



Jordan Civil Aviation Regulatory Commission

Guidance Procedure: AWS 35

Approved Maintenance Organization- Fabrication of Parts

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0.2 Abbreviations

AMC	Acceptable Means of Compliance
AMO	Approved Maintenance organization
CARC	Civil Aviation Regulatory Commission
CEO	Chief Executive Officer
CMM	Component Maintenance Manual
JCAR	Jordan Civil Aviation Regulations
MOE	Maintenance Organization Exposition
MSN	Manufacture Serial Number
NDI	Non Destructive Inspection
NDT	Non Destructive Test
POA	Production Organization Approval
P/N	Part Number
SB	Service Bulletin
S/N	Serial Number
SRM	Structure Repair Manual
STCH	Supplemental Type Certificate Holder
TCH	Type Certificate Holder



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0.3 Purpose

This guidance procedure is intended to assist maintenance organizations and inspectors on the conditions to obtain CARC agreement to fabricate parts under JCAR Part-145 approval.

0.4 Distribution

This procedure shall be published on CARC official website.

0.5 Amendments

This procedure will be reviewed each time there is a regulation change that affects it and as long as it is considered necessary by CARC.

Any amendment to this procedure will only go through CARC's formalized document control procedure (25 QP-02) to be approved by the Chief Commissioner/CEO and becomes effective only after incorporation to this procedure and publishing it on CARC official website.

0.6 Scope and Applicability.

This guidance procedure is applicable to JCAR Part-145 applicant and CARC approved Part-145 AMOs' (hereafter referred as maintenance organizations).

The provisions of this guidance procedure are complementary to the requirements of Part-145 regulation "as amended" and does not supersede or replace the associated regulatory requirements.

