



TECHNICAL GUIDANCE MATERIAL

for

Amateur-Built Aircraft

SUBJECT: GUIDANCE MATERIAL FOR AMATEUR-BUILT AIRCRAFT

EFFECTIVE DATE: 09 December 2021

APPLICABILITY

This guidance material is applicable to amateur builders, foreign amateur-built aircraft and other Aviation industry stakeholders.

PURPOSE

This guidance material provides guidance and information to applicants applying for an amateur-built aircraft approval. This guide also elaborates on the procedures for building, approval (Build number), importing, transfer, maintenance, modification and operating an amateur-built aircraft. Furthermore, it explains the construction criteria that the amateur builder must accomplish on the aircraft to be eligible for amateur-built approval.

In addition, this guidance material is not mandatory and does not constitute a regulation. This material describes an acceptable means, but not only the means, to comply with airworthiness approvals and operation requirements of amateur-built aircraft.

1. REFERENCE

It is intended that the following reference materials be used in conjunction with this document.

- i. Part 24 Subpart 1 of the SACARs,
- ii. Part 47 Subpart 1 of the SACARs
- iii. SA-CATS 24, SACATS,
- iv. SA-CATS 47, SACATS,
- v. Part 187 of the SACARs Fees.

2. TERMS AND ABBREVIATIONS:

TERM	DEFINITION
Amateur-Built Aircraft	An aircraft built in terms of the provisions of Part 24, including any of its components and includes production-built aircraft from which the build standard was deviated from,
Amateur Builder	A person who constructs an aircraft under amateur-built aircraft guidelines, and who does not receive any form of payment for such an activity,
Aircraft Evaluation	An evaluation performed for the purpose of determining if a specific amateur-built aircraft meets the major portion requirements
Build Log	The construction/assembly build log is used as an aid in determining if the manufacturer's aircraft kit meets the major portion requirements as referred to above. It is also used for determining if the completed aircraft is eligible for approval as an amateur-built aircraft,
Build Number	A unique building authorisation number issued to the amateur builder to commence with the aircraft construction in terms of Subpart 1 of Part 24 of the regulations.
Build Standard	The document package that defines the dimensions, materials and processes to be used in the construction of an aircraft, together with associated documents that show that the design complies with an established design criteria,
Commercial Assistance	Assistance in the building of an amateur-built aircraft in exchange for compensation. This does not include one builder helping another,
Compensation	Payment by the amateur builder in cash, services, or other tender, to any person who provides assistance on a commercial basis in the building of an aircraft,
Design Criteria	The document that describes the aircraft which the builder proposes to build in general terms including basic structure, materials, number of seats etc. (plans/ picture will be helpful),
Fireproof Material	The capacity to withstand the application of heat by a flame for a period of 15 minutes,
Flight Test Plan	A plan that details a test procedure in terms of how the crew and the pilot in command are going to accomplish the flight test to achieve acceptable results
Foreign Amateur -Built Aircraft Imported	Any amateur-built aircraft owned or operated by any state other than the Republic of South Africa, In the context of Part 24, means brought into the Republic by any means for the purpose of having the aircraft put on the South African Civil Aircraft Register,
Kit	A collection of pre-manufactured components, parts and materials that constitute all or part of what is required to produce a finished aircraft, as sold by a manufacturer of that kit, whether or not the manufacturer actually manufactured some or all of the kit contents,
Kit Evaluation	An evaluation to determine if an aircraft-built from, and according to, the kit instructions will meet the major portion requirements,
Major Portion	As related to an amateur-built approval, major portion means that when the aircraft is completed, the majority of the construction and assembly tasks have been performed by the amateur builder who submitted the application for a build number. The major portion means more than 50% of the aircraft (also known as the "51 percent rule"),
Plans Built Aircraft	An aircraft that is constructed exclusively from plans/blueprints without the aid of purchased major sub-assemblies or pre-assembled kit components. This also includes aircraft of a builder's original design and manufactured components. (as opposed to aircraft built from a pre-manufactured kit),
Unacceptable Commercial Assistance	Any commercial assistance that reduces the work performed by the amateur builder to less than the major portion of the aircraft construction,

ABBREVIATION	DESCRIPTION
AD	Airworthiness Directives
AED	Airworthiness Engineering
AIR	Airworthiness Department
AIR	Airworthiness Department
AME	Aircraft Maintenance Engineer
AP	Approved Person
ASO	Aviation Safety Operations
ATF	Authority to Fly
CAR	Civil Aviation Regulations
E	Executive
M	Manager
MI	Manufacturing Inspector
OEM	Original Equipment Manufacturer
PFA	Proving Flight Authorisation
SACAA	South African Civil Aviation Authority
SACAR	South African Civil Aviation Register
SACATS	South African Civil Aviation Technical Standards
SB	Service Bulletins
SM	Senior Manager
TC	Type Certified
TGM	Technical Guidance Material
TSO	Technical Standard Order

