



Test Report

This test report describes the test results of the below mentioned paragliding harness.

All the tests were carried out by:

Air Turquoise SA, official test laboratory of Switzerland.

para-test.com



paragliding by air turquoise

Standards

Tests were carried out in conformity with the following standards:

- 2. DV LuftGerPV §1, Nr. 7 c (*note: in what follows this will be abbreviated by "LTF")
- European Standard EN1651 September 1999 (*note in what follows this will be abbreviated by "EN")
- European Standard EN12491 September 2001 (*note in what follows this will be abbreviated by "EN12491")

Harness details

Manufacturer:	Sky Paragliders a.s.
Harness model:	Skylighter2
Size:	Large
Harness Weight:	2.53 kg
Maximum certified pilot	100 kg
Impact protection type:	Mousse bag
Harness type:	ABS

Test responsible:	Alain Zoller
Test place:	Villeneuve
Test date:	November 29, 2013
Test room temp & humidity:	25.1° C; 60%rel
Certification number EN:	PH 109.2013
Certification number LTF:	GZ 109.2013

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Air Turquoise S.A. - Certification of paraglider equipment
 Tested in accordance with EN 1651:1999 and 2.DV LuftGerPV§1, Nr.7c

Prepared by RE
 Rev.0, 25.01.2011
 No. 71.9.3



Test summary

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	LTF		Attach - ment points	Dummy	Req. Load in g	Min. force [N]		
1	✓	5.3.2.1		Default flying position	2 main attachment points	Hip fixated	6g	6000	10	OK
2	✓		4.2.1.a				9g	9000		
3	✓	5.3.2.2		Default, landing position	2 main att. points	Hip fixated, landing conf.	6g	6000	10	OK
4	✓		4.2.1.b				15g	15000		
5	✓	5.3.2.7		Rescue	2 rescue att. Pnts.	Hip fixated	9g	9000	10	OK
6	✓		4.2.1.a rescue				15g	15000		
7	✓	5.3.2.4		Rescue, landing	2 rescue att. Pnts.	Hip fixated, landing conf.	6g	6000	10	OK
8	✓		4.2.1.b rescue				6g	6000		
9	✓	5.3.2.3		One riser	ONE main att.	1 central hip fixation	6g	6000	10	OK
10	✓	5.3.2.5		Towing	2 main att. + 2 tow att.	None	3g	3000	10	n/a
11	✓		4.2.1.d				5g	5000		
12	✓	5.3.2.6		Upside down	One main att.	Head fix.	4.5g	4500	10	OK
13	✓		4.2.1.c				6g	6000		
14	✓		4.2.1.c rescue	Upside down rescue	2 rescue att. downw.	Head fix.	6g	6000	10	OK
15	✓		4.2.1.c rescue				6g	6000		

B. HARNESS PROTECTION SHOCK TEST

Most paraglider harnesses are equipped with a protection device that damps the shock on the pilot's spine during a hard landing.

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



Test ID	TESTED ?	Standar d Ref.:	TEST setup	Anchoring		Impact				Result
		LTF		Attach- ment points	Dummy	Max. tolerated peak impact in g	Max Peak impact measured	Impact duration of + 38 g (if any) recorded:	Impact duration of + 20 g (if any) recorded:	
PRO TECT 1		5.1.1	Default flying position	Test dummy is attached to the harness like a pilot in flight.		+50g	0	0	0	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 ?	Standar d Ref.	TEST setup	Anchoring		Force for single hand deployment			Result
		LTF		Attach- ment points	Dummy	Min. force [N]	max. force [N]	Resistance measured [daN]	
Resc depl	✓	6.1.5	Default flying position	Test responsible is attached to the harness like a pilot in flight. (no dummy required)		20 N	70 N	n/t	OK

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. Test durati on [s]	Breaking resistance measured	Result
		LTF	EN 12491					
Resc strap	✓	6.1.8	5.3.2	Connection strap in tensile testing machine	700N	10	n/t	OK

After careful examination as explained in above mentioned test reports (from page 2 to page 18), the undersigned persons declare that the harness:

**Sky Paragliders a.s.
Skylighter2
Large**

Complied with:

- **European Standard EN 1651 September 1999**

And / or (if tested)

- **European Standard EN 12491 March 2001**

And / or (if tested)

- **2. DV LuftGerPV §1, Nr. 7 c**

Villeneuve, November 29, 2013

Place, Date


EN ELTP Testing center
Alain Zoller

www.para-test.com
Test responsible

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Annex: detailed test reports

Harness Test

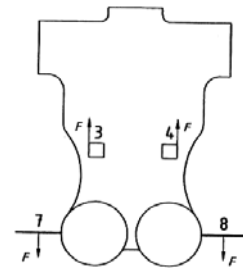
Test ID 1

Item: Skylighter2
Manufacturer: Sky Paragliders a.s.
Test place & date: Villeneuve November 29, 2013
Test responsible: Alain Zoller
Temp. [°C] & Humidity: 25.1° C; 60%rel
Maximum certified pilot weight [kg]: 100 kg

Standard: EN 1651 & 2. DV LuftGerPV §1, Nr. 7 c
Test standard §: 5.3.2.1 (EN) & 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 g : 9g (EN: 6g)
Minimum load [N]: 9000 N (EN: 6000 N)
Required test load in kg: **900 kg**
Min. duration [s]: 10 s



