

### **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

Manufacturer:	Little Cloud
Harness model:	Cocon LC
Size:	Medium
Harness Weight:	3.050 kg
Maximum certified pilot	110 kg
Impact protection type:	Mousse bag
Harness type:	ABS
Test responsible:	Alain Zoller
Test place:	Villeneuve
Test date:	November 21, 2013
Test room temp & humidity:	22.5° C; 55 %rel
Certification number EN:	PH 079.2013
Certification number LTF:	GZ 079.2013



page 1 of 4



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	TEST setup	Attach - ment points	Dummy	Req. Load in g	Min. force [N]	Test durat ion [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 3 4		5.3.2.2 5.3.2.7	4.2.1.b	Default, landing position	2 main att. points	Hip fixated, landing conf.	15g 6g 15g	15000 6000 15000	5 10 5	ОК n/a ОК
5		5.3.2.4	4.2.1.a rescue	Rescue	2 rescue att.	Hip fixated	9g 15g	9000 15000	10 5	n/a n/a
7	<sup>-</sup>     		4.2.1.b rescue	<b>Rescue</b> , landing	Pnts.	Hip fixated, landing conf.	6g	6000	10	n/a
8	✓	5.3.2.3		One riser	ONE main att.	1 central hip 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>Neqatif</b>	One main att.	Head fix.	4.5g	4500	10	ОК
11	     		4.2.1.c	Upside down	2 main att. downw.	Head fix.	6g	6000	10	n/a
12			4.2.1.c rescue	Upside down rescue	2 rescue att. downw.		6g	6000	10	n/a

#### **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.

page 2 of 4





est ID	ESTED ?	Standa rd Ref.: LTF	EST setup	Ancl Attach- ment points	horing	Max. tolerated peak impact in g	Max Peak impact M measured ad	mpact duration of -38 g (if any) ecorded:	mpact duration of -20 g (if any) ecorded:	Result
PRO			Default	•	/ is attached to		~ ~ ~			-
TECT	~	5.1.1	flying position	the harness	s like a pilot in ight.		39.88	0.004	0.012	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.

		Standa rd Ref.		Ancl	noring	Force for sir	ngle han <sub>L</sub> iviax.	nd deployment	
Test ID	TESTED ?	LTF	TEST set	Attach- ment points	Dummy	Min. force [N]	force [N]	Resistance measured [daN]	Result
Resc depl	~	6.1.5	Default flying position	attached to	ponisble is o the harness ot in flight. ny required)	20 N	70 N	n/t	ок

#### 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

page 3 of 4





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

#### Little Cloud Cocon LC Medium

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 21, 2013



Test responsible

page 4 of 4



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

Place, Date

paragliding by air turquoise

#### Annex: detailed test reports

Test ID 1 Harness Test Item: Cocon LC Manufacturer Little Cloud Test place & date: Villeneuve November 21, 2013 Test responsible: Alain Zoller Temp. [°C] & Humidity: 22.5° C; 55 %rel Maximum certified pilot weight [kg]: 110 kg EN 1651 & 2. DV LuftGerPV §1, Nr. 7 c Standard Test standard §: 5.3.2.1 (EN) & 4.2.1 a (LTF DV) Default flying position Test setup: Both main riser attachments (3, 4) Anchoring: Attachment points: 4 Dummy: Default, hip fixed (7, 8) B (EN: 6q) Required load in g : 9q Minimum load [N]: 9000 N (EN: 6000 N) 990 Required test load in kg: kg 10 s Min. duration [s]: Results Duration of maintained min. load [s]: 10.8 s Any signs of structural failure after this test: No visible failure Passed Test result: Graph: TEST ID 1: EN 5.3.2.1 & LTF 4.2.1.a — — – Norm 600 daN norm 900 daN 1000 900 800 700 Force (daN) 600 500 400 300 200 100 0 5 10 15 20 25 30 35 0 Time (s)

