



AIRWORTHINESS ADVICE NOTICE TAKE-OFF AND CLIMB PERFORMANCE MEASUREMENT

INTRODUCTION:

Take-off and Climb performance measurements are based on the requirements of JAR 22 (Change 5) paragraph JAR 22.51 Take-off and JAR 22.65 Climb.

TAKE-OFF

(a) For a powered sailplane the take-off distance at maximum weight and in zero wind, from rest to attaining a height of 15 m must be determined and must not exceed 500 m when taking off from a dry, level, hard surface and 600 m when taking off from dry, level, grass surface. In demonstration of the take-off distance the powered sailplane must be allowed to reach the selected speed promptly after lifting off and this speed must be maintained throughout the climb.

(b) The selected speed must not be less than;

(1) $1.3 V_{SI}$, or

(2) any lesser speed, not less than $1.15 V_{SI}$, that is shown to be safe under all reasonably expected operating conditions, including turbulence and complete engine failure.

CLIMB

(a) For a powered sailplane the time for climb from leaving the ground up to 360 m above the field must not exceed four minutes with:

- (1) not more than take-off power;
- (2) landing gear retracted;
- (3) wing flaps in take-off position;
- (4) cowl flaps (if any) in the position used in the colling

tests.

(b) For Self-Sustaining Powered Sailplanes, the maximum altitude that can be sustained must be determined.

The tests may be performed under conditions other than 15°C , nil wind and sea level. The test data under different conditions must then be reduced to standard conditions and the reduction procedure has to be described.

SIGNED:

CHIEF TECHNICAL OFFICER AIRWORTHINESS

For and on behalf of:

**THE GLIDING FEDERATION
OF AUSTRALIA**

EQUIPMENT

GPS data logger (IGC approved with pressure sensor).
Ground Observer.
If possible a Flight Observer.
Camera (preferably with data back).
2 Marker (large enough to be easily seen at 100 m).
Wind measuring equipment.
Thermometer.

SET-UP

From the flight manual or following JAR 22.49 and JAR 22.201 determine the stall speed V_{S1} of the powered sailplane at maximum take-off weight. The aircraft should be in the take-off configuration as defined in the Flight Manual. Calculate $1.3 * \text{this stall speed}$ (or 1.15 see JAR 22.51 b) and record it on the data sheet.

Measure the wind speed and direction beside the runway to be used. This should be done before each take-off by the ground observer. These measurements should be transferred to the data sheet at the end of the test flight session.

Position a marker to act as a reference for the start of each take-off (or draw a start line or use a line at the end of a runway). Position a marker 500 m away in starting direction for a hard surface or 600 m for a grass surface. The observer stands on a line perpendicular to the runway at 500 (600) m, far enough away from the runway to achieve appropriate photographs (30 to 50 m or more depending on camera lenses).

The aircraft must be flown as close as possible to the maximum take-off weight. This weight will be empty weight + pilot weights + fuel weight + ballast. This weight must be calculated before flight and estimates must be made of fuel burn during the tests.

METHOD

Align the aircraft with the start marker and bring the aircraft to a complete stop. Ensure the GPS data logger works correctly. Logging intervals of 1 second between data points are recommended. Perform the take-off and stay in a line with the runway (compensate for side wind if required).

The ground observer takes photographs each time the powered sailplane flies over the marker at 500 (600) m during the take-off tests. On the photographs the sailplane should be right over the marker. The runway, the marker and the complete sailplane must be on the picture. These pictures are made to double check the data measured with the GPS data logger and to confirm visually the clearance over the 15 m "obstacle".

The tests should be done in the early morning so that thermal activity has no effect on the performance measured. At least 4 take-offs should be measured.

TAKE-OFF PERFORMANCE TEST DATA

Type _____

VH-_____ S/N_____ G_____

Place _____ Date ____/____/____

Initial Flying Weight _____ kg. CG Position _____ mm aft of datum

1.3 * stall speed _____ kts. Field Altitude _____ ft

Runway direction _____ deg. Runway surface _____

Item	Run 1	Run 2	Run 3	Run 4
Wind direction				
Wind strength				
OAT ° C				
Relative Humidity				
Start Time				
Distance to lift off				
Distance to 50 ft				
Engine RPM Static				
Engine RPM at takeoff				
Engine on time				
Engine off time				
Fuel added litres				
Fuel used litres				
Net weight of fuel added or used kg				
Weight of aircraft at start of run kg				

The results shown in this flight test program are a true and correct record of the test flight.
SIGNED:

Test Pilot

Date

DOCUMENTATION:

Complete documentation is required by the CTO/A for certification purposes. This includes a test report consisting of the measured data and data evaluation. Data has to be reduced to standard atmosphere conditions. The report has to be signed and dated by the applicant. The original output file of the logger has to be submitted on a diskette in the IGC format without any manipulations done to it.

EXAMPLES:

Take-off performance and Climb charts.

