

#### **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



**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

Harness model:Cruiser NGSize:MediumHarness Weight:3.4 kgMaximum certified pilot120 kgImpact protection type:Mousse bagHarness type:ABSTest responsible:Randi EriksenTest place:VilleneuveTest date:January 11, 2011Test room temp & humidity:22,6° C; 41 % relCertification number EN:PH 014.2011Certification number LTF:GZ 014.2011	Manufacturer:	AVA Sport Ltd				
Harness Weight:3.4 kgMaximum certified pilot120 kgImpact protection type:Mousse bagHarness type:ABSTest responsible:Randi EriksenTest place:VilleneuveTest date:January 11, 2011Test room temp & humidity:22,6° C; 41 % relPH 014.2011PH 014.2011	Harness model:	Cruiser NG				
Maximum certified pilot120 kgImpact protection type:Mousse bagHarness type:ABSTest responsible:Randi EriksenTest place:VilleneuveTest date:January 11, 2011Test room temp & humidity:22,6° C; 41 %relPH 014.2011PH 014.2011	Size:	Medium				
Impact protection type: Harness type:Mousse bag ABSTest responsible: Test place: Test date: Test room temp & humidity: Certification number EN:Randi Eriksen Villeneuve 22,6° C; 41 %rel PH 014.2011	Harness Weight:	3.4 kg				
Harness type:ABSTest responsible:Randi EriksenTest place:VilleneuveTest date:January 11, 2011Test room temp & humidity:22,6° C; 41 %relCertification number EN:PH 014.2011	Maximum certified pilot	120 kg				
Test responsible:Randi EriksenTest place:VilleneuveTest date:January 11, 2011Test room temp & humidity:22,6° C; 41 %relCertification number EN:PH 014.2011	Impact protection type:	Mousse bag				
Test place:VilleneuveTest date:January 11, 2011Test room temp & humidity:22,6° C; 41 %relCertification number EN:PH 014.2011	Harness type:	ABS				
Test place:VilleneuveTest date:January 11, 2011Test room temp & humidity:22,6° C; 41 %relCertification number EN:PH 014.2011						
Test date:January 11, 2011Test room temp & humidity:22,6° C; 41 %relCertification number EN:PH 014.2011	Test responsible:	Medium 3.4 kg 120 kg Mousse bag ABS Randi Eriksen Villeneuve January 11, 2011 22,6° C; 41 %rel PH 014.2011				
Test room temp & humidity:22,6° C; 41 %relCertification number EN:PH 014.2011	Test place:	Villeneuve				
Certification number EN: PH 014.2011	Test date:	January 11, 2011				
	Test room temp & humidity:	22,6° C; 41 %rel				
Certification number LTF: GZ 014.2011	Certification number EN:	PH 014.2011				
	Certification number LTF:	GZ 014.2011				

The management system governing the provision of this test service is ISO 9001 certified:



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Test summary

#### A. STRUCTURAL STRENGHT 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.

		Standa	ard Ref.	٩	Anch	oring	For	ces	Min.	
Test ID	TESTED ?	EN	LTF	LS Attach - ES Attach - E ment points		Dummy	Req. Load in g	Min. force [N]	Test durati on [sec]	Result
1	~	5.3.2.1	4.2.1.a	Default flying position	2 main attachment points	Hip fixated	6g 9g	6000 9000	10	ок
2	✓	5.3.2.2		position points			15g	15000	5	ОК
3	✓		4.2.1.b	Default, <b>landing</b>	2 main att.	Hip fixated,	6g	6000	10	ОК
4	✓	5.3.2.7		position	points	landing conf.	15g	15000	5	ОК
5	✓		4.2.1.a rescue	Rescue		Hip fixated	9g	9000	10	ОК
6	$\checkmark$	5.3.2.4			2 rescue att. Pnts.		15g	15000	5	ОК
7	~		4.2.1.b rescue	<b>Rescue</b> , landing	PHILS.	Hip fixated, landing conf.	6g	6000	10	ок
8	✓	5.3.2.3		One riser	ONE main 1 central hip att. fixation		6g	6000	10	ок
9	✓	5.3.2.5	4.2.1.d	Towing	2 main att. + 2 tow att.	None	3g 5g	3000 5000	10	n/a
10	✓	5.3.2.6		Default, <b>Negatif</b>	One main att.	Head fix.	4.5g	4500	10	ОК
11	✓		4.2.1.c	Upside down	2 main att. downw.		6g	6000	10	ок
12	~		4.2.1.c rescue	Upside down rescue	2 rescue att. downw.	Head fix.	6g	6000	10	ок

