



# INSPECTION REPORT

PH PARAGLIDERS HARNESS

Inspection report number : PH\_142.2015

## TEST SAMPLE DATA

Manufacturer name: **Flugsau GmbH**  
Contact person: **Andre Bernhard**  
Street: **Aelplerhaus 3**  
Post code / place: **6288 Grafenort**  
Country: **Switzerland**

Harness manufacturer name: **Pigi Bi**  
Harness manufacturer size: **n/a**  
Serial number of the test sample: **010515/01**  
Harness type: **ABS**  
Maximum certified pilot weight [kg]: **120**  
Harness protector type: **Foam**  
Harness weight [kg]: **1.67**  
Volume reserve parachute container [cm3]      Min: **n/a**      Max: **n/a**  
Atmosphere [°C] RH [%] [hPa]: **22.2 / 49 / 1020.9**  
Test responsible: **Alain Zoller**  
Inspection place: **Villeneuve**  
Sample reception date: **05.05.2015**  
  
Place of declaration: **Villeneuve**  
Date of issue: **10.07.2015**  
Director management: **Alain Zoller**

Signature: \_\_\_\_\_

**Air Turquoise SA, having thoroughly assessed the sample mentioned hereunder, declare it was found conform with all requirements defined by the following norms**

European Standard **EN1651** September 1999

European Standard **EN12491** September 2001

Airworthiness requirements for hang gliders and paragliders **LTF 2009** as published in Nfl 91/09 chapter 4 and 6

Present declaration's scope only extends to the conformity of a given sample, on a given date and in a given place – as mentioned here above.

This inspection report contain the following test and is complet with the test report **PH ID 0 to 12, ST and RD**



Declaration conformity number: PH\_142.2015

## A. STRUCTURAL STRENGTH TESTS

A test plan was set up in order to execute the different tests in an efficient order. The table below summarizes this test plan together with the applicable standards and results

Test ID	TESTED ?	Standard Ref.		TEST setup	Anchoring		Forces		Min. Test duration [sec]	Result
		EN 1651	LTF		Attach -ment points	Dummy	Req. Load in [g] force	Min. force [N]		
R0	✓	5.3.2.1		Default flying position	2 main attachment points	Hip fixated	6	6000	10	POSITIV
R1	✓		4.2.1.a				9	9000		POSITIV
R2	✓	5.3.2.2					15	15000	5	POSITIV
R3	✓		4.2.1.b	Default, landing position	2 main att. points	Hip fixated,	6	6000	10	POSITIV
R4	✓	5.3.2.7				landing conf.	15	15000	5	POSITIV
R5			4.2.1.a rescue	Rescue	2 rescue att. Pnts.	Hip fixated	9	9000	10	n/a
R6		5.3.2.4					15	15000	5	n/a
R7			4.2.1.b rescue			Rescue, landing	Hip fixated, landing conf.	6	6000	10
R8	✓	5.3.2.3		One riser	ONE main att.	1 central hip fixation	6	6000	10	POSITIV
R9			4.2.1.d	Towing	2 main att. + 2 tow att.	None	3	3000	10	n/a
		5.3.2.5					5	5000		
R10	✓	5.3.2.6		Default, Negatif	One main att.	Head fix.	4.5	4500	10	POSITIV
R11	✓		4.2.1.c	Upside down	2 main att. downw.	Head fix.	6	6000	10	POSITIV
R12			4.2.1.c rescue	Upside down rescue	2 rescue att. downw.		6	6000	10	n/a

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Inspection report number : PH\_142.2015

## B. PARAGLIDER HARNESS BACK PROTECTORS

Shock impact tests have to be executed on these harnesses in order to prove the damping characteristics of it. Most paraglider harnesses are equipped with a protection device that damps the shock on the pilot's spine during a hard landing

Test ID	TESTED ?	Standard	TEST setup	Test configuration	Impact at 165 cm (Seat plate)			Results
		LTF			Max Peak impact [g] force	Impact duration at 38 [g] (if any) recorded: [ms]	Impact duration at 20 [g] (if any) recorded: [ms]	
PRO TECT 1	✓	5.1.1	Default flying position	Test sample is attached to the dummy like a pilot in flight. Sample temperature +20+25°C without rescue	32.48	0.00	0.00	n/a
PRO TECT 2	✓	5.1.1	Default flying position	Test sample is attached to the dummy like a pilot in flight. Sample temperature +20+25°C with rescue	35.22	0.00	0.00	n/a
PRO TECT 3	✓	5.1.1	Default flying position	Test sample is attached to the dummy like a pilot in flight. Sample temperature -10+5°C without rescue	27.22	0.00	0.00	n/a
PRO TECT 4	✓	5.1.1	Default flying position	Test sample is attached to the dummy like a pilot in flight. Sample temperature -10+5°C with rescue	31.92	0.00	0.00	n/a

## C. RESCUE DEPLOYMENT RESISTANCE TEST

The deployment of the rescue system has to be ensured in all circumstances of flight. This test is to verify whether the force needed to deploy is in between reasonable limits

Test ID	TESTED ?	Standard Ref.	TEST setup	Anchoring		Force for single hand deployment		Result
		LTF		Attach- ment points	Dummy	Min.	Resistance measured [N]	
						Max. [N]		
RRDT	✓	6.1.5	Default flying position	Test sample is attached to the dummy like a pilot in flight.		20	38.0	POSITIVE
					(no dummy required)	70		POSITIVE

## D. RESCUE DEPLOYMENT STRAP STRENGTH TEST

The connection between handgrip and inner container has to have sufficient load capacity/structural strength in any situation that may arise during normal use. During this test is verified, whether this connection fulfill the requirements

Test ID	TESTED ?	Standard Ref.		TEST setup	Minimum force [N]	Min.	Breaking resistance measured [N]	Result
		LTF	EN 12491			Test duration [s]		
RRST		6.1.8	5.3.2	Connection strap in tensile testing machine	700	10	4890.0	n/a

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**HARNESS STRUCTURAL STRENGTH TEST**

TEST REPORT PH ID 0

PH PARAGLIDERS HARNESS

PH\_142.2015

Manufacturer name: Flugsau GmbH

Harness manufacturer name: Pigi Bi

Test place & date: Villeneuve

Test responsible: Alain Zoller

Atmosphere [°C] RH [%] [hPa]: 22.2 / 49 / 1020.9

Maximum certified pilot weight [kg]: 120

Serial number of the test sample: 010515/01

Directives: EN 1651

Test standard §: 5.3.2.1 (EN)

Test setup: Default flying position

Anchoring:

Attachment points: Both main riser attachments (3, 4)

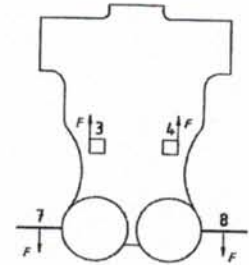
Dummy: Default, hip fixed (7, 8)

