

DATE: May 10, 1976



ADVISORY CIRCULAR

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

SUBJECT: PRODUCTION CERTIFICATES

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1. **PURPOSE.** This advisory circular provides information concerning Subpart 21 of Federal Aviation Regulations (FAR) Part 21 and sets forth acceptable means, not the sole means, of compliance with its requirements.
2. **CANCELLATION.** AC 21-1A dated July 9, 1971, is cancelled.
3. **REFERENCE.** FAR, Parts 21, 37, 39, 43, 45 and 183.
4. **DEFINITIONS AND ABBREVIATIONS.** As used herein, the following definitions and abbreviations apply:
- a. **Article.** A material, part, component, assembly, or appliance which is used in the type certificated product, as specified in the type design data.
 - b. **Supplier.** *Any person who furnishes services to a holder of a production certificate which affects a type certificated product, or who supplies articles for installation on a type certificated product, including articles which were not designed or manufactured by the type certificate holder. The term "Supplier" as used in this circular is synonymous with the term "Subsidiary" as referenced in FAR 21.143.
 - c. **Regional Office.** The Engineering and Manufacturing Branch of the Federal Aviation Administration region having jurisdiction over the geographical area in which the manufacturer is located. (In the Western Region, the Aircraft Engineering Division)
 - d. **District Office.** The Federal Engineering and Manufacturing District Office (EMDO) responsible for evaluation and inspection of the manufacturer's facilities. (In the Western Region, the Aircraft Engineering District office (AEDO).)
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- e. **PC**, Production Certificate (Ref. FAR 21, Subpart C).
- f. **API**, Approved Production Inspection System (Ref. FAR 21, Subpart F).
- g. **PMA**, Parts Manufacturer Approval (Ref. 21, Subpart K).
- h. **TSOA**, Technical Standard Order Authorization (Ref. FAR 37).
5. **DISCUSSION**. This circular covers only those sections of FAR 21, Subpart C, where further discussion, information, and examples would be helpful. The heading of each of the following main paragraphs refers to the applicable section of Subpart C.
6. **FAR 21.133-ELIGIBILITY**. An application for a production certificate is made on FAA Form 8110-12, (OMB 9004-00078) Application for Type Certificate, Production Certificate, or Supplemental Type Certificate, which is submitted to the regional office.
7. **FAR 21.135-REQUIREMENTS FOR ISSUANCE**. Upon receipt of a properly executed FAA Form 8110-12, and following a district office preliminary survey and evaluation of the applicant's quality control data and system, the FAA will convene a production certification board at the applicant's facilities to make the final determination for issuance of a production certificate. The applicant will be formally advised as to the extent of his assistance needed in the production certification board activities, and of the findings and recommendations of the district office and the product team board. Where the facilities, equipment, data, procedures, and personnel of the applicant are found to meet the requirements of FAR 21, Subpart C, a production certificate will be issued.
8. **FAR 21.139-QUALITY CONTROL**. A total quality control system meeting the requirements of FAR 21.139 would provide control over all phases of manufacture including control over the manufacture of all supplier-furnished articles. The control exercised by the manufacturer over articles furnished to the manufacturer by a supplier that holds his own FM approval (PC, API, PMA, TSOA) for the article may be limited to the approval of the supplier's material review system, design changes, and to the manufacturer's usual incoming quality control procedures employed after articles are received from an outside source.
9. **FAR 21.143-QUALITY CONTROL DATA REQUIREMENTS**.
- The data required to be submitted for approval under this regulation should be submitted to the district office at the same time the application for a production certificate is submitted to the regional office.
 - In general, the requirements of FAR 21.143 are self-explanatory and the following paragraphs provide an example of acceptable compliance:

- (1) The manufacturer's organizational structure would ensure that any decisions with regard to workmanship, quality, conformity, safety, materials review, and corrective action are not unduly influenced by other considerations. This can be achieved by having the quality control organization report directly to top management.
 - (2) An effective quality control system utilizes well qualified inspectors in sufficient number to ensure that all articles, processes, procedures, and the completed products are inspected for conformity to data, specifications, and procedures specified in the approved type design.
 - (3) The quality control data would be arranged in manual form, with a suitable index, and should cover each portion of FAR 21.143.
 - (4) When references to other company documents or data are utilized, the manual would briefly summarize the procedure, method, or system which is referenced. Any such referenced material becomes part of the data approved by the FAA.
 - (5) In providing the description required by FAR 21.143(a)(3), the inclusion of, or reference to, supplementary data such as the following is considered helpful in showing acceptable compliance:
 - (a) Copies of all inspection and acceptance forms and checklists for articles and completed products, together with a brief outline of instructions for their use.
 - (b) Imprints of the various inspection and process stamps, and their meaning.
 - (c) A schedule of inspection and calibration intervals for production jigs and fixtures, precision inspection tools, testing equipment, including gauges and recording equipment used in controlling processes.
 - (d) A listing of manufacturing processes which are relied upon to assure quality, conformity, and safety of the completed product.
- c. An acceptable means of compliance with FAR 21.143(b) would be to provide in the quality control data a description of the system used to evaluate, monitor, and control all suppliers to whom the holder of a production certificate has delegated inspection duties for: controlling conformity and quality, except that such a

description is not required for suppliers who hold an FAA approval for the article being supplied. Such a description would include an up-to-date listing, either in the manual or in a referenced company documents, of all such suppliers by name, address, general nomenclature of articles or services, and any other pertinent information, such as:

- (1) Reference to the manufacturer's quality control manual by title and date.
- (2) Delegation of Material Review Board (MRB) authority.
- (3) Name and title of the manufacturer's or supplier's quality representative(s) who will make available purchase order, drawings, and other applicable data.

d4 Quality Control System Functions. A totally integrated quality control system would include the following major functions:

(1) Technical Data Control,

(a) The usual practice is to maintain a technical data control system which ensures that only applicable FAA - approved drawing, drawing change notices, engineering data, and quality control data are available to production and inspection personnel, and that unauthorized, inappropriate, and obsolete drawings and data are promptly removed from production areas.