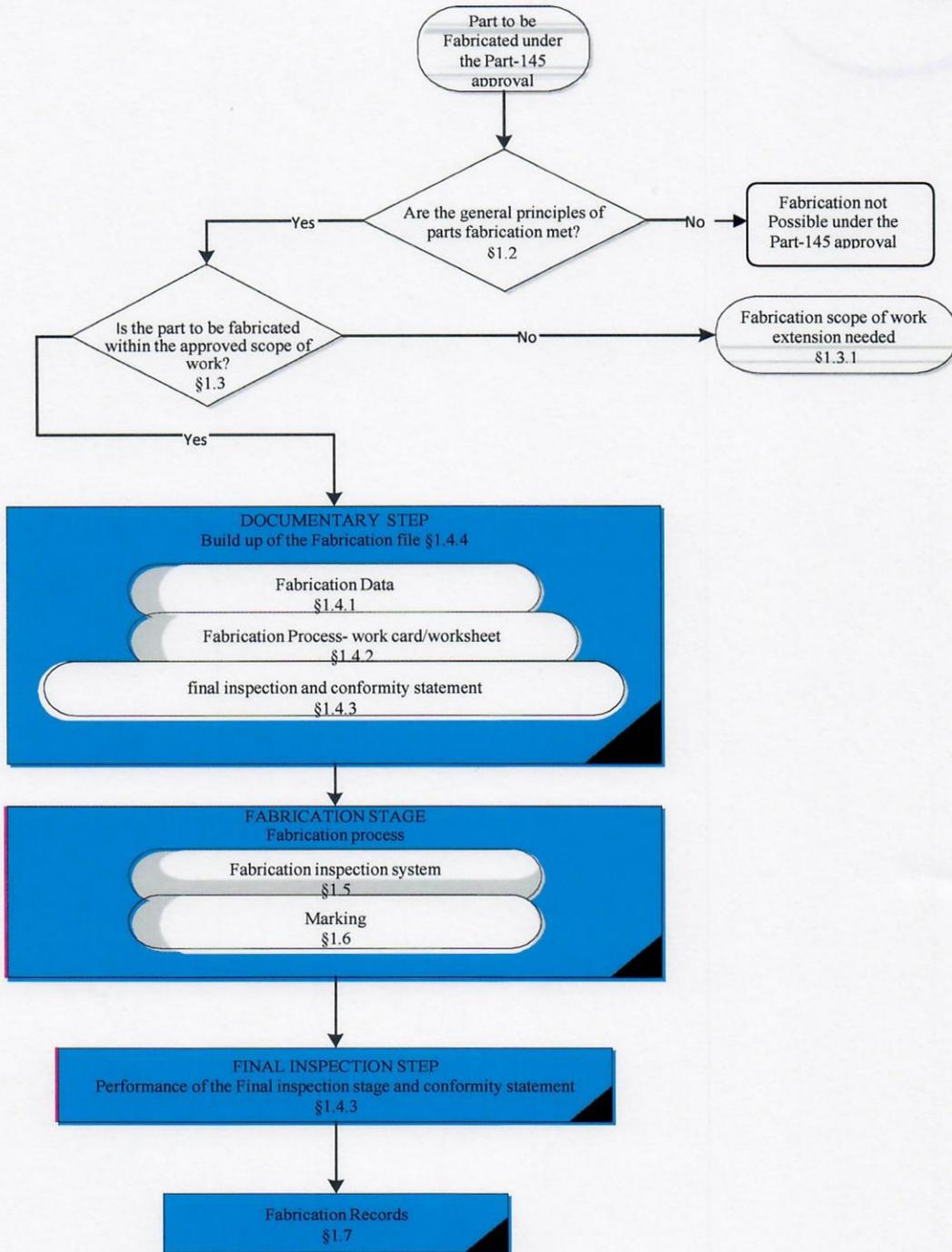
1.0 Definitions

Part 145.42 (c) provides the possibility for a maintenance organizations to have the permission to fabricate a restricted range of parts to be used in the course of maintenance within its own facilities. However, it is not the intent of the JCAR Part-145 regulation to provide an alternative mean to manufacture parts outside an approved Part-21 production organization (POA) and in order to clearly distinguish those activities, The term "fabrication" is to be used in the Part 145 maintenance organization environment to identify a restricted production under the limitations of JCAR Part 145.42 (c). The term "manufacture" is to be used in CARC Part-21 Subpart G and Subpart F (POA) for mass production



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1.1. Process flow chart





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1.2 General principles for fabrication of parts

When considering fabrication of parts under JCAR Part-145 approval, the following general principles apply:

1.2.1 The permission to fabricate parts is to be agreed by CARC through a detailed MOE procedure (paragraph 1.3 “*Scope of fabrication*“ of this guidance procedure);

1.2.2 Each time the need arises to fabricate a part or a batch of parts, the maintenance organization shall justify the reason why fabrication of part is used instead of the normal acquisition of an original part. In particular the maintenance organization shall either provide evidence of:

- a. Sufficient data to fabricate the subject part already exists in the current issue of the approved Maintenance data (i.e. the CMM or AMM refers or describes the fabrication process and/or drawings to be used, etc.). Typically this is the case described in paragraph 1.4.1 point A and B, or;
- b. Direct authorization (or no objection) received from the design approval holder to fabricate those specific parts, which shall also include the identification of the fabrication data (i.e. drawing, etc.) to be used. Typically this is the case described in paragraph 1.4.1 point C;

1.2.3 The fabrication is to be performed in the course of maintenance. This implies that:

- a. Items fabricated may be only installed on products and/or components undergoing maintenance at the same maintenance organization which is fabricating the parts;
- b. The item is fabricated under an approved rating (e.g. as part of the maintenance carried out on aircraft under rating A1, engines under rating B1, components under a C rating);
- c. The long-term storage of fabricated parts is not permitted. This means they may be only stored for limited time as justified by the duration of the on-going maintenance for which they have been fabricated;
- d. The fabrication of parts shall be done within the maintenance organization’s facilities;
- e. The maintenance organization fabricating the part may subcontract special processes but cannot subcontract the overall fabrication process;

1.2.4 The parts do not qualify for certification with CARC Form 227. A permission to fabricate does not constitute approval for manufacture, or to supply externally this means that fabrication of parts, modification kits etc., for onward supply and/or sale shall not be conducted by a maintenance organization;

1.2.5 The fabrication of the following type of parts is not permitted:

- a. Critical parts (as defined by the design approval holder);
- b. Complete primary structural elements;
- c. Prototype parts (conformity only to non-approved data).



