Advisory Circular

AC148-1

Aircraft Manufacturing Organisations - Certification

Initial Issue

01 July 2002

GENERAL

Civil Aviation Authority Advisory Circulars (AC) contain information about standards, practices and procedures that the Director has found to be an Acceptable Means of Compliance (AMC) with the associated rule.

An AMC is not intended to be the only means of compliance with a rule, and consideration will be given to other methods of compliance that may be presented to the Director. When new standards, practices or procedures are found to be acceptable, they will be added to the appropriate Advisory Circular.

This Advisory Circular also includes Explanatory Material (EM) where it has been shown that further explanation is required. Explanatory Material must not be regarded as an acceptable means of compliance.

PURPOSE

This Advisory Circular provides methods, acceptable to the Director, for showing compliance with the manufacturing organisation certification requirements of Part 148 and explanatory material to assist in showing compliance.

RELATED CAR

This AC relates specifically to Civil Aviation Rule Part 148.

CHANGE NOTICE

There was no previous issue of this AC, consequently no change is in effect.

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Subpart A — General

EM 148.1 Purpose

The purpose of Part 148 is to prescribe the certification requirements for organisations wishing to conduct aircraft manufacturing activities which contribute to the PNG civil aviation system.

While it is envisaged that no manufacturing activity will be physically conducted in PNG, industry has expressed the view that there should be a mechanism to certificate off-shore organisations that could manufacture appliances and STC design change packages for use on PNG aircraft.

Part 148 is therefore structured to accept or validate manufacturing organisation approvals granted by Contracting States. Subpart B provides for the Director's acceptance of a manufacturing approval issued by a Contracting State on the basis of known equivalence. Subpart C provides for certification of a foreign manufacturing organisation where the standards for foreign certification are either unknown or are known to differ from PNG.

Part 148 requires the supply of documentation used by an organisation to demonstrate compliance with the certification requirements of the foreign state and allows the Director to require additional information and procedures, as well as conduct surveillance of that organisation.

The privileges proposed under this Part are limited to the manufacture of appliances and parts.

EM 148.3 Definitions

The definitions shown in this rule are specific to Part 148. Definitions associated with more than one Part are contained in Part 1.

EM 148.5 Requirement for certificate

This rule prohibits any manufacturing activity encompassed by the ratings detailed in 148.11 from being carried out unless that activity is conducted by an organisation certificated under Part 148.

EM 148.7 Application for certificate

The application form CAA 148/01 must be completed in full and must identify the full extent of the intended operation. This information will be used in determining the ratings to be issued under 148.11 and the assessment and preparation of any limitations associated with the certificate.

Form CAA 148/01 can be obtained from the CAA Airworthiness Authority.

The applicant should submit the application not less than 90 days before the date of the intended operation. For applicants that apply without giving 90 days notice the CAA may not be able to offer any confirmation that the organisation will be certificated in time to meet the applicant's deadline.

Applicant's should plan their certification programme in advance and early consultation with the CAA will ensure all issues are dealt with well before the planned start-up date. Having said this, the time involved for certification is dependent on the quality and completeness of the application and exposition.

EM 148.9 Issue of certificate

There are several requirements to be met for the issue of the certificate. Primarily, the applicant must meet the requirements of Subpart B or Subpart C of the Part to be issued a certificate.

To be assessed as meeting the requirements of Subpart B, the applicant will need to provide a copy of the foreign manufacturing organisation's certificate and exposition, and details of the senior person's who will be responsible for liaison with the PNG CAA on manufacturing matters. The documentation will be assessed for acceptance and the suitability of the persons nominated for liaison with PNG confirmed.

To be assessed as meeting the requirements of Subpart C the applicant's documentation will be checked for compliance with the rules and suitability for the type of manufacturing tasks the applicant is proposing to carry out. After the documentation is accepted as satisfactory, an entry inspection of the applicant's facilities and resources will be made and will normally include interviews with key staff members.

Once the CAA is satisfied with the organisation and the applicant's nominated senior persons have been assessed as fit and proper as required by the Act, the certificate is issued. A certificate will normally be issued for a limited period on completion of which, a full compliance audit will be conducted before full certification is given. The length of the initial induction period will depend on the type of manufacturing work proposed, the adequacy of resources, and the experience of the applicant and their staff.

The Director may prescribe limitations and conditions on a manufacturing organisation certificate. These additional limitations placed upon the certificate may include limitations based on the applicable requirements of Part 21, or general qualifications of the manufacturing activities considered appropriate. For example, the certificate may be limited to a manufacturing process such as heat treatment or plating.

