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AIRW-M16
Guidelines for Annual Inspections of Gliders
Airworthiness

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Revision 7.4

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Guidelines for Annual Inspections of Gliders AIRW-M16 v7.4

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TABLE OF CONTENTS

REVISION RECORD	2
TABLE OF CONTENT.....	3
1. INTRODUCTION	4
2. THE PRELIMINARIES	5
2.1 CERTIFICATES OF REGISTRATION	5
2.2 CERTIFICATE OF AIRWORTHINESS	5
2.3 LOGBOOK STATEMENT	5
2.4 THE MOST RECENT MAINTENANCE RELEASE	5
2.5 SAILPLANE LOGBOOK	6
2.6 FLIGHT AND MAINTENANCE MANUALS	6
2.7 FORM 2 KIT	6
2.7.1 FINDING MANDATORY AIRWORTHINESS DIRECTIVES	6
2.7.2 WHAT INSPECTIONS ARE DUE?	7
3. PERFORMING THE INSPECTION	8
3.1 WHERE TO START	8
3.1.1 WING FREQUENCY CHECK	8
3.1.2 CONTROL SURFACE FREEPLAY CHECK	8
3.1.3 CONTROL SURFACE DEFLECTION CHECK	8
3.1.4 FLIGHT CONTROL SYSTEM STOPS	8
3.1.5 ASI and ALTIMETER CALIBRATION	8
3.1.6 HARNESS INSPECTION	8
3.2 FATIGUE LIFE	8
3.3 LOAN EQUIPMENT	9
3.4 FILLING OUT THE FORM	9
3.5 CHECKS AFTER RIGGING THE SAILPLANE	9
3.6 LOGBOOK ENTRIES	10
3.7 GUIDANCE ON COMPLETION OF GLIDER LOGBOOKS	10

Guidelines for Annual Inspections of Gliders AIRW-M16 v7.4

1. INTRODUCTION

This guide is designed to make the Annual Inspection easier and the purpose a little clearer. It has been compiled from information contained in the GFA Manual of Standard Procedures (MOSP Part 3, Airworthiness), CASA regulations, Basic Sailplane Engineering (BSE) and accumulated experience. GFA is here to help make this clearer and to guide you to comply. Our rules are intended to make us operate in a complaint manner and to guide us on the complex regulations and exemptions that we have. GFA represent us as a group to arrange improvements. We have to operate aircraft in accordance with Australian Legislation but because we have approved differences you have agreed to operate in accordance with GFA rules in becoming a member.

The GFA additionally has the 'The RO Handbook' available on the GFA website to guide the Registered Operator (RO) and assist the GFA inspector. Note the subjects covered in the 'The RO Handbook' are not included in this guide.

Guidelines for Annual Inspections of Gliders AIRW-M16 v7.4

2. THE PRELIMINARIES

The Registered Operator must ensure that all necessary documentation is available to the inspector before the inspection. The inspector cannot begin work until all paperwork is present. The following documents will be required:

- a. Certificates of Registration (C of R)
- b. Certificate of Airworthiness (C of A)
- c. Logbook Statement (if applicable)
- d. The most recent maintenance release
- e. Sailplane Logbook
- f. Flight and Maintenance Manuals
- g. Form 2 Kit

2.1 CERTIFICATES OF REGISTRATION

The inspector must ensure that the details of the Registration Holder (RH) and Registered Operator (RO) as shown on the C of R documents are current and correct. All ADs will be sent to the RO's address. If these details are incorrect it is possible that important documentation may not have been received. ADs will be sent by e-mail. If an e-mail is not available they will be sent by mail.

Note that it is not required to get a replacement C of R when the Registration Holder has a change of address, but it is mandatory to update the new address with the GFA. The address can then be updated on the certificate. An email confirmation is all that is required. GFA will check to ensure every Form 2 return shows the correct address. If you are sure it is correct you may write "No change".

2.2 CERTIFICATE OF AIRWORTHINESS

Check the C of A or Experimental Certificate (EC) for validity and currency. If the C of A or EC is invalid, or will expire before the next Annual Inspection, it should be renewed immediately.