Required load in force [g] : 6

Minimum load [N]: 6000

Required test load in [N]: 734

Min. duration [s]: 10



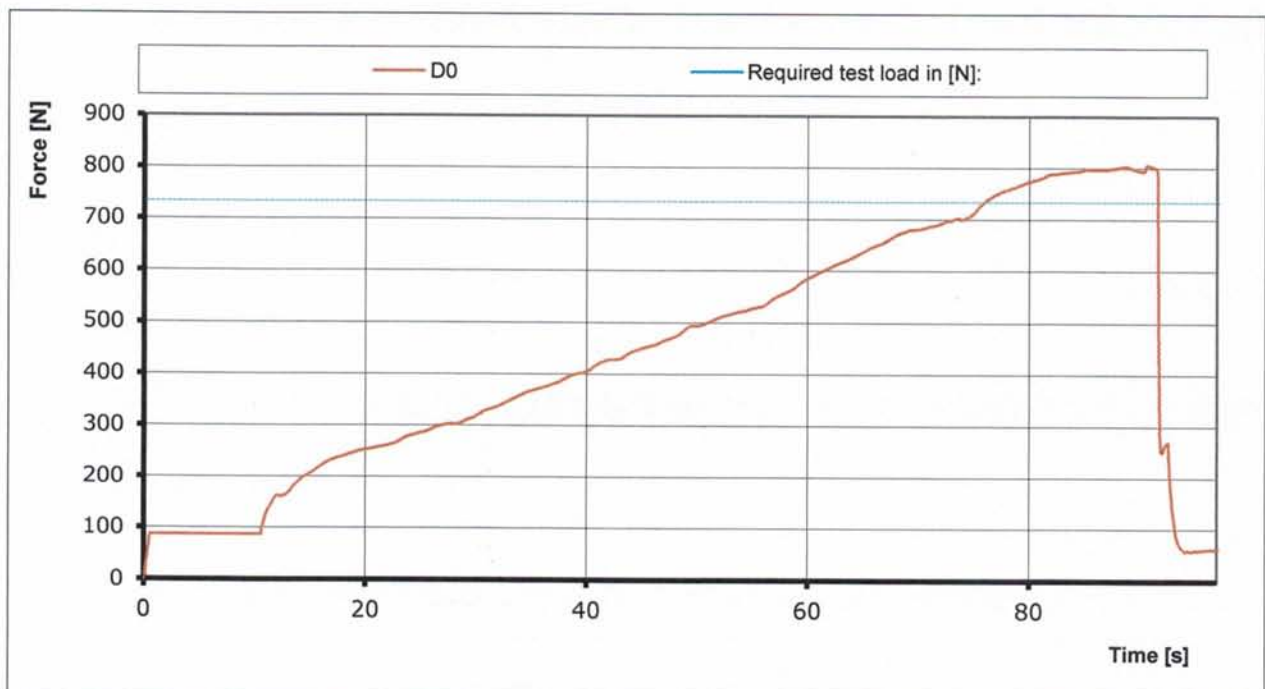
**Results**

Duration of maintained min. load [s]: 11.52

Any signs of structural failure after this test: no failure

Test result: **POSITIV**

Graph: D0



Instruments	Validity	Manufacturer	Type nr.	S/N
Load sensor	2017			
Geos n°11 Skywatch	07.04.2017	JDC electronics	Geos n° 11	0022

**HARNES STRUCTURAL STRENGHT TEST**

TEST REPORT PH ID 1

PH PARAGLIDERS HARNES

PH\_142.2015

Manufacturer name: Flugsau GmbH

Harness manufacturer name: Pigi Bi

Test place & date: Villeneuve

Test responsible: Alain Zoller

Atmosphere [°C] RH [%] [hPa]: 22.2 / 49 / 1020.9

Maximum certified pilot weight [kg]: 120

Serial number of the test sample: 010515/01

Directives: Nfl II 91 / 09

Test standard §: 4.2.1 a (LTF DV)

Test setup: Default flying position

Anchoring:

Attachment points: Both main riser attachments (3, 4)

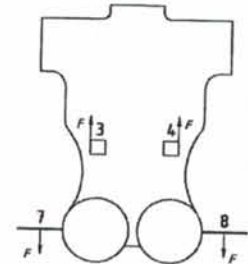
Dummy: Default, hip fixed (7, 8)

Required load in force [g] : 9

Minimum load [N]: 9000

Required test load in [N]: 1101

Min. duration [s]: 10



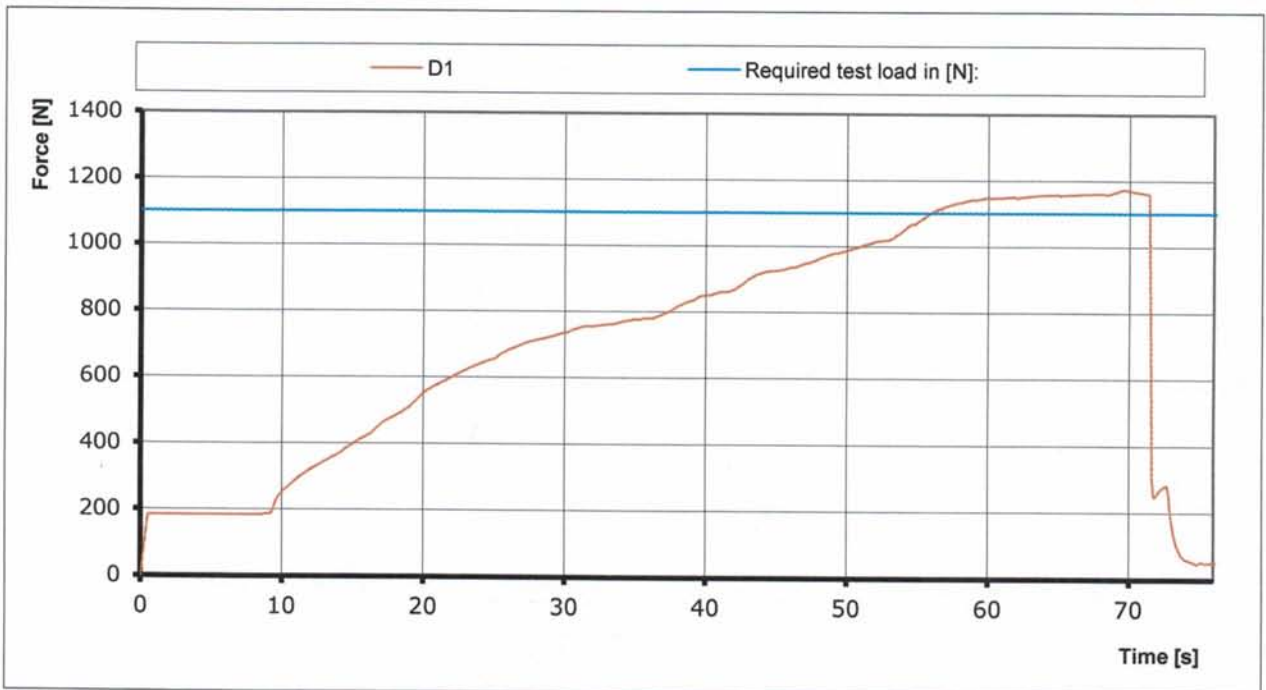
**Results**

Duration of maintained min. load [s]: 12.31

Any signs of structural failure after this test: no failure

Test result: POSITIV

Graph: D1



Instruments	Validity	Manufacturer	Type nr.	S/N
Load sensor	2017	0	0	0
Geos n°11 Skywatch	07.04.2017	JDC electronics	Geos n° 11	0022



