

Storage and Distribution of Aeronautical Supplies

General

Civil Aviation Authority (CAA) Advisory Circulars (ACs) contain information about standards, practices, and procedures that the Director has found to be an **acceptable means of compliance** with the associated rules.

Consideration will be given to other methods of compliance that are presented to the Director. When new standards, practices, or procedures are found to be acceptable they will be added to the appropriate AC.

Purpose

This AC describes an acceptable means of compliance with standards for the purchase, storage, and distribution of common types of aeronautical products that is acceptable to the Director.

Related Rules

The guidelines for safely storing and distributing aeronautical supplies are applicable to all individuals and organisations carrying out aircraft and component maintenance and manufacture.

The typical stores system in Appendix 1 is representative of a non-certificated maintenance provider. It may also be applicable to an organisation certificated under Part 19, Subpart F, Supply Organisations Approvals.

Change Notice

This is a substantive update of this AC. It updates content throughout and removes information:

- drawn from foreign guidance material, replacing it with direct reference to the source information, and
- which could have contravened overarching guidance from organisations such as WorkSafe or the Environmental Protection Authority (EPA), replacing it with reference to the relevant source data.

Lastly, it adds a Version History.

Version History

History Log

Revision No.	Effective Date	Summary of Changes
AC20-3, Rev 0	25 December 1997	Initial issue
AC20-3, Rev 1	23 June 2004	Amended several spelling errors, corrected some terms and changed the format and structure to present information more clearly.
AC00-2, Rev 1	24 July 2007	Replaced AC20-3 by re-numbering it to AC00-2 as part of a project to standardise the numbering of all ACs.
AC00-2, Rev 2	XX XXX 2024	Updates content throughout. Removes information drawn from foreign guidance material, replacing it with direct reference to the source. Removes information which could have contravened overarching guidance from other organisations replacing it with reference to the relevant source. Adds a Version History.

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Introduction

This AC aims to provide guidance for a range of organisations involved in the maintenance and manufacture of aircraft and components. It provides general guidance on storing aircraft parts and materials and describes the functions of a typical store.

It should be read in conjunction with:

- AC00-1 *Acceptability of Parts*
- AC43-1 *Aircraft maintenance*
- AC92-3, *Dangerous goods packaging approval*
- AC145-1 *Aircraft Maintenance Organisations*, and
- AC148-1 *Aircraft manufacturing organisations*.

Note 1: *The guidance in this AC should not be used in place of any manufacturer information relating to storage or preservation.*

Note 2: *Because of the wide range of materials that could potentially be stored, it is important to research safe conditions thoroughly. In addition to aviation-related sources, there is information on the websites of [WorkSafe](#) and the [Environmental Protection Authority](#), or in the standards for specific materials from the [Standards New Zealand](#) website. Note that Standards New Zealand resources have to be purchased. The UK CAA's Civil Aircraft Airworthiness Information and Procedures, , [CAP562, Civil Aircraft Airworthiness Information and Procedures, Book 1 Leaflet D-40](#), Storage Conditions For Aeronautical Supplies, is another comprehensive resource, which has informed many parts of this AC.*

Storage conditions for aeronautical supplies

The integrity of the parts and materials installed on aircraft is vital in ensuring the airworthiness of that aircraft. Appropriate storage and handling of parts and materials ensures that when they are installed on the aircraft, they will be in the condition intended by the manufacturer.

If a manufacturer specifies storage requirements for their parts or materials, the person responsible for the stores should ensure they satisfy these requirements. Particular care should be taken in the handling, inspecting, and re-packaging of parts and materials to ensure that no damage or deterioration will occur.

Staff who work in the stores should understand aviation safety, and airworthiness, to a level appropriate to the responsibilities they hold. They should be trained in the inspection of aircraft parts and materials and the identification of the types of damage or defects which typically occur during shipping or storage. They should also be trained in the necessary actions to take should they identify any issues with damaged parts and materials.

This AC contains some general guidance for storage but does not attempt to cover storage for every item. Many other resources, notably those listed in Note 2 in the *Introduction* section, provide more detailed advice on specific items. Manufacturer's guidance should be given precedence when establishing the necessary storage conditions for a part or material.

General storage conditions

Temperature and relative humidity

Premises should be clean, well-ventilated, and maintained at an even temperature and humidity, to minimise the effects of condensation. In many instances the manufacturer will specify the storage temperature and relative humidity to be maintained. Where parts or materials are subject to manufacturer requirements for temperature and humidity, the store should be continuously monitored to ensure these parameters are maintained. Depending on the manufacturer's requirements, it may be necessary to use data loggers to ensure that conditions are maintained. Composite materials which are stored in a frozen state are a good example where temperature control is vital in ensuring material integrity.

