

## **SA-CATS 44**

### **Maintenance rules – Non-Type Certificated aircraft**

#### **List of technical standards**

##### **44.01.2 LOGBOOKS**

1. Format

##### **44.01.3 LOSS OF LOGBOOKS**

1. Procedure for opening new logbooks

##### **44.01.4 PERSONS TO CARRY OUT MAINTENANCE**

1. Pilots

##### **44.01.6 ANNUAL INSPECTIONS**

1. Items to be inspected
2. Annual inspection form

##### **44.01.9 MASS AND BALANCE**

1. Procedure to establish mass
2. Form

##### **44.01.10 MODIFICATIONS**

1. Form

##### **44.01.11 TEST FLIGHTS**

1. General
2. Requirements

##### **44.01.12 AIRCRAFT COMPASS REQUIRMENTS**

1. Compass swing requirements
2. Deviation cards
3. Logbook entries
4. Compass swing areas and equipment

**44.01.13 RELEASE TO SERVICE**

1. Form

**44.01.14 RECORD KEEPING AND AUDITS**

1. General

**44.01.16 OVERHAUL, REPAIR AND SUBSTITUTION OF MAJOR COMPONENTS**

1. Reissuing of an Authority to Fly or Proving Flight Authority
2. Overhauls: General
3. Engine overhauls
4. Propeller overhauls
5. Substitution of products, components and parts

**44.01.17 TEMPORARY AND PERMANENT REPAIRS AFTER ACCIDENTS**

1. General

**44.02.1 ACCEPTED MAINTENANCE SCHEDULE**

1. Introduction
2. Format

**44.03.1 MAINTENANCE SCHEDULE**

1. Introduction
2. Format

**44.03.2 MAINTENANCE CONTROL MANUAL**

1. Maintenance control manual
2. Maintenance programme

**Appendices**

**44.01.2 Logbooks**

- (1) The approved logbook makes provision for the recording of-

- (a) airframe, engine(s) and propeller(s) particulars;
- (b) major defects and damage;
- (c) compass or direction indicator maintenance;
- (d) class I product substitution;
- (e) compliance with airworthiness directives or safety directives, as applicable;
- (f) compliance with service bulletins, service letters and similar documents, as applicable;
- (g) engine components;
- (h) Class II product overhaul;
- (i) scheduled inspections; and
- (j) scheduled and non-scheduled maintenance and defect rectification on airframe, engines, propellers and accessories and any relevant matter.

#### **44.01.3                      Loss of logbooks**

- (1)     The person or organisation responsible for the opening of a new logbook-
  - (a) may consult relevant records at the premises of the Civil Aviation Authority or at the premises of the organisation designated for the purpose in terms of The Act, as the case may be, and, at the prescribed fee, obtain the relevant pages;
  - (b) shall obtain any further information required to open the substitute logbook(s) so that these comply with the relevant regulations and technical standards, copies of which shall be supplied to The Director for Civil Aviation or the organisation designated for the purpose in terms of The Act, as the case may be.
  - (c) shall provide evidence of overhaul of all Class I and all installed Class II products;
  - (d) shall research and certify that all relevant Airworthiness Directives, Service Bulletins or Service Letters declared mandatory by The Director for Civil

Aviation or the organisation designated for the purpose in terms of The Act, as the case may be, have been complied with;

(e) shall certify that the aircraft, its engine(s) and, in particular, its tubular engine mountings (if applicable) have been inspected for corrosion; and

(f) shall in the substitute logbook(s) detail and certify the inspection(s) and test(s) carried out to ensure that the aircraft, engine or propeller and their components is indeed serviceable.

- (2) The total hours operated or the times since overhaul of the relevant aircraft, engine(s) or propeller(s) shall be mutually agreed upon between the owner, maintenance organisation(s) and The Director for Civil Aviation or the organisation designated for the purpose in terms of The Act, as the case may be.
- (3) The substitute logbook(s) shall be inspected for acceptance by The Director for Civil Aviation or the organisation designated for the purpose in terms of The Act, as the case may be.
- (4) In the event of all relevant documentation having been lost, all documents required for the issue of an Authority to fly must be prepared in accordance with this technical standard, and the aircraft and its substitute documents shall be inspected by a person appointed by The Director for Civil Aviation or the organisation designated for the purpose in terms of The Act, as the case may be.

#### **44.01.4                      Persons to carry out maintenance**

(1) Line maintenance comprising of the following may be carried out by the owner of a non-type certificated aircraft provided that only approved materials, parts and components are used:

- (a) changing of tyres and tubes and repairing of punctures;
- (b) servicing landing gear shock struts with air;
- (c) correcting defective locking wire and split pins;
- (d) replenishing hydraulic fluid in the hydraulic fluid reservoir;
- (e) small simple repairs to fairings, non-structural cover plates and cowlings by means of stop drilling cracks and fitting small patches or reinforcements which will not change contours or interfere with proper airflow;

- (f) replacing side windows where such work does not interfere with the primary system;
- (g) replacing safety belts;
- (h) replacing seats or seat parts where such work does not involve any removal, dismantling or interference with a primary structure system;
- (i) replacing pre-fabricated fuel and oil lines, provided that a fuel flow check is subsequently carried out;
- (j) replacing any electrical bulb, reflector, lens or fuse of navigation and landing lights;
- (k) replacing or cleaning spark plugs and setting spark plug gaps;
- (l) cleaning fuel and oil strainers;
- (m) replacing batteries and checking fluid level and specific gravity;
- (n) replacing tail wheels and tail-wheel springs;
- (o) changing engine oil;

#### **44.01.6 Annual Inspections**

##### **1. Items to be inspected**

- (a) The minimum requirements for an annual inspection of an amateur-built or production-built aircraft shall be as per Annex A.
- (b) The minimum requirements for an annual inspection of a manned free balloon shall be as per Annex B.
- (c) The annual inspections, referred to in paragraphs (a) and (b), shall be carried out not later than 12 months since the previous inspection.

##### **2. Annual Inspection Form**

See Annex D.

#### **44.01.9 Mass and Balance**

##### **(1) Procedure to establish mass and centre of gravity**

- (a) Remove excessive dirt, grease and moisture from the aircraft.
- (b) Place the aircraft in a level-flight attitude, as prescribed by the builder or manufacturer.
- (c) Where practical, establish the mass inside a closed building to prevent errors induced by wind.
- (d) Use only mass meters as prescribed in sub-regulation 44.01.9.
- (e) Obtain the necessary publications (i.e. maintenance manual, flight manual, etc.) before commencing with the procedures.
- (f) Ensure that the aircraft conforms to the definition of its “empty mass”. Any extra items must be removed before computation. Empty mass of an aircraft shall be the mass of the aircraft and its power plant(s), including engine coolant, unusable fuel, total oil, total hydraulic fluid, any fixed ballast, and all items of fixed equipment.
- (g) In the case of a weight-shift controlled aircraft, the applicant must provide the centre of gravity and the height difference or angle between the front wheel and the main gear.

## **(2) Form**

- (a) The mass and balance data as prescribed in Regulation 44.01.9 shall be recorded on Form XYZ1.
- (b) The mass and balance report shall include at least the following information:
  - (i) aircraft nationality and registration, make, model and serial/build number;
  - (ii) date on which the mass was determined and the centre of gravity computed;
  - (iii) datum point used;
  - (iv) the necessary calculations made. (A specimen mass and balance report is given in FAA Advisory Circular AC 43.13-1 B, Chapter 10);

---

<sup>1</sup> This form is yet to be created.

(v) the reference numbers of any other applicable publications which were used;

(vi) the signature and licence or approval number of the appropriately rated approved AMO, AME or Approved Person, rated in accordance with Regulation 66.4, who was responsible for establishing the mass and computing of the centre of gravity;

(vii) a copy of the mass and balance report must be submitted to The Director for Civil Aviation or the organisation designated for the purpose in terms of The Act, as the case may be.

#### **44.01.10 Modifications**

##### **(1) Form**

The appropriate sections in Form XYZ2, found in Annex D, must be completed in their entirety before the application for modification is submitted to The Director for Civil Aviation, or the organisation designated for the purpose in terms of The Act, as the case may be, with the applicable fee as described in Part 187 of these Regulations. All supporting documentation as required by the form must accompany the application.

#### **44.01.11 Test Flights**

##### **(1) General**

(a) The flight testing prescribed by Regulation 44.01.11 shall be carried out by-

(i) an appropriately rated pilot when a minor modification was carried out.

(ii) an appropriately rated test pilot in terms of Part 61 of these Regulations, if a major modification was carried out

(b) For complex aircraft the manufacturer's test flight procedure(s) may be utilised.

---

<sup>2</sup> This form is yet to be created.

## **(2) Requirements**

### **(a) Recording of flight test results**

(i) When an aircraft is flight tested, the results are to be recorded on the following flight performance records:

(aa) Form CA 21.19 for single engine fixed wing aircraft;

(bb) Form CA21.18 for multiple engine fixed wing aircraft; and

(cc) Form CA 21.34 for helicopters.

(ii) The forms referred to in subparagraph (i) shall be forwarded to The Director for Civil Aviation or, if applicable, the organisation designated for the purpose in terms of The Act, as the case may be, within 48 hours after the completion of the flight test.

### **(b) Climb performance**

(i) In order to check the climb performance of the aircraft, a controlled climb is to be made with the aircraft in the en route configuration.

(ii) Prior to commencing the climb performance test, the altimeter is to be set to 1013.25 hPA.

(iii) Before commencing the climb the indicated airspeed should be allowed to stabilise to the appropriate climbing speed and the power then applied gradually and the aircraft eased into the climb, endeavouring to maintain the correct speed. Care must be taken to ensure that the initial times and altitudes are recorded when the aircraft has settled down in the climb and the airspeed should be kept to within  $\pm 2$  knots.

(iv) In the case of twin piston engine aircraft, the climb is to be made with the critical engine inoperative and the propeller feathered. The power setting on the operative engine should be set as specified in the approved flight manual. For single engine aircraft the engine is to be operated at maximum continuous or climb power for a maximum period of 5 minutes.

(v) The test climb should not be carried out in or near cloud or in turbulent air and a steady heading should be maintained throughout.

(vi) In the case of helicopters-



(aa) an in-ground effect hover test must be carried out in still air conditions at a helicopter mass as specified in the approved flight manual for prevailing atmospheric conditions.

(bb) powered by reciprocating engines, the hover test results must also be plotted on hover performance graphs given in the approved flight manual. These results must be attached to Form CA 21.34.

(cc) powered by turbine engines, a power assurance check must be carried out according to data given in the approved flight manual. The results must be plotted on the power assurance graphs given in the approved flight manual. These results must be attached to Form CA 21.34.

#### **44.01.12      Aircraft compass requirements**

##### **(1)      Compass swing requirements**

All compasses fitted to South African registered non-type certificated aircraft must be swung-

(a) on installation;

(b) every 5 years thereafter

(c) before a newly registered aircraft is placed into service in the country;

(d) immediately after material or equipment that may affect the compass is installed, removed or replaced;

(e) an aircraft has been struck by lightning

(f) after each engine change, except where it has been established that non-compliance with this requirement will not affect the compass readings. The Director for Civil Aviation or, if applicable, the organisation designated for the purpose in terms of The Act, as the case may be, must be advised accordingly;

(g) in the case of any primary compass, the compass swing shall be carried out with all common electrical equipment "ON".

(h) in the case of any standby compass, the compass swing shall be carried out with all electrical equipment “OFF”.

## (2) Deviation cards

(a) A deviation card must be installed on or in close proximity to each compass or, for remote reading compasses, the main indicator or repeaters and must contain the following information:

(i) The readings at intervals not greater than 45 degrees.

(ii) Whether the compass was swung with electrical equipment switched “ON” or “OFF”, as applicable. The space marked A as shown on the examples of the deviation cards referred to in subparagraph (vi), below, may be used for this purpose.

(iii) The signature and licence number of the person responsible for the swing and the date it was carried out.

(iv) After a magnetic compass has been compensated the reading must be such the residual deviation in level flight does not exceed 5 degrees on any heading.

(v) Remote-reading compasses must be adjusted to obtain minimum deviations, but where the construction of the compasses is such that all deviation can be adjusted for, no deviation card will be necessary.

(vi) The compass deviation card must be completed in a manner similar to the examples shown below:

Aircraft:					Electrical equipment ON/OFF*			
FOR	000	045	090	135	180	225	270	315
STEER	001	046	090	134	179	225	272	316

Aircraft:		Electrical equipment ON/OFF*	
FOR	STEER	FOR	STEER
000	001	180	179
045	046	225	225
090	090	270	272
135	134	315	316

\* delete as applicable

(vii) Deviation cards must be placed in holders provided for this purpose

**(3) Logbook entries**

The date on which the compass was swung must be entered in the airframe logbook and certified by an appropriately licensed and rated aircraft maintenance engineer, Approved Person, or the holder of a commercial pilot or airliner transport pilot licence.

**(4) Compass swing areas and equipment**

(a) Before any compass is swung it must be established that the swinging area is free from unwanted magnetic effects and that the landing compass is serviceable.

(b) Where the landing compass is replaced by a permanent base it must be borne in mind that the magnetic north on the base is not a fixed point but is a point which moves due to local magnetic variations. The magnetic bearings of the compass base must therefore be checked at periods not exceeding 4 years.

**44.01.13 Release to Service**

**(1)** The release to service for a non-type certificated aircraft shall either;

(a) be an entry in the flight folio; or

(b) be a separate form contained in the aircraft document folder.

**(2)** An entry to the following effect shall be made:

Aircraft Registration:.....

Aircraft type:.....

Serial No.:.....

"I hereby certify that I am satisfied that the above-mentioned aircraft and all its equipment are in every way serviceable for flight and that all maintenance has been carried out in accordance with the Civil Aviation Regulations of 1997, as amended, and the aircraft's Accepted Maintenance Schedule. This certificate lapses at a total of \_\_\_\_\_ hours of flight time or on \_\_\_\_\_(date), whichever

occurs first, unless the aircraft is involved in an accident or becomes unserviceable, in which case the certificate is invalid for the duration of the period”.

Signed:.....

Licence No.:.....

Date:.....

#### **44.01.14 Record Keeping and Audits**

(1) An owner shall ensure that the following records are kept for the periods mentioned-

- (a) The total time in service for the aircraft and all components.
- (b) The current status of compliance with all service bulletins.
- (c) Details of modifications and repairs to the aircraft and its major components.
- (d) The time in service (hours, calendar time and cycles, as appropriate) since last overhaul of the aircraft or its components.
- (e) The current aircraft status of compliance with its maintenance schedule.
- (f) The detailed maintenance records to show that all requirements for signing or a release to service have been met.

(2) The records, referred to in subparagraphs (1)(a) to (e), shall be kept for a minimum period of 90 days after the aircraft or item to which they refer has been permanently withdrawn from service.

(3) The records, referred to in subparagraph (1)(f), shall be kept or a minimum period of one year after the signing of the release to service.

(4) In the event of a change of ownership of the aircraft, the above maintenance records shall be transferred to the new owner.

#### **44.01.16 Overhaul, repair and substitution of major components**

## **1. Reissuing of an Authority to Fly or Proving Flight Authority**

To reinstate the validity of a Certificate of Airworthiness deemed suspended as a result of an aircraft having been involved in an accident or incident that rendered one or more Class I products unserviceable, the following applies:

- (a) Such maintenance as is necessary shall be carried out in accordance with approved manuals, structural repair manuals, or authorised repair schemes or other approved data.
- (b) A annual inspection shall be carried out if the primary structure, the engine(s) or the propeller(s) have been damaged.
- (c) A test flight shall be done by an appropriately rated ~~test~~ pilot and the performance recorded in accordance with Regulation 44.01.11.
- (d) Copies of the certificates relating to maintenance in respect of all repairs affected shall be submitted to Director for Civil Aviation or, if applicable, the organisation designated for the purpose in terms of The Act, as the case may be, within 5 working days of the certificate of release to service having been completed.

## **2. Overhauls: General**

- (a) Any overhaul must be carried out in accordance with the manufacturer's current overhaul manuals. Records of compliance or non-compliance with Service Bulletins, Service Letters and Service Instructions must be kept in the relevant logbook.
- (c) Overhauls shall be recorded and certified in the appropriate logbook(s) by the holder of an appropriately rated licence or approval.
- (d) The required record of fits and clearances shall be made in the sequence indicated in the respective manuals.
- (e) Engine mountings shall be inspected at the time of the engine overhaul, propeller strike or whenever an engine is changed for signs of external and internal corrosion, cracks and other damage. Magnaflux, dye penetrant or any other non-destructive testing inspection procedure acceptable to The Director for Civil Aviation or, if applicable, the organisation designated for the purpose in terms of The Act, as the case may be, may be used.
- (f) The overhaul and the procedure which was used shall be recorded in the relevant logbook and signed by the appropriately rated person.

### **3. Engine overhauls**

- (a) Engines and engine components may be overhauled at the recommended times indicated in the latest revised issues of the Maintenance Manuals, Service Bulletins and Service Letters, as applicable, or as and when their condition shows that it is necessary to keep the aircraft serviceable. The overhauled engine must then be tested as a complete unit in accordance with the manufacturer's recommendations, as applicable.
- (b) The overhaul of turbine engines must be executed in accordance with the manufacturer's current instructions and recommendations.
- (c) The engine and its Class II products, notably the ignition system, the fuel system and (when fitted) the turbo charging or super charging system must be overhauled according to the requirements of their manufacturers as and when their condition shows that it is necessary to keep the aircraft serviceable.
- (d) An engine shall be completely overhauled together with all components the fuel system, the ignition system and (if applicable) the turbo charging or super charging system-
  - (i) where the engine has been subjected to significant external heat, e.g. fire;
  - (ii) where the engine has been submerged in water;
  - (iii) when the engine has suffered substantial damage;
- (e) In cases where the engine has been struck by lightning and there are witness marks on the propeller, the manufacturer's recommendations should be complied with.
- (f) A copy of the overhaul record shall be submitted to The Director for Civil Aviation or, if applicable, the organisation designated for the purpose in terms of The Act, as the case may be, by an appropriately rated approved AMO, AME or Approved Person, in terms of Part 66.4 of these Regulations, approving the installation of the engine in the aircraft within 5 working days.

### **4. Propeller overhauls**

- (1) Propellers and propeller components may be overhauled at the recommended times indicated in the latest revised issues of the Maintenance Manuals, Service Bulletins and Service Letters, as applicable, or as and when their condition shows that it is necessary to keep the aircraft serviceable. The overhauled propeller must then be tested as a complete unit in accordance with the manufacturer's recommendations, as applicable.

- (2) When a propeller requires an overhaul, the overhaul may be carried out by an approved propeller overhaul facility.
- (3) Notwithstanding paragraph (2) above, overhauls on propellers may be conducted by an appropriately rated approved AMO, AME or Approved Person, in terms of Part 66.4 of these Regulations.
- (4) Propeller inspection and repair requirements for the different propeller types are as follows-

**(a) Variable-pitch propellers**

(i) The inspection requirement is for the propeller to be dismantled, cleaned and inspected, paying particular attention to the following and taking the necessary remedial action:

(aa) corrosion;

(bb) worn, damaged, cracked or otherwise unserviceable parts: life-limited parts to be replaced as required;

(cc) checking the blades for cracks (the removal of serviceable de-icing boots is not mandatory unless required in terms of the Maintenance Manual, or Service Bulletin);

(dd) blade measurement: length, width, thickness and blade angles must be within the serviceable limits and actual measurements must be recorded;

(ee) all seals and gaskets must be replaced by new ones;

(ff) reassembly of the propeller and subsequent checking of balance.

**(b) Fixed-pitch propellers (other than wooden propellers)**

(i) The requirements contained in fixed-pitch propeller manufacturer's service manuals and other data shall be adhered to.

(ii) Propellers involved in propeller strikes must undergo a complete overhaul.

(iii) The recommended overhaul requirements, apart from those set out in the overhaul manual or service publications are as follows:

(aa) Inspect the propeller thoroughly for damage and corrosion, and rectify-

- diameter;
- blade width;
- blade thickness;
- face alignment;
- blade angles;
- edge alignment;
- balance; and

(bb) keep a record of the findings

### **(c) Fixed-pitch wooden propellers**

(i) Due to the nature of the wood itself, it is necessary that wooden propellers and blades be frequently inspected to assure continued airworthiness. Inspect for such defects as cracks, bruises, scars, warpage, evidence of glue failure and separated laminations, sections broken off and defects in the finish.

(ii) Irrespective of make, propeller of wooden construction must be removed and carefully inspected every 1 000 hours of operation or 5 years in service, whichever is shorter, for conditions such as the following:

- (aa) elongated bolt holes;
- (bb) out of track condition;
- (cc) cracks in the shaft hole, bolt holes or blades;
- (dd) oversize shaft hole;
- (ee) broken lag screws that attach the metal leading edge sleeve to the blade;
- (ff) separated laminations;
- (gg) cracked internal laminations;
- (hh) split blades;
- (ii) cracks or deep cuts across the grain of the wood;
- (jj) loose lag screws or rivets;
- (kk) appreciable warp of blades;
- (ll) appreciable portion of wood missing;



(mm) damaged hub flanges caused by over-tightening

(iii) The propellers must be re-varnished and the balance checked and corrected.

(iv) Propeller tip drain holes must be opened.

(v) Any repairs required must be carried out in accordance with the provisions of FAA document AC43-13-1B, or as the manufacturers prescribe.

## **5. Substitution of products, components and parts**

- (a) The substitution of products, components and parts with new items, considered to be desirable or essential by the manufacturer of the product, component or part, or recommended after a specified time in service, must be effected at the times recommended by the manufacturer in its applicable manuals, Service Bulletins, Service Letters, Service Instructions or other similar technical information that refer thereto.
- (b) Products, components and parts of which the manufacturer has classified the substitution as essential or mandatory after a specified time in service must be substituted not later than the time prescribed. Where a manufacturer bases the life of an item on factors other than flight times, e.g. number of landings, cycles or calendar periods, such records must be kept in the logbook(s) or other approved recording system in respect of such items to ensure that their expiry dates are not exceeded.
- (c) Any substitution must be recorded, together with the item's serial and part number and its historical record, where applicable. Where the part is being substituted with a used part, the time or cycles in service since new or since overhaul must be recorded.

### **44.01.17 Temporary and permanent repairs after accidents ~~or incidents~~**

The following procedures must be followed whenever temporary or permanent repairs become necessary after an accident:

- (1) Once it has been established that the aircraft must be repaired after an accident, the owner or operator of the aircraft must repair the aircraft in accordance with either the approved manufacturer's specifications, standard practises or, if

neither are available, consult an appropriately rated approved AMO, AME or Approved Person, rated in accordance with Regulation 66.4.

(2) When all the repairs have been completed the owner or operator shall advise The Director for Civil Aviation or, if applicable, the organisation designated for the purpose in terms of The Act, as the case may be, accordingly and arrange for an inspection for the reissuing of the Authority to Fly by an airworthiness inspector or an Approved Person.

(3) The owner or operator of an aircraft may arrange for an appropriately rated approved AMO, AME or Approved Person, rated in accordance with Regulation 66.4 to act on his or her behalf and recover and return the aircraft to service. In this case he or she shall ensure that The Director for Civil Aviation or, if applicable, the organisation designated for the purpose in terms of The Act, as the case may be, is advised of his or her arrangement with the AMO, AME or approved repair facility. The AMO, AME or approved repair facility shall comply with the contents of paragraph (1) and (2) in addition to the requirements prescribed in paragraph (4).

(4) The appropriately rated approved AMO, AME or Approved Person, rated in accordance with Regulation 66.4, concerned, must-

(a) submit to The Director for Civil Aviation or, if applicable, the organisation designated for the purpose in terms of The Act, as the case may be-

(i) the name(s) of valid type-rated, approved, AMO, AME or Approved Person, rated in accordance with Regulation 66.4, who will be responsible for the carrying out of the repairs;

(ii) a detailed description of the manner in which the repairs are to be effected; and

(iii) a detailed specification of all the repairs to be made in order to fly the aircraft safely to a base where it can be permanently repaired;

(b) certify the temporary or permanent repairs in the appropriate logbook(s) or flight folio, and forward copies of such certification or certificates relating to maintenance of an aircraft to The Director for Civil Aviation or, if applicable, the organisation designated for the purpose in terms of The Act, as the case may be;

(c) after certifying the aircraft as safe for flight, obtain from The Director for Civil Aviation or, if applicable, the organisation designated for the purpose in terms of The Act, as the case may be, an authority to fly the aircraft (which authority is valid for flight within the borders of the Republic); and

(5) Those responsible for temporary repairs shall ensure that such repairs are carried out in accordance with standard aviation practices or in a reasonable manner.

#### **44.02.1 Accepted Maintenance Schedule**

##### **1. Introduction**

The Accepted Maintenance Schedule (AMS), referred to in Regulation 44.02.1 and which may be issued in separate parts, shall contain a description of the procedures to be followed, to the extent applicable, to ensure that-

- (a) the aircraft is maintained in an airworthy condition;
- (b) the operational and emergency equipment, required for intended flight, is serviceable;
- (c) the Authority to Fly or Special Flight Permit referred to in Regulation 24.02.4, remains valid for each aircraft to which the AMS applies;

##### **2. Format**

The AMS shall contain or reference the following information:

- (a) maintenance tasks and the intervals at which these are to be performed, taking into account the anticipated utilisation of the aircraft.
- (b) when applicable, a continuing structural integrity program.
- (c) procedures for changing or deviating from (a) and (b) above.

#### **44.03.1 Maintenance Schedule**

##### **1. Introduction**

The Accepted Maintenance Schedule (AMS), referred to in Regulation 44.03.1 and which may be issued in separate parts, shall contain a description of the procedures to be followed, to the extent applicable, to ensure that-

- (a) the aircraft is maintained in an airworthy condition;
- (b) the operational and emergency equipment, required for intended flight, is serviceable;

- (c) the Authority to Fly or Special Flight Permit referred to in Regulation 24.02.4, remains valid for each aircraft to which the AMS applies;
- (d) in the case where an aircraft is operated in terms of Part 96, a description of the administrative and contractual arrangements between the owner and the person or persons approved to carry out maintenance on the aircraft; and

## **2. Format**

The AMS shall contain or reference the following information:

- (a) maintenance tasks and the intervals at which these are to be performed, taking into account the anticipated utilisation of the aircraft.
- (b) when applicable, a continuing structural integrity program.
- (c) procedures for changing or deviating from (a) and (b) above.

### **44.03.2 Maintenance control manual**

#### **1. Maintenance control manual**

The maintenance Control Manual (MCM) prescribed by sub-regulation 44.03.2, which may be issued in separate parts, shall contain the following information, as applicable:

- (a) The description of the procedures required to ensure that-
  - (i) each aircraft, covered by the MCM, is maintained in an airworthy condition;
  - (ii) the operational and emergency equipment, necessary for an intended flight, is serviceable;
  - (iii) the Authority to Fly remains valid for each aircraft covered by the MCM.
- (b) the administrative arrangements between the operator and an appropriately rated approved AMO, AME or Approved Person, rated in accordance with Regulation 66.4;
- (c) the maintenance procedures and the procedures for completing and signing off maintenance that is based on a system other than that of an appropriately rated approved AMO, AME or Approved Person, rated in accordance with Regulation 66.4;
- (d) the ratings of the person or persons who are required by the MCM to ensure that all maintenance is carried out in accordance with the MCM with regard to

an Accepted Maintenance Programme. The design and application of the operators Maintenance Programme shall observe Human Factors principles;

- (e) a description of the methods used for the completion and retention of the maintenance records;
- (f) a description of the procedure for monitoring, assessing and reporting maintenance required by the operator of an aircraft in terms of these Regulations;
- (g) a description of the procedures for complying with the service information reporting requirements to the aircraft manufacturer and to The Director for Civil Aviation or the organisation designated for the purpose in terms of The Act, as the case may be;
- (h) a description of the procedures for implementing action resulting from Mandatory Airworthiness Notification and procedures for assessing continuing airworthiness information, issued by the organisation responsible for the type design of the aircraft covered by the MCM;
- (i) a description of establishing and maintaining a system of analysis and continued monitoring of the performance and efficiency of the Maintenance Programme in order to correct any deficiency in that programme;
- (j) a description of procedures for controlling the removal and use of parts from other aircraft and the controlling of Time Between Overhaul records when this occurs;
- (k) a description of the procedure for advising The Director for Civil Aviation or the organisation designated for the purpose in terms of The Act, as the case may be, of significant in-service occurrences;
- (l) a description of aircraft types and models to which the manual applies.

## **2. Maintenance programme**

The Maintenance Program, referred to above, shall be in the format prescribed in TS 44.03.2(2)

## **Annex A**

### **MINIMUM REQUIREMENTS FOR AN ANNUAL INSPECTION FOR AMATEUR-BUILT AIRCRAFT OTHER THAN BALLOONS MANDATORY 25-HOUR PERIODIC INSPECTION FOR MICROLIGHT AEROPLANES OPERATED IN TERMS OF PART 96**

(Inspect as applicable)

#### **1. AIRFRAME AND INSTALLED EQUIPMENT**

##### **1.1 Fuselage or Hull**

1. Carefully inspect the fuselage or hull for general condition.
2. Check the fabric and dope, or other skin covering, for condition and security.
3. Check installed systems and components for proper installation, security, defects and satisfactory functioning.

##### **1.2 Cabin or Cockpit**

1. Inspect the cabin or cockpit for cleanliness and loose or displaced articles that might interfere with the operation of controls.
2. Check seats, seat rails, seat locking mechanisms, safety harness, flooring and tie-down fittings for security and condition.
3. Check windscreens and windows for security, condition and, where applicable, for satisfactory operation.
4. Check emergency exits for proper installation, condition, legibility of operating instructions and other markings and for satisfactory functioning.
5. Check flight, engine and propeller controls for correct installation, security of connections, condition, proper operation and, where applicable, legibility of markings.
6. Check all systems and their controls in the cockpit or cabin for proper installation, security, satisfactory operation and legibility of markings.
7. Ensure that all required placards and registration letters are correctly installed and positioned, are legible and in good condition.

### **1.3 Instruments and Instrument Systems**

1. Check instruments for proper installation, security, obvious defects and legibility and correctness of markings.
2. Check instrument operating systems for proper installation, security and condition. Pay particular attention to pitot-static systems for freedom from obstructions and absence from leakage.
3. Check that filter elements of vacuum operated instruments are cleaned or replaced in accordance with the manufacturer's recommendations.
4. Check altimeters and airspeed indicators for accuracy.

### **1.4 Landing Gear**

1. Check the landing gear for general condition and security of attachment of all components.
2. Inspect the shock absorbing devices for correct fluid levels and pressures.
3. Check linkages, trusses and other members for condition and security of attachments.
4. Check retracting and locking mechanisms for condition and satisfactory operation.
5. Check hydraulic lines and retraction jacks for condition and any leakage of fluid.
6. Check electrical items for condition, chafing of cables and satisfactory operation of motors, switches and indicators.
7. Check mechanical indicators for conditions and satisfactory operation.
8. Check steering mechanisms for condition and bearings for condition, lubrication and correct adjustment.
10. Check tyres for condition and creep. Check tyre pressures.
11. Check brakes for condition, correct adjustment and operation.
12. Check floats, skis or skids for additional security.

### **1.5 Wings and Centre Section**

1. Check the entire assembly, including any external bracing, for general conditions.
2. Check fabric and dope, or other skin covering, for condition and security.

3. Check wing attachments and bracings for security, condition, correct assembly and, where applicable, correct torqueing of attaching bolts.
4. Check movable surfaces for condition, security, proper attachment, correct travel and operation and security of all control connections.
5. Check installed systems and components for proper installation, security, condition and satisfactory functioning.

## **1.6 Empennage**

1. Check the entire assembly, including external bracing, for general condition.
2. Check fabric and dope, or other skin covering, for condition and security.
3. Check attachment of all components for security and correct assembly.
4. Check movable surfaces for condition, security, proper attachment, correct travel and operation and security of all control connections.
5. Check installed systems and components for proper installation, security, condition and satisfactory functioning.

## **1.7 Electrical and Radio Equipment Installations**

1. Inspect batteries for condition, corrosion and venting and for correct installation, and check specific gravity and level of electrolyte.
2. Check electrical installations and components for condition, security of mounting, correct installation and functioning.
3. Check electrical wiring and conduits for condition and security of mounting.
4. Check bonding and shielding for correct installation, security and condition.
5. Check radio equipment for correct functioning and for correct installation and security of mountings.
6. Check radio antenna systems for condition, correct installation and security, and trailing aerials for satisfactory operation.
7. Check for unacceptable interference from electrical and ignition systems on applicable radio equipment.

## **1.8 Fuel Systems**



1. Check fuel tanks and fuel systems for the presence of water or other foreign matter, condition, security, correct installation, freedom from leaks and satisfactory functioning of components.
2. Inspect ON, OFF, BOTH fuel selector (as applicable) for condition and proper operation.

### **1.9 Rotorcraft (Helicopters and Gyroplanes and Gyrogliders)**

In addition to applicable items under paragraphs 1.1 to 1.8 above, the following items on rotorcraft shall be checked for condition, security, correct installation and, as applicable, alignment:

- (a) drive shaft assemblies or similar systems;
- (b) main rotor transmission gear box;
- (c) rotary wings (rotors) and centre section or equivalent area;
- (d) tail rotor assembly where applicable; and
- (e) tracking of main rotors.

### **1.10 Miscellaneous**

Check any systems, assemblies and items not specifically mentioned under paragraphs 1.1 to 1.9 above, for connection, correct installation, security and satisfactory operation.

## **2. POWER PLANTS AND INSTRUMENTS RELATING THERETO**

### **2.1 Engine and Engine Installations**

1. Inspect each entire engine for evidence of fuel, oil and other fluid leaks and for the sources of any such leaks.
2. Check all studs, nuts and other fasteners for security, condition and correct torqueing.
3. Check the internal conditions of engines by means of cylinder compression or blow-by checks, and oil filters and sump drain plugs for evidence of metal particles or other foreign matters.

4. Check engine shock mounts for condition, security and correct installation.
5. Check engine controls for correct installation, operation, condition and security.
6. Check fluid-carrying lines for security, correct installation and condition.
7. Check systems of security and condition. Pay particular attention to exhaust manifold assemblies, heater muffers and heat exchangers.
8. Check engine-driven accessories for condition and security of mountings.
9. Check carburettor air intake filters for cleanliness, condition, security and correct installation.
10. Check engine mountings for condition and security of attachment to the main structure.
11. Check cooling baffles and seals for condition, security and correct installation.
12. Check engine cowling for condition, security and correct installation.
13. Check cooling gills or other cooling devices for condition, security, correct installation and operation.
14. Check ignition systems for condition and correct timing of magnetos. Pay particular attention to the condition and assembly at terminal points of ignition switch wiring and ensure that ignition switch(es) function satisfactorily.
15. Where practicable, ensure that fuel flow at the carburettor or equivalent component from all tanks meets at least the minimum prescribed flow requirements.

## **2.2 Propellers**

1. Check metal and composite propeller blades for nicks and damage, and metal hubs and counterweights, where applicable, for condition.
2. Check wooden propellers for condition. Check that propeller hub bolts are correctly torqued and leading edge caps are properly secured.
3. Check security of attachment of propeller to the engine.
4. Check propeller, where applicable, for oil leaks and for satisfactory operation.
5. Check propeller control systems for condition and satisfactory operation.
6. Check that propeller track is within specified limits.
7. Check any anti-icing systems for condition, security and satisfactory operation.

## **2.3 Powerplant Instruments and Instrument Systems**

1. Check instruments for proper installation, security, obvious defects and legibility and correctness of markings.
2. Where practicable, check powerplant instrument for satisfactory functioning before and during engine run.

## **2.4 Miscellaneous**

Check any other power plant system, assemblies and items not specifically mentioned under paragraphs 2.1 to 2.3 above, for condition, correct installation, security and satisfactory operation.

## **2.5 Engine Operation**

On completion of an annual inspection each engine shall be run in accordance with the manufacturer's recommendations to determine the following:

### **(1) Piston Engines**

- (a) power output (static and idle rpm);
- (b) engine rpm-drop on each magneto;
- (c) fuel and oil pressures;
- (d) cylinder and oil temperatures; and
- (e) satisfactory operation of any engine-driven accessories or other items not specifically mentioned above.

### **(2) Gas Turbine Engines**

- (a) satisfactory operation of the engine and engine-driven accessories;
- (b) engine pressure ration (EPR), if applicable;
- (c) exhaust gas temperature (EGT), if applicable;
- (d) maximum power; and
- (e) other parameters, as applicable.

## **Annex B**

### **MINIMUM REQUIREMENTS FOR AN ANNUAL INSPECTION FOR MANNED BALLOONS**

(Inspect as applicable)

#### **1. ENVELOPE FABRIC AND LOAD TAPE**

- (a) Check that the temperature link is still in place.
- (b) Check temperature label. If overheating is indicated (above 120°C), install a new label alongside, and note temperature indication in logbook. See paragraph 8 of this appendix for procedures.
- (c) Inspect for holes, tears and abrasions. Holes or tears smaller than 25 mm (1O) are acceptable, but all other damage must be repaired using prescribed methods.
- (d) Check fabric porosity by attempting to blow through it. If substantial porosity is suspected, perform a flight test.
- (e) Check envelope fabric strength by a 1O grab test. Minimum strength is 14 kg (30 lbs.). Perform the test three times; the lowest value is disqualifying. Perform test on the top section of the envelope, and make sure original fabric is tested. Also, look for discoloration as sign of overheating or exposure.
- (f) Check both vertical and horizontal tapes for security or stitching. Check especially the stitching of the crown ring, and the joints between overlying tapes and top rim tape.
- (g) Check the flying wire loops for friction and burn damage. Check that the pockets are in place.

#### **1.2 Parachute Deflation Systems**

- (a) Check control lines for wear and burn damage.
- (b) Check that knots are secure.
- (c) Check that pulleys are in good condition and not jammed with loose thread or other foreign material.
- (d) Check stitching of control line tie-off loops and pulley fixings.

(e) Check that retaining cords and release cords are in good condition. Stiffness indicates overheating.

(f) Check knots and stitching of loops to both parachute and balloon. If there are doubts about the sealing of the parachute, the balloon should be inflated. The parachute overlap should be equal all the way round with no daylight showing and no excessive stress in the retaining lines. Excessive stress is indicated by stress wrinkles in the edge of the parachute.

### **1.3 Combination Tops**

(a) Check parachute as above.

(b) Check Velcro control line as above.

(c) Check that cape wells operate correctly.

(d) Check fixing of cape wells. The fixing of the female half to the Velcro panel is particularly important.

(e) Check condition of Velcro.

(f) Check fit of Velcro. The Velcro panel edge must not be shorter at all, or significantly longer than the Velcro on the balloon. On Velcro balloons, the overlying tapes are gated to a top rim tape. The length of free tape below this rim tape should be 2,5%- 5% shorter than the corresponding seam length on the Velcro panel. Any errors here should be reported to the manufacturer so that the correct repair can be specified.

### **1.4 Triangular Velcro Rip**

This is only used on certain special shapes. With one person stretching each corner of the triangular aperture, the fitted Velcro panel should be loose below the mesh of overlying tapes. Check rigging and cape well as for parachute/Velcro balloons. Check the condition of the side vent. Check the attachment of release and closing lines as above for parachutes. Check that the elastic closing lines are in good condition.

### **1.5 Load-Bearing Attachments**

(a) Flying wires must be of stainless steel or kevlar. There should be no exposed stands in the wire and no severe kinks. Slight discoloration is permissible.

- (b) Check thimbles and copper ferrules. Damage to the colour-coded plastic sleeving at the carabiner end of the cable is not important.
- (c) Carabiners should be free of distortion with fully operational screw gates. There should be no serious corrosion.
- (d) Basket wires: Check for abrasion damage. Check thimbles and copper ferrules.
- (e) Burner frame: Check for condition of welds, particularly if the frame shows signs of distortion.
- (f) Nylon rods are not critical for flight safety. Replace if cracked.

## **2. BURNER AND FUEL SYSTEM**

### **2.1 Burner**

- (a) Check for external signs of damage.
- (b) Check tightness of main jets.
- (c) Check blast valves for signs of wear or leakage.
- (d) Check that all joints and connections are leak proof.
- (e) Carry out a burner test, using each cylinder. Observe function of pressure gauge, blast valves and cylinder valves. Cylinders should be vertical for this test.
- (f) Pilot light: Check by sound and appearance of flame.
- (g) If blockage is suspected, check hoses and jet by removing them and cleaning as necessary. Reassemble with PTEE tape.
- (h) Check operation of pilot valves on burner (if fitted).
- (i) Hoses: Should be of the wire-braided type. Check for wear, cuts or excessive bends. Liquid hoses should be pinpricked on the outer cover. Hose inspection should include fuel manifolds, if these are fitted.

### **2.2 Fuel Cylinders**

- (a) Check for external damage.

(b) Check self-seal on couplings by opening the valves with no hoses connected. No leakage should occur. After closing the liquid valve, release the pressure in the coupling by depressing the central pin.

(c) Check operation of contents gauge.

(d) Fuel tanks should be treated with a mixture of 4 oz. (113,4 gram) methanol/10 gallon (45,46 lt.) propane.

### **3. BASKETS**

(a) Check for wear or excessive distortion in weave.

(b) Check the floor where (and if) the cane passes through it.

(c) Check integrity of wooden floor.

(d) Check rod sockets condition.

(e) Check integrity of tank straps. No more than 30% cross sectional damage is acceptable.

### **4. INFLATION OR FLIGHT TEST**

An inflation test is recommended, as this makes detailed fabric inspection much simpler and allows control lines to be checked. If fabric porosity or leaking parachute is suspected, a carefully monitored test flight should be made to assess fuel consumption.

High fuel consumption itself is not dangerous, but if the leakage is such that exceptional skill is required to fly the balloon, then the balloon is not airworthy.

### **5. INSTRUMENTS**

Check instruments for proper operation, security and that they have been calibrated annually.

### **6. FIRE EXTINGUISHER**

(a) Check by weighing.

(b) Check for condition.

(c) Check mounting brackets and release mechanism.

## **7. 250-HOUR TEST AND SUBSEQUENT 100-HOUR TEST**

Perform grab test in accordance with balloon operating handbook.

## **8. PROCEDURE AFTER OVERHEATING**

If the temperature flag descends (i.e. the fusible link melts) the maximum allowable temperature has been exceeded. The flag will separate at approximately 127°C; maximum allowable temperature is 120°C. Inspect the two temperature indicating tags, if stitched onto the inside surface of the parachute. These tags, in turn, have ten temperature-incremental temperature windows. When a specific temperature is reached, the applicable window will turn black. These tags register service temperature (i.e. direct fabric temperature), which always will be somewhat less than inside air temperature.

