

Test report

No.: 2024-0212-VU

Date of test: April 2024

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

No. of pages: 26

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

Test specimens: Different specimens: see table 1 to 12 on
pages 13 to 24

**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: April 08th, 2024

Date of report: April 22nd, 2024

Test specimens:

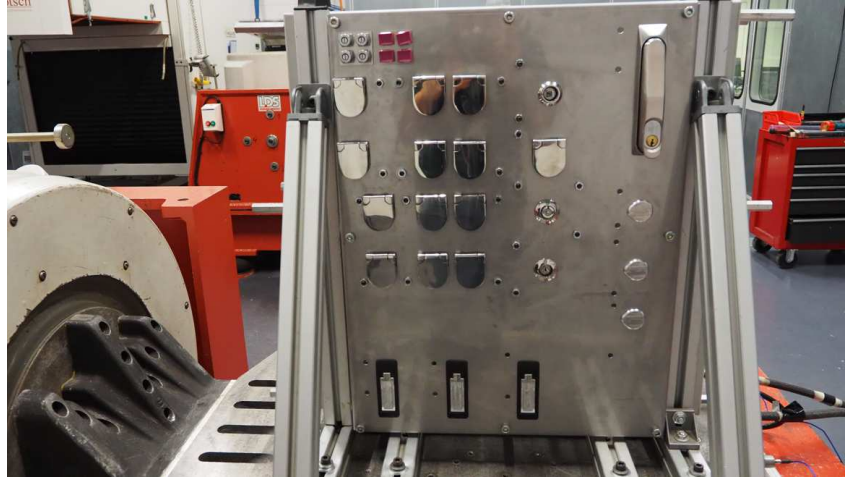


Fig. 1: Test specimens on assembly device

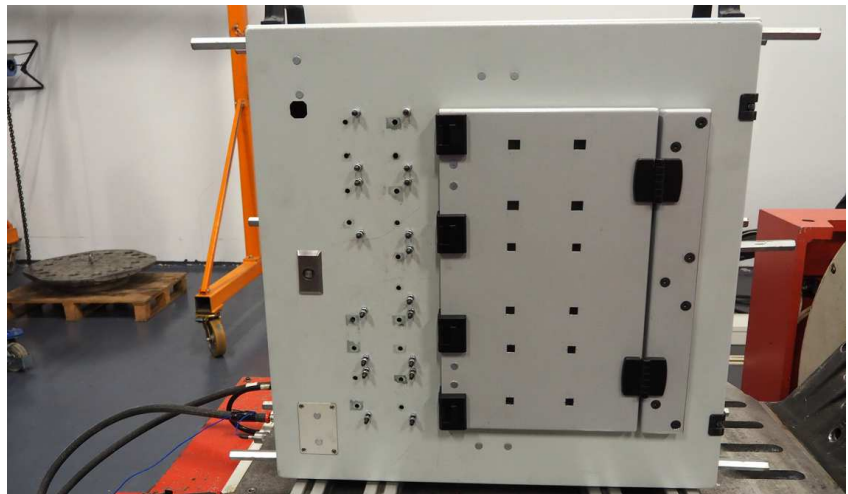


Fig. 2: Test specimens on assembly device

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:	05/2023
Accelerometer:	PCB J320C34
PM:	V300
Calibration date:	01/2024
Accelerometer:	PCB J320C34
PM:	V301
Calibration date:	01/2024
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 Raumrichtungen (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 9 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 Raumrichtungen (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.

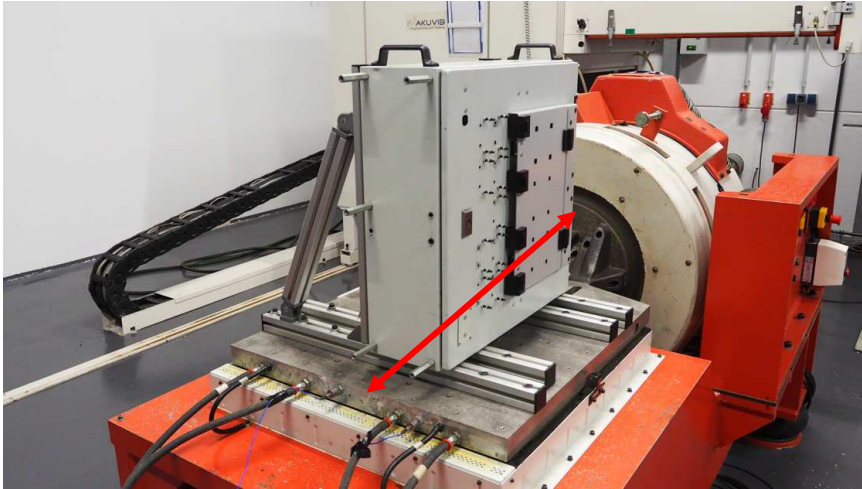


Fig. 3: Specimens during the vibration and shock test in the first horizontal direction