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1.3 Scope of fabrication of parts

In order to allow the fabrication of parts under CARC Part-145 approval, the related fabrication, inspection assembly and test should be clearly within the technical and procedural capability of the maintenance organization. The capability to fabricate parts shall be defined through the MOE content in particular:

- The MOE 1.9 “*Scope of work*” shall specify if the permission of fabrication of parts is included or is not applicable;
- When the permission is included, the MOE 2.9. “*Repair procedure*” shall further describe the parts fabrication procedure in compliance with this user guide.

1.3.1 Identification of fabrication groups

According to the examples given in the AMC 145.42(c), fabrication under the Part-145 approval can include but is not limited to the following “**fabrication groups**”:

- a. Fabrication of bushes, sleeves and shims;
- b. Fabrication of secondary structural elements;
- c. Fabrication of control cables;
- d. Fabrication of flexible and rigid pipes;
- e. Fabrication of electrical cable looms and assemblies;
- f. Formed or machined sheet metal panels for repairs;
- g. Additional cases as agreed by CARC.

The “fabrication groups” shall be identified in the MOE 2.9 and limited to the ones for which the maintenance organization may demonstrate to the CARC having the effective technical capability.

1.4 Fabrication file

1.4.1 Fabrication data

All necessary data to fabricate the part shall be approved either by CARC or the type certificate (TCH) holder or Part-21 design organization approval holder, or supplemental type certificate (STC) holder.

For the purpose of this guidance procedure any of the following may be considered **acceptable data for fabrication** of parts by the maintenance organization:

- a. Instructions for continuing airworthiness issued by TCH, STCH or any other organization required to publish such data by Part 21. This case typically includes fabrication procedures directly provided in maintenance data such as AMM, SRM, CMM, Overhaul or Repair Manuals, SB, etc.;
- b. Modification and/or repair data, involving the fabrication of parts, approved under Part-21 regulation. This case typically refers to data in support to repairs or



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modifications which are not already included in available approved data (i.e. structural damages outside the limits of the SRM, etc.);

- c. Manufacturing drawings for items specified in aircraft, engines, components parts lists directly provided or made available by a TCH, STCH or an approved production organization, which is not referred to in other maintenance data (such as AMM, SB, etc.). As already specified in paragraph 1.2, in this case a direct authorization (or no objection) received from the design approval holder to fabricate those specific parts is necessary, which shall also include the identification of the fabrication data (i.e. drawing, etc.) to be used bearing in mind that TCH messages such as a Non-Technical Objection cannot be considered as maintenance data for the purpose of parts fabrication.

The maintenance organization shall ensure that the data to fabricate parts is:

- Falling in one of the cases identified above;
- Applicable to the concerned part;
- Up to date, is legally obtained and respect the proprietary data protection; the intent of the regulation is specifically to prevent the maintenance organizations from reverse engineering parts when they do not have legitimate access to the approved design data;
- Including all necessary information of part numbering, dimensions with tolerances, materials, processes, and any special manufacturing techniques, special raw material specification and/or incoming inspection requirement.