#### **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.

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				Ancl	horing		Impac	t		
Test ID		Standa rd Ref.: 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:	Result
PRO TECT 1	>	5.1.1	Default flying position	the harness	v is attached to s like a pilot in ght.	+50g	26.07 g	0	15 ms	ОК

#### 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	'ESTED ?	Standa rd Ref. LTF	IEST setup	Anc Attach- ment points	horing A E E D	Force for sir Min. force [N]	ngle han wax. force [N]	Resistance measured	Result
			r-	Test responi	sble is attached			[daN]	<u> </u>
Resc	~	6.1.5	Default flying	to the harne	ss like a pilot in ight.		70 N	n/t	ок
depl			position	(no dumr	ny required)				

#### D. RESCUE DEPLOYMENT STRAP STRENGHT 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 ?	Standa LTF	ard Ref. EN 12491	TEST setup	Minimum force [N]	Min. Test durati on [s]	Breaking resistance measured	Result
Resc strap	>	6.1.8	5.3.2	Connection strap in tensile testing machine	700N	10	n/t	ОК

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

#### AVA Sport Ltd Cruiser NG Medium

**C**omplied 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, January 11, 2011

Randi Eriksen

Place, Date

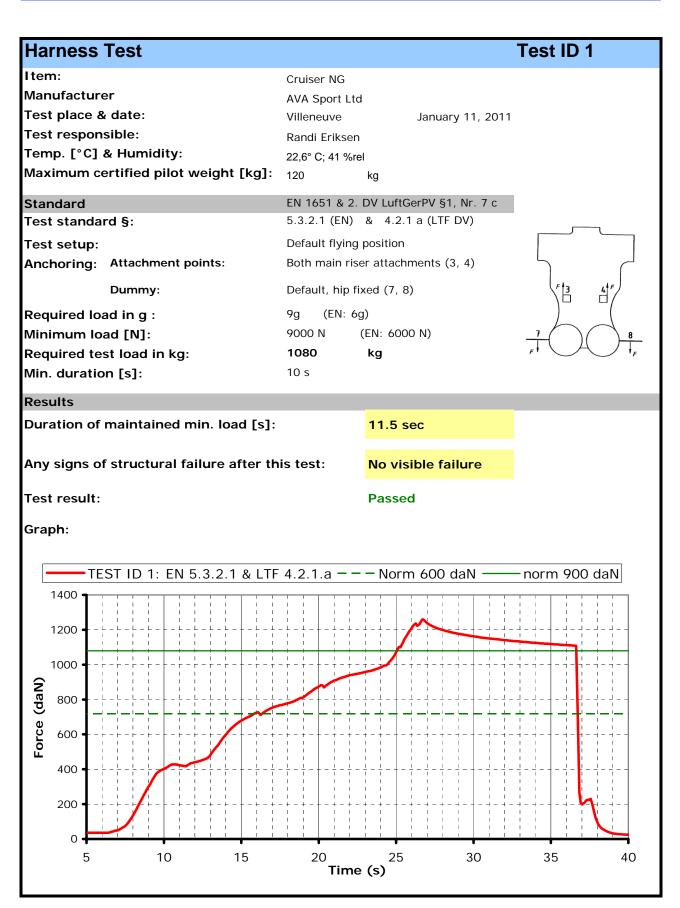
Test responsible

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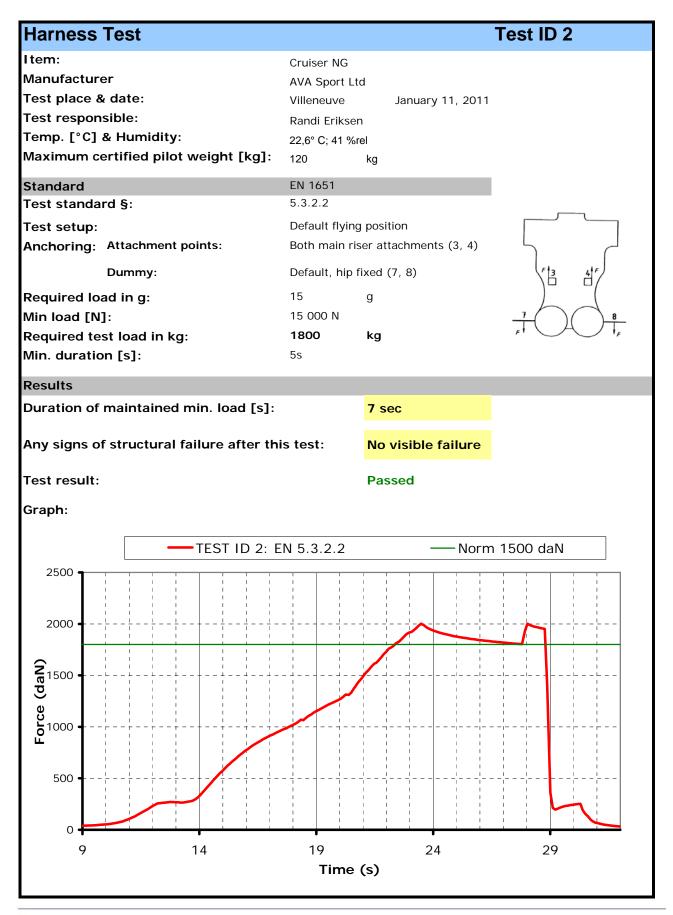


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Annex: detailed test reports









Harness Test			Test ID 3			
Item:	Cruiser NG					
Manufacturer	AVA Sport Ltd					
Test place & date:	Villeneuve	January 11, 2011				
Test responsible:	Randi Eriksen					
Temp. [°C] & Humidity:	22,6° C; 41 %rel					
Maximum certified pilot weight [kg]:	120	kg				
Standard	2. DV LuftGerPV	§1, Nr. 7 c				
