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Foreign Part-145 approvals - Fabrication of Parts

UG.CAO.00131-001

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DOCUMENT CONTROL SHEET

Reference documents
a) Contextual documents
Applicable requirements are listed in the form "FO.CAO.00136-XXX - Foreign Part-145 approvals – Documentation Index".
b) Internal documents
Applicable document are listed in the form "FO.CAO.00136-XXX - Foreign Part 145 approvals – Documentation Index".

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Issue	Issue date	Change description
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0. Introduction





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0.2. Definitions and abbreviations

Abbreviations	
AMC	ACCEPTABLE MEANS OF COMPLIANCE
AMO	APPROVED MAINTENANCE ORGANISATION
AMTO	APPROVED MAINTENANCE TRAINING ORGANISATION
AOG	AIRCRAFT ON GROUND
BIPM	INTERNATIONAL BUREAU OF WEIGHTS AND MEASUREMENTS
CAO	CONTINUING AIRWORTHINESS ORGANISATION
CAP	CORRECTIVE ACTION PLAN
CIPM	INTERNATIONAL COMMITTEE ON WEIGHTS AND MEASUREMENTS
C/S	CERTIFYING STAFF
CC/S	COMPONENT CERTIFYING STAFF
EASA	EUROPEAN AVIATION SAFETY AGENCY
EU	EUROPEAN UNION
GM	GUIDANCE MATERIAL
ILAC	INTERNATIONAL LABORATORY ACCREDITATION COOPERATION
IOIRS	INTERNAL OCCURENCE REPORTING SYSTEM
MOA	MAINTENANCE ORGANISATION APPROVAL
MOAP	MAINTENANCE ORGANISATION APPROVAL PROCEDURES
MOC	MAINTENANCE OVERSIGHT COORDINATOR
MOE	MAINTENANCE ORGANISATION EXPOSITION
MOR	MANDATORY OCCURRENCE REPORTING
MRA	MUTUAL RECOGNITION ARRANGEMENT
NAA	NATIONAL AVIATION AUTHORITY
NRAB	NATIONAL RECOGNISED ACCREDITATION BODY
OEM	ORIGINAL EQUIPMENT MANUFACTURER
PPB	PRINCIPAL PLACE OF BUSINESS
QE	QUALIFIED ENTITY
RAB	REGIONAL ACCREDITATION BODY
S/S	SUPPORT STAFF
STCH	SUPPLEMENTAL TYPE CERTIFICATE HOLDER
TCH	TYPE CERTIFICATE HOLDER
WH	WORKING HOURS
WHOC	WORKING HOURS EASA OVERSIGHT COORDINATOR





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0.3. Scope and applicability.

EASA is the Competent Authority for maintenance organisations having their principal place of business located outside the EU, as established by EASA Part 145.1 “General” and is therefore responsible for the final approval of these maintenance organisations and for establishing procedures detailing how EASA Part-145 applications and approvals are managed.

This user Guide is applicable to EASA Part-145 applicant and EASA Part-145 AMOs’ (hereafter referred as maintenance organisations) having their principal place of business located outside the EU Member States and which are not certified under the provisions of a bilateral agreement signed with the EU.

The provisions of this user guide are complementary to the requirements of Part-145 regulation “as amended” and does not supersede or replace the associated regulatory requirements.

0.4. Purpose

This user guide is intended to provide guidance to maintenance organisations and inspectors on the conditions to obtain agreement by the competent authority to fabricate parts under the EASA Part-145 approval.

0.5. Entry into force

This User Guide comes into effect 90 days after publication on the EASA website.

0.6. Associated user guides

EASA has developed associated instructions (user guides, Forms, templates and work instructions), that detail specific matters, which have to be considered as an integral part of this procedure.

A complete listing of these documents, together with their applicability to the maintenance organisations or NAA / QE / EASA, is addressed in the current revision of the “Foreign Part 145 approvals – documentation Index”, FO.CAO.00136-XXX (XXX identifies the revision number). Documents which are applicable to both NAA/QE/EASA and maintenance organisations are made available on the EASA Web Site (<http://easa.europa.eu>) - Continuing Airworthiness Organisations page.