1.4.2 Fabrication Process -Work card/Worksheet System.

The fabrication of parts process shall be included by the maintenance organization in the work card/worksheet system (i.e. worksheets, process sheets, engineering instructions, etc.). Work cards/worksheets will be used to convert/split the acceptable data for fabrication into clear stages of work instructions for maintenance personnel. The work card/worksheet system shall be subjected to a control procedure which shall:

- Define the responsibilities within the maintenance organization for developing such instructions in compliance with the acceptable data for fabrication described in the previous chapter;
- Define the traceability of such instructions to each individual fabricated part;
- Ensure that each part undergoing fabrication is unambiguously linked for use on a specific product or component undergoing maintenance in the maintenance organization. This requires that the product or component where the fabricated part is going to be installed shall be clearly identified in the worksheet/work card (i.e. fabricated for Aircraft MSN/Registration, for Landing Gear S/N ZZZZ, etc.);



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For any given part/batch fabrication process, the relevant Part-145 work card/worksheet shall contain:

- The data sufficient to define fabrication such as but not limited to reference(s) of the fabrication maintenance data, required tooling, part numbering, dimensions with tolerances, incoming inspection requirement, raw material specification, detailed fabrication processes, any special manufacturing techniques, marking instructions, intermediate and final inspections, testing, etc.
- Identification of the processes which are subcontracted and related specific inspections by the maintenance organization.

1.4.3 Final inspection and conformity statement

The work card/worksheet shall describe the final inspection and associated conformity statement.

The final inspection stage is required at the completion of the part fabrication. The final inspection shall be done independently from the fabrication itself. In addition the final inspection shall be done before, separately, and independently from, any inspection required at the installation of the part.

The final inspection shall consist of the following minimum elements:

- Check for compliance to MOE 2.9 procedure related to the fabrication of parts;
- Check completion of the fabrication file (paragraph 1.4.4);
- Physical inspection of the part manufactured, to confirm the part conforms to the approved data for fabrication.

The results of the final inspection shall be recorded and formalized through a dedicated form (which cannot be CARC Form 227 or equivalent), or directly inside the work card/worksheet system described in paragraph 1.4.2 provided it is clearly distinguished from task fabrication stages; The final inspection records shall contain reference to the following statement “**part(s) fabricated as per MOE 2.9**”.

1.4.4 Composition of the fabrication file

In conclusion, to support and record the parts fabrication process, a standard “**fabrication file**” is to be used for each part or batch to be fabricated by the maintenance organization, being composed by:

- a. the “*data*” described in paragraph 1.4.1;
- b. the “*Fabrication process -work card/worksheet system*” described in paragraph 1.4.2;
- c. the “*Final inspection and conformity statement*” described in paragraph 1.4.3.

This “fabrication file” will constitute the maintenance records specified in paragraph 1.7 of this guidance procedure.



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1.5 Fabrication inspection system

The maintenance organization shall establish a “**Fabrication Inspection System**” to ensure that all fabrication processes, whether performed by the maintenance organization or by subcontractors under its control, are carried out strictly in accordance with the specifications provided as part of the approved data for fabrication, ensuring as a minimum:

Availability of personnel with defined qualification criteria, including suitable experience and training, and formally authorized by the maintenance organization to:

- Undertake the necessary engineering functions to fabricate the part, such as but not limited to developing the data described in paragraph 1.4.2 “Fabrication process - work card/worksheet system”;
- Sign-off for the accomplishment of the fabrication process related tasks including the final inspection stage. Special attention should be paid to tasks requiring specialized knowledge and skill (i.e. NDT/NDI, welding, etc.);

A system for the control and authorized amendment of all data provided for the fabrication, inspection and test to ensure that:

- it is complete and up-to-date at the point of use, readily available to fabrication and inspection personnel, and used when necessary;
- during execution, all works are accompanied by documentation giving either directly or by means of appropriate references, the description of the works as well as the identification of the personnel in charge of inspection and execution tasks for each of the different work phases;
- each part is inspected in such a way which identifies the nature of all inspections required and the fabrication stages at which they occur (i.e. fabrication work cards with clear inspection stages, such as dimensional checks, NDT, etc.);

A system to control the fabrication step(s) which are subcontracted;

Parts in process are inspected for conformity with the approved data for fabrication at points in production where accurate determinations can be made;

Procedures to deal adequately with non-conforming parts identified in the fabrication process. Such parts shall be treated as “unsalvageable” and identified, segregated, disposed to preclude its further use (i.e. mutilation by grinding, burning, etc.);

The means to achieve adequate configuration control of fabricated parts, to enable the maintenance organization to make the final determination and identification for conformity and eligibility status;

Incoming materials used in the finished product are properly identified as specified in the approved data for fabrication;

Parts in process are dully identified and segregated as being fabricated by the maintenance



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1.6 Marking

Any fabricated part shall be marked according to the instructions provided in the approved data for fabrication, including:

1.6.1 Part number;

1.6.2 The maintenance organization’s identity.

The main criteria to establish how and by which means the part shall be marked shall be based on the information available in the approved data (i.e. marking field, possible depth and/or means, actual text or symbols to be used, etc.).

By derogation from the above, in cases where it is impractical to mark the fabricated part without compromising the airworthiness (integrity) of the part or not enough space for the marking information is available due to the size/shape issues, the documentation accompanying the part shall include the information that could not be marked on the part. In this case the use of a label is recommended.

1.6.1. Fabrication part number identification

For standardization and traceability purposes of parts fabricated by maintenance organizations, the following standard is recommended be used to identify the “**fabrication P/N**”:

- a. Original Part Number (mandatory): part number provided in the approved fabrication data;
- b. Maintenance organization identification/CARC approval number (mandatory): **CARC.AMO.XX**;
- c. Additional maintenance organization identification codes (optional): additional digits (number and/or letters) may be added according to criteria specified in the MOE to facilitate the part traceability (i.e. year of manufacture, workshop, location, batch number, etc.);

As a consequence, the “**fabrication P/N**” is identified by the digits: A+B+C.

The following is an explanatory example:

Part number as given in the approved data for fabrication (mandatory)	Maintenance Organization Identification (mandatory)	Additional Identification (optional)
Example: 6NC148	CARC.AMO.XX	2019APR
Fabrication P/N = 6NC148 CARC.AMO.XX 2019APR		

Special attention should be given to the fact that any symbol or digit included in a part number identification (i.e. point, comma, dash, etc.) is to be considered integral part of the P/N and difference shall be made between lowercase and capital letters. Therefore, the P/N identification marked on the part shall exactly reflect the P/N stated in the documentation accompanying the part.





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1.7 Fabrication records

The fabrication records constitute objective evidence that:

- All the prescribed stages of the fabrication process have been satisfactorily completed;
- Compliance with the approved data for fabrication has been achieved;
- Traceability from the part to the approved data is ensured.

Therefore, the maintenance organization shall implement a system for the completion and retention of records during all stages of fabrication appropriate to the nature of the part and its fabrication processes.

The record retention procedure shall:

- Describe the organization of the archiving system (i.e. location, paper/electronic format, responsibility);
- Clarify conditions for access to the information (e.g., by P/N, batch of the fabricated parts, or by identification of the component/engine/aircraft on which the fabricated part is installed);
- Ensure that, when a subcontractor is used according to paragraph 145.75 (c), the records retention function is not subcontracted and the records are duly retained by the maintenance organization.

The fabrication records are composed by the documents described in the following paragraphs 1.7.1 and 1.7.2

1.7.1 Fabrication file record

The “**fabrication file**” referred in paragraph 1.4.4 shall be kept for each part or batch in compliance with records retention time provided in JCAR Part 145.55 (c). Particular attention shall be made to the fact that the time retention period is not counted from the date of fabrication but the date of release to service of the product or component on which the fabricated part is installed.

1.7.2 List of parts fabricated

The maintenance organization shall have a system (i.e. paper register, database, etc.) allowing a listing of all the parts/batches which have been fabricated by the maintenance organization together with the information of the product/component on which those parts have been installed. The following minimum information need to be recorded.

Template for list of fabricated parts:

Fabrication Group	Part Description	Original P/N	Fabrication P/N	Approved data for Fabrication