Test standard §:	4.2.1.b					
Test setup:	board (11) in lan straps (10) close	Flying position before landing: seat board (11) in landing position, leg straps (10) closed.				
Anchoring: Attachment points:	attached (3 and 4		3/4			
Dummy:	Default, hip fixed	I (7, 8)	10			
Required load in g:	6	g	7/8 - 11			
Min load [N]:	6000 N					
Required test load in kg:	720	kg				
Min. duration [s]:	10 s					
Results						
Duration of maintained min. load [s]:		11 sec				
Any signs of structural failure after th	is test:	No visible failure				
Test result:		Passed				
Graph:						
TEST ID 3: LTF	4.2.1.b	Norm 6	00 daN			
1000						
900 •						
800		- <u> </u>				
700	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$					
<b>e</b> 600 <b>e</b>	<b>/</b>					
<b>Y</b> 600 <b>•</b> • • • • • • • • • • • • • • • • • •						
300						
300 •						
	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	22	27			
300	17 Time (s		27			



Harness Test	Test ID 4
Item: Manufacturer Test place & date: Test responsible: Temp. [°C] & Humidity: Maximum certified pilot weight [kg]:	Cruiser NG AVA Sport Ltd Villeneuve January 11, 2011 Randi Eriksen 22,6° C; 41 %rel 120 kg
Standard	EN 1651
Test standard §:	EN 5.3.2.7
Test setup: Anchoring: Attachment points:	Flying position before landing: seat board (11) in landing position, leg straps (10) closed.
Dummy:	attached (3 and 4); Default, hip fixed (7, 8)
Required load in g:	15 g
Min load [N]:	15 000 N
Required test load in kg:	1800 kg
Min. duration [s]:	5 s
Results	
Duration of maintained min. load [s]:	13.5 sec
Any signs of structural failure after this Test result:	s test: No visible failure
Graph:	Fasseu
TEST ID 4: EN	5.3.2.7 — Norm 1500 daN
2500	
<b>Jobs - 1</b> 000 <b>• 1</b> 0000 <b>• 1</b> 00000000000000000000000000000000000	
	1     1
500	
5 10 15	20 25 30 35 Time (s)



