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## Foreign Part-145 approvals - Tools & Equipment

**UG.CAO.00132-003**

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10/11/2022**DOCUMENT CONTROL SHEET****Reference documents****a) Contextual documents**

Applicable requirements are listed in the form "FO.CAO.00136 - Foreign Part-145 approvals – Documentation Index".

**b) Internal documents**

Applicable document are listed in the form "FO.CAO.00136 - Foreign Part-145 approvals – Documentation Index".

**Log of issues**

Issue	Issue date	Change description
001	22/10/2015	First issue
002	18/07/2018	Introducing additional cases to allow use of alternative tools, introducing additional cases of calibration laboratories following comments received from stakeholders, amending the transition period for using non-accredited laboratories under the control of the organisation's quality system.
003	DD/11/2022	<ul style="list-style-type: none"><li>• Endorsement of Regulation (EU) 2021/1963 introducing SMS</li><li>• Changes to § 7.3 [Calibration] to provide further clarification in relation calibration of measuring tools and equipment. Introduction of new § 9.2.5 [Interpretation of calibration standards] which provides explanation for the different meanings of term "standard".</li></ul>





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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 MEASURES
BIPM KCDB	BIPM KEY COMPARISON DATABASE
CAO	COMBINED AIRWORTHINESS ORGANISATION
CAOA	CONTINUING AIRWORTHINESS ORGANISATION APPROVAL
CAP	CORRECTIVE ACTION PLAN
CIPM	INTERNATIONAL COMMITTEE ON WEIGHTS AND MEASURES
CIPM MRA	CIPM MUTUAL RECOGNITION ARRANGEMENT
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
IORS	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
NMI	NATIONAL METROLOGY INSTITUTE
NRAB	NATIONAL RECOGNISED ACCREDITATION BODY
OEM	ORIGINAL EQUIPMENT MANUFACTURER
OMS	OVERSUGHT MANAGEMENT SOFTWARE
PPB	PRINCIPAL PLACE OF BUSINESS
QE	QUALIFIED ENTITY
RAB	REGIONAL ACCREDITATION BODY
S/S	SUPPORT STAFF
SMS	SAFETY MANAGEMENT SYSTEM
STCH	SUPPLEMENTAL TYPE CERTIFICATE HOLDER
TCH	TYPE CERTIFICATE HOLDER
WH	WORKING HOURS
WHOC	WORKING HOURS EASA OVERSIGHT COORDINATOR





### 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 designed to be used by maintenance organisation and the assigned inspector when:

- The maintenance organisation is:
  - Defining the processes and procedures related to:
    1. the tools/equipment classification;
    2. the tools /equipment equivalence assessment ;
    3. the tool/equipment calibration;
  - Evaluating compliance with Part-145.A.40(a) with particular reference to the availability of the tools to perform the approved scope of work and Part-145.A.40.(b) with regards to tool/equipment calibration;
- Assigned inspector is :
  - Evaluating by sampling the Compliance of the maintenance organisation with Part-145.A.40 (a) and Part-145.A.40 (b);

### 0.5. Entry into force

This User Guide is applicable on 2 December 2022, after publication on the EASA website.

The entry into force date of this User Guide does not supersede the need to comply with any other entry into force date(s) established by applicable regulations.

### 0.6. Associated instructions

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 user guide.

A complete listing of these documents, together with their applicability to the maintenance organisation 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>, Foreign Part-145 Approvals 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, the overseeing authority and EASA shall be in the English language unless otherwise agreed by EASA.





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## 1. Processes flow chart.





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This user guide intends to describe the two main processes that shall be used by a maintenance organisation to demonstrate compliance with Part-145.A.40 (a) and Part-145.A.40 (b).

In particular those processes represent the basic elements expected to be described in the MOE chapter 2.6 “Use of Tooling and Equipment by Staff (including alternate tools)” and in the chapter 2.5 “Calibration of Tools and Equipment”, refer to MOE User Guide (Foreign Part-145- UG.CAO.00024-XXX).

For the purpose of this user guide the term “**tooling**” is used to indicate any tool or equipment. The maintenance organisation may vary in the terminology used to define and classify the tooling; therefore, adherence to any particular designation shown in this user guide may not match each maintenance organisation’s structure.

