DAkkS Deutsche Akkreditierungsstelle D-PL-11130-01-00

paconsult

TEST REPORT - Translation
No. 15-7042

Test Specimen:	Outdoor Case Type 5000
Client:	B&W International GmbH) Junkendiek 5 D-49479 Ibbenbüren
Involved Persons:	Joachim Luegtenaar (B&W International GmbH)) Verena Sarach (PAConsult GmbH)

Purpose:

By means of a laboratory simulation an outdoor case -type 5000- is to be tested to transport strains. The tests should be performed according to the specification of the client, based on ATA 300. The final analysis will be performed by the client.

Summary:

The tests were successfully finished. During the tests visible changes could be observed. During the drop test the pin of the handle moved within its fixation. The case showed deformations and scratches in the area of the drop corner and edges. The evaluation of the result will be performed by the client.

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3. Specimen

For the tests a test sample was provided by the client. The outdoor case is specified as follows.

In the following designation the test sample is shortened by EUT (**E**quipment **U**nder **T**est).

Table 1: Specimen

EUT No	Test Sample	Content	Dimensions [mm]			Weight [g]
			Length	Width	Height	
1	Outdoor case type 5000 (black)	without content	465	365	185	2905

Illustration 1 shows the test sample.

Illustration 1: EUT

The incoming goods control showed no visible damages at the case (see illustration 1).

4. Test and Equipment

The test standard is based on ATA 300 and was given by the client. The tests according to the specification are described in table 2.

Table 2: Test-Parameters

Test	Parameter	Stress	Reference
Drop Test	Drop Height 762 mm Drop Height 915 mm Drop Height 915 mm	Faces 3 – 60 drops 1, 2, 4, 5 and 6 each 20 drops Edges 2-3, 3-4, 3-5 and 3-6 each Edge 10 drops Edges: 2-5, 2-6, 4-5, 4-6, 1-2, 1-4, 1-5 and 1-6 each edge 5 drops Corner 1-2-5, 1-4-5, 1-4-6, 1-2-6, 2-3-5, 2-3-6, 3-4-5 and 3-4-6 each 5 drops	Based on ATA 300
Drip Proof Test	Water flow rate 140 l/m²/h	15 minutes	
Vibration Tests	Resonance Search Frequency 5-50 Hz Acceleration 0.5 g Swepp-Rate 1 Oct/min.	Face 3 1 Cycle (2 Sweeps)	
	Resonance Dwell Resonance Point (2-fold acceleration)	Face 3 2 h per Resonance	
Impact Test	Drop Height Projectile 50 cm Projectile 6 kg / Ø 32 mm Drop Height 500 mm	Drop on most fragile point	

4.1 Test Conditions and Laboratory

All tests were performed, if not otherwise stated in the test report, under the following conditions (table 3).

Table 3: Environmental Conditions

Temperature	15°C-35°C
Relative Humidity	<85 %
Air Pressure	840 hPa – 1070 hPa

The tests were performed in the laboratory of PAConsult GmbH:

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D-22087 Hamburg
info@paconsult.de

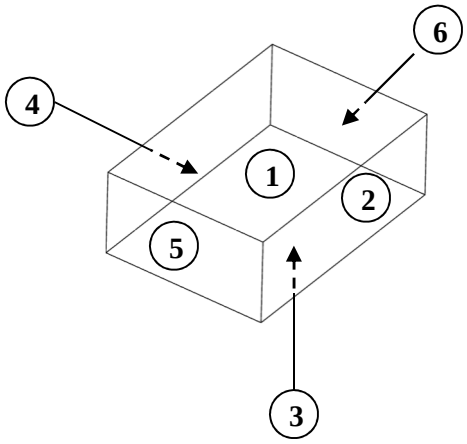
4.2 Equipment used for Test

The test equipment used in the laboratory of PAConsult is listed in the following table.

Table 4: Test Equipment

Devices	Manufacturer	Type	Serial number / Version	Date of last calibration
Shaker RMS 8130	RMS	SW 8130	11382	2014/12
Test Manager 1 (Lab. 0)	LDS	Laser USB	9364940	2014/12
Accelerometer Lab. 0/ Ch. 1	PCB	M353B03	91672	2014/12
Accelerometer Lab. 0/ Ch. 2	PCB	M353B03	69892	2014/12
Drop Table 1	Lansmont	PDT-56ED	M-13090	2015-02
Drop Table 2 (CE)	Lansmont	PDT-56ED CE	M15943	2014/09
Projectile	bwh Spezialkoffer	provided by the client		
Scale (Lab. 4)	Mettler Toledo	SB32000-P	2114375058	2015/05
Drip Proof Dispenser (RTCA)	PAConsult	007-PAC	001	before each test
The calibration of the laboratory test equipment is performed annually.				