3. GENERAL

3.1 APPLICATION FOR AN AMATEUR-BUILT AIRCRAFT

3.1.1 DESIGN AND CONSTRUCTION

- a. Any choice of engines, propellers, wheels, other components, and any choice of materials may be used in the construction of amateur-built aircraft. However, it is strongly recommended that approved components and established aircraft quality material be used, especially in manufacturing parts constituting the primary structure, such as wing spars, critical attachment fittings, and fuselage structural members. Inferior materials, whose identity cannot be established, should not be used.
- b. Major sections e.g. wings, fuselage, empennage, etc. from type certificated aircraft may be used in the construction as long as the sections are in a condition for safe operation. These sections are to be considered by the SACAA in determining the major portion requirements.
- c. The design of the cockpit or cabin of the aircraft should avoid, or provide for padding on, sharp corners or edges, protrusions, knobs and similar objects which may cause injury to the pilot in the event of an accident. It

is strongly recommended that Technical Standard Order (TSO) approved or equivalent seat belts be installed along with approved shoulder harnesses.

- d. An engine installation should ensure that adequate fuel is supplied to the engine in all anticipated flight attitudes. Also, a suitable means, consistent with the size and complexity of the aircraft, should be provided to reduce fire hazard wherever possible, including a fireproof firewall between the engine compartment and the cabin. When applicable, a carburetor heat system should also be provided to minimise the possibility of carburetor icing.

3.1.2 CONSTRUCTION KITS

- a. An amateur-built aircraft build from a kit may be eligible for amateur-built approval (Build number), provided that the major portion has been constructed and assembled by the amateur builder. The major portion of such kits may consist of raw material such as lengths of wood, tubing, extrusions, etc., which may have been cut to an approximate length. A certain quantity of pre-manufactured parts such as heat-treated ribs, bulkheads or complex parts made from sheet metal, fibre glass, or polystyrene would also be acceptable, provided the kit still meets the major portion of the construction and assembly requirement.
- b. Various material/part kits for the construction of aircraft are commercially available for use by aircraft builders. However, it is advisable for one to familiarized themselves with the content of this TGM prior to acquiring the build kit.

Note: The major portion of the aircraft is defined as more than 50 percent of the fabrication and assembly tasks, commonly referred to as the “51 -percent rule.” The amateur builder will jeopardise eligibility for amateur-built approval if they allow someone else to build the aircraft on their behalf.

3.1.3 AIRCRAFT REBUILDS

- a. The prospective amateur re-builder may apply for an amateur-built aircraft approval (build number).
- b. For the rebuilt aircraft intended to be registered in the South African Civil Aviation Register (SACAR) and classified as an amateur-built aircraft the re-builder shall provide evidence of the following supporting data:
 - i. insurance certificate proving that the aircraft was insured,
 - ii. insurance letter proving that the aircraft was scrapped by the insurer,
 - iii. evidence of scrapping from manufacturer,
 - iv. confirmation of aircraft de-registration,
 - v. copies of flight folio entries (shows the last entry),
 - vi. certificate of registration if rebuilding own aircraft,
 - vii. evidence of purchase if you are not the owner of the aircraft,
declaration letter from the seller, when scrapped is sourced from the foreign land.
- c. In addition of the above required supporting data the following shall be submitted for build number approval:
 - i. application form with associated fees,

- ii. design criteria,
- iii. copy of the certified identity document.

Note: The rebuilt aircraft will lose the original designation, manufacturer, serial number, and the registration mark. The amateur re-builder becomes the new manufacturer.

3.1.4 TRANSFER OF AMATEUR-BUILT AIRCRAFT APPROVAL (BUILD NUMBER)

- a. The regulations do not necessarily make provision for transfer of build number from one amateur builder to another during the construction period of the aircraft. However, the below guidelines will apply.
- b. The amateur builder may lose interest or become incapacitated during aircraft construction and may need to transfer the project to another amateur builder enthusiast. The amateur builder taking over such a project must apply for build number transfer by completing application form (CA 24-07).
- c. The following supporting data is required for transfer purpose:
 - i. provide evidence (build log) that he/she will still be responsible to construct the major portion of the aircraft,
 - ii. a letter signed by the builder number holder,
 - iii. copy of the certified identity document
 - iv. copy of the build number concerned,

Note: Purchasers of partially completed kits should obtain all construction and assembly records from the previous owner(s). This may enable the builder who completes the aircraft to be eligible for amateur-built approval. The transfer is only applicable whilst the aircraft is still incomplete not and registered.

