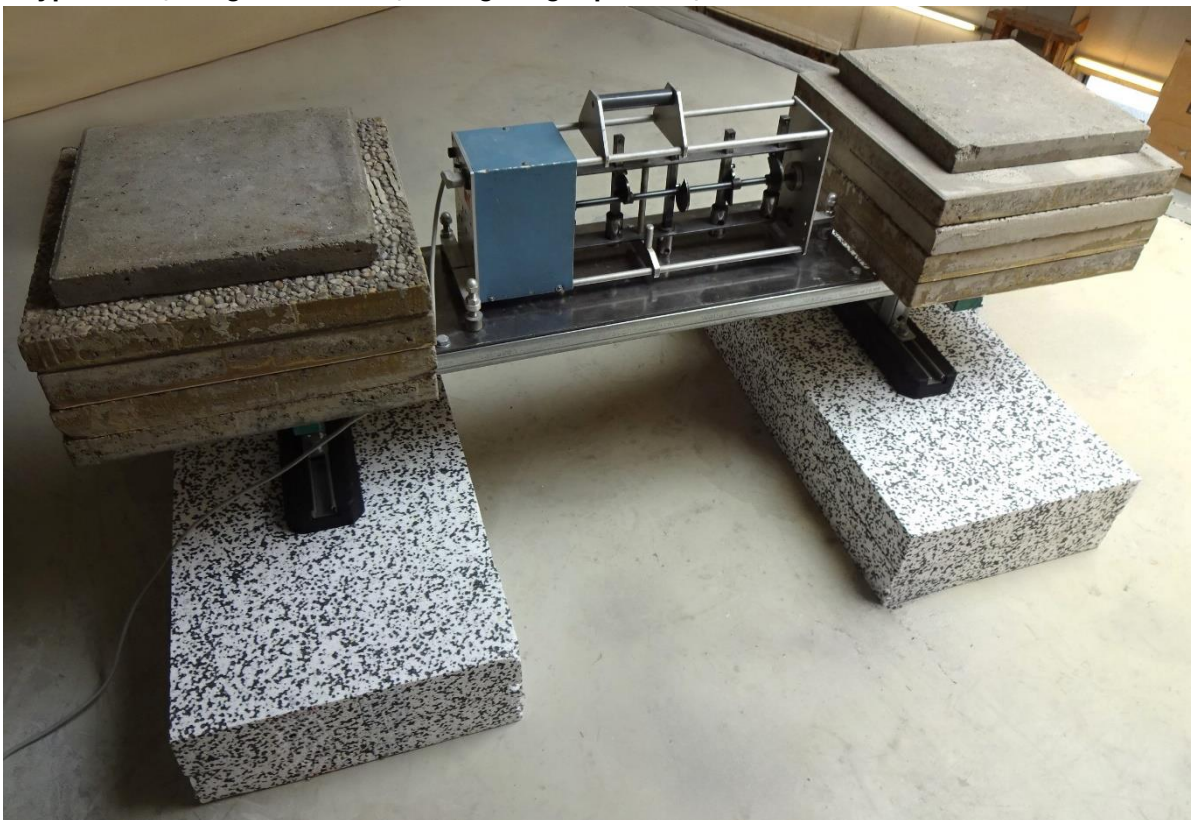


Photo 8: Type A-low, Length = 400 mm, 150 kg weight per foot, with additional EPS-insulation



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Photo 9: Type A-low, Length = 250 mm, 150 kg weight per foot



Photo 10: Type A-low, Length = 250 mm, 150 kg weight per foot, with additional EPS-insulation



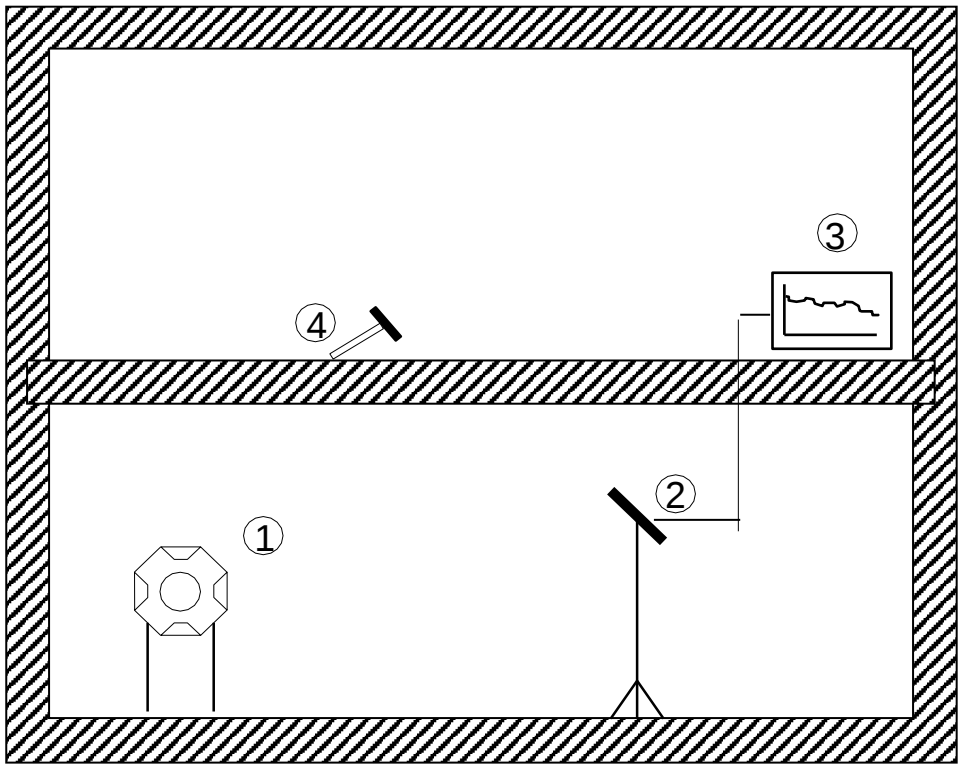
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Client: J. van Walraven Holding B.V., Industrieweg 5, 3641 RK Mijdrecht, The Netherlands