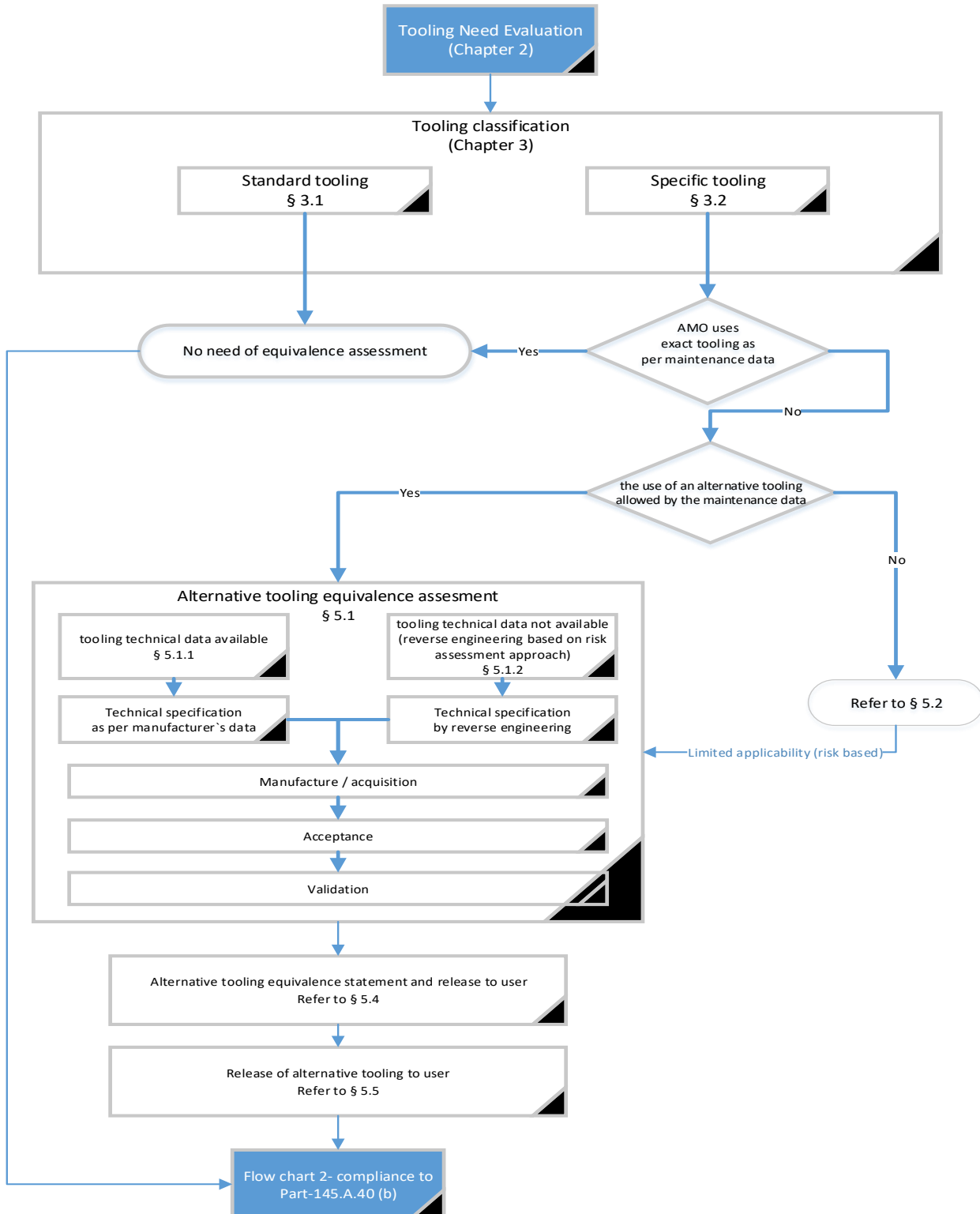
Note: Other requirements apply to the use of tooling within the maintenance organisation, which are however not intended to be covered in this user guide (e.g. after completion of all maintenance a general verification must be carried out to ensure the aircraft or component is clear of all tools, use of personal tools, etc.).





