

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

AIR TURQUOISE SA certified by

Flight test report: EN

BUREAU VERITA:

Manufacturer Niviuk Gliders / Air Games Certification number PG_0393.2010 Address C. Del Ter, 6 - Nave D Date of flight test 18.01.2011 17165 La Cellera de Ter

> Girona Spain

Place of test Representative None Villeneuve

Glider model **Takoo 2-42** Classification В

yes: opened Trimmer

> Test pilot Zoller Alain Thurnheer Claude Harness Gin Gliders - Gingo 2 L Advance - Bi-pro 2

Name	Total weight in flight (kg)	130		220	
Special take off technique required No A No A 2. Landing A No A No A Special landing technique required No A No A No A 3. Speed in straight flight B F F Time speed more than 30 km/h Yes A Yes A A Seed ange using the controls larger than 10 km/h Yes A 2 Skm/h to 30 km/h A	1. Inflation/Take-off	A			
2. Landing A Special landing technique required No A No A 3. Speed in straight flight B - - 17 min speed more than 30 km/h Yes A Yes A A Control movement A Feed range using the controls larger than 10 km/h Yes A Yes A 4. Control movement A A Yes A Shan/h to 30 km/h B 4. Control movement A A Yes A Shan/h to 30 km/h B 4. Control movement A A Yes A Shan/h to 30 km/h B 4. Control movement A A Yes A Shan/h to 30 km/h B 4. Control movement A A A Yes A Shan/h to 30 km/h B 4. Control movement A A A Yes A Indianal shank	Rising behaviour	Smooth, easy and constant rising	Α	Smooth, easy and constant rising	Α
Special landing technique required No A No A 3. Speed in straight flight B Trim speed more than 30 km/h Yes A Yes A Speed range using the controls larger than 10 km/h Yes A Yes A Minimum speed Less than 25 km/h A Yes A Minimum speed A Ves A 25 km/h to 30 km/h B 4. Control movement A A 25 km/h to 30 km/h B Max. weight in flight 180 kg to 100 kg Increasing / greater than 100 kg Increasing / greater than 65 cm A Increasing / greater than 100 kg Increasing / greater than 65 cm A	Special take off technique required	No	Α	No	Α
3. Speed in straight flight B Trim speed more than 30 km/h Yes A Yes A Speed range using the controls larger than 10 km/h Yes A Yes A Minimum speed Less than 25 km/h A Yes km/h to 30 km/h B 4. Control movement A A 25 km/h to 30 km/h B Max. weight in flight up to 80 kg not available 0 not available 0 Symmetric control pressure / travel not available 0 not available 0 Max. weight in flight greater than 100 kg Travel Increasing / greater than 65 cm A Increasing / greater than 65 cm A Symmetric control pressure / travel Increasing / greater than 65 cm A Increasing / greater than 65 cm A Symmetric control pressure / travel Increasing / greater than 65 cm A Increasing / greater than 65 cm A Symmetric control pressure / travel not available 0 Increasing / greater than 65 cm A Symmetric control pressure / travel not available 0 not available <td< td=""><td>2. Landing</td><td>A</td><td></td><td></td><td></td></td<>	2. Landing	A			
Tim speed more than 30 km/h Yes A Yes A Yes A Mes A Minimum speed Less than 25 km/h A 25 km/h to 30 km/h B 4. Control movement Ax. weight in flight up to 80 kg Symmetric control pressure / travel Max. weight in flight 80 kg to 100 kg Symmetric control pressure / travel Max. weight in flight greater than 100 kg Symmetric control pressure / travel Max. weight in flight greater than 100 kg Symmetric control pressure / travel Max. weight in flight greater than 100 kg Symmetric control pressure / travel Max. weight in flight greater than 100 kg Symmetric control pressure / travel Increasing / greater than 65 cm A	Special landing technique required	No	Α	No	Α
Speed range using the controls larger than 10 km/h Yes A Yes A Minimum speed Less than 25 km/h A 25 km/h to 30 km/h B 4. Control movement A Max. weight in flight up to 80 kg Symmetric control pressure / travel not available 0 not available 0 Symmetric control pressure / travel not available 0 not available 0 Max. weight in flight greater than 100 kg Value (a) 0 not available 0 Symmetric control pressure / travel Increasing / greater than 65 cm A Increasing / greater than 65 cm A Max. weight in flight greater than 100 kg Value (a) Value (a) Value (a) Value (a) A Max. weight in flight greater than 100 kg Value (a) Value (a) A Increasing / greater than 65 cm A Increasing / greater than 65 cm<	3. Speed in straight flight	В			
Minimum speed Less than 25 km/h A 25 km/h to 30 km/h B 4. Control movement A Max. weight in flight up to 80 kg not available 0 not available 0 Symmetric control pressure / travel not available 0 not available 0 Symmetric control pressure / travel Increasing / greater than 65 cm A Increasing / greater than 65 cm A Increasing / greater than 65 cm A 5. Pitch stability exiting accelerated flight 0 not available 0 not available 0 Collapse occurs not available 0 not available 0 not available 0 6. Pitch stability operating controls during accelerated flight 0 not available 0 not available 0 6. Pitch stability operating controls during accelerated flight 0 not available 0 not available 0 0 not available 0 6. Pitch stability and damping A A Reducing A Reducing A Reducing A Reducing A 7. Roll stability and damping A Stability in gentle spirals	Trim speed more than 30 km/h	Yes	Α	Yes	Α
A. Control movement Max. weight in flight up to 80 kg Symmetric control pressure / travel Max. weight in flight 80 kg to 100 kg Symmetric control pressure / travel not available o not ava	Speed range using the controls larger than 10 km/h	Yes	Α	Yes	Α
Symmetric control pressure / travel not available 0 not availa	Minimum speed	Less than 25 km/h	Α	25 km/h to 30 km/h	В
Symmetric control pressure / travel not available not avai	4. Control movement	A			
Max. weight in flight 80 kg to 100 kg Symmetric control pressure / travel not available 0 not available 1 not available 2 not available 3 not available 2 not available 3 not available 2 not available 3 not	Max. weight in flight up to 80 kg				
Symmetric control pressure / travel not available 0 not availa	Symmetric control pressure / travel	not available	0	not available	0
Max. weight in flight greater than 100 kg A Increasing / greater than 65 cm A Increasing / greater than 65 cm <t< td=""><td>Max. weight in flight 80 kg to 100 kg</td><td></td><td></td><td></td><td></td></t<>	Max. weight in flight 80 kg to 100 kg				
Symmetric control pressure / travel Increasing / greater than 65 cm A Incr	Symmetric control pressure / travel	not available	0	not available	0
5. Pitch stability exiting accelerated flight 0 Dive forward angle on exit not available 0 not available 0 Collapse occurs not available 0 not available 0 6. Pitch stability operating controls during accelerated flight 0 not available 0 not available 0 Collapse occurs not available 0 not available 0 not available 0 7. Roll stability and damping A A Reducing A Reducing A 8. Stability in gentle spirals A A Reducing A 8. Stability in gentle spirals A Spontaneous exit A 9. Behaviour in a steeply banked turn B Spontaneous exit A 9. Behaviour in a steeply banked turn B A More than 14 m/s B 10. Symmetric front collapse B A Rocking back less than 45° A Recovery Rocking back less than 45° A Rocking back less than 45° A Cascade occurs No A Dive forward 0° to 30° / Keeping course A Dive forward 0° to 30° / Keepi	Max. weight in flight greater than 100 kg				
Dive forward angle on exit Collapse occurs not available ont av	Symmetric control pressure / travel	Increasing / greater than 65 cm	Α	Increasing / greater than 65 cm	Α
Collapse occurs not available 0 not available 0 not available 0 6. Pitch stability operating controls during accelerated flight Collapse occurs not available 0 not availabl	5. Pitch stability exiting accelerated flight	0			
6. Pitch stability operating controls during accelerated flight Collapse occurs not available 0 not available 1 No not availabe 1 No not available 1 No not available 1	Dive forward angle on exit	not available	0	not available	0
flightCollapse occursnot available0not available07. Roll stability and dampingAReducingAReducingAOscillationsReducingAReducingA8. Stability in gentle spiralsASpontaneous exitASpontaneous exitA7. Endency to return to straight flightSpontaneous exitASpontaneous exitA9. Behaviour in a steeply banked turnBUp to 12 m/sAMore than 14 m/sBSink rate after two turnsUp to 12 m/sAMore than 14 m/sB10. Symmetric front collapseBEntryRocking back less than 45°ARocking back less than 45°ARecoverySpontaneous in 3 s to 5 sBSpontaneous in less than 3 sADive forward angle on exit / Change of courseDive forward 0° to 30° / Keeping courseADive forward 0° to 30° / Keeping courseACascade occursNoANoANo	Collapse occurs	not available	0	not available	0
7. Roll stability and damping Oscillations Reducing Reducing A Reducing A 8. Stability in gentle spirals A Tendency to return to straight flight Spontaneous exit A Spontaneous exit A 9. Behaviour in a steeply banked turn B Sink rate after two turns Up to 12 m/s A More than 14 m/s B Entry Rocking back less than 45° A Recovery Spontaneous in 3 s to 5 s B Spontaneous in less than 3 s A Dive forward angle on exit / Change of course No No A Reducing A Reducing A Reducing A Spontaneous exit A Spontaneous exit A Spontaneous exit A Spontaneous exit A More than 14 m/s B Spontaneous in less than 45° A Rocking back less than 3 s A Dive forward 0° to 30° / Keeping course No No No A No No A No Reducing		0			
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8. Stability in gentle spirals Tendency to return to straight flight Spontaneous exit A Spontaneous exit A 9. Behaviour in a steeply banked turn B Sink rate after two turns Up to 12 m/s A More than 14 m/s B Entry Rocking back less than 45° A Rocking back less than 45° A Rocking back less than 45° A Rocking back less than 3 s A Pive forward angle on exit / Change of course Cascade occurs No A No A No A No A	7. Roll stability and damping	A			
Tendency to return to straight flight Spontaneous exit A More than 14 m/s B Spontaneous in 14 m/s B Spontaneous in 2 m Spontaneous in 3 m Sto 5 m Spontaneous in less than 45° A Recovery Spontaneous in 3 m Sto 5 m Spontaneous in less than 3 m Spontaneous in less than 3 m Spontaneous in 18 m Spontaneo	Oscillations	Reducing	Α	Reducing	Α
9. Behaviour in a steeply banked turn Sink rate after two turns Up to 12 m/s A More than 14 m/s B 10. Symmetric front collapse B Entry Rocking back less than 45° A Dive forward angle on exit / Change of course Dive forward 0° to 30° / Keeping course Cascade occurs No A No A No A	8. Stability in gentle spirals	A			
Sink rate after two turns Up to 12 m/s A More than 14 m/s B 10. Symmetric front collapse B Entry Rocking back less than 45° A Recovery Spontaneous in 3 s to 5 s Dive forward angle on exit / Change of course Dive forward 0° to 30° / Keeping course Cascade occurs No A More than 14 m/s B Spontaneous in 14 m/s B A Rocking back less than 45° A Poive forward 0° to 30° / Keeping course A Dive forward 0° to 30° / Keeping course A No A No A	Tendency to return to straight flight	Spontaneous exit	Α	Spontaneous exit	Α
B Entry Rocking back less than 45° A Rocking back less than 45° A Recovery Spontaneous in 3 s to 5 s B Spontaneous in less than 3 s A Dive forward angle on exit / Change of course Dive forward 0° to 30° / Keeping course A Dive forward 0° to 30° / Keeping course A Cascade occurs No A No A	9. Behaviour in a steeply banked turn	В			
Entry Recovery Spontaneous in 3 s to 5 s Dive forward angle on exit / Change of course Dive forward 0° to 30° / Keeping course Cascade occurs A Rocking back less than 45° A Rocking back less than 45° A Pointaneous in less than 3 s A Dive forward 0° to 30° / Keeping course A Dive forward 0° to 30° / Keeping course A No A No A	Sink rate after two turns	Up to 12 m/s	Α	More than 14 m/s	В
Recovery Spontaneous in 3 s to 5 s B Spontaneous in less than 3 s A Dive forward angle on exit / Change of course Dive forward 0° to 30° / Keeping course Cascade occurs No A No A Spontaneous in less than 3 s A Dive forward 0° to 30° / Keeping course A Dive forward 0° to 30° / Keeping course	10. Symmetric front collapse	В			
Dive forward angle on exit / Change of course Dive forward 0° to 30° / Keeping course Dive forward 0° to 30° / Keeping course A Dive forward 0° to 30° / Keeping course A No A	Entry	Rocking back less than 45°	Α	Rocking back less than 45°	Α
Cascade occurs Course Course A No A	Recovery	Spontaneous in 3 s to 5 s	В	Spontaneous in less than 3 s	Α
	Dive forward angle on exit / Change of course	. 0	Α		Α
With accelerator	Cascade occurs	No	Α	No	Α
	With accelerator				

Entry	not available	0	not available	0
Recovery	not available	0	not available	0
Dive forward angle on exit / Change of course	not available	0	not available	0
Cascade occurs	not available	0	not available	0
11. Exiting deep stall (parachutal stall)	Α			
Deep stall achieved	No	Α	Yes	Α
Recovery	Spontaneous in less than 3 s	Α	Spontaneous in less than 3 s	Α
Dive forward angle on exit	Dive forward 0° to 30°	Α	Dive forward 0° to 30°	Α
Change of course	Changing course less than 45°	Α	Changing course less than 45°	Α
Cascade occurs	No	Α	No	Α
12. High angle of attack recovery	Α			
Recovery	Spontaneous in less than 3 s	Α	Spontaneous in less than 3 s	Α
Cascade occurs	No	Α	No	Α
13. Recovery from a developed full stall	В			
Dive forward angle on exit	Dive forward 0° to 30°	Α	Dive forward 30° to 60°	В
Collapse	No collapse	Α	No collapse	Α
Cascade occurs (other than collapses)	No	Α	No	Α
Rocking back	Less than 45°	Α	Less than 45°	Α
Line tension	Most lines tight	Α	Most lines tight	Α
14. Asymmetric collapse	В			
With 50% collapse				
Change of course until re-inflation / Maximum dive forward or roll angle	Less than 90° / Dive or roll angle 0° to 15°	Α	Less than 90° / Dive or roll angle 15° to 45°	Α
Re-inflation behaviour	Spontaneous re-inflation	Α	Spontaneous re-inflation	Α
Total change of course	Less than 360°	Α	Less than 360°	Α
Collapse on the opposite side occurs	No	Α	No	Α
Twist occurs	No	Α	No	Α
Cascade occurs	No	Α	No	Α
With 75% collapse				
Change of course until re-inflation / Maximum dive forward or roll angle	90° to 180° / Dive or roll angle 15° to 45°	В	90° to 180° / Dive or roll angle 15° to 45°	В
Re-inflation behaviour	Spontaneous re-inflation	Α	Spontaneous re-inflation	Α
Total change of course	Less than 360°	Α	Less than 360°	Α
Collapse on the opposite side occurs	No	Α	No	Α
Twist occurs	No	Α	No	Α
Cascade occurs	No	Α	No	Α
With 50% collapse and accelerator				
Change of course until re-inflation / Maximum dive forward or roll angle	not available	0	not available	0
Re-inflation behaviour	not available	0	not available	0
Total change of course	not available	0	not available	0
Collapse on the opposite side occurs	not available	0	not available	0
Twist occurs	not available	0	not available	0
Cascade occurs	not available	0	not available	0
With 75% collapse and accelerator				
Change of course until re-inflation / Maximum dive forward or roll angle	not available	0	not available	0
Re-inflation behaviour	not available	0	not available	0
Total change of course	not available	0	not available	0
Collapse on the opposite side occurs	not available	0	not available	0
Twist occurs	not available	0	not available	0
Cascade occurs	not available	0	not available	0
15. Directional control with a maintained asymmetric collapse	A			
Able to keep course	Yes	Α	Yes	Α
180° turn away from the collapsed side possible in 10 s	Yes	Α	Yes	Α
Amount of control range between turn and stall or spin	More than 50 % of the symmetric control travel	Α	More than 50 % of the symmetric control travel	Α

16. Trim speed spin tendency	A			
Spin occurs	No	Α	No	Α
17. Low speed spin tendency	A			
Spin occurs	No	Α	No	Α
18. Recovery from a developed spin	Α			
Spin rotation angle after release	Stops spinning in less than 90°	Α	Stops spinning in less than 90°	Α
Cascade occurs	No	Α	No	Α
19. B-line stall	A			
Change of course before release	Changing course less than 45°	Α	Changing course less than 45°	Α
Behaviour before release	Remains stable with straight span	Α	Remains stable with straight span	Α
Recovery	Spontaneous in less than 3 s	Α	Spontaneous in less than 3 s	Α
Dive forward angle on exit	Dive forward 0° to 30°	Α	Dive forward 0° to 30°	Α
Cascade occurs	No	Α	No	Α
20. Big ears	В			
Entry procedure	Dedicated controls	Α	Dedicated controls	Α
Behaviour during big ears	Stable flight	Α	Stable flight	Α
Recovery	Recovery through pilot action in less than a further 3 s	В	Spontaneous in 3 s to 5 s	В
Dive forward angle on exit	Dive forward 0° to 30°	Α	Dive forward 0° to 30°	Α
21. Big ears in accelerated flight	0			
Entry procedure	not available	0	not available	0
Behaviour during big ears	not available	0	not available	0
Recovery	not available	0	not available	0
Dive forward angle on exit	not available	0	not available	0
Behaviour immediately after releasing the accelerator while maintaining big ears	not available	0	not available	0
22. Behaviour exiting a steep spiral	A			
Tendency to return to straight flight	Spontaneous exit	Α	Spontaneous exit	Α
Turn angle to recover normal flight	Less than 720°, spontaneous recovery	Α	Less than 720°, spontaneous recovery	Α
Sink rate when evaluating spiral stability [m/s]	17		24	
23. Alternative means of directional control	A			
180° turn achievable in 20 s	Yes	Α	Yes	Α
Stall or spin occurs	No	Α	No	Α
24. Any other flight procedure and/or configuration described in the user's manual	A			
Procedure works as described	not available	0	Yes	Α
Procedure suitable for novice pilots	not available	0	Yes	Α
Cascade occurs	not available	0	No	Α
25. Comments of test pilot				
Comments				