



Foreign Part 145 approval
Tools and Equipment

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UG.CAO.00132-001
14/12/2015

Foreign Part-145 approvals - Tools & Equipment

UG.CAO.00132-001

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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
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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
IOSRS	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 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 comes into effect 90 days after publication on the EASA website. However, with regards to chapter 10.2 Tooling calibration, a transition period of 24 months is given with regards to the need to perform tooling calibration in an ILAC Accredited Laboratory. However, during the transition period the maintenance organisation Quality System shall comply with chapter 10.2.4 “calibration in non-accredited laboratories” and should demonstrate having initiate the process to ensure that the maintenance organisation calibrated tool will be within the above time frame calibrated in an ILAC accredited laboratory.

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 organisation are made available on the EASA Web site:

<http://easa.europa.eu/easa-and-you/aviation-domain/aircraft-products?page=foreign-part-145-organisations>

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.





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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).

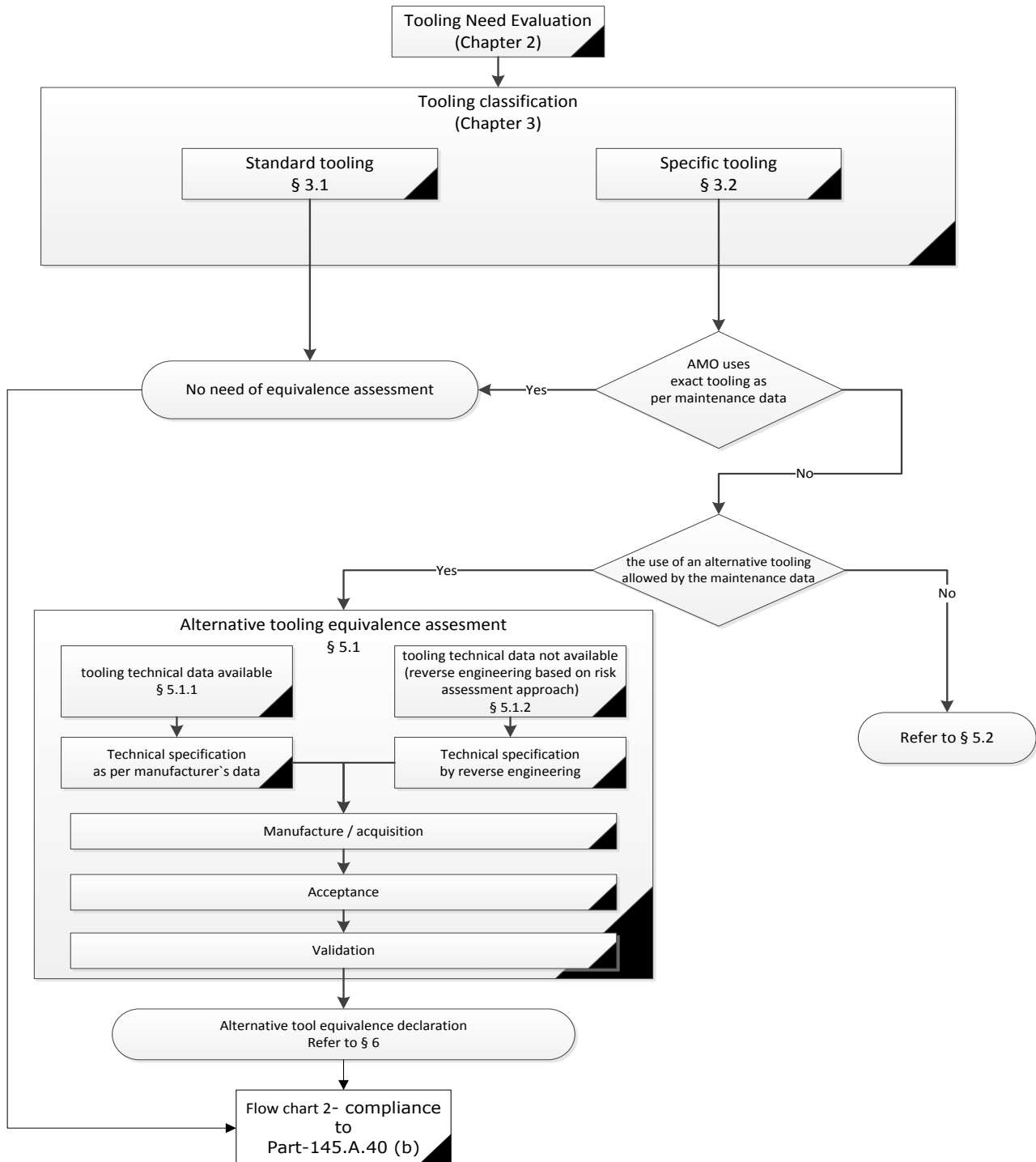
For the purpose of this user guide the term “**tooling**” is used to indicate any tool or equipment. The maintenance organisation may vary in the terminology used to define and classify the tooling; therefore, adherence to any particular designation shown in this user guide may not match each maintenance 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 (i.e. after completion of all maintenance a general verification must be carried out to ensure the aircraft or component is clear of all tools as required by M.A.402, use of personal tools, etc.)