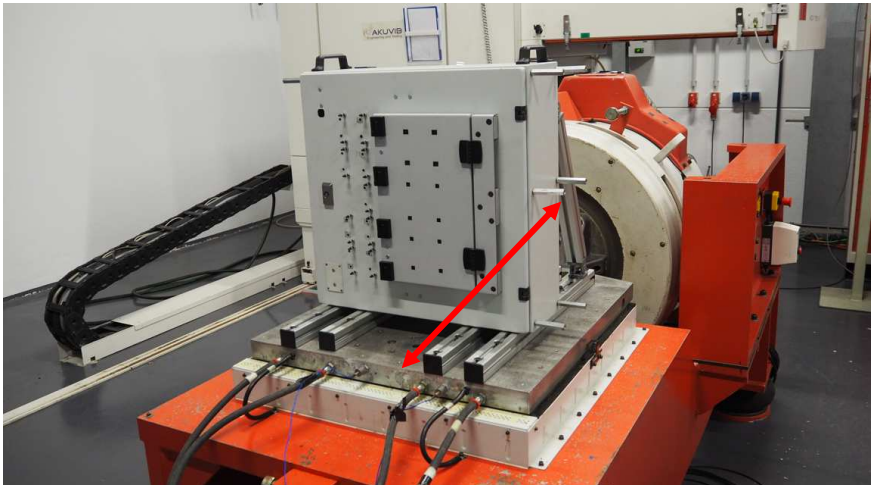


Fig. 4: Specimens during the vibration and shock test in the second horizontal direction

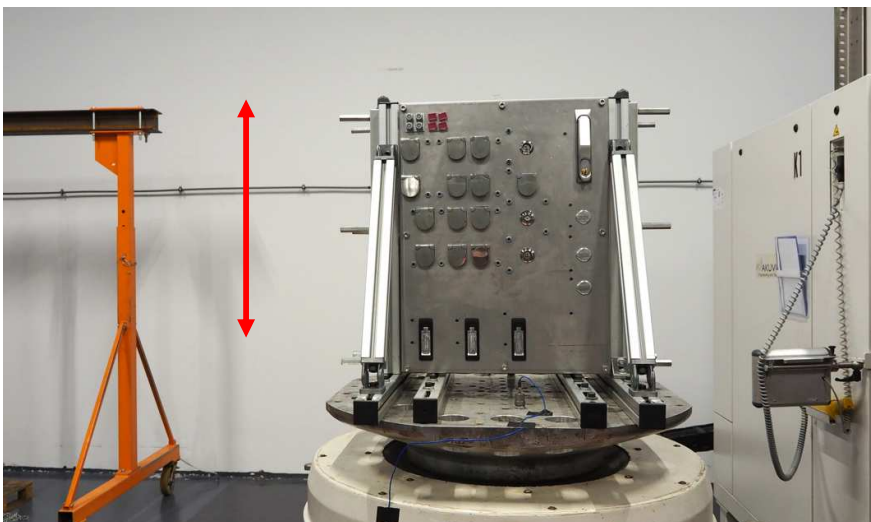


Fig. 5: Specimens during the vibration and shock test in vertical direction

3 Test procedure

The tests were conducted in the following order:

- | | |
|--|-------------------------------|
| 1. Random vibration test, long term test,
first horizontal direction | April 08 th , 2024 |
| 2. Shock test, first horizontal direction | April 08 th , 2024 |
| 3. Random vibration test, function test,
first horizontal direction | April 08 th , 2024 |
| 4. Random vibration test, long term test,
second horizontal direction | April 08 th , 2024 |
| 5. Shock test, second horizontal direction | April 09 th , 2024 |
| 6. Random vibration test, function test,
second horizontal direction | April 09 th , 2024 |
| 7. Random vibration test, long term test,
vertical direction | April 09 th , 2024 |
| 8. Shock test, vertical direction | April 09 th , 2024 |
| 9. Random vibration test, function test,
vertical direction | April 09 th , 2024 |


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.