Air Turquoise SA certified by ISO 9001 BUREAU VERITAS Certification

Air Turquoise S.A. - Certification of paraglider equipment Tested in accordance with EN 1651:1999 and 2.DV LuftGerPV§1, Nr.7c Annex TEST ID 1 Prepared by RE Rev.0, 25.01.2011 No. 71.9.3

Harness Test			Test ID 2
Item:	Cocon LC		
Manufacturer	Little Cloud		
Test place & date:	Villeneuve	November 21, 2013	
Test responsible:	Alain Zoller		
Temp. [°C] & Humidity:	22.5° C; 55 %r		
Maximum certified pilot weight [kg]:	110	kg	
Standard	EN 1651		
Test standard §:	5.3.2.2		
Test setup:	Default flying	position	
Anchoring: Attachment points:	Both main ris	er attachments (3, 4)	
Dummy:	Default, hip f	ixed (7, 8)	
Required load in g:	15	g	
Min load [N]:	15 000 N		
Required test load in kg:	1650	kg	
Min. duration [s]:	5s		
Results			
Duration of maintained min. load [s]:		6.1 s	
Any signs of structural failure after th	is test:	No visible failure	
Test result:		Passed	
Graph:			
TEST ID 2	: EN 5.3.2.2	Norm	1500 daN
1800	. EN 0.0.2.2		
1600			
1400			
<b>9</b> <sup>1200</sup>			
8 1000			
	1		
90 800 ·			
й <sub>600</sub>			
400			
+00			
200			
0 10 20	30	40 50	60 70
	Time	(s)	

Air Turquoise SA certified by



Air Turquoise S.A. - Certification of paraglider equipment Tested in accordance with EN 1651:1999 and 2.DV LuftGerPV§1, Nr.7c Annex TEST ID 2 Prepared by RE Rev.0, 25.01.2011 No. 71.9.3

Harness Test	Test ID 4
Item: Manufacturer Test place & date: Test responsible: Temp. [°C] & Humidity: Maximum certified pilot weight [kg]:	Cocon LC Little Cloud Villeneuve November 21, 2013 Alain Zoller 22.5° C; 55 %rel 110 kg
Standard Test standard §: Test setup:	EN 1651 EN 5.3.2.7 Flying position before landing: seat board (11) in landing position, leg straps (10) closed.
Anchoring: Attachment points: Dummy:	Both of the main riser attachments 3/4 attached (3 and 4); Default, hip fixed (7, 8)
Required load in g: Min load [N]: Required test load in kg: Min. duration [s]:	15 g 15 000 N <b>1650 kg</b> 5 s
Results	
Duration of maintained min. load [s]:	<mark>5.9 s</mark>
Any signs of structural failure after this	
Test result: Graph:	Passed
TEST ID 4: EN 1800 1600 1400 1200 1000 800 600 400 200 0 10 10 20 10 20 10 10 20 10 10 10 10 10 10 10 10 10 1	15.3.2.7 — Norm 1500 daN

Air Turquoise SA certified by



Air Turquoise S.A. - Certification of paraglider equipment Tested in accordance with EN 1651:1999 and 2.DV LuftGerPV§1, Nr.7c Annex TEST ID 4 Prepared by RE Rev.0, 25.01.2011 No. 71.9.3

Harness Test	Test ID 8
l tem: Manufacturer Test place & date: Test responsible: Temp. [°C] & Humidity: Maximum certified pilot weight [kg]:	Cocon LC Little Cloud Villeneuve November 21, 2013 Alain Zoller 22.5° C; 55 %rel 110 kg
Standard	EN 1651
Test standard §:	5.3.2.3
Test setup:	Only one riser attached
Anchoring: Attachment points:	One main riser attachments (3)
Anchoring.	
Dummy:	Hip fixed (7, 8 -> 12)
Required load in g:	6 g
Min load [N]:	6 000 N
Required test load in kg:	660 kg
Min. duration [s]:	10 s
Results	
Duration of maintained min. load [s]:	10.2 s
Any signs of structural failure after th	is test: No visible failure
Test result:	Passed
Graph:	
700 •	
600 -	
<b>S</b>	
Lore (dal)	
<b>H</b>	
200-	
100	
-8 2 12	
	Time (s)

