GHANA
CIVIL AVIATION AUTHORITY

ADVISORY CIRCULAR
AC 05-002

ELIGIBILITY & TRACEABILITY OF REPLACEMENT PARTS

SECTION 1 POLICY & GENERAL INFORMATION

1.1 PURPOSE

This advisory circular (AC) provides information and guidance for use in determining the quality, eligibility and traceability of aeronautical parts and materials intended for installation on type-certificated products and to enable compliance with the applicable Ghana Civil Aviation Directives. (GCAD).

1.2 STATUS OF THIS ADVISORY CIRCULAR

This AC is an original issuance.

1.3 APPLICABILITY

A. This advisory circular is applicable to all aircraft registered in Ghana and the parts that are installed on those aircraft.

B. The AC is also applicable to the performance standards for persons performing maintenance and signing maintenance release for those parts.

1.4 RELATED DIRECTIVES

The following directives are directly applicable to the guidance contained in this advisory circular—

- GCADs Part 5, Aircraft and Component Original Certificate
- GCADs Part 5, Continuing Airworthiness of Aircraft

1.5 RELATED PUBLICATIONS

For further information on this topic, individuals, organizations and other entities are invited to consult the following publications—

1) Ghana Civil Aviation Authority (GCAA)

   - ♦ AC 05-003, Disposition of Unsalvageable Parts & Materials.
   - ♦ AC 04-005, Handling of Suspected Unapproved Parts.

Copies may be obtained from the GCAA Safety Regulations Department.

- Advisory Circulars are intended to provide advice and guidance to illustrate a means, but not necessarily the only means, of complying with the directives, or to explain certain regulatory requirements by providing informative, interpretative and explanatory material.
- Where a directive contains the words “prescribed by the Authority,” the AC may consider to “prescribe” a viable method of compliance, but status of that “prescription” is always “guidance” (never a directive).

2) International Civil Aviation Organization (ICAO)

- Annex 8, Airworthiness of Aircraft
- Document 9760, Airworthiness Manual

Copies may be obtained from Document Sales Unit, ICAO, 999 University Street, Montreal, Quebec, Canada H3C 5H7.

1.6 DEFINITIONS & ACRONYMS

A. The following definitions apply to this advisory circular—

1) **Acceptable Parts.** The following parts may be found to be acceptable for installation on a type-certificated product—

(a) Standard parts (such as nuts and bolts) conforming to an established industry or approved specification.

(b) Parts produced by an owner or operator for maintaining or altering their own product and which are shown to conform with approved data.

(c) Parts for which inspections and tests have been accomplished by appropriately certificated persons authorized to determine conformity to an approved design data.

2) **Class I Product.** A complete aircraft, aircraft engine, or propeller that has been type-certificated in accordance with the applicable directives, and for which approved Specifications or TC data sheets have been issued.

3) **Class II Product.** A major component of a Class I product (e.g., wings, fuselages, empennage assemblies, landing gears, power transmissions, or control surfaces, etc.), the failure of which would jeopardize the safety of a Class I product; or any part, material, or appliance, approved and manufactured under the Technical Standard Order (TSO) system in the ‘‘C’’ series.

4) **Class III Product.** Any part or component that is not a Class I or Class II product, including standard parts. Class III products are considered to be parts.

5) **Standard Part.** A part manufactured in complete compliance with an established Government or industry-accepted specification which includes design, manufacturing, and uniform identification requirements.

Examples of accepted specifications include, but are not limited to—
- National Aerospace Standards (NAS),
- Society of Automotive Engineers (SAE),
- SAE Aerospace Standard (AS),
- Military Standard (MS), etc.

(a) The specification must include all information necessary to produce and conform the part.

(b) The specification must be published so that any party may manufacture the part.

6) **New.** A product, accessory, part, or material that has no operating time or cycles.

7) **Surplus.** This term is used to describe a product, assembly, part, or material that has been released as surplus by the military, manufacturers, owners/operators, repair facilities, or any other parts supplier. These products should show traceability to an approved manufacturing procedure.