Approved by:



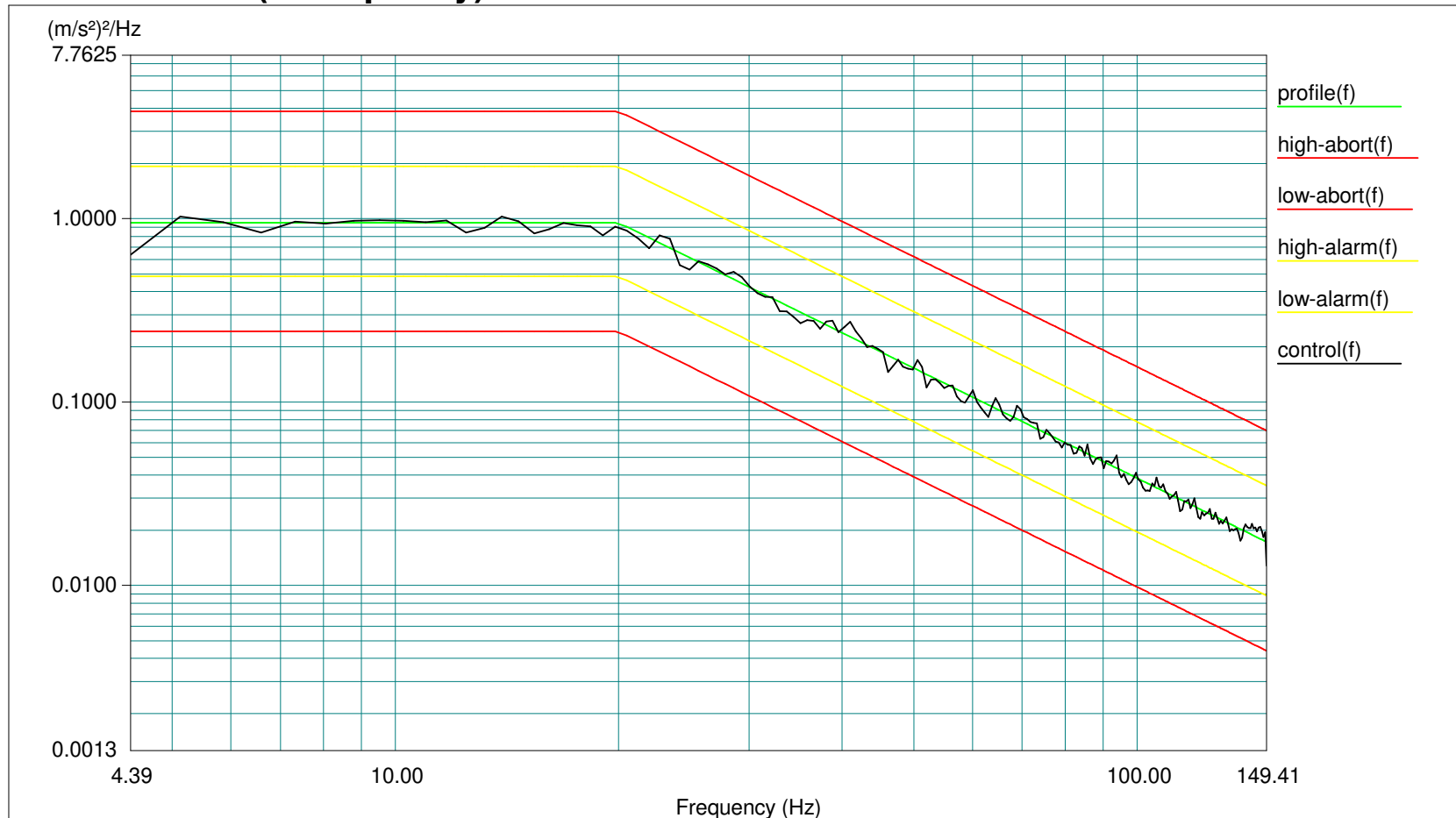
(Dipl.-Ing. Pröhl)
(Head of laboratory)

Processed by:



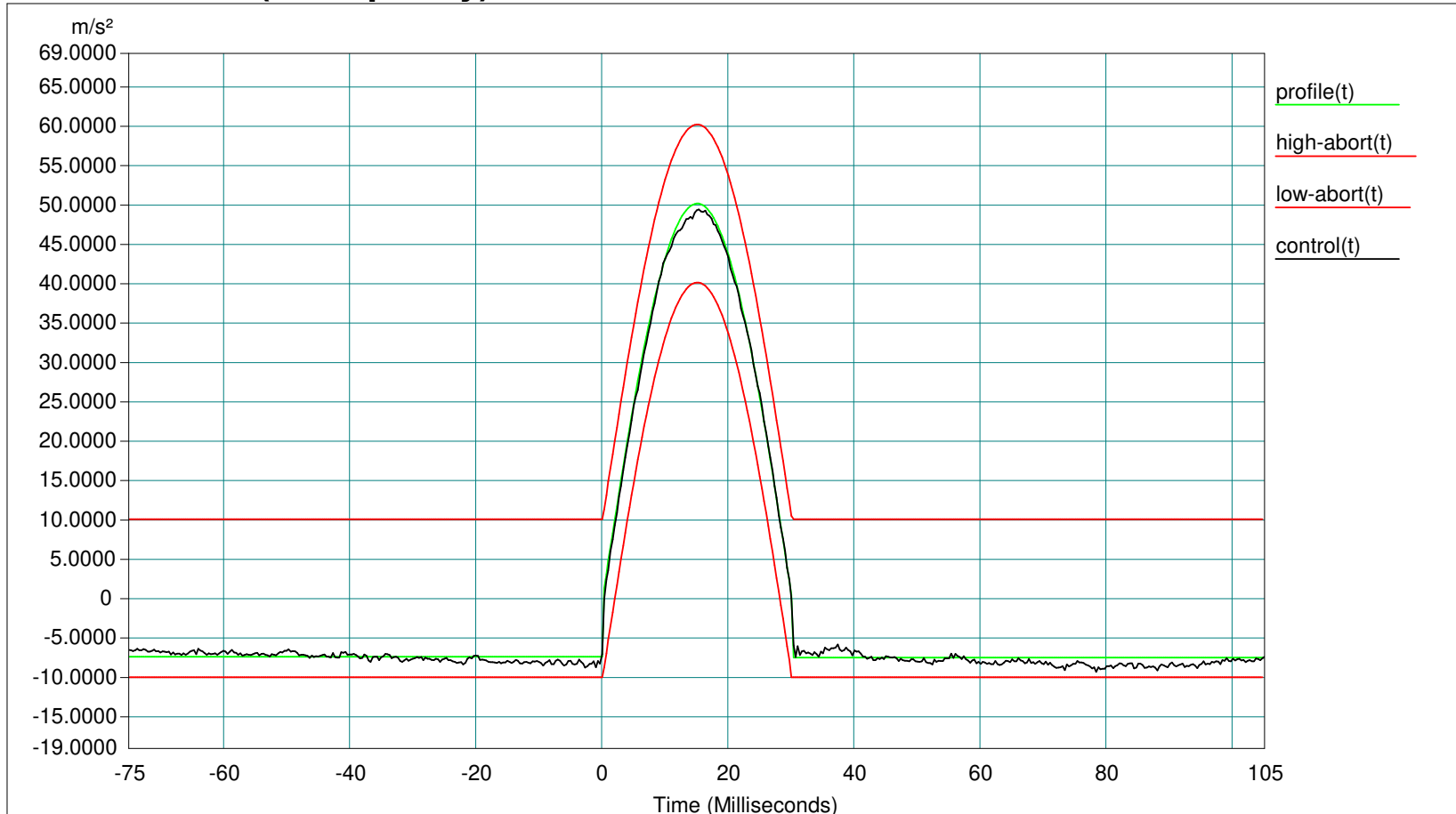
(B. Eng. Dogan)
(test engineer)

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



Level: 100 %
 Control RMS: 5.573477 m/s^2 Full Level Elapsed Time: 05:00:00 Lines: 200 Frame Time: 1.365333 Seconds
 Demand RMS: 5.626908 m/s^2 Remaining Time: 00:00:00 DOF: 154 dF: 0.732422 Hz

