Paragliding equipment

CEN/TC 136/WG 06

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Draft of FprEN 926-2 for submission to formal vote with marking

COMMENTARIES / DECISIONS

This document presents the final version with marking of prEN 926-2 updated with tje following given to CEN enquiry results and comments on during CEN/TC 136/WG 6 meeting in Zurich on July 11th/12th, 2012.

The WG experts agreed to submit the current version of prEN 926-2 standard to CEN/TC 212 for formal vote.

You are invited to considerate changes made during this meeting, decisions taken and submit your comments for no later than August 17th, 2012 to aisatou.doucoure@afnor.org .

Then, the project will be sent for formal vote approval to CEN/TC 136.

FOLLOW UP 2012-08-17

CENCEN/TC 136136

Date: 20122012-0202

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CENCEN/TC 136136

Secretariat: DINDIN

Paragliding equipment — Paragliders — Part 2: Requirements and test methods for classifying flight safety characteristicsParagliding equipment — Paragliders — Part 2: Requirements and test me-thods for classifying flight safety characteristics

Ausrüstung für das Gleitschirmfliegen — Gleitschirme — Teil 2: Anforderungen und Prüfverfahren zur Klassifzierung der sicherheitsrelevanten FlugeigenschaftenAusrüstung für das Gleitschirmfliegen — Gleitschirme — Teil 2: Anforderungen und Prüfverfahren zur Klassifzie-rung der sicherheitsrelevanten Flugeigenschaften

Equipement pour le parapente — Parapentes — Partie 2 : Exigences et procédures de test pour classification des caractéristiques de sécurité en volEquipement pour le parapente — Parapentes — Partie 2 : Exigences et procédures de test pour classification des caractéristiques de sécurité en vol

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Foreword

This document (prEN 926-2:2012) has been prepared by Technical Committee CEN/TC 136 “Sports, playground and other recreational facilities and equipment”, the secretariat of which is held by DIN.

This document is currently submitted to the CEN ~~Enquiry~~formal vote.

This document will supersede EN 926-2:2005.

This document is one of a series of standards on equipment for paragliding as follows:

— EN 926-1, *Paragliding equipment — Paragliders — Part 1: Requirements and test methods for structural strength;*

— EN 926-2, *Paragliding equipment — Paragliders — Part 2: Requirements and test methods for classifying flight safety characteristics;*

— EN 1651, *Paragliding equipment — Harnesses — Safety requirements and strength tests;*

— EN 12491, *Paragliding equipment — Emergency parachutes — Safety requirements and test methods.*

In comparison with the previous edition EN 926-2:2005, the following significant changes have been made:

a) editorial revision;
b) introduction of new definitions
c) modification of paraglider's classification
d) update of marking
e) introduction of additional lines paragraph
f) harness dimension have been modified
g) tests method for asymmetric and symmetric collapse have been improved
h) update of test method for behaviour exiting a fully developed spiral dive

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1 Scope

This document specifies requirements and test methods for classifying the flight safety characteristics of paragliders in terms of the demands on pilot flying skills.

This document is intended for the use of independent testing laboratories qualified for flight testing paragliders.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 926-1, *Paragliding equipment — Paragliders — Part 1: Requirements and test methods for structural strength*

EN 966, *Helmets for airborne sports*

EN 1651~~:1999~~, *Paragliding equipment — Harnesses — Safety requirements and strength tests*

EN 12491~~:2001~~, *Paragliding equipment — Emergency parachutes — Safety requirements and test methods*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
paraglider
ultralight glider with no primary rigid structure, for which take-off and landing are on foot, with the pilot (and potentially one passenger) carried in a harness (or harnesses) connected to the wing

3.2
harness
assembly composed of straps and fabric for supporting the pilot in the seated or semi-recumbent or standing position

NOTE The harness is attached to the wing via two connectors; it can also be integral with the wing via risers.

[EN 1651~~:1999~~]

~~NOTE The harness is attached to the wing via two connectors; it can also be integral with the wing via risers.~~

3.3
emergency parachute
emergency device intended to slow the descent of a paraglider pilot in the event of an incident in flight, which is deployed by the pilot by an intentional manual action.

NOTE This may be unsteered or steerable

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[EN 12491~~:2001~~]

3.4
controls
primary steering and speed controls which are designated as such by the manufacturer

3.5
trimmer
lockable pitch adjustment system, i. e. action by the pilot is required to return it to the initial position

3.6
accelerator
secondary pitch control mechanism operated by the feet (generally), which automatically returns to the initial position when the action of the pilot stops

3.7
accelerator fully activated
when the mechanical limits of the glider are reached and further action on the accelerator does not result in a further decrease of the angle of attack

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3.~~7~~8
action of the pilot
any transfer of weight, action on the controls, the accelerator or on the trimmer

3.~~8~~9
normal flight
flight condition in which the paraglider is fully inflated and is following a trajectory close to straight flight (at a speed close to trim speed) without any action on the part of the pilot. A small number of cells may still be collapsed

3.~~9~~10
spiral dive
flight condition in which the paraglider is fully inflated and is following a circling, steep, nose down trajectory: pitch angle of more than 70° and the angle of the span relative to the horizontal between 0° and 40° as illustrated in figure 1

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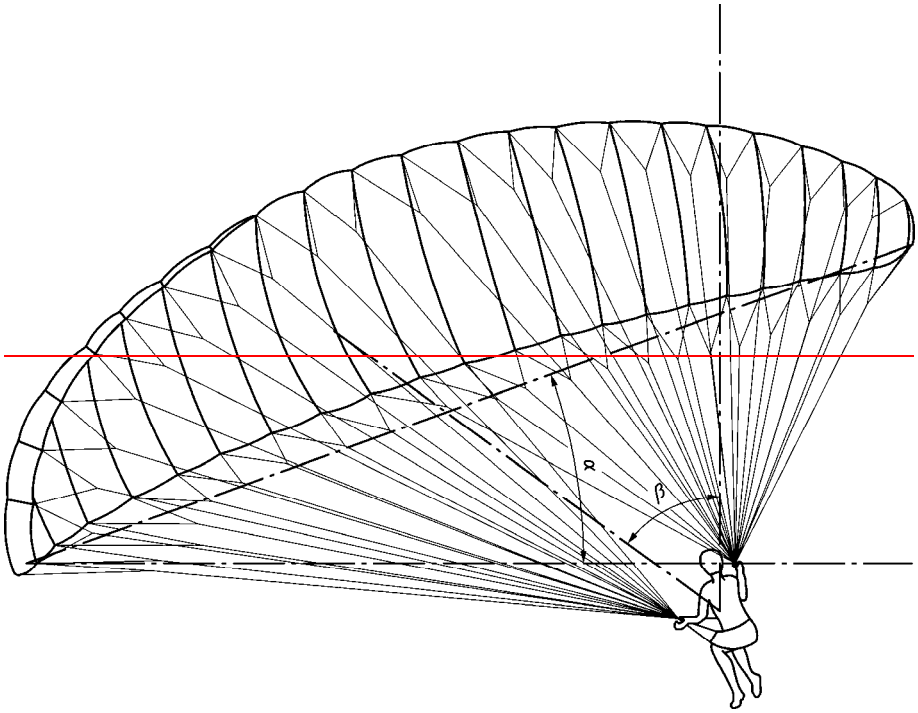
α
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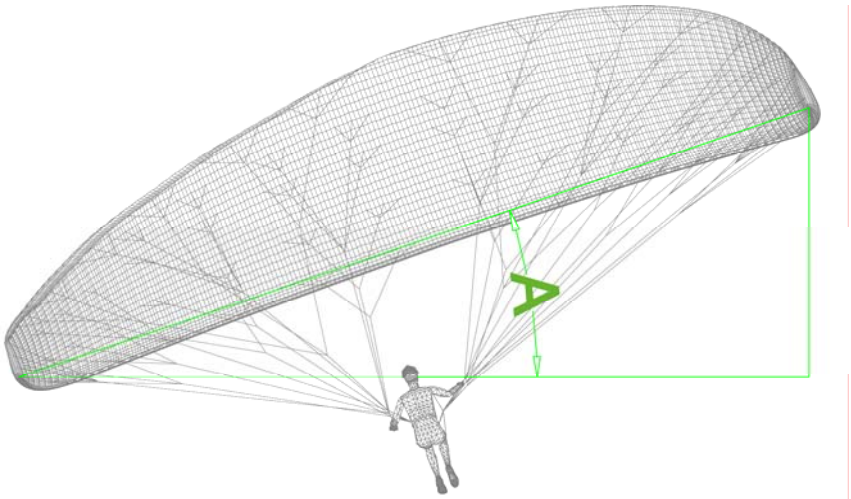

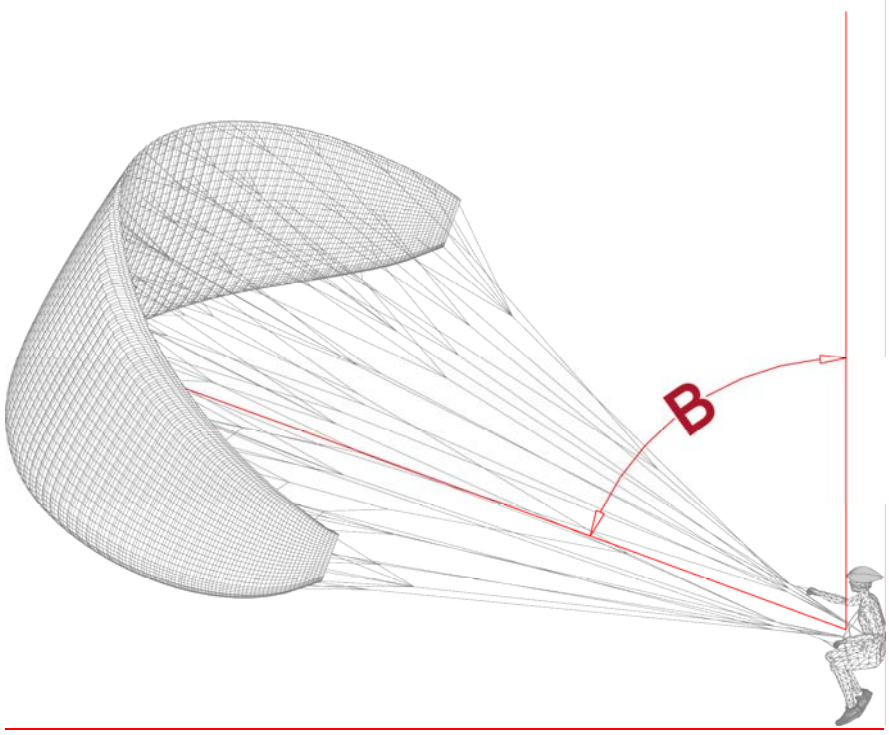

Key

~~α~~A Angle of the span relative to the horizon

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βB Pitch angle

Figure 11 — Illustration of a spiral dive

3.1011
spontaneous recovery
without any action on the part of the pilot, the paraglider returns to normal flight

3.1112
front collapse
front collapse is considered to have occurred when the top surface is visible from the underside of the paraglider

NOTE Deformation of the leading edge is not considered to be a front collapse.