3.1.5 FOREIGN AMATEUR-BUILT AIRCRAFT ACCEPTANCE

- a. Application for a foreign fully built amateur aircrafts shall be submitted to eng@caa.co.za by the new aircraft owner or his/her representative.
- b. Following is the required documentation for processing of the application:
 - i. application form (CA 24-56) accompanied by associated fee,
 - ii. proof of purchase,
 - iii. copy of the new aircraft owner identification,
 - iv. aircraft design criteria (pictures, aircraft drawings & specification),
 - v. flight manual and maintenance manual,
 - vi. copy of the logbook entries while the aircraft is in the state of registry,
 - vii. copy of permit to fly or equivalent issued by state of registry,
 - viii. confirmation of registration from the state where the aircraft is imported from,
 - ix. evidence that the aircraft is categorization as amateur built or experimental by the state of registry.

Note: The SACAA inspector may conduct an inspection at any stage (kit verification, build number approval/ acceptance, proving flight authorisation and authority to fly) of the approval to enable the applicant to demonstrate compliance with the regulatory requirements as referenced herein.

3.1.6 REGISTRATION AND NATIONALITY MARKS REQUIREMENTS

- a. Requirements for registration and nationality marks of amateur-built aircraft are stipulated under Part 47 of the regulations. Amateur builders are encouraged to familiarize themselves with such requirements before embarking on any construction/assembly or purchase of aircraft kits.

Note: The aircraft can only be registered once the declaration of construction completion (CA 24-57) has been issued by the overseer (AP) who supervised the construction of that aircraft as stated under section 4 of application form CA 24-07.

- b. Once the aircraft has been registered the build number cannot be transferred.

3.1.7 IDENTIFICATION PLATE

- a. An amateur builder must affix to the aircraft the builder's identification plate stamped or engraved with its nationality or registration marks before applying for proving flight authorisation in terms of SA-CATS 24.
- b. The identification plate must be made of fireproof metal or other fireproof material of suitable physical properties and affixed to the aircraft in a prominent position near the main point of entrance to the aircraft.

3.2 APPROVAL STEPS

The following guidelines in general order should be followed in the approval process:

3.2.1 INITIAL STEP

The prospective amateur builder may initiate the process by submitting the amateur-built approval (build number) application form (CA 24-07) accompanied by the supporting data and applicable fee proof of payment to eng@caa.co.za.

3.2.2 AIRCRAFT MARKING

The registration/nationality mark, ZU-Letters, assigned to the aircraft and an identification plate must be affixed in accordance with CAR Parts 47.

3.2.3 PROVING FLIGHT AUTHORISATION

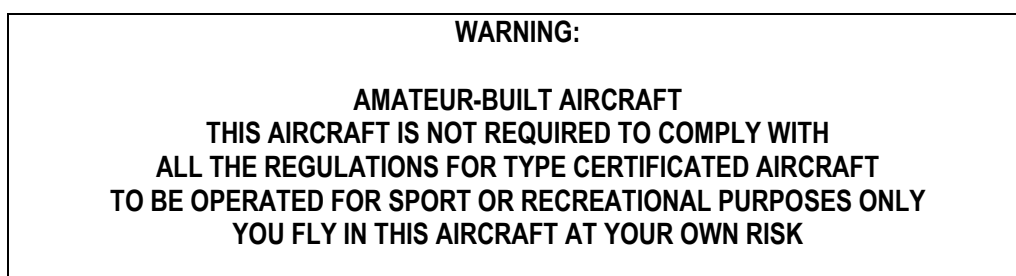
- a. To test the aircraft after construction, the amateur builder is required to apply for proving flight authorization (PFA) to perform the necessary test flights to realise the concept.
- b. The application for PFA must be accompanied by the following documents or information:
 - i. application form (CA 24-01) accompanied by associated fee,
 - ii. photographs or three-view drawings, to identify the aircraft,
 - iii. copy of the build number transmittal letter,
 - iv. copy of the declaration of construction completion (CA 24-57)
 - v. copy of insurance documents, including third party insurance,
 - vi. equipment list,
 - vii. draft flight manual/ pilot operating handbook,
 - viii. pitot static checks,
 - ix. compass swings records,
 - x. ground test conducted recorded on the flight folio,
 - xi. certificate of registration,
 - xii. radio station license,
 - xiii. inspection report (CA 44-01),
 - xiv. aircraft release statement by the AP,
 - xv. mass and balance report,
 - xvi. pilot license and rating,
 - xvii. modification and (AD/SB) status,
 - xviii. transponder checks (if applicable),
 - xix. builder's build log,
 - xx. flight test plan,
 - xxi. evidence of the affixed identification plate,
 - xxii. evidence of inspections, such as logbook entries signed by the relevant approved person, describing all inspections conducted during construction of the aircraft in addition to photographic documentation of construction details. It is recommended that this evidence be documented in a logbook to allow for review of service records and recording of inspection.