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



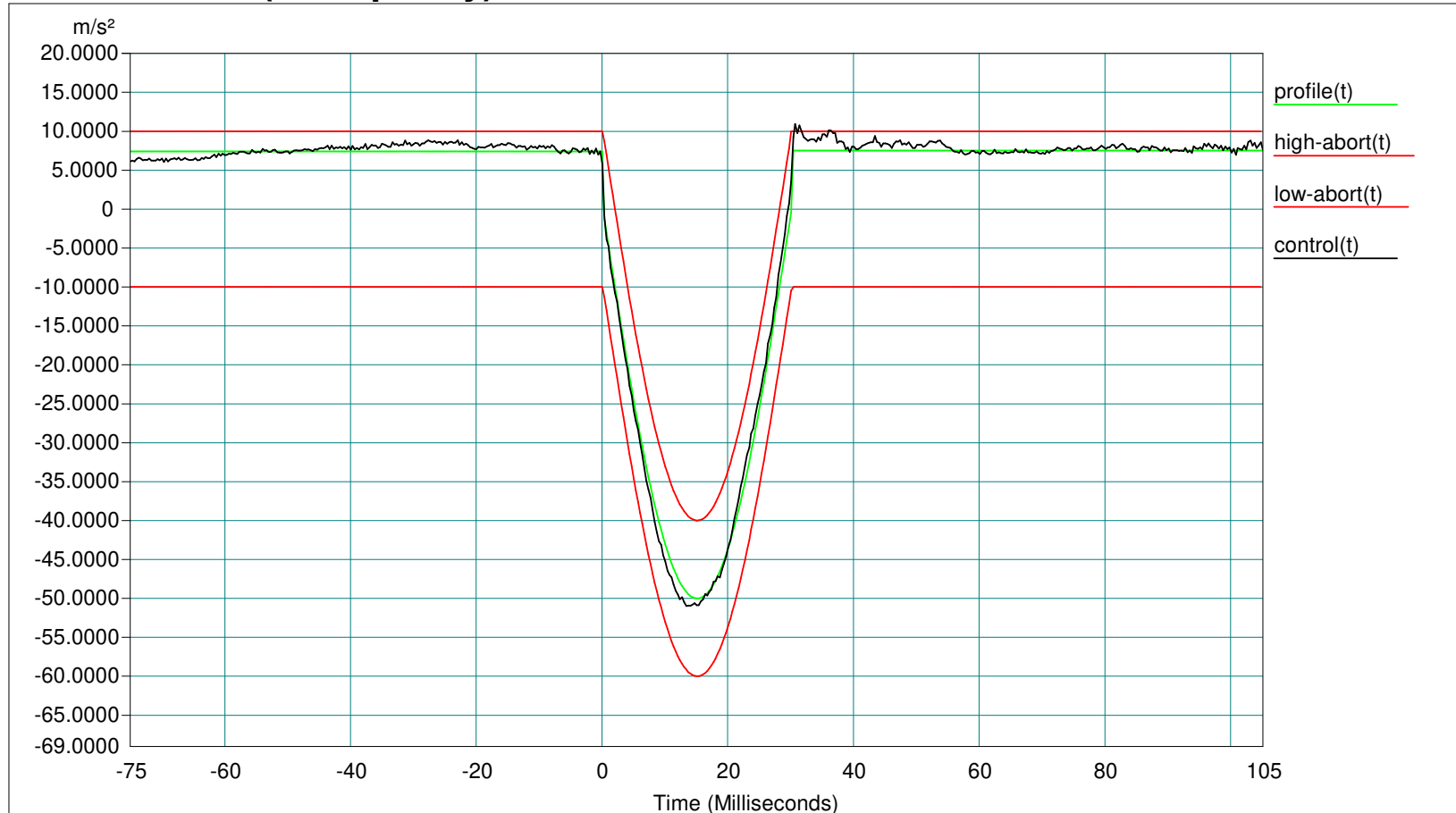
Level: 100 %	Block Size: 2048	Elapsed Pulses: 11
Frame Time: 0.682667 Seconds	Control Peak: 49.265087	Control RMS: 8.775564
dT: 0.000333 Seconds	Demand Peak: 50.000000	Demand RMS: 8.806992
Pulse Type: Half Sine	Amplitude: 50.000000	Pulse Width: 29.999999 ms
		Full Level Elapsed Pulses: 3
		Remaining Pulses: 6