3.1213
cascade
transition from one involuntary abnormal flight condition to another involuntary abnormal flight condition

3.1314
minimum speed
slowest airspeed maintainable without entering a deep stall or full stall

3.1415
trim speed
airspeed of the paraglider in straight flight without activating the controls or the accelerator

3.1516
maximum speed
airspeed of the paraglider in straight flight with the controls in the zero position and the accelerator fully activated.

NOTE Maximum speed is only used when referring to gliders equipped with an accelerator

3.1617
low speed
airspeed of the paraglider in straight flight with the controls at 50 % of travel between the zero and the symmetric stall position (i. e. 50 % of the symmetric control travel)

3.1718
weight in flight
total weight (mass) of the pilot and his entire paragliding equipment (including the glider) ready to fly

NOTE for the purposes of this document masses are indicated in kg, rounded to the nearest integer value

3.19
additional lines
cross lines or folding lines used to help the test pilot achieving specified manoeuvres

3.20
cross line
single line going from one riser to any position on an opposite A-line or A-line attachment point

3.21
folding lines
copy of the complete geometry of the A-lines (angle, cascade, length) used to help the test pilot achieving specified manoeuvres

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4 Requirements

4.1 Paraglider classes

The class of a paraglider is determined according to 4.2.

The class is intended to give pilots a guideline whether a paraglider is suitable for their levels of skills (see Table 1).

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Table 1 — Description of the paraglider classes

Class	Description of flight characteristics	Description of pilot skills required
A	Paragliders with maximum passive safety and extremely forgiving flying characteristics. Gliders with good resistance to departures from normal flight.	Designed for all pilots including pilots under all levels of training.
B	Paragliders with good passive safety and forgiving flying characteristics. Gliders with some resistance to departures from normal flight.	Designed for all pilots and may be suitable for pilots under training if recommended by the manufacturer.
C	Paragliders with moderate passive safety and with potentially dynamic reactions to turbulence and pilot errors. Recovery to normal flight may require precise pilot input.	Designed for pilots familiar with recovery techniques, who fly “actively” and regularly, and understand the implications of flying a glider with reduced passive safety.
D	Paragliders with demanding flying characteristics and potentially violent reactions to turbulence and pilot errors. Recovery to normal flight requires precise pilot input.	Designed for pilots well practised in recovery techniques, who fly very actively, have significant experience of flying in turbulent conditions, and who accept the implications of flying such a wing.

4.2 Classification of flight characteristics

When testing in accordance with the procedures 5.5.~~19~~18.1 to 5.5.~~19~~18.23, various aspects of the paraglider's behaviour are measured. These measurements are classified according to 4.4.1 to 4.4.23.

The class of a paraglider according to this document is determined by the highest classification obtained (i. e. by the highest level of pilot skill required, see Table 1).

4.3 Failure

The glider has failed the test procedure if either:

a) as a consequence of tests 5.5.~~19~~18.1 to 5.5.~~19~~18.23 any failure of any part or component occurs;

b) the results of any of the tests 5.5.~~19~~18.1 to 5.5.~~19~~18.23 are not classified A, B, C or D.

NOTE In the classification tables in 4.4.1 to 4.4.23 the letter "F" (failed) is used to identify unacceptable behaviour.

4.4 Flight characteristics

4.4.1 Inflation/take-off

When tested in accordance with 5.5.~~19~~18.1 it is found out how difficult it is to take-off with this glider (including checking for undesirable tendencies).

The behaviour of the paraglider is measured according to Table 2 and classified according to Table 3.

Table 2 — Measurements and possible ranges in the inflation/take-off test

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Measurement	Ranges
Rising behaviour	Smooth, easy and constant rising no pilot correction required,
	Easy rising, some pilot correction is required,
	Overshoots, shall be slowed down to avoid a front collapse
	Hangs back
Special take off technique required	No
	Yes

Table 3 — Classification of a paraglider's behaviour in the inflation/take-off test

Code de champ modifié

Measurement and ranges (according to Table 2)	Classification
Rising behaviour	
Smooth, easy and constant rising	A
Easy rising, some pilot correction is required,	B
Overshoots, shall be slowed down to avoid a front collapse	C
Hangs back	D
Special take off technique required	
No	A
Yes	C

4.4.2 Landing

When tested in accordance with 5.5.~~19~~18.2 it is found out how difficult it is to flare and land this glider (including checking for undesirable tendencies).

The behaviour of the paraglider is measured according to Table 4 and classified according to Table 5.

Table 4 — Measurements and possible ranges in the landing test

Code de champ modifié

Measurement	Ranges
Special landing technique required	No
	Yes

Table 5 — Classification of a paraglider's behaviour in the landing test

Code de champ modifié

Measurement and ranges (according to Table 4)	Classification
Special landing technique required	
No	A
Yes	D

4.4.3 Speeds in straight flight

When tested in accordance with 5.5.~~19~~18.3 it is made sure that the paraglider is not too slow (hands up) and an adequate speed range is achievable using the controls only (not activating the accelerator).

The behaviour of the paraglider is measured according to Table 6 and classified according to Table 7.

(The speeds recorded in this test are not to be published.)

Table 6 — Measurements and possible ranges in the speeds in straight flight test

Code de champ modifié

Measurement	Ranges
Trim speed more than 30 km/h	Yes
	No
Speed range using the controls larger than 10 km/h	Yes
	No
Minimum speed	Less than 25 km/h
	25 km/h to 30 km/h
	Greater than 30 km/h

Table 7 — Classification of a paraglider's behaviour in the speeds in straight flight test

Code de champ modifié

Measurement and ranges (according to Table 6)	Classification
Trim speed more than 30 km/h	
Yes	A
No	F
Speed range using the controls larger than 10 km/h	
Yes	A
No	F
Minimum speed	
Less than 25 km/h	A
25 km/h to 30 km/h	B
Greater than 30 km/h	D

4.4.4 Control movement

The paraglider shall have acceptable control force and control travel.

When tested in accordance with 5.5.~~19~~18.4 the glider's control force and control travel are measured according to Table 8 and classified according to Table 9.

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Table 8 — Measurements and possible ranges in the control movement test

Measurement	Ranges		
Symmetric control pressure	Increasing		
	Approximately constant		
	Decreasing		
Symmetric control travel (cm)	Ranges, max. weight in flight up to 80 kg	Ranges, max. weight in flight 80 kg to 100 kg	Ranges, max. weight in flight greater than 100 kg
	Greater than 55 ~~cm~~	Greater than 60 ~~cm~~	Greater than 65 ~~cm~~
	40 ~~cm~~ to 55 ~~cm~~	45 ~~cm~~ to 60 ~~cm~~	50 ~~cm~~ to 65 ~~cm~~
	35 ~~cm~~ to 40 ~~cm~~	35 ~~cm~~ to 45 ~~cm~~	35 ~~cm~~ to 50 ~~cm~~
	Less than 35 ~~cm~~	Less than 35 ~~cm~~	Less than 35 ~~cm~~

Code de champ modifié

Table 9 — Classification of a paraglider's behaviour in the control movement test

Measurement and ranges (according to Table 8)				Classifi-cation
Symmetric control pressure	Symmetric control travel (cm)			
	Max. weight in flight up to 80 kg	Max. weight in flight 80 kg to 100 kg	Max. weight in flight greater than 100 kg	
Increasing	Greater than 55 ~~cm~~	Greater than 60 ~~cm~~	Greater than 65 ~~cm~~	A
Increasing	40 ~~cm~~ to 55 ~~cm~~	45 ~~cm~~ to 60 ~~cm~~	50 ~~cm~~ to 65 ~~cm~~	C
Increasing	35 ~~cm~~ to 40 ~~cm~~	35 ~~cm~~ to 45 ~~cm~~	35 cm to 50 ~~cm~~	D
Increasing	Less than 35 ~~cm~~	Less than 35 ~~cm~~	Less than 35 ~~cm~~	F
Approximately constant	Greater than 55 ~~cm~~	Greater than 60 ~~cm~~	Greater than 65 ~~cm~~	B
Approximately constant	40 ~~cm~~ to 55 ~~cm~~	45 ~~cm~~ to 60 ~~cm~~	50 ~~cm~~ to 65 ~~cm~~	C
Approximately constant	35 ~~cm~~ to 40 ~~cm~~	35 ~~cm~~ to 45 ~~cm~~	35 ~~cm~~ to 50 ~~cm~~	F
Approximately constant	Less than 35 ~~cm~~	Less than 35 ~~cm~~	Less than 35 ~~cm~~	F
Decreasing	any	any	any	F

4.4.5 Pitch stability exiting accelerated flight

This test is only required for paragliders equipped with an accelerator.

When tested in accordance with 5.5.~~19~~18.5 it is checked that the paraglider returns to normal flight when the accelerator is quickly released.

The behaviour of the paraglider is measured according to Table 10 and classified according to Table 11.

Table 10 — Measurements and possible ranges in the pitch stability exiting accelerated flight test

Code de champ modifié

Measurement	Ranges
Dive forward angle on exit	Dive forward less than 30°
	Dive forward 30° to 60°
	Dive forward more than 60°
Collapse occurs	Yes
	No

Table 11 — Classification of a paraglider's behaviour in the pitch stability exiting accelerated flight test

Code de champ modifié

Measurement and ranges (according to Table 10)	Classification
Dive forward angle on exit	
Dive forward less than 30°	A
Dive forward 30° to 60°	C
Dive forward more than 60°	F
Collapse occurs	
No	A
Yes	F

4.4.6 Pitch stability operating controls during accelerated flight

This test is only required for paragliders equipped with an accelerator.

When tested in accordance with 5.5.~~19~~18.6 the behaviour of the paraglider after activating the controls in accelerated flight is checked.

The behaviour of the paraglider is measured according to Table 12 and classified according to Table 13.

Table 12 — Measurements and possible ranges in the pitch stability operating controls during accelerated flight test

Code de champ modifié

Measurement	Ranges
Collapse occurs	No
	Yes

Table 13 — Classification of a paraglider's behaviour in the pitch stability operating controls during accelerated flight test

Code de champ modifié

Measurement and ranges (according to Table 12)	Classification
Collapse occurs	
No	A
Yes	F

4.4.7 Roll stability and damping

When tested in accordance with 5.5.~~19~~18.7 it is checked that the paraglider returns to normal flight from large control input and that roll oscillations are damped.

The behaviour of the paraglider is measured according to Table 14 and classified according to Table 15

Table 14 — Measurements and possible ranges in the roll stability and damping test

Code de champ modifié

Measurement	Ranges
Oscillations	Reducing
	Not reducing

Table 15 — Classification of a paraglider's behaviour in the roll stability and damping test

Code de champ modifié

Measurement and ranges (according to Table 14)	Classification
Oscillations	
Reducing	A
Not reducing	F

4.4.8 Stability in gentle spirals

When tested in accordance with 5.5.~~19~~18.8 the glider's behaviour during and exiting from gentle spirals is measured according to Table 16 and classified according to Table 17.