Harness Test	Test ID 5
I tem: Manufacturer Test place & date: Test responsible: Temp. [°C] & Humidity: Maximum certified pilot weight [kg]:	Cruiser NG AVA Sport Ltd Villeneuve January 11, 2011 Randi Eriksen 22,6° C; 41 %rel 120 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 7 8
Required test load in kg:	1080 kg $F$
Min. duration [s]:	10 s
Results	
Duration of maintained min. load [s]:	11.2 sec
Any signs of structural failure after thi	is test: No visible failure
Test result:	Passed
Graph:	
Graph: TEST ID 5: LTF 4.	2.1.a.rescue — Norm 900 daN
-	2.1.a.rescue — Norm 900 daN
TEST ID 5: LTF 4.	2.1.a.rescue — Norm 900 daN
TEST ID 5: LTF 4.	2.1.a.rescue — Norm 900 daN
TEST ID 5: LTF 4.	2.1.a.rescue — Norm 900 daN
TEST ID 5: LTF 4.	2.1.a.rescue — Norm 900 daN
TEST ID 5: LTF 4.	2.1.a.rescue — Norm 900 daN
TEST ID 5: LTF 4.	2.1.a.rescue — Norm 900 daN
TEST ID 5: LTF 4.	2.1.a.rescue — Norm 900 daN
TEST ID 5: LTF 4.	
TEST ID 5: LTF 4.	



Harness Test	Test ID 6
Item: Manufacturer Test place & date: Test responsible: Temp. [°C] & Humidity: Maximum certified pilot weight [kg]:	Cruiser NG AVA Sport Ltd Villeneuve January 11, 2011 Randi Eriksen 22,6° C; 41 %rel
Standard	EN 1651
Test standard §:	
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 7 8
Required test load in kg:	1800 kg $\overline{f}$
Min. duration [s]:	5 s
Results	
Duration of maintained min. load [s]:	6.2 sec
Any signs of structural failure after th	nis test: No visible failure
Test result:	Passed
Graph:	
TEST ID 6:	EN 5.3.2.4 — Norm 1500 daN
2500	
2000	
<b>2</b> 1500 <b>-</b>	
<b>9</b> 1500	
500	
0	
20 25 30	0 35 40 45 50
	Time (s)



Harness Test			Test ID 7
Item:	Cruiser NG		
Manufacturer	AVA Sport Lto	d	
Test place & date:	Villeneuve	January 11, 20	11
Test responsible:	Randi Erikser	-	
Temp. [°C] & Humidity:	22,6° C; 41 %r		
Maximum certified pilot weight [kg]:		kg	
	120	Kg	
Standard		rPV §1, Nr. 7 c	F,
Test standard §:	4.2.1.b rescu	e	1/2 5
Test setup: Anchoring: Attachment points:	board (11) in straps (10) cl	n before landing: seat landing position, leg losed. escue riser attachments	Ð
Anchoring: Attachment points.	attached (1 a		
Dummy:	Default, hip f	ixed (7, 8)	$\sim$ $1 / 1$
Required load in g:	6	g	10
Min load [N]:	6 000 N		7/8
Required test load in kg:	720	kg	F
Min. duration [s]:	10 s		
Describe			
Results			
Duration of maintained min. load [s]:		11.2 sec	
Any signs of structural failure after th	is test:	No visible failure	
Test result:		Passed	
Graph:			
TEST ID 7: LTF	4 2 1 h res		Norm 600 daN
1000	4.2.1.0.100		
900			
800			
700			
	$\frac{1}{1} = - \left  \frac{1}{1} \frac{1}{1} \frac{1}{1} \right $		
<b>Gubble Construction</b>	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$		
<b>3</b> 400 <b>-</b>			
	+   + - 		
i j🖌 i i i i i i	+ + -		
200 •			
200 •	++-		
100	18	23	28 33
100	18 Time		28 33



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

Harness Test			Test ID 8
ltem: Manufacturer Test place & date: Test responsible: Temp. [°C] & Humidity: Maximum certified pilot weight [kg]:	Cruiser NG AVA Sport Ltd Villeneuve Randi Eriksen 22,6° C; 41 %re 120	January 11, 2011	
Standard	EN 1651		
Test standard §:	5.3.2.3		1
Test setup:	Only one riser	attached	$\wedge$
Anchoring: Attachment points:	One main rise	r attachments (3)	
Dummy:	Hip fixed (7, 8	8 -> 12)	$\mathcal{V}$
Required load in g:	6	g	
Min load [N]:	6 000 N		A second
Required test load in kg:	720	kg	F 12
Min. duration [s]:	10 s		
Results			
Duration of maintained min. load [s]:		11.2 sec	
Any signs of structural failure after th	nis test:	No visible failure	
Test result:		Passed	
Graph:			
	.3.2.3	Nori	m 600 daN
1400			
1200 •			
1000			
(gan)			
Force (aa)			
400 •			
200			
	1 Time	16 21	26



