

Test report 1

No.: 2025-0558-VU

Date of test: August 2025

Testers: Dipl.-Ing. Pröhl,
B. Eng. Dogan

No. of pages: 14

**Applicant/
manufacturer:** DIRAK GmbH
Königsfelder Straße 1
58256 Ennepetal

Test specimens: Different specimens: see pages 11 - 14

**Test procedures /
bases:** Random vibration test:
base standard: DIN EN 60068-2-64 (09/2020)
test standard: DIN EN 61373 (04/2011)

Shock test:
base standard: DIN EN 60068-2-27 (02/2010)
test standard: DIN EN 61373 (04/2011)

Delivered on: August 11th, 2025

Date of report: August 25th, 2025

1 Test equipment and regulation

1.1 Vibration and shock test

Electro dynamic shaker:	LDS V875-LPT750C with connected slip table LPT 750 and power amplifier SPA 40K
PM:	V8
Calibration date:	08/2025
Accelerometer:	PCB J320C34
PM:	V300
Calibration date:	01/2025
Accelerometer:	PCB J320C34
PM:	V301
Calibration date:	01/2025
Total uncertainty of measurement [%]*:	± 0.72

^{*)} Given are the uncertainties of measurement according to *EA-4/02 M:2022*. These are within the scope of the accreditation the smallest measurable uncertainties of measurement with a coverage probability of approx. 95 % with a coverage factor $k = 2$. Uncertainties of measurement without specifications of the units are relative values related to the measured value, unless otherwise noted.

2 Testing methods

2.1 Visual checks

Before, during and after the vibration and shock tests the specimens were subjected to a visual check.

2.2 Random vibration test (long-term test)

The vibration test was conducted in accordance with the standard DIN EN 61373 (2011) Category 1, Class B. The category and class were specified by the customer.

The test parameters were defined as follows:

Excitation mode:	random
Frequency range:	5 Hz to 150 Hz
Power density:	<u>vertical, longitudinal, transversal:</u> 5 Hz – 20 Hz 0.964 (m/s ²) ² /Hz 20 Hz – 150 Hz -6 dB / octave
Effective acceleration:	<u>vertical, longitudinal, transversal:</u> 5.72 m/s ² (RMS)
Test directions:	3 directions (X, Y, Z)
Test duration:	approx. 5 h / direction
Total test duration:	approx. 15 h (effective vibration time)
Test temperature:	room temperature

Following customers instructions, the test was conducted with the profile “vertical” in all three directions.

Diagram 1 on page 8 shows exemplarily the regulating channel’s excitation during the long-term test.

2.3 Shock test

The shock test was conducted in accordance with the standard DIN EN 61373 (2011) Category 1, Class B. The category and class were specified by the customer.

The test parameters were defined as follows:

Shock pulse:	half sine
Shock duration and amplitude:	<u>vertical, longitudinal, transversal:</u> 30 ms at 50m/s ²
Test directions:	6 directions
Number of shocks:	3 / direction
Test temperature:	room temperature

Following customers instructions, the test was conducted with the profile “longitudinal” in all three directions.

Diagrams 2 to 3 on pages 10 to 11 show the regulating channel’s shock excitation in the positive and negative directions.

2.4 Random vibration test (function test)

The vibration test was conducted in accordance with the standard DIN EN 61373 (2011) Category 1, Class B. The category and class were specified by the customer.

The test parameters were defined as follows:

Excitation mode:	random
Frequency range:	5 Hz to 150 Hz
Power density:	<u>vertical, longitudinal, transversal:</u> 5 Hz – 20 Hz 0.031 (m/s ²) ² /Hz 20 Hz – 150 Hz -6 dB / octave
Effective acceleration:	<u>vertical, longitudinal, transversal:</u> 1.01 m/s ² (RMS)
Test directions:	3 directions (X, Y, Z)
Test duration:	approx. 10 min / direction
Total test duration:	approx. 30 min (effective vibration time)
Test temperature:	room temperature

Following customers instructions, the test was conducted with the profile “vertical” in all three directions.

Diagram 4 on page 12 shows exemplarily the regulating channel's excitation during the long-term test.

The following figures show the test specimens undergoing the vibration and shock tests.