If after flag separation the temperature tags show:

(a) Up to 120°C: No further action needed. Replace flag link.

(b) 120°C to 127°C: Carefully inspect top of envelope for signs of overheating, especially parachute and its retaining lines. Look for discolouration and undue stiffness in materials. If any discoloration or stiffness is visible, perform fabric test as per 250-hour inspection. If no signs of overheating are apparent, replace the temperature tags and flag, but always enter into the log/maintenance manual that an overheating has occurred, and what temperatures the tags registered.

(c) 127°C or higher reading: Perform fabric test and enter result of same and temperature reading into flight log.

Do not try to re-solder the temperature flag link - always replace with a new item.



## **Annex C**

### **CHECKLIST FOR AERODYNAMIC ANALYSIS**

(Include as applicable)

#### **1. AEROPLANES**

1. Aeroplane type
2. Intended aeroplane application
3. Aeroplane configuration:
  - a. Wings
  - b. Fuselage
  - c. Empennage
  - d. Power plant range
4. Wing details:
  - a. Plan form
  - b. Wing span
  - c. Wing cord at root and at tip
  - d. Wing area
  - e. Wing aspect ratio
  - f. Wing thickness (%) at root and at tip
  - g. Wing location
  - h. Airfoil at root and at tip
  - i. Spar material
  - j. Wing rib material
  - k. Skin material
  - l. Lift augmentation devices
5. Undercarriage configuration and type
6. Aeroplane overall length
7. Aeroplane overall height

8. Seating:

- a. Crew number
- b. Passenger seats
- c. Side-by-side or tandem

9. Luggage compartment(s)

10. Fuel:

- a. System
- b. Tank(s)
- c. Type and grade

11. Aircraft mass:

- a. Maximum all-up mass
- b. Empty mass: Standard configuration
- c. Total payload
- d. Maximum take-off mass
- e. Maximum landing mass

12. Centre of gravity range (% of cord)

13. Limit loads:

- a. Design load
- b. Wing loading
- c. Power loading

14. Aircraft speeds:1

- a. Design manoeuvring speed ( $V_a$ )
- b. Design speed for maximum gust intensity ( $V_b$ )
- c. Design cruising speed ( $V_c$ )
- d. Design diving speed ( $V_d/M_d$ )
- e. Demonstrated flight diving speed ( $V_{df}/M_{df}$ )

- f. Speed at which the critical engine is assumed to fail during take-off ( $V_{ef}$ )
- g. Design flap speed ( $V_f$ )
- h. Maximum speed for stability characteristics ( $V_{fo}/M_{fc}$ )
- i. Maximum flap extended speed ( $V_{fe}$ )
- j. Maximum speed in level flight with maximum continuous power ( $V_h$ )
- k. Maximum landing gear extension speed ( $V_{le}$ )
- l. Maximum landing gear operating speed ( $V_{lo}$ )
- m. Lift-off speed ( $V_{lof}$ )
- n. Minimum control speed with the critical engine inoperative ( $V_{mc}$ )
- o. Minimum control speed, take-off climb ( $V_{mca}$ )
- p. Minimum control speed, on or near the ground ( $V_{mcg}$ )
- q. Minimum control speed, approach and landing ( $V_{mcl}$ )
- r. Maximum operating limit speed ( $V_{mo}/M_{mo}$ )
- s. Minimum unstick speed ( $V_{mu}$ )
- t. Never-exceed speed ( $V_{ne}$ )
- u. Rotation speed ( $V_r$ )
- v. Rough air speed ( $V_{ra}$ )
- w. Stall speed or the minimum steady flight speed at which the aeroplane is controllable ( $V_s$ )
- x. Stall speed or the minimum steady flight speed in the landing configuration ( $V_{so}$ )
- y. Reference stall speed ( $V_{sr}$ )
- z. Reference speed in the landing configuration ( $V_{sro}$ )
- aa. Speed at which onset of natural or artificial stall warning occurs ( $V_{sw}$ )
- bb. Vne-g stall speed at which the aeroplane can develop a lift force (normal to the flight path) equal to its mass
- cc. Maximum aerotow speed ( $V_t$ )

- dd. Threshold speed ( $V_t$ )
  - ee. Maximum threshold speed ( $V_{tmax}$ )
  - ff. Maximum winch-launch speed ( $V_w$ )
  - gg. Speed for best rate-of-climb ( $V_y$ )
  - hh. Minimum speed in take-off, following a failure of the critical engine at  $V_{ef}$ , at which the pilot can continue the take-off and achieve the required height above the take-off surface within the take-off distance ( $V_1$ )
  - ii. Take-off safety speed ( $V_2$ )
  - jj. Minimum take-off safety speed ( $V_{2min}$ )
  - kk. Steady initial climb speed with all engines operating.
15. Take-off distance to 50 ft obstacle clearance - no wind
  16. Take-off ground run – level, no wind
  17. Landing distance from 50 ft obstacle clearance height - no wind
  18. Landing ground run - level, no wind
  19. Maximum rate of climb
  20. Range
  21. Endurance

## **2. HELICOPTERS**

[Under development]

## **3. GYROCOPTERS**

[Under development]

## **Annex D**

## **FORMS**

[Note: The following forms are under development.]

<b>Form RA24.1A</b>	Application for the issuing of a Build Number in terms of Regulation 24.01.2(4)
<b>Form RA24.1B</b>	Proving Flight Authority
<b>Form RA24.2A</b>	Application for the issuing of an Authority to Fly in terms of Regulation 24.02.1(2)(a) currently Form CA103-03
<b>Form RA24.2B</b>	Application for the renewal of an Authority to Fly
<b>Form RA24.2C</b>	Subsequent application for the renewal of an Authority to Fly
<b>Form RA24.2D</b>	Application for a Special Flight Permit
<b>Form CA24.02.4</b>	Application for Aircraft Type Approval in terms of Regulation 24.02.10(1)
<b>Form CA24.02.5</b>	Aircraft Type Approval
<b>Form RA44.1A</b>	Annual Inspection Form
<b>Form RA44.1B</b>	Major Modifications
<b>Form RA44.1C</b>	Mass and Balance
<b>Form RA44.1D</b>	Test Flights