2.3 LOGBOOK STATEMENT

Logbook Statements have been introduced for sailplanes who's Registration Holder (owner) elects to maintain the Sailplane/Powered Sailplane in accordance with the manufacturers or alternate approved System of Maintenance (SoM). The Logbook Statement is mandatory for:

1. Sailplanes/Powered Sailplanes maintained to a SoM other than the GFA system;
2. Light Sports Aircraft (LSA);
3. Sailplanes powered by electrical motor;
4. Sailplanes that have unique maintenance requirements.

Logbook statements are located at the front of the logbook. Sailplanes/ Powered Sailplanes that are maintained in accordance with the GFA SoM are exempt from the Logbook Statement requirement.

2.4 THE MOST RECENT MAINTENANCE RELEASE

Review the most recent maintenance release to check for any Minor Defects still outstanding, and to ensure that the logbook hours are up to date. Scheduled or periodic maintenance/ inspection items and minor defects that will carry over into the next annual period should also be noted for transfer into the new Maintenance Release (MR) if required.

Guidelines for Annual Inspections of Gliders AIRW-M16 v7.4

2.5 SAILPLANE LOGBOOK

The hours must be up-to-date (check with the Maintenance Release). The logbook provides a complete record of the sailplane maintenance history that should be reviewed to check for repetitive defects, degradation of repairs, approved mods etc. and any special inspections due.

2.6 FLIGHT AND MAINTENANCE MANUALS

These provide the primary source of relevant technical information. Data such as allowable wear limits, control deflections, flight limitations, required placards etc. will be found in these manuals. They must be current up to date or updated manuals.

You should have the current National Airworthiness Authority (NAA) issued Type Certificate Data Sheet (TCDS), or if that does not exist the GFA Type Data Sheet, that will give weight & balance information, minimum equipment lists, life of components and some of the placarding requirements.

2.7 FORM 2 KIT

This data is sent by email with only the Maintenance Release posted. The email contains the paperwork documents that you can print for the Annual Inspection, and will include a copy of this guide, the Form 2 Inspection Schedule & Inspection Report, engine Appendix A, B, C or D (which ever applicable) for powered sailplanes and a copy of the types Specific & General AD and AN schedules. Latest issues of GFA ADs, ANs and AWAs can be downloaded from the AD/AN/AWA register on the GFA website.

NOTE

Not all the ADs you need to comply with are listed on the GFA schedules.
Search for additional ADs from the State-of-Design for the aircraft.

2.7.1 FINDING MANDATORY AIRWORTHINESS DIRECTIVES

From 1 October 2009 CASA changed the regulations concerning ADs aircraft operators must comply with. The registered operator (RO) is legally responsible to find and ensure the glider complies with all applicable ADs, including GFA issued ADs, CASA issued ADs, and those issued by the State-of-Design (SoD) of the airframe, engine, propeller and other equipment.

- a. CASR Part 39 states that compliance with ADs originating from CASA, or, after 1 Oct 2009, from the State-of-Design of an aircraft, is mandatory, including ADs covering engines, propellers, instrumentation and equipment. It is the Registered Operator's responsibility to monitor ADs, not CASA's or GFA's responsibility to provide them.
- b. The RO is required by law to find all relevant ADs for their aircraft and equipment. GFA will continued to issue General and Specific AD Schedules with GFA ADs listed. GFA has been adding State-of-Design ADs to the schedules but it is not guaranteed that all are listed. The GFA does not know what equipment is fitted eg, harness, radio and transponder, so reliance on the GFA Schedule may not include all mandatory ADs. If you find ADs not on the GFA schedules please advise GFA by email to returns@glidingaustralia.org of the source address together with the list of ADs.
- c. GFA continues to obtain notification of overseas ADs and will advise the applicable ROs.
- d. All General, Engine, Radio and other equipment ADs may be applicable to gliders when issued by EASA (European Aviation Safety Authority) or the FAA (USA NAA) or other SoD. For example a European glider fitted with a Canadian engine, the Canadian engine ADs apply and the EASA airframe ADs apply.

Guidelines for Annual Inspections of Gliders AIRW-M16 v7.4

Amateur-Built (homebuilt) gliders will usually have only general and equipment ADs to be concerned with. Amateur-Built powered sailplanes fitted with a type certified engine must also comply with engine State-of-Design ADs.

LSA aircraft generally get issued Safety Directions from LSA manufacturers (not ADs from the State-of-Design) but must also comply with CASA AD applicable to the engine and general equipment.