Note: Operators of rotorcraft having fully articulated rotor systems should be particularly cautious of “ground resonance.” This condition of rotor unbalance, if maintained or allowed to progress, can be extremely dangerous and usually results in structural failure; and tests showing that stability, vibration, and balance are satisfactory should normally be completed with the rotorcraft tied down, before beginning hover or horizontal flight operations.

3.2.4 INITIAL AUTHORITY TO FLY

- a. The amateur builder shall only be eligible for a standard authority to fly (ATF) on successful completion of a proving flight authorization. Application form (CA 24-02) must be submitted to eng@caa.co.za accompanied by the associated payment as per Part 187.
- b. The application for an ATF must be accompanied by the following documents or information in addition to the required supporting data stipulated under the proving flight authorisation:
 - i. flight manual,
 - ii. flight performance records,
 - iii. flight folio records.

Note: The applicant should expect that the SACAA will also verify during inspection that all required markings are properly applied, including the following placard which must be displayed in the cabin or the cockpit at a location in full view of all passengers and in capital letters of not less than 3 mm high. The placard is not applicable to single-seater aircraft.



3.2.5 AIRCRAFT INSPECTION

- a. The amateur-built program was designed to permit person(s) to build an aircraft solely for educational or recreational purposes. SACAA permits amateur builders the freedom to select their own designs. SACAA does not formally approve these designs since it is not practicable to develop design standards for the multitude of unique design configurations generated by kit manufacturers and amateur builders.
- b. Amateur builders should call upon persons having experience with aircraft construction techniques, such as approved persons (AP), approved maintenance engineers (AME), to inspect particular components and oversee the construction e.g. wing assemblies, fuselages etc. prior to closure and to conduct other inspections as necessary.
- c. AP/ AME builders building their own aircrafts may not inspect and release their own work/aircrafts. This practice is an effective means of independent monitoring of construction integrity.
- d. The purpose of the inspection is to allow the inspector to make a subjective assessment of the workshop methods, techniques and practices used in the construction of the aircraft solely for the purpose of prescribing appropriate conditions and operating limitations necessary to protect other airspace users and persons on the ground, e.g. to protect persons and property not involved in the activity.

Note: The person carrying out the inspection is not responsible for the integrity of the design or construction of the amateur-built aircraft, or for the identification of any structural design or construction deficiencies - responsibility for the design, construction and integrity of the aircraft rests with the amateur builder.

3.2.6 MODIFICATION AND REPAIR REQUIREMENTS

An amateur-built aircraft is not a design approved product or configuration in terms of the SACAA categorisation and as such all subsequent design changes are the responsibility of the amateur aircraft builder. However, an amateur builder must ensure that those changes are properly recorded in the aircraft logbook.

Note: In view of the amateur-built aircraft not intended to comply with any prevailing airworthiness design standard, the classification of major or minor modification is not necessarily applicable.





3.2.7 MAINTENANCE REQUIREMENTS

- a. The builder of the amateur aircraft must carry out and certify maintenance on the aircraft and is fully responsible for maintenance of such an aircraft. Maintenance of the aircraft should be recorded on the aircraft logbooks.

3.2.8 SAFETY PRECAUTIONS RECOMMENDATIONS

- a. The pilot should become thoroughly familiar with the brake tests, engine operation, and ground handling characteristics of the aircraft by conducting taxi tests before attempting flight operations.
- b. Before the first flight of an amateur-built aircraft, the pilot should take precautions to ensure that emergency equipment and ground personnel are readily available in the event of an accident.
- c. Violent or aerobatic manoeuvres should not be attempted until sufficient flight experience has been gained to establish that the aircraft is satisfactorily controllable throughout its normal range of speeds and manoeuvres. All manoeuvres satisfactorily conducted are to be documented in the aircraft logged by the pilot.
- d. Unless authorisation to deviate is obtained from Air Traffic Control, any aircraft equipped with a transponder shall have a calibrated airspeed/static pressure system to prevent an error in altitude reporting.

4. DOCUMENT AUTHORISATION

DEVELOPED BY:		
	THANDI MOFOKENG	09 DECEMBER 2021
SIGNATURE OF MI	NAME IN BLOCK LETTERS	DATE
REVIEWED BY:		
	RICHARD MAFAPHLA	09 DECEMBER 2021
SIGNATURE OF M: AED	NAME IN BLOCK LETTERS	DATE
VALIDATED BY:		
	LOBANG THABANTSO	09 DECEMBER 2021
SIGNATURE OF SM: AW		
APPROVED BY:		
	SIMON SEGWABE	09 DECEMBER 2021
SIGNATURE OF E: ASO	NAME IN BLOCK LETTERS	DATE

END