EM 148.11 Privileges of certificate holder

The holder of a manufacturing certificate may—

- manufacture those appliances and parts specified on the certificate and detailed in the holder's exposition
- issue airworthiness release certificates for those appliances and parts

The manufacturing organisation should hold a supplemental type certificate or a design approval for the product but they may choose to have a suitable arrangement with the holder of one of these.

A manufacturing certificate may be related to one or more supplemental type certificates or design approvals, but the manufacturing certificate may not always authorise manufacture of every product listed on a supplemental type certificate or in a design approval. In other words, an organisation may be certificated to manufacture only one component of an STC package.

In all cases, the appliances and parts authorised for manufacture should be detailed in the organisation's exposition with the appropriate supplemental type certificate or design approval references.

An applicant should not detail appliances and parts the organisation is not currently able to manufacture, i.e. future intentions should not be included in the application.

EM 148.13 Duration of certificate

The initial issue of a certificate will normally be for a period of six months to enable the organisation to demonstrate compliance with their exposition and Part 148. Prior to the expiry of the initial certificate the CAA will conduct a full compliance inspection of the organisation and, if satisfactory, a longer duration certificate, up to five years, will be issued.

The initial compliance audit should ensure that the organisation is complying with their exposition and that the exposition accurately reflects the organisation's activities. Future audits will examine similar compliance requirements and any other relevant matters.

Certificates which expire, or are revoked, must be returned immediately to the CAA Airworthiness Authority. Suspended certificates should also be forwarded immediately to the CAA for endorsement.

EM 148.15 Notification of ceasing manufacturing

If an organisation decides to cease manufacturing activity, this rule requires the certificate holder to notify the CAA. A letter should be sent to the CAA Airworthiness Authority, together with the certificate, within 30 days of ceasing activity.

As well as ensuring the CAA has an accurate picture of the aircraft manufacturing organisations supporting aircraft in Papua New Guinea, this rule ensures continuing airworthiness responsibilities are addressed when

a manufacturing organisation ceases to operate.

EM 148.17 Renewal of certificate

The rule specifies a period of 30 days before the certificate expires for application for renewal. The certificate holder should make provision for this in the exposition. The renewal of a maintenance organisation certificate may be delayed if the organisation's application is not forwarded with the required lead-time.

An organisation should allow sufficient time for the renewal process to be planned and carried out. The time involved will vary according to the type of manufacturing activity the organisation is certificated for and carrying out, as well as the period the certification has been in force.

Where a certificate has been in force for the full five years, a re-entry application and audit process will be required to be followed. This process will ensure that all facets of the organisation comply with Part 148 and the latest revision of its exposition. The extent of this re-entry process will depend on the organisation's conduct to date, any changed circumstances, and results of safety audit findings over the period of validity.

Subpart B — Acceptance of Foreign Manufacturing Organisations

EM 148.51 Purpose

This purpose of this Subpart is to provide a mechanism for the CAA to recognise acceptable foreign manufacturing organisation certificates as an alternative to organisations holding such certificates having to go through the full compliance process detailed in Subpart C.

EM 148.53 Acceptable foreign certifications

This rule lists those authorities which the CAA has determined issue manufacturing organisation certificates to the same standards as are prescribed in Subpart C. Where the certification processes for manufacturing organisations in other countries are either known to be different (e.g. the USA PMA system) or are unknown, an applicant is not eligible for certification under this rule. Applications will be assessed on a case by case basis and if the foreign authority certification process is shown to be equivalent to this Part 148, that authority will be added to the list in 148.53.

An applicant seeking to have a certificate issued by one of these authorities accepted for the purpose of gaining PNG certification under Part 148 is only required to provide the CAA with a copy of the foreign manufacturing organisation certificate and the associated exposition, together with the names of the senior persons in that organisation who will liaise with the CAA on matters relating to PNG.

The rule does allow the CAA to verify the conditions of continuing validity of the foreign organisation certificate and to impose any conditions and limitations of the PNG certificate. Typically these conditions will reflect the limited nature of the manufacturing activity focused on PNG.

Subpart C — Certification Requirements

EM 148.101 Purpose

This Subpart details the certification requirements to be met by an organisation which is not eligible for certification under Subpart B. A foreign manufacturing organisation currently holding a certificate issued by an authority other than one of those listed in 148.53, or a PNG organisation seeking approval as a manufacturing organisation, must meet the requirements of this Subpart.