NOTE

All CASA ADs that are applicable - i.e. engine and equipment ADs - are mandatory, not just those issued after October 2009.

Please use the GFA web pages to assist you to find your ADs. They are all under the GFA homepage under Doc/ Forms, and include all Manuals and Handbooks in MOSP, all GFA ADs, ANs, AWAs and the Schedules.

To find your AD schedule: Go to the Gliding Australia web page

- a. Click on the 'Docs/Forms' tab
- b. From the Documents list, click on 'Airworthiness'
- c. Click on the first sub folder 'AD Schedules'

This brings you to a page where you can download an Excel spreadsheet "GFA AD-AN-AWA Register YYYY-MM-DD.xls". The spreadsheet is updated regularly and the date at the end of the file name gives the date when the file was last updated. There are reasonable instructions on how to use the spreadsheet on this page as well.

- d. Download the file "GFA AD-AN-AWA Register YYYY-MM-DD.xls" and open it.

When you open the file you may need to click on 'Allow Editing' depending on your security settings.

- e. When the spreadsheet opens there are a number of column titles across the top of the worksheet. Click on the down arrow icon for 'Type Certificate' in column D. This pulls up a list of all of the aircraft, engine and prop types listed in the spreadsheet.
- f. Deselect the tick in the list at (Select All).
- g. Scroll down the list and find your aircraft, engine and prop type and click in the tick box as required.

This has now produced a filtered list of all of the ADs that GFA Airworthiness has knowledge about for the selected aircraft, engine and prop type.

2.7.2 WHAT INSPECTIONS ARE DUE?

Consult GFA MOSP 3 Section 14 (old GFA AD 337) to determine if a special inspection is required.

GFA 'Airworthiness' has moved a number of ADs into MOSP 3 or BSE. These ADs are now cancelled and the relative MOSP or BSE section is now listed in the Schedules.

To save time and cost the RO should perform all the documentation preparation work and provide all current documents to the inspector. The inspector must check if the package reflects the SoM elected in the Logbook Statement (if applicable) and ensure the work package is current. The RO may fill in lists and hours in the Logbook, but only an Annual Inspector may make a certification entry in the front part of the Logbook certifying the maintenance was correctly performed and the Logbook is correct.

Guidelines for Annual Inspections of Gliders AIRW-M16 v7.4

3. PERFORMING THE INSPECTION

3.1 WHERE TO START

Like all jobs, carrying out an Annual Inspection can be helped along with some thought and pre-planning. The following items are key aspects of an Annual Inspection and should be checked before the sailplane is de-rigged.

3.1.1 WING FREQUENCY CHECK

If this check shows a significant change then you may have a wing structural problem or the fuselage carry through system has developed looseness or other defects.

3.1.2 CONTROL SURFACE FREEPLAY CHECK

Free play in excess of the maker's (or BSE) limits may indicate bearing wear, loose control horns, or other control system defects that may not be readily found once the sailplane is de-rigged.

3.1.3 CONTROL SURFACE DEFLECTION CHECK

Incorrect control surface deflection may indicate control system damage, incorrect pushrod/cable adjustment or control stop problems and could explain adverse handling characteristics.

3.1.4 FLIGHT CONTROL SYSTEM STOPS

Incorrectly adjusted or damaged control stops can lead to system damage (bent pushrods, damaged bellcranks and control surface hinges etc.).

3.1.5 ASI and ALTIMETER CALIBRATION

If the ASI or Altimeter calibration is out, the instrument will need to be sent away for overhaul and this takes time. Check any colour coding against the cockpit placard; differences could indicate that the instrument may have been swapped from another aircraft. The ASI need not be colour coded unless the Flight Manual requires it but if there is colour coding on an instrument it must accurately reflect the limits for the particular sailplane.

3.1.6 HARNESS INSPECTION

Is there an Airworthiness Directive out on the harness? How old is it? Webbing damage or age deterioration may require the harness to be replaced or re-webbed. It is common to find harnesses still in service well beyond their approved service life. Re-web or replace such harnesses and if the harness lap belt is of the "pull down to tighten" variety, take the opportunity to convert it to "pull up to tighten".

3.2 FATIGUE LIFE

As time goes by sailplanes may be kept flying by cannibalising parts. Many of these parts will have fatigue life limits. Check for components that may have exceeded their life limit or will do so during the next 12 months (exchanged component life must be listed in the Logbook). The whole airframe may also be close to its certified fatigue life limit.