Horpoop Toot				Test ID 10	
Harness Test				Test ID 10	
Item:	Cruiser NG				
Manufacturer	AVA Sport Lt	d			
Test place & date:	Villeneuve	Ja	inuary 11, 2011		
Test responsible:	Randi Erikser	า			
Temp. [°C] & Humidity:	22,6° C; 41 %r	el			
Maximum certified pilot weight [kg]:	120	kg			
Standard	EN 1651				
Test standard §:	5.3.2.6			. F.	
Test setup:	Normal flying	g position i	in NEGATIF	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	
Anchoring: Attachment points:	ONE of the m attached dow			$\sum_{i=1}^{n}$	7
Dummy:	Dummy anch (9)	nored at th	e head position	3/4	
Required load in g:	4.5	g			
Min load [N]:	4500 N			$() \land ()$	
Required test load in kg:	540	kg		$\langle \langle \rangle$	
Min. duration [s]:	10 s			, F	
Results					
Duration of maintained min. load [s]:		10.5 se	ec		
Any signs of structural failure after th	is test:	No visi	ble failure		
Test result:		Passed	I		
Graph:					
TEST ID 10: E	N 5.3.2.6		Norm 4	50 daN	
700					
600 •		A			
500 •			+		
	<u> </u>				
Equip 400 400 400 400					
<b>9</b> 300 <b>•</b> - + - + - + - + - + - + - + - + - + -		+	+-+-+		
200		+	++	- + <b></b>	
100					
100					
	20		25	30 35	
100	20 Time	(s)	25	30 35	



Harness Test				Test ID 11
I tem: Manufacturer Test place & date: Test responsible: Temp. [°C] & Humidity: Maximum certified pilot weight [kg]:	Cruiser NG AVA Sport Ltd Villeneuve Randi Eriksen 22,6° C; 41 %re 120	Janu	ıary 11, 2011	
Standard Test standard §: Test setup: Anchoring: Attachment points: Dummy: Required load in g: Min load [N]: Required test load in kg: Min. duration [s]:	<ul> <li>2. DV LuftGerl</li> <li>4.2.1.c</li> <li>Pilot upside do</li> <li>Both of the mattached down</li> <li>Dummy anchor</li> <li>(9)</li> <li>6</li> <li>6 000 N</li> <li>720</li> <li>10 s</li> </ul>	own flying p ain riser atta nwards (3 a	osition achments ind 4);	
Results Duration of maintained min. load [s]:		11 sec		
Any signs of structural failure after this Test result: Graph:	s test:	<mark>No visibl</mark> Passed	e failure	
(NP) 900 800 700 600 500 400 300 200 5 10 5 10 15	4.2.1.c	25 (s)	Nor	m 600 daN



Harness Test	Test ID 12			
Item: Manufacturer Test place & date: Test responsible: Temp. [°C] & Humidity: Maximum certified pilot weight [kg]:	Cruiser NG AVA Sport Ltd Villeneuve January 11, 2011 Randi Eriksen 22,6° C; 41 %rel 120 kg			
Standard Test standard §:	2. DV LuftGerPV §1, Nr. 7 c 4.2.1.c rescue			
	Pilot upside down flying position $1 \int \frac{1}{\sqrt{2}} \frac{2}{\sqrt{2}}$			
Test setup: 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: Min load [N]: Required test load in kg: Min. duration [s]:	6 g 6 000 N 720 kg 10 s			
Results				
Duration of maintained min. load [s]:	11.3			
Any signs of structural failure after thi	is test: No visible failure			
Test result:	Passed			
Graph:				
TEST ID 12: LTF	4.2.1.c.rescue — Norm 600 daN			
900 •				
700				
<b>Government of the second seco</b>				
300 •				
7 12 17 22 27 <b>Time (s)</b>				



Protector sho	ock test	Test ID Protect 1
Item:		Cruiser NG
Manufacturer		AVA Sport Ltd
Test place & date	:	Villeneuve January 11, 2011
Test responsible:		Randi Eriksen
Temp. [°C] & Humidity:		22,6° C; 41 %rel
Maximum certifie	ed pilot weight [kg]:	120 kg
		-
Standard		2. DV LuftGerPV §1, Nr. 7 c
Test standard §:		5.1.1
Test setup:		Harness attached to protector test dummy, in a similar way like a real pilot in flight.
		Impact will be simulated by dropping the dummy from a certain height (with and without reserve).
		To simulate the "in-flight" conditions, the airbag is inflated with pressurized air equalling an airspeed of 7m/s. Inflation has to be stopped at least 5 sec before impact.
		Impact will be measured by an accelerometer mounted on the dummy. (Impact measured in g's)
Requirements:	Minimun height:	1.65 m (between lowest point test dummy and impact surface)
	Impact requirements:	+50g as absolute maximum;
		+38g during less than 7 msec;
		+20g during less than 25 msec.
	Repetitions:	The test will be performed 2 times, minimum 1 hour and maximum 2 hours after the first impact (with airbag protectors this pause is not necessary). The 2 Max-values should not differ more than 20%
Results <u>Shock test 1:</u>		
Impact at a heigh	nt of 1.65m:	26.07 g —
Impact duration	of+ 38 g (if any):	0
-	of +20 g (if any):	15 ms
		$\Delta < 20 \% ?$
<u>Shock test 2:</u>		
Impact at a heigh	nt of 1.65m:	<mark>29.2 g</mark>
Impact duration of+ 38 g (if any):		0
Impact duration of +20 g (if any):		19 ms
Test Result:		Passed
l l		

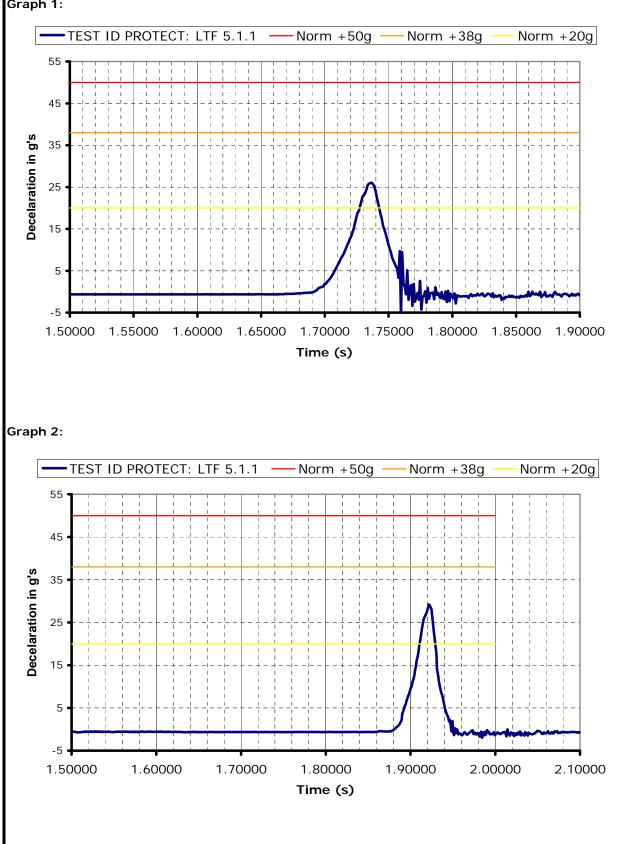


paragliding by air turguoise

Graph 1:

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PD





Rescue deployment resistance	e test Test ID resc			
Item: Manufacturer Test place & date: Test responsible: Temp. [°C] & Humidity: Maximum certified pilot weight [kg]:	Cruiser NGAVA Sport LtdVilleneuveJanuary 11, 2011Randi Eriksen22,6° C; 41 %rel120kg			
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: Min force to prevent unwanted opening:	approx. 70 N approx. 20 N			
Results				
Measured peak to peak required force for deployment [daN]:	6.5 daN			
Comment:	Passed			
Graph:	1			
TEST ID rescue deployn	nent 1 — Max 7 daN – - – - Min 2 daN			
8 7 6 7 6 7 6 7 6 7 6 7 7 6 7 7 7 7 7 7 7 7 7 7 7 7 7				
2.00000 2.50000 3.00000 3.50000 4.00000 4.50000 5.00000 Time (s)				



Rescue deployment strap stre	ngth test Test ID resc strap		
Item:	Cruiser NG		
Manufacturer	AVA Sport Ltd		
Test place & date:	Villeneuve January 11, 2011		
Test responsible:	Randi Eriksen		
Temp. [°C] & Humidity:	22,6° C; 41 %rel		
Maximum certified pilot weight [kg]:	120 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]:	13 sec		
Breaking resistance [daN]:	239		
Comment:	Passed		
Graph:			
	ap strenght Min 70 daN		
300			
250			
-50			
7 12 17 22 27			
Time (s)			