Object: BIS Yeti® Support Systems, type 480 or 335, with additional load, without or with EPS-insulation

1. Measuring Set-up



	Device Designation/ Type		Serial Number	Date of Last Inspection/Calibrated until	Last Calibration
1	Dodecahedron-loudspeaker for streaming third octave band noise		2766189	28.02.2020/-	-
2	Condensor Microphon:	M3: Norsonic, Typ 1225	358090	05.01.2023/31.12.2025	13.08.2024
		V3: Norsonic, Typ 1209	22399	05.01.2023/31.12.2025	13.08.2024
		M4: Norsonic, Typ 1225	358189	05.01.2023/31.12.2025	13.08.2024
		V4: Norsonic, Typ 1209	22403	05.01.2023/31.12.2025	13.08.2024
3	Analysator:	Norsonic, Typ 140	1407499	05.01.2023/31.12.2025	13.08.2024
		Norsonic, Typ 140	1407503	05.01.2023/31.12.2025	13.08.2024
4	Stand. Tapping Machine:	Norsonic, Typ 277	2776367	07.09.2021/-	-

2. Carrying Out Measuring (Impact Sound Reduction)

In order to ascertain the standard impact sound level in accordance with DIN EN ISO 10140-3 a standard tapping machine is used to stimulate the test object in the source room. The sound pressure level generated in the receiving room is measured and averaged at a total of 3 measuring positions. Taking the reverberation time and/or the sound absorption area A in the receiving room into consideration, the standard impact sound level is ascertained in accordance with the relationships given in DIN EN ISO 10140-3. The difference of the standard impact sound level of the raw ceiling and the test set-up represents the impact sound reduction ΔL . The single value specification ΔL_w is the result of converting the measured values with due regard to the standard impact sound level of a reference ceiling according to the procedure described in DIN EN ISO 717-2.

Impact Sound Reduction according to DIN EN ISO 10140-3

Appendix 12

Ascertainment of Impact Sound Reduction in Laboratory

Client: J. van Walraven Holding B.V., Industrieweg 5, 3641 RK Mijdrecht, The Netherlands

Object: BIS Yeti® Mounting System, type A, with additional load, with or without EPS-insulation

Test Date: 13.08.2024

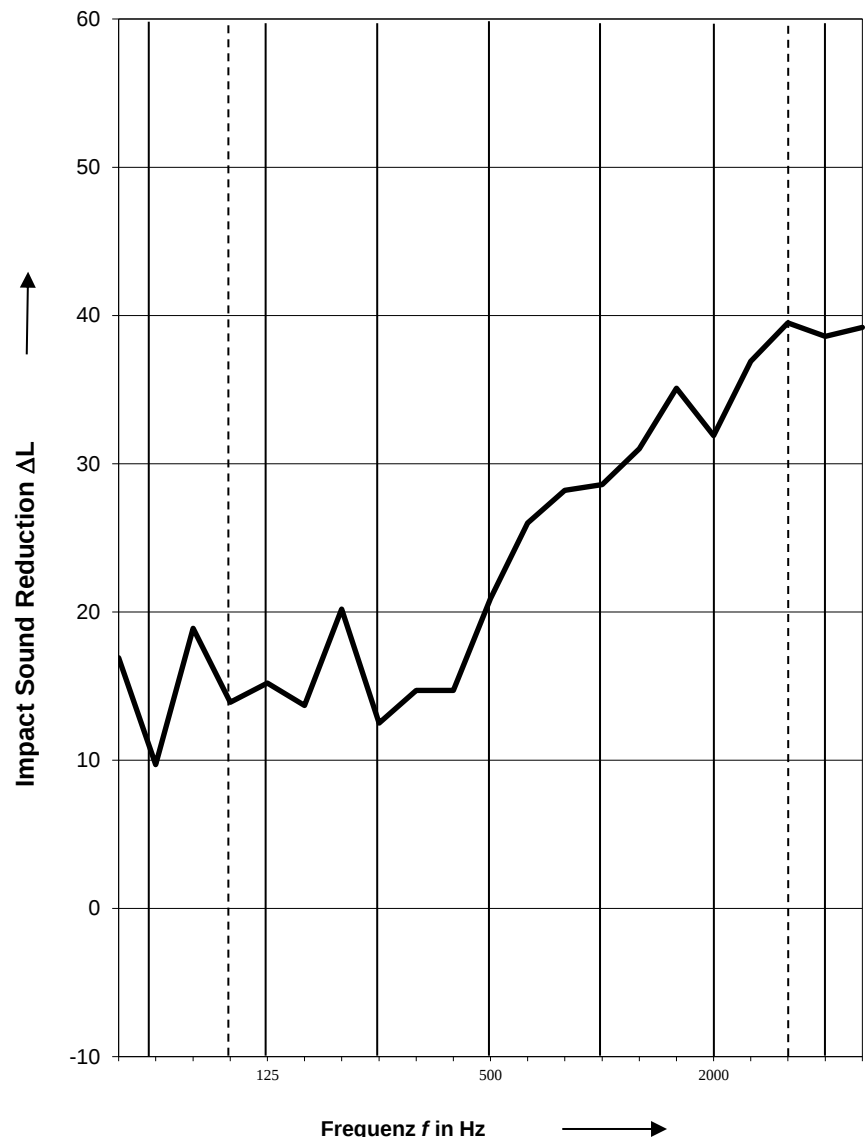
Description of Test Object: **Measurement 1**

Test arrangement consisting of BIS Yeti® mounting system, type A (2 pieces), length = 1,000 mm, with profile rail base, horizontal support structure, bolted steel plate (800 mm x 300 mm x 6 mm) the standard hammer mechanism, arrangement set up on the laboratory ceiling, approx. 150 kg additional load per foot (approx. 300 kg total load)

Specific of measuring:
DIN EN ISO 10140-1, Category I

Mass per unit area: --
Setting time:
Air temperature: 24,0 °C
Relative humidity: 53,0 %
Volume receiving room: 74.5 m³

Frequency <i>f</i> Hz	<i>L_{n,0}</i> Terz dB	ΔL Terz dB
50	60,0	16,9
63	56,2	9,7
80	64,1	18,9
100	64,0	13,9
125	70,1	15,2
160	67,6	13,7
200	73,4	20,2
250	71,5	12,5
315	71,0	14,7
400	70,6	14,7
500	72,1	20,9
630	72,6	26,0
800	73,0	28,2
1000	73,8	28,6
1250	75,4	31,0
1600	77,2	35,1
2000	76,6	31,9
2500	76,1	36,9
3150	74,2	39,5
4000	72,6	38,6
5000	69,8	39,2



Evaluation according to ISO 717-2:

$\Delta L_w = 29 \text{ dB}$ $\Delta L_{IN} = 18 \text{ dB}$
 $C_{l,\Delta} = -11 \text{ dB}$ $C_{l,r} = 0 \text{ dB}$

Test report-No.: 2058-001-24
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Impact Sound Reduction according to DIN EN ISO 10140-3

Appendix 13

Ascertainment of Impact Sound Reduction in Laboratory

Client: J. van Walraven Holding B.V., Industrieweg 5, 3641 RK Mijdrecht, The Netherlands

Object: BIS Yeti® Mounting System, type A, with additional load, with or without EPS-insulation

Test Date: 13.08.2024

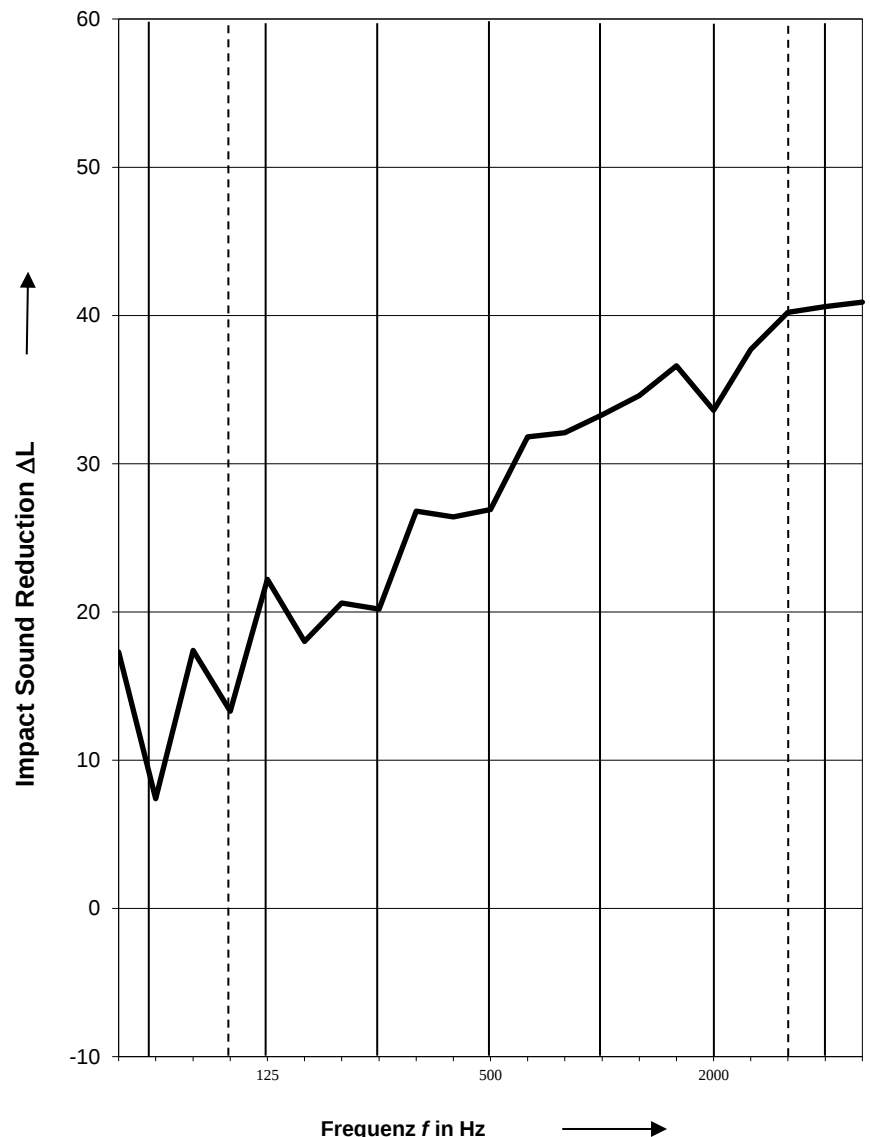
Description of Test Object: **Measurement 2**

Test arrangement consisting of BIS Yeti® mounting system, type A (2 pieces), length = 1,000 mm, with profile rail base, horizontal support structure, bolted steel plate (800 mm x 300 mm x 6 mm) the standard hammer mechanism, arrangement set up on the laboratory ceiling, approx. 150 kg additional load per foot (approx. 300 kg total load), **placed on EPS-insulation (t = 200 mm)**

Specific of measuring:
DIN EN ISO 10140-1, Category I

Mass per unit area: --
Setting time:
Air temperature: 24,0 °C
Relative humidity: 53,0 %
Volume receiving room: 74.5 m³

Frequency <i>f</i> Hz	<i>L_{n,0}</i> Terz dB	ΔL Terz dB
50	60,0	17,3
63	56,2	7,4
80	64,1	17,4
100	64,0	13,3
125	70,1	22,2
160	67,6	18,0
200	73,4	20,6
250	71,5	20,2
315	71,0	26,8
400	70,6	26,4
500	72,1	26,9
630	72,6	31,8
800	73,0	32,1
1000	73,8	33,3
1250	75,4	34,6
1600	77,2	36,6
2000	76,6	33,6
2500	76,1	37,7
3150	74,2	40,2
4000	72,6	40,6
5000	69,8	40,9



Evaluation according to ISO 717-2:

$\Delta L_w = 33 \text{ dB}$ $\Delta L_{IN} = 23 \text{ dB}$
 $C_{l,\Delta} = -10 \text{ dB}$ $C_{l,r} = -1 \text{ dB}$

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 45478 Mülheim an der Ruhr, den 02.09.2024

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Impact Sound Reduction according to DIN EN ISO 10140-3