Fig. 1: Specimens during the vibration and shock test in the first horizontal direction

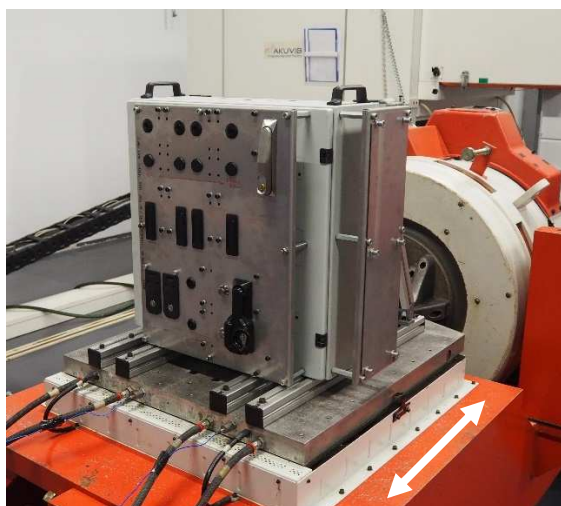


Fig. 2: Specimens during the vibration and shock test in the second horizontal direction



Fig. 3: Specimens during the vibration and shock test in vertical direction

3 Test procedure

The tests were conducted in the following order:

- | | |
|--|--------------------------------|
| 1. Random vibration test, long term test,
first horizontal direction | August 11 th , 2025 |
| 2. Shock test, first horizontal direction | August 11 th , 2025 |
| 3. Random vibration test, function test,
first horizontal direction | August 11 th , 2025 |
| 4. Random vibration test, long term test,
second horizontal direction | August 11 th , 2025 |
| 5. Shock test, second horizontal direction | August 12 th , 2025 |
| 6. Random vibration test, function test,
second horizontal direction | August 12 th , 2025 |
| 7. Random vibration test, long term test,
vertical direction | August 12 th , 2025 |
| 8. Shock test, vertical direction | August 12 th , 2025 |
| 9. Random vibration test, function test,
vertical direction | August 12 th , 2025 |

4 Result

The visual inspection of the specimens after testing could not detect any cracks, chipping, deformation, abrasion, or other mechanical damage.

The specimens did not self unlock during the tests.

The customer will continue investigations on the test specimens.

Processed by:

Approved by:

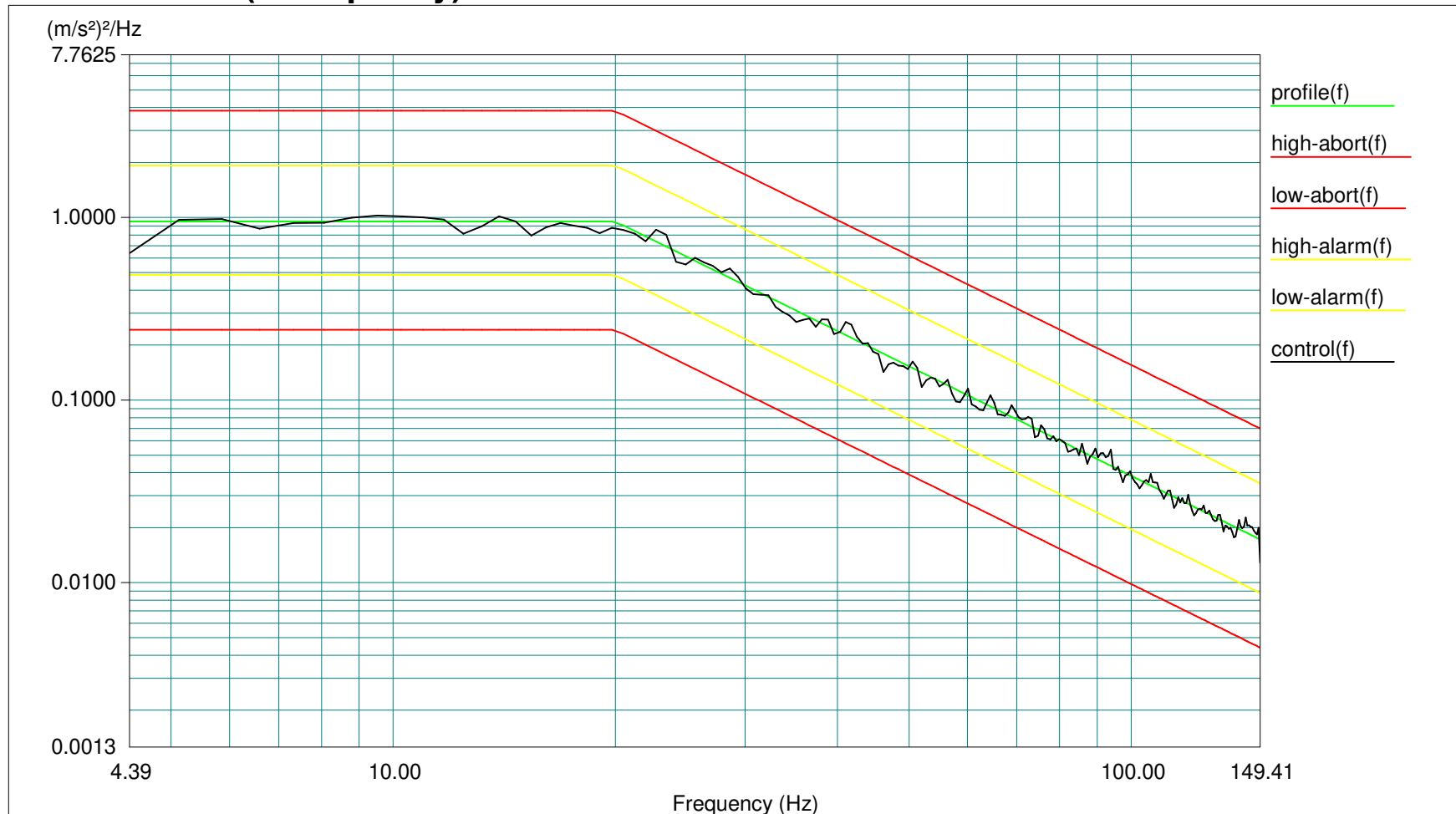


(Dipl.-Ing. Pröhl)
(Head of laboratory)



(B. Eng. Dogan)
(test engineer)

Diagram 1: Long-term test regulating channel (exemplarily)



Level: 100 %
Control RMS: 5.579903 m/s² Full Level Elapsed Time: 05:00:00 Lines: 200 Frame Time: 1.365333 Seconds
Demand RMS: 5.626908 m/s² Remaining Time: 00:00:00 DOF: 154 dF: 0.732422 Hz