## HARNES STRUCTURAL STRENGHT TEST

TEST REPORT PH ID 2

PH PARAGLIDERS HARNES

PH\_142.2015

Manufacturer name: Flugsau GmbH

Harnes manufacturer name: Pigi Bi

Test place & date: Villeneuve

Test responsible: Alain Zoller

Atmosphere [°C] RH [%] [hPa]: 22.2 / 49 / 1020.9

Maximum certified pilot weight [kg]: 120

Serial number of the test sample: 010515/01

Directives: EN 1651

Test standard §: 5.3.2.2

Test setup: Default flying position

Anchoring:

Attachment points: Both main riser attachments (3, 4)

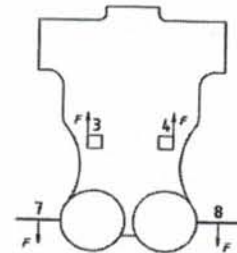
Dummy: Default, hip fixed (7, 8)

Required load in force [g]: 15

Min load [N]: 15 000

Required test load in [N]: 1835

Min. duration [s]: 5



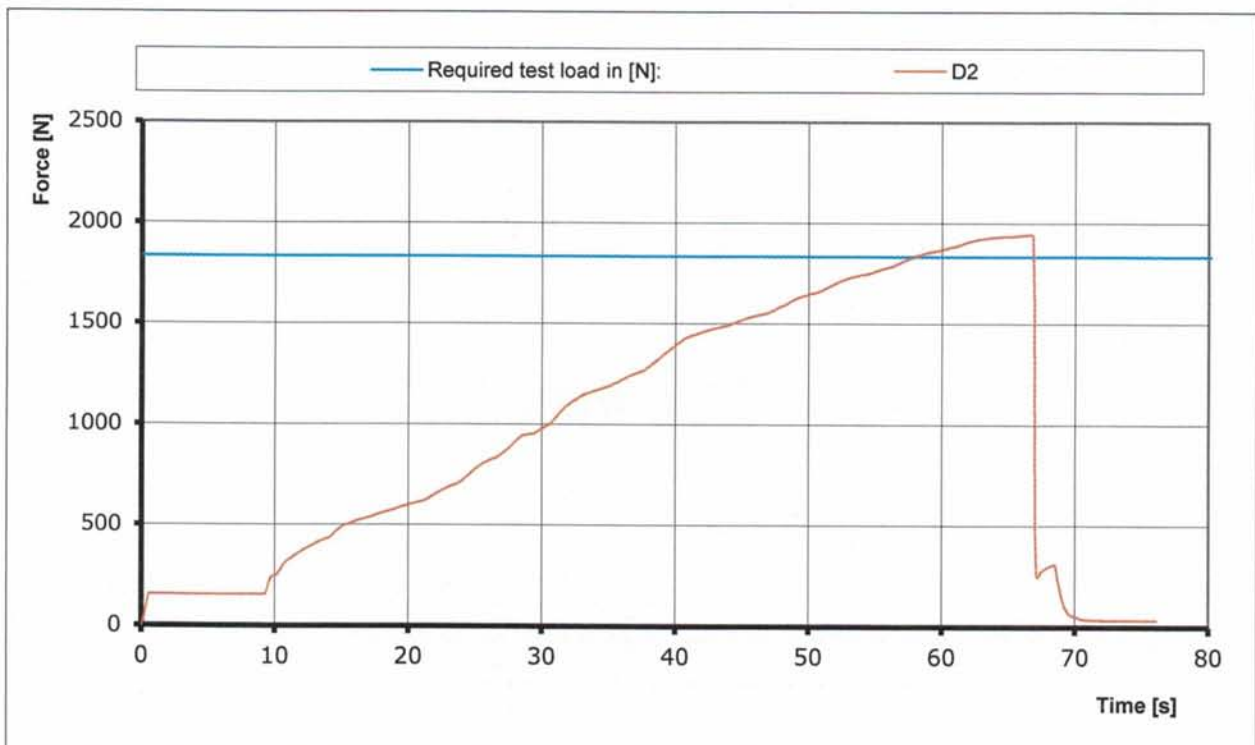
### Results

Duration of maintained min. load [s]: 6.48

Any signs of structural failure after this test: no failure

Test result: **POSITIV**

Graph: D2



Instruments	Validity	Manufacturer	Type nr.	S/N
Load sensor	2017	0	0	0
Geos n°11 Skywatch	07.04.2017	JDC electronics	Geos n° 11	0022

## HARNES STRUCTURAL STRENGTH TEST

TEST REPORT PH ID 3

PH PARAGLIDERS HARNES

PH\_142.2015

Manufacturer name: Flugsau GmbH

Harnes manufacturer name: Pigi Bi

Test place & date: Villeneuve

Test responsible: Alain Zoller

Atmosphere [°C] RH [%] [hPa]: 22.2 / 49 / 1020.9

Maximum certified pilot weight [kg]: 120

Serial number of the test sample: 010515/01

Directives: NfL II 91 / 09

Test standard §: 4.2.1.b

Test setup: Flying position before landing: seat board (11) in landing position, leg straps (10) closed.

Attachment points: Both of the main riser attachments attached (3 and 4);

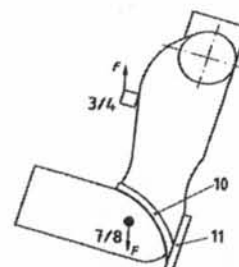
Dummy: Default, hip fixed (7, 8)

Required load in force [g]: 6

Min load [N]: 6000

Required test load in [N]: 734

Min. duration [s]: 10



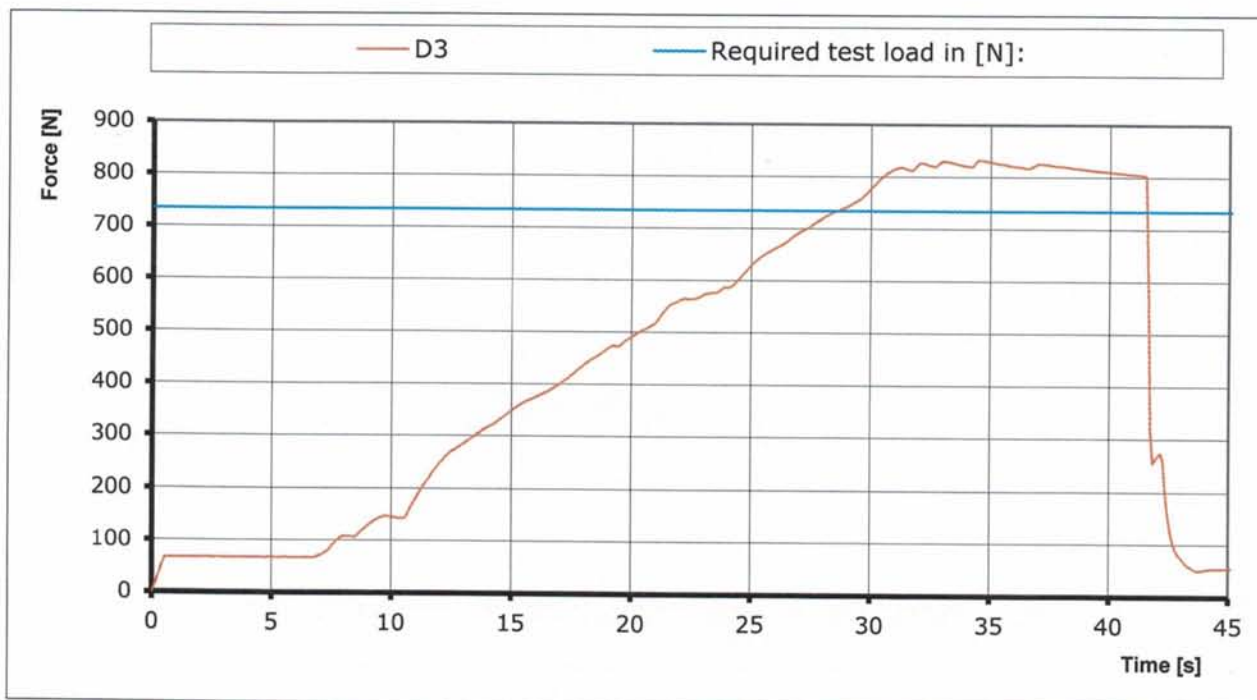
### Results

Duration of maintained min. load [s]: 11.57

Any signs of structural failure after this test: no failure

Test result: **POSITIV**

Graph: D3



Instruments	Validity	Manufacturer	Type nr.	S/N
Load sensor	2017	0	0	0
Geos n°11 Skywatch	07.04.2017	JDC electronics	Geos n° 11	0022

## HARNES STRUCTURAL STRENGHT TEST

TEST REPORT PH ID 4

PH PARAGLIDERS HARNES

PH\_142.2015

Manufacturer name: Flugsau GmbH

Harness manufacturer name: Pigi Bi

Test place & date: Villeneuve

Test responsible: Alain Zoller

Atmosphere [°C] RH [%] [hPa]: 22.2 / 49 / 1020.9

Maximum certified pilot weight [kg]: 120

Serial number of the test sample: 010515/01

Directives: EN 1651

Test standard §: EN 5.3.2.7

Flying position before landing: seat  
 Test setup: board (11) in landing position, leg  
 straps (10) closed.

Anchoring:

Attachment points: Both of the main riser attachments  
 attached (3 and 4);

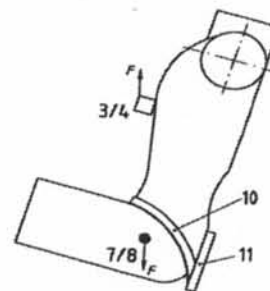
Dummy: Default, hip fixed (7, 8)

Required load in force [g] : 15

Min load [N]: 15000

Required test load in [N]: 1835

Min. duration [s]: 5



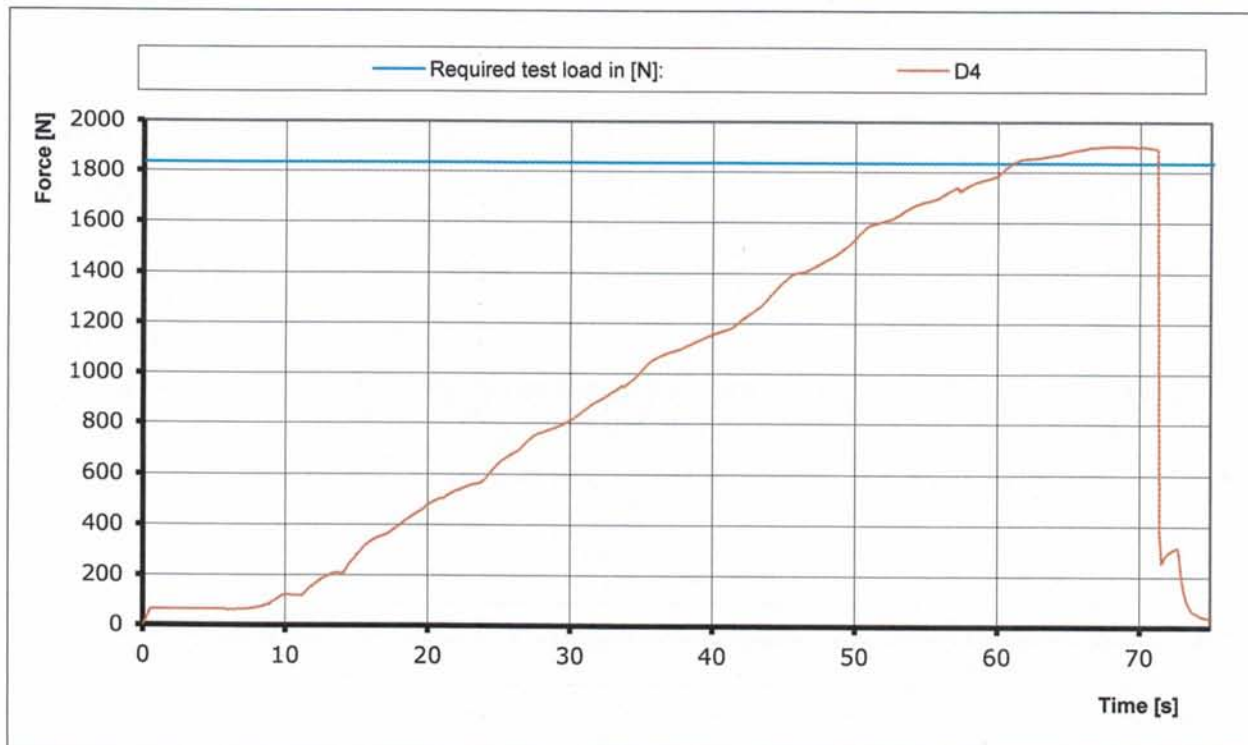
### Results

Duration of maintained min. load [s]: 6.53

Any signs of structural failure after this test: no failure

Test result: **POSITIV**

Graph: D4



Load sensor	2017	0	0	0
Geos n°11 Skywatch 42832	JDC electronics	Geos n° 11	0022	
0	00.01.1900	0	0	0



**HARNES STRUCTURAL STRENGTH TEST**

TEST REPORT PH ID 8

PH PARAGLIDERS HARNES PH\_142.2015

Manufacturer name: Flugsau GmbH  
 Harness manufacturer name: Pigi Bi  
 Test place & date: Villeneuve  
 Test responsible: Alain Zoller  
 Atmosphere [°C] RH [%] [hPa]: 22.2 / 49 / 1020.9  
 Maximum certified pilot weight [kg]: 120  
 Serial number of the test sample: 010515/01

Directives: EN 1651

Test standard §: 5.3.2.3

Test setup: Only one riser attached

Anchoring: Attachment points: One main riser attachments (3)

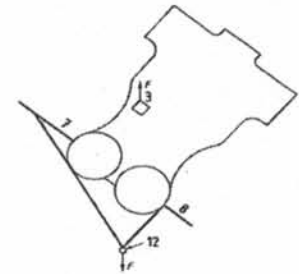
Dummy: Hip fixed (7, 8 -> 12)

Required load in force [g]: 6

Min load [N]: 6000

Required test load in [N]: 734

Min. duration [s]: 10



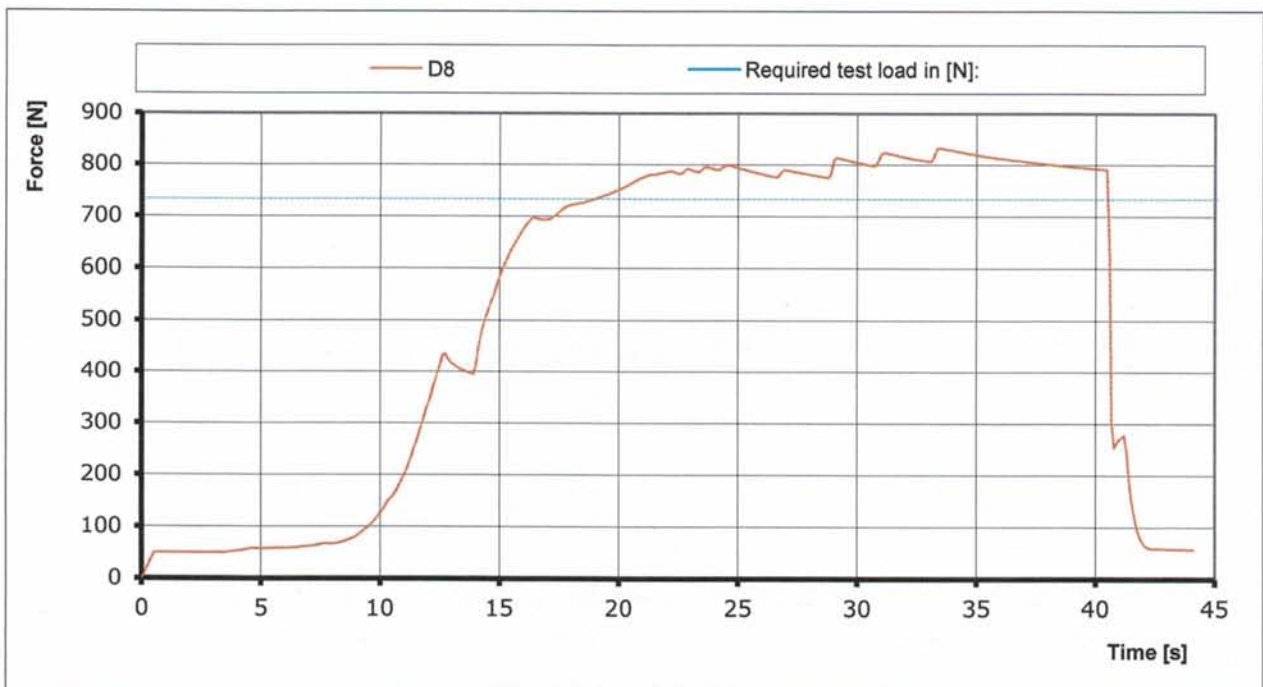
**Results**

Duration of maintained min. load [s]: 19.51

Any signs of structural failure after this test: no failure

Test result: POSITIV

Graph: D8



Load sensor	2017	0	0	0
Geos n°11 Skywatch	42832	JDC electronics	Geos n° 11	0022
0	00.01.1900	0	0	0

## HARNES STRUCTURAL STRENGHT TEST

TEST REPORT PH ID 10

PH PARAGLIDERS HARNES

PH\_142.2015

Manufacturer name: Flugsau GmbH

Harness manufacturer name: Pigi Bi

Test place & date: Villeneuve

Test responsible: Alain Zoller

Atmosphere [°C] RH [%] [hPa]: 22.2 / 49 / 1020.9

Maximum certified pilot weight [kg]: 120

Serial number of the test sample: 010515/01

Directives: EN 1651

Test standard §: 5.3.2.6

Test setup: Normal flying position in NEGATIF

Anchoring:

Attachment points: ONE of the main riser attachments attached downwards(3 or 4);

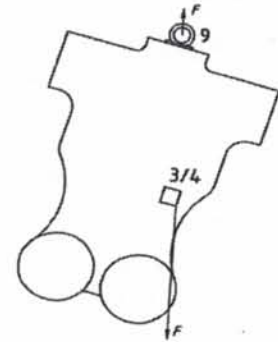
Dummy: Dummy anchored at the head position (9)

Required load in force [g]: 4.5

Min load [N]: 4500

Required test load in [N]: 550

Min. duration [s]: 10



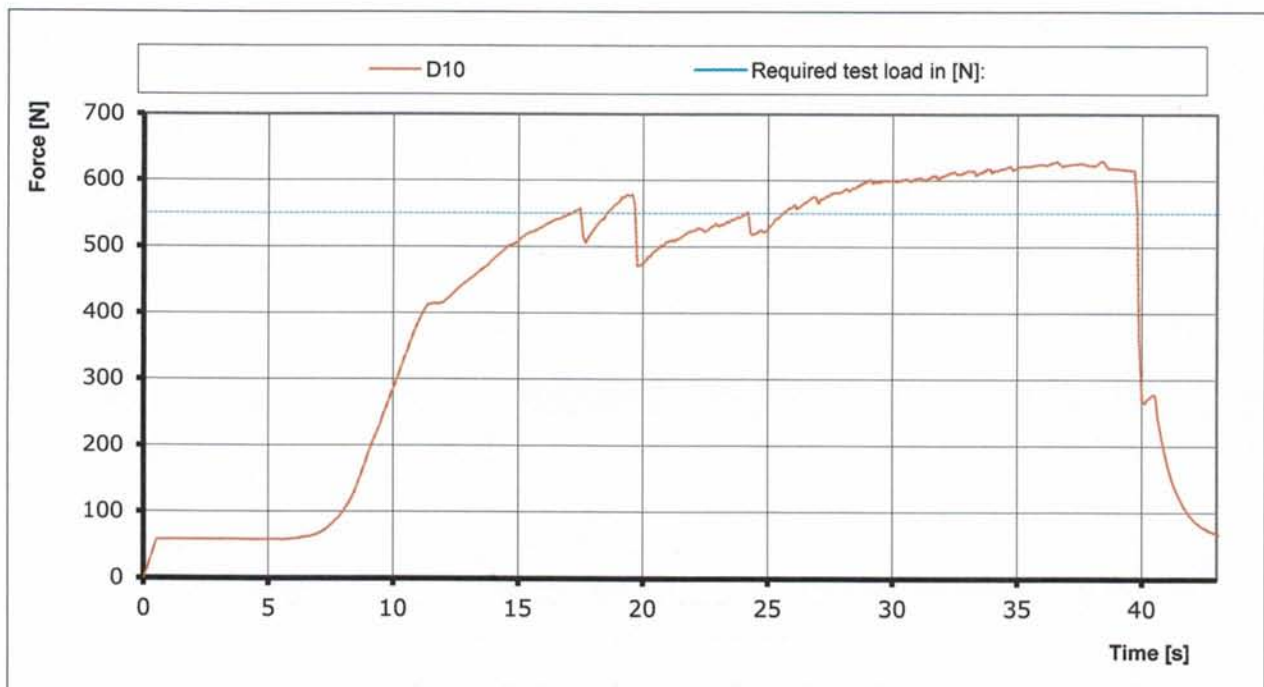
### Results

Duration of maintained min. load [s]: 11.16

Any signs of structural failure after this test: no failure

Test result: **POSITIV**

Graph: D10



Instruments	Validity	Manufacturer	Type nr.	S/N
Load sensor	2017	0	0	0
Geos n°11 Skywatch	07.04.2017	JDC electronics	Geos n° 11	0022

## HARNES STRUCTURAL STRENGHT TEST

TEST REPORT PH ID 11

PH PARAGLIDERS HARNES

PH\_142.2015

Manufacturer name: **Flugsau GmbH**  
 Harness manufacturer name: **Pigi Bi**  
 Test place & date: **Villeneuve**  
 Test responsible: **Alain Zoller**  
 Atmosphere [°C] RH [%] [hPa]: **22.2 / 49 / 1020.9**  
 Maximum certified pilot weight [kg]: **120**  
 Serial number of the test sample: **010515/01**

Directives: **NFL II 91 / 09**

Test standard §: **4.2.1.c**

Test setup: **Pilot upside down flying position**

Anchoring:

Attachment points: **Both of the main riser attachments attached downwards (3 and 4);**

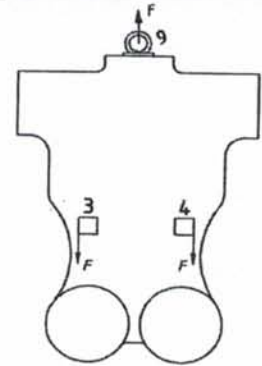
Dummy: **Dummy anchored at the head position (9)**

Required load in force [g] : **6**

Min load [N]: **6000**

Required test load in [N]: **734**

Min. duration [s]: **10**



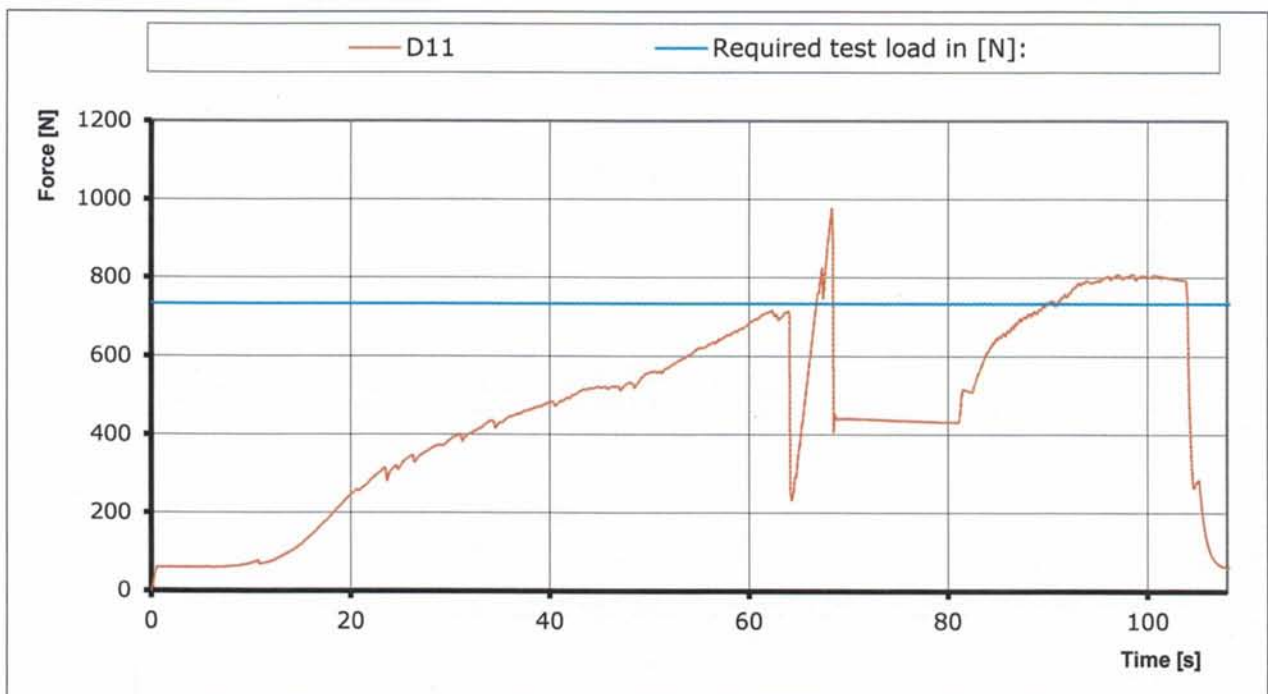
### Results

Duration of maintained min. load [s]: **11.27**

Any signs of structural failure after this test: **no failure**

Test result: **POSITIV**

Graph: **D11**



Instruments	Validity	Manufacturer	Type nr.	S/N
Load sensor	2017	0	0	0
Geos n°11 Skywatch	07.04.2017	JDC electronics	Geos n° 11	0022



## HARNESS STRUCTURAL STRENGTH TEST

TEST REPORT PH ID ST

PH PARAGLIDERS HARNESS

PH\_142.2015

Manufacturer name: **Flugsau GmbH**  
Harness manufacturer name: **Pigi Bi**  
Test place & date: **Villeneuve**  
Test responsible: **Alain Zoller**  
Atmosphere [°C] RH [%] [hPa]: **22.2 / 49 / 1020.9**  
Maximum certified pilot weight [kg]: **120**  
Serial number of the test sample: **010515/01**  
Directives: **Nfl II 91 / 09**

Test standard §: 6.1.5

The deployment of the rescue system has to be ensured in all circumstances, especially with a damaged glider.