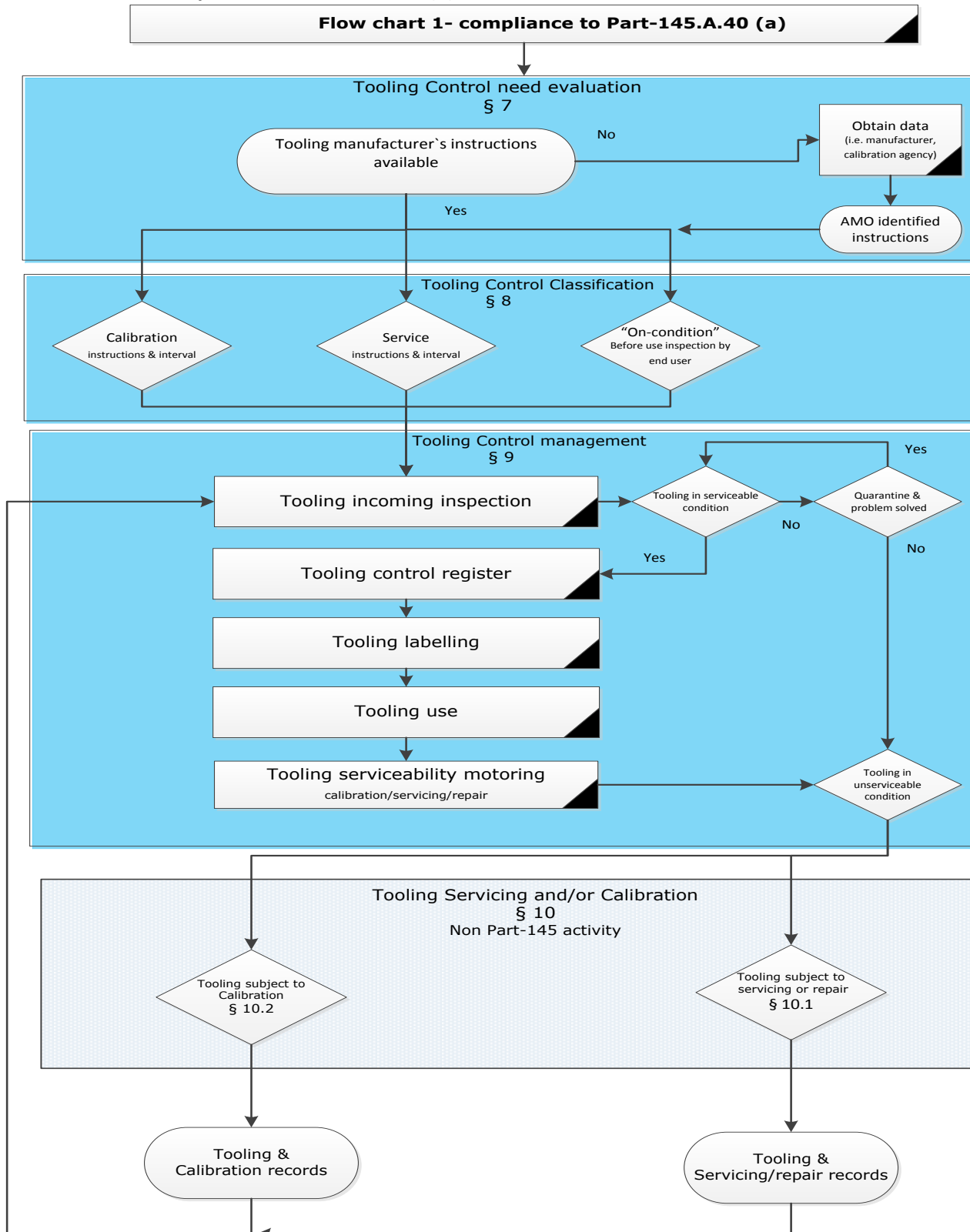


Flow chart 1- compliance to Part-145.A.40 (a)