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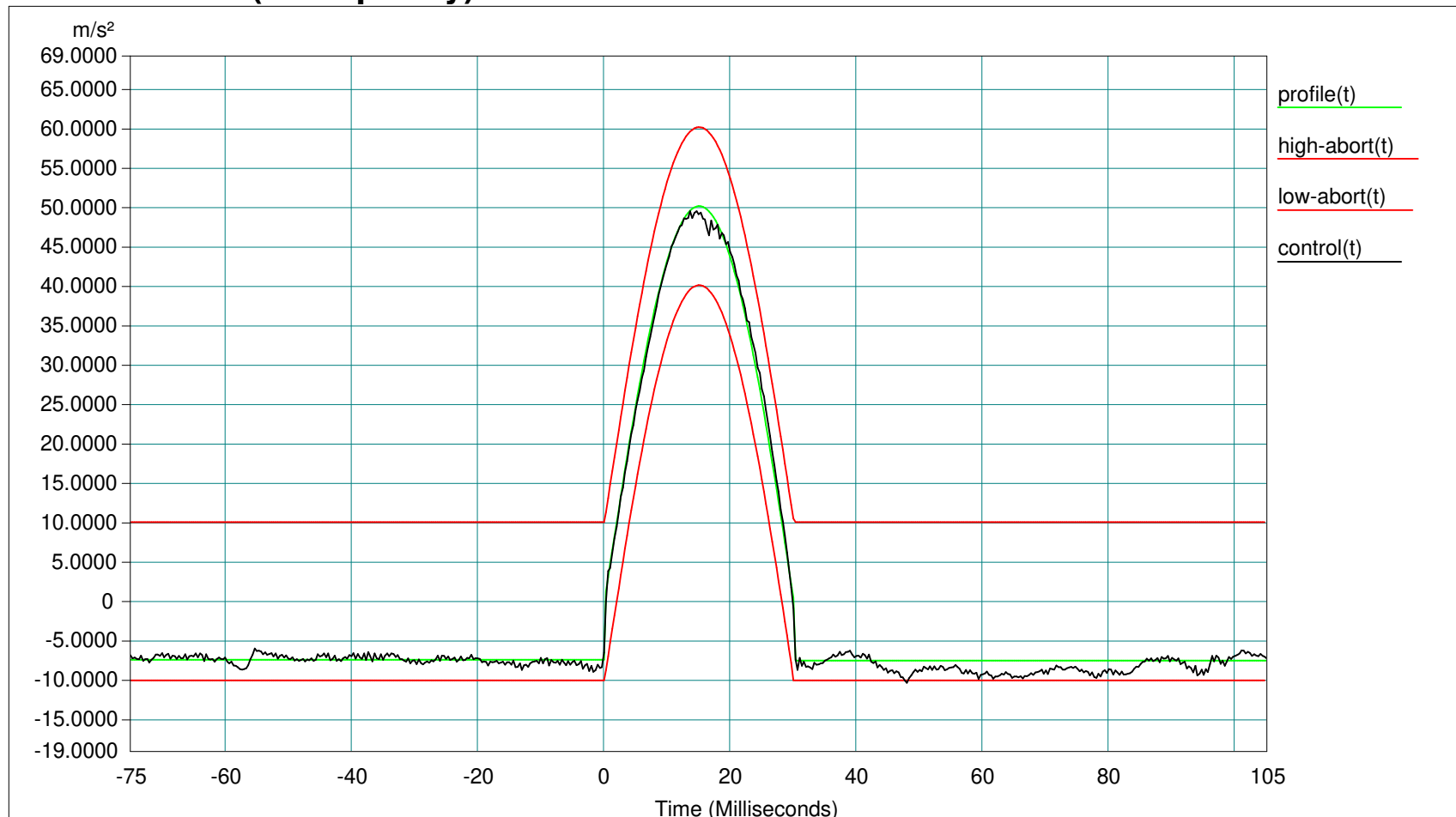
Date: August 25th, 2025
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The findings presented in this report apply exclusively to the specimen submitted for testing. No part of this publication may be duplicated without the prior consent in writing of the testing laboratory.