Table 16 — Measurements and possible ranges in the stability in gentle spirals test

Code de champ modifié

Measurement	Ranges
Tendency to return to straight flight	Spontaneous exit
	Turn remains constant
	Turn tightens

Table 17 — Classification of a paraglider's behaviour in the stability in gentle spirals test

Code de champ modifié

Measurement and ranges (according to Table 16)	Classification
Tendency to return to straight flight	
Spontaneous exit	A
Turn remains constant	C
Turn tightens	F

4.4.9 Behaviour exiting a fully developed spiral dive

When tested in accordance with 5.5.1~~8~~9.9 the glider's behaviour during and exiting from steep spirals is measured according to Table 18 and classified according to Table 19.

The G force and/or the rate of turn are recorded for documentation and information purposes.

Table 18 — Measurements and possible ranges in the behaviour exiting a fully developed spiral dive

Code de champ modifié

Measurement	Ranges
Initial response of glider (first 180°)	Immediate reduction of rate of turn
	No immediate reaction
	Immediate increase in rate of turn
Tendency to return to straight flight	Spontaneous exit (g force decreasing, rate of turn decreasing)
	Turn remains constant (g force constant, rate of turn constant)
	Turn tightens (g force increasing, rate of turn increasing)
Turn angle to recover normal flight	Less than 720°, spontaneous recovery
	720° to 1 080°, spontaneous recovery
	~~More than~~ 1 080° to 1440°, spontaneous recovery
	With pilot action

Table 19 — Classification of a paraglider's behaviour in the behaviour exiting a fully developed spiral dive

Code de champ modifié

Measurement and ranges (according to Table 18)	Classification
Initial response of glider (first 180°)	
Immediate reduction of rate of turn	A
No immediate reaction	B
Immediate increase in rate of turn	C
Tendency to return to straight flight	
Spontaneous exit (g force decreasing, rate of turn decreasing)	A
Turn remains constant (g force constant, rate of turn constant)	~~C~~D
Turn tightens (g force increasing, rate of turn increasing)	F
Turn angle to recover normal flight	
Less than 720°, spontaneous recovery	A
720° to 1 080°, spontaneous recovery	B
1080° to ~~More than 1 080~~1440°, spontaneous recovery	C
With pilot action	~~C~~D

4.4.10 Symmetric front collapse

When tested in accordance with 5.5.~~19~~18.10 the glider's behaviour and recovery from a front collapse is measured according to Table 20 and classified according to Table 21.

If the paraglider is equipped with an accelerator, its behaviour in the symmetric front collapse test shall be classified both with and without its use.

Table 20 — Measurements and possible ranges in the symmetric front collapse test

Code de champ modifié

Measurement	Ranges
Entry	Rocking back less than 45°
	Rocking back greater than 45°
Recovery	Spontaneous in less than 3 s
	Spontaneous in 3 s to 5 s
	Recovery through pilot action in less than a further 3 s
	Recovery through pilot action in more than a further ~~5~~ 3 s
Dive forward angle on exit	Dive forward 0° to 30°
	Dive forward 30° to 60°
	Dive forward 60° to 90°
	Dive forward greater than 90°
Change of course	Keeping course
	Entering a turn of less than 90°
	Entering a turn of 90° to 180°
Cascade occurs	No
	Yes
Folding lines used	No
	Yes

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Table 21 — Classification of a paraglider's behaviour in the symmetric front collapse test

Measurement and ranges (according to Table 20)		Classification
Entry		
Rocking back less than 45°		A
Rocking back greater than 45°		C
Recovery		
Spontaneous in less than 3 s		A
Spontaneous in 3 s to 5 s		B
Recovery through pilot action in less than a further 3 s		D
~~Recovery through pilot action between a further 3 s to 5 s~~		~~D~~
Recovery through pilot action in more than a further ~~5~~ 3 s		F
Dive forward angle on exit	Change of course	
Dive forward 0° to 30°	Keeping course	A
Dive forward 0° to 30°	Entering a turn of less than 90°	A
Dive forward 0° to 30°	Entering a turn of 90° to 180°	C
Dive forward 30° to 60°	Keeping course	B
Dive forward 30° to 60°	Entering a turn of less than 90°	B
Dive forward 30° to 60°	Entering a turn of 90° to 180°	C
Dive forward 60° to 90°	Keeping course	D
Dive forward 60° to 90°	Entering a turn of less than 90°	D
Dive forward 60° to 90°	Entering a turn of 90° to 180°	F
Dive forward greater than 90°	Keeping course	F
Dive forward greater than 90°	Entering a turn of less than 90°	F
Dive forward greater than 90°	Entering a turn of 90° to 180°	F
Cascade occurs		
No		A
Yes		F
Folding lines used		
No		A
Yes		D

Code de champ modifié

Tableau mis en forme

Mis en forme : Retrait : Gauche : 0,2 cm

4.4.11 Exiting deep stall (parachutal stall)

When tested in accordance with 5.5.~~19~~18.11 it is found out how difficult it is to exit a deep stall with this glider (including checking for undesirable tendencies).

The behaviour of the paraglider is measured according to Table 22 and classified according to Table 23.

Table 22 — Measurements and possible ranges in the exiting deep stall (parachutal stall) test

Code de champ modifié

Measurement	Ranges
Deep stall achieved	Yes
	No
Recovery	Spontaneous in less than 3 s
	Spontaneous in 3 s to 5 s
	Recovery through pilot action in less than a further 5 s
	Recovery through pilot action in more than a further 5 s
Dive forward angle on exit	Dive forward 0° to 30°
	Dive forward 30° to 60°
	Dive forward 60° to 90°
	Dive forward greater than 90°
Change of course	Changing course less than 45°
	Changing course 45° or more
Cascade occurs	No
	Yes

Table 23 — Classification of a paraglider's behaviour in the exiting deep stall (parachutal stall) test

Code de champ modifié

Measurement and ranges (according to Table 22)	Classification
Deep stall achieved	
Yes	A
No	A
Recovery	
Spontaneous in less than 3 s	A
Spontaneous in 3 s to 5 s	C
Recovery through pilot action in less than a further 5 s	D
Recovery through pilot action in more than a further 5 s	F
Dive forward angle on exit	
Dive forward 0° to 30°	A
Dive forward 30° to 60°	B
Dive forward 60° to 90°	D
Dive forward greater than 90°	F
Change of course	
Changing course less than 45°	A
Changing course 45° or more	C
Cascade occurs	
No	A
Yes	F

4.4.12 High angle of attack recovery

~~This test manoeuvre is not required if the manufacturer excludes this manoeuvre in the user's manual and the B-risers are clearly marked accordingly.~~

When tested in accordance with 5.5.~~19~~18.12 the glider's recovery from high angles of attack is measured according to Table 24 and classified according to Table 25.

Table 24 — Measurements and possible ranges in the high angle of attack recovery test

Code de champ modifié

Measurement	Ranges
Recovery	Spontaneous in less than 3 s
	Spontaneous in 3 s to 5 s
	Recovery through pilot action in less than a further 3 s
	Recovery through pilot action in more than a further 3 s
Cascade occurs	No
	Yes

Table 25 — Classification of a paraglider's behaviour in the high angle of attack recovery test

Code de champ modifié

Measurement and ranges (according to Table 24)	Classification
Recovery	
Spontaneous in less than 3 s	A
Spontaneous in 3 s to 5 s	C
Recovery through pilot action in less than a further 3 s	D
Recovery through pilot action in more than a further 3 s	F
Cascade occurs	
No	A
Yes	F

4.4.13 Recovery from a developed full stall

When tested in accordance with 5.5.1~~9~~8.13 the glider's behaviour when recovering from a maintained full stall (and in particular its dive forward behaviour) is measured according to Table 26 and classified according to Table 27.

Code de champ modifié

Table 26 — Measurements and possible ranges in the full stall test

Measurement	Ranges
Dive forward angle on exit	Dive forward 0° to 30°
	Dive forward 30° to 60°
	Dive forward 60° to 90°
	Dive forward greater than 90°
Collapse	No collapse
	Symmetric collapse
Cascade occurs (other than collapses)	No
	Yes
Rocking back	Less than 45°
	Greater than 45°
Line tension	Most lines tight
	Many visibly slack lines

Code de champ modifié

Table 27 — Classification of a paraglider's behaviour in the full stall test

Measurement and ranges (according to Table 26)	Classification
Dive forward angle on exit	
Dive forward 0° to 30°	A
Dive forward 30° to 60°	B
Dive forward 60° to 90°	C
Dive forward greater than 90°	F
Collapse	
No collapse	A
Symmetric collapse	C
Cascade occurs (other than collapses)	
No	A
Yes	F
Rocking back	
Less than 45°	A
Greater than 45°	C
Line tension	
Most lines tight	A
Many visibly slack lines	F

4.4.14 Asymmetric collapse

When tested in accordance with 5.5.~~19~~18.14 the glider's behaviour and recovery from an asymmetric collapse is measured according to Table 28 and classified according to Table 29.

If the paraglider is equipped with an accelerator, its behaviour in the asymmetric collapse test shall be classified both with and without its use.

Table 28 — Measurements and possible ranges in the asymmetric collapse test

Code de champ modifié

Tableau mis en forme

Measurement	Ranges
Change of course until re-inflation	Less than 90°
	90° to 180°
	180° to 360°
	Greater than 360°
Maximum dive forward or roll angle	Dive or roll angle 0° to 15°
	Dive or roll angle 15° to 45°
	Dive or roll angle 45° to 60°
	Dive or roll angle 60° to 90°
	Dive or roll angle greater than 90°
Re-inflation behaviour	Spontaneous re-inflation
	Inflates in less than 3 s from start of pilot action
	Inflates in 3 s to 5 s from start of pilot action
	No re-inflation within a further 5 s
Total change of course	Less than 360°
	Greater than 360°
Collapse on the opposite side occurs	No (or only a small number of collapsed cells with a spontaneous re inflation)
	Yes, no turn reversal
	Yes, causing turn reversal
Twist occurs	No
	Yes
Cascade occurs	No
	Yes
Folding lines used	No
	Yes

Mis en forme : Retrait : Gauche : 0,2 cm

Table 29 — Classification of a paraglider's behaviour in the asymmetric collapse test

Measurement and ranges (according to Table 28)		Classification
Change of course until re-inflation	Maximum dive forward or roll angle	
Less than 90°	Dive or roll angle 0° to 15°	A
	Dive or roll angle 15° to 45°	A
	Dive or roll angle 45° to 60°	C
	Dive or roll angle 60° to 90°	~~C~~D
	Dive or roll angle greater than 90°	~~D~~F
90° to 180°	Dive or roll angle 0° to 15°	A
	Dive or roll angle 15° to 45°	B
	Dive or roll angle 45° to 60°	C
	Dive or roll angle 60° to 90°	~~C~~D
	Dive or roll angle greater than 90°	~~D~~F
180° to 360°	Dive or roll angle 0° to 15°	A
	Dive or roll angle 15° to 45°	C
	Dive or roll angle 45° to 60°	C
	Dive or roll angle 60° to 90°	D
	Dive or roll angle greater than 90°	F
Greater than 360°	Dive or roll angle 0° to 15°	C
	Dive or roll angle 15° to 45°	C
	Dive or roll angle 45° to 60°	D
	Dive or roll angle 60° to 90°	F~~D~~
	Dive or roll angle greater than 90°	F
Re-inflation behaviour		
Spontaneous re-inflation		A
Inflates in less than 3 s from start of pilot action		C
Inflates in 3 s to 5 s from start of pilot action		D
No re-inflation within a further 5 s		F
Total change of course		
Less than 360°		A
Greater than 360° with tendency to recover (g force decreasing, rate of turn decreasing)		C
Greater than 360° without tendency to recover (g force not decreasing, rate of turn not decreasing)		F
Collapse on the opposite side occurs		
No (or only a small number of collapsed cells with a spontaneous re inflation)		A
Yes , no turn reversal		C
Yes, causing turn reversal		D
Twist occurs		
No		A
Yes		F
Cascade occurs		
No		A
Yes		F
Folding lines used		
No		A
Yes		D

Code de champ modifié

Mis en forme : Retrait : Gauche : 0,2 cm, Paragraphes solidaires

Mis en forme : Retrait : Gauche : 1,38 cm, Paragraphes solidaires

Mis en forme : Retrait : Gauche : 1,38 cm

4.4.15 Directional control with a maintained asymmetric collapse

When tested in accordance with 5.5.~~19~~18.15 the glider's directional controllability whilst affected by an asymmetric collapse (the ability to fly straight and to turn away from the collapsed side) is measured according to Table 30 and classified according to Table 31.