EM 148.103 General

This rule recognises that an applicant may have an exposition which could either be shown to meet all the requirements of Subpart C or which otherwise could be supplemented to address the Subpart requirements not considered to be met. An applicant would only be required to produce a complete exposition specifically for PNG certification if neither of the previous conditions could be met.

EM 148.105 Personnel requirements

An applicant must identify their Chief Executive and other key personnel. The applicant's nominated senior persons must be employed, contracted or otherwise engaged to work sufficient hours such that the individual can fulfil the management functions associated with the size and scope of the applicant's business.

The rule identifies what are considered the critical members of an organisation who will exercise an appropriate level of control, direction, and responsibility, to ensure the continued effectiveness of the operation. Further, the applicant must have in their exposition an organisation chart showing the lines of responsibility extending from the CEO through to each location where manufacturing staff are located.

An applicant may utilise any organisational structure as part of their overall business structure provided the applicant can satisfy the Director as to the effectiveness of the reporting lines and control required to be exercised. Applicants should note that approval of alternative organisation structures is not automatic.

148.105(a)(1)

The intent of the rule regarding the responsibility and authority of the Chief Executive is to ensure that:–

- the manufacturing activities carried out by the organisation can be financed
- those activities are carried out in accordance with Part 148
- the organisation complies with the requirements of Part 148.

It is clear that this person needs to have the authority to ensure the activities of the organisation can be financed. A suggested method of demonstrating this could be by presenting an annual business forecast, or have as a part of compliance with rule 148.123(a)(3), the authority to finance the operation clearly defined as part of the Chief Executive responsibilities.

The Chief Executive must assure that the exposition complies with the rules. The exposition amendment procedures should cover this.

The Chief Executive must also be assured that manufacturing is conducted in compliance with the exposition. Ensuring compliance with the exposition is the responsibility of the senior persons under rule 148.105(a)(2) and the assurance that the Chief Executive requires could be shown through the medium of the internal audit reports or inspections.

This person will need to demonstrate during initial application and at any other time, that they have the knowledge to control the organisation.

If an organisation has several independent business units then it may be appropriate to apply for certification independently. If this is the case a Chief Executive will be required to be identified for the manufacturing unit specifically.

If, on the other hand, an organisation retains one identity the Chief Executive should be clearly shown to have an appropriate level of authority. This may occur where an organisation is certificated for other tasks such as maintenance or design and only one core exposition is used for all administrative functions.

148.105(a)(2)

Under this rule, the organisation must appoint senior persons responsible to the Chief Executive for —

- supply
- production
- inspection and test
- internal quality assurance

Titles may vary between organisations but the requirements are for management representatives for supply, production, inspection and testing, and internal quality assurance. If a particular area is specifically excluded, or specifically included, in the exposition the responsibilities required to be addressed may vary.

In particular, the senior person responsible to the Chief Executive for the organisation's compliance with Part 148 should be a design or production engineer.

In smaller organisations the Chief Executive and the senior persons may be the same individual but in all cases there should be clear definitions of the position's responsibilities. The individual undertaking one or more functions in the organisation should have a clear understanding of the division of the responsibilities and be able to show this to the CAA. Some functions should not be combined as they conflict with responsibilities assigned to the intended positions, for example, the functions of Chief Executive and Quality Assurance.

The person or persons nominated will represent the management structure of the organisation and are required to be acceptable to the Director.

The senior persons should be responsible for ensuring that—

Supply

- raw materials are inspected for compliance to the required specifications
- any assemblies sourced from external suppliers meet the requirements of the manufacturing organisation, particularly if the assemblies can not be completely checked on receipt
- internal supply procedures include the acceptance, packaging, preservation, and delivery of products
- liaison is maintained with all suppliers to ensure on time delivery of materials and parts necessary to support the manufacturing process
- the suppliers used are aware of the manufacturing organisation's systems and requirements
- any corrective action relating to supply and stores resulting from the internal quality assurance programme is quickly and effectively carried out

Production

- appropriate materials are provided for the manufacturing process
- suitable arrangements for testing and inspection, including equipment and facilities, exist with providers of these services
- there are procedures for liaison with the appropriate design organisation to allow for effective production and concessions and corrections to be made during the production process

- staff are appropriately authorised
- appropriate production process control exists including provisions for supply, processing, testing, storage of completed items, and issue of those items for release
- any corrective action relating to the manufacturing process resulting from the internal quality assurance programme is quickly and effectively carried out

Inspection and testing

- any inspections and tests carried out are implemented and running effectively
- inspections and tests reflect the current state of the art of the aviation industry and provide the results necessary to show compliance with airworthiness requirements
- suitable arrangements with providers of testing equipment and facilities are established and reflected in the exposition
- support systems are effective in providing for the activities of the inspection personnel
- any corrective action relating to the inspection and testing resulting from the internal quality assurance programme is quickly and effectively carried out

Internal quality assurance

- the organisation remains in compliance with Part 148
- the exposition and the associated procedures remain adequate for the scope of the organisations activities
- any exemptions required are processed in accordance with the organisation's procedures and Part 11
- personnel meet the initial and on-going training and qualification criteria defined in the exposition
- staff are authorised appropriately for performing certifications on behalf of the organisation
- support systems are effective in providing for the activities of any internal quality assurance personnel
- any corrective action relating to the exposition, procedures, qualifications, personnel, or support systems resulting from the internal quality assurance programme is quickly and effectively carried out

148.105(a)(3)

Under this rule, the organisation's personnel levels should ensure that a sufficient number of suitably qualified people are available to carry out the manufacturing task. As part of these levels, a sufficient number of qualified inspectors is required to ensure that all parts, processes, and procedures, are inspected for conformity to technical data, specifications, and procedures specified in the appliance or part design.

148.105(b)

The competence of all staff should be determined on the basis of—

- academic qualifications
- licences, certificates or approvals held
- employment records
- written, oral, or practical examination

The organisation should provide for the assessment and maintenance of the levels of competency of all personnel.

At the time of application the applicant must consider how they will deal with transfer of the senior person functions, to other suitable and qualified persons during periods of absence. Although the rule does not make provision for or have any requirement for the situation where a senior person may be absent for a prolonged period of time, or vacates the position it is advisable to provide for this in advance. Consideration should also be given to a situation where a senior person has been incapacitated. This would in effect cause the position to be vacant for the period of incapacitation and would require a substitute person to meet the requirements of this Part. In the event that the responsibilities and functions are transferred to another person they would also be required to be fit and proper, and meet the experience and qualifications set out in the exposition.

In the event an applicant chooses not to provide for the situation where a senior nominated person vacates a position, it should be remembered that the Director has to be notified of such a situation and the certificate holder will also be called to provide details of the contingency arrangements to be implemented pending a permanent solution being achieved.

It should be noted that where a change of senior person is proposed, rule 148.203(b)(2) requires the prior notification of the change and acceptance by the Director.

In accepting such contingency arrangements, the Director may impose limitations or conditions of a temporary nature for the period of the contingency. The conditions or limitations imposed by the Director in all cases will be clearly stated to the certificate holder in writing, and could be as simple as providing a time frame for events to take place or a total suspension of manufacturing activity.

EM 148.107 Facility requirements

Office accommodation should provide for the management, planning, records, quality, production, and other staff. The offices should be sufficient to meet the requirements for the scope of manufacturing work to be undertaken.

As there is an ongoing requirement to retain production records the provision of storage and the methods of cataloguing and preventing deterioration of this material is required.

Testing facilities may include calibrated and critical equipment and this test and measurement equipment should have adequate protection and control.

The manufacturing organisation’s arrangement of production areas should—

- provide for the segregation of manufacturing processes or operations which may adversely affect other operations
- provide for the storage of equipment, tooling, material and components

The separation of precision inspection areas from each area where, for example, grinding, cutting, sanding, or painting operations are performed allows for compliance with the applicable process specifications.

Suitable storage areas provide the manufacturing organisation with control over the deterioration of, damage to, and acceptability of those items stored. Correct storage of inspection tooling, for example, ensures accurate checks to be carried out on the manufacturing process.

EM 148.109 Equipment, tools, and material

An applicant for Part 148 certification must show that all tools and equipment, necessary to accomplish the approved manufacturing instructions, must either be permanently on hand or available as required in accordance with documented arrangements in the exposition.

This rule requires the manufacturing organisation to not only have the necessary equipment but to also have the procedures to ensure control of the process.

The requirements extend to the provision of—

- production data from organisations such as libraries, standards organisations, the Civil Aviation Authority, the military, and other manufacturing organisations
- tools and testing facilities requiring workshop, or other specialised environments
- equipment including measurement, drawing, and computer support equipment.

The procedures should ensure that each process is performed by trained and qualified personnel in accordance with acceptable specifications containing definitive standards of quality.

The procedures would provide for periodic inspection of gauges, solutions, or any critical equipment including the associated documentation. Special processes and services, such as welding, brazing, heat treatment, and plating, would include the close control of factors such as temperature, curing time, and solution.