The pilot has to be able to deploy the rescue chute with a single pull out of the outer container, single handed and in an anatomical favorable direction.

In order to simulate this, the test responsible deploys the rescue seated in the harness. In a similar way as in real flight. The deployment resistance is approximately measured by the load cell, which is placed between the hand of the test responsible and the rescue hand grip.

On the other hand inadvertent deployment has to be fairly remote. Therefore a shear link has to withstand a minimum load.

Requirements [kN]: **0.07**

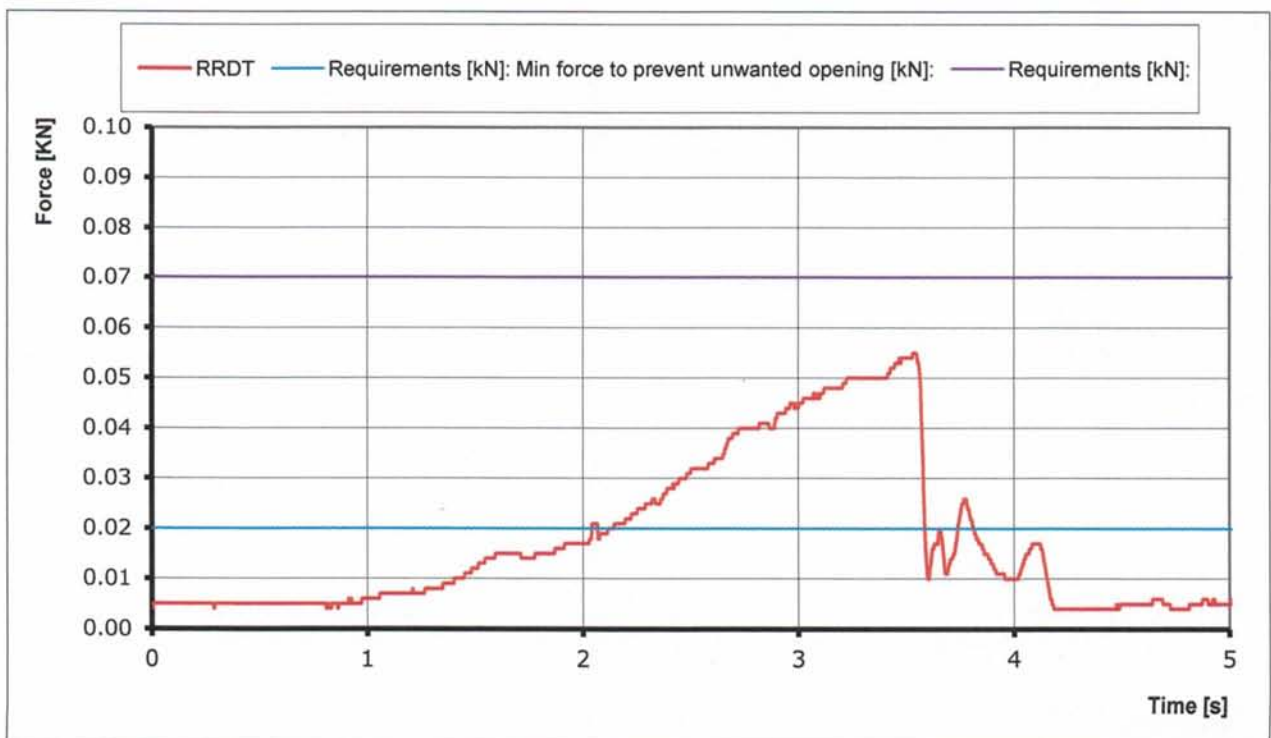
Min force to prevent unwanted opening [kN]: **0.02**

Measured peak to peak required force for deployment [kN]:

Test result 20 [N]: **POSITIVE**

Test result 70 [N]: **POSITIVE**

Graph: **RRDT**





# INSPECTION REPORT

BP PARAGLIDERS HARNESS BACK PROTECTORS

Inspection report number: **PH 142.2015**

## TEST SAMPLE DATA

Manufacturer name: **Flugsau GmbH**  
 Contact person: **Andre Bernhard**  
 Street: **Aelpierhaus 3**  
 Post code / place: **6288 Grafenort**  
 Country: **Switzerland**  
 Harness manufacturer name: **Pigi serie**  
 Harness manufacturer size: **L**  
 Serial number of the test sample: **010515/01**  
 Harness weight [kg]: **1.67**  
 Maximum certified pilot weight [kg]: **120**  
 Harness protector type: **Airbag**  
 Harness type: **ABS**  
 Volume rescue system container [cm3] Max: **n/a**  
 Volume rescue system container [cm3] Min: **n/a**  
 Sample reception date: **05.05.2015**  
 Place of declaration: **Villeneuve**  
 Date of issue: **10.07.2015**  
 Director Management: **Alain Zoller**

Signature: \_\_\_\_\_

Air Turquoise SA, having thoroughly assessed the sample mentioned hereunder, declare it was found conform with all requirements defined by the following directives:

**Airworthiness requirements for hang gliders and paragliders LTF 2009 as published in NfL 91/09 chapter 5 Paraglider harness protectors**

Present declaration's scope only extends to the conformity of a given sample, on a given date and in a given place – as mentioned here above.

This inspection report contain the following test and is complet with the **test report PH BP**

## TESTS RESULTS

.Shock impact tests is executed on these harnesses in order to prove the damping characteristics of it.

Test ID	TESTED ?	Standard	TEST setup	Test configuration	Impact at 165 cm (Seat plate)			Results
		LTF			Max Peak impact [g] force	Impact duration at -38 [g] (if any) recorded: [ms]	Impact duration at -20 [g] (if any) recorded: [ms]	
PRO TECT 1	✓	5.1.1	Default flying position	Test sample is attached to the dummy like a pilot in flight. Sample temperature +20+25°C without rescue	34.63	0.00	0.00	POSITIVE
PRO TECT 2		5.1.1	Default flying position	Test sample is attached to the dummy like a pilot in flight. Sample temperature +20+25°C with rescue	0.00	0.00	0.00	n/a
PRO TECT 3	✓	5.1.1	Default flying position	Test sample is attached to the dummy like a pilot in flight. Sample temperature -10+5°C without rescue	29.02	0.00	0.00	POSITIVE
PRO TECT 4		5.1.1	Default flying position	Test sample is attached to the dummy like a pilot in flight. Sample temperature -10+5°C with rescue	0.00	0.00	0.00	n/a

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## BACK PROTECTORS SHOCK TEST

BP PARAGLIDERS HARNESS BACK PROTECTORS

### TEST REPORT PH BP

PH 142.2015

Inspection report number: PH 142.2015

#### TEST SAMPLE DATA

Manufacturer name: **Flugsau GmbH**  
 Adress: **Aelpplerhaus 3**  
**6288 Grafenort**  
**Switzerland**

Harness Manufacturers name: **Pigi serie**  
 Harness Manufacturers Size: **L**  
 Harness Manufacturers max load (kg): **120**  
 Harness Manufacturers serial number: **010515/01**  
 Date of sample reception: **05.05.2015**  
 Directive: **LTF NFL II-91/09 chapter 5 Paraglider harness protectors**  
 Place of inspection: **Villeneuve**  
 Date of inspection: **13.05.2015**  
 Inspector: **Alain Zoller**

Signature: 

The following limits may not be exceeded during back protector test: Maximum peak 50g, Maximum 38g for a period of 7 milliseconds, Maximum 20g for a period of 25 milliseconds: All three criteria must be fulfilled.