The above items can be checked quickly a week or two before the formal inspection is started thereby allowing some pre-planning to be done. Obviously it is better to know before you start that the ASI needs overhauling, rather than finding out after the rest of the inspection is completed and the sailplane is about to be put back in service.

Guidelines for Annual Inspections of Gliders AIRW-M16 v7.4

3.3 LOAN EQUIPMENT

GFA and the State Associations have a number of specialised tools available for loan to inspectors. If you will need to borrow any of these items, book them in advance through your RTOA or State Association.

Loan equipment includes:

- a. Electronic weighing scales
- b. Tow release testing tool
- c. Econoscope (Boroscope)
- d. Cable swaging tools (not all states)
- e. Fluoro crack detection equipment (not all states)
- f. Altimeter and ASI tester

3.4 FILLING OUT THE FORM

Before commencing the inspection the details of RH and RO as shown on the Certificates of Registration must be verified and the Certificate of Airworthiness checked for currency. If the documents cannot be verified the RH and/or GFA must be contacted before proceeding.

Once the documents have been verified accurate and current the details should be entered onto the Form 2.

The inspector then carries out the inspection using the Form 2 as a checklist. It is good policy to inspect the sailplane together with all ancillary equipment such as radio, oxygen system, tie-down, battery etc. The Inspector should review these items for function, security and their influence on weight and balance.

The inspection schedule is designed to be used as a checklist. At the end of each major component group there is provision for recording a duplicate inspection by an independent inspector of DI or higher authorisation (See items 16, 20 and 45). This is to verify the integrity of critical internal items & controls which would not be visible once the structure is closed up.

Once the inspection is completed an Independent Control Check is performed by the holder of a Daily Inspection or higher airworthiness authorisation. This person must check that all parts are correctly attached, that all controls are correctly connected and safety locks in place, that there is full and free movement and that the controls move in the correct sense. Concealed controls, which have already been checked and signed out at items 16, 20 & 45 in the inspection schedule, need not be re-inspected for safety locking.

Once he has completed the Logbook certification, the Annual Inspector signs & dates the "Inspectors Certification" on the bottom of Page 2 and fills out the Maintenance Release. The MR can be issued for any period up to a maximum of 12 months/250 hours, at the inspector's discretion, but not beyond due Surveys or life extension programs. Any scheduled maintenance required by the manufacturer, the GFA, or the inspector which may fall due before the next Annual Inspection must be entered in Part 1 of the MR. The date of issue of the MR is on or prior to the evaluation flight.

3.5 CHECKS AFTER RIGGING THE SAILPLANE

The sailplane may now be rigged in preparation for the evaluation flight. At this point the Independent Control Check must be performed. Check the Pitot system is working. Control surface deflections should be measured to ensure they are within the specified tolerances and the wing-bending frequency should be checked. If extensive fabric replacement, painting or repairs have been done or extensive changes made to the aircraft equipment or ballast, then the sailplane must be reweighed.

Guidelines for Annual Inspections of Gliders AIRW-M16 v7.4

Once a Daily Inspection has been performed and recorded in the DI section of the MR, the sailplane may undergo an Evaluation Flight in accordance with the procedures in Basic Sailplane Engineering Section 3.5. The flight is to be carried out by an experienced, authorised person (see GFA MOSP Part 2 Operations) who must wear a currently repacked parachute. The completion of a satisfactory evaluation flight may require multiple launches.

Any defects found are to be recorded under Major or Minor Defects in the Maintenance Release as appropriate. Any Major Defect will mean that the sailplane cannot be flown again until the defect is rectified and signed out by an Annual Inspector. Minor Defects mean the sailplane may continue to be flown but the defect must be checked at each Daily Inspection or interval as listed in the MR.

If the flight is satisfactory the Evaluation Flight Report in the Maintenance Release is signed by the pilot and the sailplane can be returned to service. If you do a run to Vne then tick the box. If Vne was not reached on the evaluation flight for any reason, write the speed you reached so that future pilots know.

The Inspector then fully completes the airframe (GFA Form 2 or manufacturers) and if powered, the engine schedule (Appendix A, B, C, D or manufacturers), Inspection Report 'Return' & Defect Report and forwards the package to the GFA secretariat.