In undertaking manufacturing work the organisation should ensure that it identifies, in its exposition, the processing and testing locations it intends to use regularly. If tools, equipment, or special processes are located at these other premises then controls should be in place to ensure the equipment is controlled and calibrated as necessary.

Outside organisations, or organisations certificated under other Civil Aviation Rules, may be acceptable to provide the equipment, tools, and manufacturing facilities. In these instances a contractual arrangement would be expected and this agreement should be referenced in the exposition.

As an example of tool or equipment control, a procedure may require that—

- equipment and tooling would have the capability and reliability to ensure production of uniform duplicate parts and products conforming to the type design
- the acceptance of non-conforming parts, or rejection of conforming parts, due to improperly controlled tools and gauges, be avoided by—
    - inspecting and calibrating the equipment to appropriate measurement standards
    - inspecting tools, gauges, and testing equipment, as well as production jigs, fixtures, and templates which are depended upon as means of inspection
    - establishing inspection intervals on the basis that such tools and gauges would be inspected prior to their becoming inaccurate, or requiring adjustment, replacement, or repair
- a records system is provided to ensure that each piece of equipment, tooling, or storage container is—
    - checked prior to first usage and at the proper periodic interval
    - marked to indicate the date that the next inspection is due
    - removed from inspection and shop areas, or conspicuously identified, to prohibit usage after expiration of the inspection due date.

EM 148.111 Design approvals

A suitable arrangement between a manufacturing organisation and the holder of a supplemental type certificate or design approval should be detailed in the organisation's procedures. This arrangement may take any appropriate form but must enable the organisation to exercise the appropriate quality assurance over the manufacturing tasks. The quality assurance should include checking of the completed products for conformity to the type design.

Each manufacturing certificate may be related to one or more supplemental type certificates or design approvals, but the manufacturing certificate may not always authorise manufacture of every product listed on

a supplemental type certificate or design approval.

The arrangement with the supplemental type certificate or design approval holder ensures that the necessary type design information and requirements to be met during manufacture are available. The manufacturer and designer should be closely linked to ensure that the design is interpreted correctly and potential problems identified. This liaison is particularly important in the early stages of manufacture, such as prototyping.

EM 148.113 Production control procedures

This rule details the process control elements of a manufacturing organisation. These elements ensure that conformity is assured at each step of manufacture. Process control includes provisions for—

- supply
- process control
- testing and inspection
- stores
- issue

Supply

Supply is generally referred to in relation to those activities where items enter the organisation.

The holder of a manufacturing certificate is responsible for any parts, assemblies or services used in the manufacture of their product. The holder's procedures should include methods to monitor and control all parts or services obtained from suppliers and all suppliers to whom the holder has delegated inspection duties for controlling conformity and quality.

The inspections and tests of a holder of a manufacturing certificate are extended to include their supplier's inspections and tests when parts or services cannot or will not be completely inspected upon receipt. In effect, each supplier's facilities constitute extensions of the facilities of the holder of a manufacturing certificate.

Process control

To provide control over the fabrication and assembly operations and to ensure that necessary inspections and tests are conducted in the proper sequence, production planning procedures should be utilised. The manufacturing organisation should establish its production procedures taking into consideration—

- the establishing of appropriate inspection stations and programmes
- the arrangement of production areas to provide segregation of manufacturing processes or operations which may adversely affect other operations
- a system to control the integrity of all special processes and services
- the identification and control of products and controlling documentation

The process control procedures would include, for a non-destructive inspection as an example—

- the operator qualifications required by the manufacturer
- the currency requirements for an operator by the manufacturer
- inspection procedures in specifications that are approved as part of quality control data
- inspection and calibration of equipment
- the establishment of realistic, current acceptance criteria

- the recording and retention requirements for records

Any subcontracted work is considered to be an extension of the manufacturer's organisation and should be controlled by the manufacturer's procedures.

Testing and Inspection

The manufacturer should establish and comply with test and inspection procedures applicable to the products. These procedures should include—

- an inspection planning system
- production testing requirements
- final testing requirements

The holder of a manufacturing certificate should establish procedures for dealing with materials and parts not conforming to the type design or specifications. These procedures should enable the manufacturing organisation to—

- control the identification, rework, and use of non-conforming parts, including the isolation and scrapping of unusable parts
- ensure that any parts which will not conform to the type design are not used until the necessary design changes have been approved
- provide for corrective action with regard to discrepancies in manufacturing procedures, processes, designs, or any other condition which caused the non-conforming parts, to ensure that all affected and subsequent products will be in conformity with the type design
- maintain charts or records to show the effectiveness of the corrective action program and to reveal problem areas as they arise
- ensure that only those parts and processes which have been accepted and found to conform to acceptable design data are used in the product.

Stores

Stores is generally referred to in relation to those activities where items move within the organisation.

The stores system in many manufacturing organisations is linked closely to the supply system. The stores system is generally the internal supply processes controlling product and material distribution and flow through the organisation.

Issue

Although normally associated with the completed product, a manufacturing organisation may issue products from one production area to another, either directly or through a stores control mechanism.

At each stage where a product leaves a production area the issue may be controlled by a statement of compliance. This is the confirmation by an authorised company person that the product, whether complete or at a step in the process—

- has been checked
- complies with the airworthiness requirements
- is acceptable for approval

Compliance versus conformity

The terms compliance and conformance are often used interchangeably but this is not strictly correct.

Conformance generally refers to the conformity of a product to an applicable type design. It is correct, therefore, that a statement of conformity attests to the product showing conformity with the type design.

Compliance has a much broader meaning and better reflects the entire production concept. A design comprises several parts and conformance to the type design is only one aspect. A product must meet the relevant airworthiness requirements and these requirements include—

- conformity to the type design
- applicable design standards
- special conditions set by the CAA
- general safety aspects of the product
- the product's fitness for use

The statement of compliance therefore refers to the wider considerations that must be taken into account when checking a product.

The airworthiness release documentation issued by the holder of a manufacturing certificate must include—

- any internal statements of compliance; and
- authorised release certificates (the CAA Form One).

EM 148.115 Continued airworthiness

The manufacturing organisation has a responsibility to ensure that the products manufactured are monitored and supported. As with design organisations, part of this monitoring includes the investigation and analysis of defect incidents.

Defects that have no effect on safety, in any form, do not come under the definition of defect incidents and as such are not subject to this rule. These include defects which if corrected may aid production or make the item easier to use, resulting in an economic advantage to operating and maintenance organisations.

Defects that may result in injury, accidents, or hazards to other aviation activities are considered defect incidents. Under this rule, the manufacturing organisation has a responsibility to keep the users of products which they manufacture and the designer of those products informed of defect incidents.

The defect reporting responsibility of a manufacturing organisation will generally cover those product features that are causing a problem that are introduced by poorly controlled manufacturing processes and poor material performance rather than design faults or maintenance practices. Defect reporting to the CAA is covered in Part 12.

As part of the documentation of a design, particular a product design, there is a requirement for Instructions for Continued Airworthiness. These instructions should be developed by the design organisation but will involve collaboration with manufacturing and maintenance organisations.

Advisory circular AC146–1 contains additional information on the continued airworthiness responsibilities of a design organisation.

For in-service products the holder of a manufacturing certificate should establish procedures for recording, investigating cause, and assuring corrective action of all known or reported failures, malfunctions, and defects. Procedures should ensure that—

- in-service problems are investigated and prompt corrective action is taken on all affected products as appropriate
- users of the product are informed of the service difficulties and resultant changes to the type design

- feedback on service problems is received from the users of the products to the extent practicable
- procedures to ensure the defect reporting requirements of Part 12 are complied with.

The procedures required may form part of a totally integrated quality control system.

EM 148.117 Records

Manufacturing records

The holder of a manufacturing certificate should provide procedures that ensure correct technical data control, including—

- only applicable drawings, drawing change notices, engineering data, and quality control data are available to production and inspection personnel
- that unauthorised, inappropriate, and obsolete drawings and data are promptly removed from production areas
- prior to final acceptance of products or parts, all changes to the type design are either incorporated in the applicable drawings, or described in change notices attached to such drawings.

For airworthiness certification and recording compliance with the airworthiness requirements, all significant inspection and test records attesting to the conformity and safety of the completed part or product are required to be retained.

The procedures should detail the method of identification of records that are no longer current, but are required to be held for research or other purposes.

As the records should be legible and of a permanent nature, the retention of facsimile paper records should be avoided due to its likelihood of fading.

Records can be kept electronically but systems should ensure the information security, integrity, and retrieval. A system of backing up electronic data would be considered appropriate. Procedures for electronic record and document keeping should consider—

- avoidance of data loss in the event of power interruptions
- software control, including amendments and prevention of corruption
- unauthorised access
- audit trail facilities
- archiving of data in a similar manner to hard copies, and for a similar period
- backup of critical information, preferably once a day, with storage for that backup information
- data verification, on entry and retrieval
- publication provision
- staff training
- amendment of stored data
- problem report register including the problem details and solutions

For ease of access records may also be microfilmed or magnetically stored but the original documents

should be retained in a secure environment.