Air Turquoise SA certified by



Air Turquoise S.A. - Certification of paraglider equipment Tested in accordance with EN 1651:1999 and 2.DV LuftGerPV§1, Nr.7c Annex TEST ID 8 Prepared by RE Rev.0, 25.01.2011 No. 71.9.3

Harness Test			Test ID	10
Item: Manufacturer Test place & date: Test responsible: Temp. [°C] & Humidity: Maximum certified pilot weight [kg]:	Cocon LC Little Cloud Villeneuve Alain Zoller 22.5° C; 55 % 110	November 21 rel kg	, 2013	
Standard	EN 1651			
Test standard §:	5.3.2.6			1.F
Test setup:	Normal flyin	g position in NEGAT	IF /	~ <u>©</u> 9
Anchoring: Attachment points:		nain riser attachme wnwards(3 or 4);	nts	
Dummy:	Dummy ancl (9)	nored at the head p	osition	3/4
Required load in g:	4.5	g	$\bigwedge$	Y
Min load [N]:	4500 N		()	
Required test load in kg:	<b>495</b> 10 s	kg	$\sim$	F
Min. duration [s]:	IU S			<i>.</i>
Results				
Duration of maintained min. load [s]:		10.3 s		
Any signs of structural failure after th	is test:	No visible fail	ure	
Test result:		Passed		
Graph:				
TEST ID 10:	EN 5.3.2.6	No	rm 450 daN	
600 <b>1</b>				
500 •				
400				
400				
2 400 ·				
000 (gan)				
400 300 200 100				
400 400 400 400 400 400 400 400 400 400	20	30	40	50

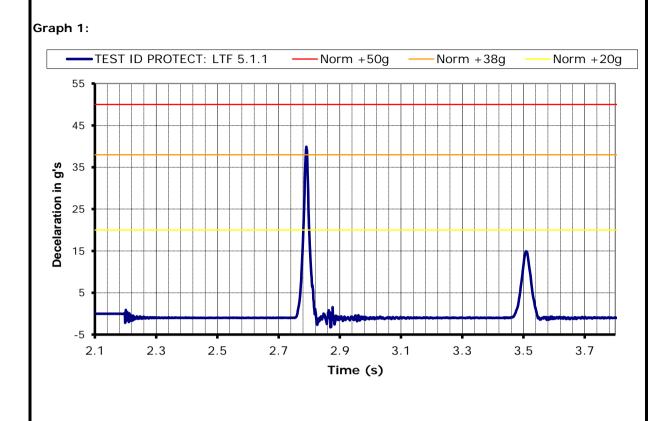


Air Turquoise S.A. - Certification of paraglider equipment Tested in accordance with EN 1651:1999 and 2.DV LuftGerPV§1, Nr.7c Annex TEST ID 10 Prepared by RE Rev.0, 25.01.2011 No. 71.9.3