#### TEST ATMOSPHERE AGL

[C°] **22.2**  
 RH [%] **49**  
 [hPa] **1020.9**

#### RESULTS Impact in at a height of min 165 [[cm] drop:

Without rescue system	20 25°	20 25°	*-10° -5°	*-10° -5°
Test ID	P1	P2	PN1	PN2
Absolute maximum impact [g]	34.6	37.5	29.0	34.0
Impact duration of+ 38 [g] (if any): [ms]	0.00	0.00	0.00	0.00
Impact duration of +20 [g] (if any): [ms]	0.00	0.00	0.00	0.00
Uncertainty 95 % [%]	6.61	6.61	6.61	6.61
Uncertainty 95 % [g]	2.29	2.48	1.92	2.25
MAX ACCELERATION compare [%]	100	108	100	117
<b>Test Result:</b>	<b>POSITIVE</b>	<b>POSITIVE</b>	<b>POSITIVE</b>	<b>POSITIVE</b>
With rescue system	20 25°	20 25°	*-10° -5°	*-10° -5°
Test ID	P1R	P2R	PN1R	PN2R
Absolute maximum impact [g]	0.0	0.0	0.0	0.0
Impact duration of+ 38 [g] (if any): [ms]	0.00	0.00	0.00	0.00
Impact duration of +20 [g] (if any): [ms]	0.00	0.00	0.00	0.00
Uncertainty 95 % [%]	6.61	6.61	6.61	6.61
Uncertainty 95 % [g]	0.00	0.00	0.00	0.00
MAX ACCELERATION compare [%]	100	#DIV/0!	100	#DIV/0!
<b>Test Result:</b>	<b>n/a</b>	<b>n/a</b>	<b>n/a</b>	<b>n/a</b>

Instruments	Validity	Manufacturer	Type nr.	S/N
Accelerometer sensor 100 G	2017	Burster / MTS	89010-100	1263567
Geos n° 11 Skywatch	07.04.2017	JDC electronics	Geos n° 11	0022

\* Sample is refrigerated at negative value according to the LTF91/09 chapter 5 requirements, the test is executed at the test room temperature.

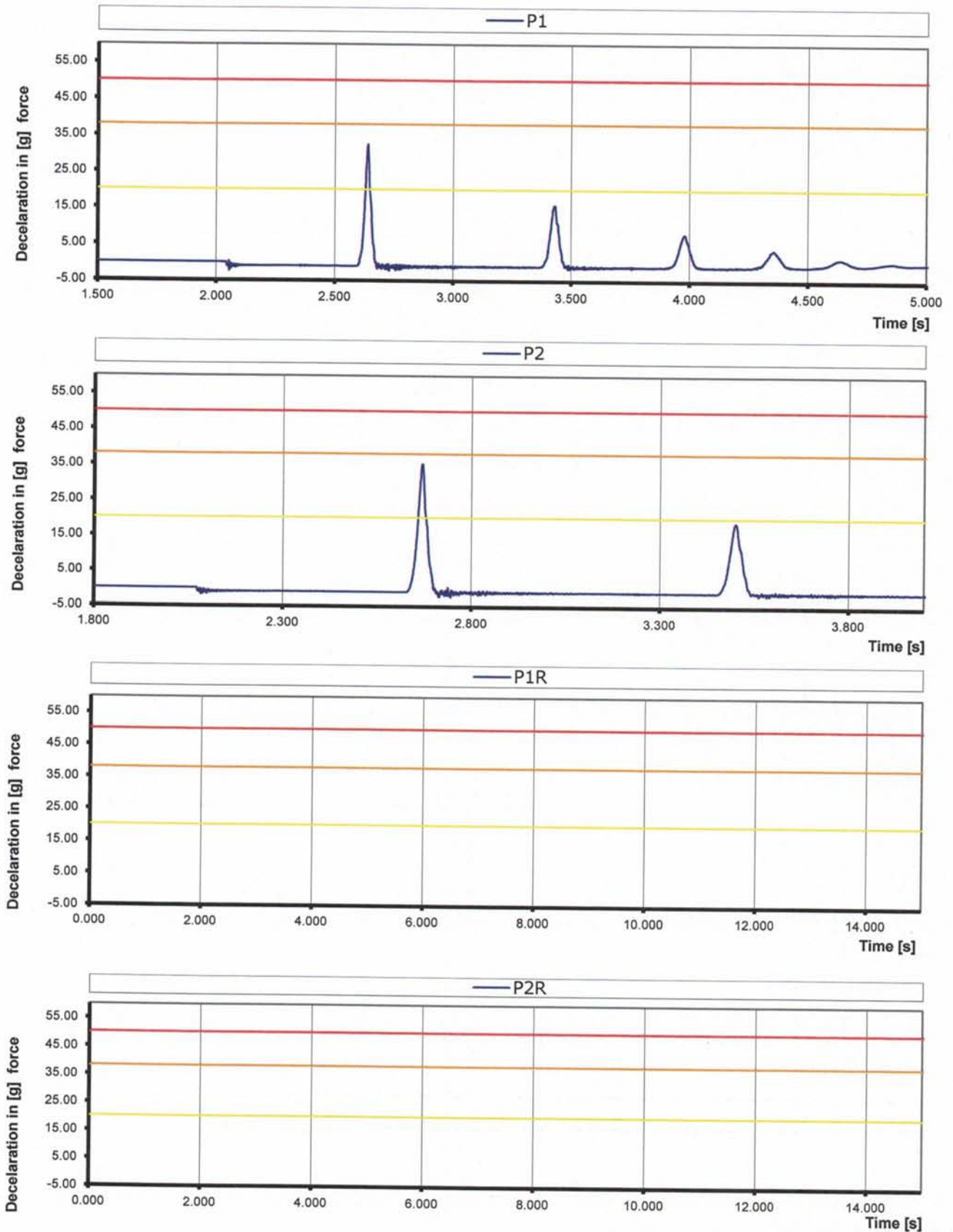


## BACK PROTECTORS SHOCK TEST

BP PARAGLIDERS HARNESS BACK PROTECTORS

TEST REPORT PH BP

Inspection report number: PH 142.2015



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