8) **Overhauled.** This term is used to describe an airframe, aircraft engine, propeller, appliance, or component part using methods, techniques, and practices acceptable to the FSI, which has undergone the following—

(a) Has been disassembled, cleaned, inspected, repaired when necessary, and reassembled to the extent possible.

(b) Has been tested in accordance with approved standards and technical data, or current standards and technical data acceptable to the FSI (i.e., manufacturer's data), which have been developed and documented by the holder of one of the following—

(i). TC.

(ii). Supplemental Type Certificate (STC), or material, part, process, or appliance approval.

(iii). PMA.

9) **Rebuilt.** This term is used to describe an aircraft, airframe, aircraft engine, propeller, or appliance, using new or used parts that conform to new part tolerances and limits or to approved oversized or undersized dimensions that has undergone the following—

(a) Has been disassembled, cleaned, inspected, repaired as necessary, and reassembled to the extent possible.

(b) Has been tested to the same tolerances and limits as a new item.

10) **Return to Service Inspection Records.** The person approving or disapproving for return to service a type-certificated product must ensure that the required maintenance record entries comply with GCADs Part 5, and therefore must include the following information—

(a) Type of inspection and a brief description of the extent of the inspection.

(b) Date.

(c) Product hours, cycles, or life limits as applicable.

(d) Signature, certificate number, and kind of certificate held by the person approving or disapproving for return to service.

(a) The appropriate certifying statement that the product or part thereof, is approved or disapproved for return to service, as applicable.

1) **As Is.** Describes any airframe, aircraft engine, propeller, appliance, component part, or material, the condition of which is unknown.

2) **Appropriately Certificated Person.** As related to return to service after maintenance, preventative maintenance, rebuilding, or modification, can include the holder of a—

(a) **Mechanic certificate**. May perform maintenance, preventative maintenance, and modifications as provided in GCADs.

(b) **Inspection authorization.** May inspect and approve for return to service any aircraft or related part or appliance (except aircraft maintained in accordance with a continuous airworthiness program under GCADs Part 09) after a major repair or modification as provided in Part 5 if the work was done in accordance with technical data approved by GCAA. Perform an annual, or supervise a progressive inspection according to Part 5.

(c) **Approved Maintenance Organization** under Part 6, may perform maintenance, preventative maintenance, or modifications as provided in Part 5.

B. The following acronyms are used in this advisory circular—

1) **AD** – Airworthiness Directive

2) **AMO** – Approved Maintenance Organization

3) **Cof A** – Certificate of Airworthiness

4) **Cof R** – Certificate of Registration

5) **ICAO** – International Civil Aviation Organization

6) **PAH** – Production Approval Holder
7) **PC** – Production Certificate
8) **PMA** – Part Manufacturer Approval
9) **STC** – Aircraft Supplemental Type Certificate
10) **SUP** – Suspected Unapproved Part
11) **TC** – Aircraft Type Certificate

SECTION 2 INFORMATION RELEVANT TO USED PARTS

The following information may be useful when assessing maintenance records and part status—

2.1 DOCUMENTATION

A. If the part has been rebuilt, overhauled, inspected, modified, or repaired, the records should include a maintenance release, return to service tag, repaired parts tag, or similar documentation from a certificated person or AMO.

B. Documentation describing the maintenance performed and parts replaced must be made for the part (Reference Part 5).

2.1.1 INFORMATION THAT SHOULD BE OBTAINED

A. The records should include information, either directly or by reference, to support documentation that may be helpful to the user or installer in making a final determination, as to the airworthiness and eligibility of the part.

B. Listed are examples of information that should be obtained, as applicable—

1) AD status.
2) Compliance or noncompliance with service bulletins.
3) Life cycle limited parts status (i.e., time, time since overhaul, cycles, history) should be substantiated.
4) Shelf-life data, including manufacturing date or cure date.
5) Return to service date.
6) Shortages applicable to assemblies or kits.
7) Import or export certification documents.
8) The name of the person who removed the part.
9) Completed Major Repair or modification form.
10) Maintenance Manual standards used for performing maintenance.

- If the part is serialized and life-limited, then both operational time and/or cycles (where applicable) must be indicated.
- Historical records that clearly establish and substantiate time and cycles must be provided as evidence.

2.1.2 UNUSUAL CIRCUMSTANCES

If a particular part was obtained from any of the following, then it should be so identified by some type of documentation (i.e., maintenance record entries, removal entries, overhaul records).

1) Non-certificated aircraft (aircraft without airworthiness certificate, i.e., State aircraft, aircraft not registered in Ghana and military surplus aircraft.

2) Aircraft, aircraft engines, propellers or appliances subjected to extreme stress, sudden stoppage, heat, major failure or accident.

3) Salvaged aircraft or aircraft components.

2.1.3 SURPLUS

A. Many materials, parts, appliances, and components that have been released as surplus by the military service or by manufacturers may originate from obsolete or overstocked items.

- Parts obtained from surplus sources may be used, provided it is established that they meet the standards to which they were manufactured, interchangeability with the original part can be established, and they are in compliance with all applicable AD's.

B. Such items, although advertised as ''remanufactured,'' ''high quality,'' ''like new,'' ''unused,'' or ''looks good,'' should be carefully evaluated before they are purchased.

The storage time, storage conditions, or shelf life of surplus parts and materials are not usually known.

SECTION 3 CONDITION FOR SAFE OPERATION

A. Parts and materials should be properly stored, protected, and maintained to ensure airworthiness.

B. The following factors should be considered when determining air-worthiness—

1) **Composite Materials.** Generally, most composite materials (thermoset polymers) have a refrigeration shelf-life recommended by the manufacturer.

- Composite materials must be kept refrigerated in accordance with the manufacturer's recommended temperature range and out-of-refrigeration time (out-time) limitations.
- Records must be maintained of the cumulative total of material out-time to prevent exceeding shelf-life.

2) **Anti-friction Bearings.** Anti-friction bearings that have been in storage for a long period of time, or have been improperly stored, are subject to the deteriorating effects of time and elements, unless they were hermetically sealed.

Such parts should be completely inspected and lubricated before being placed in service.

3) **Aircraft Fabric.** Fabric and prefabricated covers should be used only if they are identifiable as meeting aircraft standards.

- All fabric should be examined or tested for freedom from deterioration, as determined by an appropriately certificated person.

4) **Dope, Paint, Sealants, and Adhesives.** These items advertised as aircraft quality may have deteriorated due to age or environmental conditions, while in storage, and may require testing before use.

5) **Parts with Internal Seals.** Internal seals on parts such as pumps, valves, actuators, motors, generators, and alternators are subject to deterioration from long-term storage and are susceptible to early failure in service.

A procedure should be established for control of shelf-life items in order to prevent possible premature failures of the parts/components, unless other preventive procedures are in place.

6) **Rotating Components.** Rotating components, such as propellers, engine parts, and rotor blades, may have a life-limit or retirement life.

- Maintenance records should reflect a complete continuity of service time and repair history.

- Information that indicates whether the component has exceeded the life limit may, in some cases, be obtained from the manufacturer or from an Approved Maintenance Organization that may have affixed a logo, decal, or some other identification.

7) **Heat and Fire.** Parts that may have been exposed to heat or fire can be seriously affected and are likely unserviceable.

8) **Corrosives.** Foreign or corrosive liquids can also be detrimental on aircraft parts. Parts, appliances, and components that have been submerged in salt water may be unserviceable parts.

9) **Manufacturing Rejects.** Parts that failed the manufacturers quality assurance inspection criteria for conformity to type design, may be offered for sale by the manufacturers as scrap without being mutilated or destroyed rendering them unusable, and are unacceptable for installation.

10) **Damaged Aircraft.** Parts removed from an aircraft involved in an accident may have been subjected to undue stresses that may have seriously effected structural integrity and rendered them permanently unusable.

11) **Rebuilt Engines.** Only engines that are rebuilt by a manufacturer holding a production approval, an agency approved by the PAH, or an appropriately rated certificated agency can be considered as zero-timed.

SECTION 4 ELECTRICAL PARTS & INSTRUMENTS

4.1 ELECTRONIC KIT

A. Kits assembled by non-certificated individuals are not eligible for installation on type-certificated aircraft, until the part is certified as airworthy and found eligible for installation, in accordance with Parts 5 and 6.

B. During and after assembly, these kits should receive documented conformity inspections, by properly certificated persons, to ensure that they meet all applicable airworthiness requirements, for use on the specific aircraft on which they are to be installed.

C. The installation of these approved units should be accomplished by or under the supervision of a properly certificated person or agency in accordance with Schedules 5 and 6.

When the installation is a major modification, the kit data and the data used for the modification of the product must be approved by a representative of the GCAA.

D. An appropriately certificated person must complete the maintenance records to ensure that the aircraft is approved and airworthy for return to service.

4.2 DISCRETE ELECTRICAL & ELECTRONIC COMPONENT PARTS

A. Electrical and electronic parts, such as resistors, capacitors, diodes, and transistors, if not specifically marked by the equipment manufacturers part number or marking scheme, may be substituted or used as replacement parts, provided—

1) That such parts are tested; or

2) Determined to meet published performance specifications; and

3) Do not adversely affect the performance of the equipment or article into or onto which they are installed.

B. The performance of such equipment or article must be equal to its original or properly altered or repaired condition.

- Integrated circuits such as hybrids, large scale integrated circuits (LSIC), programmable logic devices, gate arrays, application specific integrated circuits (ASIC), memories, CPU's etc., are not included because their highly specialized functionality does not readily lend itself to substitution.

4.3 AIRCRAFT INSTRUMENTS

A. Instruments advertised as ''high quality,'' ''looks good,'' or ''remanufactured'' or that were acquired from aircraft involved in an accident should not be put in service unless they are inspected, tested, and/or overhauled as necessary.

- Instruments are highly susceptible to hidden damage caused by rough handling or improper storage conditions;
- Instruments that have been sitting on a shelf for a period that cannot be established, should be tested by an appropriately rated and certificated organization or person.

B. This should be accomplished by an appropriately rated Approved Maintenance Organization, and the installer establishes that (for the aircraft in which) the instrument installed will comply with the applicable directives.

SECTION 5 KNOW YOUR SUPPLIERS

5.1 USED AND REPAIRED PARTS

A. In addition to unapproved parts, used or repaired parts may be offered for sale as ''like new,'' ''near new,'' and ''remanufactured.''

B. Such terms do not aid the purchaser in positively determining whether the part is acceptable for installation on a type-certificated product and do not constitute the legal serviceability and condition of aircraft parts.

5.2 CAUTION

A. It is the installer's responsibility to ensure airworthiness.

B. Aircraft parts distributors, aircraft supply companies or aircraft electronic parts distributors, unless they are a PAH, cannot certify the airworthiness of the parts they advertise and/or sell

C. It is the installer's responsibility to request documentation establishing traceability to a PAH.

SECTION 6 SUMMARY

A. The approval for return to service after maintenance of aircraft, engines, propellers, appliances, and materials and parts thereof, is the responsibility of the person who performs the maintenance and who signs the record for approval for return to service.

The owner/operator is responsible for the continued airworthiness of the aircraft.

B. To ensure continued safety in civil aviation, it is essential that appropriate data is used when inspecting, testing, and determining the acceptability of all parts and materials.

C. Particular caution should be exercised when the origin of parts, materials, and appliances cannot be established or when their origin is in doubt.

End of Advisory Circular

This Page Intentionally Left Blank