(b) A drawing change control system which ensures that prior to final acceptance of products or articles, all changes to the type design are either incorporated in the applicable drawings, or described in change notices attached to such drawings.

(2) Manufacturing Processes. An inspection planning system that would provide the means for selecting and controlling procedures governing methods for:

(a) Selection of appropriate inspection methods and plans for articles to ensure that all characteristics affecting safety will be inspected as required, to ensure conformity to approved design data and to eliminate discrepancies from completed product, and spare articles.

- (b) Ensuring that any defects which might be in a lot accepted under a statistical quality control plan will not result in an unsafe condition in an end product or spare article.
- (c) The establishing of appropriate inspection stations and the programing of inspections at each stage of production to ensure that parts, assemblies, processes, and assembly operations are inspected, and applicable tests are conducted, in accordance with data, technical materials, and procedures maintained at the station for that particular stage of production.
- (d) Production planning is commonly achieved through use of fabrication and inspection instructions, shop travelers, checklists, or similar media, which not only provide control over fabrication and assembly operations, but also ensure that necessary inspections and tests will be conducted in the proper sequence, when articles and processes are in an inspectable condition. Such a system would provide for inspection and tests appropriate to all phases of the production cycle, from raw materials and related-processes and services to the completed product.
- (e) Production areas would be arranged to provide segregation of manufacturing processes or operations which may adversely affect other operations; for example, separation of precision inspection from each area where grinding, cutting, sanding, or painting operations are performed.
- (3) Special Processes. The integrity of processes and services utilized in the construction of articles and products is dependent upon the skill with which the work is performed, the capabilities of the equipment used, and the close control of temperatures, solutions, curing time, or other critical factors. A system to control all processes and services, such as welding, brazing, heat treatment, plating, etc., ensures that each process is performed by trained and qualified personnel and in accordance with approved specifications containing definitive standards of quality, and that periodic inspection of gauges, solutions, or any critical equipment is controlled and documented.
- (4) Inspection/Identification. Identifying articles or controlling documentation with appropriate stamps or marks traceable to the individual inspector, is a means of ensuring that only those articles and processes which have been accepted and found to conform to FM - approved design data are used in the product.

(e) Articles obtained from foreign suppliers are under the same degree of control that is exercised over domestic suppliers. In general, an undue burden may exist whenever the type certificate holder performs, or he has suppliers perform, any of his regulated functions outside the United States. Under such circumstances, the evaluation and approval of design changes and the evaluation, approval and subsequent surveillance of manufacturers, including the supervision of designees performing outside the United States may create a burden on the FAA in administering the FARs. In accordance with FARs 21.43 and 21.137, the determination of whether or not an undue burden exists must be made by the FAA in each case. FAA surveillance of materials, parts, and appliances is not considered to be an undue burden when:

- 1 The manufacturer completely inspects such articles for - conformity and condition upon receipt in the United States, and such inspections are programmed in his FAA-approved quality control data; or
- 2 An agreement is negotiated between FAA, the foreign civil air authorities and the U.S./foreign manufacturers whereby the foreign civil air authority agrees to perform inspections and surveillance on behalf of the FAA, and certifies to the FAA that each article conforms to the FAA-approved design and is in a condition for safe operation; or
- 3 The foreign civil air authority at the country of manufacture certifies that the article meets U.S. requirements in accordance with FAR 21.302.

(f) An effective purchasing and receiving inspection system precludes release to production of nonconforming or unsafe articles procured from outside sources. Such a system would ensure that:

- 1 Purchase orders provide specifications or other design data in the detail necessary to ensure procurement of articles or services which meet the requirements of the approved type design.
- 2 All incoming articles conform to approved type design data prior to their acceptance and release to production.
- 3 Articles which are not designed or manufactured by the production certificate holder are of the same design configuration as specified in the approved type design data.

(c) A recordkeeping system would ensure that each piece of equipment or container is checked prior to first usage and at the proper periodic intervals, and marked to indicate the date that the next inspection is due, and is removed from inspection and shop areas or conspicuously identified to prohibit usage after expiration of the inspection due date.

(7) **Supplier Control**, The holder of a production certificate is primarily responsible under the requirements of FAR 21.1855 for each article used in his product; therefore, he should establish a system to ensure conformity to the type design of all articles or services obtained from suppliers. Such a system would ensure that:

(a) Inspections and tests are extended to include supplier's inspection and tests of articles or services which cannot or will not be completely inspected upon receipt by the holder of a production certificate at his approved facilities.

(b) Provisions are made for the evaluation and/or surveillance of suppliers by the holder of a production certificate when he relies to any degree upon a supplier's quality control system, or has delegated inspection duties to the supplier. Minimal source surveillance by the production certificate holder is customarily an acceptable means of control when the supplier provides a certification of conformance that includes reports of quality measurement data which show objective evidence that quality standards have been met.

(c) Effective control is exercised to ensure conformity to approved design data of all articles obtained from suppliers who hold an FM approval (PC, APIS, PM, TSOA) for the article involved,

(d) Suppliers to the holder of a production certificate would be formally advised that their facilities' system, data, equipment, personnel, and articles being supplied are subject to evaluation and inspection by the production certificate holder and the FAA since, in effect, such supplier's facilities constitute extensions of the facilities of the holder of a production certificate.