Diagram 2: Shock test regulating channel, positive direction (exemplarily)



Level:	100 %	Block Size:	2048	Elapsed Pulses:	11	
Frame Time:	0.682667 Seconds	Control Peak:	49.367760	Control RMS:	8.878386	Full Level Elapsed Pulses: 3
dT:	0.000333 Seconds	Demand Peak:	50.000000	Demand RMS:	8.806992	Remaining Pulses: 6
Pulse Type:	Half Sine	Amplitude:	50.000000	Pulse Width:	29.999999 ms	

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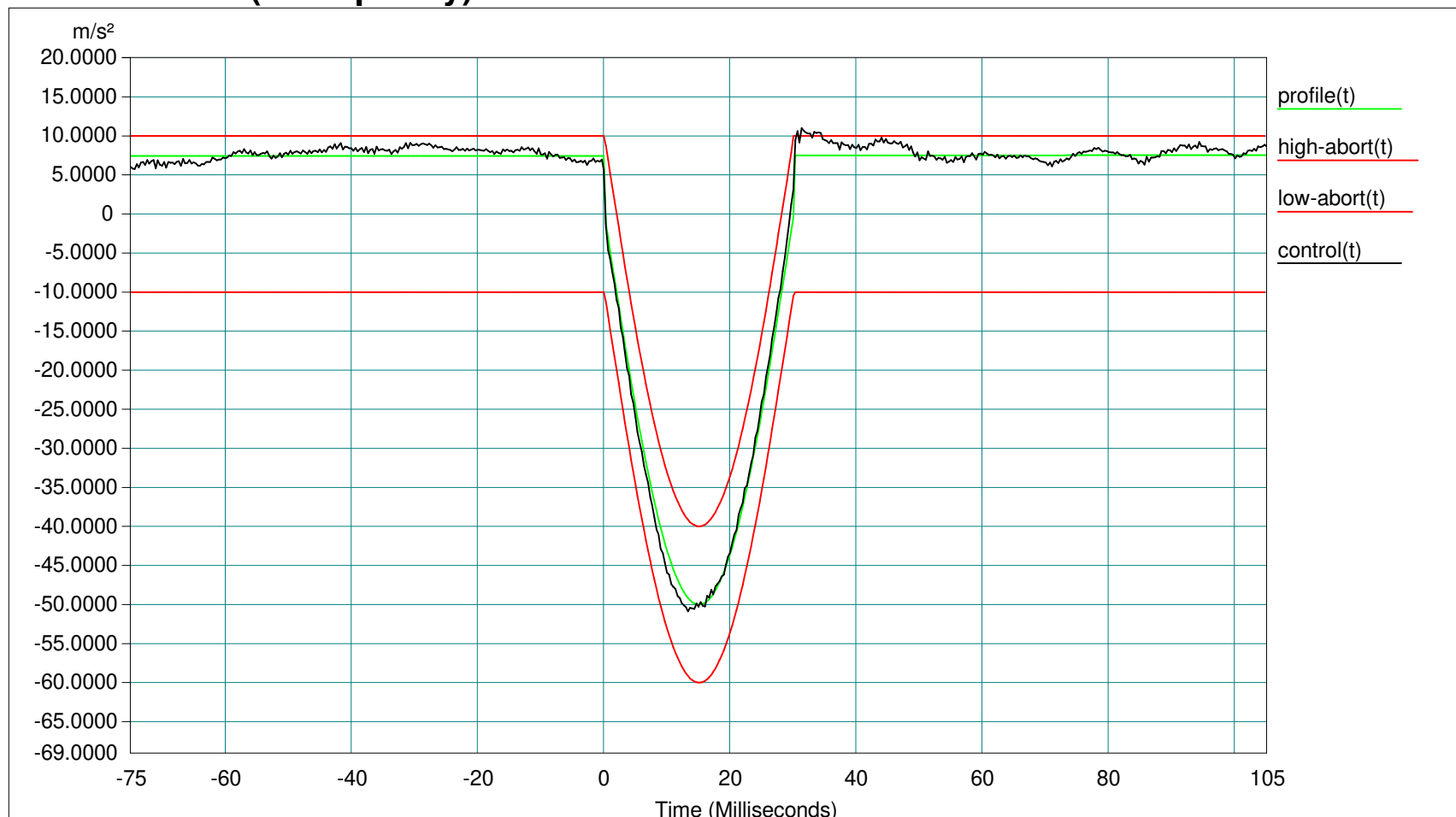
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Diagram 3: Shock test regulating channel, negative direction (exemplarily)