Protector sho	ock test		Test ID Protect
I tem:		Cocon LC	
Manufacturer		Little Cloud	
Test place & date	:	Villeneuve	November 21, 2013
Test responsible:		Alain Zoller	
Temp. [°C] & Humidity:		22.5° C; 55 %rel	
Maximum certifie	d pilot weight [kg]:	110	kg
Standard		2. DV LuftGerP	V §1, Nr. 7 c
Test standard §:		5.1.1	
Test setup:		Harness attach real pilot in flig	ed to protector test dummy, in a similar way like a ht.
			simulated by dropping the dummy from a certain d without reserve).
		pressurized air	e "in-flight" conditions, the airbag is inflated with equalling an airspeed of 7m/s. Inflation has to be t 5 sec before impact.
		•	measured by an accelerometer mounted on the ct measured in g's)
Requirements:	Minimun height:	1.65 m (betwee	en lowest point test dummy and impact surface)
	Impact requirements:	+50g as absolu	ite maximum;
	•	+38g during les	ss than 7 msec;
		+20g during le	ss than 25 msec.
	Repetitions:	maximum 2 ho	performed 2 times, minimum 1 hour and urs after the first impact (with airbag protectors of necessary). The 2 Max-values should not differ
Results Shock test 1:			
Impact at a heigh	nt of 1.65m:	39.88	
Impact duration of	of+ 38 g (if any):	0.004	
Impact duration of	of +20 g (if any):	0.01243	
<u>Shock test 2:</u>			$\Delta < 20 \% ?$
<u></u>			
Impact at a heigh	nt of 1.65m:	46.924	]
Impact duration of	of+ 38 g (if any):	0.006	
Impact duration of	of +20 g (if any):	0.018	
Test Result:			Passed



Air Turquoise SA Rte du Pré-au-Comte 8 | CH-1844 Villeneuve tel. +41 21 965 65 65 | mobile +41 79 202 52 30 info@para-test.com

