

Acceptability of parts

24 July 2007

General

Civil Aviation Authority Advisory Circulars (AC) contain information about standards, practices and procedures that the Authority has found to be acceptable for compliance with the associated rule.

Consideration will be given to other methods of compliance which may be presented to the Authority.

When new standards, practices or procedures are found to be acceptable they will be added to the appropriate AC.

In addressing a subject the use of the imperative *must* or *is to*, terms not normally welcome in an AC, is because it is associated with mandatory provisions of the Rule itself.

Each reference to a number in this AC, such as 21.15, is a reference to a specific rule within Part 21.

Purpose

This AC provides methods acceptable to the Authority for showing compliance with Part 21, Subpart K and Part 43, Subpart B relating to the use of acceptable parts on type certificated aircraft.

Focus

This material is intended for to assist persons purchasing and installing parts in determining the acceptability of those parts for installation onto aircraft and their associated assemblies.

Related Rules

This AC relates specifically to Part 21, Subpart K – Materials, Parts, Processes, and Appliances, Part 43 – General Maintenance Rules and to Part 145 – Aircraft Maintenance Organisations.

Change Notice

This AC replaces AC 20-2A by re-numbering it to AC 00-1 as part of a project to standardise the numbering of all advisory circulars. The renumbering of this AC to a generic 00- series is intended to clarify that the AC has a general applicability to various rule Parts.

Reference to Part 145 Organisations has also been included in this AC.

Introduction

The basis for the airworthiness of an aeronautical product is that the product must continue to conform to an approved design and be in a condition for safe operation. In order for the product to continue to be airworthy, any replacement or modification parts installed must also conform to the product's type design. Part 21, Certification of Products and Parts, requires aircraft parts to meet certain conditions to be considered acceptable and Part 43, General Maintenance Rules, requires each installer to use acceptable parts. Part 145 requires an aircraft maintenance organisation to establish procedures to ensure the acceptable quality of parts and assemblies.

Recent developments in the USA and Europe have highlighted those airworthiness authorities' problems with unacceptable parts in the aviation industry. Investigations by the New Zealand Civil Aviation Authority have also shown that the New Zealand industry is not immune to the problems of unacceptable parts.

This advisory circular provides guidance on determining the acceptability of parts for use on type certificated aircraft.

Table of Contents

Introduction	3
General.....	5
Part 21 – Materials, parts, processes, and appliances	5
Part 43 – Maintenance practices	5
Part 145 – Maintenance control procedures	5
Acceptable parts	5
Unacceptable parts	6
Definitions	7
Additional reference material	7
Purchasers.....	9
General	9
Foreign sources	10
Parts purchasing	10
Records	11
Life-limited components.....	12
Salvaged parts	12
Unsalvageable parts.....	12
Surplus parts	13
Ex-military parts	13
Operators.....	16
General	16
Parts Pooling	16
Installers	17
General	17
Determining eligibility.....	17
Disposal of parts.....	19

General

Under the New Zealand Civil Aviation Regulations 1953 the Civil Aviation Authority was prescriptive in the type of documents required to determine a part's eligibility for use. This prescriptive requirement was carried over to the Civil Aviation Rules and tightened when the occurrences of unapproved parts increased.

Correct documentation generally assures the acceptability of a part. These documents, when correctly completed, assure a purchaser of the eligibility of aircraft parts.

Part 21 – Materials, parts, processes, and appliances

This Subpart defines those materials, parts, processes, and appliances that are considered acceptable for the use on type certificated products. Rule 21.303 lists the particular requirements for a material, part, or appliance to be eligible for installation.

Part 21, Subpart K has retained the prescription of documentation for New Zealand parts. Rule 21.303 also provides for the acceptance of imported parts by the Director. The acceptance under 21.303 does not require the acceptance of individual parts by the Director. Individual acceptance of parts by the Director is not feasible nor appropriate.

The rule provides a set of considerations that, if followed, should ensure the acceptability of a particular part. This advisory circular provides those considerations and discusses traceability, type conformity, and quality to be considered by purchasers, operators, and installers when sourcing spare parts. Following these guidelines should assure the suitability of parts.