Level:	100 %	Block Size:	2048	Elapsed Pulses:	17	
Frame Time:	0.682667 Seconds	Control Peak:	50.900372	Control RMS:	9.005869	Full Level Elapsed Pulses: 6
dT:	0.000333 Seconds	Demand Peak:	50.000000	Demand RMS:	8.806992	Remaining Pulses: 0
Pulse Type:	Half Sine	Amplitude:	50.000000	Pulse Width:	29.999999 ms	

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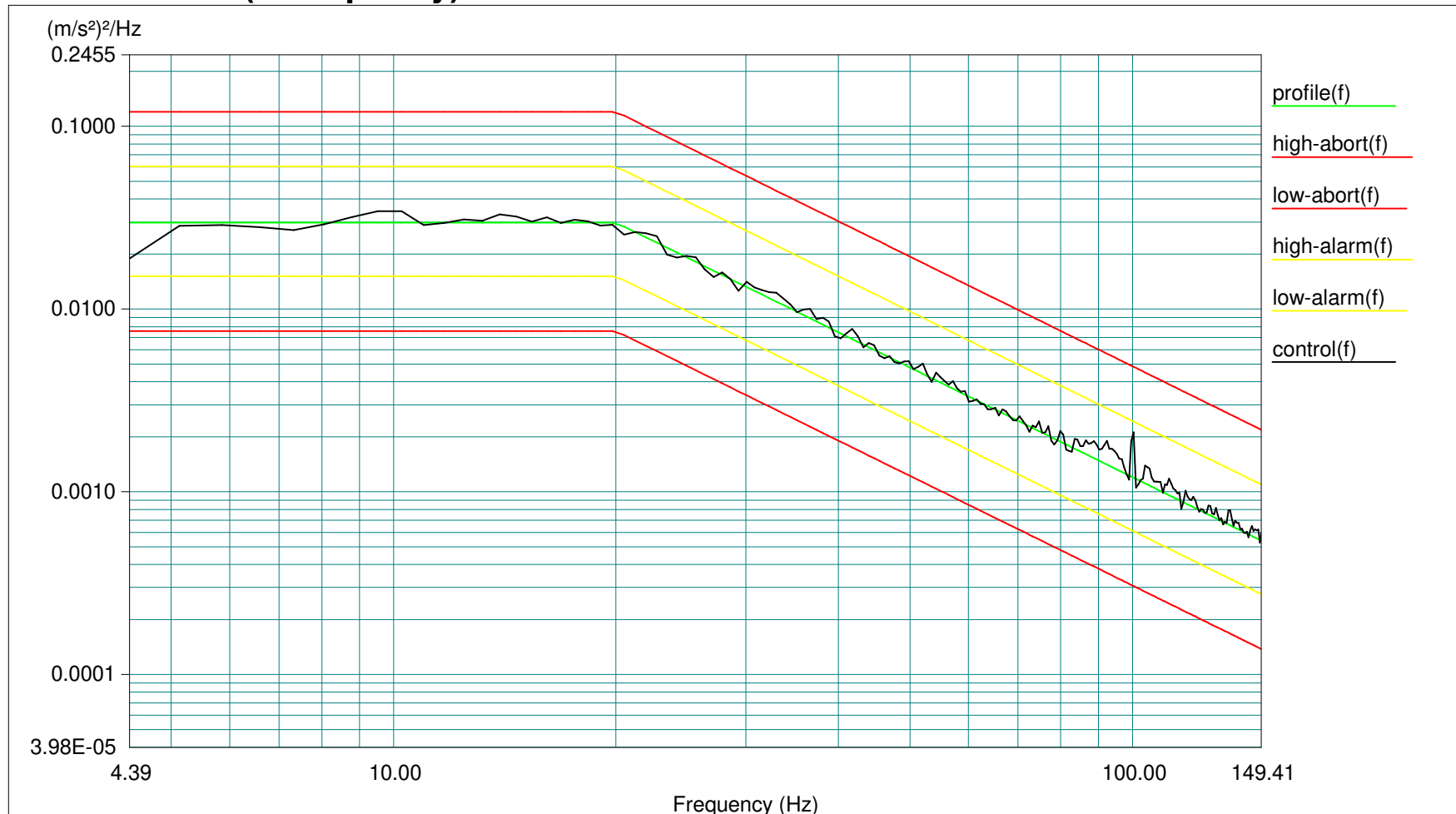
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**Diagram 4: Function test regulating channel
(exemplarily)**



Level: 100 %	Control RMS: 1.006672 m/s^2	Full Level Elapsed Time: 00:09:59	Lines: 200	Frame Time: 1.365333 Seconds
Demand RMS: 0.994294 m/s^2	Remaining Time: 00:00:00	DOF: 154	dF: 0.732422 Hz	

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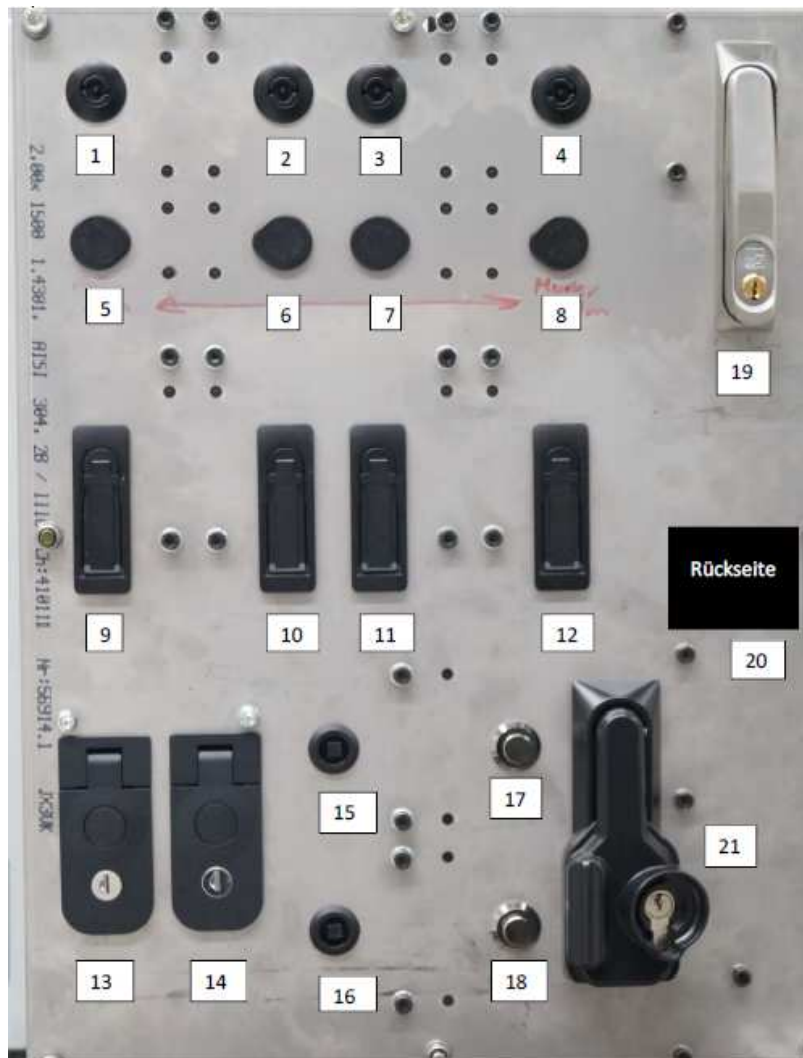
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Fig. 4: Arrangement of the specimens