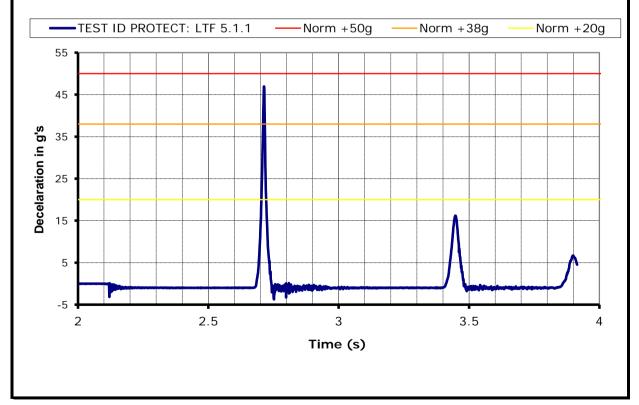


paragliding by air turguoise

#### Graph 2:

para-test.com

PD





Annex TEST ID Protect 1 Prepared by RE Rev.0, 25.01.2011 No. 71.9.3

Pull out of the outer container, single handed and in an anatomical favorable direction. In order to simulate this, the test responsible deploys the resc. seated in the harness. In a similar way as in real flight. The deployment resistance is approximately measured by the load ecli, which is placed between the hand of the test responsible a the rescue hand grip. On the other hand inadvertent deployment has to be fairly remote. Therefore a shear link has to withstand a minimum loa approx. 70 N approx. 20 N Results Measured peak to peak required force for deployment [daN]: Comment: Passed Graph: TEST ID rescue deployment 1 — Max 7 daN — Min 2 daN	Rescue deployment resistance	e test Test ID resc
Test standard §: 6.1.5 Test setup: Characterization 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 jul out of the outer container, single handed and in an anatomical favorable direction. In order to simulate this, the test responsible deploys the rescue system has to be fairly measured by the load cell, which is placed between the hand of the test responsible a the rescue hand grip. On the other hand inadvertent deployment has to be fairly remote. Therefore a shear link has to withstand a minimum loa approx. 70 N approx. 70 N Results Measured peak to peak required force for deployment [daN]: Comment: Passed Graph: TEST ID rescue deployment 1 Max 7 daNMin 2 daN	Manufacturer Test place & date: Test responsible: Temp. [°C] & Humidity:	Little Cloud Villeneuve November 21, 2013 Alain Zoller 22.5° C; 55 %rel
Test setup: Test setup: Test setup: Test setup: 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 singli pulot of the outer container, single handed and in an anatomical favorable direction. In order to simulate this, the test responsible deploys the rescue seted in the harmens. 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 a 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 Results Measured peak to peak required force for deployment [daN]: Comment: Test ID rescue deployment 1 Max 7 daN TEST ID rescue deployment 1 TEST ID rescue deployment 1 Max 7 daN TEST ID rescue deployment 1 TEST ID rescue dep	Standard	2. DV LuftGerPV §1, Nr. 7 c
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 rescu- 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 a the rescue hand grip. On the other hand inadvertent deployment has to be fairly remote. Therefore a shear link has to withstand a minimum loa Requirements: Max force for single hand deployment: unwanted opening: approx. 70 N approx. 20 N Results Measured peak to peak required force for deployment [daN]: Comment: Passed Graph: TEST ID rescue deployment 1 — Max 7 daN — — Min 2 daN	Test standard §:	6.1.5
Requirements: Max force for single hand deployment resistance is approximately measured by the load cell, which is placed between the hand of the test responsible a the rescue hand grip. On the other hand inadvertent deployment has to be fairly remote. Therefore a shear link has to withstand a minimum loa approx. 70 N approx. 20 N Results Measured peak to peak required force for deployment [daN]: Comment: Passed Graph:	Test setup:	
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 a the rescue hand grip. On the other hand inadvertent deployment has to be fairly remote. Therefore a shear link has to withstand a minimum loa approx. 70 N approx. 20 N    Requirements: Max force for single hand deployment: Min force to prevent unwanted opening: approx. 70 N approx. 20 N   Results 3.8   Measured peak to peak required force for deployment [daN]: 3.8   Comment: Passed   Graph: 1   Max 7 daN Min 2 daN   Approx 1   Max 7 daN Min 2 daN   Approx 1		
remote. Therefore a shear link has to withstand a minimum loa 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]: Comment: Passed Graph:		deployment resistance is approximately measured by the load cell, which is placed between the hand of the test responsible and
hand deployment: approx. 70 N Min force to prevent unwanted opening: approx. 20 N Results Measured peak to peak required force for deployment [daN]: Comment: Passed Graph:		On the other hand inadvertent deployment has to be fairly remote. Therefore a shear link has to withstand a minimum load.
Results Measured peak to peak required force for deployment [daN]: Comment: Passed Graph:	hand deployment:	approx. 70 N
Measured peak to peak required force for deployment [daN]: Comment: Passed Graph:		approx. 20 N
Graph:	Measured peak to peak required force	3.8
TEST ID rescue deployment 1 Max 7 daN Min 2 daN	Comment:	Passed
All and a second a	Graph:	
Particular and the second seco	, ,	$1 \qquadMax 7 daN \qquadMin 2 daN$
-1 <u>0</u> 0.5 1 1.5 2 2.5 3 3.5 4 4.5 5	7 6 5 4 3 2 1 0 -1 -1	



Air Turquoise S.A. - Certification of paraglider equipment Tested in accordance with EN 1651:1999 and 2.DV LuftGerPV§1, Nr.7c Annex TEST ID resc depl Prepared by RE Rev.0, 25.01.2011 No. 71.9.3

Rescue deployment strap stre	ngth test Test ID resc strap
Item: Manufacturer Test place & date: Test responsible: Temp. [°C] & Humidity: Maximum certified pilot weight [kg]:	Cocon LC Little Cloud Villeneuve November 21, 2013 Alain Zoller 22.5° C; 55 %rel 110 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:	
Results	
Duration of maintained load [s]:	15 sec
Breaking resistance [daN]:	185.9
Comment:	Passed
Graph:	
TEST ID rescue st	rap strenght Min 70 daN
200 150 50 -50 -50	
0 5 10	15 20 25 Time (s)



Air Turquoise S.A. - Certification of paraglider equipment Tested in accordance with EN 1651:1999 and 2.DV LuftGerPV§1, Nr.7c Annex TEST ID resc strap Prepared by RE Rev.0, 25.01.2011 No. 71.9.3