3.6 LOGBOOK ENTRIES

A short, concise Logbook entry (ref. Basic Sailplane Engineering Sect 3 or as follows) finishes the job. Write your entries as if you were the person reading it in the future and trying to understand just what has been done and in accordance to what system of maintenance. The certification entry must be signed, include your GFA membership number and dated.

3.7 GUIDANCE ON COMPLETION OF GLIDER LOGBOOKS

There are some differences in logbooks dependent on their age. Please amend your logbook to make it compatible. This helps ensure entries and format for all types are similar, makes it clearer and easier to ensure the continued maintenance of your glider and makes the next inspector's job easier. It is worth getting the above right this winter and then it will be correct and easier thereafter.

Please see MOSP for Logbook requirements (OR CASA CAO 100.5 for regulatory requirements).

What is essential in a logbook is as follows;

- a. White Pages
 - i. Annual updates are permissible but monthly totals of hours and landings are transferred from the maintenance release (Form 1) at the Annual. Except where a maintenance activity has been performed requiring a logbook entry during the year; in which case hours and landings must be updated at that date.
 - ii. The Maintenance Log is exactly that, it is the only legal record and must contain a certification (signature, name, GFA membership number and date for each entry, bulk entries at an Inspection may have one certification). Maintenance activities that require a logbook entry are; each AD when first performed or a listing for recurring ADs each year, ANs, repairs, modifications, test results, lifed component changes, scheduled maintenance and any other significant activity. (Cleaning and polishing are not significant but installing a new radio is)
 - iii. Inspection entries in the Maintenance Log should be opposite the corresponding years, hours and landing record. Pages should be ruled off at the annual so that it is very clear where the entry starts and finishes for that year, do not leave blank lines/spaces in your certification statement.

Guidelines for Annual Inspections of Gliders AIRW-M16 v7.4

- b. Green or Yellow pages
 - i. The Modification Record is a complete list of authorised modifications and the date of incorporation {*}
 - ii. The Repair Record contains records of all (significant, usually structural) repairs carried out {*}
 - iii. The AD Record is a complete list of ADs and the incorporation date. For convenience this can be separated into General and Specific ADs and into once off and recurring ADs. I.e. a number of pages but easier to check off. {*}
 - iv. The Lified Structural Component Record is a complete list of the aircrafts lifed structural components and details of the life limit and date of changes. Look in the Maintenance Manuals and ADs to complete this and the lifed components. {*}
 - v. The Lified Component Record is a complete list of any component that requires changing at a defined interval, the life limit and the dates of changes should be recorded {*}
 - vi. Weight and Balance Record records the weight and balance data and any changes since the last weight and balance

Note: Green and Yellow pages are not certifications, all work must be certified in the Maintenance Log, i.e. the front part of the logbook; therefore all ADs will have two entries; one in the AD Record and one in the Maintenance Log. The neatest way to tie all of these together is to record the page number of the certification against the record entry e.g. (P14). Make sure the certification is there or an Annual Inspector adds one once he has confirmed the AD was completed. Then complete the record so you don't have to search for all of them every year.

The Lists marked {*} above will make your life easier next year. Please add them if your Logbook does not have them.

Some inspectors choose to glue a certification entry in the logbook. If electing to use a 'Loose Leaf' logbook certification, make a short summary statement on the logbook page in pen and glue the 'loose leaf' entry over the top. This to leave a record of the inspection in case the page goes missing. Further, be clear in your entry, "All ADs complied with" tells the next inspector nothing. Whereas "The following ADs were checked, complied with and nil defects; GFA AD 123, EASA AD 231, CASA AD/Eng/4." says exactly.

- a. The Weight and Balance sheet must be recorded as an entry on the W&B pages then put in the pocket in the back of the logbook or logbook folder.
- b. All other entries must be neatly handwritten in pen or printed.
- c. Errors are to be neatly crossed out and the correct entry made adjacent to it; liquid paper or white out is not to be used.

The logbook is a valuable part of the glider. Without it or poorly completed and the future owner should realise he is taking a chance and expect a large reduction in price. Look after the logbook; store it so it is safe from fire or accidents.

Remember you are responsible for all work you certify even after you sell the aircraft. An honest mistake is one thing but if it could result in a fatality be sure you did your work properly at all times.