Tabel 1: List of specimens

Figure	Item number	Item name	Product number
1.	100-9240.00-00001	Rastdrehriegel	1-084
2.	100-9240.00-00001	Rastdrehriegel	1-084
3.	100-9240.00-00001	Rastdrehriegel	1-084
4.	100-9240.00-00001	Rastdrehriegel	1-084
5.	300-9000.10-09000	m.tec Drehriegel	1-120 m.tec.
6.	300-9000.10-09000	m.tec Drehriegel	1-120 m.tec.
7.	300-9000.10-09000	m.tec Drehriegel	1-120 m.tec.
8.	300-9000.10-09000	m.tec Drehriegel	1-120 m.tec.
9.	300-9200.10-09000	m.tec Schwenkhebel	2-071 m.tec.
10.	300-9200.10-09000	m.tec Schwenkhebel	2-071 m.tec.
11.	300-9200.10-09000	m.tec Schwenkhebel	2-071 m.tec.
12.	300-9200.10-09000	m.tec Schwenkhebel	2-071 m.tec.
13.	353-2052.00-00001	Kompressions-Hebelverschluss	6-167
14.	353-2052.00-00001	Kompressions-Hebelverschluss	6-167
15.	200-9003.00-00000	Drehriegel Polyamid	1-095
16.	200-9003.00-00000	Drehriegel Polyamid	1-095
17.	264-9009.00-00000	Schnappverschluss	1-501
18.	264-9009.00-00000	Schnappverschluss	1-501
19.	207-9164.00-00000	Schwenkhebel FS PrC für Assa-Abloy Zylinder Edelstahl	7-064
20.	200-9637.00-00000	90° Eckumlenkung für Mehrpunktverriegelung	1-263.01
21.	207-9161.00-00000	Doppelzylinder Schwenkhebel RS 105 für iLOQ Zylinder	2-126.05

Fig. 5: Arrangement of specimens



Tabel 2: List of specimens

Figure	Item number	Item name	Product number
22.	294-9303.00-00055	DST Unverlierbarer Flex-Verbinder	1-034.01 DST
23.	294-9303.00-00055	DST Unverlierbarer Flex-Verbinder	1-034.01 DST
24.	294-9303.00-00055	DST Unverlierbarer Flex-Verbinder	1-034.01 DST
25.	294-9303.00-00055	DST Unverlierbarer Flex-Verbinder	1-034.01 DST
26.	259-9104.00-00000	Spannverschluss	7-320.02
27.	264-9001.00-00000	Schnappverschluss	1-501
28.	264-9001.00-00000	Schnappverschluss	1-501
29.	259-9104.00-00000	Spannverschluss	7-320.02
30.	248-8819.00-00000	Kompressions Drehriegel mit Klappe	7-071
31.	248-8810.00-00000	Kompressions Drehriegel mit Klappe	7-071
32.	248-8811.00-00000	Kompressions Drehriegel mit Klappe	7-071
33.	307-9361.RH-09005	NT Schwenkhebel 70	2-066.01
34.	307-9361.RH-09005	NT Schwenkhebel 70	2-066.01
35.	248-9376.00-00000	Kompressions-Drehriegel mit T-Griff	1-157
36.	248-9376.00-00000	Kompressions-Drehriegel mit T-Griff	1-157
37.	307-9357.02-00000	NT Schwenkhebel RS	2-066
38.	307-9357.02-00000	NT Schwenkhebel RS	2-066
39.	246-9001.00-00000	Zungenriegel Vkt. 8 kpl.	6-400
40.	246-9001.00-00000	Zungenriegel Vkt. 8 kpl.	6-400