



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:	DLCO Little Cloud
Harness model:	Unique size
Size:	unique
Harness Weight:	2.5 kg
Maximum certified pilot	120 kg
Impact protection type:	Airbag
Harness type:	ABS

Test responsible:	Alain Zoller
Test place:	Villeneuve
Test date:	February 23, 2011
Test room temp & humidity:	21,6° C; 24 %rel
Certification number EN:	PH 018.2011
Certification number LTF:	GZ 000.0000

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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	✓	5.3.2.2	4.2.1.a				9g	9000	5	OK
3			4.2.1.b	Default, landing position	2 main att. points	Hip fixated, landing conf.	6g	6000	10	n/a
4	✓	5.3.2.7					15g	15000	5	OK
5			4.2.1.a rescue	Rescue	2 rescue att. Pnts.	Hip fixated	9g	9000	10	n/a
6		5.3.2.4					15g	15000	5	n/a
7			4.2.1.b rescue	Rescue, landing		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	OK
9		5.3.2.5	4.2.1.d	Towing	2 main att. + 2 tow att.	None	3g	3000	10	n/a
10	✓	5.3.2.6		Default, Negatif	One main att.	Head fix.	4.5g	4500	10	OK
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.



Test ID	TESTED ?	Standard Ref.:	TEST setup	Anchoring		Impact			Result		
		LTF		Attachment 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:	
PROTECT 1	✓	5.1.1	Default flying position	Test dummy is attached to the harness like a pilot in flight.			+50g	17.044g	0	0	OK

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		Attachment 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	n/a

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 duration [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	n/a





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

**DLCO Little Cloud
Unique size
unique**

DID complied with:

- **European Standard EN 1651 September 1999**

And / or (if tested)

- **European Standard EN 12491 March 2001**

Villeneuve, February 23, 2011

Alain Zoller

Place, Date

Test responsible

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Annex: detailed test reports

Harness Test		Test ID 1
Item:	Unique size	
Manufacturer	DLCO Little Cloud	
Test place & date:	Villeneuve	February 23, 2011
Test responsible:	Alain Zoller	
Temp. [°C] & Humidity:	21,6° C; 24 %rel	
Maximum certified pilot weight [kg]:	120	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 :	6g (EN: 6g)	
Minimum load [N]:	6000 N (EN: 6000 N)	
Required test load in kg:	720	kg
Min. duration [s]:	10 s	

Results	
Duration of maintained min. load [s]:	11.1 s
Any signs of structural failure after this test:	No visible failure
Test result:	Passed

Graph:

— TEST ID 1: EN 5.3.2.1 & LTF 4.2.1.a
 - - - Norm 600 daN
 — norm 900 daN

Time (s)	Force (daN) - TEST ID 1	Force (daN) - Norm 600 daN	Force (daN) - norm 900 daN
15	50	600	900
20	80	600	900
25	150	600	900
30	250	600	900
35	350	600	900
38	1000	600	900
40	1100	600	900
45	1050	600	900
48	1000	600	900
50	50	600	900
55	20	600	900





Harness Test **Test ID 2**

Item: Unique size
Manufacturer: DLCO Little Cloud
Test place & date: Villeneuve February 23, 2011
Test responsible: Alain Zoller
Temp. [°C] & Humidity: 21,6° C; 24 %rel
Maximum certified pilot weight [kg]: 120 kg

Standard: EN 1651

Test standard §: 5.3.2.2

Test setup: Default flying position

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

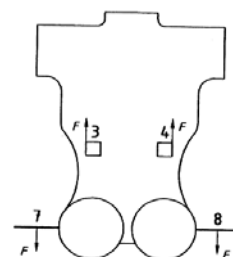
Dummy: Default, hip fixed (7, 8)