Code de champ modifié

Table 30 — Measurements and possible ranges in the directional control with a maintained asymmetric collapse test

Measurement	Ranges
Able to keep course	Yes
	No
180° turn away from the collapsed side possible in 10 s	Yes
	No
Amount of control range between turn and stall or spin	More than 50 % of the symmetric control travel
	25 % to 50 % of the symmetric control travel
	Less than 25 % of the symmetric control travel

Code de champ modifié

Table 31 — Classification of a paraglider's behaviour in the directional control with a maintained asymmetric collapse test

Measurement and ranges (according to Table 30)	Classification
Able to keep course	
Yes	A
No	F
180° turn away from the collapsed side possible in 10 s	
Yes	A
No	F
Amount of control range between turn and stall or spin	
More than 50 % of the symmetric control travel	A
25 % to 50 % of the symmetric control travel	C
Less than 25 % of the symmetric control travel	D

4.4.16 Trim speed spin tendency

When tested in accordance with 5.5.~~19~~18.16 the glider's tendency to enter a spin from trim speed is measured according to Table 32 and classified according to Table 33.

Code de champ modifié

Table 32 — Measurements and possible ranges in the trim speed spin tendency test

Measurement	Ranges
Spin occurs	No
	Yes

Code de champ modifié

Table 33 — Classification of a paraglider's behaviour in the trim speed spin tendency test

Measurement and ranges (according to Table 32)	Classification
Spin occurs	
No	A
Yes	F

4.4.17 Low speed spin tendency

When tested in accordance with 5.5.~~19~~18.17 the glider's tendency to enter a spin from low speed is measured according to Table 34 and classified according to Table 35.

Table 34 — Measurements and possible ranges in the low speed spin tendency test

Code de champ modifié

Measurement	Ranges
Spin occurs	No
	Yes

Table 35 — Classification of a paraglider's behaviour in the low speed spin tendency test

Code de champ modifié

Measurement and ranges (according to Table 34)	Classification
Spin occurs	
No	A
Yes	D

4.4.18 Recovery from a developed spin

When tested in accordance with 5.5.~~19~~18.18 the glider's behaviour and recovery from a fully developed spin is measured according to Table 36 and classified according to Table 37.

Table 36 — Measurements and possible ranges in the recovery from a developed spin test

Code de champ modifié

Measurement	Ranges
Spin rotation angle after release	Stops spinning in less than 90°
	Stops spinning in 90° to 180°
	Stops spinning in 180° to 360°
	Does not stop spinning within 360°
Cascade occurs	No
	Yes

Code de champ modifié

Table 37 — Classification of a paraglider's behaviour in the recovery from a developed spin test

Measurement and ranges (according to Table 36)	Classification
Spin rotation angle after release	
Stops spinning in less than 90°	A
Stops spinning in 90° to 180°	B
Stops spinning in 180° to 360°	D
Does not stop spinning within 360°	F
Cascade occurs	
No	A
Yes	F

4.4.19 B-line stall

This test manoeuvre is not required if the manufacturer excludes this manoeuvre in the user's manual and the B-risers are clearly marked accordingly.

When tested in accordance with 5.5.~~19~~18.19 the glider's behaviour and recovery from a B-line stall is measured according to Table 38 and classified according to Table 39.

Code de champ modifié

Table 38 — Measurements and possible ranges in the B-line stall test

Measurement	Ranges
Change of course before release	Changing course less than 45°
	Changing course more than 45°
Behaviour before release	Remains stable with straight span
	Remains stable without straight span
	Unstable
Recovery	Spontaneous in less than 3 s
	Spontaneous in 3 s to 5 s
	Recovery through pilot action in less than a further 3 s
	Recovery through pilot action between a further 3 s to 5 s
	Recovery through pilot action in more than a further 5 s
Dive forward angle on exit	Dive forward 0° to 30°
	Dive forward 30° to 60°
	Dive forward 60° to 90°
	Dive forward greater than 90°
Cascade occurs	No
	Yes

Table 39 — Classification of a paraglider's behaviour in the B-line stall test

Code de champ modifié

Measurement and ranges (according to Table 38)	Classification
Change of course before release	
Changing course less than 45°	A
Changing course more than 45°	C
Behaviour before release	
Remains stable with straight span	A
Remains stable without straight span	C
Unstable	D
Recovery	
Spontaneous in less than 3 s	A
Spontaneous in 3 s to 5 s	B
Recovery through pilot action in less than a further 3 s	D
Recovery through pilot action between a further 3 s to 5 s	D
Recovery through pilot action in more than a further 5 s	F
Dive forward angle on exit	
Dive forward 0° to 30°	A
Dive forward 30° to 60°	A
Dive forward 60° to 90°	C
Dive forward greater than 90°	F
Cascade occurs	
No	A
Yes	F

4.4.20 Big ears

This test manoeuvre is not required if the manufacturer excludes this manoeuvre in the user's manual and the A-risers are clearly marked accordingly.

When tested in accordance with 5.5.~~19~~18.20 the glider's behaviour and handling during and exiting big ears is measured according to Table 40 and classified according to Table 41.

Code de champ modifié

Table 40 — Measurements and possible ranges in the big ears test

Measurement	Ranges
Entry procedure	Dedicated controls
	Standard technique
	No dedicated controls and non-standard technique
Behaviour during big ears	Stable flight
	Unstable flight
	Deep stall occurs
Recovery	Spontaneous in less than 3 s
	Spontaneous in 3 s to 5 s
	Recovery through pilot action in less than a further 3 s
	Recovery through pilot action between a further 3 s to 5 s
	Recovery through pilot action in more than a further 5 s
Dive forward angle on exit	Dive forward 0° to 30°
	Dive forward 30° to 60°
	Dive forward 60° to 90°
	Dive forward greater than 90°

Code de champ modifié

Table 41 — Classification of a paraglider's behaviour in the big ears test

Measurement and ranges (according to Table 40)	Classification
Entry procedure	
Dedicated controls	A
Standard technique	A
No dedicated controls and non-standard technique	C
Behaviour during big ears	
Stable flight	A
Unstable flight	C
Deep stall occurs	F
Recovery	
Spontaneous in less than 3 s	A
Spontaneous in 3 s to 5 s	B
Recovery through pilot action in less than a further 3 s	B
Recovery through pilot action between a further 3 s to 5 s	D
Recovery through pilot action in more than a further 5 s	F
Dive forward angle on exit	
Dive forward 0° to 30°	A
Dive forward 30° to 60°	D
Dive forward 60° to 90°	F
Dive forward greater than 90°	F

4.4.21 Big ears in accelerated flight

This test is only required for paragliders equipped with an accelerator.

This test manoeuvre is not required if the manufacturer excludes this manoeuvre in the user's manual and the A-risers are clearly marked accordingly.

When tested in accordance with 5.5.~~19~~18.21 the glider's behaviour and handling during and exiting big ears when using the accelerator is measured according to Table 42 and classified according to Table 43.

Table 42 — Measurements and possible ranges in the big ears in accelerated flight test

Code de champ modifié

Measurement	Ranges
Entry procedure	Dedicated controls
	Standard technique
	No dedicated controls and non-standard technique
Behaviour during big ears	Stable flight
	Unstable flight
	Deep stall occurs
Recovery	Spontaneous in less than 3 s
	Spontaneous in 3 s to 5 s
	Recovery through pilot action in less than a further 3 s
	Recovery through pilot action between a further 3 s to 5 s
	Recovery through pilot action in more than a further 5 s
Dive forward angle on exit	Dive forward 0° to 30°
	Dive forward 30° to 60°
	Dive forward 60° to 90°
	Dive forward greater than 90°
Behaviour immediately after releasing the accelerator while maintaining big ears	Stable flight
	Unstable flight
	Deep stall occurs

Code de champ modifié

Table 43 — Classification of a paraglider's behaviour in the big ears in accelerated flight test

Measurement and ranges (according to Table 42)	Classification
Entry procedure	
Dedicated controls	A
Standard technique	A
No dedicated controls and non-standard technique	C
Behaviour during big ears	
Stable flight	A
Unstable flight	C
Deep stall occurs	F
Recovery	
Spontaneous in less than 3 s	A
Spontaneous in 3 s to 5 s	A
Recovery through pilot action in less than a further 3 s	B
Recovery through pilot action between a further 3 s to 5 s	D
Recovery through pilot action in more than a further 5 s	F
Dive forward angle on exit	
Dive forward 0° to 30°	A
Dive forward 30° to 60°	D
Dive forward 60° to 90°	F
Dive forward greater than 90°	F
Behaviour immediately after releasing the accelerator while maintaining big ears	
Stable flight	A
Unstable flight	C
Deep stall occurs	F

4.4.22 Alternative means of directional control

When tested in accordance with 5.5.~~19~~18.23 it is checked whether the glider may be steered in case of a failure of the primary controls.

The glider's behaviour when **applying** alternative means of directional control is measured according to Table 44 and classified according to Table 45.

Code de champ modifié

Table 44 — Measurements and possible ranges in the alternative means of directional control test

Measurement	Ranges
180° turn achievable in 20 s	Yes
	No
Stall or spin occurs	No
	Yes

Table 45 — Classification of a paraglider's behaviour in the alternative means of directional control test

Code de champ modifié

Measurement and ranges (according to Table 46)	Classification
180° turn achievable in 20 s	
Yes	A
No	F
Stall or spin occurs	
No	A
Yes	F

4.4.23 Any other flight procedure and/or configuration described in the user's manual

Any other flight procedure and/or configuration described in the user's manual not covered through the tests 5.5.~~19~~18.1 to 5.5.~~19~~18.22 are tested in accordance with 5.5.~~19~~18.23.

The glider should behave during and exit any normal flight procedure and/or configuration as described in the manual. No procedure should require high levels of pilot skill.

The behaviour of the paraglider is measured according to Table 46 and classified according to Table 47.

Table 46 — Measurements and possible ranges when testing any other flight procedure and/or configuration described in the user's manual

Code de champ modifié

Measurement	Ranges
Procedure works as described	Yes
	No
Procedure suitable for novice pilots	Yes
	No
Cascade occurs	No
	Yes

Table 47 — Classification of a paraglider's behaviour when testing any other flight procedure and/or configuration described in the user's manual

Code de champ modifié

Measurement and ranges (according to Table 48)	Classification
Procedure works as described	
Yes	A
No	F
Procedure suitable for novice pilots	
Yes	A
No	C
Cascade occurs	
No	A
Yes	F

5 Flight tests

5.1 General

The behaviour of the paraglider in the programme of test manoeuvres laid down in 5.5.~~19~~ 18 is demonstrated by a manufacturer's pilot in front of a test pilot of the testing laboratory carrying out the flight tests.

If this demonstration is judged satisfactory by the test pilot, the test procedure described in 5.5 of this document is then carried out by two test pilots of the testing laboratory.

It is highly recommended that all test manoeuvres are carried out over water, and that appropriate safety measures are taken to pick up the pilot quickly in case of an emergency landing in the water.

5.2 Apparatus

5.2.1 Test pilot equipment

The test pilot shall be equipped with:

— helmet in accordance with EN 966;

— radio communication system for announcing manoeuvres and comments in flight;

— airspeed indicator;

— variometer;

— lifejacket (if the flight tests are carried out over water);

— ballast system for adjusting the load in accordance with the manufacturer's requirements if required;

— emergency parachute which complies with EN 12491;

— Harness in accordance with EN 1651.

A G meter may optionally be used.

If the paraglider is tested in two-seater configuration, the passenger shall be equipped with:

— helmet in accordance with EN 966;

— lifejacket (if the flight tests are carried out over water);

— Harness in accordance with EN 1651;

— ballast system for adjusting the load in accordance with the manufacturer's requirements if required.

The total weight of the ballast shall not exceed 15 kg or 20 % of the pilot's weight, whichever is larger.

If the paraglider is tested in two-seater configuration, the total weight of the ballast shall not exceed 30 kg or 20 % of the total weight of pilot plus passenger, and should be distributed proportionally to each (see 5.5.7).

5.2.2 Ground equipment

The ground personnel shall be equipped with:

— telephoto video camera to review the movements and actions of the pilot and the behaviour of the paraglider;

— radio link with the test pilot to record his comments directly on the video tape.

5.3 Test specimen

5.3.1 Selection

Select a test specimen, complete with the user's manual in a language acceptable to the testing laboratory, ready to fly and conforming in all points to the production model.

5.3.2 Marking

5.3.2.1 Marking of the wing

Mis en forme : Titre 4

~~5.3.2~~

The test specimen supplied by the manufacturer shall be clearly marked in the following way:

A line must be marked from a point at 50 % of the trailing edge at a 45° angle to the leading edge. Either side of this line, at distances of ± 2,5 % of the wingspan (with a minimum of 50 cm and maximum of 75 cm measured between the inside of the parallel marks) parallel marks must be attached, indicating the tolerance area.

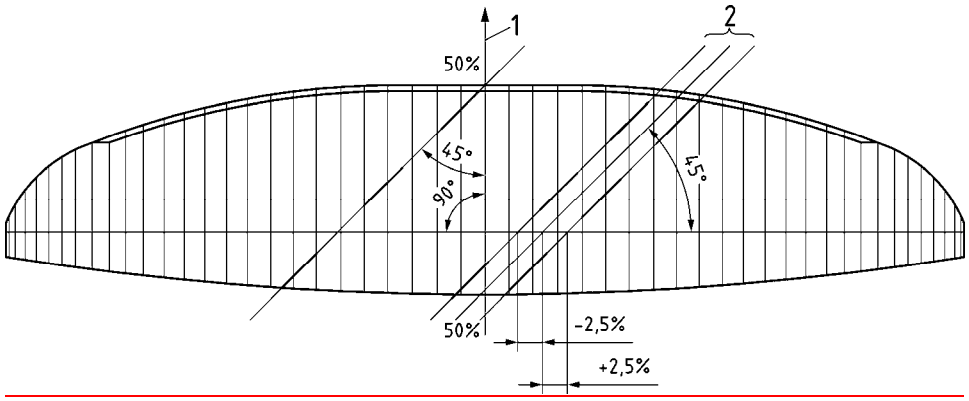
Marks must be contrasting and easily recognisable from the video documentation as shown in Figure 2.

'A line must be marked from a point of 50 % of the leading edge at a 45° angle to the trailing edge.

There is no need to mark a tolerance field for the asymmetric 50 % collapse.

When agreed by the test centre, the marks can only be done on one wing side.

— these positions are percentages of the flat (i. e. non-inflated) span, and are determined with the paraglider laid flat;



Keys

1 Flight direction
2 Tolerance field

Figure 2 — Marking of the test specimen

Code de champ modifié

Mis en forme : Retrait : Gauche : 0,71 cm, Sans numérotation ni puces

5.3.2.2 Marking of the control lines

Mmarkings are required on for the control lines travel. ;

Mis en forme : Sans numérotation ni puces

zZero and symmetric stall positions shall be marked.

The zero position mark is placed at the position of the control lines at which the first action on any point of the trailing edge can be observed.

— There shall be a minimum of 5 cm free control lines travel before the zero mark is reached.

NOTE To mark zero and symmetric stall positions, it is recommended that manufacturers attach an additional reference line to each side of the paraglider, running from the B-riser to the seat of the harness, and incorporating elastic to maintain tension. Each reference line should be fitted with 2 adjustable toggles (e.g. tonkas™ [1]).

Mis en forme : Police :10 pt

When moving the controls to a position to be marked, the pilot moves both the controls and the appropriate tonkas toggles down. When releasing the controls again, he lets go of the tonkas toggles (refer to the procedure in 5.5.1918.4).

Mis en forme : Police :10 pt

Mis en forme : Police :10 pt

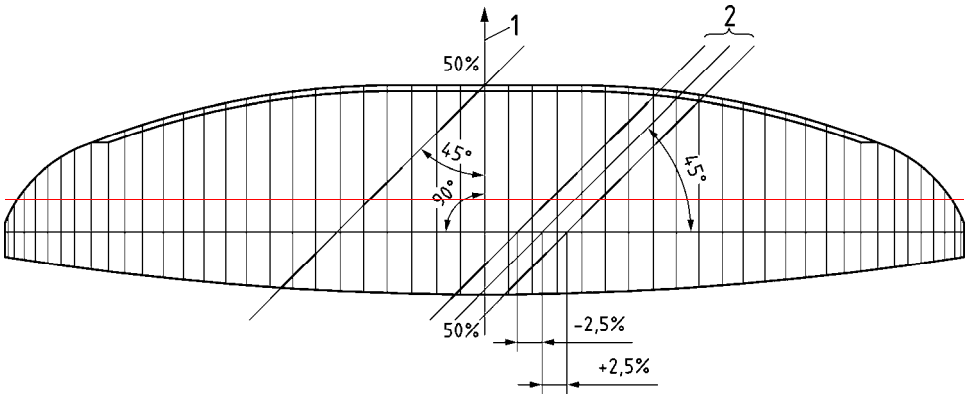
Mis en forme : Police :10 pt

If the position of any of these marks obtained at the minimum weight in flight differs noticeably from the position obtained at the maximum weight in flight, the manufacturer is required to provide the test specimen with a second set of clearly identified marking(s), pair of identical control lines or reference lines, one marked for the minimum and/or the maximum , the other one for the maximum weight in flight.

— To help visualize the glider trajectory, a streamer 1 m long and 5 cm wide shall be attached to on one risera suitable line to help visualise the trajectory..

Mis en forme : Retrait : Gauche : 0 cm, Suspendu : 0,71 cm, Sans numérotation ni puces

1) Tonkas is an example of a suitable product commercially. This information is given for the convenience of users of this European Standard and does not constitute an endorsement by CEN of this product.



~~Keys~~

~~1 Flight direction~~
~~2 Tolerance field~~

~~Figure 2 — Marking of the test specimen~~

5.3.3 ~~Folding lines~~Additional lines

~~If due to the geometry of a paraglider's suspension line system any type of deliberate collapse required in this document cannot be achieved in accordance with the procedure description, the manufacturer is required to attach additional lines (folding lines) to the wing of the test specimen enabling the test pilot to perform these manoeuvres.~~

5.3.3.1 General

Mis en forme : Titre 4

The test house shall determine if it is possible to test the glider in deliberate collapse manoeuvres without additional lines. If it is possible to test the glider without the use of additional lines then the glider shall be tested without additional lines.

5.3.3.2 Cross lines

Cross lines are allowed in all categories only for the large asymmetric collapse test.

Test according to 5.5.18.14.3

5.3.3.3 Folding lines

Folding lines shall not be used in categories A, B and C gliders.

In category D gliders, folding lines are only permitted in symmetric and asymmetric collapse manoeuvres.

Test according to 5.5.18.10 and 5.5.18.14.3.

If folding lines are used:

— The attached riser shall be longer than the original riser such that the folding line has no effect when not in use.

— for safety reasons the test pilot can hold a longer, extra brake handle in his hand. There has to be no tension visible on the trailing edge.

— this has to be reported in the User Manual, with the attachment and the dimensions (lengths) of the folding lines specified.

— the maximum rearward position is the position of the original A's; the maximum forward position is on the lower surface of the paraglider and not further forward than the rear end of the air inlet. In no case may it be further forward than 3% of the chord.

— the additional line attachment points on the glider must be supplied with the production glider as well.

5.3.4 Control extensions

Where desired for test 5.5.~~19~~18.10, control extensions may be used to enable the controls to be held in the pilot's hands throughout the manoeuvres.

5.4 Test conditions

Meteorological conditions:

— wind less than 10 km/h within the test perimeter;

— no turbulence within the test perimeter disturbing the flight tests.

5.5 Procedure

5.5.1 General

Two different test pilots of the testing laboratory each carry out one complete programme of the test manoeuvres laid down in 5.5.~~19~~18, one at the minimum weight in flight declared by the manufacturer, the other one at the maximum weight in flight declared by the manufacturer. Where the declared maximum weight in flight exceeds 170 kg, then specified tests shall be conducted at a maximum weight in flight of 170 kg.

The maximum weight in flight declared by the manufacturer shall not exceed the maximum weight in flight up to which the paraglider is in compliance with EN 926-1.

In the exceptional case that the minimum weight in flight declared by the manufacturer is less than 65 kg and the testing laboratory cannot provide a light enough test pilot, then the test programme at the minimum weight in flight is replaced by a test programme flown at the lowest weight in flight which is achievable. The manufacturer is then additionally required to demonstrate a test programme at the declared minimum weight in flight. This demonstration programme shall be witnessed by a test pilot of the testing laboratory and recorded on video.

Any test weight in flight up to 125 kg shall be achieved using 1 pilot.

If any test weight in flight exceeds 125 kg, this weight can be achieved using 1 or 2 pilots.

If any test weight in flight exceeds 155 kg, this weight shall be achieved using 2 pilots.

All weights are subject to an acceptable tolerance of ± 2 kg.

All speeds are subject to an acceptable tolerance of ± 2 km/h.

If a test manoeuvre has not been performed in precise accordance with its procedure in 5.5.~~19~~18, the manoeuvre shall be repeated. (This may be due to an error of the test pilot or due to meteorological influences).

If the outcome of any test manoeuvre appears open to doubt, the manoeuvre shall be repeated.

5.5.2 Trimmers

If trimmers are fitted to a paraglider, then the complete test programme is repeated with the trimmers set both to the slowest and to the fastest position.

5.5.3 Other adjustable or removable devices

If the paraglider is equipped with other adjustable or removable devices which are not covered explicitly in this clause and which may influence its flight characteristics or its control, the paraglider shall be tested in the least favourable (symmetric) configuration.

5.5.4 Video documentation

All the tests shall be filmed on video. If required explicitly by the procedures 5.5.~~19~~18.1 to 5.5.~~19~~18.23, the test pilot maintains a defined course relative to the camera axis when starting the test manoeuvre.

~~In 5.5.19.1 to 5.5.19.23 t~~The following ~~terms~~ configurations ~~are~~ shall be used:

— Camera axis: Profile:
The pilot maintains a course at a right angle to the horizontal projection of the camera axis.

— Camera axis: Face-on:
The pilot is approaching the camera along the horizontal projection of the camera axis.

— Camera axis: From behind:
The pilot is flying away from the camera along the horizontal projection of the camera axis.

5.5.5 Radio documentation

Any comments of the pilot in flight shall be recorded on the video. Using the radio connection to the camera, the test pilot shall:

— announce which manoeuvre is about to follow;

— add any comment helping to evaluate the glider's behaviour (optional);

— announce if he is sure any manoeuvre just performed was not valid for some reason.

5.5.6 Harness dimensions

The test pilot (and the passenger when testing in two-seater configuration) shall use a harness with a perpendicular distance from the harness attachment points (bottom of the carabiners as shown in Figure 3~~s 3 and 4~~, measured from connector centrelines) to the seat board top surface as shown in figure 4 depending on the total weight in flight as shown in Table 48.

The horizontal distance between the harness attachment points (measured between connector centrelines) shall be set depending on the total weight in flight as shown in Figure ~~3~~ 5 and Table 48.

When testing in two-seater configuration the horizontal dimension of the passenger's harness is set to the same width as the pilot's harness.

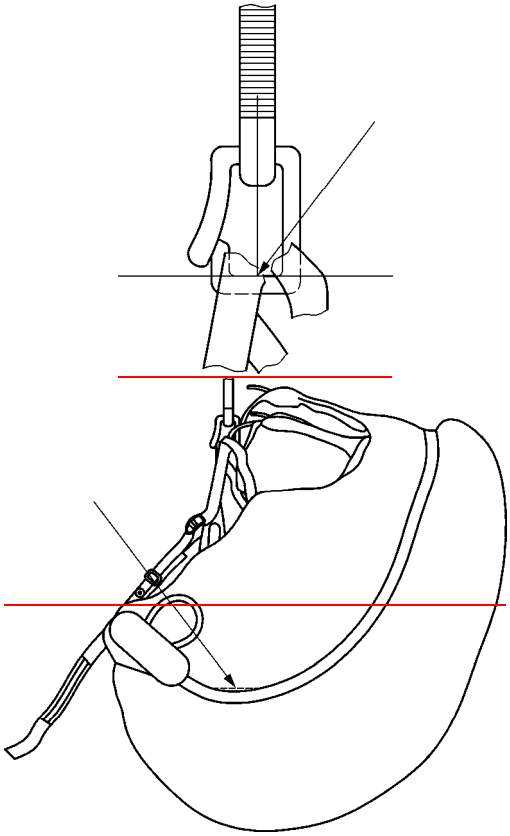


Figure 3 — Harness upper measuring point ~~Harness lower measuring point~~

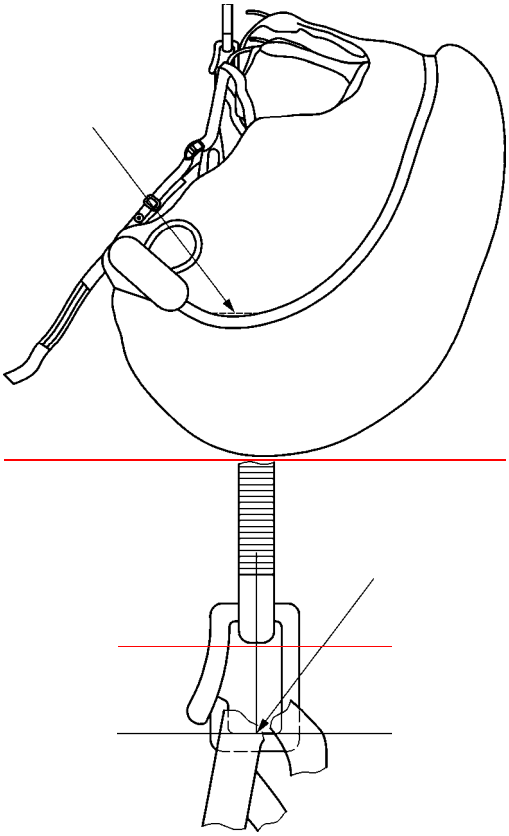


Figure 4 — Harness lower measuring point ~~Harness upper measuring point~~

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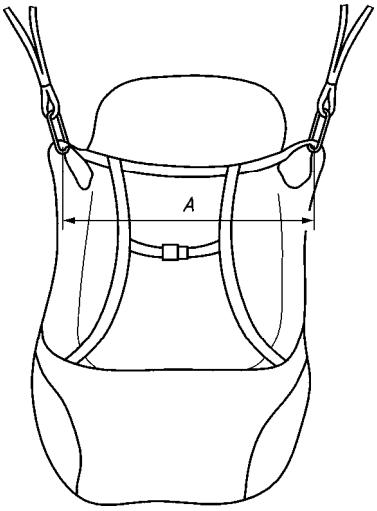

Figure 5 — Width of harness attachment points

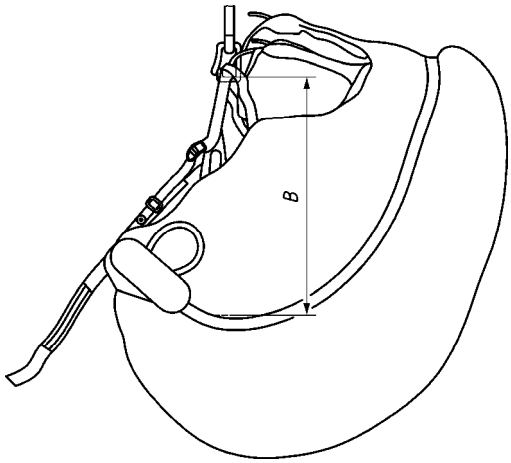

Figure 6 — Height of harness attachment points

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Table 48 — Total weight in flight

TWF (total weight in flight)	< 80 kg	~~>~~ 80 kg-100 kg	> 100 kg
Width (Measurement A on Figure 54)	~~40~~(40 ±2) cm	(44 ±2) cm~~44~~	(48 ±2) cm~~48~~
~~Tolerance ± 2 cm~~			
Height (Measurement B on Figure 65)	(40 ±1) cm~~40~~	(42 ±1) cm~~42~~	(44 ±1) cm~~44~~
~~Tolerance ± 1 cm~~			

5.5.7 Ballast

Any ballast shall be tightly attached to the pilot and positioned as close as possible to the centre of gravity of a pilot sitting in the harness not carrying any ballast.

When testing in two-seater configuration any ballast carried by the passenger shall be attached following the same principles as for the pilot's ballast.

The use of water ballast is recommended for safety reasons.

5.5.8 Sitting position

Unless the test procedure states otherwise, the test pilot should adopt a normal upright sitting position with his feet perpendicularly below his knees.

5.5.9 Controls in hand

Unless the test procedure states otherwise, the controls are always held in the pilot's hands. The term 'releasing the controls' means taking all tension off the control lines.

5.5.10 Wraps

The test pilot shall never need to use wraps unless the test procedure requires this.

~~**5.5.11 Maximum travel of the accelerator**~~

~~The accelerator is considered to be fully activated when the mechanical limits of the glider are reached and further action on the accelerator does not result in a further decrease of the angle of attack.~~

~~5.5.12~~5.5.11 **Timing when starting test measurements**

In tests 5.5.19.11, 5.5.19.12, 5.5.19.14, 5.5.19.20, 5.5.19.21 timing starts from the instant that the controls reach the zero position after the pilot releases them.

~~5.5.13~~5.5.12 **Timing when exiting stalled flight conditions**

The glider is considered to have exited tests 5.5.19.11, 5.5.19.12 and 5.5.19.19 when it reaches its furthest forward pitching point.

If there is no noticeable pitching, the glider is considered to have exited any of these tests when the streamer on the riser reaches 45° to the horizon.

~~5.5.14~~5.5.13 **Exiting developed spin rotation**

The glider is considered to have exited a developed spin when the airflow is reattached over the full span.

~~5.5.15~~5.5.14 **Pitch angles**

Measurement is of the change of angle. A straight line taken from the leading edge at the centre of the canopy to the pilot's buttocks is compared to the horizon before and after the manoeuvre.

~~5.5.16~~5.5.15 **Keep course**

The paraglider is considered to have kept its course throughout a test if it stays within 15° either side of its original course.

~~5.5.17~~5.5.16 **Twist**

In test 5.5.19.14 a twist has occurred, when after 5 s or after a turn of 360° the pilot's position still is rotated more than 180° relative to the glider.

~~5.5.18~~5.5.17 **Collapse on the opposite side**

In test 5.5.19.14 a collapse on the opposite side has occurred when less than 50 % of the span of the paraglider's leading edge is affected. If more than 50 % of the span is affected, this is a cascade.

~~5.5.19~~5.5.18 **Details of test manoeuvres to be carried out**

~~5.5.19.1~~5.5.18.1 **Inflation/take-off test**

The inflation shall take place on a slope between 10 % and 33 %.

It shall be carried out in headwinds of less than 8 km/h (measured about 1,5 m above the ground) and shall be repeated twice (to ensure the genuine behaviour is established).

The test pilot uses a normal forward launch technique (controls and A-risers in the hands, the other risers in the elbows, A-lines just tight, constant steady acceleration).

If a special take off technique is required for a paraglider then this information shall be contained in the user's manual, and these instructions shall be followed by the test pilot.

Camera axis: Camera not required

~~5.5.19.2~~5.5.18.2 **Landing test**

The pilot shall make a normal landing (straight final glide at trim speed) on level ground, into a wind of less than 8 km/h (measured about 1,5 m above the ground), using the controls only.

If a special landing technique is required for a paraglider then this information shall be contained in the user's manual, and these instructions shall be followed by the test pilot.

Camera axis: Camera not required

~~5.5.19.3~~5.5.18.3 **Speeds in straight flight test**

Assess the trim speed in 10 s stabilised straight flight and then the minimum speed in 10 s stabilised straight flight.

Camera axis: Camera not required

~~5.5.19.4~~5.5.18.4 **Control movement test**

Check the zero position and the symmetric stall position reference marks.