Protection from the ultraviolet light in sunlight

Storage locations should be protected from the potential deterioration associated with sunlight. Rubber materials for example, are commonly known to be adversely affected by the ultraviolet light in sunlight, however nearly all parts and materials have the potential to be damaged by exposure to direct sunlight.

Protection from physical damage

The stores should be equipped with the physical locations necessary to ensure the integrity of the parts and materials they hold. Any potential for damage to the part and materials while stored should be addressed by the organisation. Metal to metal contact of parts and materials should be avoided to prevent corrosion and other types of damage. Racking, shelves, storage bins etc, should be fit for purpose.

It is important for staff to ensure that when they induct a part or material into stores that the contents are known and that the relevant precautions are taken to prevent adverse interactions. For example, a hydraulic component containing Skydrol should not be placed on a shelf directly above avionics components.

Staff working in stores should be trained in the importance of maintaining the integrity of parts and materials, and the safety implications of installing a damaged part on an aircraft.

Storage conditions for specific materials and parts

Note: *The following list is not meant to be a complete list of any item that needs storage. It is recommended that operators refer to the resources listed in Note 2 of the Introduction, as well as manufacturers' instructions for specialised items.*

Aircraft batteries

Aircraft batteries in storage should be maintained in accordance with manufacturer recommendations.

In addition, Aircraft batteries with different electrolytes (for example, lead-acid and nickel-cadmium (Ni-Cd or Ni-cad) among others) should not be stored or maintained in the same area due to their incompatibility. Refer to the manufacturer's instructions for further precautions.

Safety advice on the storage and protection of lithium or electric batteries is available from:

- <https://www.fireandemergency.nz/home-fire-safety/home-fire-hazards/lithium-ion-battery-safety/>
- <https://www.standards.govt.nz/shop/iso-243522023/>
- <https://www.standards.govt.nz/shop/isotr-208912020/>
- <https://www.standards.govt.nz/shop/isots-236252021/>
- <https://www.standards.govt.nz/shop/asnzs-51392019/>
- <https://www.worksafe.govt.nz/managing-health-and-safety/consumers/safe-living-with-electricity/safely-charging-your-electric-vehicle-at-home/>
- <https://standardsworks.sae.org/standards-committees/ae-7d-aircraft-energy-storage-charging-committee>
- <https://www.ehs.washington.edu/system/files/resources/lithium-battery-safety.pdf>
- <https://iosh.com/media/9495/lithium-batteries-and-their-safe-storage-transport-use-and-disposal-including-re-use-and-re-cycling.pdf>

Aircraft engines

It is critical that an engine which is placed into storage is appropriately prepared in accordance with the manufacturer's Instructions for Continuing Airworthiness (ICA) and that the on-going continuing airworthiness requirements of the engine and its subcomponents are appropriately managed throughout the storage period.

Appropriate entries for maintenance carried out during storage must be made in the engine logbook, for example, the particulars of the inhibiting procedures carried out. Refer to AC43-1, *Aircraft Maintenance*, for the necessary entries and certification requirements.

Engines which are returned to service from a period of storage will undergo a de-preservation procedure which should follow the manufacturer's ICA.

Composite materials

Composite materials, such as carbon fibre, aramid fibre etc, and the resins and chemicals used in their processing, will have very specific storage conditions. These include temperature and humidity controls, as well as ensuring protection from physical damage.

Stores staff should be trained in the handling and storage of specialist products used in composite maintenance so that they can ensure both their own safety, and the integrity of the materials, is maintained.

Compressed gas cylinders

Refer to WorkSafe material on gas cylinders, including, at the time of this AC:

[WKS-4-Hazardous-substances-guide-to-gas-cylinders.pdf \(worksafe.govt.nz\)](https://www.worksafe.govt.nz/wks-4-hazardous-substances-guide-to-gas-cylinders.pdf)

It is important to remember that this is outside of CAA's remit, so checking the most updated material with agencies or companies responsible is recommended. Standards and products change over time, and the most up-to-date guidance can be found on relevant websites, either the manufacturer's or the relevant government agency, in this case, WorkSafe.

Electronic sensitive devices

Electronic sensitive devices need to be handled and stored appropriately to prevent damage. As well as the usual care applied to aircraft components, staff who handle electronic devices need to be aware of the detrimental effects that static electricity can have on electronics. The damage incurred due to inappropriate handling may not be evident by visual inspection, meaning that its first detection may be once the part or component is installed in the aircraft.

Stores facilities for the handling of sensitive electronics will include static safe work areas which include earthing straps for staff, and the provision of specialist storage packaging which protects against static electricity.

Staff involved in the handling of sensitive electronic equipment must be appropriately trained to do so.

Specific guidance on storage conditions for aircraft parts and materials

For further guidance, unless otherwise specified by the manufacturer, refer to the UK CAA's document, [CAP562, Civil Aircraft Airworthiness Information and Procedures](#), Book 1 Leaflet D-40, *Storage Conditions For Aeronautical Supplies*.

Disposing of aeronautical supplies safely

Expired life limited parts, or parts which have been deemed beyond repair for any reason (often referred to as scrap) should be managed in such a way as to prevent them from re-entering the aviation system.

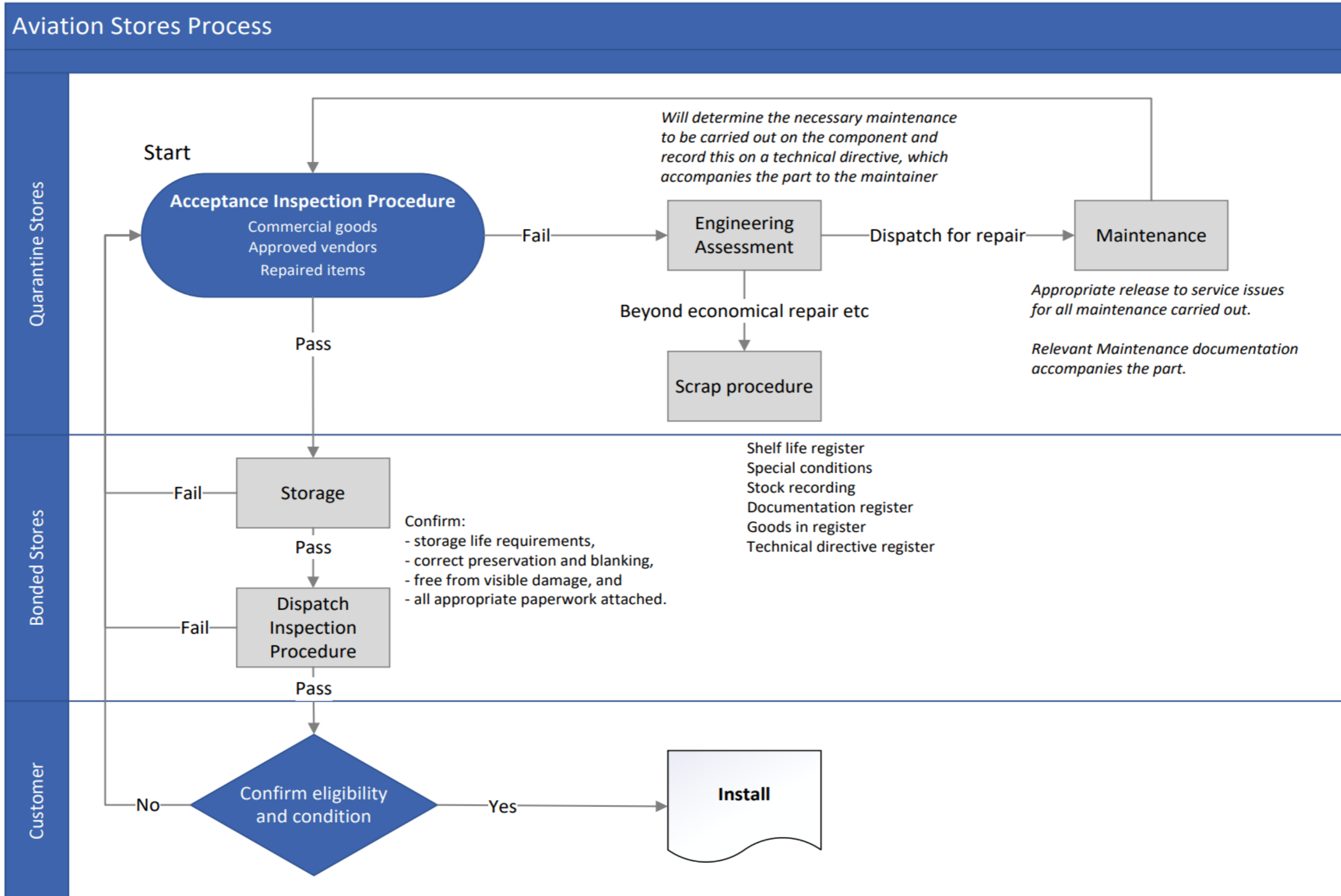
Steps to ensure that parts cannot inadvertently re-enter the aviation system can include:

- removing data plates
- removing part and serial numbers, and
- physically damaging the item to a degree that it would prevent another person from taking that part and disguising or misrepresenting the damage to a potential buyer.

All parts which are awaiting a scrap determination should be held in the quarantine stores.

For further guidance refer to the UK CAA's CAP 562, Book 1 Leaflet B-210 *Disposition of Scrap Aircraft Parts and Materials*, which can be found via the hyperlink above.

Appendix I: A typical stores system:



The system approach includes the methods and procedures used to control goods, as well as the documentation and the physical arrangements necessary, to ensure parts and materials are fit for their intended use. The following paragraphs should be read in conjunction with Figure 1 above, which illustrates a typical system.

Because the stores system is intended to control all parts and material for use on aircraft, the person responsible for stores should ensure that all non-approved items are specifically controlled to prevent inadvertent use on aircraft. As a means of reinforcing the unapproved condition these items are required to be kept separate, i.e. quarantined.

Any applicable special storage conditions or shelf-life limitations should be regularly reviewed and followed. As shelf-life and other standards can change over time, operators need to keep up with manufacturer's instructions and other notices about the items in storage, as they would for any items they use in their operations. A documented process for checking storage conditions and shelf-life limitations is strongly recommended, so staff can understand the requirements and follow the right procedures.

Parts and components may enter the store system from workshops and hangars. All such items should be properly identified by suitable labels and tags. No item should be accepted into the system without proper identification.

All items in transit through the stores system and in workshops and hangars should always carry appropriate identification labels.

Quarantine store

The quarantine store is a separate and secure location under the control of authorised stores personnel. The quarantine store is used to store aircraft parts, components, and materials which are not accepted into the stores for any reason. The purpose of the quarantine store is to ensure that only parts and materials which are acceptable, may be allocated to an aircraft. From the quarantine store, items may be directed to the stores, for repair or rejected.

It is usual to maintain a register of items in the quarantine store and to require a signature to account for any item removed from quarantine. The register should contain sufficient information to identify the item and show its origin, condition and final disposition.

Inspection

Before any item is received into the quarantine store it should undergo an inspection by an authorised person to verify that the item:

- is identified with reference to an approved specification or drawing
- has been properly inhibited, packed, and previously stored
- is properly identified in accompanying documentation
- has the correct accompanying documentation, and
- is free from obvious damage or defects.

The inspection should be to the depth necessary to establish that the item is free from damage and is fit for its intended use. The inspection may include, but is not limited to:

- mechanical testing of the item or a representative batch sample

- non-destructive testing
- comparison with the drawing or specification, and/ or
- confirmations of the incorporation of modifications or airworthiness directives.

Any item which fails inspection should be subject to a rejection procedure.

Stores staff with authority for accomplishing the acceptance inspections should be clear to all personnel in the organisation.

A record of each inspection should be maintained which will show who did the inspection and what was done to achieve a satisfactory result.

Acceptance inspection as part of the stores process is not the same as the installing engineer verifying that the part is airworthy and eligible for installation. This should be clear to both the stores person conducting the acceptance inspection, and the engineer who ultimately installs the part.

Rejection

Any item which fails the acceptance inspection should remain in the quarantine stores until either a restoration process is determined, or the part is disposed of (possibly via the scrap procedure).

Some items may be recoverable by repair or overhaul, in which case arrangements should be made to raise a technical directive for maintenance. Parts which are re-directed from stores for maintenance should remain under the control of the quarantine procedures to ensure they do not inadvertently enter the stores system.

Technical directives

When unserviceable items are re-directed from stores for maintenance, they should be accompanied by appropriate documentation such as a technical directive. The purpose of the technical directive is to specify the scope of maintenance to be carried out on the part, including any relevant references to ICA, specifications, processes etc. The person raising the technical directive must be familiar with the requirements for continuing airworthiness of the part, and have the appropriate engineering competence to make an airworthiness determination.

Technical directives may detail processes such as:

- heat treatment specifications
- welding specifications
- specialist inspection requirements
- test and inspection specifications
- modifications and airworthiness directives to be incorporated.