Each time a cross reference is provided to another document or another chapter / paragraph of the same document, this reference is identified with grey text.

0.7. Communication.

All documents and correspondences between the maintenance organisation and EASA including allocated inspectors shall be in the English language unless otherwise agreed by EASA.





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1. Fabrication of parts





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1.0. Definitions

Part 145.A.42 (c) provides the possibility for a maintenance organisations 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 EASA Part-145 regulation to provide an alternative mean to manufacture parts outside an approved Part-21 production organisation (POA) and in order to clearly distinguish those activities, the following definitions are adopted:

1.0.1. Fabrication of parts

The term “fabrication” is to be used in the EASA Part 145 environment to identify a restricted production under the limitations of EASA PART 145.A.42 (c).

1.0.2. Production of parts

The term “manufacture” is to be used in the EASA Part-21 Subpart G and Subpart F (POA) for mass production.

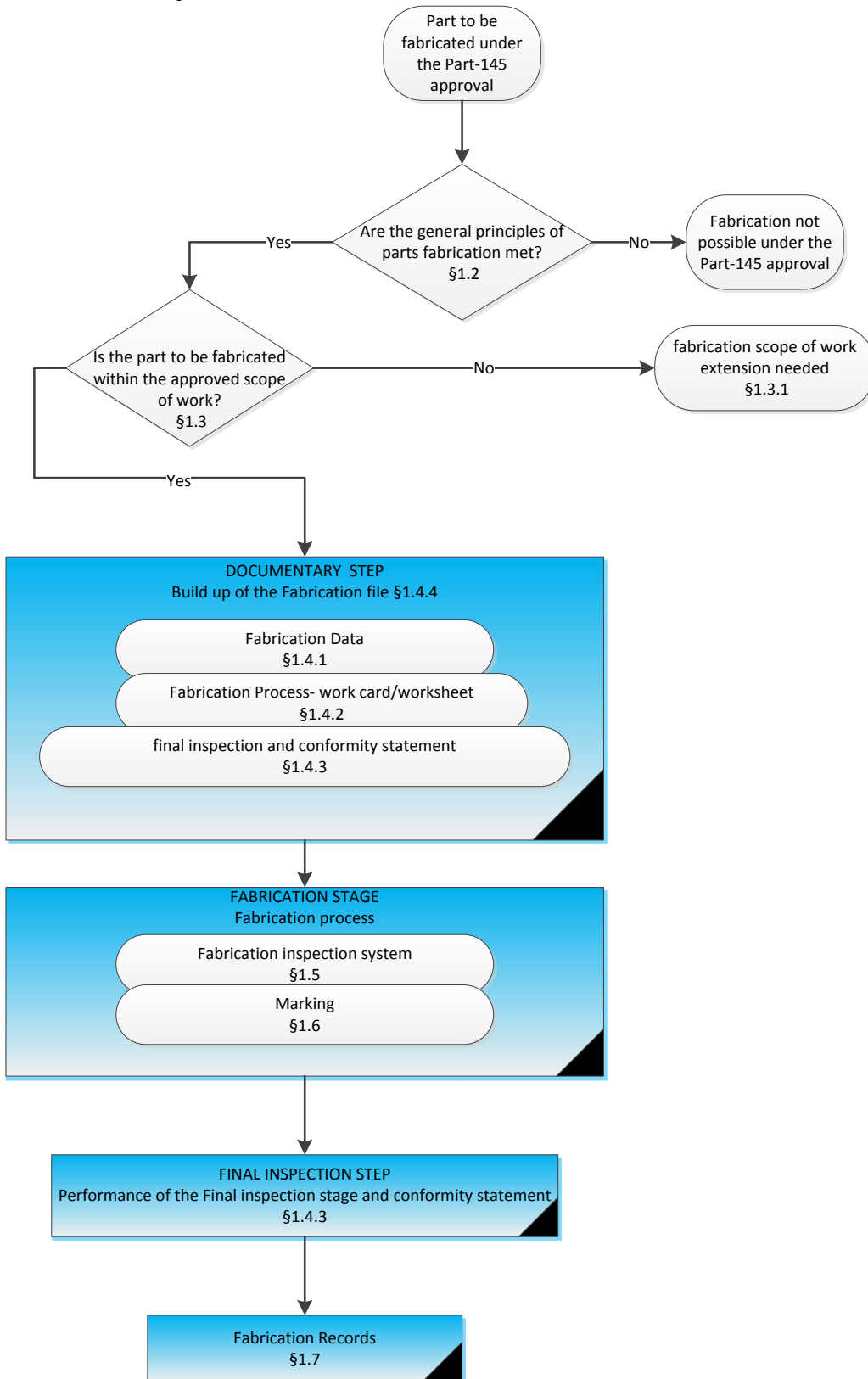
Note: This user guide is only intended to cover the fabrication of parts by a maintenance organisations and it cannot be used in any way to support manufacturing of parts under the EASA Part-21 regulations.





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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 the EASA Part-145 approval, the following general principles apply:

- the permission to fabricate parts is to be agreed by the competent authority through a detailed MOE procedure (refer to the following chapter *“Scope of fabrication”* of this user guide);
- each time the need arise to fabricate a part or a batch of parts, the maintenance organisation shall justify the reason why fabrication of part is used instead of the normal acquisition of an original part. In particular the maintenance organisation shall either provide evidence of:
 - sufficient data to manufacture 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 1.4.1 point A and B, or;
 - direct authorisation (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 1.4.1 point C;
- the fabrication is to be performed in the course of maintenance. This implies that:
 - items fabricated may be only installed on products and/or components undergoing maintenance at the same maintenance organisation which is fabricating the parts;
 - 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);
 - 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;
 - the fabrication of parts shall be done within the maintenance organisation`s facilities;
 - the maintenance organisation fabricating the part may subcontract special processes but cannot subcontract¹ the overall fabrication process;
- the parts do not qualify for certification with EASA Form 1. 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 may not be conducted by a maintenance organisation;
- the fabrication of the following type of parts is not permitted:
 - critical parts (as defined by the design approval holder);
 - complete primary structural elements;
 - prototype parts (conformity only to non-approved data).

¹ Subcontracting the entire fabrication of parts as per 145.A.75 (c) may be accepted at the additional condition that the maintenance organisation routinely performs in-house a minimum fabrication within the scope intended to be carried out, to ensure the maintenance organisation maintains the necessary expertise.





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1.3. Scope of fabrication of parts

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

- the MOE chapter 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 chapter 2.9. “Repair procedure” shall further describe the parts fabrication procedure in compliance with this user guide.

For further guidance on the MOE structure refer to the “Foreign Part 145 approvals – use guide for MOE, UG.CAO.00024-xxx)

1.3.1. Identification of fabrication groups

According to the examples given in the AMC 145.A.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 the competent authority*².

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

² The Competent Authority may agree for additional “fabrication groups” to be identified. Elements of a primary structural part (i.e. skin panels, a bracket for a circumferential frame, etc.) could also be considered, but this may depend on how such elements are being considered by the design approval holder in terms of criticality. Any such additional fabrication groups shall be carefully assessed by the maintenance organisation with the involvement when necessary of the design approval holder to support the agreement with the competent authority to allow fabrication. The EASA MOC shall be informed by the assigned inspector when use is made of 1.3.1 (g) option.





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1.4. Fabrication file

1.4.1. Fabrication data

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

For the purpose of this user guide any of the following may be considered **acceptable data for fabrication** of parts by the maintenance organisation:

- A. Instructions for continuing airworthiness issued by TCH, STCH or any other organisation required to publish such data by Part 21 (such as ETSO holder). This case typically includes fabrication procedures directly provided in maintenance data such as AMM, SRM, CMM, Overhaul or Repair Manuals, ESM, SB, etc.;
- B. Modification and/or repair data, involving the fabrication of parts, approved under EASA Part-21 regulation or under the terms of a bilateral agreement. This case typically refers to data in support to repairs or modifications which are not already included in available approved data (i.e. structural damages outside the limits of the SRM, etc.);
- C. Manufacturing drawings³ for items specified in aircraft, engines, components parts lists directly provided or made available by a TCH, STCH or an approved production organisation, 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 authorisation (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.

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

- Falling in one of the cases identified above⁴;
- 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 organisations 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.

³ A particular case may be un-dimensioned drawings such as “loft drawing”. This is basically a full size 1:1 replica of an item that enables the part to be produced to pattern (i.e. some old technology aircraft never had an original dimensioned drawing. In the case of these aircraft, where often multiple compound curves are involved, a “loft drawing” of the item was prepared and was the only means for the production of parts). Such fabrication of parts to pattern may be acceptable provided that an engineering drawing of the item is produced which includes any necessary fabrication processes. However, considering the peculiarity of such case of using un-dimensioned drawings, the maintenance organisation is expected to support the need of manufacturing such parts and to receive the competent authority agreement on a case by case basis.

⁴ TCH messages such as a Non-Technical Objection cannot be considered maintenance data for the purpose of parts fabrication





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1.4.2. **Fabrication process -work card/worksheet system.**

The fabrication of parts process shall be included by the maintenance organisation 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 subject to a control procedure which shall:

- Define the responsibilities within the maintenance organisation 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 organisation. 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 a/c MSN, for Landing Gear s/n ZZZZ, etc.);

For any given part/batch fabrication process, the relevant EASA 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 organisation.

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 the MOE 2.9 procedure related to the fabrication of parts;
- Check completion of the fabrication file (refer to the following chapter);
- Physical inspection of the part manufactured, to confirm the part conforms to the approved data for fabrication⁵.

The results of the final inspection shall be recorded and formalised through a dedicated form (which cannot be an EASA Form 1), or directly inside the work card/worksheet system described in the previous chapter 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”**.

⁵ This means that applicable dimensions or data (critical or relevant for fit, form and function) have to be measured during the final inspection stage and recorded, confirming that the part complies with the approved data for fabrication. A simple check box exercise to declare conformity is not considered acceptable.





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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 organisation, being composed by:

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

This “fabrication file” will constitute the maintenance records specified in chapter 1.7 of this user guide;

1.5. **Fabrication inspection system**

The maintenance organisation shall establish a “**Fabrication Inspection System**” to ensure that all fabrication processes, whether performed by the maintenance organisation 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 authorised by the maintenance organisation to:
 - undertake the necessary engineering functions to fabricate the part, such as but not limited to developing the data described in chapter 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 specialised knowledge and skill (i.e. NDT/NDI, welding, etc.);
- a system for the control and authorised 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 organisation 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 organisation.





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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:

- a part number;
- the maintenance organisation`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 standardisation and traceability purposes of parts fabricated by maintenance organisations, the following standard is recommended be used to identify the “**fabrication P/N**”:

- original Part Number (mandatory): part number provided in the approved fabrication data;
- maintenance organisation identification (mandatory): EASA.145.XXXX⁶;
- additional maintenance organisation 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 organisation Identification (mandatory)	Additional identification (optional)
<i>Example</i>	EASA.145.XXXX	2015JAN
Fabrication P/N = <i>Example</i> EASA.145.XXXX 2015JAN		

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.

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.

⁶ “XXXX” to be replaced by the EASA Part-145 approval number of the maintenance organisation fabricating the parts





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Therefore, the maintenance organisation 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 organisation 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 145.A.75 (c), the records retention function is not subcontracted and the records are duly retained by the maintenance organisation.

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 chapter 1.4.4 shall be kept for each part or batch in compliance with records retention time provided in EASA Part 145.A.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 organisation 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 organisation 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 ⁷	Approved data for fabrication ⁸

⁷ For the identification of the Fabrication P/N refer to 1.1.6 “Marking”

⁸ Refer to 1.4.1 “Fabrication Data”