Required load in g: 15 g

Min load [N]: 15 000 N

Required test load in kg: **1800 kg**

Min. duration [s]: 5s



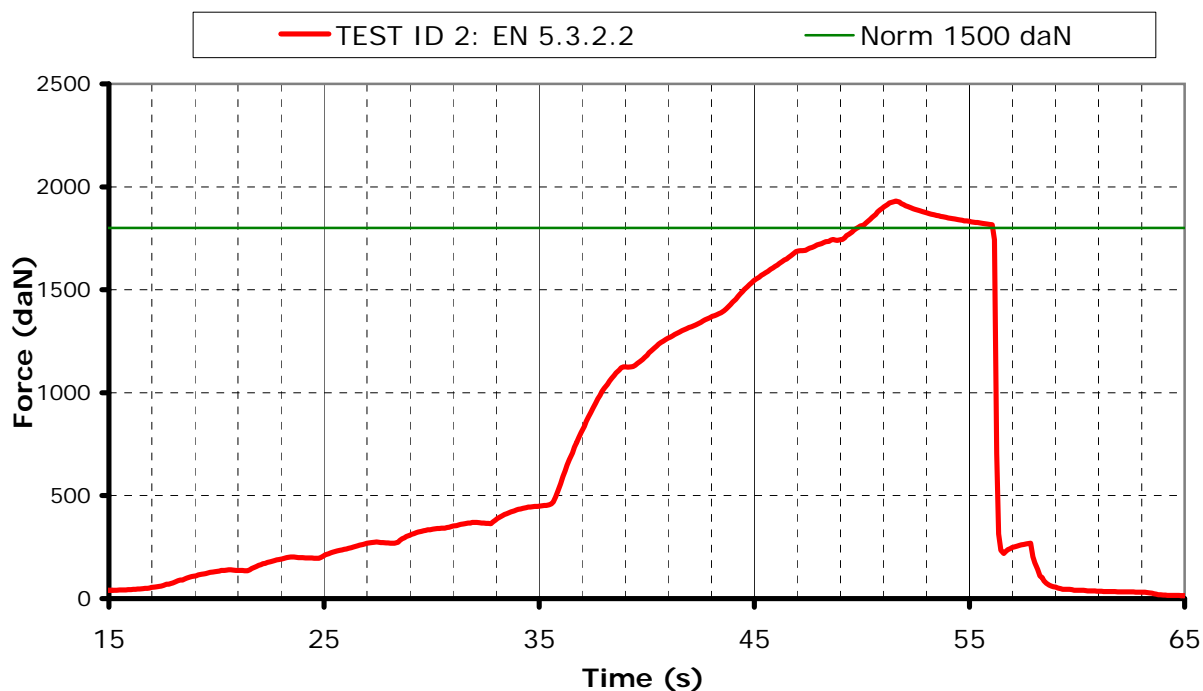
Results

Duration of maintained min. load [s]: **6.2 s**

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

Test result: **Passed**

Graph:



Harness Test **Test ID 4**

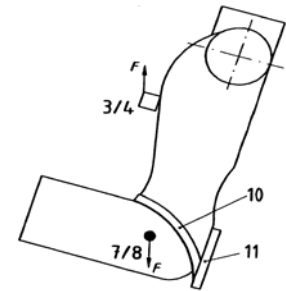
Item: Unique size
 Manufacturer: DLCO Little Cloud
 Test place & date: Villeneuve February 23, 2011
 Test responsible: Alain Zoller
 Temp. [°C] & Humidity: 21,6° C; 24 %rel
 Maximum certified pilot weight [kg]: 120 kg

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: **1800 kg**
 Min. duration [s]: 5 s