The rule requires the ideal retention of records to be 2 years from the date of the withdrawal of the last example of the product from service. This is a very onerous requirement but ensures that the information is available no matter how long the product remains in service. The rule recognises the need for varying this time limit in special cases. The cases that may support the reduction of this period will vary considerable but may include, but not be limited to, the following—

- the only examples of the product being used are installed on aircraft limited to experimental operations
- the number of products is finite and the necessary information can be provided to each owner for inclusion in the product's service records
- although products still exist, the likelihood of restoring an operating example of the product is considered extremely rare
- the supplemental type certificate is cancelled and the owners of each example of the product informed as to the non-type certificated nature of the product.

Personnel records

A certificated manufacturing organisation must establish procedures to ensure records are kept of all staff authorised to certify under its authority. The following minimum information should be kept in respect of each certifying person—

- name
- date of birth
- qualifications
- initial training
- continuation training
- experience
- qualifications relevant to the authorisation
- privileges of the authorisation
- date of first issue of the authorisation
- the expiry date of the authorisation
- identification number of the authorisation

The records may be kept in any format but must be controlled by the organisation's quality assurance senior person. Safeguards must be put in place to ensure that the records cannot be altered in an unauthorised way. Personal information must not be accessible to unauthorised persons. Organisations should take account of Privacy of Information legislation in the management of personal information.

The persons to whom the records relate should be given access, on request, to his or her own records. The CAA is an authorised person in respect of any aviation documents and records. When the CAA is assessing eligibility for initial or continued approval, or when it has cause to doubt the competence of a particular certifying person, it may access those records.

An organisation should keep the records for at least five years after the individual has ceased to be in its employment, or after withdrawal of the authorisation, whichever is sooner. In addition certifying persons, on leaving an organisation, must be provided with a complete record of company certification authorisations which they have held.

EM 148.119 Identification of products

This rule is self-explanatory.

EM 148.121 Internal quality assurance

An applicant must establish an internal quality assurance system that meets the requirements of this rule.

The requirements of this rule are common to all certificated organisations which require an internal quality assurance system, for example all the organisations to which the 140 series and 170 series Parts apply.

Detailed information on what is required for an internal quality assurance system is contained in PNG AC 10-1.

EM 148.123 Manufacturing organisation exposition

This rule requires an applicant for a manufacturing organisation certificate to establish an exposition.

The purpose of an exposition is to express the Chief Executive's requirements for the conduct of the organisation and sets out the means by which an organisation defines its operation, and shows both its employees and the CAA how it will conduct its day-to-day business in compliance with Part 148.

An exposition must assure the CAA that the organisation is in documentary compliance with the rule. Hence before the CAA grants an organisation entry into the system, the exposition must be accepted by the Director.

Makeup of exposition

An exposition may be produced as a single volume or any number of separate manuals Depending on an organisation's structure and size, separate manuals could cover—

- Management and Policy
- Personnel
- Manufacturing Procedures
- Stores
- Document control
- Quality Assurance
- Contractual Arrangements with Design Organisations.

If the exposition comprises more than one volume, the make up of the exposition and the content of individual manuals must be described in the management part of the exposition.

Procedures should be established to ensure Managers hold copies of those parts of an exposition which affect their areas of responsibility and staff are familiar with those parts of an exposition which affect their area of employment.

Content

The exposition should be constructed to address each element of 148.123. The structure should reflect the hierarchy of Part 148 such that the exposition progressively moves from higher level organisational material such as policy, scope of approval, and duties of senior persons to more detailed procedures.

Structuring the exposition according to the flow of the rules in Part 148 should be avoided, the result will not be a user friendly document.

The level of detail should be consistent with the size and complexity of the organisation and the manufacturing activity undertaken.

Exposition acceptance

The acceptance of an organisation's exposition by the Director will be one step in the process of Part 148 approval. Unless an exposition is accepted by the Director, a Manufacturing Organisation Certificate cannot be issued. Evidence of acceptance of the exposition is the issue of a certificate, however the CAA will normally stamp the log of pages to signify that they have found the exposition acceptable at a particular status.