Test report A24-0212-VU

Date: April 22nd, 2024
Page 10 of 26

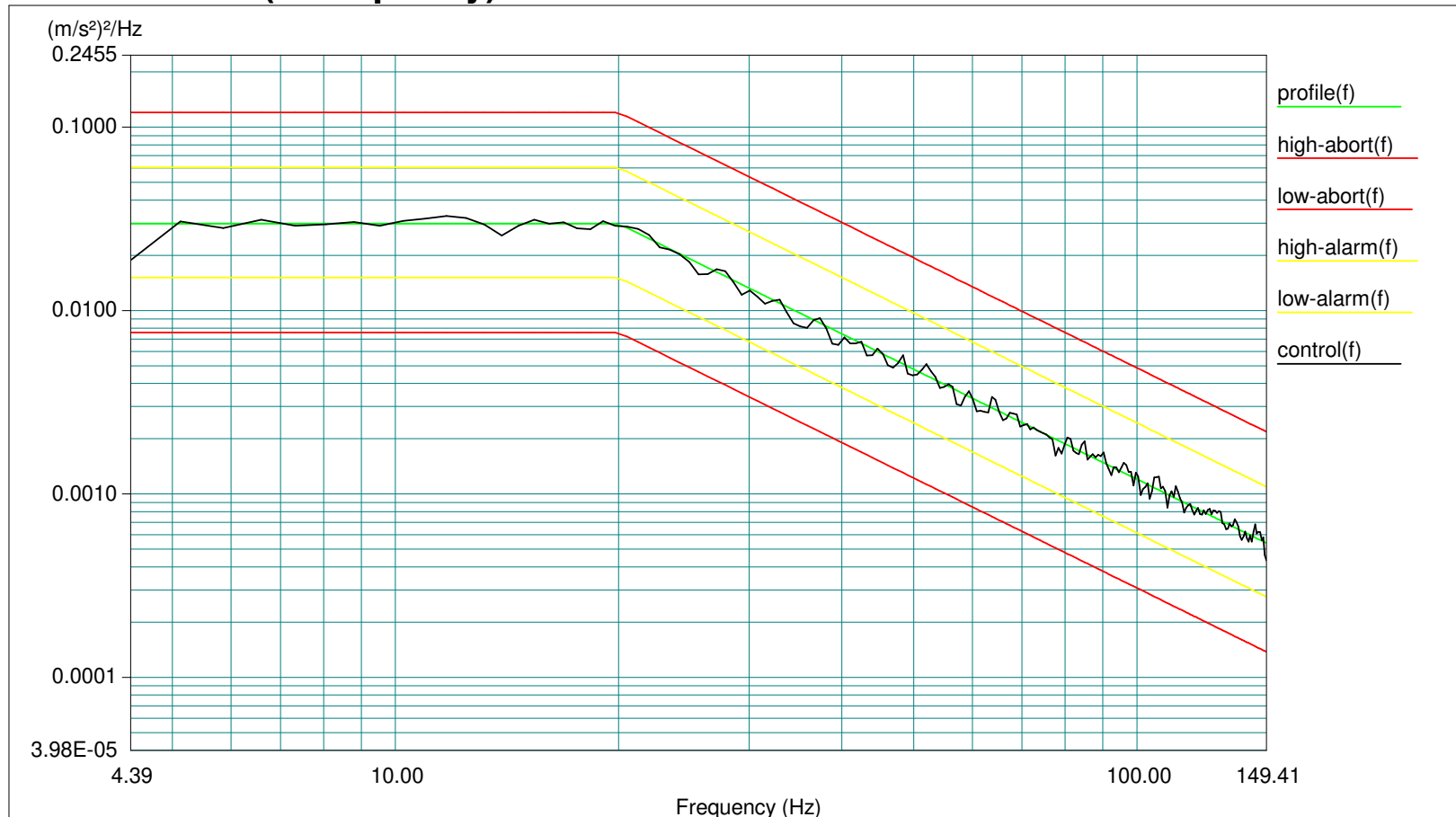
Processed by: Dogan
EngBer2024-0212-VU_DIRAK_Kothmaier

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



Level: 100 %	Block Size: 2048	Elapsed Pulses: 17
Frame Time: 0.682667 Seconds	Control Peak: 50.968109	Control RMS: 8.969805
dT: 0.000333 Seconds	Demand Peak: 50.000000	Demand RMS: 8.806992
Pulse Type: Half Sine	Amplitude: 50.000000	Pulse Width: 29.999999 ms
	Full Level Elapsed Pulses: 6	Remaining Pulses: 0

Diagram 4: Function test regulating channel (exemplarily)



Level: 100 %
 Control RMS: 0.987438 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

Table 1: Listing of test specimens

Number	Article number	Designation
1	248-9605.00-00005	Komp. Drehr. m. Klappe RH L32 Vkt. 20



2	248-9605.00-00005	Komp. Drehr. m. Klappe RH L32 Vkt. 20
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3	248-9654.00-00005	Komp. Drehr. m. Klappe LH L32 Vkt. 20
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Table 2: Listing of test specimens