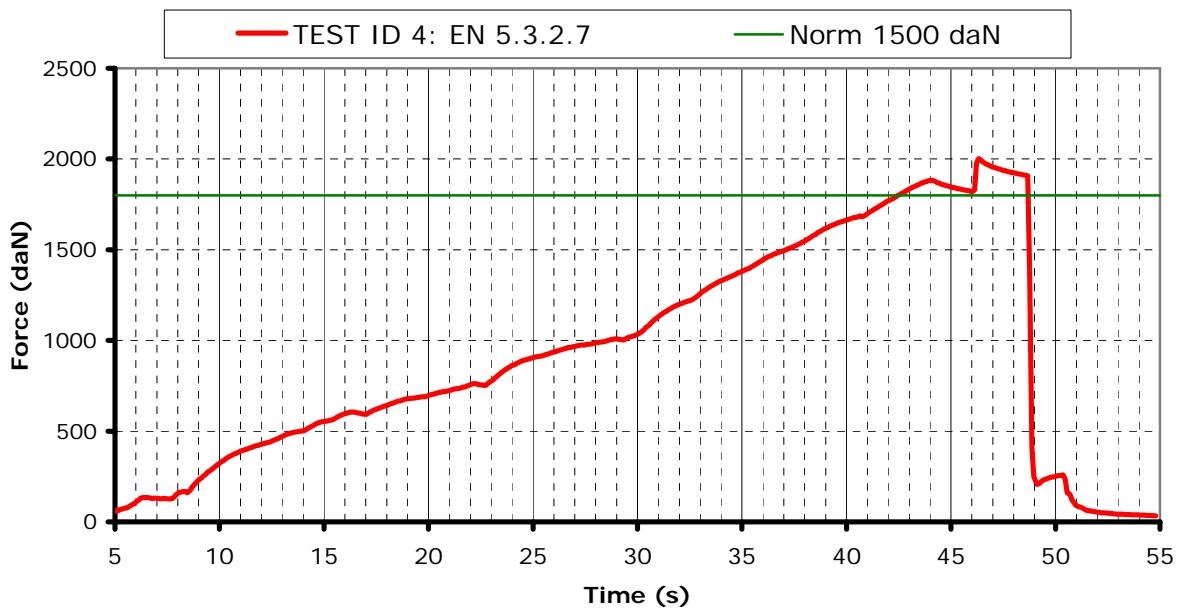
Results

Duration of maintained min. load [s]: **6.0 s**

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

Test result: **Passed**

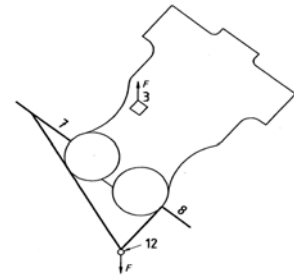
Graph:



Harness Test **Test ID 8**

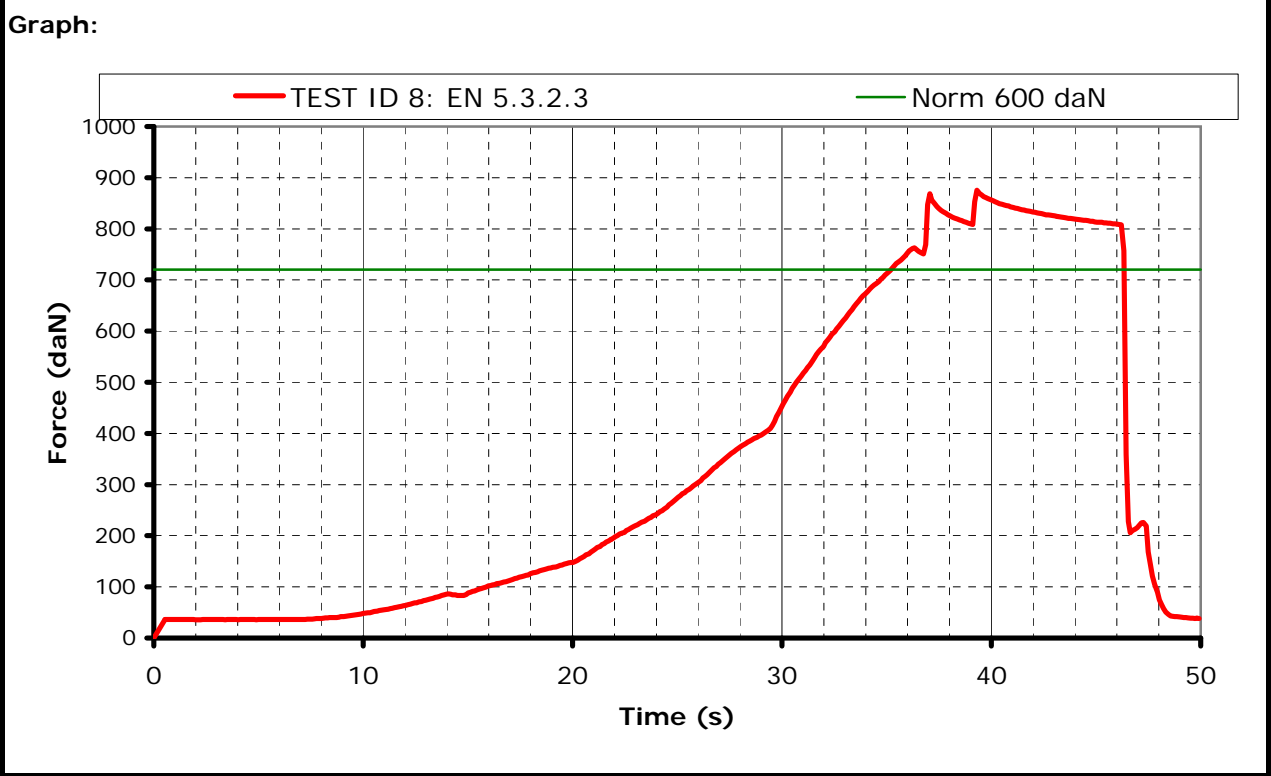
Item:	Unique size	
Manufacturer	DLCO Little Cloud	
Test place & date:	Villeneuve	February 23, 2011
Test responsible:	Alain Zoller	
Temp. [°C] & Humidity:	21,6° C; 24 %rel	
Maximum certified pilot weight [kg]:	120	kg