The faces of the case are declared in drawing 1.



Drawing 1: Identify Faces

5. Test Procedures

5.1 Drop Test

The drop test was performed onto a steel plate. Following drops were performed:

Drop Area	Layer	Drop Height	Drops
Faces	Face 3	762 mm	60
	Face 1		20
	Face 2		20
	Face 4		20
	Face 5		20
	Face 6		20
Bottom Edges	Edge 2-3	915 mm	10
	Edge 3-4		10
	Edge 3-5		10
	Edge 3-6		10
Vertical Edges	Edge 2-5	915 mm	5
	Edge 2-6		5
	Edge 4-5		5
	Edge 4-6		5
Top Edges	Edge 1-2	915 mm	5
	Edge 1-4		5
	Edge 1-5		5
	Edge 1-6		5
Bottom Corners	Corner2-3-5	915 mm	5
	Corner2-3-6		5
	Corner3-4-6		5
	Corner3-4-5		5
Top Corners	Corner1-2-5	915 mm	5
	Corner1-4-5		5
	Corner1-4-6		5
	Corner1-2-6		5

Illustration 2 documents the setups exemplarily.

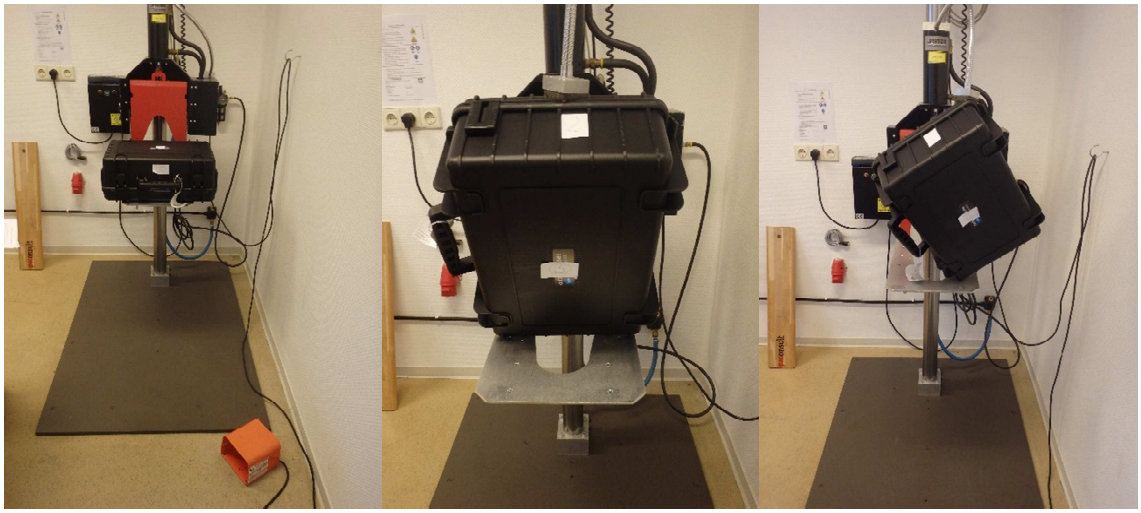


Illustration 2: Test Setup Drop Test

5.2 Drip Proof Test

The drip proof dispenser was placed 1 m above the specimen. The flow rate was 140 l/m²/h. The water flow rate was calibrated before testing. The test duration was 15 minutes. Illustration 3 and 4 shows the calibration of flow rate and the setup.

Illustration 3: Test Setup Drip Proof Test and Calibration

Illustration 4: EUT during Drip Proof Test

5.3 Vibration Test

5.3.1 Resonance Search

According to the specification a resonance search was performed. The frequency range was 5 to 50 Hz and the acceleration was 0.5 g. The sweep rate was 1 octave per minute. 2 Sweeps were performed. Illustration 5 documents the setup for vibration testing.