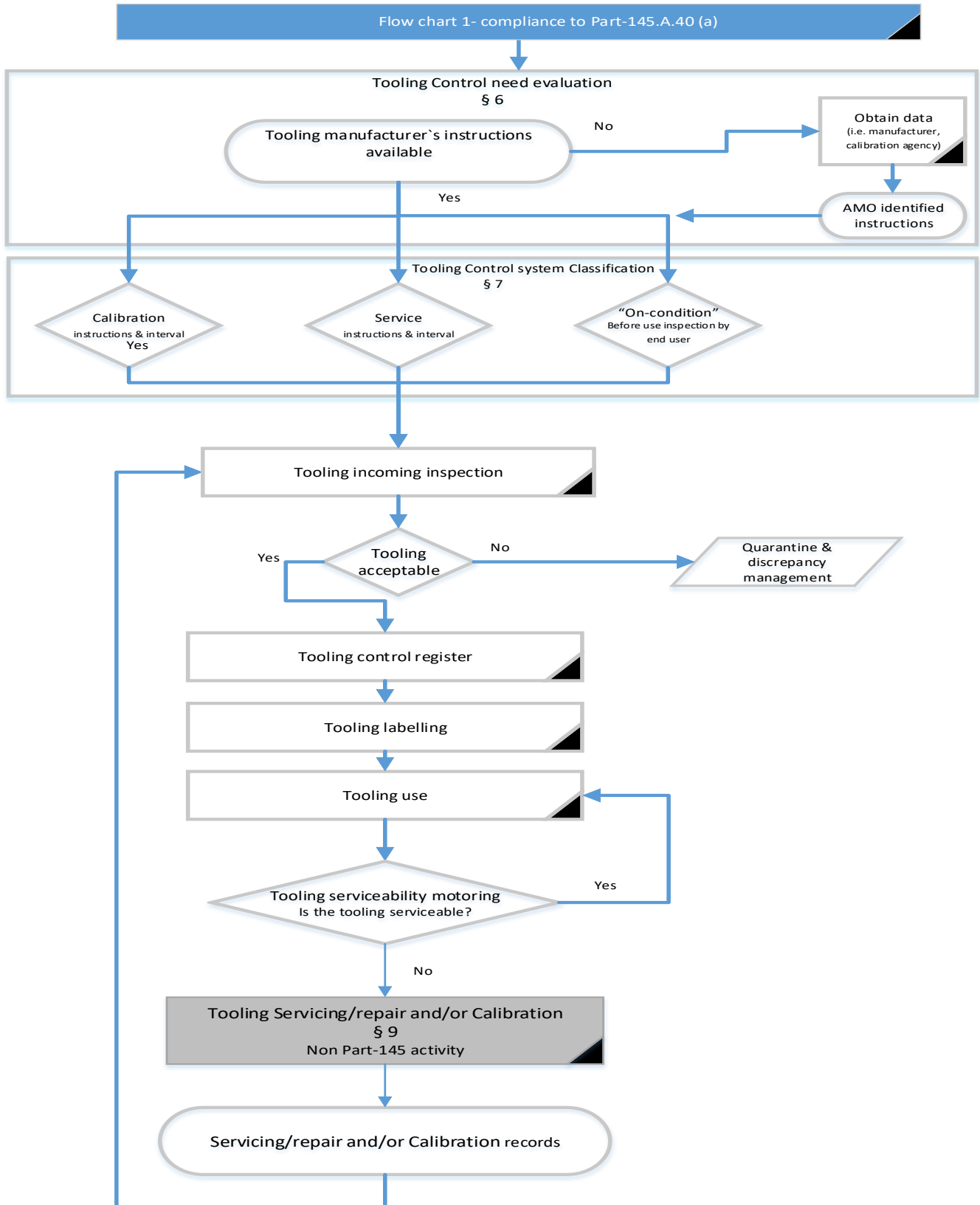


Flow chart 1- compliance to Part-145.A.40 (a)





Flow chart 2- compliance to Part-145.A.40 (b)





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## 2. Tooling need evaluation





As mentioned in Part-145 “once the applicant for an initial approval or for a change of an approval has determined the intended scope of approval for consideration by the competent authority, it will be necessary to show that all tools and equipment as specified in the maintenance data<sup>1</sup> can be made available when needed”.

This demonstration is to be achieved with a “**tooling need evaluation**” which consist in:

- Identifying, classifying and listing all tooling required to perform the intended scope of work by analyzing the maintenance tasks;
- Identifying and listing the tooling that is permanently available in the maintenance organisation and those that are leased or loaned<sup>2</sup>; in the case of tooling which is not permanently available (limited to infrequently used ones), the maintenance organisation needs to ensure that they can be made available when needed (a contract is an acceptable way for demonstration);
- Demonstrating that the tooling in use is the one specified by the maintenance data or in the case the maintenance organisation is using alternative tooling, as agreed by EASA through an MOE procedure, such tooling has been assessed to be equivalent.

<sup>1</sup> The AMC 145.A.45 (b) indicates which maintenance data is to be considered applicable under the rating (e.g. Aircraft maintenance manual, non-destructive testing manual, component maintenance manual, service bulletin, etc.).

<sup>2</sup> In the case of leased or loaned tooling it remains the responsibility of the maintenance organisation using the tooling to make sure the tooling complies with EASA Part-145 and therefore this UG also applies in such cases.





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### 3. Tooling classification





For the purpose of this user guide, due to the need to have different level of tooling assessment depending from the related complexity, the tooling is classified in the following categories:

- Standard Tooling;
- Task Specific Tooling.

### 3.1. Standard tooling

Standard tooling are those tools and equipment not being of exclusive use in the aviation industry (e.g. being commercially available) and being generically identified by the maintenance data by type and/or family and/or characteristics.

The following examples extracted from maintenance data are considered to be “standard tooling”:

- ladder, access platform 4m, screw driver, standard wrench, protective cover, circuit breaker safety clip, syringe, nitrogen bottle charged to 3000 psi, caps and plugs, grease gun, container suitable for oil (4 Liters), etc.;
- Multimeter  $\pm 5\%$  accuracy used to measure 115 V, 28 V, and 28 volts DC; Torque wrench 0 to 300 inch•pounds / 0 to 33.9 Nm; Pressure Gage, 800 to 2500 PSIG.; Hydraulic jack nose gear, minimum capacity 10.000 daN (22480.89 lbf); Portable Hydraulic Cart, Capable of 3000 PSI and a minimum flow of 50 GPM, etc.;

Note: the values mentioned above are not intended to be used as parameters defining the standard tooling. These values are only typical examples extracted from the maintenance data.

### 3.2. Task specific tooling

Task Specific tooling<sup>3</sup> are those tools and equipment designed for the particular Aircraft/Engine/Component/NDT/etc. maintenance task and specifically identified in the maintenance data (e.g. by P/N, vendor and description). The following examples extracted from maintenance data are considered to be “Task Specific Tooling”:

- MLG wheel adapter, P/N J32032-22, vendor:81205;
- pin - Locking, Valve, Hydraulic Reservoir Pressurization Shutoff (Part #: A29002-6, Vendor: 81205, A/C Effectivity);
- jack adapter-fuselage, reference 98D07013500000;
- temperature switch tool, P/N 622, vendor: Desco Cort, Walnut, CA;
- oil service dispenser, Malabar WF150-1;
- A10444 tire removal machine;
- analyzer - Databus, Datatrac Models 600, 650, 650H (Part #: 01-1405-00, vendor: 41364);
- dolly wheel/brake change P/N 175, vendor 94861;
- jack Axle, 8398-012, 65 Ton, Regent Manufacturing, vendor 02708;
- GFCI Tester - AC Hydraulic Pump (Part #: J24014-24, vendor: 81205);
- adapters – air data system flushing, reference 98D34103002000;
- adaptor-charging pitot probe, reference 36122;
- standby compass calibration, reference 2591553-903.

<sup>3</sup> When the maintenance organisation is using an automated bench test operated by software, the maintenance organisation is responsible to ensure that the software complies with the CMM requirements at the latest revision.





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## 4. Use of tooling





On the basis of the tools classification given in the previous chapter of this User guide, the maintenance organisation may use tooling, as detailed below.

#### 4.1. Use of “Standard tooling”

For “standard tooling” the assessment of the particular tool or equipment to be used starting from the information given in the maintenance data is self-explanatory and the end user<sup>4</sup> (e.g. technician, certifying staff, etc.) should have the necessary knowledge in order to determine, before starting the maintenance task, that the tooling is adequate to perform the intended work and a formalized equivalence assessment is not required. However, the maintenance organisation may decide to develop such an equivalence assessment if deemed useful.

#### 4.2. Use of “task specific tooling”

When dealing with a “task specific tooling”, the maintenance organisation may proceed according to one of the following options to:

- a) acquire/use the “task specific tooling” as indicated by the maintenance data (exact P/N, vendor) and in such case, there is no need of any further equivalence assessment<sup>5</sup>;  
Note: when the maintenance data itself identifies for the same task a main tooling plus other(s) possible(s) substitute(s), the maintenance organisation may use the main or the substitute tooling without any need of further equivalence assessment.
- b) acquire/use a different tooling<sup>6</sup> from the one specified in the maintenance data. Such replacement tooling is defined, in this user guide, as “**alternative tooling**” and may be used only subject to compliance with the conditions specified in the following chapter “alternative tooling equivalence assessment” of this user guide.

4 The end user is intended to be the person formally authorised by the maintenance organisation to perform and sign-off the maintenance task for which the tooling is to be used.

5 The maintenance organisation remains however responsible for the acquisition, acceptance, identification, control or calibration of the tools according to EASA Part-145 requirements and its MOE procedures

6 This option may be considered for various reason (e.g. the tool specified is not available in the necessary time frame, another tool is already available in the maintenance organisation, etc.)







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## 5. Alternative tooling equivalence assessment





### 5.1. Maintenance data allowing the use of alternative tooling

The maintenance data are normally providing clear statements on the cases where alternative tooling to the one specified may be used<sup>7</sup>. Only when this possibility is given in the maintenance data, the maintenance organisation is entitled to proceed with an equivalence assessment process in order to use alternative tooling. Alternative tooling may be obtained by different means<sup>8</sup>, however, regardless of the type of acquisition process, the two possibilities given in the following paragraphs have to be considered by the maintenance organisation.

#### 5.1.1. The tooling technical data is available

Tooling technical data may be considered acceptable when:

- the maintenance data (AMM, CMM, etc...) already includes such data (e.g. manufacturing drawing, technical characteristics, manufacturing procedure, etc.), or;
- the maintenance organisation obtains additional data (e.g. manufacturing drawings, etc.) from the relevant manufacturer (may be the applicable TCH, STCH, OEM or the tool manufacturer which is specified in the maintenance data of the product or component being maintained).

In both cases the following minimum steps shall be considered and described in the MOE:

- **Technical Specification:** engineering document establishing:
  - the technical characteristics of the tooling to be acquired/manufactured to demonstrate it is in conformity to the relevant technical data (e.g. dimensions, material, functions, accuracy, etc.), and;
  - the applicable inspection/service/calibration need (refer to chapter 7 of this user guide for definitions);
- **Manufacture/acquisition:** process in use to manufacture the tool and/or to acquire it from any internal or external source;
- **Acceptance:** incoming inspection process to verify the tooling meets the requirements established in the Technical Specification and is identified accordingly;
- **Validation:** practical demonstration (e.g. functional check, etc.) that the alternative tool is capable of correctly performing the relevant maintenance task;
- **Alternative tooling equivalence statement:** the satisfactory completion of the process mentioned above is finalized with a formal approval by the maintenance organisation, as described in paragraph 5.4 “Alternative tooling equivalence statement” of this user guide;
- **Release to user:** process describing how the user is informed of the use of alternative tooling, as described in paragraph 5.5 “release to user” of this user guide.

<sup>7</sup> May be in the “front matter” of the aircraft maintenance manual, in a specific tools/equipment manual when published, in the TCH aircraft maintenance task card manual, in the special tools section of the component maintenance manual, etc. A declaration or other data from the tooling manufacturer stating that its tooling is equivalent or may be used in lieu of a tooling specified by the CMM (or AMM, etc.) is not sufficient to consider such tooling an equivalent alternative, unless such tooling manufacturer is also the OEM issuing the CMM (or TCH issuing the AMM, etc.);

<sup>8</sup> Internal or external manufacture, purchase from an external provider not being identified by the manufacturer, loan, use of an already available tool approved for another product or component, etc.





### 5.1.2. *The tooling technical data is not available*

This case applies when no acceptable tooling technical data, is available to establish conformity of an alternative tooling.

The maintenance organisation, may still intend in this situation to use an alternative tooling, applying its engineering judgment through a reverse engineering approach.

The main driver to evaluate the applicability of this option is a **risk based approach** that shall be considered by the maintenance organisation on a case by case basis. This option is to be limited to the cases where the use of the alternative tooling does not affect the content and sequence of the maintenance task. Moreover, the use of an alternative tooling shall be assessed by the organisation to be of low risk for the overall performance of the maintenance. The low risk assessment needs to be demonstrated and documented by a detailed engineering analysis.

The following minimum steps needs to be described in the MOE:

- **Technical Specification:** engineering document establishing:
  - the technical characteristics of the tool to be acquired/manufactured based on a reverse engineering approach (e.g. dimensions, material, functions, accuracy, etc.) to demonstrate it is equivalent to the one specified in the maintenance data of the product or component being maintained, and;
  - the applicable inspection/service/calibration need (refer to chapter 7 of this user guide for definitions);
- **Manufacture/acquisition:** process in use to manufacture the tool and/or to acquire it from any internal or external source;
- **Acceptance:** incoming inspection process to verify the tooling meets the requirements established in the Technical Specification and is identified accordingly;
- **Validation:** practical demonstration (e.g. functional check, etc.) that the alternative tool is capable of correctly performing the relevant maintenance procedure;
- **Alternative tooling equivalence statement:** the satisfactory completion of the process mentioned above is finalized by a formal approval by the maintenance organisation, as described in paragraph 5.4 “Alternative tooling equivalence statement” of this user guide;
- **Release to user:** process describing how the user is informed of the use of alternative tooling, as described in paragraph 5.5 “release to user” of this user guide.





### 5.2. Maintenance data not stating the possibility to use alternative tooling.

There are cases, where the maintenance data neither allows nor prohibit the use of alternative tooling. In those cases, the maintenance organisation may either:

- Acquire the specific tooling P/N by the identified vendor (s), or;
- Request a revision of the maintenance data directly to the TCH or STCH or ETSO holder to include the alternative tooling proposed by the maintenance organisation before its use.

However, the use of an alternative tooling maybe still acceptable in limited circumstances. The main driver to evaluate the applicability of this option is a **risk based approach** that shall be considered by the maintenance organisation on a case by case basis. This option is to be limited to the cases where the use of the alternative tooling does not affect the content and sequence of the maintenance task. Moreover, the use of an alternative tooling shall be assessed by the organisation to be of low risk for the overall performance of the maintenance. The low risk assessment needs to be demonstrated and documented by a detailed engineering analysis.

For this case the MOE procedure developed in compliance to paragraphs 5.1. of this User Guide, can be used with the additional requirement of notification to the TCH/STCH about the use of the alternative tooling.

### 5.3. Personnel dedicated to the alternative tooling equivalence assessment

The alternative tooling equivalence assessment is considered to be a complex engineering task and in order to be allowed to follow this process, the maintenance organisation shall have staff assigned to this activity who needs to be appropriately qualified according to an MOE procedure acceptable to the competent authority.

In addition, the compliance monitoring function has to be involved in this process, at least but not necessarily limited to the following:

- definition of the job description and qualification requirements for the above staff;
- competency assessment and issuance of the related individual authorizations;
- definition of the forms and procedures to be used;
- inclusion of this area of activity in the independent audit plan.

#### 5.3.1. Alternative tooling in the NDT activity

In the case of tools related to NDT activity (e.g. ultrasonic probes, etc.), only a person qualified as NDT level III on the relevant method can determine if an alternative tool is equivalent to the one specified by the maintenance data. Therefore, in this case, the equivalence assessment shall be signed by an NDT level III.

### 5.4. Alternative tooling equivalence statement

The successful completion of the process related to establishing that an alternative tooling is equivalent to the one specified in the maintenance data, needs to be formally documented in a form to be included in the MOE Part 5.1 "sample of documents". This Form shall include:

- the reference to the maintenance data requiring the tooling;
- the identification of the tooling as given by the maintenance data;
- the identification of the alternative tooling to be used by the maintenance organisation;
- the reference to technical specification which has been developed by the maintenance organisation to acquire/manufacture the alternative tooling;
- a statement that the alternative tooling is equivalent to the one specified by the maintenance data;
- Identification/signature of the person performing the assessment;

*Note: the form described above need to be kept on-file 3 years after the tool has been permanently withdrawn from service by the maintenance organisation.*





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### 5.5. Release of alternative tooling to user

Updated documentation on the alternative tooling shall be provided to the user. In particular, a system shall be in place so that maintenance staff can easily identify the alternative tooling to be used as replacement of the one identified in the maintenance data (e.g. by information provided in the maintenance task card, or by developing modified maintenance data, or in a system that can provide the same level of information and traceability).





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## 6. Tooling control need evaluation





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As required by Part-145, the maintenance organisation shall ensure that “all tools, equipment and particularly test equipment, as appropriate, are controlled and calibrated according to an officially recognized standard at a frequency to ensure serviceability and accuracy”

In order to comply with this requirement, the maintenance organisation shall, for any tooling in use, identify the related inspection/service/calibration needs.

This “**tooling inspection/service/calibration need evaluation**” must be carried out at any application for initial or extension of an EASA Part-145 approval or each time a certain type of tooling (P/N) is entering the maintenance organisation for the first time. This includes tooling that are infrequently used and leased or loaned by the maintenance organisation in order to ensure their availability at the time the maintenance is to be performed.

This will allow the maintenance organisation to ensure/demonstrate that the need of inspection, service and calibration for the tooling required to perform the intended scope of work has been considered.





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## 7. Tooling control system classification







For the purpose of this user guide, the tooling control processes are classified in the following groups having different control requirements in order to establish serviceability:

- On Condition;
- Service;
- Calibration;

The main driver for establishing in which group a certain tooling should be entered depends on the applicable requirements defining the serviceability.

This information is normally given by the tooling manufacturer instructions, when published.

In the absence of such data, it is the responsibility of the maintenance organisation to retrieve the necessary documentation (e.g. by the tooling manufacturer, a calibration agency, etc.).

### 7.1. On Condition

Tooling which requires a visual inspection prior to each use.

The following examples are normally considered to be “on-condition tooling”:

- Simple tooling (including task specific tooling as defined by paragraph 3.2 “task specific tooling” of this User Guide) which are not used for measuring purposes: LDG lock pin, LDG adapters, wheel dolly, screw driver, standard wrench, ladder, etc.;

### 7.2. Service

Tooling which requires:

- a visual inspection prior to each use, and;
- servicing at established frequency.

The following examples are normally considered to be “tooling subject to servicing”:

- Portable Hydraulic pump, grease gun, movable platforms, etc.

### 7.3. Calibration

Tooling which requires:

- a visual inspection prior to each use, and;
- calibration at established frequency and, when applicable, servicing.

ISO 10012 states that the measuring equipment metrological characteristics (MEMC) are often determined by calibration. This means that calibration is related to the determination of metrological characteristics of measuring tools and equipment.

The following examples are normally considered to be “tooling subject to calibration”:

- all precision tooling used for measuring purposes according to maintenance data tasks, such as: multimeter, torque wrench, manometer, test benches, etc.

There are some precision and other tools that require adjustments and maintenance to ensure proper functioning but not used for measurements. Consequently, calibration in such cases is not necessary .





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## 8. Tooling control management





The tooling control management system is composed by the following minimum elements:

- incoming inspection system;
- control register;
- labelling system;
- serviceability monitoring system;

### 8.1. Incoming inspection

The purpose of the tooling incoming inspection system is to verify the tooling meets all applicable standards.

The satisfactory result of the incoming inspection allows to proceed with the entry of relevant data in the control register as described in the following paragraph “Control register” of this User Guide.

The unsatisfactory result of the incoming inspection, requires to consider the tooling as unserviceable and to quarantine it in order to avoid its use until any identified problem is solved.

In addition, particular attention is needed during receiving inspection of calibrated tooling. The following minimum elements shall be verified by the maintenance organisation:

- calibration laboratory meets the MOE specified requirements (e.g. accreditation of the laboratory, etc.). In the case of accredited laboratories, this also includes verification that the accreditation of the laboratory is valid (e.g. proof of accreditation on file, etc.) and its scope of accreditation specifically covers the intended calibration activity;
- calibration certificate includes:
  - standard used for the specific calibration (e.g. EN/ISO 837-1 for the calibration of pressure gauges);
  - traceability to master instrument used for calibration;
  - measurement/calibration results;
  - person(s) performing the calibration;
  - where applicable, reference to any accreditation hold by the laboratory;
- conformity to the calibration order (ref. par. 9.2.2) sent to the laboratory (availability of a confirmation that calibration results are within acceptable limits is expected as part of the incoming inspection process).

### 8.2. Control register

The purpose of the control register is to maintain the inventory and status of all the tooling in use by the maintenance organisation.

The system in use shall be able to provide the following minimum information:

- At the level of tooling P/N (family):
  - identification of the tooling P/N and description;
  - classification of the tooling control system as defined in the previous chapter 7 “tooling control system classification” of this User guide ;
  - identification of the reference instruction/ to be used for the inspection, servicing or calibration;
  - identification of the servicing or calibration intervals where applicable;





- At the level of each specific tool S/N:
  - identification of tooling S/N;
  - location within the maintenance organisation (e.g. wheels workshop, Line stations, hangar, line maintenance);
  - status (e.g. serviceable, unserviceable, scrapped, sent for calibration, loaned, etc.).

The tooling control register can be in the form of a paper or electronic system (e.g. electronic list, database, etc.), as appropriate depending from the size and complexity of the maintenance organisation. In particular, where for a small component workshop a simple paper or electronic list could be acceptable, for a major maintenance organisation having several workshops, line station, hangar, a database should be expected, which is capable to manage the complexity of the information and can be accessed from different locations.

### 8.3. Labelling

The purpose of the tooling labelling system is to:

- indicate to the end users that the item is within any inspection or service or calibration time-limit, and;
- formally declare the tooling serviceability status.

The labelling system in use has to be adapted to the tooling type and working condition to ensure the information displayed remains at any time legible. After the labelling, the tooling enters the maintenance process and remains in serviceable condition subject to the serviceability monitoring system.

It is not the intent of this User Guide to describe the tooling labelling system. For further guidance on this matter refer to the MOE User Guide, Foreign Part-145 UG.CAO.00024-XXX, chapter 2.4 “Acceptance of Tools and Equipment”.

### 8.4. Serviceability monitoring

The purpose of the serviceability monitoring is to ensure that the status of any tooling is controlled by the maintenance organisation so that a tooling is:

- segregated when in unserviceable<sup>9</sup> condition;
- sent for inspection/service/calibration when reaching any applicable due date;
- sent for repair when necessary;

The maintenance organisation shall ensure that any servicing or calibration interval required by the tooling manufacturer is complied with. This interval may be modified where the maintenance organisation can show by results that a different time period is appropriate in a particular case.

Additional serviceability verifications, such as for example torque wrench verification by a master torque tester, can be used to support the modification of the calibration intervals but does not supersede the requirement for calibration of the tools.

<sup>9</sup> The unserviceable condition may occur for several reasons:

- due to an incident which requires a repair to the tooling; or
- due to reaching the inspection/servicing due date (for “service” or “calibration” tooling); or
- due to reaching the calibration due date (for “calibration” tooling); or
- due to phase-out, etc.;





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This process has to be done in accordance with an MOE procedure approved by the competent authority. However, when a servicing/calibration interval is recommended or required to be reduced based upon the servicing/calibration results, such change is to be systematically and immediately implemented by the maintenance organisation.

It is not the purpose of this User Guide to describe the tooling serviceability monitoring system. For further guidance on this matter refer to the Foreign Part-145 UG.CAO.00024-XXX, MOE User Guide chapter 2.5 “Calibration of Tools”.





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## 9. Tooling Servicing/Repair and/or Calibration





Part-145 regulation states that the maintenance organisation “shall ensure that all tools, equipment and particularly test equipment, as appropriate, are controlled and calibrated according to an officially recognized standard”.

However, performing tooling servicing, repair and calibration is NOT an EASA Part-145 privilege, and the activities described in the following paragraphs 9.1 “Tooling servicing/repair” and 9.2 “Tooling Calibration”, are formally outside the EASA Part-145 remit.

The intent of these paragraphs is to describe how the maintenance organisation may adequately discharge its responsibilities.

The “tooling service provider(s)” which carry out those activities have to be identified in a list under the control of the [compliance monitoring](#) function referred in the MOE chapter 2.4 (refer to the MOE User Guide, Foreign Part-145 UG.CAO.00024-XXX).

Any tooling related service provider (e.g. service, repair and calibration) is expected to meet the applicable requirements of this chapter.

### 9.1. Tooling servicing/repair

The repair and/or servicing process is to be carried out ensuring the following minimum requirements:

- The activity is done according to the tooling manufacturer’s instruction, and;
- A record is kept on file by the maintenance organisation for each tooling, providing evidence of:
  - the expected servicing activities to be performed and related frequency, and;
  - servicing accomplishment to demonstrate that content and frequency requirements are met, and;
  - any repair carried out, including replacement of parts, and;
  - the indication of “tooling service provider” which has carried out such activities.





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## 9.2. Tooling calibration

### 9.2.1. Definitions

**Accreditation bodies:** there are many accreditation bodies that provide third-party laboratory accreditation, such as National and Regional Accreditation Bodies (NRAB, RAB). The International Laboratory Accreditation Cooperation (ILAC) establishes a global network for accreditation of laboratory and testing facilities. Signatories to the ILAC MRA are in full conformance with the standards of ISO 17011/IEC “Conformity assessment — General requirements for accreditation bodies accrediting conformity assessment bodies”.

**Accredited Laboratory:** means a laboratory which is accredited by an accreditation body.

**BIPM:** The International Bureau of Weights and Measures is the intergovernmental organization established by the Metre Convention, through which Member States act together on matters related to measurement science and measurement standards. The BIPM web site lists the National Metrology Institutes (NMI) from its Member States and Associate States and Economies that are signatory to the CIPM Mutual Recognition Arrangement (CIPM MRA see BIPM website).

**CIPM:** The International Committee on Weights and Measures. The CIPM is the governance body for the BIPM.

**CIPM MRA:** The CIPM MRA is the framework through which NMIs demonstrate the international equivalence of their measurement standards and the calibration and measurement certificates they issue. The outcomes of the CIPM MRA are the internationally recognized Calibration and Measurement Capabilities (CMCs) of the participating institutes. Participating NMIs are required to take part in regular "key comparisons" of national measurement standards and have their CMC claims validated through the peer review process of the CIPM MRA. This process also includes the approval of the laboratory [compliance monitoring](#) system for conformance with ISO/IEC 17025. CMCs and supporting technical data are publicly available from the CIPM MRA database (KCDB see BIPM website), which is operated by the BIPM.

**ISO/IEC 17011** Conformity assessment - General requirements for accreditation bodies accrediting conformity assessment bodies.

**ISO/IEC 17025** - General requirements for the competence of testing and calibration laboratories

**ISO 10012** - Measurement management systems - Requirements for measurement processes and measuring equipment

**ILAC:** International Laboratory Accreditation Cooperation. In addition to promoting mutual acceptance of measurement results and calibration or test certificates between its members, ILAC also promotes the acceptance of accredited test and calibration data by regulators and governments.

**Laboratory:** means an entity performing tooling, equipment and test equipment calibration

**Metrological traceability:** property of a measurement result whereby the result can be related to a reference through a documented unbroken chain of calibrations, each contributing to the measurement uncertainty.

**MRA:** Mutual Recognition Arrangement.

**NMI:** National Metrology Institutes have the responsibility of maintaining the national measurement standards and provide metrological traceability.

### 9.2.2. Calibration requirements







In order to comply with Part-145 the maintenance organisation shall ensure that:

- (a) Tooling requiring calibration is periodically calibrated in accordance with the tool manufacturers' published standards and recommendations.
- (b) Where no recommendations for calibration are published or where the calibration methods or standards are not specified, calibration is carried out in accordance with the requirements of the ISO 10012. This standard details both the generic requirements and guidance for the implementation of measurement management systems.

Based on the evaluation above the applicable requirements shall be clearly specified in a calibration order sent to the calibration laboratory together with the tooling, including any relevant specific requirements/information (e.g. tool incidentally damaged or specific accuracy requirements contained in the A/C, engine, CMM or tooling manufacturer instructions, etc.).

When using tooling requiring test, calibration or measurement, a maintenance organisation shall ensure that the calibration or measurement interval required by the tooling manufacturer is complied with. This process is detailed in paragraph 8.4 "serviceability monitoring" of this user guide.

### 9.2.3. Selection of the calibration provider

When selecting a calibration provider the maintenance organisation shall ensure that the provider falls into one of the cases below provided that the MOE chapter 2.5 "Tools Calibration" is reflecting those cases.

### 9.2.4. Calibration in "acceptable" laboratories

Tooling shall be calibrated by any of the following laboratories:

- (a) a NMI whose scope specifically covers the intended calibration (scope means the services covered by the CIPM MRA and can be viewed in Appendix C of the BIPM KCDB including the range and uncertainty for each listed service; refer to "kcdb.bipm" website), or;
- (b) a calibration laboratory accredited to ISO/IEC 17025 by an accreditation body which is signatory of the ILAC MRA (Full Members) or an ILAC Recognised Regional Cooperation Body (Signatories and Recognised Regional Cooperation Bodies are listed on ILAC Membership website), where the scope of accreditation specifically covers the intended calibration, or;
- (c) original tool manufacturer identified in the approved maintenance data, provided it is supported by a calibration or accuracy statement, or;
- (d) calibration entity<sup>10</sup> which is acceptable in an EASA POAH or Production Organisation under bilateral agreement with the EU. This option is limited to tooling which are the ones specified by the maintenance data (not applicable to alternative tools in use by the production organisation)

### 9.2.5. Interpretation of calibration standards

The term "standard" used in 145.A.40(b) has different meanings depending on the context in which the term used.

With this regard 145.A.40(b) requires that certain tools shall be controlled and calibrated according to an "officially recognised standard". It also requires that records of such "calibration and traceability to the standard used shall be kept".

<sup>10</sup> this case applies to particular situations where the maintenance organisation is also a production organisation





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Concerning tools and equipment AMC 145.A.40(b)1 explains that a register should be maintained together with record of calibration and “standards used”.

Simultaneously, AMC 145.A.40(b)3 clarifies that “an officially recognised standard means those standards established or published by an official body”.

It should be noted that ISO 10012 (in relation to “traceability”) states that the management of the metrological function shall ensure that all measurement results are “traceable to SI<sup>11</sup> unit standards”. Therefore, in this context the term “standard” used by AMC 145.A.40(b)1 is related to a specific measuring tool used for calibration to ensure traceability to an SI unit standard.

However, the term “standard” used by AMC 145.A.40(b)3 is related to a document (e.g. an ISO Standard) established or published by an official body.

Maintenance organisations are expected to ensure that the term “standard” is properly used in the MOE taking into consideration the above described two different meanings.

<sup>11</sup> International System of Units