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:	720	kg
Min. duration [s]:	10 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



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

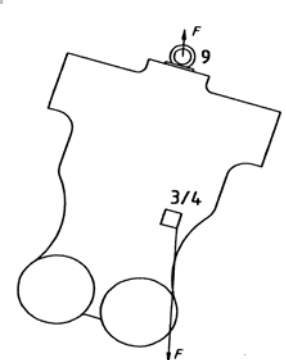




Harness Test **Test ID 10**

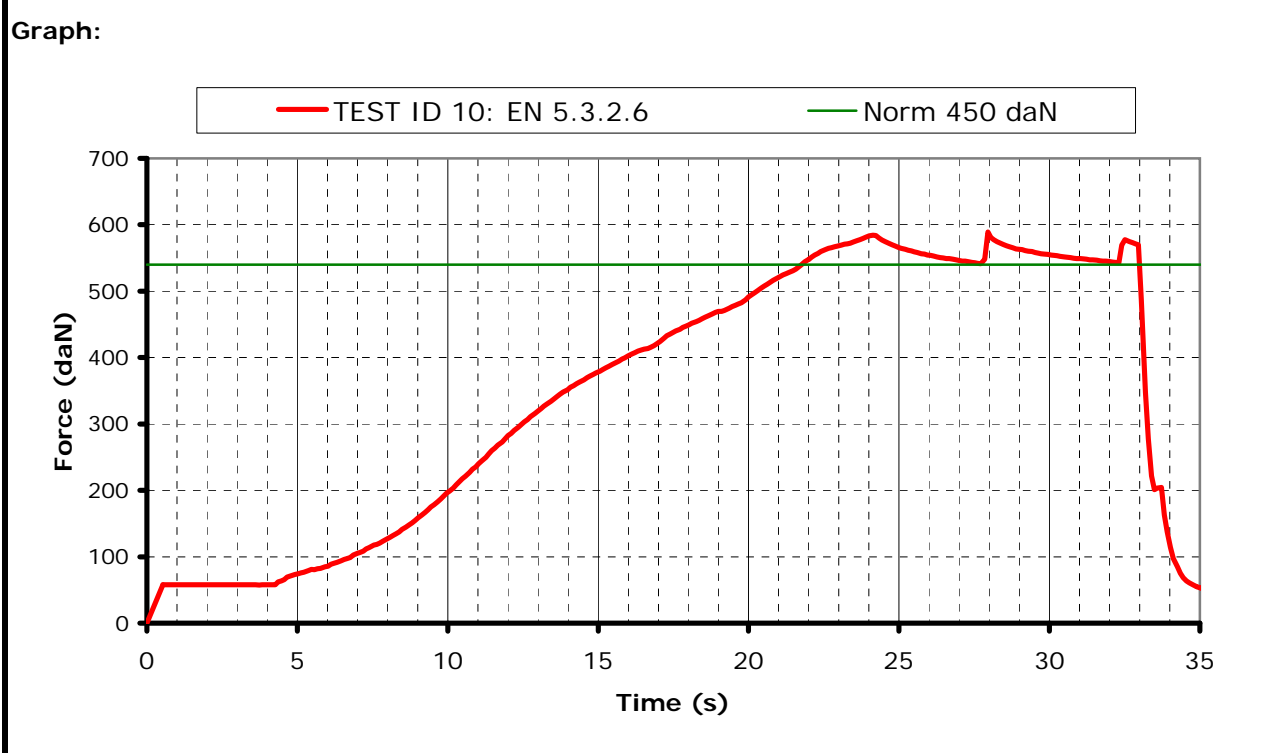
Item:	Unique size	
Manufacturer	DLCO Little Cloud	
Test place & date:	Villeneuve	February 23, 2011
Test responsible:	Alain Zoller	
Temp. [°C] & Humidity:	21,6° C; 24 %rel	
Maximum certified pilot weight [kg]:	120	kg

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:	540	kg
Min. duration [s]:	10 s	



Results

Duration of maintained min. load [s]:	11 s
Any signs of structural failure after this test:	No visible failure
Test result:	Passed



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





Protector shock test **Test ID Protect 1**

Item:	Unique size
Manufacturer	DLCO Little Cloud
Test place & date:	Villeneuve February 23, 2011
Test responsible:	Alain Zoller
Temp. [°C] & Humidity:	21,6° C; 24 %rel
Maximum certified 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

Shock test 1:

Impact at a height of 1.65m:	17.044g
Impact duration of+ 38 g (if any):	0
Impact duration of +20 g (if any):	0

Shock test 2:

Impact at a height of 1.65m:	16.092g
Impact duration of+ 38 g (if any):	0
Impact duration of +20 g (if any):	0

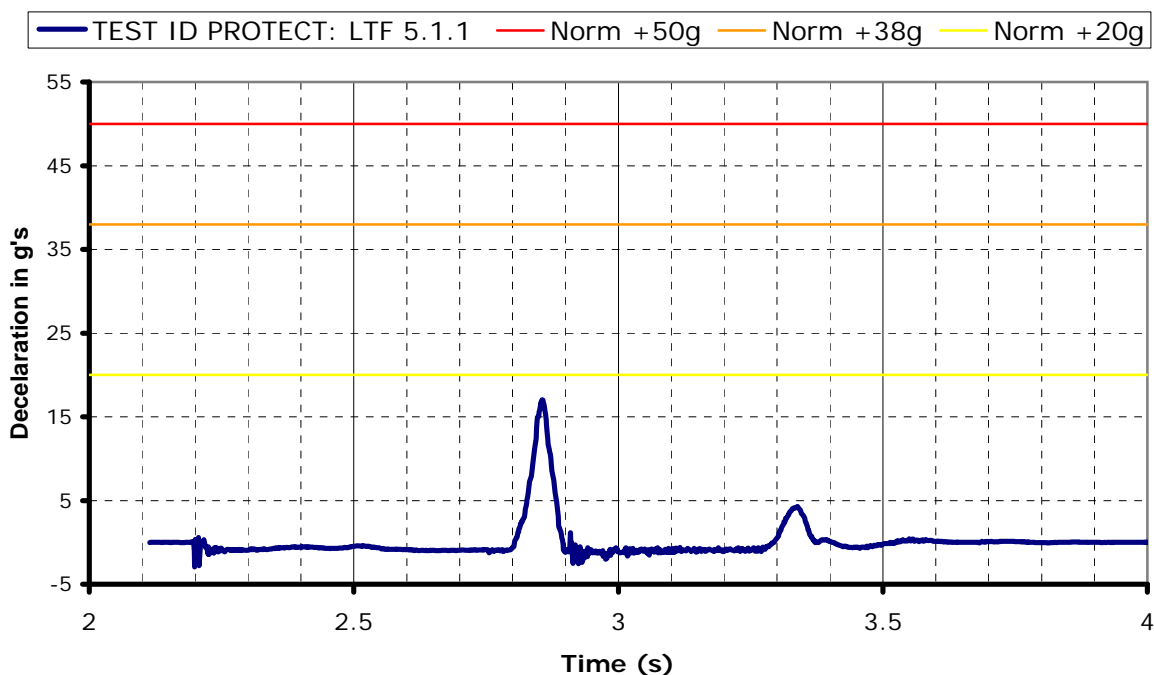
Δ < 20 % ?

Test Result: Passed





Graph 1:



Graph 2:

