BRITISH MICROLIGHT AIRCRAFT ASSOCIATION

MICROLIGHT TYPE ACCEPTANCE DATA SHEET (TADS)

NO: BMO-26 ISSUE: 1

TYPE:
WILLOW
(BMAA Designation: Dual Sealeander/Willow)
(G-MMMH: only example of type)

(1) MANUFACTURER:
Wing: Flexiform Skysails Ltd (UK)
Trike: M J Hadland (UK)

(2) UK IMPORTER:
N/A

(3) CERTIFICATION BASIS:
BCAR Section S requirements listed in CAA document dated 17th January 1986, ref: 9/30/UL18

(4) DEFINITION OF BASIC DESIGN STANDARD:
Not available (but see appendix)

(5) DIMENSIONS/WEIGHTS FOR COMPLIANCE WITH MICROLIGHT DEFINITION

(a) Wing area (inc canard area, excluding winglets):
19.0 m² (nominal)
(b) Span:
11.36 m
(c) Standard Mean Chord:
1.67 m
(d) Dry Empty Weight:
147 kg
(e) Max Take-Off Weight:
309 kg
(f) Wing Loading (Weight Empty/Wing Area):
7.74 m²
(g) Wing Loading (Max Take-Off Weight/Wing Area):
16.26 kg/m²
(h) Fuel Capacity:
25 litres

DOCUMENT ISSUE STATUS

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<th>Issue Number</th>
<th>Revision Reference</th>
<th>Date</th>
<th>Authorisation</th>
<th>Pages affected</th>
<th>Valid pages at this Issue number</th>
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<tr>
<td>1</td>
<td>New MAAN 1108</td>
<td>14.12.93</td>
<td>BMAA</td>
<td>All new</td>
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### (6) POWER PLANTS

<table>
<thead>
<tr>
<th>Designation</th>
<th>Willow</th>
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<tbody>
<tr>
<td>Engine Type</td>
<td>BMW R60/6</td>
</tr>
<tr>
<td></td>
<td>(modified)</td>
</tr>
<tr>
<td></td>
<td>Horizontal</td>
</tr>
<tr>
<td>Reduction</td>
<td>2.7:1</td>
</tr>
<tr>
<td>Gear/ratio</td>
<td></td>
</tr>
<tr>
<td>Exhaust System</td>
<td>Morris</td>
</tr>
<tr>
<td></td>
<td>Marina rear</td>
</tr>
<tr>
<td></td>
<td>silencer box</td>
</tr>
<tr>
<td>Intake System</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Propeller Type</td>
<td>Hadland</td>
</tr>
<tr>
<td></td>
<td>2 blade wood</td>
</tr>
<tr>
<td>Propeller Dia x Pitch</td>
<td>62&quot; x 27&quot;</td>
</tr>
<tr>
<td>Noise Type</td>
<td>143M</td>
</tr>
<tr>
<td>Cert. No.</td>
<td>Issue 1</td>
</tr>
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**MANDATORY LIMITATIONS:** (* indicates which are placarded)

*(a)* Max Take-off Weight: 309 kg

*(b)* C G Limits: N/A - weightshift

*(c)* C G Datum: -

*(d)* Cockpit Loadings

<table>
<thead>
<tr>
<th>Pilot or Ballast (min)</th>
<th>Front</th>
<th>Rear</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>65 kg</td>
<td>- kg</td>
<td>65 kg</td>
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</tbody>
</table>

*(e)* Permanent Ballast, Weight and Position: Not fitted.

*(f)* Empty C G: -

*(g)* Never Exceed Speed: 69 mph

*(h)* Manoeuvring Speed: 43 mph

*(i)* Manoeuvre Limitations: Aerobatics prohibited. Roll <60° bank Pitch <+/- 30°

*(j)* Fuel Contents (Max Usable): 25 litres

*(k)* Power Plant: See Table below

<table>
<thead>
<tr>
<th>ENGINE</th>
<th>BMW R60/6 (modified)</th>
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<tbody>
<tr>
<td>Max RPM</td>
<td>7200</td>
</tr>
<tr>
<td>Max CHT</td>
<td>N/A</td>
</tr>
<tr>
<td>Max EGT</td>
<td>N/A</td>
</tr>
<tr>
<td>Fuel Spec</td>
<td>98 Oct (min) Petrol</td>
</tr>
<tr>
<td>Engine Oil Spec</td>
<td>4 stroke multigrade</td>
</tr>
<tr>
<td>Gearbox Oil Spec</td>
<td>N/A</td>
</tr>
<tr>
<td>Fuel/Oil Mix</td>
<td>N/A</td>
</tr>
<tr>
<td>Oil Pressure</td>
<td>7 psi: idle 40 psi: cruise</td>
</tr>
<tr>
<td>Oil Temp</td>
<td>N/A</td>
</tr>
<tr>
<td>Coolant Temp</td>
<td>N/A</td>
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(8) INSTRUMENTS REQUIRED FOR TYPE ACCEPTANCE:

<table>
<thead>
<tr>
<th></th>
<th>ASI</th>
<th>Altimeter</th>
<th>RPM</th>
<th>CHT</th>
<th>Compass</th>
<th>EGT</th>
<th>Coolant Temp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Required</td>
<td></td>
<td>Required</td>
<td></td>
<td></td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>0 to &gt;70 mph</td>
<td></td>
<td>Required</td>
<td></td>
<td></td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>or equivalent</td>
<td></td>
<td>Wrist type</td>
<td></td>
<td></td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>N/A</td>
<td></td>
<td>acceptable</td>
<td></td>
<td></td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
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(9) CONTROL DEFLECTIONS (3-AXIS SYSTEMS): N/A – weightshift

<table>
<thead>
<tr>
<th>Control</th>
<th>Pitch Control</th>
<th>Tailplane Trim</th>
<th>Ailerons</th>
<th>Rudder</th>
<th>Steering</th>
<th>Spoilers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up:</td>
<td>Up:</td>
<td>Up:</td>
<td>Up:</td>
<td>Left:</td>
<td>Left:</td>
<td>N/A</td>
</tr>
<tr>
<td>Down:</td>
<td>Down:</td>
<td>Down:</td>
<td>Down:</td>
<td>Right:</td>
<td>Right:</td>
<td></td>
</tr>
</tbody>
</table>

(10) PILOT'S NOTES, MAINTENANCE MANUALS REFERENCES:

BMAA document: MAAN 1108
FlexiforlJ! Skysails 'Pilot Instructions' handbook

(11) MANDATORY MODIFICATIONS/SERVICE BULLETINS/AIRWORTHINESS DIRECTIVES, ETC

See Appendix 1
BMAA Defect Warning Report No 024.

(12) APPROVED OPTIONAL MODIFICATIONS

(13) MINIMUM PERFORMANCE AT MAX T/O WEIGHT:

Rate of Climb: 470 ft/minute
Climb speed: 42 mph
Stall or Minimum Flying Speed: 32 mph
Note: Drawings and/or colour photographs illustrating the principal features of the aircraft described herein shall be attached to and form part of this Data Sheet.

<table>
<thead>
<tr>
<th>Issue</th>
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<tr>
<td>1</td>
<td>BMAA</td>
<td>17 December 1993</td>
<td>P.R. Curtis</td>
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APPENDIX 1.

a) Modifications:

The following standard modifications are required for the Willow:

1) Required modifications called up in BMAA Defect Warning report No 024 dated 19.11.85, covering:
   i) extension to bowsprit
   ii) revision of outer rigging cables between bowsprit and leading edge.
   iii) revision of the top front rigging
   iv) revision of control frame to bowsprit rigging
   v) addition of control frame to noseplate rigging
   vi) revision of inner wing wires
   vii) reinforcement sleeving of control frame uprights.

2) A monopole steel backup cable of at least 4 mm diameter is to be installed. The cable should be installed in such a way as to ensure that it is held securely to the monopole structure at regular intervals along its length.

3) Fire resistant fuel line must be fitted and routed as far as possible on the opposite side of the engine to the exhaust, in accordance with BMAA document TIL Series No 0007.

4) An on-off fuel cock is to be installed in the fuel line. The fuel cock is to have positive stops in the ON and OFF positions and these are to be clearly marked.

5) Fire resistant ignition switch wiring adjacent to the engine must be installed in accordance with BMAA document TIL Series No 0007, so that in the event of an engine fire, the engine can be stopped.

6) The following cockpit placards are to be installed:
   i) Max take off weight: 309 kg.
   ii) Max load per seat: 90 kg.
   iii) TOTAL cockpit load NOT to exceed 144 kg.
   iv) Min cockpit load: 65 kg.
   v) Never Exceed Speed \( V_{NE} \): 69 mph.
   vi) Manoeuvring Speed \( V_A \): 43 mph.
   vii) Stall speed: 32 mph.
   viii) Usable fuel capacity: 25 litres
   ix) Placard to the effect that aerobatics and spinning are prohibited.
   x) Placard restricting bank angle to 60° and pitch angle to \(+/-\) 30°.
   xi) Placard requiring occupants to wear safety helmets when flying the aircraft.
   xii) Placard stating: "The load suspended by the wing must not exceed 272 kg".
   xiii) Standard Occupant Warning placard stating:

   OCCUPANT WARNING:
   THIS AEROPLANE HAS NOT BEEN SHOWN TO COMPLY WITH ANY PUBLISHED CODE OF AIRWORTHINESS
b) **Inspection:**
The following standard inspection points are applicable to the Willow:

1) Tangs and thimbles at cable terminations must be checked to ensure that, when rigging, the thimbles at each cable end are not twisted around tangs. (Use of "Never Kinks" or heat shrink tubing is recommended).

2) Cable swages must be checked for correct type AND application. If there is any (even minor) doubt about the state of a swage, or its method of application, a demonstration of the method used may be sought by the inspector. In general, swages should be finished circular and must not have "flashes" or ears of excess material when released from the compression tool. **ANY DOUBT REQUIRES CABLE REPLACEMENT.**

3) If the wing has been used with back up loops, ensure that no abrasion of the keel has occurred.

4) Examine the wing sail material to ascertain that loads applied into it from the structure are not causing local wear.

5) Ensure that where battens are fixed to the leading edge structure (particularly tip battens or tip batten brackets or holders), the method of retention is not worn and that it is unlikely to become loose.

6) The method of attachment of the wing to the trike unit is to be examined to ensure that it is extremely unlikely (in the experience of the inspector) to cause a hazardous situation.

7) Check all welded components for cracks, especially those at the engine support, seat frame and front wheel assembly.

8) Ensure that any plastic covering of welded steel components has been stripped, and an alternative non-flexible protective coating or plating used.

9) Ensure that there is no sign of cracking at the top of the seat frame where it connects to the main structure, and also where it attaches to the engine bearers.

10) Ensure that no wear or cracking has occurred where the rear footrest attaches to the keel.

11) Ensure that the propeller is securely and correctly installed.

12) Ensure that there is no sign of cracking at the top of the seat frame i) where it connects to the main structure and ii) where the engine bearers are attached.

13) Ensure that the pod and windshield are in satisfactory condition.

14) Inspect brackets for cracks or deformation of fixing holes.

15) Check bolts for corrosion.

16) Ensure that engine flexible mounts have not corroded and that the failure of any one mounting could neither cause a serious engine misalignment nor a hazardous reduction in propeller clearance.

17) Ensure that spark plug caps are securely installed.

18) Propeller bolts are to be checked for correct quality and shank length.
19) Ensure that clearance between the propeller and all rigging components is satisfactory for all ground and flight positions of the wing, throughout the complete propeller arc. Due allowance must be made for momentary reductions in cable tension which may occur when taxiing over rough ground.

20) Ensure that fuel tank is stable in its location, and cannot chafe.

21) Ensure that the layout of fuel lines does not have the potential to cause vapour locking of fuel.

22) Ensure that fuel tank pick-up tube cannot rise clear of fuel.

23) Ensure that fuel tank vent discharges clear of the aircraft structure.

24) The suitability, function and safe installation of equipment installed is to be checked.

25) Inspectors are to be satisfied that the applicant is familiar with the implications of BMAA Defect Warning Report No 024, in particular, those matters headed "OTHER POINTS ... TO NOTE".

26) Action must be taken to ensure that any bulletins issued by the BMAA affecting the aircraft are complied with.

In addition, Inspectors must pay attention to the relevant "Spotlight" and Defect Warning reports in the BMAA Inspectors' Manual.
2"x17 SWG with 178°x17 SWG SLEEVE THROUGHOUT. LOCAL REINFORCEMENT AT HANG PT., SEAT AND ENG. HTS. 156°x17 SWG

1"x16 SWG

1 1/8" x 17 SWG

1/8" x 17 SWG COLD FORMED AT CORNERS

1 1/8" x 17 FRAME

2"x17 SWG with 178°x17 SWG SLEEVE THROUGHOUT.

2'8" REINFORCING AS SHOWN "A"

C-MMMH

WILLLOW MICROLIGHT

UNMARKED DIMS IN MM

MAIN STRUCTURE, MATERIAL

TUBES : HT 30 TF SEAMLESS DRAWN

BRACKETS : HE 30 TF CHANNEL OR ANGLE

BOLTS : 4", 5", 6", 8".

'X' QUALITY
Typical Sealander/Striker wing with trike.

Not to Scale
Typical Seander/Striker wing with trike.

Not to Scale