Part 43 – Maintenance practices

Part 43 requires, in 43.53, that each person performing maintenance on an aircraft or aircraft component—

- use acceptable methods, techniques, and practices
- restore the aircraft or aircraft component to its original or properly modified condition

These requirements of Part 43 mean that only acceptable parts may be used during the maintenance of an aircraft or aircraft component. This advisory circular provides guidance on the considerations for determining the eligibility of materials, parts, and appliances to comply with Parts 21 and 43.

Part 145 – Maintenance control procedures

Part 145 requires, in 145.59, that a maintenance organisation establish procedures –

- for the use of acceptable maintenance techniques and practices
- for the inspection of materials and parts to ensure acceptable quality of parts and assemblies.

Acceptable parts

To be considered acceptable parts should comply with one of the following:

- Engines, propellers, and rotors should be accompanied with a correctly completed authorised release certificate, such as—
 - NZCAA Form One
 - FAA 8130

- JAA Form One
- CASA DA1
- Transport Canada TC24-0078
- An equivalent document issued by an organisation in accordance with the airworthiness requirements of an ICAO state
- Finite life components and parts that require regular maintenance by an organisation certificated under Part 145 should be—
 - accompanied by the documents specified above; or
 - if the documents specified above are not available—
 - accompanied by another type of documentation recognised by the airworthiness authority of an ICAO state; and
 - passed to a New Zealand Part 145 organisation to determine the conformity of the item and issue a CAA Form One
- All other components should be examined by the purchaser, operator, and installer in accordance with this advisory circular

Unacceptable parts

In 1996 the Federal Aviation Administration established a specific office for the reporting and investigation of what they termed suspected unapproved parts, or SUPS. This office provides various support services to aviation participants and can be found on the World Wide Web at:

<http://www.faa.gov/avr/sups.htm>

An unapproved part is a material, part, or appliance that—

- has not been manufactured or repaired in accordance with the appropriate procedures required by the rules
- if serialised, has lost its manufacturer's serial number identification
- may not conform to an approved type design
- may not conform to established industry specifications

In New Zealand the above parts are considered unacceptable and may not be installed on a type certificated product. Examples of unacceptable parts include, but are not limited to—

- counterfeit or fraudulently marked parts, components, or materials
- stolen parts available on the surplus aviation parts market

The subject of a FAA notice, engines from a Boeing 757 that crashed in South America were stolen before the investigation teams could arrive on site.

- parts available from manufacturers or suppliers that do not hold the appropriate certifications to produce or supply those parts
- parts that have not been maintained or repaired and returned to service in accordance with Parts 43 or 145

Identification of unacceptable parts is often difficult, due to the similarity of characteristics between unacceptable parts and acceptable parts. Unacceptable parts pose a significant safety risk when installed on aircraft, either intentionally or unintentionally.

The Civil Aviation Rules do not prevent the sale of aircraft parts of questionable serviceability but it is the operator's responsibility to be aware of the possible consequences of using questionable parts on certificated aircraft. An operator using a part of unknown quality, condition, or origin must be able to prove conclusively that such parts conform to the type design.

Definitions

Definitions used in this advisory circular, additional to those in Part 1, are as follows:

Article means any material, part, process, or appliance:

As is describes aeronautical products that are of unknown condition:

New means an aeronautical product that has accumulated no operating time or operating cycles:

Newly overhauled describes a product that has not been operated or placed in service, except for functional testing, since having been overhauled, inspected, and approved for return to service:

Rebuilt describes an aeronautical product that has been disassembled, cleaned, inspected, repaired as necessary, and reassembled to the same tolerances as a new item:

Surplus describes an aeronautical product that has been released as surplus by the military, by manufacturers, or by other parts suppliers:

In relation to the Part 1 definition of a standard part, national and international aeronautical specifications are published by standard setting organisations and include design, material, manufacture, and identification requirements. Standard part specifications are detailed in one of the following series—

- Air Force-Navy Aeronautical Standard (AN)
- American National Standards Institute (ANSI)
- Australian Standards (AS)
- British Standards, Aircraft Series (BS)
- Military Standards (MS)
- Military Specifications (MIL-SPEC)
- National Aerospace Standards (NAS)
- New Zealand Standards (NZS)
- SAE Aerospace Standard (AS)
- Society of Automotive Engineers (SAE)

Additional reference material

The following documents, and their revisions, also provide useful information on the determination of acceptable parts:

- FAA Advisory circulars

- AC00-56
- AC20-29
- AC20-62
- AC21-2
- AC21-13
- AC21-20
- AC21-29
- AC21-38
- FAA Orders
 - 8120-10
 - 8130-21
- UK CAA Airworthiness Notices
 - Notice 17
 - Notice 19

Purchasers

General

To assure the acceptability of parts, purchasers should aim to ensure complete traceability, type conformity, and quality. If these aspects cannot be assured the part should not be considered for purchase.

A purchaser can ensure the acceptability of a part by insisting on the correct documentation. This documentation should include the following information—

- the country of issue
- the airworthiness authority of the country of issue
- a reference to the approved manufacturing or maintenance organisation the part is sourced from
- a description of the part including as appropriate—
 - the nomenclature
 - the part number
 - the eligibility for use
 - the quantity
 - the serial number or batch number
- the status of the part including—
 - fatigue, cycle, shelf, or overhaul life
 - airworthiness directive status
 - compliance or non-compliance with service bulletins
 - the standards to which maintenance has been performed
 - any limitations associated with the part's use
- a certification as to the status of the part and that the part meets the applicable airworthiness requirements

Documents that, when completed in accordance with the appropriate airworthiness authority's requirements, provide assurance to a purchaser, operator, and installer as to a part's eligibility for installation include, but are not limited to the—

- NZCAA Form One
- FAA 8130
- JAA Form One
- CASA DA1
- Transport Canada TC24-0078

Purchasers are cautioned that the accompanying documents should be carefully assessed for compliance with the requirements of issue. Incorrectly completed forms immediately indicate a possible problem with the part. Suppliers of suspected unacceptable parts often fill in supporting documentation incorrectly in the false belief that incorrect documentation absolves them of any fraudulent actions.

The CAA considers that legitimate issuers of authorised release certificates should know how to fill them out correctly. If the form is not filled out correctly, suspect the part.

It is often difficult to determine the correct use of a form from a country other than the USA, Europe, Canada, or Australia. These authorities provide information on the use of their documents that is readily available. For example, FAA Order 8130-21 details what should and shouldn't be found on the FAA Form 8130-3.

For finite life components and other parts that are not accompanied by the above documents should be passed through a New Zealand Part 145 organisation to determine the conformity of the item. To determine the conformity of a component a Part 145 organisation will have procedures in its exposition that should ensure—

- the source of the component is appropriate and that any certification made has been made in accordance with the suppliers procedures

This will normally involve direct contact with the supplier

- that the records reflect the complete life and history of the component
- that the component is sufficiently dismantled to confirm its conformity
- the CAA Form One is issued correctly

All parts must be manufactured or maintained under controlled conditions but the ultimate responsibility is on the installer. Purchasers should endeavour to ensure that the parts are acceptable before buying, as no person may subsequently be willing to fit that part to an aircraft. The purchaser should also ensure that the required documentation is available for the installer to be satisfied as to the parts acceptability.

Purchasers should not place installers in the position of accepting responsibility for an unacceptable part.

Foreign sources

Foreign authorities, such as the Federal Aviation Administration and the UK Civil Aviation Authority, do not approve supply organisations. The FAA in particular is actively pursuing the unapproved parts suppliers in their country, but without recognised FAA approval, foreign purchasers have little proof of an organisation's reputation. Purchasers should consider that these type of suppliers may look to other countries, such as New Zealand, for customers.

Problems with documentation accompanying parts will normally be addressed and resolved between authorities. The NZCAA is actively pursuing suitable agreements with foreign authorities to clarify the requirements regarding acceptable parts.

Parts purchasing

Parts Purchasing: KNOW YOUR SUPPLIER

When purchasing parts there are several factors to be considered in determining if a part is acceptable for installation on a product. The purchaser should—

- Establish if the supplier is authorised to manufacture or distribute parts they supply
- Screen a potential supplier taking into consideration—
 - **The quoted price.** Is the price significantly lower than the price quoted by other suppliers of the same part.
 - **The delivery schedule.** Is the delivery schedule significantly shorter than that of other suppliers of the same part.
 - **Accompanying data.** Can the supplier provide drawings, specifications, overhaul manuals, or substantiating data demonstrating the conformity of the part.
 - **Part approval.** Can the supplier or maintenance organisation provide evidence of approval for the part or organisation.
 - **Unlimited parts.** Have discussions created a perception that an unlimited supply of parts, components, or material are available to the end user; and
- Check the parts on receipt taking into consideration—
 - **Packaging.** A visual inspection may indicate that the product container reveals it has come from another supplier's name, is unmarked, or damaged.
 - **Documentation.**

A cross check of the purchase order with the delivery receipt for proper part number and serial number.

A sampling of any certifications made by the supplier to ensure that they are correct and valid.
 - **Limitations.** Check to ensure that any shelf life or equivalent life limitation has not expired.
 - **Visual condition.**

Check that the part identification requirements have been met and that serial numbers have not been defaced, removed, or placed in other than normal positions.

Check any evidence of visual defects or abnormalities such as surface finish, prior usage, new and old paint together, or corrosion.

If receiving a large number of similar items, such as nuts and bolts, the inspection of a sample of the parts may be sufficient; and
- If dealing with expensive or critical components, or establishing a source for ongoing supply, consider visiting the supplier to assure yourself as to the processes that the supplier follows in providing parts

Records

Purchasers of parts should require the following records, particularly with life-limited parts, and ensure that they are complete and accurate:

- Records pertaining to the manufacturing, inspection, maintenance, and operation of the part including any certifications made regarding the parts
- Records of the manufacture of the part showing it was produced under appropriately approved conditions and show that it is still in an airworthy condition
- Records of engines, gear box assemblies, landing gears, instruments, or other parts that show they originally conformed to the type design and have been maintained in accordance with the applicable requirements

Life-limited components

All life-limited components should be provided with a set of records that reflect the entire service of that component. The service life should be continuous from new and include the relevant repair information. Life-limited components that do not provide complete service histories are not considered acceptable.

Salvaged parts

Salvaged parts which have come from aircraft that have been involved in accidents, and rejected parts sold by the manufacturer as scrap metal, are available to purchasers as replacements. Such items may have been subjected to forces or environments which would render them permanently unairworthy.

Purchasers should consider rejecting parts that have been exposed to—

- heat or fire
- foreign or corrosive liquids
- salt water from previously submerged aircraft
- excessive inertia forces or impact damage

A part may not show any signs of distress from these factors but manufacturer's maintenance manuals usually provide guidance on the serviceability of parts involved in accidents. For example, helicopter accidents involving severe rotor strikes usually render the transmission unserviceable.

Unsalvageable parts

It is common practice for possessors of aircraft parts to dispose of unsalvageable parts and materials by selling, discarding, or transferring such items. In some instances, these items have reappeared for sale in the aviation community. Misrepresentation of the status of parts and material and the practice of making such items appear serviceable have resulted in the use of unsalvageable non-conforming parts and materials.

Persons disposing of unsalvageable aircraft parts and materials should, when appropriate, mutilate those parts and materials prior to release. Mutilated parts should not be able to be reworked or camouflaged to provide the appearance of being serviceable but instances of this practice have been found in New Zealand.

A rotor blade was found in service that had been mutilated and discarded. The blade had been 'patched', not in a way to ensure its serviceability but only to hide the mutilation. This practice has significant safety implications and is unacceptable.

All purchasers of aircraft parts and materials should ensure that misrepresented unsalvageable parts and materials are not received. Purchasers should be cautious when receiving parts—

- showing signs of rework, but sold as new

- that are new but are sold with maintenance release tags reflecting a status other than new
- have a significant service history but appear new
- having damaged or partly mutilated identifying plates and information
- showing signs of inappropriate repair
- exhibiting poor workmanship or signs of rework in the area of the part number or serial number inscription
- with prices too good to be true
- lacking verifiable documentation of history and approved manufacture or repair
- with questionable part numbers or identification markings

Surplus parts

Parts are often released as surplus by manufacturers, the military, and suppliers. Parts obtained from surplus sources may be used, provided—

- they meet the standards to which they were manufactured
- they are interchangeable with the original part
- they are in compliance with all applicable airworthiness directives

Purchasers should be aware that surplus parts may not be controlled adequately between the time they are determined to be surplus and when they are disposed of. Records or information for surplus parts should be checked for the actions taken after removal from service. Particular care should be taken to examine storage time and conditions.

Ex-military parts

Inspection itself is not necessarily sufficient to determine if a military part is interchangeable with a civilian part

The numbers of ex-military aircraft entering the civilian aviation market continues to increase. The US military in particular is releasing increasing numbers of helicopters. Many of these aircraft are outwardly equivalent to the civilian model of the same aircraft and may or may not use the same parts.

Ex-military aircraft can be, and have been, issued civilian type certificates or type acceptance certificates when shown to meet the applicable design requirements. In addition, major components and spare parts for these aircraft may be available separately. In order that these parts may be used they must have been manufactured and inspected in accordance with civilian requirements.

Special attention should be given to areas that are critical to airworthiness, including the following:

- Major components such as wings, fuselage, landing gear, engine mount, cowlings, engines, controls and control systems, and instrumentation
- Propellers, rotors, and related parts

Purchasers of surplus military aircraft and parts should be aware of the civil requirements, and that such aircraft and parts must comply with the civil requirements to be acceptable. Ex-military parts are acceptable on standard category aircraft if they—

- are new or newly overhauled
- are traceable to the manufacturer or maintenance organisation
- are interchangeable with the civilian part, normally identified in the aircraft manufacturer's manuals
- comply with all airworthiness directives applying to the civilian part

Purchasers should be aware of the following when examining military parts for purchase.

Interchangeability

Inspection itself is not necessarily sufficient to determine if a military part is interchangeable with a civilian part. Military parts that are identical to civilian parts may have different part numbers. Unless the manufacturer is contacted or has provided the appropriate information, and the complete history of the part can be determined back to manufacture, the suitability of a military part cannot be assured.

Life limitations

Determining the appropriate life remaining for a part is difficult. Military and civilian life limitations may be different and the in service use has normally been taken into account when setting the military limitation. Retirement lives are generally listed on the type certificate data sheet or its accompanying documents and purchasers should examine these limitations before buying a life-limited part.

On standard category aircraft the parts must be new or newly overhauled; that is, the part must be returned to zero life.

On restricted category aircraft, life-limited parts may be used for the remaining time left on the part providing the record of time is clearly reflected in the aircraft log books. The remaining time is calculated from the lesser of—

- the military life limit
- the civilian life limit
- the life limit applied by an airworthiness directive to an equivalent civilian aircraft

The life of a part used on a civilian aircraft can be restricted based upon the number of landings or cycles. Military parts are not always limited in this way. The correct life shall be determined—

- from actual service records that reflect the required limit
- from a conversion calculation that has been provided by the manufacturer of the part to convert time in service to landings or cycles

If neither limit can be determined the part is unacceptable.

Operational considerations

Military aircraft are generally operated in conditions and manners considerably different to civilian aircraft. The operational limitations may permit the aircraft to be used beyond the civilian acceptable parameters. When purchasing parts the previous usage should be determined and

assessed. Parts that have undergone excessive stress or operation beyond the acceptable civilian limitations are not acceptable.

Manufacturing considerations

Military parts may not have been manufactured under the same conditions and the materials, specifications, and manufacturing quality may be different to the equivalent civilian part. The differently produced parts should have different part numbers and are therefore not interchangeable.

Maintenance programmes

During its service life a military aircraft is normally maintained in accordance with a military programme. These programmes may vary the life, time between servicings, and condition of parts on those aircraft. The military programme may not provide suitable compliance with the civilian airworthiness requirements.

Modifications and repairs

Modifications and repairs to military aircraft are not required to conform to civilian standards. Purchasers should examine the maintenance records of military parts for modifications and repairs that do not comply with civilian airworthiness requirements. If modifications or repairs exist, civilian approval of the change will be required before the part is used.

Manufacturer out of business

Even when an original manufacturer has ceased production some parts are available for a given aircraft type for a number of years after its removal from military service. If original-manufacturer fabrication can be substantiated for such parts, they are acceptable providing they comply with all applicable airworthiness directives.

Certain parts are and have been scarce. Occasionally, parties other than the original or approved manufacturer produce these parts illegally and offer them for sale. These parts are unacceptable.

Operators

General

Under Part 91 each operator is responsible for the airworthiness of their aircraft. This responsibility means that the operator must ensure that all replacement parts meet or exceed original certification standards. The operator should ensure that the required documentation is available for the installer to be satisfied as to a part's acceptability.

Operators should not place installers in the position of accepting responsibility for an unacceptable part.

Parts Pooling

Parts pooling is normally only applicable to the larger air transport operators who team with other operators to reduce spares holdings or make more efficient use of common spares systems.

Parts pooling systems must be detailed in the operator's exposition and provide for—

- initial inspection of the parts pooling facilities
- continued inspection of the parts pooling facilities
- parts pooling facilities to only perform work in accordance with the operator's manuals
- the identification of the sources of parts entering the system

When using parts pooling facilities operators should consider the variances, if any, of overhaul times and lives of parts between operators using the pool. The operator must ensure that their exposition is followed when applying service lives.

Installers

General

Part 43 requires, in 43.53, that each person performing maintenance on an aircraft or aircraft component—

- use acceptable methods, techniques, and practices
- restore the aircraft or aircraft component to its original or properly modified condition

Where an operator is responsible for the airworthiness of an aircraft, it is ultimately the installer that decides to fit a part. The installer, normally a licensed aircraft maintenance engineer, must ensure that the part is appropriate for the aircraft onto which it is to be fitted.

Determining eligibility

The installer should determine the eligibility of the part by—

- determining the correct description for the part from—
 - the approved design
 - the manufacturer's parts catalogue
 - the type certificate data sheet or equivalent document issued by an airworthiness authority
 - from a certified statement on the accompanying documentation that states what the part is or if it is an approved substitute
- ensuring that the description of the part as marked on the part, its container, or the accompanying documentation, is identical to that determined under paragraph (a) above
- ensuring that the traceability of the part provides for determining the part's conformity with the applicable airworthiness standards

The existence of release documentation alone does not automatically constitute authority to install the part.

The installer must ensure that the part is to the required design and modification standard for fitment. Inspection alone may not provide this assurance and documentation should be assessed to ensure compliance with manufacturing or maintenance quality standards, airworthiness directives, and life limitations. Whenever the current status of life-limited parts cannot be established and the historical records are not available, the airworthiness of that part cannot be determined and it should be removed from service.

The part should be able to be traced back to the manufacturer or certificated maintenance organisation that performed work on the part. If this traceability cannot be determined the part should be considered unacceptable.

Correct documentation is normally the only mechanism for an installer to assess the history of a part. Documents that, when completed in accordance with the appropriate airworthiness authority's requirements, provide assurance to an installer as to a part's eligibility for installation include, but are not limited to the—

- NZCAA Form One
- FAA 8130

- JAA Form One
- CASA DA1
- Transport Canada TC24-0078

Particular note should be taken of serial numbers of serialised items and a comparison made with the physical identification on the item. If a serialised item is not identified with the genuine manufacturer's data plate or other markings then—

- the item should not be used
- the manufacturer of the item should be contacted for advice

Installers are cautioned that the accompanying documents should be carefully assessed for compliance with the requirements of issue. Incorrectly completed forms immediately indicate a possible problem with the part. Suppliers of suspected unacceptable parts often fill in supporting documentation incorrectly in the false belief that incorrect documentation absolves them of any fraudulent actions.

The CAA considers that legitimate issuers of authorised release certificates should know how to fill them out correctly. If the form is not filled out correctly, suspect the part.

Other documentation should be carefully assessed for the required information to reflect a parts suitability for use. The responsibility for the use of a part that is not accompanied with one of the above documents is firmly with the installer. The reliance on the certification of an unapproved organisation does not absolve the installer of the responsibility for the use of a part subsequently found to be unacceptable.

Disposal of parts

In some instances parts that are damaged or life expired must be disposed of. It is in the interests of the industry as a whole to ensure that these parts do not re-enter the aviation system.

Actions take to dispose of parts must ensure that under no circumstances can the part be restored. When appropriate the parts should be mutilated in such a manner that the parts become unusable for their original intended use. Mutilated parts should not be able to be reworked or camouflaged to provide the appearance of being serviceable, including actions such as replating, shortening and rethreading long bolts, welding, straightening, machining, cleaning, polishing, or repainting.

Caution should be exercised to ensure that the following types of parts and materials are disposed of in a manner that does not allow them to be returned to service:

- Parts with non-repairable defects, particularly those not visible to the naked eye
- Parts that are not within the specifications set forth by the approved design, and cannot be brought into conformance with applicable specifications
- Parts and materials for which further processing or rework cannot make them eligible for use
- Parts subjected to unapproved modification or rework that is irreversible
- Life-limited parts that have reached or exceeded their life limits, or have missing or incomplete records
- Parts that cannot be returned to airworthy condition due to exposure to extreme forces or heat
- Principal structural elements (PSE) removed from a high cycle aircraft for which conformity cannot be accomplished