The symmetric stall position is checked by stabilising the paraglider in straight flight at trim speed.

Over a period of 5 s gradually lower both controls to the symmetric stall position marks, being careful not to induce pitch oscillations.

Hold this position until the paraglider rocks back entering a full stall.

Assess the control forces throughout the procedure.

Camera axis: Camera not required

~~5.5.19.5~~5.5.18.5 **Pitch stability exiting accelerated flight test**

Stabilise the paraglider in straight flight at maximum speed.

Then abruptly release the accelerator and assess the behaviour.

Camera axis: Profile

~~5.5.19.6~~5.5.18.6 **Pitch stability operating controls during accelerated flight test**

Stabilise the paraglider in straight flight at maximum speed.

Activate both controls symmetrically to 25 % of the symmetric control range within 2 s.

Hold that position for 2 s.

Then slowly release both controls.

Camera axis: Any axis

~~5.5.19.7~~5.5.18.7 Roll stability and damping test

Induce the maximum possible roll angle achievable by quickly activating and releasing each control in turn to the symmetric stall position marks once without inducing a stall, spin or collapse. The timing of the control inputs is selected by the test pilot to maximise the roll angle.

Then observe the glider's immediate behaviour.

Camera axis: Any axis

~~5.5.19.8~~5.5.18.8 Stability in gentle spirals test

Stabilise the glider in straight flight at trim speed.

By use of the controls only, direct the paraglider into a gentle spiral between 3 m/s and 5 m/s sink rate, such that the least stable behaviour (least tendency to exit the turn) is established. Maintain this sink rate for one turn.

Then release the controls over a period of 2 s and observe the paraglider's behaviour.

If the turn clearly tightens, the pilot acts to recover the glider. Otherwise the pilot waits for two turns to establish the glider's behaviour.

The pilot shall not counteract inertia effects on his body at any stage.

Camera axis: Any axis

~~5.5.19.9~~5.5.18.9 Behaviour exiting a fully developed spiral dive

Stabilise the glider in straight flight at trim speed.

Without weight-shift, apply a smooth progressive input with one brake until the glider enters a spiral dive.

For a valid test, the glider should enter the spiral dive after a minimum of 5 s and a maximum of 1.5 turns without a spin or collapse occurring.

The pilot then holds the brake position reached while actively maintaining a central and neutral position relative to the risers (as if the harness was cross-braced).

The pilot shall hold this position for 720° then release the initiating brake smoothly and progressively in one turn. Whilst releasing the brake the pilot no longer actively maintains a central and neutral position and allows his body to follow the inertial effects.

If the turn clearly tightens significantly, the pilot shall act to recover the glider. Otherwise the pilot waits up to four turns to establish the glider's behaviour. The measurements/ranges start when the pilot begins to release the control.

Camera axis: any axis

~~5.5.19.10~~5.5.18.10 **Symmetric front collapse test**

~~5.5.19.10.1~~5.5.18.10.1 **Test 1: Unaccelerated collapse (approximately 30 % chord)**

Stabilise the glider in straight flight at trim speed.

Release the controls and attach them to the risers (however, for safety reasons, the controls may be kept in the hands if the front collapse is achievable without significantly affecting the trailing edge).

Then by abruptly pulling the appropriate lines or risers, induce a symmetric front collapse over the entire leading edge with approximately 30 % of the centre chord affected. As soon as the collapse is achieved, let go of the lines/risers.

If the paraglider has not recovered spontaneously after 5 s or after 180° of turn (which ever happens first), the pilot acts on the controls to recover normal flight (without inducing a deliberate stall).

~~5.5.19.10.2~~5.5.18.10.2 **Test 2: Unaccelerated collapse (at least 50 % chord)**

Stabilise the glider in straight flight at trim speed.

Release the controls and attach them to the risers (however, for safety reasons, the controls may be kept in the hands if the front collapse is achievable without significantly affecting the trailing edge).

Then by abruptly pulling the appropriate lines or risers, induce a symmetric front collapse over the entire leading edge with at least 50 % of the centre chord affected. As soon as the collapse is achieved, let go of the lines/risers.

If the paraglider has not recovered spontaneously after 5 s or after 180° of turn (which ever happens first), the pilot acts on the controls to recover normal flight (without inducing a deliberate stall).

~~5.5.19.10.3~~5.5.18.10.3 **Test 3: Accelerated collapse**

If the paraglider is equipped with an accelerator then the following additional test is required:

Stabilise the glider in straight flight at maximum speed.

Release the controls and attach them to the risers (however, for safety reasons, the controls may be kept in the hands if the front collapse is achievable without significantly affecting the trailing edge).

Then by abruptly pulling the appropriate lines or risers, induce a symmetric front collapse over the entire leading edge with at least 50 % of the centre chord affected. As soon as the collapse is achieved, let go of the accelerator and the lines/risers.

If the paraglider has not recovered spontaneously after 5 s or after 180° of turn (which ever happens first), the pilot acts on the controls to recover normal flight (without inducing a deliberate stall).

Camera axis: Profile

~~5.5.19.11~~5.5.18.11 **Exiting deep stall (parachutal stall) test**

Slow down the paraglider using the controls to obtain a trajectory as close as possible to the vertical without significantly changing the shape of the wing (deep stall). If a deep stall cannot be achieved due to a very long control travel, the pilot takes wraps to shorten the control lines.

If a deep stall is achieved, maintain it for 3 s.

Then release the controls smoothly and gradually (in about 2 s) to the zero position.

If the glider does not recover in 5 s then intervene in accordance with the user's manual.

Camera axis: Profile

~~5.5.19.12~~5.5.18.12 **High angle of attack recovery test**

Attain a trajectory as close as possible to the vertical (deep stall), without activating the controls or the accelerator, and with the minimum amount of deformation of the canopy (usually by using the minimum necessary pull-down of the B-risers).

Maintain this high condition for 3 s.

Then release the risers very slowly, symmetrically and continuously.

Camera axis: Profile

~~5.5.19.13~~5.5.18.13 **Recovery from a developed full stall test**

Stabilise the glider in straight flight at minimum speed.

Fully apply the controls and hold that position until the paraglider is in a maintained full stall. If a full stall cannot be achieved due to a very long control travel, the pilot takes wraps to shorten the control lines.

Release the controls slowly and symmetrically, until the canopy has approximately regained its inflated span.

Then quickly and symmetrically fully release the controls in a period of 1 s.

(If an asymmetric collapse occurs, it is assumed that the release has not been sufficiently symmetrical, and the test manoeuvre should be repeated.)

If any pitch oscillations don't die out, the controls are to be fully released when the canopy, rocking forward, arrives above the pilot.

Where the total weight in flight exceeds 170 kg, the maximum weight test will be conducted at a total weight in flight of 170 kg

Camera axis: Profile

~~5.5.19.14~~5.5.18.14 **Asymmetric collapse test**

~~5.5.19.14.1~~5.5.18.14.1 **General**

If the paraglider is equipped with an accelerator, the two tests below shall be repeated with the accelerator fully activated. The accelerator shall be released at the same time as the lines are released.

Camera axis: Face-on and behind (this may be with two cameras or by a repeated test)

~~5.5.19.14.2~~5.5.18.14.2 **Small asymmetric collapse**

Stabilise the glider in straight flight at trim speed. Release the control handle on the side to be collapsed and attach it to the riser.

Pull down the appropriate lines on one side as fast as possible to collapse the canopy asymmetrically at approximately 50 % of the leading edge along the marked line.

As soon as the collapse is achieved, release the lines quickly.

The pilot shall take no further action and remains passive until the glider either recovers, or changes course by more than 360°, or 5 s elapses.

If the glider has not recovered, the pilot acts to recover the glider.

~~5.5.19.14.3~~5.5.18.14.3 **Large asymmetric collapse**

Stabilise the glider in straight flight at trim speed. Release the control handle on the side to be collapsed and attach it to the riser.

Pull down the appropriate lines on one side as fast as possible to collapse the canopy asymmetrically inside the tolerance field in accordance with 5.3.2.

In the status of the maximum shape of the collapse, the bend line has to be completely (right through to the trailing edge) inside the marked tolerance field as shown in Figure 7.

As soon as the collapse is achieved, release the lines quickly.

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The pilot shall take no further action and remains passive until the glider either recovers, or changes course by more than 360°, or 5 s elapses.

If the glider has not recovered, the pilot acts to recover the glider.

Where the total weight in flight exceeds 170 kg, the maximum weight test will be conducted at a total weight in flight of 170 kg.

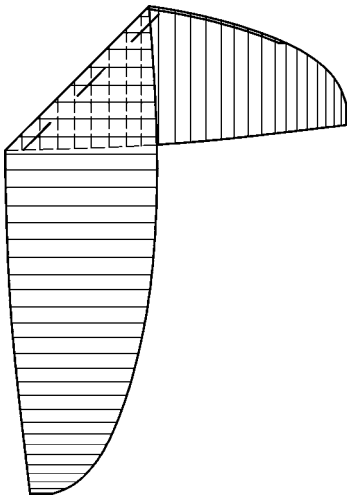

Figure 7 — Asymmetric collapse overlap

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~~5.5.19.15~~5.5.18.15 **Directional control with a maintained asymmetric collapse test**

Stabilise the glider in straight flight at trim speed. Release the control handle on the side to be collapsed and attach it to the riser.

Pull down the appropriate lines on one side as fast as possible to collapse the canopy asymmetrically at 45 % to 50 % of the span at an angle of approximately 45° relative to the longitudinal axis and hold the collapse.

Then the pilot attempts to keep course for a period of 3 s, using the control on the inflated side if necessary.

From straight flight the pilot further uses this control to turn 180° to the inflated side in a period of 10 s without involuntarily entering an abnormal flight condition. The pilot assesses the position of the control relative to the symmetric stall position mark.

Stabilise the glider in straight flight at trim speed. Release the control handle on the side to be collapsed and attach it to the riser.

Pull down the appropriate lines on one side as fast as possible to collapse the canopy asymmetrically at 45 % to 50 % of the span at an angle of approximately 45° relative to the longitudinal axis and hold the collapse.

Then the pilot attempts to keep course for a period of 3 s, using the control on the inflated side if necessary.

From straight flight the pilot further uses this control to establish the minimum amount of control input required to induce a stall or spin. This amount of control shall be applied in a period of 1 s. The pilot assesses the position of the control relative to the symmetric stall position mark.

The pilot shall not counteract inertia effects on his body at any stage.

Where the total weight in flight exceeds 170 kg, the maximum weight test will be conducted at a total weight in flight of 170 kg.

Camera axis: Face-on

~~5.5.19.16~~5.5.18.16 Trim speed spin tendency test

Stabilise the glider in straight flight at trim speed.

Then over a period of 2 s activate one control to 25 % of the symmetric control range.

Wait 20 s or until the glider has turned 360°, then over a period of 2 s further activate the same control to 50 % of the remaining range, and wait 20 s or until the glider has turned another 360°, or the glider has obviously entered a spin.

Camera axis: Camera not required

~~5.5.19.17~~5.5.18.17 Low speed spin tendency test

Stabilise the glider in straight flight at low speed.

Then over a period of 2 s further activate one control to 50 % of the remaining range (i. e. to 75 % of the symmetric control travel) without releasing the other, and wait for 60 s or until the glider has turned 360°, or the glider has obviously entered a spin.

Camera axis: Any axis

~~5.5.19.18~~5.5.18.18 Recovery from a developed spin test

Stabilise the glider in straight flight at low speed.

Induce a spin with as little pitch and roll as possible by rapidly lowering one control to its maximum range whilst releasing the other.

Release the inside control while the glider is above the pilot after about one turn of spin rotation, inducing as little pitch and roll as possible. Assess the behaviour.

Where the total weight in flight exceeds 170 kg, the maximum weight test will be conducted at a total weight in flight of 170 kg.

Camera axis: Any axis

~~5.5.19.19~~5.5.18.19 **B-line stall test**

Stabilise the glider in straight flight at trim speed.

Quickly pull down the B-riser maillons symmetrically until the maillons reach the main connectors, or until a mechanical limit (e.g. interference with the accelerator or other risers) is reached.

Wait 5 s, then quickly and symmetrically fully release the risers in a period of not more than 1 s.

If a special technique for entry is required then this information shall be contained in the user's manual, and these instructions shall be followed by the test pilot.

Where the total weight in flight exceeds 170 kg, the maximum weight test will be conducted at a total weight in flight of 170 kg.

Camera axis: Profile

~~5.5.19.20~~5.5.18.20 **Big ears test**

Stabilise the glider in straight flight at trim speed.

Collapse approximately 30 % of the span at each tip by twisting down the appropriate lines simultaneously. Note the glider's behaviour.

After at least 10 s let go of both ears simultaneously.

The pilot shall take no further action and remains passive until the glider either recovers, or 5 s elapses.

If the glider has not recovered, the pilot acts to recover the glider.

If the glider is equipped with special big ears handles or if special entry or exit techniques are required, then this information shall be contained in the user's manual, and these instructions shall be followed by the test pilot.

Camera axis: Profile

~~5.5.19.21~~5.5.18.21 **Big ears in accelerated flight test**

Stabilise the glider in straight flight at trim speed.

Collapse approximately 30 % of the span at each tip by twisting down the appropriate lines simultaneously.

Fully apply the accelerator and note the glider's behaviour.

After at least 10 s release the accelerator quickly, and immediately let go both ears simultaneously.

The pilot shall take no further action and remains passive until the glider either recovers, or 5 s elapses.

If the glider has not recovered, the pilot acts to recover the glider.

To evaluate the behaviour of the glider when releasing the accelerator while maintaining big ears, collapse approximately 30 % of the span at each tip by twisting down the appropriate lines simultaneously.

Fully apply the accelerator.

After at least 10 s release the accelerator quickly and note the glider's behaviour while maintaining the big ears.

If the glider is equipped with special big ears handles or if special entry or exit techniques are required, then this information shall be contained in the user's manual, and these instructions shall be followed by the test pilot.

Camera axis: Profile

~~5.5.19.22~~5.5.18.22 Alternative means of directional control

Stabilise the glider in straight flight at trim speed.

Apply the alternative control method recommended in the user's manual without affecting the primary controls and perform a 180° turn.

Wait for 20 s or until the turn is completed.

Camera axis: Any axis

~~5.5.19.23~~5.5.18.23 Testing any other flight procedure and/or configuration described in the user's manual

Check whether every other flight procedure and/or configuration described in the user's manual can be flown safely.

This requirement may be satisfied by the manufacturer producing suitable and acceptable evidence (e.g. video).

Camera axis: Camera not required

6 Test files

6.1 Test file information

The test files shall include:

a) version of the current EN 926-2 standard

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~~a)~~b) name and address of the manufacturer;

~~b)~~c) name and address of the person or company presenting the paraglider for testing (if different from manufacturer);

~~c)~~d) model and reference of the paraglider tested;

~~d)~~e) model,size, dimensions of harness(es) used during the test;

~~e)~~f) class of the paraglider tested;

~~f)~~g) results of each test programme according to 4.4.1 to 4.4.23 (this should include a note detailing whether this test was performed with the use of folding lines or using any other special procedure permitted in the details of test manoeuvres described in 5.5.~~19~~18);

~~g)~~h) name and address of the testing laboratory;

~~h)~~i) names of the test pilots;

~~i)~~j) unique identifying test reference number.

6.2 Items accompanying the test files

The following items shall accompany the test files and be filed by the testing laboratory:

a) video recording of the tests;

b) manufacturing record;

c) user's manual;

d) paraglider that has undergone testing.

e) This documentation shall be archived for a minimum of 15 years and the tested paraglider for a minimum of 5 years.

7 User's manual

The user's manual should be supplied in English and in the majority language(s) of any country in which the paraglider is intended to be sold.

It shall always accompany the paraglider and shall include and specify the following elements that shall be checked by test laboratory:

a) General information:

   1) paraglider model name;

   2) name and address of the manufacturer;

   3) name and address of person or company having presented the paraglider for testing (if different from manufacturer);

   4) minimum and maximum total weight in flight;

   5) maximum symmetric control travel at maximum weight in flight;

   6) introduction to the intended use of the paraglider;

   7) class of the paraglider according to this document;

   8) harness dimensions used during testing

   9) version and date of issue of the user's manual;

b) Manufacturer's recommendations on the levels of pilot skills required for safe operation; the paraglider shall not be recommended for less experienced pilots than laid down for its class in Table 1;

c) Dimensions, illustrations and characteristics:

   1) overall illustration identifying all components essential for operation;

2) wing span (laid flat including stabilisers, manufacturer’s information);

3) projected area (manufacturer’s information);

4) number of cells;

5) number of risers;

6) trimmers, with travel in centimetres. If no trimmers are present, this fact has to be clearly specified;

7) accelerator, with travel in centimetres. If no accelerator is present, this fact has to be clearly specified;

8) any other adjustable or removable or variable device, with information on adjustment limits (if applicable). If no such device is present, this fact shall be clearly specified;

9) dimensioned drawings of all suspension lines including the control lines;

10) dimensions shall include both individual section lengths, and the overall lengths measured from the lower surface of the canopy to the inside edge of the maillon connecting them to the risers (see Annex A);

11) line lengths shall be specified when measured under a tension of 50 N, this tension being slowly and gradually applied before taking the measurement;

12) dimensioned drawings of the risers;

13) compliance of the test samples' suspension lines, control lines and risers with the dimensions given in the user's manual shall be checked by the testing laboratory after the test flights have been completed;

14) overall line lengths actually measured shall not differ more than $\pm$ 10 mm from the lengths laid down in the user's manual;

15) riser lengths actually measured shall not differ more than $\pm$ 5 mm from the lengths laid down in the user's manual;

d) the manufacturer's recommendations on all necessary piloting techniques in particular these recommendations shall describe and specify:

1) harness dimension used during testing

2) pre-flight inspection procedure

3) normal piloting techniques including the procedure for laying out the wing before inflation/take-off;

4) use of trimmers, accelerator and any other devices;

5) recovery from involuntary abnormal flight conditions (deep stall, asymmetric collapse etc.);

6) rapid descent procedure(s);

7) procedure for steering in case of failure of the primary controls;

8) any other special flying procedure and/or configuration the manufacturer suggests to apply;

e) Repair and maintenance instructions; in particular these instructions shall describe and specify:

1) general information on maintaining and repairing the paraglider;

2) recommended frequency of inspections in months from purchase or accumulated hours flying time (whichever comes first);

3) a thorough inspection of all components (including checking suspension line strength, line geometry, riser geometry and permeability of the canopy material) shall be recommended at least every 36 months or 150 hours flying time (whichever comes first);

4) detailed instructions on any repair- and maintenance procedures that can be performed without special knowledge or special machinery;

5) list of spare parts and information how to obtain them.

8 Manufacturing record

The manufacturing record supplied by the manufacturer shall contain the following information:

a) name and address of manufacturer;

b) name and address of person or company presenting the paraglider for testing (if different from manufacturer);

c) name of model;

d) year (four digits) and month of manufacture of the sample tested;

e) minimum and maximum total weight in flight;

f) user's manual with date of issue and version number;

g) dimensioned and toleranced drawings;

The drawings are provided in an annex to the manufacturing record. They permit the suspension lines to be clearly seen and also give a plan view of all the components of the paraglider.

If folding lines have been provided for the flight tests, their locations must be detailed on the drawings.

It is possible to provide these drawings on binary media (as long as their format is readable with standard office software), but the suspension lines and plan view drawings shall necessarily be on paper.

h) list of components and materials;

All the materials used shall be listed with:

1) name of the material;

2) name and references of the manufacturer;

3) its specific use in the paraglider;

4) characteristics and tests carried out on this material by the supplier or manufacturer.

9 Marking

The conformity of the paraglider to the requirements of this document shall be stated on a stamp or label permanently fixed to the canopy, which shall include the following information:

a) manufacturer's name;

b) name of person or company having presented the paraglider for testing (if different from manufacturer);

c) paraglider model name;

d) class of the paraglider;

e) harness chest strap dimensions (distance between center of base of connectors)

f) number of this document, i. e. EN 926-2, and issue date;

g) references to any other standards the paraglider is in compliance with;

h) year (four digits) and month of manufacture;

i) serial number;

j) minimum and maximum total weight in flight (kg);

k) paraglider weight (wing, lines, risers) (kg);

l) projected area (m^2);

m) number of risers;

n) accelerator: yes or no;

o) trimmer: yes or no;

p) inspections (whichever is earlier);

   1) number of (months);

   2) number of (hours flying time).

q) conformity tests carried out by (name and address of the testing laboratory);

r) unique identifying test reference number;

s) warning: Before use refer to the user's manual.

Annex A
(normative)

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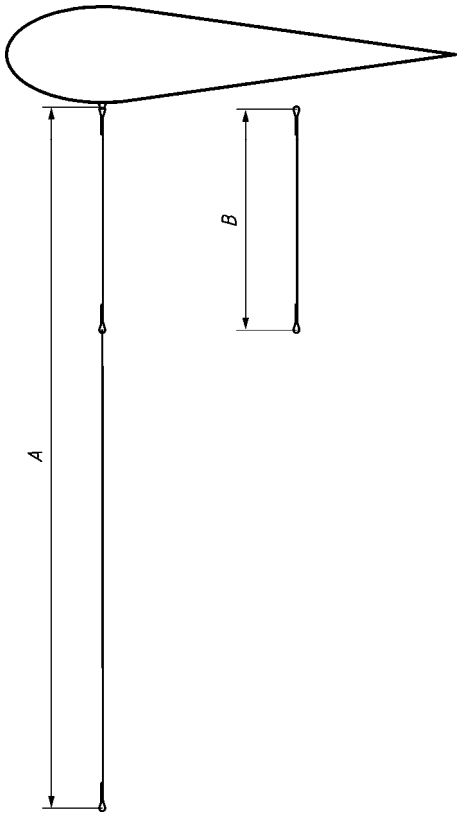
Measuring suspension line lengths



Key

A Overall suspension line length
B Suspension line section length

Figure A.~~A.~~1 — Measuring suspension line lengths

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