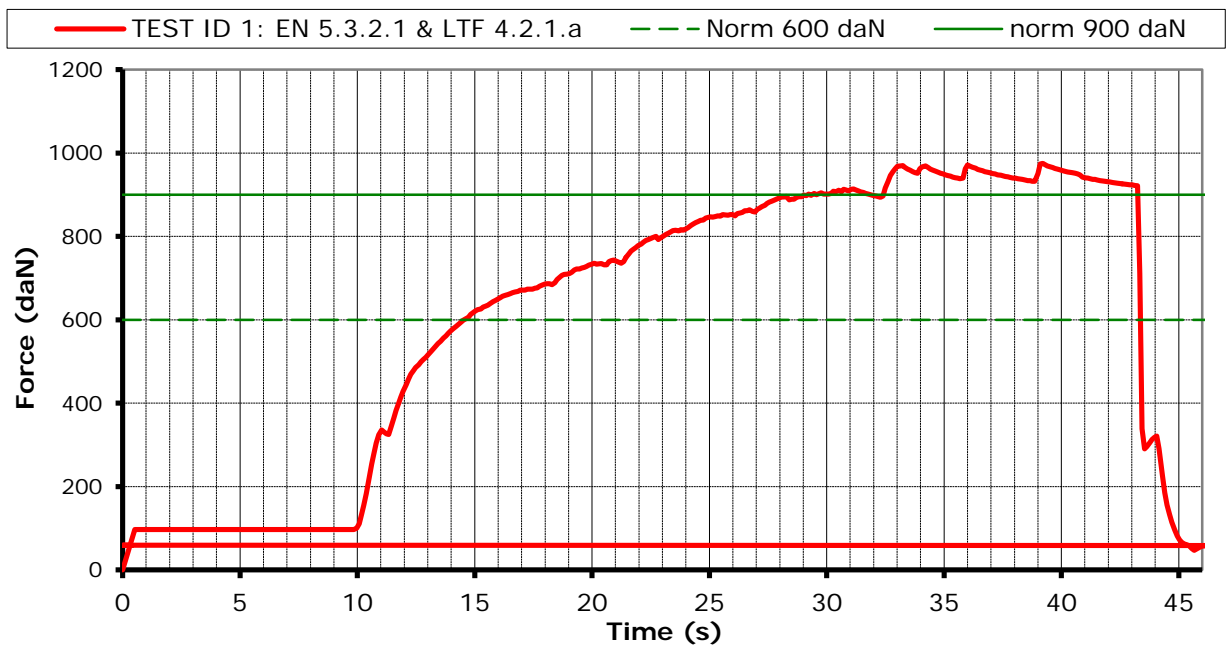
Results

Duration of maintained min. load [s]: **10.1 s**

Any signs of structural failure after this test: **No visible failure**

Test result: **Passed**

Graph:



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Harness Test

Test ID 2

Item: Skylighter2
Manufacturer: Sky Paragliders a.s.
Test place & date: Villeneuve November 29, 2013
Test responsible: Alain Zoller
Temp. [°C] & Humidity: 25.1° C; 60%rel
Maximum certified pilot weight [kg]: 100 kg

Standard: EN 1651

Test standard §: 5.3.2.2

Test setup: Default flying position

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

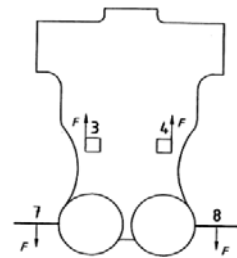
Dummy: Default, hip fixed (7, 8)

Required load in g: 15 g

Min load [N]: 15 000 N

Required test load in kg: 1500 kg

Min. duration [s]: 5s



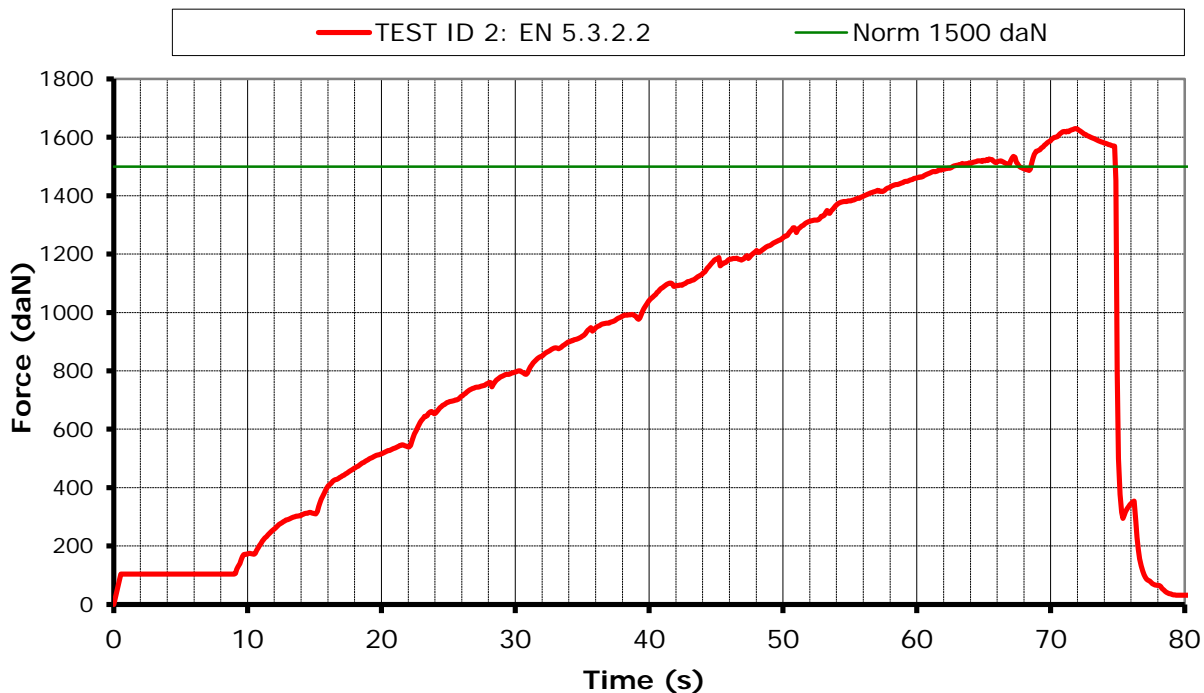
Results

Duration of maintained min. load [s]: 5.8 s

Any signs of structural failure after this test: No visible failure

Test result: Passed

Graph:



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Harness Test

Test ID 3

Item: Skylighter2
 Manufacturer: Sky Paragliders a.s.
 Test place & date: Villeneuve November 29, 2013
 Test responsible: Alain Zoller
 Temp. [°C] & Humidity: 25.1° C; 60%rel
 Maximum certified pilot weight [kg]: 100 kg

Standard: 2. DV LuftGerPV §1, Nr. 7 c

Test standard §: 4.2.1.b

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

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

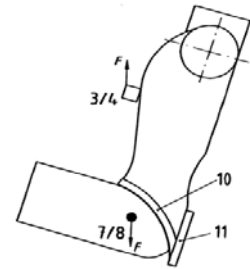
Dummy: Default, hip fixed (7, 8)

Required load in g: 6 g

Min load [N]: 6000 N

Required test load in kg: 600 kg

Min. duration [s]: 10 s



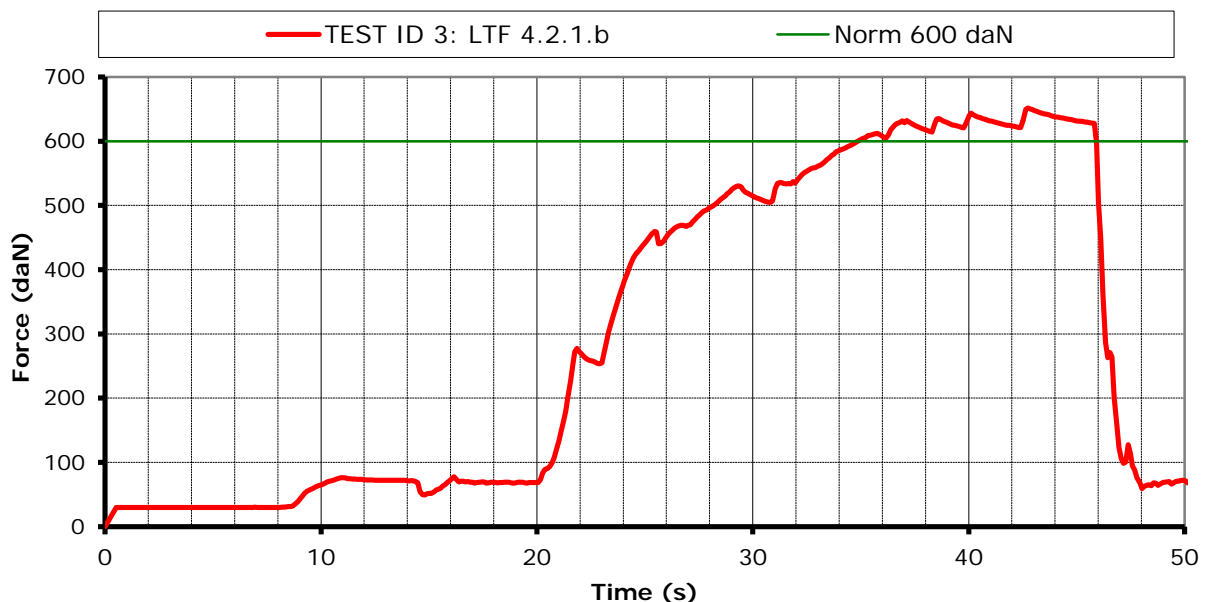
Results

Duration of maintained min. load [s]: 10.8 s

Any signs of structural failure after this test: No visible failure

Test result: Passed

Graph:



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Harness Test

Test ID 4

Item: Skylighter2
 Manufacturer: Sky Paragliders a.s.
 Test place & date: Villeneuve November 29, 2013
 Test responsible: Alain Zoller
 Temp. [°C] & Humidity: 25.1° C; 60%rel
 Maximum certified pilot weight [kg]: 100 kg

Standard: EN 1651

Test standard §: EN 5.3.2.7

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

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

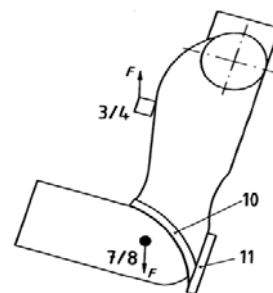
Dummy: Default, hip fixed (7, 8)

Required load in g: 15 g

Min load [N]: 15 000 N

Required test load in kg: **1500 kg**

Min. duration [s]: 5 s



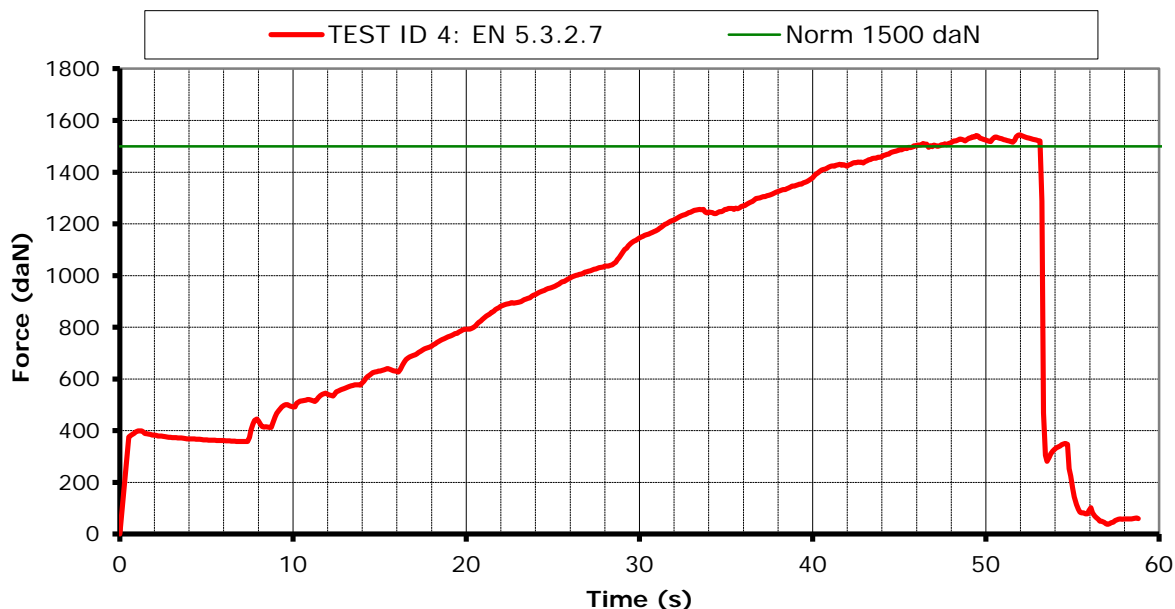
Results

Duration of maintained min. load [s]: **5.2 s**

Any signs of structural failure after this test: **No visible failure**

Test result: **Passed**

Graph:



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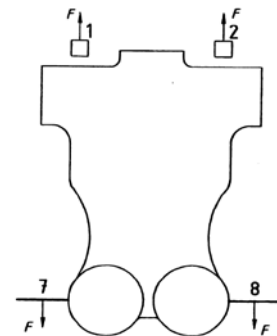
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Harness Test

Test ID 5

Item: Skylighter2
 Manufacturer: Sky Paragliders a.s.
 Test place & date: Villeneuve November 29, 2013
 Test responsible: Alain Zoller
 Temp. [°C] & Humidity: 25.1° C; 60%rel
 Maximum certified pilot weight [kg]: 100 kg

Standard: 2. DV LuftGerPV §1, Nr. 7 c
 Test standard §: 4.2.1.a rescue
 Test setup: Rescue attachments
 Anchoring: Attachment points: Rescue riser attachments (1,2)
 Dummy: Hip fixed (7, 8)
 Required load in g: 9 g
 Min load [N]: 9 000 N
 Required test load in kg: **900 kg**
 Min. duration [s]: 10 s



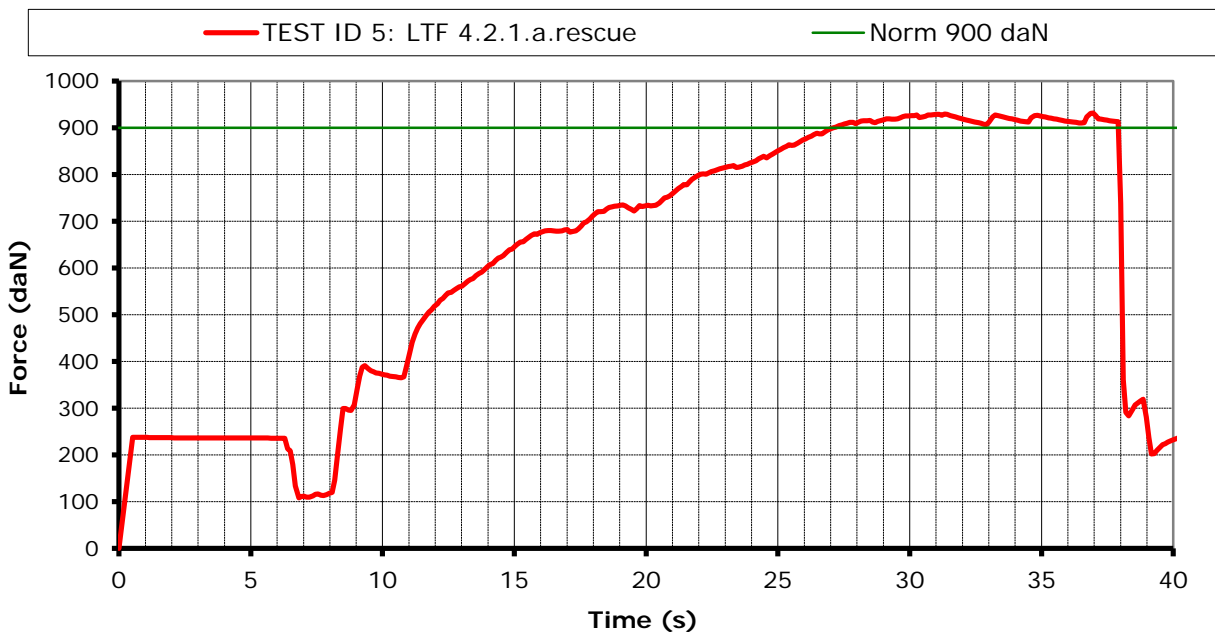
Results

Duration of maintained min. load [s]: **10.2 s**

Any signs of structural failure after this test: **No visible failure**

Test result: **Passed**

Graph:



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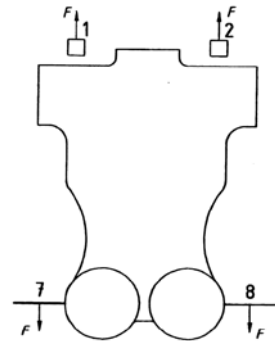


Harness Test

Test ID 6

Item: Skylighter2
Manufacturer: Sky Paragliders a.s.
Test place & date: Villeneuve November 29, 2013
Test responsible: Alain Zoller
Temp. [°C] & Humidity: 25.1° C; 60%rel
Maximum certified pilot weight [kg]: 100 kg

Standard: EN 1651
Test standard §: 5.3.2.4
Test setup: Rescue attachments
Anchoring: Attachment points: Rescue riser attachments (1,2)
Dummy: Hip fixed (7, 8)
Required load in g: 15 g
Min load [N]: 15 000 N
Required test load in kg: 1500 kg
Min. duration [s]: 5 s



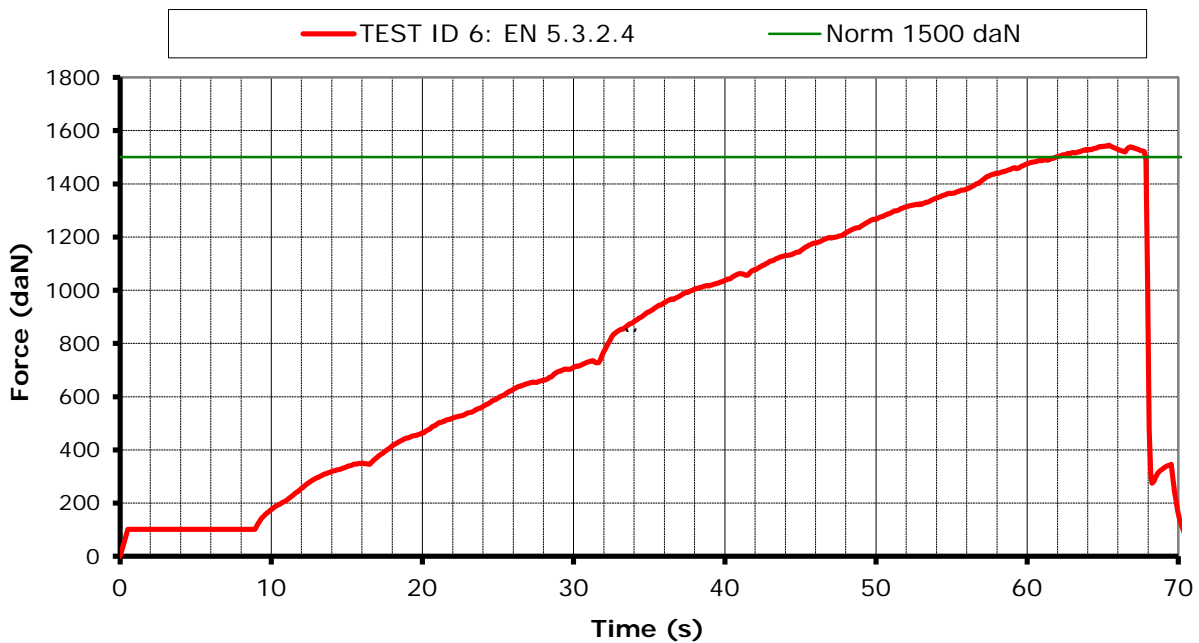
Results

Duration of maintained min. load [s]: 5.6 s

Any signs of structural failure after this test: No visible failure

Test result: Passed

Graph:



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Harness Test

Test ID 7

Item: Skylighter2
Manufacturer: Sky Paragliders a.s.
Test place & date: Villeneuve November 29, 2013
Test responsible: Alain Zoller
Temp. [°C] & Humidity: 25.1° C; 60%rel
Maximum certified pilot weight [kg]: 100 kg

Standard 2. DV LuftGerPV §1, Nr. 7 c

Test standard §: 4.2.1.b rescue

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

Anchoring: Attachment points: Both of the rescue riser attachments attached (1 and 2);

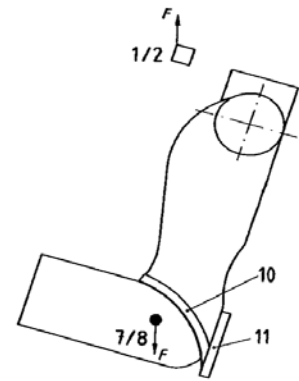
Dummy: Default, hip fixed (7, 8)

Required load in g: 6 g

Min load [N]: 6 000 N

Required test load in kg: 600 kg

Min. duration [s]: 10 s



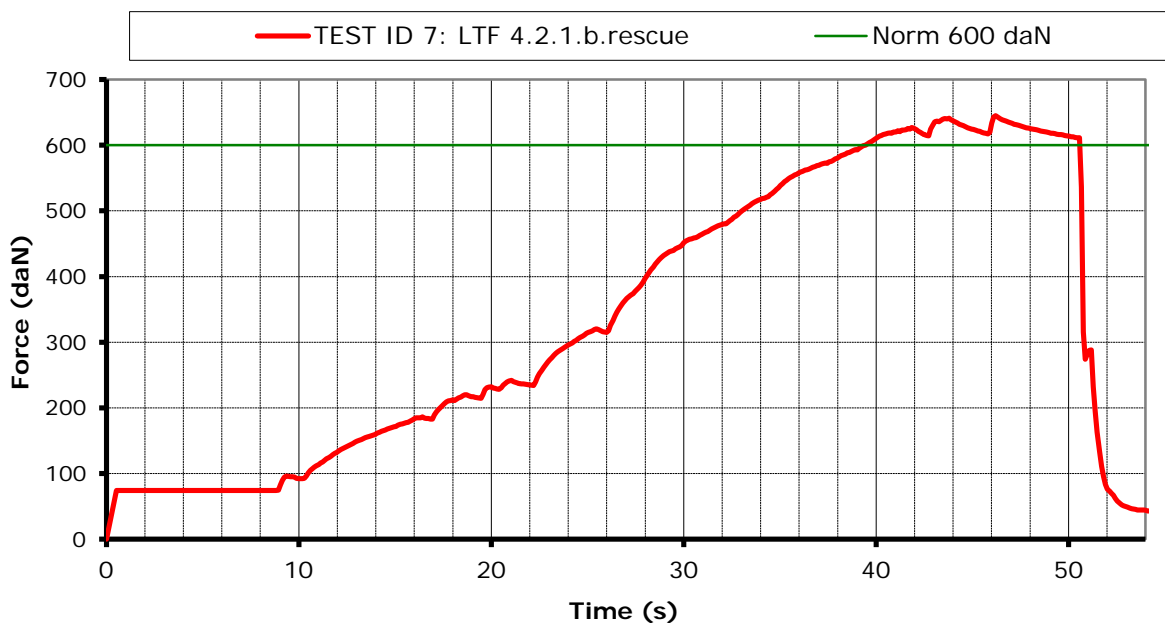
Results

Duration of maintained min. load [s]: 10.3 s

Any signs of structural failure after this test: No visible failure

Test result: Passed

Graph:



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Annex TEST ID 7
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Harness Test

Test ID 8

Item: Skylighter2
 Manufacturer: Sky Paragliders a.s.
 Test place & date: Villeneuve November 29, 2013
 Test responsible: Alain Zoller
 Temp. [°C] & Humidity: 25.1° C; 60%rel
 Maximum certified pilot weight [kg]: 100 kg

Standard: 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)