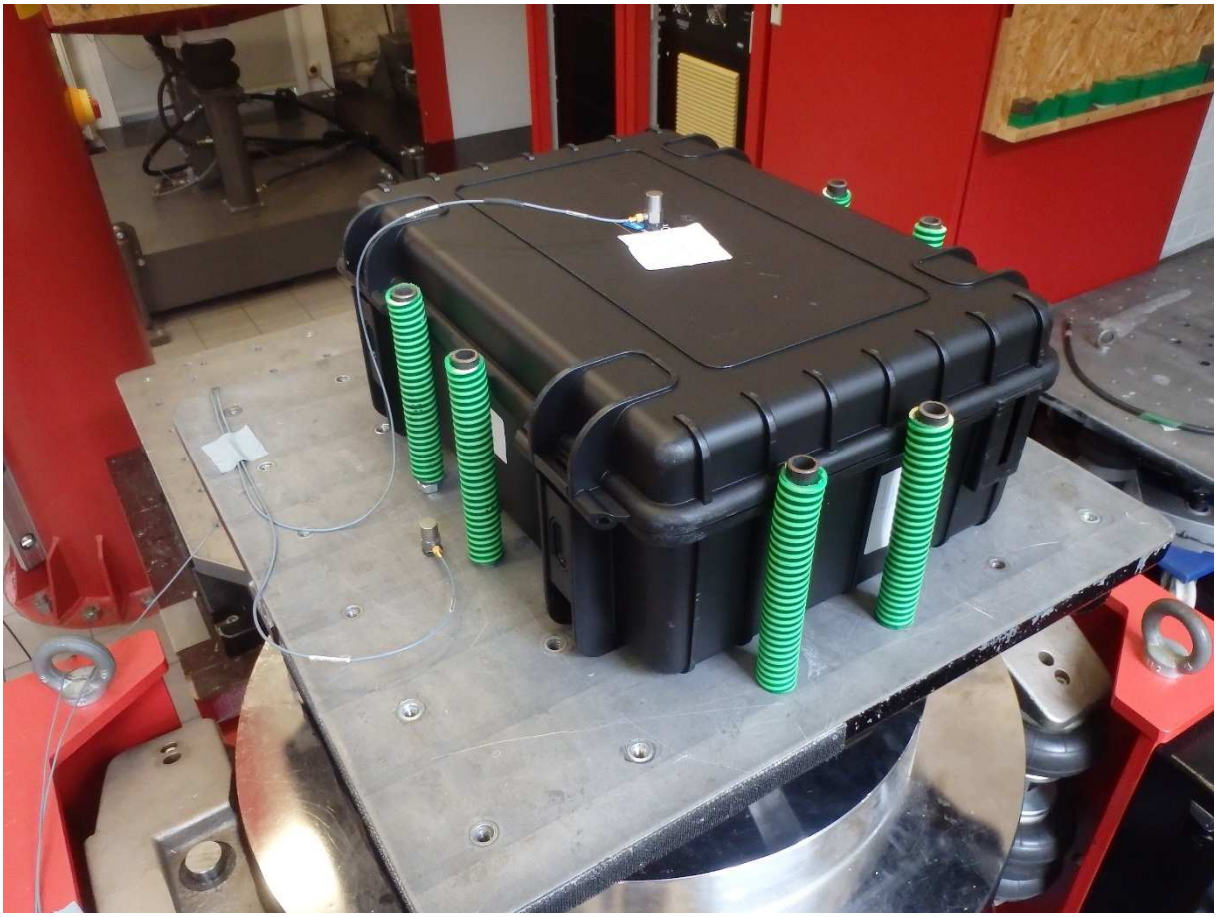


Illustration 5: Setup Vibration Tests

5.3.2 Resonance Dwell Test

In conclusion of the resonance search each resonance point was dwelled for 2 hours. A definition of a resonance point was given by the client (2-fold acceleration). The test setup is equal to the search and documented in illustration 5.

5.4 Projectile Test

The impact projectile was sponsored by the client. The projectile was placed onto the drop table, 50 cm above the top of the EUT. The drop was performed one time onto the top face of the case. Illustration 6 shows the setup.

Illustration 6: Setup Impact Drop Test

6. Results

6.1 Drop Test

The test was performed with the parameters from table 2. During the test the pin of the handle moved in its fixation; the handle was usable after the test (see illustration 7). Furthermore, the drop corners and edges showed deformation on impact areas (see illustration 8).