When an item is received in the quarantine store following the maintenance action detailed on a technical directive, the person performing acceptance inspection must ensure that all relevant parts of the technical directive have been completed. This may require a physical inspection of the work carried out, as well as an assessment of the completed documentation accompanying the part. The person carrying out the acceptance inspection must have the

necessary engineering competence to assess the work has been appropriately completed and that the documentation is satisfactory.

If a release to service for the work carried out has not been made, the person carrying out the acceptance inspection will need to address this with an appropriately qualified/authorised engineer.

Bonded store

The bonded store provides secure physical storage for all items which have passed acceptance inspection, and which are capable of being allocated for aircraft use. Access to the bonded store should be restricted to those individuals who are involved in the running of stores. For example, engineers will not typically be allowed free access to stores.

Items in stock must be placed in appropriate bins, racks, or stands and be properly blanked, inhibited, and packed as described previously in this AC.

Stock items which are subject to shelf-life limitations should be annotated to indicate the limits and appropriate records should be kept, to ensure that no stock item is permitted to be allocated for use on an aircraft if it has exceeded its limitations.

All stock requiring special conditions of storage should be identified and stored in accordance with the manufacturer's requirements. Periodic inspections of the conditions should be carried out and recorded.

All forward stock holding areas, even though located outside the bonded store, are to be considered as part of the main store for the purpose of control.

Goods which are in the dangerous or hazardous category shall be stored in accordance with the appropriate requirements.

Records

The following records should be maintained and kept:

Shelf-life register

A record system is to be maintained whereby all parts and materials held in store which are subject to shelf-life limitation are individually recorded, including:

- part number
- serial number
- description
- quantity
- internal release reference, and
- goods received reference.

Special storage conditions

Records of the stored aeronautical supplies requiring special storage conditions should be maintained, also the records relating to any inspections required to ensure these conditions.

Issue documentation register

The issue documentation should enable associated supply and work records and consignees to be identified and should be recorded in a register. The register may be in the form of sequential copies of issued documents.

Goods-in register

A register should be maintained of all materials or parts received in the store and should:

- be periodically checked against the stock records held to prevent long-term storage of old stocks
- show part number, description, reason for quarantine, and any other relevant details that may apply, and
- include a signature column for the signature of the persons removing the goods from the store.

Dispatch inspection

Before any item is dispatched from bonded stores it should undergo an inspection which gives assurance that the:

- shelf-life limitation period is within limits
- general condition is acceptable
- correct labelling is attached
- acceptance inspection has been performed and recorded, and
- records have been amended as required.

All incoming and outgoing serviceable stock to or from the bonded store must be accompanied by appropriate documentation.

Note that, although an item may have been removed from an aircraft and overhauled or repaired by the one organisation, the flow chart needs to show that the item should be:

- labelled and placed into quarantine
- after failing an acceptance inspection, have a technical directive raised for repair
- been routed to a workshop for repair, and/ or
- after completion of any repair, returned to quarantine before another acceptance inspection and issue via the bonded store and dispatch inspection.

In practise the item may well go direct from workshop bench to an aircraft, but the system requires all the other steps to be followed if the integrity of the system is to be maintained. This does not apply to items removed and refitted to the same aircraft undergoing inspection where all the work done will be detailed and certified either in job records or logbook entry.

Personnel responsibilities

Personnel should have clearly defined responsibilities and instructions so they can control and operate the stores system. As a guide the following positions should be considered:

A store person directly responsible for:

- supply services
- the efficient operation of the stores system
- the training of personnel on supply procedures
- the implementation of any procedures relating to the stores system
- the supervision of stock recording and invoice pricing procedures, and
- ensuring that all necessary inspection and certification is accomplished.

Additional store persons responsible for:

- the receipt, storage, rotation, and issue of all items in the store(s)
- the security and maintenance of stores areas
- the satisfactory storage of the different classes of parts
- the issue of release documentation
- stocktaking
- ensuring that dispatch inspection is performed and recorded on all items issued from the store(s)
- ensuring that appropriate records are maintained
- operation of the disposal of redundant and scrap items via the scrap procedure
- ensuring that all items leaving the store for repair or rework are accompanied by a technical directive
- maintaining the appropriate registers for stock held in the store(s)
- maintaining appropriate storage conditions
- reviewing stock records and the ensuring adequate stock levels are maintained
- raising purchase orders, and
- ensuring that all stock held in the supply system is appropriately labelled, packaged, and stored.