Appendix 14

Ascertainment of Impact Sound Reduction in Laboratory

Client: J. van Walraven Holding B.V., Industrieweg 5, 3641 RK Mijdrecht, The Netherlands

Object: BIS Yeti® Mounting System, type A, with additional load, with or without EPS-insulation

Test Date: 13.08.2024

Description of Test Object: **Measurement 3**

Test arrangement consisting of BIS Yeti® mounting system, type A (2 pieces), length = 250 mm, with profile rail base, horizontal support structure, bolted steel plate (800 mm x 300 mm x 6 mm) the standard hammer mechanism, arrangement set up on the laboratory ceiling, approx. 150 kg additional load per foot (approx. 300 kg total load)

Specific of measuring:

DIN EN ISO 10140-1, Category I

Mass per unit area: --

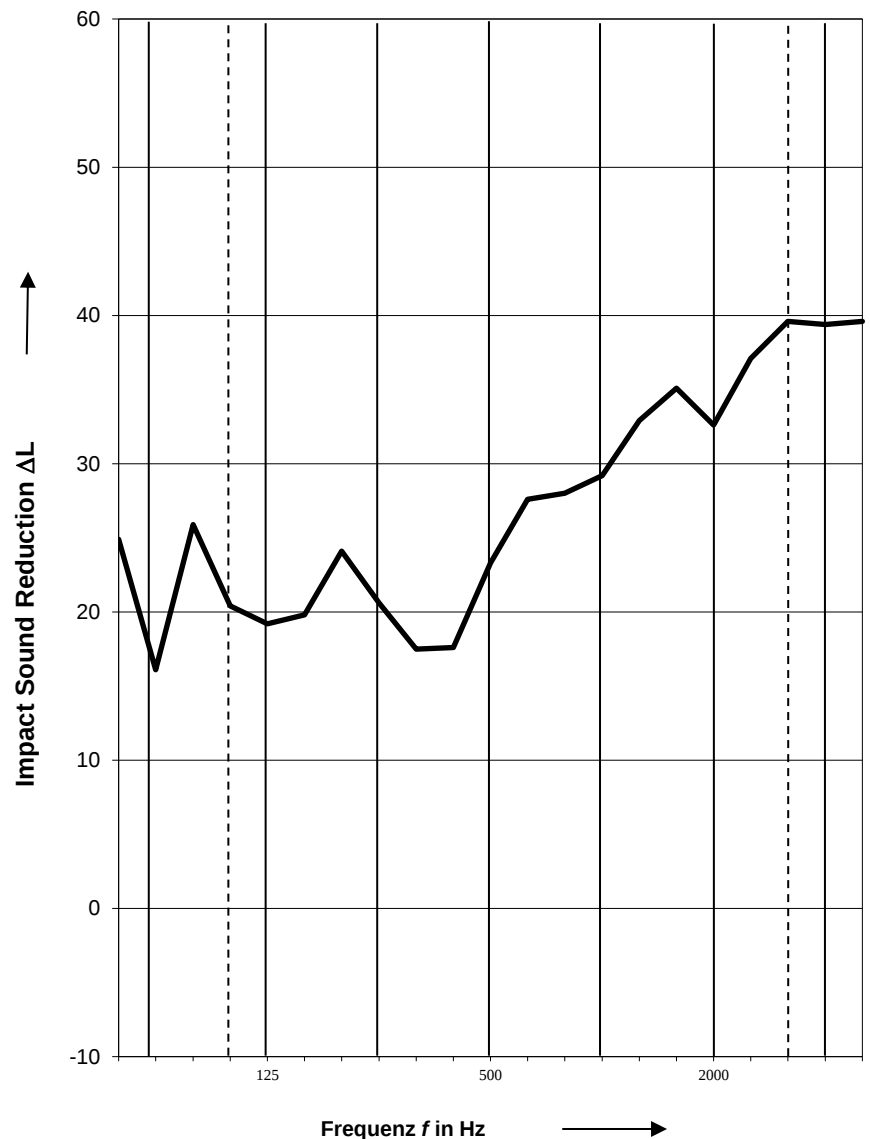
Setting time:

Air temperature: 24,0 °C

Relative humidity: 53,0 %

Volume receiving room: 74.5 m³

Frequency <i>f</i> Hz	<i>L</i> _{n,0} Terz dB	ΔL Terz dB
50	60,0	24,9
63	56,2	16,1
80	64,1	25,9
100	64,0	20,4
125	70,1	19,2
160	67,6	19,8
200	73,4	24,1
250	71,5	20,6
315	71,0	17,5
400	70,6	17,6
500	72,1	23,3
630	72,6	27,6
800	73,0	28,0
1000	73,8	29,2
1250	75,4	32,9
1600	77,2	35,1
2000	76,6	32,6
2500	76,1	37,1
3150	74,2	39,6
4000	72,6	39,4
5000	69,8	39,6



Evaluation according to ISO 717-2:

$\Delta L_w = 32 \text{ dB}$ $\Delta L_{IN} = 22 \text{ dB}$

$C_{l,\Delta} = -10 \text{ dB}$ $C_{l,r} = -1 \text{ dB}$

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Impact Sound Reduction according to DIN EN ISO 10140-3

Appendix 15

Ascertainment of Impact Sound Reduction in Laboratory

Client: J. van Walraven Holding B.V., Industrieweg 5, 3641 RK Mijdrecht, The Netherlands

Object: BIS Yeti® Mounting System, type A, with additional load, with or without EPS-insulation

Test Date: 13.08.2024

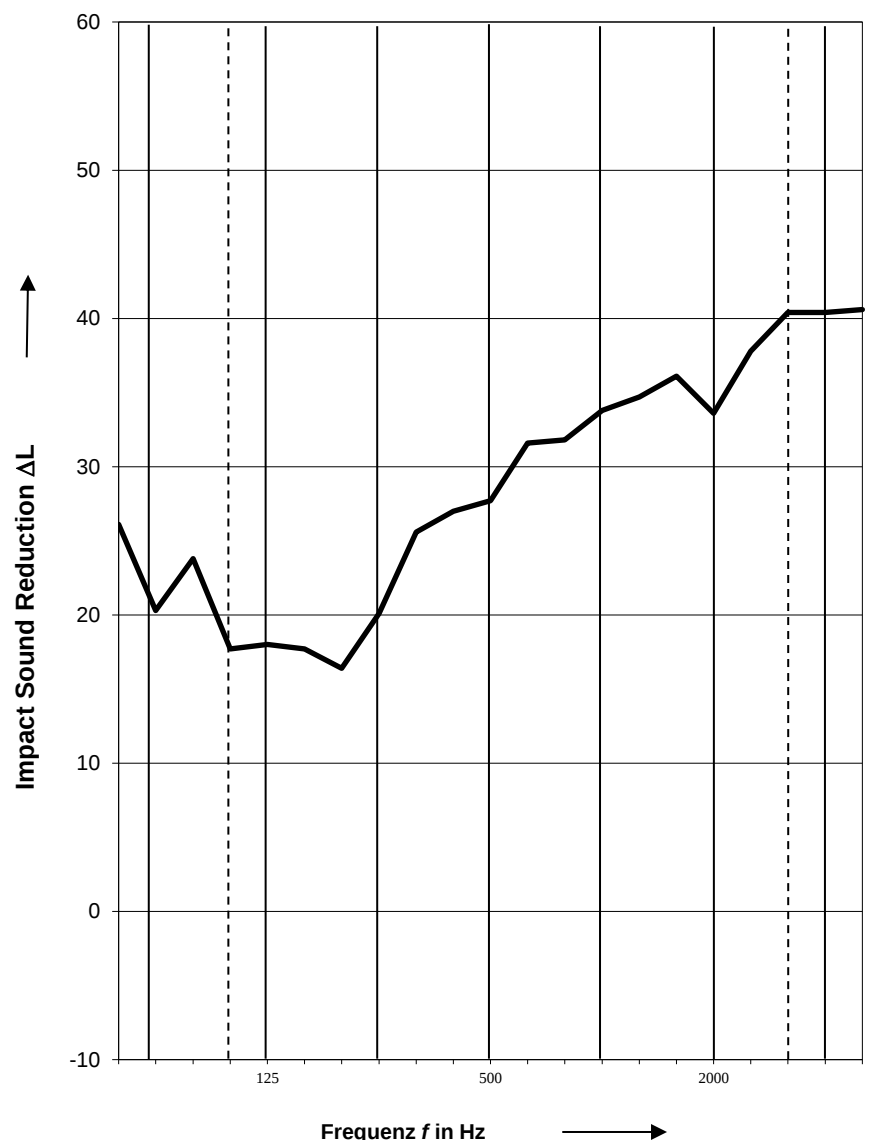
Description of Test Object: Measurement 4

Test arrangement consisting of BIS Yeti® mounting system, type A (2 pieces), length = 250 mm, with profile rail base, horizontal support structure, bolted steel plate (800 mm x 300 mm x 6 mm) the standard hammer mechanism, arrangement set up on the laboratory ceiling, approx. 150 kg additional load per foot (approx. 300 kg total load), **placed on EPS-insulation (t = 200 mm)**

Specific of measuring:
DIN EN ISO 10140-1, Category I

Mass per unit area: --
Setting time:
Air temperature: 24,0 °C
Relative humidity: 53,0 %
Volume receiving room: 74.5 m³

Frequency <i>f</i> Hz	<i>L</i> _{n,0} Terz dB	ΔL Terz dB
50	60,0	26,1
63	56,2	20,3
80	64,1	23,8
100	64,0	17,7
125	70,1	18,0
160	67,6	17,7
200	73,4	16,4
250	71,5	20,1
315	71,0	25,6
400	70,6	27,0
500	72,1	27,7
630	72,6	31,6
800	73,0	31,8
1000	73,8	33,8
1250	75,4	34,7
1600	77,2	36,1
2000	76,6	33,6
2500	76,1	37,8
3150	74,2	40,4
4000	72,6	40,4
5000	69,8	40,6



Evaluation according to ISO 717-2:

$\Delta L_w = 33 \text{ dB}$ $\Delta L_{in} = 22 \text{ dB}$
 $C_{l,\Delta} = -11 \text{ dB}$ $C_{l,r} = 0 \text{ dB}$

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Ascertainment of Impact Sound Reduction in Laboratory

Client: J. van Walraven Holding B.V., Industrieweg 5, 3641 RK Mijdrecht, The Netherlands

Object: BIS Yeti® Mounting System, type A, with additional load, with or without EPS-insulation

Test Date: 13.08.2024

Description of Test Object:

Measurement 5

Test arrangement consisting of BIS Yeti® mounting system, type A-low (2 pieces), length = 400 mm, with profile rail base, horizontal support structure, bolted steel plate (800 mm x 300 mm x 6 mm) the standard hammer mechanism, arrangement set up on the laboratory ceiling, approx. 150 kg additional load per foot (approx. 300 kg total load)

Specific of measuring:

DIN EN ISO 10140-1, Category I

Mass per unit area: --

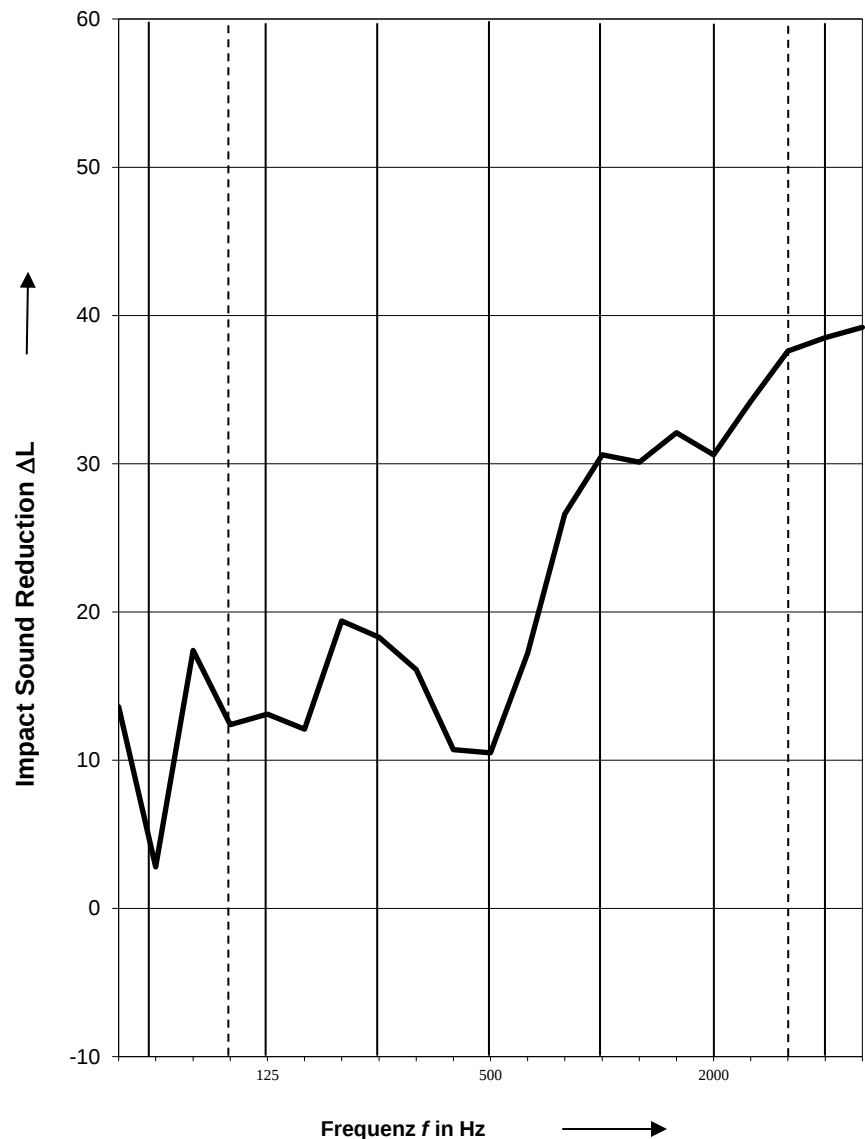
Setting time:

Air temperature: 24,0 °C

Relative humidity: 53,0 %

Volume receiving room: 74.5 m³

Frequency <i>f</i> Hz	<i>L</i> _{n,0} Terz dB	ΔL Terz dB
50	60,0	13,6
63	56,2	2,8
80	64,1	17,4
100	64,0	12,4
125	70,1	13,1
160	67,6	12,1
200	73,4	19,4
250	71,5	18,3
315	71,0	16,1
400	70,6	10,7
500	72,1	10,5
630	72,6	17,2
800	73,0	26,6
1000	73,8	30,6
1250	75,4	30,1
1600	77,2	32,1
2000	76,6	30,6
2500	76,1	34,2
3150	74,2	37,6
4000	72,6	38,5
5000	69,8	39,2



Evaluation according to ISO 717-2:

 $\Delta L_w = 27 \text{ dB}$ $\Delta L_{IN} = 15 \text{ dB}$ $C_{l,\Delta} = -12 \text{ dB}$ $C_{l,r} = 1 \text{ dB}$

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Impact Sound Reduction according to DIN EN ISO 10140-3

Appendix 17

Ascertainment of Impact Sound Reduction in Laboratory

Client: J. van Walraven Holding B.V., Industrieweg 5, 3641 RK Mijdrecht, The Netherlands

Object: BIS Yeti® Mounting System, type A, with additional load, with or without EPS-insulation

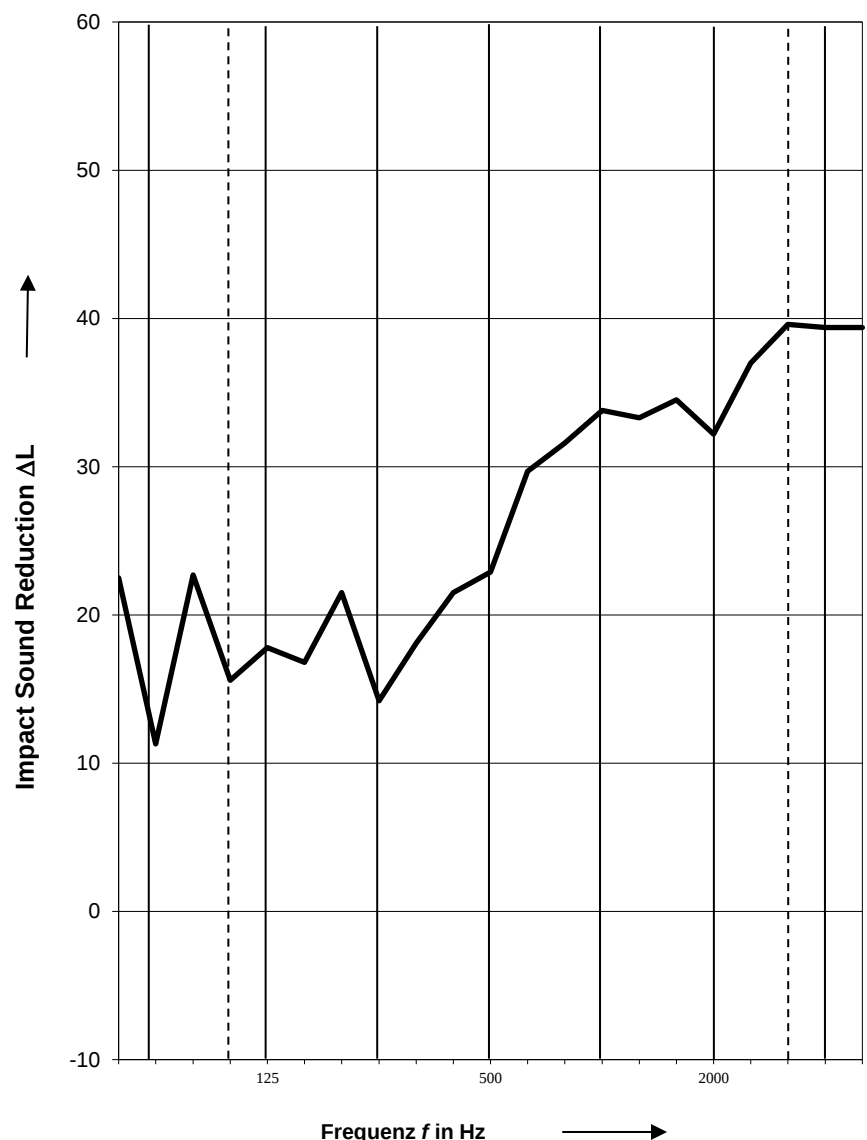
Test Date: 13.08.2024

Description of Test Object: **Measurement 6**
 Test arrangement consisting of BIS Yeti® mounting system, type A-low (2 pieces), length = 400 mm, with profile rail base, horizontal support structure, bolted steel plate (800 mm x 300 mm x 6 mm) the standard hammer mechanism, arrangement set up on the laboratory ceiling, approx. 150 kg additional load per foot (approx. 300 kg total load), **placed on EPS-insulation (t = 200 mm)**

Specific of measuring:
DIN EN ISO 10140-1, Category I

Mass per unit area: --
 Setting time:
 Air temperature: 24,0 °C
 Relative humidity: 53,0 %
 Volume receiving room: 74.5 m³

Frequency <i>f</i> Hz	<i>L</i> _{n,0} Terz dB	ΔL Terz dB
50	60,0	22,5
63	56,2	11,3
80	64,1	22,7
100	64,0	15,6
125	70,1	17,8
160	67,6	16,8
200	73,4	21,5
250	71,5	14,2
315	71,0	18,1
400	70,6	21,5
500	72,1	22,9
630	72,6	29,7
800	73,0	31,6
1000	73,8	33,8
1250	75,4	33,3
1600	77,2	34,5
2000	76,6	32,2
2500	76,1	37,0
3150	74,2	39,6
4000	72,6	39,4
5000	69,8	39,4



Evaluation according to ISO 717-2:

$\Delta L_w = 31 \text{ dB}$ $\Delta L_{IN} = 20 \text{ dB}$
 $C_{l,\Delta} = -11 \text{ dB}$ $C_{l,r} = 0 \text{ dB}$

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Impact Sound Reduction according to DIN EN ISO 10140-3

Appendix 18

Ascertainment of Impact Sound Reduction in Laboratory

Client: J. van Walraven Holding B.V., Industrieweg 5, 3641 RK Mijdrecht, The Netherlands
Object: BIS Yeti® Mounting System, type A, with additional load, with or without EPS-insulation
Test Date: 13.08.2024

Description of Test Object:

Measurement 7

Test arrangement consisting of BIS Yeti® mounting system, type A-low (2 pieces), length = 250 mm, with profile rail base, horizontal support structure, bolted steel plate (800 mm x 300 mm x 6 mm) the standard hammer mechanism, arrangement set up on the laboratory ceiling, approx. 150 kg additional load per foot (approx. 300 kg total load)

Specific of measuring:

DIN EN ISO 10140-1, Category I

Mass per unit area: --

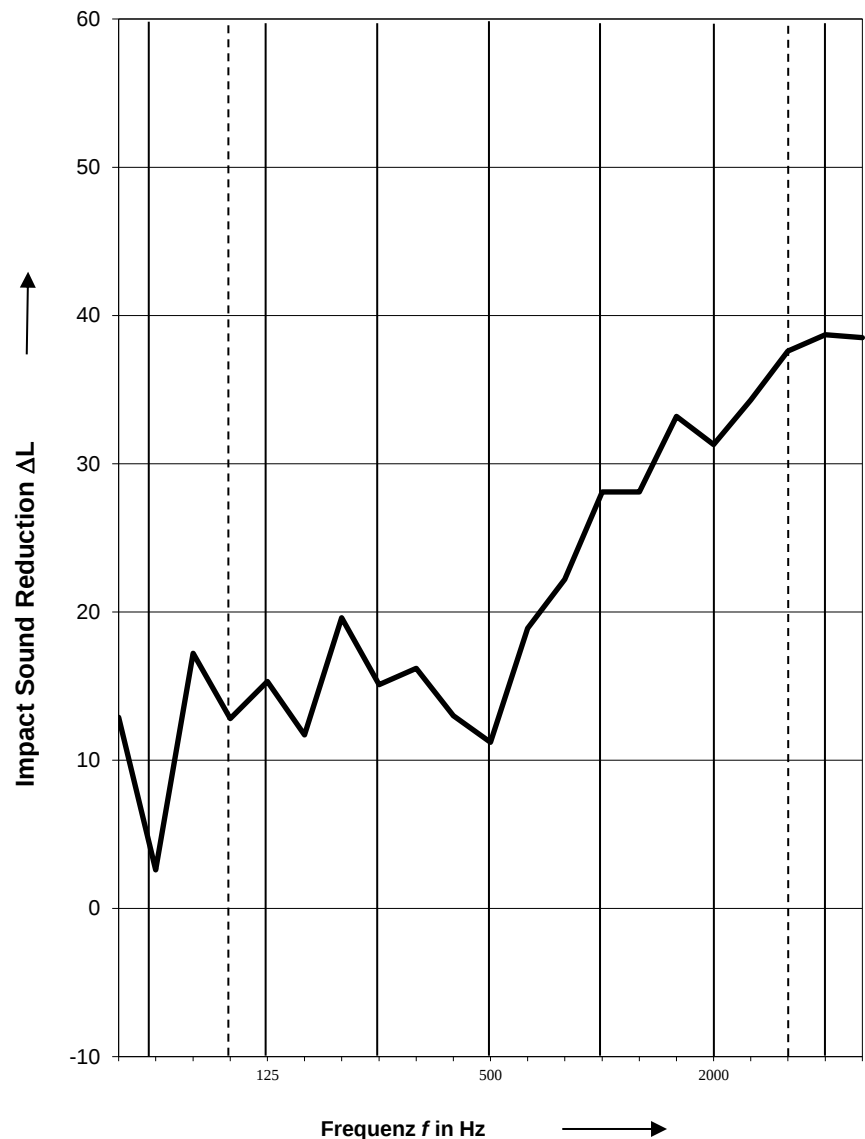
Setting time:

Air temperature: 24,0 °C

Relative humidity: 53,0 %

Volume receiving room: 74.5 m³

Frequency <i>f</i> Hz	<i>L</i> _{n,0} Terz dB	ΔL Terz dB
50	60,0	12,9
63	56,2	2,6
80	64,1	17,2
100	64,0	12,8
125	70,1	15,3
160	67,6	11,7
200	73,4	19,6
250	71,5	15,1
315	71,0	16,2
400	70,6	13,0
500	72,1	11,2
630	72,6	18,9
800	73,0	22,2
1000	73,8	28,1
1250	75,4	28,1
1600	77,2	33,2
2000	76,6	31,3
2500	76,1	34,3
3150	74,2	37,6
4000	72,6	38,7
5000	69,8	38,5



Evaluation according to ISO 717-2:

$\Delta L_w = 27$ dB $\Delta L_{IN} = 16$ dB
 $C_{l,\Delta} = -11$ dB $C_{l,r} = 0$ dB

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Impact Sound Reduction according to DIN EN ISO 10140-3

Appendix 19

Ascertainment of Impact Sound Reduction in Laboratory

Client: J. van Walraven Holding B.V., Industrieweg 5, 3641 RK Mijdrecht, The Netherlands

Object: BIS Yeti® Mounting System, type A, with additional load, with or without EPS-insulation

Test Date: 13.08.2024

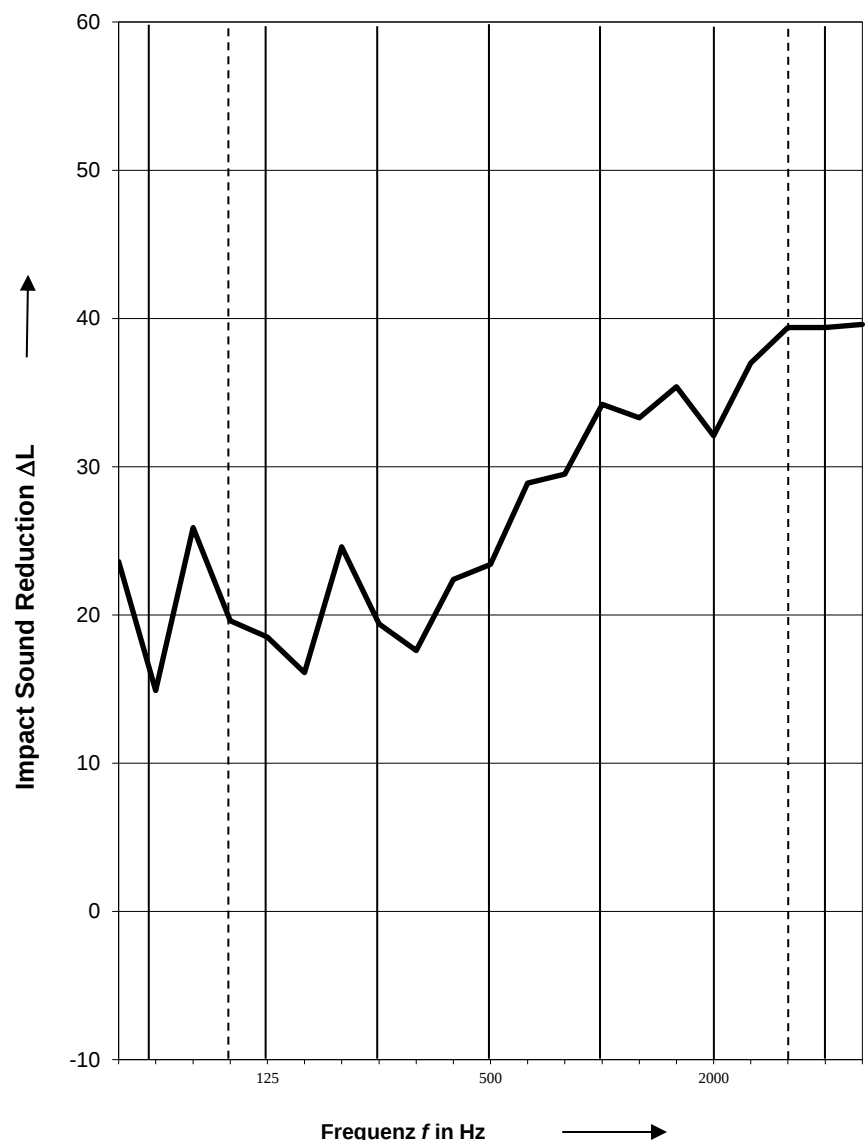
Description of Test Object: **Measurement 8**

Test arrangement consisting of BIS Yeti® mounting system, type A-low (2 pieces), length = 250 mm, with profile rail base, horizontal support structure, bolted steel plate (800 mm x 300 mm x 6 mm) the standard hammer mechanism, arrangement set up on the laboratory ceiling, approx. 150 kg additional load per foot (approx. 300 kg total load), **placed on EPS-insulation (t = 200 mm)**

Specific of measuring:
DIN EN ISO 10140-1, Category I

Mass per unit area: --
Setting time:
Air temperature: 24,0 °C
Relative humidity: 53,0 %
Volume receiving room: 74.5 m³

Frequency <i>f</i> Hz	<i>L_{n,0}</i> Terz dB	ΔL Terz dB
50	60,0	23,6
63	56,2	14,9
80	64,1	25,9
100	64,0	19,6
125	70,1	18,5
160	67,6	16,1
200	73,4	24,6
250	71,5	19,4
315	71,0	17,6
400	70,6	22,4
500	72,1	23,4
630	72,6	28,9
800	73,0	29,5
1000	73,8	34,2
1250	75,4	33,3
1600	77,2	35,4
2000	76,6	32,1
2500	76,1	37,0
3150	74,2	39,4
4000	72,6	39,4
5000	69,8	39,6



Evaluation according to ISO 717-2:

$\Delta L_w = 32 \text{ dB}$ $\Delta L_{IN} = 22 \text{ dB}$
 $C_{l,\Delta} = -10 \text{ dB}$ $C_{l,r} = -1 \text{ dB}$

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