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





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2. Tooling need evaluation





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As mentioned in AMC 145.A.40 (a), “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 data¹ 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 analysing the maintenance tasks;
- Identifying and listing the tooling that is permanently available in the maintenance organisation and those that are leased or loaned²; 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, such tooling has been assessed to be equivalent.

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

² 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





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For the purpose of this user guide, due to the need to have different level of tooling assesment 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 (i.e. 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 tooling³ are those tools and equipment designed for the particular Aircraft/Engine/Component/NDT/etc. maintenance task and specifically identified in the maintenance data (i.e. by P/N, supplier and description). The following examples extracted from maintenance data are considered to be “Task Specific Tooling”:

- MLG wheel adapter, P/N J32032-22, supplier:81205;
- pin - Locking, Valve, Hydraulic Reservoir Pressurization Shutoff (Part #: A29002-6, Supplier: 81205, A/C Effectivity);
- jack adapter-fuselage, reference 98D07013500000;
- temperature switch tool, P/N 622, supplier: 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, Supplier: 41364);
- dolly wheel/brake change P/N 175, supplier 94861;
- jack Axle, 8398-012, 65 Ton, Regent Manufacturing, vendor 02708;
- GFCI Tester - AC Hydraulic Pump (Part #: J24014-24, Supplier: 81205);
- adapters – air data system flushing, reference 98D34103002000;
- adaptor-charging pitot probe, reference 36122;
- standby compass calibration, reference 2591553-903.

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





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4. Use of tooling





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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 user⁴ (i.e. 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, supplier) and in such case, there is no need of any further equivalence assessment⁵;
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 tooling⁶ 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 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 (i.e. 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





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The possibility to use “alternative tooling” requires a previous verification in the maintenance data of the product or component being maintained. The maintenance organisation will have to proceed differently depending if:

- (a) the Maintenance data is allowing the use of “alternative tooling”⁷ : proceed to § 5.1 “ maintenance data allowing the use of alternative tooling” of this user guide;
- (b) the Maintenance data is not allowing or not clearly stating the possibility to use “alternative tooling: proceed to § 5.2 “maintenance data not allowing or not clearly stating the possibility to use alternative tooling” of this user guide.

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 used⁸. 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 means⁹, however, regardless of the type of acquisition process, the two possibilities given in the following chapters 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 (i.e. manufacturing drawing, technical characteristics, manufacturing procedure, etc.), or;
- the maintenance organisation obtains additional data (i.e. 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 (i.e. dimensions, material, functions, accuracy, etc.), and;
 - the applicable inspection/service/calibration need;
- **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 (i.e. functional check, etc.) that the alternative tool is capable of correctly performing the relevant maintenance task;
- **Alternative tooling equivalence declaration:** The satisfactory completion of the process mentioned above, is finalized by the formal approval by the maintenance organisation, using a form as described in chapter 6 “alternative tolling alternative statement” of this user guide.

⁷ A declaration or other data from the tooling manufacturer stating that its tooling is equivalent to 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);

⁸ 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.

⁹ 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.





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5.1.2. The tooling technical data is not available

This case applies when no acceptable tooling technical data, as defined in the previous chapter 5.1.1 “tooling technical data available” of this user guide, 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 of the maintenance task in terms of sequence and performance of the maintenance, in which case the chapter 5.2 (bullet 2 or 3) “Maintenance data not allowing or not clearly stating the possibility to use alternative tooling” of this user guide applies.

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 (i.e. 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;
- **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 (i.e. functional check, etc.) that the alternative tool is capable of correctly performing the relevant maintenance procedure;
- **Alternative tooling equivalence declaration:** The satisfactory completion of the process mentioned above is finalized by the formal approval by the maintenance organisation, using a form as described in chapter 6 “Alternative tooling equivalence statement” of this user guide.

5.2. Maintenance data not allowing or not clearly stating the possibility to use alternative tooling.

There are cases, where the maintenance data does not allow or does not clearly states that alternative tooling may be used. 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, or;
- request an approval for deviation to the maintenance data. Such deviation needs to be in the form of a new approved data (i.e. data issued by an appropriately approved EASA Part-21 DOA or under the conditions defined in bilateral agreements between the Community and the competent authority of a third country). Such request should be typically addressed to the TCH¹⁰ or STCH or ETSO holder or if this is not possible, to any other appropriately approved EASA Part-21 DOA.

¹⁰ It has to be noted that an e-mail or letter from the TCH or STCH or ETSO cannot be considered as approved data





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6. Alternative tooling equivalence statement





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6.1. Recording of the alternative tooling equivalence assessment

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 to meet the following minimum requirements:

- The assessment has to be recorded in a form (to be included in the **MOE Part 5.1** list of forms), which allows recording for each tool:
 - 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.
- A system shall be in place for the maintenance staff so they can easily identify the alternative tooling to be used as replacement of the one identified in the maintenance data (i.e. by information provided in the maintenance task card or in a tooling management system, etc.);

6.2. 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 follow this process, the maintenance organisation shall have staff assigned to this activity who needs to be appropriately qualified according to an MOE procedure to be acceptable by the competent authority.

In addition, the quality department has to be involved in this process, at least but not necessarily limited to the following:

- Defining the job description and qualification requirements for the above staff;
- issuing the related authorizations;
- Defining the forms and procedures to be used;
- Including this area of activity in the independent audit plan.

6.2.1. Alternative tooling in the NDT activity

In the case of tools related to NDT activity (i.e. 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





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7. Tooling control need evaluation





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As required by AMC 145.A.40 (b), 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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8. Tooling control classification





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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 (i.e. by the tooling manufacturer, a calibration agency, etc.).

8.1. 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 chapter 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.;

8.2. 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.

8.3. Calibration

Tooling which requires:

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

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, crimping tools, etc.





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9. Tooling control management





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

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

9.1. Incoming inspection

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

Particular attention shall be placed on the documents received with the calibrated tools refers to Chapter 10.2.2.4

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

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 chapter 9.2 “tool 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.

9.2. 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 8 “tooling control 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 (i.e. wheels workshop, Line stations, hangar, line maintenance);
 - status (i.e. serviceable, unserviceable, scrapped, sent for calibration, loaned, etc.).

The tooling control register can be in the form of a paper or electronic system (i.e. 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





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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.

9.3. 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.

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”.

After the labelling, the tooling enters the maintenance process and remains in serviceable condition subject to the serviceability monitoring system.

9.4. 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 unserviceable¹¹ condition;
- sent for inspection/service/calibration when reaching any applicable due date;
- sent for repair when necessary;

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](#), chapter 3.5 “Calibration of Tools”).

¹¹ 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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10. Tooling Servicing and/or calibration





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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 recognised standard”.

However, performing tooling servicing and calibration is NOT an EASA Part-145 privilege, and the activities described in the following paragraphs 10.1 “Tool Servicing” and 10.2 “Tooling Calibration”, are formally outside the EASA Part-145 remit.

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

Based on the above, the “tooling service provider” which carry out those activities has to be considered a supplier of services to the maintenance organisation under the control of the quality system (also refer to the MOE User Guide, Foreign Part-145 UG.CAO.00024-XXX, chapter 2.4 “acceptance of tools and equipment”).

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

When the tools are sent out for servicing and/or calibration the maintenance organisation shall issue a work order detailing the activity to be carried out and possible specific requirements/information (e.g. Tool incidentally damaged or specific accuracy requirements contained in the A/C, engine, CMM or tooling manufacturer instructions)

10.1. Tooling servicing

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;
- Servicing interval definition (to be developed)

- 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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10.2. Tooling calibration

10.2.1. Definitions

BIPM: The International Bureau of Weights and Measurements is a recognized authority that maintains a global list of National Metrology Institutes (NMI). The BIPM web site lists the NMI signatory countries that participate in the International Committee on Weights and Measurements (CIPM¹²). CIPM and ILAC work in close cooperation, as formalised by the signature of a Memorandum of understanding, stating that “The CIPM MRA and ILAC MRA are complementary. Their combination helps to provide confidence in the consistency of System of Units traceable measurements worldwide”.

Accreditation bodies: there are many accreditation bodies that provide third-party laboratory accreditation, such as National and Regional Accreditation Bodies (NAB, RAB). The International Laboratory Accreditation Cooperation (ILAC¹³) 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 “**Conformity assessment — General requirements for accreditation bodies accrediting conformity assessment**” bodies. For the purpose of this user guide, “**Accreditation bodies**” are only the signatories of the ILAC MRA.

Accredited Laboratory: means a laboratory which is accredited by an accreditation body. For the purpose of this User guide “**Accredited Laboratory**” are only the ones accredited by an “**Accreditation body**” which is signatory of the ILAC MRA.

CIPM: International Committee on Weights and Measurements

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 which does not fall within the above definition of “Accredited Laboratory” (being not accredited by an ILAC entity).

MRA: Mutual Recognition Arrangement.

NMI: National Metrology Institutes (NMI).

NAB: National Recognised Accreditation Body

RAB: Regional Accreditation Body

¹² The CIPM Mutual Recognition Arrangement (MRA) signatories can be found at www.bipm.org

¹³ ILAC MRA signatories can be found at www.ilac.org.





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10.2.2. General principles

10.2.2.1. Calibration interval

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 chapter 9 “serviceability monitoring” of this user guide.

This interval may be modified where the maintenance organisation can show by results that a different time period is appropriate in a particular case. This process has to be done in accordance with an MOE procedure approved by the competent authority.

In any case, any interval that is recommended or required to be reduced by the accredited laboratory based upon the calibration results is required to be systematically and immediately taken into account by the maintenance organisation.

10.2.2.2. Selection of the tooling service provider

When selecting a tooling service provider to perform testing, calibration or measurement the maintenance organisation shall ensure that the calibration laboratory can supply accurate and reliable results. This means that the selected laboratory is:

- Technically competent to perform the required test, calibration or measurement;
- Technically competent to produce precise, accurate test and calibration data;

10.2.2.3. Competency of the laboratory¹⁴

The technical competences addressed in the previous paragraph shall at least include the following criteria:

- traceability of measurements and calibrations to officially recognised standards;
- appropriate testing environment;
- technical competency of staff including qualifications, training and experience;
- validity and appropriateness of the methods;
- appropriate application of measurement uncertainty and appropriate sampling practices;
- use of suitable test equipment that is appropriately calibrated and maintained;
- accurate recording and reporting of data;
- competent handling and transportation of test items;
- robust quality assurance and quality control procedures

¹⁴ Using an Accredited ILAC laboratory or the original tool manufacturer, these criteria are considered as met.





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10.2.2.4. Incoming inspection

When receiving tooling which have been tested, calibrated or measured, the maintenance organisation shall comply with its “tooling incoming inspection” procedure (refer to paragraph 9.1 “incoming inspection” of this User guide).

Particular attention shall be placed on the documents received with the calibrated tools. This document shall include a minimum of information such as, but not limited to:

- Identification of the Accredited Laboratory (traceability to ILAC accreditation);
- Standard used for the specific calibration (i.e. EN/ISO 837-1 for the calibration of pressure gauges);
- Test results;
- Identification of specific method undertaken, results of measurement, details of the persons performing the calibration including authorisation details, etc...;
- Evaluation of the calibration results to verify if within acceptable limits.

Note: Except for alternate tooling, a tool delivered new only with the certificate of conformity issued by the original manufacturer does not need additional calibration unless otherwise indicated by the manufacturer.

10.2.3. Calibration in accredited laboratories

In order to comply with Part-145.A.40 (b) the maintenance organisation shall ensure that:

- (a) tooling are periodically calibrated in accordance with the 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.

Both (a) and (b) above shall require the tooling to be calibrated in a test laboratory accredited to the ISO/IEC 17025 standard, by an accreditation body acceptable to the European Aviation Safety Agency.

Only a laboratory accredited by an “Accreditation body” which is signatory of the ILAC MRA is considered acceptable to EASA, considering that in this case traceability through the assessment and accreditation process under ISO/IEC 17025 has already been established.

When a maintenance organisation is using such an Accredited Laboratory then the following shall be ensured in addition to the requirements addressed in paragraph 4 “ Tooling control management “ of this user guide:

- The MOE chapter 2.5 “Tools Calibration” shall detail the use of Accredited Laboratory as defined in this user guide;
- The accreditation of the laboratory is valid (i.e. proof of accreditation on file) and includes the tooling which are intended to be tested, calibrated or measured.

10.2.4. Calibration by the original tool manufacturer





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A maintenance organisation using the original tool manufacturer identified in the approved maintenance data for calibrating/testing the related tool is considered as acceptable provided the calibration certificate issued refers to ISO/IEC 17025 standard.





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10.2.5. Calibration in non-accredited laboratories

In exceptional cases the maintenance organisation may need to send tooling to a laboratory which is not accredited.

For this type of laboratory EASA considers that traceability through the assessment and accreditation process under ISO/IEC 17025 has not been established.

Therefore, the maintenance organisation shall demonstrate that:

- the need to use a non-accredited laboratory, is evaluated and accepted by the assigned inspector. The assigned inspector shall report the use of non-accredited laboratory to EASA and;
- The volume of tooling and equipment calibrated using a non-accredited laboratory shall be kept as lower as possible, and;
- Its responsibilities are appropriately discharged by complying at least with the following conditions:

Environmental conditions of the laboratory

1	The Quality system of the maintenance organisation shall ensure that tooling are calibrated in a controlled environment as per the ISO 17025 standard.	
2	The Quality system of the maintenance organisation shall ensure that there are procedures in place to control temperature, humidity and cleanliness of both the calibration facility and the related storage areas.	

Standards/Norms applied by the laboratory

1	The Quality system of the maintenance organisation shall ensure that the standards applied for the tooling calibration are appropriate. Example: <ul style="list-style-type: none"> • EN/ISO 6789 for the calibration of hand torque tools; • EN/ISO 837-1 for the calibration of pressure gauges; • Etc... 	
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Quality Management of the laboratory

1	The Quality system of the maintenance organisation shall ensure that: <ul style="list-style-type: none"> • an internal audit programme is in place; • the audit programme has appropriate corrective action processes for findings; • a procedure is in place showing how the laboratory is dealing with non-conforming /out of tolerance tooling, where manufacturer’s or TC holder’s tolerance limits are exceeded, including rectification/repair of out of tolerance tooling and a return to service procedure; • there is a procedure for the recommendation of adjustment of calibration frequencies based on calibration results; 	
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Master Equipment in use in the laboratory

2	<p>The Quality system of the maintenance organisation shall ensure that:</p> <ul style="list-style-type: none"> • there is a calibration program for equipment and tooling that is used by the calibration facility {all utilised reference standards (master equipment) require external calibration with traceability to a National Standards Institute}; • there is certification available and valid for externally calibrated reference standards (master equipment). 	
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Staff of the laboratory

1	<p>The Quality system of the maintenance organisation shall ensure that the staff performing calibration activities have been authorised to do so, after appropriate training and assessment.</p>	
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Documents and records/calibration reporting issued of the laboratory

1	<p>The Quality system of the maintenance organisation shall ensure that all work undertaken is accurately recorded.</p>	
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2	<p>The Quality system of the maintenance organisation shall ensure that the work packages are adequately structured such that full traceability is ensured, including reference to the utilised calibration standard.</p>	
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3	<p>The Quality system of the maintenance organisation shall ensure that an acceptable calibration report is generated, including:</p> <ul style="list-style-type: none"> • Identification of specific method undertaken; • Results of measurement including correction charts and tables; • A statement of measurement uncertainties achieved and any limitations of detection applied; • Details of the persons involved in the calibration activities including authorisation details; • Environmental conditions under which the activities were undertaken; • Identification of the master instrument used (P/N, S/N, calibration due date, etc.) • Statement on the calibration certificate which gives traceability to the “national/international recognised standard used. 	
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MOE

1	<p>The MOE or referenced Tool Calibration Procedures Manual shall explain how the requirements of Part-145.A.40 are achieved, and how the maintenance organisation’s quality system ensures that the non-accredited calibration facility is complying with the minimum requirements in respect of the above topics.</p>	
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