Number	Article number	Designation
4	248-9654.00-00005	Komp. Drehr. m. Klappe LH L32 Vkt. 20



5	248-9655.00-00005	Komp. Drehr. m. Klappe LH L41 Vkt. 20
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6	248-9655.00-00005	Komp. Drehr. m. Klappe LH L41 Vkt. 20
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Table 3: Listing of test specimens

Number	Article number	Designation
7	248-9606.00-00010	Komp. Drehr. Klappe RH32 Vkt. 22



8	248-9606.00-00010	Komp. Drehr. Klappe RH32 Vkt. 22
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9	248-9657.00-00005	Komp. Drehr. m. Klappe LH32 Vkt. 22
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Table 4: Listing of test specimens

Number	Article number	Designation
10	248-9657.00-00005	Komp. Drehr. m. Klappe LH32 Vkt. 22
11	248-9607.00-00005	Komp. Drehr. Klappe RH32 Vkt. 22 M10
12	248-9607.00-00005	Komp. Drehr. Klappe RH32 Vkt. 22 M10



Table 5: Listing of test specimens

Number	Article number	Designation
13	248-9607.00-00010	Komp. Drehr. Klappe RH32 Vkt. 22 M10



14	207-9164.00-00000	Schwenkhebel 100 ASSA ABLOY
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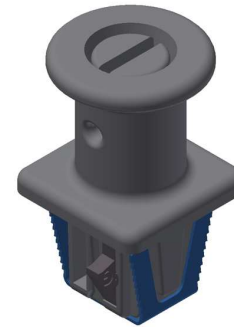


15	294-8708.00-00000	DST Befestiger m. Schlitz
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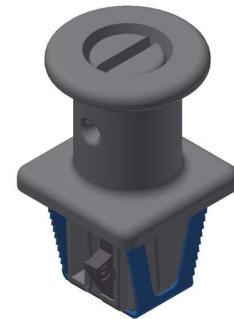


Table 6: Listing of test specimens

Number	Article number	Designation
16	294-8708.00-00000	DST Befestiger m. Schlitz



17	294-8708.00-00000	DST Befestiger m. Schlitz
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18	294-8708.00-00000	DST Befestiger m. Schlitz
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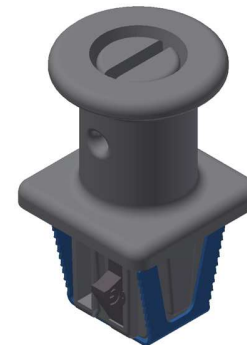


Table 7: Listing of test specimens

Number	Article number	Designation
19	762-8010.00-00004	SNAP Joiner 4,2 - 4,6 RAL 4010



20	762-8010.00-00004	SNAP Joiner 4,2 - 4,6 RAL 4010
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21	762-8010.00-00004	SNAP Joiner 4,2 - 4,6 RAL 4010
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Table 8: Listing of test specimens

Number	Article number	Designation
22	762-8010.00-00004	SNAP Joiner 4,2 - 4,6 RAL 4010



23	348-9501.00-03008	Komp.-Drehriegel RH/LH Achse kurz/19,1
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24	348-9553.00-09003	Komp.-Drehriegel RH/LH Achse kurz/19,1
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Table 9: Listing of test specimens

Number	Article number	Designation
25	348-9502.00-06008	Komp.-Drehriegel RH/LH Achse kurz/19,1



26	xxx-xxxx.xx-xxxxx	Drehriegel Magnettechnik
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27	xxx-xxxx.xx-xxxxx	Drehriegel Magnettechnik
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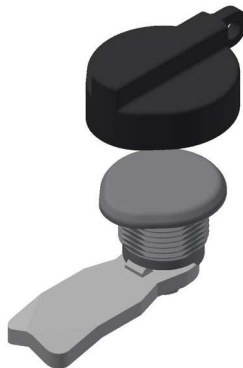


Table 10: Listing of test specimens

Number	Article number	Designation
28	xxx-xxxx.xx-xxxxx	Drehriegel Magnettechnik
29	xxx-xxxx.xx-xxxxx	Flächenbündiger Verschluss Magnettechnik
30	xxx-xxxx.xx-xxxxx	Flächenbündiger Verschluss Magnettechnik



Table 11: Listing of test specimens

Number	Article number	Designation
31	xxx-xxxx.xx-xxxxx	Flächenbündiger Verschluss Magnettechnik
32	208-9091.00-10000	Stangenschloss Kompr. RH bidirektional
33	208-9079.00-10000	Stangenschloss m. Kompr. einfach RH

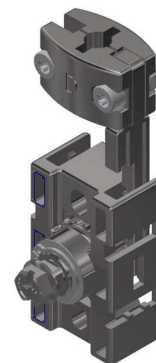
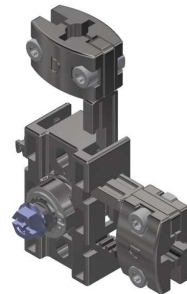
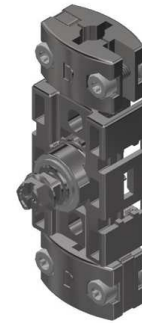
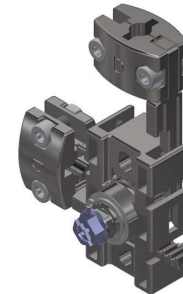


Table 12: Listing of test specimens

Number	Article number	Designation
34	208-9077.00-10000	Stangenschloss m. Kompression RH



35	208-9083.00-10000	Stangenschloss Kompr. RH bidirektional
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36	208-9078.00-10000	Stangenschloss m. Kompr. einfach LH
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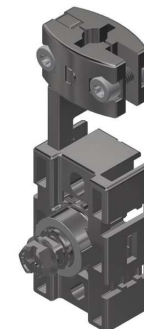


Figure 6: Arrangement of the test specimens

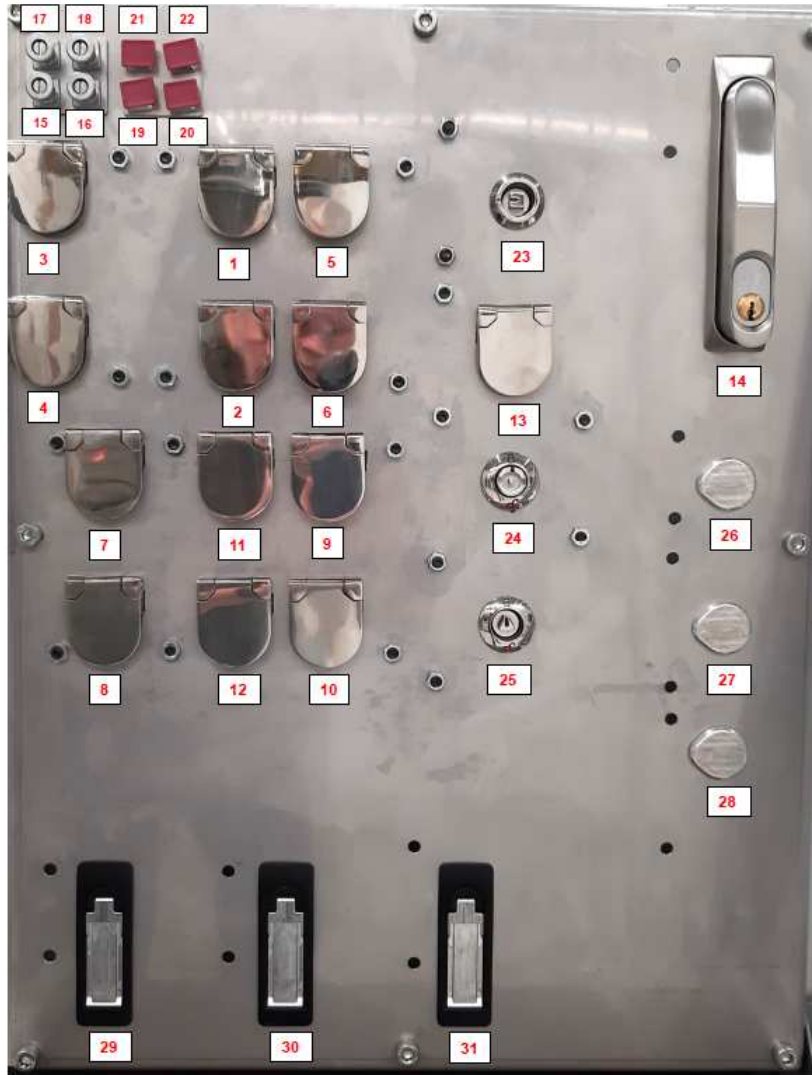


Abbildung 7: Arrangement of the test specimens