Multiple certification

When an organisation seeks certification under more than one Civil Aviation Rule Part each of which requires an exposition, it may be possible for some parts of the exposition to be common to each certificate. For instance, if the same management set-up is used for each certificate, the management and policy part of the exposition could be common. Equally, all of the quality assurance procedures for one or more certificates could be placed in one manual.

Whatever format of exposition is chosen, it must be possible to clearly show how the requirements of each Part are satisfied. It is desirable that a compliance matrix is provided showing where compliance is shown in the exposition for each Part. This matrix should distinguish between those requirements which are common and those which are specific.

Any difficulty in establishing compliance will require more investigation time to be expended, and can only result in delays and additional cost to an applicant.

Subpart D — Operating Requirements

EM 148.201 Continued compliance

To ensure that all members of the organisation have access to the exposition, a certificated organisation is required to provide copies of its exposition at all places where work is normally carried out.

For continued compliance with the conditions of its Part 148 certificate, the organisation must comply with all the procedures detailed in the exposition and continue to meet the standards and conditions, which were required for initial certification.

The organisation must also comply with any reasonable requests from the Director to undergo audits and inspections. The Director is empowered by the Civil Aviation Act to make such requests.

In the case of organisations accepted under Subpart B for issue of a PNG manufacturing certificate, that organisation's foreign certificate must remain valid. If that foreign certificate is suspended, revoked or cancelled, the organisation's PNG certificate will be suspended, revoked or cancelled.

EM 148.203 Changes to certificate holder's organisation

An organisation should always ensure that its exposition remains an accurate description of the organisation and its activities. When there are changes to staff, structure, location, or documented procedures the organisation should ensure the exposition reflects these changes.

Prior acceptance by the Director is required for certain changes including—

- the Chief Executive
- the listed senior persons
- the manufacturing activities
- the locations at which work is carried out, including testing and inspection locations.

Organisational changes

When the holder of a manufacturing certificate changes their organisation in such a way as to necessitate a revision of their manuals or exposition, the CAA is to be kept informed. An acceptable means of compliance with the notification requirements is to notify the CAA in writing of any changes. A facsimile message may be accepted as a notice in writing.

The CAA's agreement to the change may be more readily obtained if the proposed wording of the change is fully defined and any supplementary information is provided to assist the CAA in deciding whether the change is acceptable.

A change of supplier, or in the delegation of quality functions to suppliers, which results in a change to the exposition of the holder of a manufacturing certificate should be considered as a change to the holder's process control system.

Manufacturing certificate amendments

An application to amend a manufacturing certificate is made in the same form and manner as the original issue. Where the changes include changes to the manufacturing organisation's exposition, only the changes need be submitted.

Since a manufacturing certificate may be amended for several different purposes, the following paragraphs provide examples as to methods applicable in differing circumstances:

- the holder of a manufacturing certificate may make an application to add a supplemental type certificate or design approval to the manufacturing certificate. Upon evaluation and approval of the process control data and manufacturing facilities, as applicable, the CAA will issue a new certificate. The new certificate will automatically cancel the existing one.

- When manufacture of completed products as well as spare parts has ceased, the holder of a manufacturing certificate should request deletion of the applicable supplemental type certificate or design approval from the manufacturing certificate. This can be accomplished by writing to the CAA. A revised certificate will be issued and any superseded certificate would be revoked.

If the holder of a manufacturing certificate ceases to manufacture complete products, but continues to manufacture replacement parts, the certificate does not require an amendment.

EM 148.205 Safety audit and inspections

The CAA operates a safety audit programme for all participants in the aviation system. For manufacturing organisations the safety audit will be part of the total industry safety monitoring schedule and visits will be notified in advance. These arrangements will allow for forward planning by both the CAA and the certificated organisations.

An organisation's policy and procedures will be accepted by the CAA during the entry process. These policies and procedures, documented in an organisation's exposition, will form the agreed performance standard for an organisation's safety audit programme. This safety audit programme will initially examine the certificate holder's internal quality assurance system. Any deficiency found at this level will result in a broader and deeper investigation until the causal factors of the deficiency are identified. The on-going frequency and depth of audit will depend directly on the performance of the organisation.

The CAA's level of confidence in an organisation will be raised when it is found to comply with its documented procedures. The CAA can then consider reducing the frequency and depth of the audit programme, with consequent financial savings for the organisation. Conversely where the level of confidence is low, due to non-compliance, the level of auditing and the consequent cost to an organisation may be expected to increase. Whenever it is discovered, through an audit or other reporting method, that an organisation is not conforming with its procedures, or complying with the Part 148 rules, the Director may suspend or revoke the certificate.