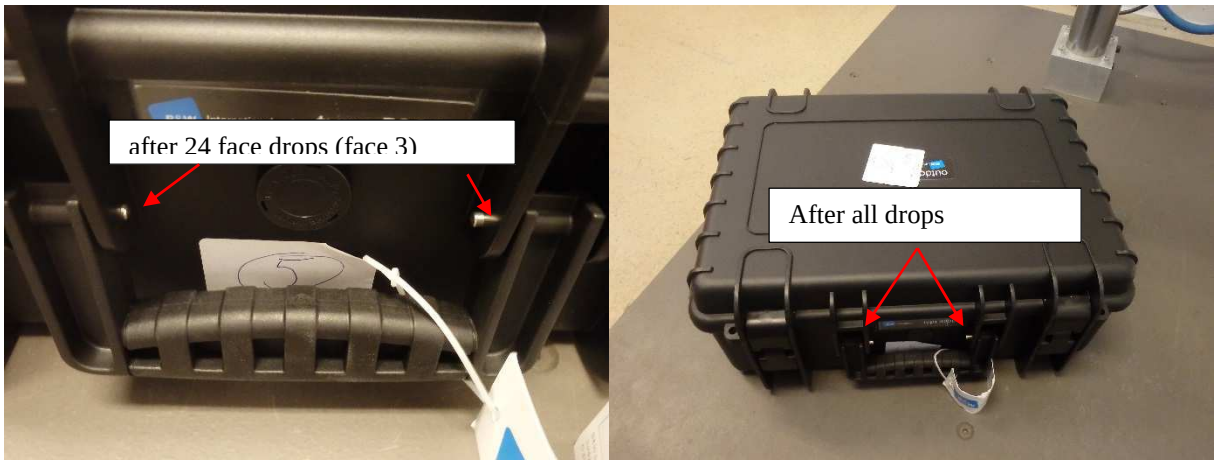


Illustration 7: Moved Pins of Handle

Illustration 8: Example for Deformations

6.2 Drip Proof Test

The test was performed with the parameters from table 2. After the test a visual inspection was performed. No ingress of water could be detected.

6.3 Vibration Test

6.3.1 Resonance Search

The test was performed with the parameters from table 2. Diagram 1 documents the test proceeding.

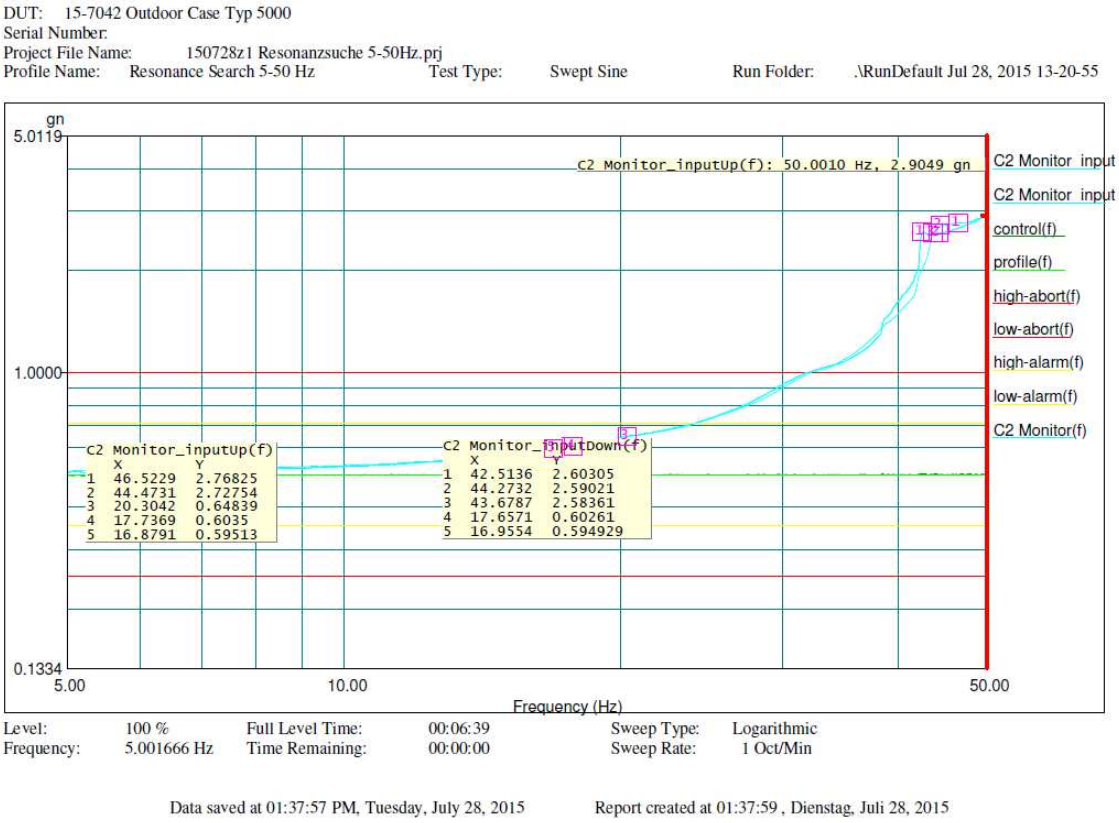


Diagram 1: Resonance Search Test

Following resonance points were detected:

Resonance-Frequency and Acceleration-Response			
Acceleration Input 0.50 g			
Axis	**Frequency**	**Acceleration Response**	**Dwell Time**
Z-Axis	42.5 to 46.5 Hz	2.5 to 2.7 g	2 h
	50 Hz	2.9 g	2 h

6.3.2 Resonance Dwell

The test was performed with the parameters from table 2. No visual changes could be detected after the test. Diagram 2 documents the test proceeding exemplarily.

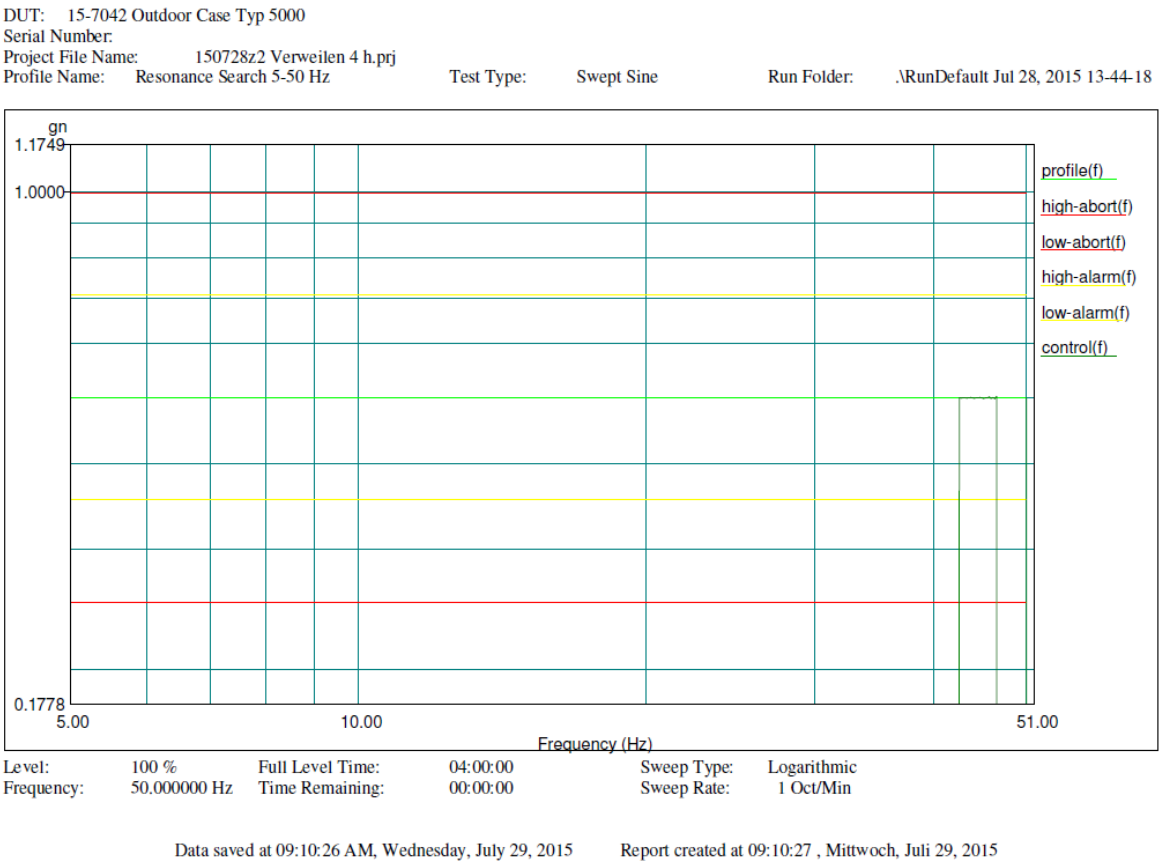


Diagram 2: Resonance Dwell Test

6.4 Projectile Test

The test was performed with the parameters from table 2. After the test a visual inspection was performed. No visible changes were observed.

7. Evaluation

The tests were finished successfully. During the tests visible changes were observed. In table 5 the results of all tests are summarized.

Table 5: Summary Results

Transport Simulation - Outdoor Case Type 5000 -		
Seq.	**Test**	**Result**
1.	Drop Test	The pin of the handle moved in its fixation (see illustration 7). The case showed deformations in the range of impact areas (see illustration 8).
2.	Drip Proof Test	No visible changes could be observed; no ingress of water
3.	Vibration Tests	No visible changes could be observed
4.	Impact Test	No visible changes could be observed

The test sample will be checked and evaluated by the client.

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Note

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