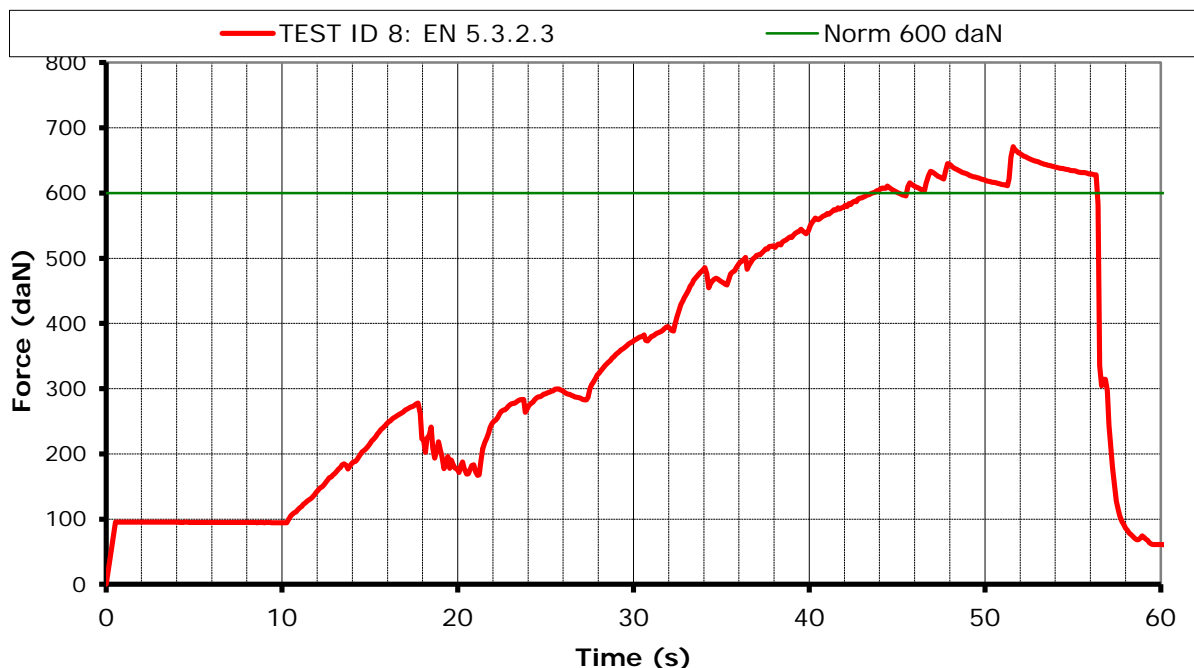
Required load in g: 6 g
 Min load [N]: 6 000 N
 Required test load in kg: **600** kg
 Min. duration [s]: 10 s



Results

Duration of maintained min. load [s]: **10.4 s**
 Any signs of structural failure after this test: **No visible failure**
 Test result: **Passed**

Graph:



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Harness Test **Test ID 10**

Item: Skylighter2
Manufacturer: Sky Paragliders a.s.
Test place & date: Villeneuve November 29, 2013
Test responsible: Alain Zoller
Temp. [°C] & Humidity: 25.1° C; 60%rel
Maximum certified pilot weight [kg]: 100 kg

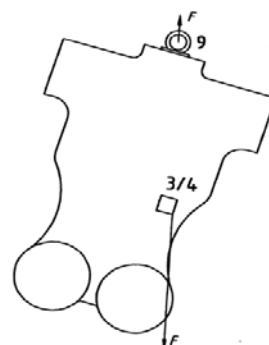
Standard: EN 1651

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 g: 4.5 g
Min load [N]: 4500 N
Required test load in kg: 450 kg
Min. duration [s]: 10 s



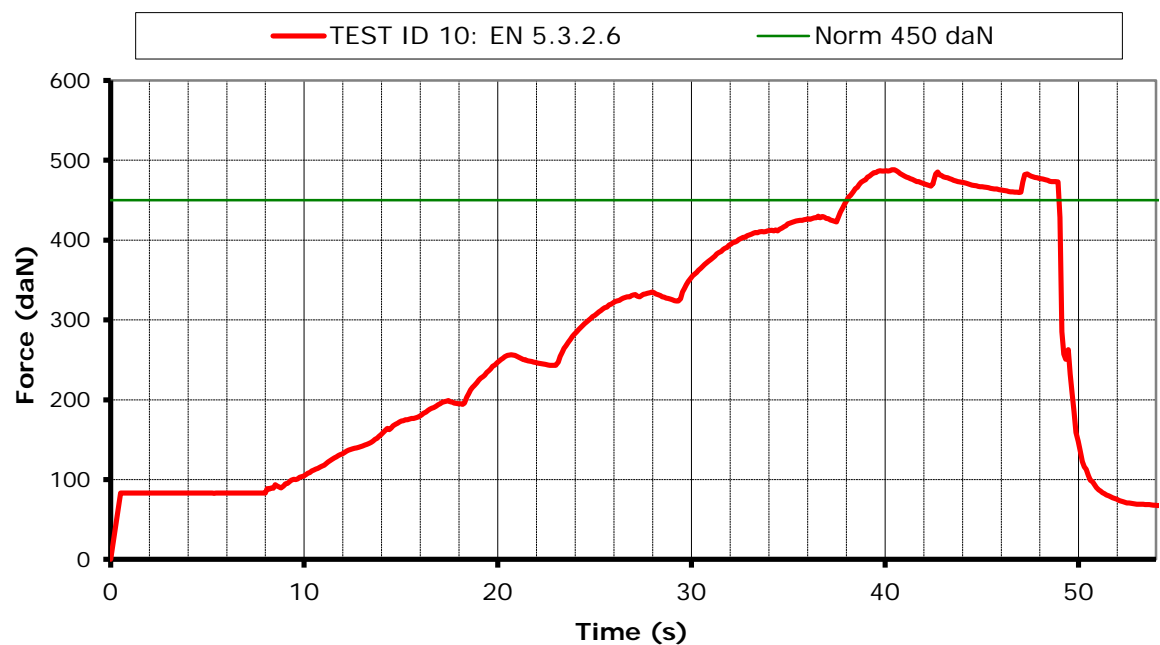
Results

Duration of maintained min. load [s]: 10.3 s

Any signs of structural failure after this test: No visible failure

Test result: Passed

Graph:



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Harness Test

Test ID 11

Item:	Skylighter2
Manufacturer	Sky Paragliders a.s.
Test place & date:	Villeneuve November 29, 2013
Test responsible:	Alain Zoller
Temp. [°C] & Humidity:	25.1° C; 60%rel
Maximum certified pilot weight [kg]:	100 kg

Standard 2. DV LuftGerPV §1, Nr. 7 c

Test standard §: 4.2.1.c

Test setup: Pilot upside down flying position

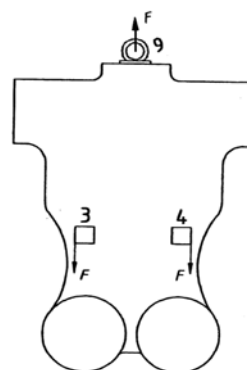
Anchoring: Attachment points: Both of the main riser attachments attached downwards (3 and 4);
Dummy: Dummy anchored at the head position (9)

Required load in g: 6 g

Min load [N]: 6 000 N

Required test load in kg: **600 kg**

Min. duration [s]: 10 s



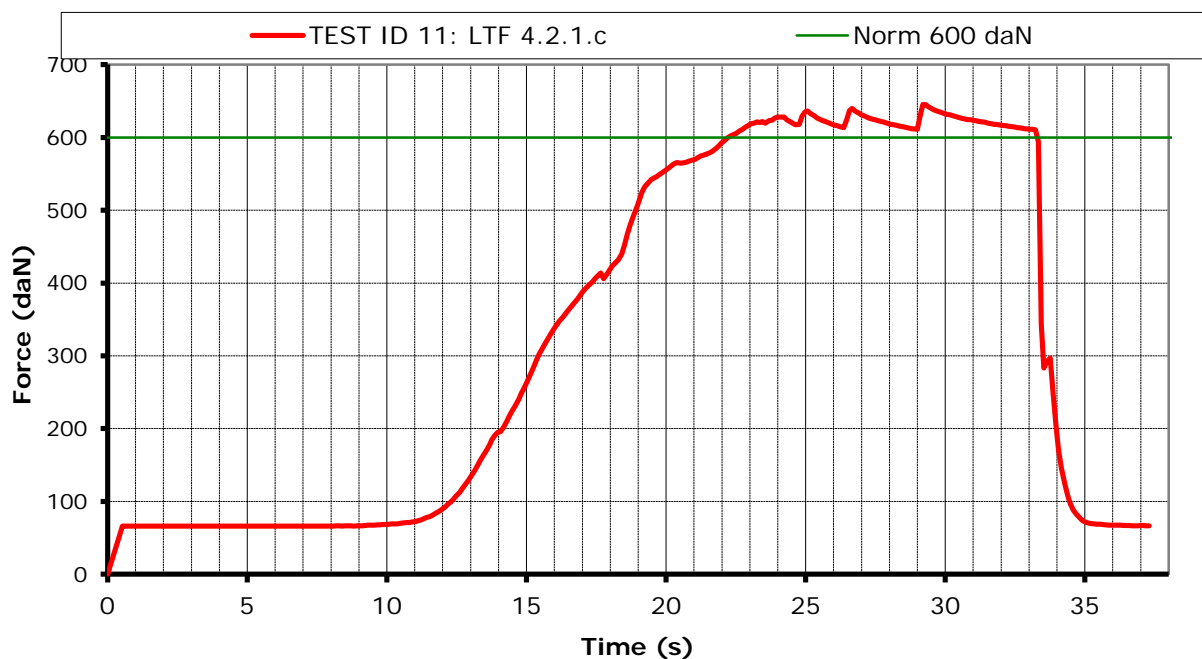
Results

Duration of maintained min. load [s]: **10.9 s**

Any signs of structural failure after this test: **No visible failure**

Test result: **Passed**

Graph:



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Annex TEST ID 11
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Harness Test **Test ID 12**

Item: Skylighter2
Manufacturer: Sky Paragliders a.s.
Test place & date: Villeneuve November 29, 2013
Test responsible: Alain Zoller
Temp. [°C] & Humidity: 25.1° C; 60%rel
Maximum certified pilot weight [kg]: 100 kg

Standard 2. DV LuftGerPV §1, Nr. 7 c

Test standard §: 4.2.1.c rescue

Test setup: Pilot upside down flying position

Anchoring: Attachment points: Both of the rescue riser attachments attached downwards (1 and 2);

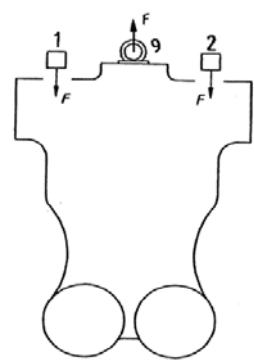
Dummy: Dummy anchored at the head position (9)

Required load in g: 6 g

Min load [N]: 6 000 N

Required test load in kg: **600 kg**

Min. duration [s]: 10 s



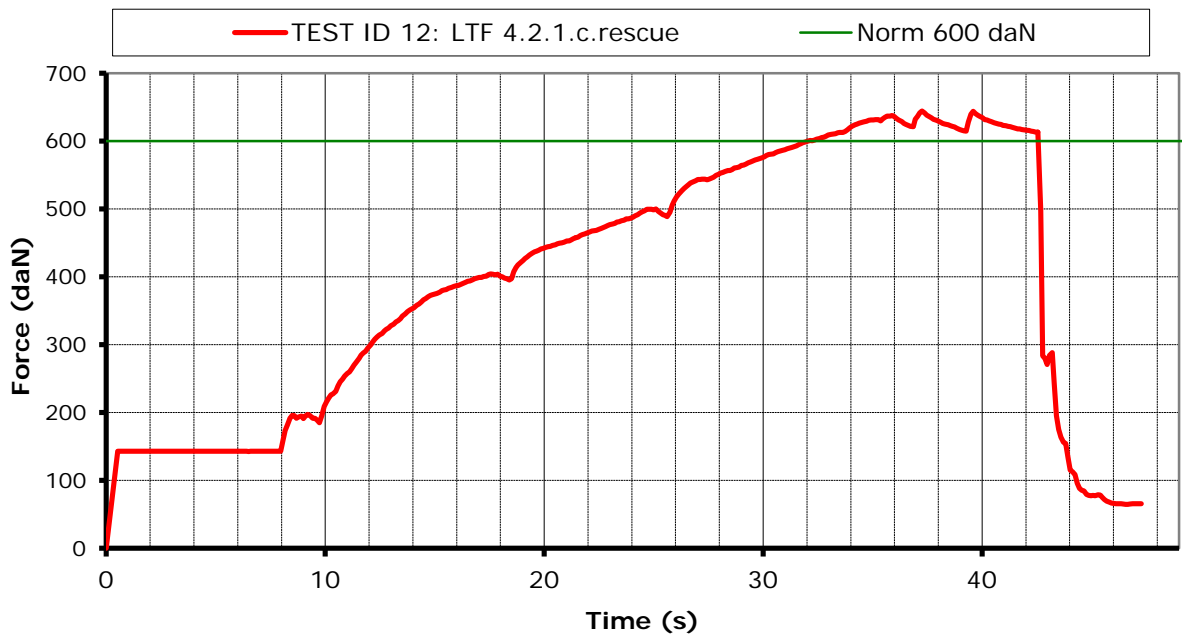
Results

Duration of maintained min. load [s]: **10.3 s**

Any signs of structural failure after this test: **No visible failure**

Test result: **Passed**

Graph:



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Annex TEST ID 12
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Rescue deployment resistance test

Test ID resc

Item: Skylighter2
Manufacturer: Sky Paragliders a.s.
Test place & date: Villeneuve November 29, 2013
Test responsible: Alain Zoller
Temp. [°C] & Humidity: 25.1° C; 60%rel
Maximum certified pilot weight [kg]: 100 kg

Standard 2. DV LuftGerPV §1, Nr. 7 c

Test standard §: 6.1.5

Test setup:

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:

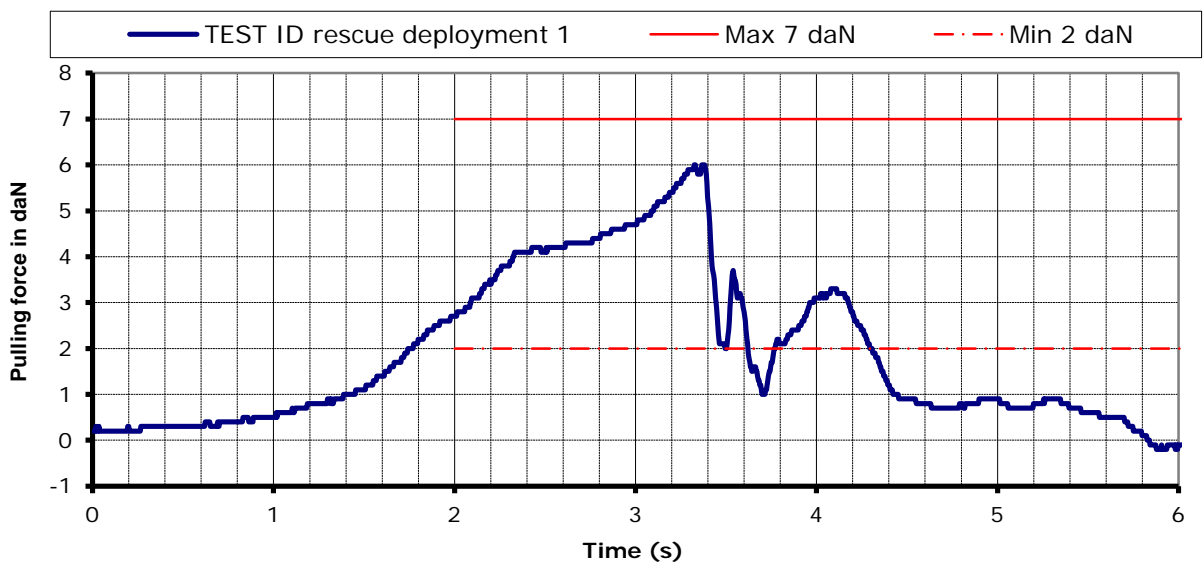
Max force for single hand deployment:	approx. 70 N
Min force to prevent unwanted opening:	approx. 20 N

Results

Measured peak to peak required force for deployment [daN]: 6 daN

Comment: Passed

Graph:



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ISO 9001
BUREAU VERITAS
Certification



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Annex TEST ID resc depl
 Prepared by RE
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Rescue deployment strap strength test

Test ID resc strap

Item: Skylighter2
Manufacturer: Sky Paragliders a.s.
Test place & date: Villeneuve November 29, 2013
Test responsible: Alain Zoller
Temp. [°C] & Humidity: 25.1° C; 60%rel
Maximum certified pilot weight [kg]: 100 kg

Standard EN 12491 & 2. DV LuftGerPV §1, Nr. 7 c

Test standard §: 5.3.2 (EN 12491) & 6.1.8 (LTF)

Test setup: The handgrip of the outer container has to be connected to the inner container with a removable loop in a way that it is possible to use the inner container with different types of outer containers.
 The connection between handgrip and inner container has to have sufficient load capacity/structural strength in any situation that may arise during normal operation.
 In order to verify this, the connection is tested on its tensile strength by a default tensile testing setup.
 In addition to this the breaking resistance will also be measured.

Requirements: Min. tensile strenght for 10 s: 700 N (= 70daN)

Results

Duration of maintained load [s]: < 10 sec

Breaking resistance [daN]: 105.2

Comment: Passed

Graph:

