

AERONAUTICAL CIRCULAR CIVIL AVIATION AUTHORITY – MACAO, CHINA

SUBJECT:

MAR-147 Approved Maintenance Training Organisation

EFFECTIVE DATE:

01 October 2022

CANCELLATION:

This Aeronautical Circular (AC) supersedes AC/PEL/014R00 dated 16 June 2016.

GENERAL:

The President of Civil Aviation Authority, in exercise of his power under Article 35 of the Statutes of Civil Aviation Authority approved by the Decree-Law 10/91/M and Paragraph 89 of the Air Navigation Regulation of Macao (ANRM), established this AC.

1 MAR-147 Approved Maintenance Training/Examinations

- 1.1 The *MAR-147 Approved Maintenance Training Organisation Issue 3*, attached to this AC, prescribes the requirements to be met by organisations seeking for approval to conduct approved training and/or examination as specified in the MAR-66.
- 1.2 The MAR-147 was firstly issued on 15 Apr 2008 and came into force on 01 Jul 2008.
- 1.3 The purpose of this complete reissue is to update the requirements based on the EASA Part-147 published in Commission Regulation No. 1321/2014 of 26 November 2014 and its amendment up to and including Commission Regulation No. 2022/410 of 10 March 2022 published in the Official Journal of the European Union on 11 March 2022, as well as up to EASA ED Decision 2020/002/R for the AMC/GM.

- END -

澳門特別行政區

REGIÃO ADMINISTRATIVA ESPECIAL DE MACAU



民航局

AUTORIDADE DE AVIAÇÃO CIVIL
CIVIL AVIATION AUTHORITY

Macao Aviation Requirements

MAR-147

Approved Maintenance Training Organisation

Issue 3

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FOREWORD

1. The content of this document was developed based on EASA Part-147 published in Commission Regulation No. 1321/2014 of 26 November 2014 and its amendment up to and including Commission Regulation No. 2022/410 of 10 March 2022 published in the Official Journal of the European Union on 11 March 2022, as well as up to EASA ED Decision 2020/002/R for the AMC/GM.
2. Amendments are incorporated into the print text by means of a 'Revision' or a complete 'Re-issue'.

Preambles

ISSUE 1 15/Apr/2008

This MAR-147 was first issued on 15/Apr/2008 and became effective on 01/Jul/2008.

ISSUE 2 31/Jul/2015

- Restructured the document. There are three sections where Section 1 contains reorganised subparts A, B, C, D and E, Section 2 contains Acceptable Means of Compliance (AMC) and Guidance Material (GM) and Section 3 contains Appendices.
- Changed the paragraph numbering of the MAR-147 to align with EASA Part-147.
- Incorporated the definition of “Accountable Manager” in MAR 147.105 and AMC 147.105.
- Extended the privilege of a MAR-147 approved maintenance training organisation regarding conduct of examination on behalf of the AACM to cover practical assessment.
- Added a new provision MAR 147.140(c) for approving minor amendments to the maintenance training organisation exposition through an exposition procedure.
- Added the provisions for handling audit findings in MAR 147.160.
- Added the provision on Basic Training Course Duration in Section 3 Appendix 1.
- Added a new provision on records in respect of instructors, knowledge examiners and practical assessors in AMC 147.110.
- Added a new provision regarding disqualified examiner to be reinstated in GM 147.135.

ISSUE 3 01/October/2022

- Requirements amended to align with the latest EASA Part-147. Editorial changes, change of wordings and correction of typos.
- Added MAR 147.05 ‘Scope’.
- Renumber and amended MAR 147.1 ‘General’ to MAR-147.10. Moved the original MAR 147.10 ‘Definitions’ and GM 147.10 to paragraph 3 of Section 1.
- Deleted MAR 147.5 ‘Effectivity’.
- Amended MAR 147.15 and 147.20.
- Amended 147.105.
- Amended MAR 147.125. All student training, examination and assessment records shall now be kept for an unlimited period.
- Amended MAR 147.140.
- Amended MAR 147.145. Privileges of carrying out examination added.
- Amended MAR 147.155 and MAR 147.160. Definition of level 3 finding added.
- Amended MAR 147.405.
- Deleted GM 147.10 and AMC 147.15.
- Amended AMC 147.105(b), AMC 147.105(f) and added GM 147.105(f).
- Amended AMC 147.115(c).
- Added AMC 147.130(a) regarding the guidance on new training methods and training technologies.
- Added AMC 147.145(f).
- Added AMC 147.200(f)
- Amended AMC 147.210(b) to provide reference to MAR-66.
- Deleted GM 147.405.
- Renamed Section 3 ‘APPENDICES TO MAR-147’.
- Reserved Appendix 2 to MAR-147.
- Amended Appendix 3 to MAR-147.
- Deleted Appendix 4 to MAR-147.
- Added Section 4 ‘APPENDICES TO AMC TO MAR-147’

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Section 1 **Requirements**

1. **GENERAL**

This Section 1 contains the requirements for MAR-147 maintenance training organisations.

2. **PRESENTATION**

- 2.1 Each page being identified by the date of issue and the Issue/Revision number under which it is amended or reissued.
- 2.2 Sub-headings are in bold typeface.
- 2.3 Explanatory Notes not forming part of the requirements appear in smaller typeface.
- 2.4 New, amended and corrected text is indicated by a marginal line; except for a complete reissue of the whole document.

3. **DEFINITIONS**

For the purpose of this MAR-147 the following definitions shall apply:

'AACM' means the Civil Aviation Authority-Macao, China.

'Approved basic training course' means a defined course of maintenance training designed to give a level of knowledge and some experience to a student such that it justifies the reduction in maintenance experience permitted by MAR-66.

'MAR-66' means the *Macao Aviation Requirements MAR-66 Licensing of Aircraft Maintenance Engineer* attached to the Aeronautical Circular No. AC/PEL/013 (as amended).

'Organisation' means an organisation registered as a legal entity. Such an organisation may conduct business from more than one address and may hold more than one Macao Aviation Requirements (MAR) approval.

'Terms of Reference' means the scope of work that a person is responsible for and authorised to carry out on behalf of the MAR-147 approved maintenance training organisation.

SUBPART A - GENERAL

MAR 147.05 Scope

This MAR-147 establishes the requirements to be met by organisations seeking approval to conduct approved training and examination as specified in MAR-66.

MAR 147.10 General

A training organisation shall be an organisation or part of an organisation registered as a legal entity.

MAR 147.15 Application

- (a) An application for the issue of an approval or for the variation or renewal of an existing approval shall be made on the appropriate application form and in a manner established by the AACM.
- (b) Each application shall demonstrate to the AACM that it meets the relevant requirements of this MAR-147.

MAR 147.20 Applicability

(See AMC 147.20)

- (a) The MAR-147 prescribes the requirements for issuing approvals to maintenance training organisations to conduct the approved training courses and/or examinations required by MAR-66 and for such organisations to issue certificates to students upon successful completion of such courses.
- (b) (Reserved)
- (c) Maintenance training organisations where its located outside Macao may be granted an approval if the AACM is satisfied that there is a need for such approval.

SUBPART B - ORGANISATIONAL REQUIREMENTS

MAR 147.100 Facility requirements

(See AMC and GM 147.100)

- (a) The size and structure of facilities shall ensure protection from the prevailing weather elements and proper operation of all planned training and examination on any particular day.
- (b) Fully enclosed appropriate accommodation separate from other facilities shall be provided for the instruction of theory and the conduct of knowledge examinations.
 - 1. The maximum number of students undergoing knowledge training during any training course shall not exceed 28.
 - 2. The size of accommodation for examination purposes shall be such that no student can read the paperwork or computer screen of any other student from his/her position during examinations.
- (c) The point (b) accommodation environment shall be maintained such that students are able to concentrate on their studies or examination as appropriate, without undue distraction or discomfort.
- (d) In the case of a basic training course, basic training workshops and/or maintenance facilities separate from training classrooms shall be provided for practical instruction appropriate to the planned training course. If, however, the organisation is unable to provide such facilities, arrangements may be made with another organisation to provide such workshops and/or maintenance facilities, in which case a written agreement shall be made with such organisation specifying the conditions of access and use thereof. The AACM shall require access to any such contracted organisation and the written agreement shall specify this access.
- (e) In the case of an aircraft type/task training course, access shall be provided to appropriate facilities containing examples of aircraft type as specified in MAR 147.115(d).
- (f) The maximum number of students undergoing practical training during any training course shall not exceed 15 per supervisor or assessor.
- (g) Office accommodation shall be provided for instructors, knowledge examiners and practical assessors of a standard to ensure that they can prepare for their duties without undue distraction or discomfort.
- (h) Secure storage facilities shall be provided for examination papers and training records. The storage environment shall be such that documents remain in good condition for the retention period as specified in MAR 147.125. The storage facilities and office accommodation may be combined subject to adequate security.
- (i) A library shall be provided containing all current technical material appropriate to the scope and level of training undertaken.

MAR 147.105 Personnel requirements

(See AMC and GM 147.105)

- (a) The organisation shall appoint an accountable manager who has corporate authority for ensuring that all training commitments can be financed and carried out to the standard required by this MAR-147.
- (b) A person or group of persons, whose responsibilities include ensuring that the maintenance training organisation is in compliance with the requirement of this MAR-147, shall be nominated. Such person(s) shall be responsible to the accountable manager. The senior person or one person from the group of persons may also be the accountable manager subject to meeting the requirements for the accountable manager as defined in point (a).
- (c) The maintenance training organisation shall contract sufficient staff to plan/perform knowledge and practical training, conduct knowledge examinations and practical assessments in accordance with the approval.
- (d) By derogation to point (c), when another organisation is used to provide practical training and assessments, such other organisation's staff may be nominated to carry out practical training and assessments.
- (e) Any person may carry out any combination of the roles of instructor, examiner and assessor subject to

compliance with point (f).

- (f) The experience and qualifications of instructors, knowledge examiners and practical assessors shall be established in accordance with criteria published or in accordance with a procedure and to a standard agreed by the AACM.
- (g) The knowledge examiners and practical assessors shall be specified in the organisation exposition for the acceptance of such staff.
- (h) Instructors and knowledge examiners shall undergo updating training at least every 24 months relevant to current technology, practical skills, human factors and the latest training techniques appropriate to the knowledge being trained or examined.

MAR 147.110 Records of instructors, examiners and assessors

(See AMC and GM 147.110)

- (a) The organisation shall maintain a record of all instructors, knowledge examiners and practical assessors. These records shall reflect the experience and qualification, training history and any subsequent training undertaken.
- (b) Terms of Reference shall be drawn up for all instructors, knowledge examiners and practical assessors.

MAR 147.115 Instructional equipment

(See AMC and GM 147.115)

- (a) Each classroom shall have sufficient presentation equipment of a standard that ensures students can easily read presentation text/drawings/diagrams and figures from any position in the classroom.

Presentation equipment shall include representative synthetic training devices to assist students in their understanding of the particular subject matter where such devices are considered beneficial for such purposes.
- (b) The basic training workshops and/or maintenance facilities as specified in MAR 147.100(d) shall have all tools and equipment necessary to perform the approved scope of training.
- (c) The basic training workshops and/or maintenance facilities as specified in MAR 147.100(d) shall have an appropriate selection of aircraft, engines, aircraft parts and avionic equipment.
- (d) The aircraft type training organisation as specified in MAR 147.100(e) shall have access to the appropriate aircraft type. Synthetic training devices may be used when such synthetic training devices ensure adequate training standards.

MAR 147.120 Maintenance training material

(See AMC 147.120)

- (a) Maintenance training course material shall be provided to the student and cover as applicable:
 - 1. the basic knowledge syllabus specified in MAR-66 for the relevant aircraft maintenance licence category or sub-category and,
 - 2. the type course content required by MAR-66 for the relevant aircraft type and aircraft maintenance licence category or sub-category.
- (b) Students shall have access to examples of maintenance documentation and technical information of the library as specified in MAR 147.100(i).

MAR 147.125 Records

The organisation shall keep all student training, examination and assessment records for *an unlimited period*.

MAR 147.130 Training procedures and quality system

(See AMC and GM 147.130)

- (a) The organisation shall establish procedures acceptable to the AACM to ensure proper training standards and compliance with all relevant requirements in this MAR-147.
- (b) The organisation shall establish a quality system including:
 - 1. an independent audit function to monitor training standards, the integrity of knowledge examinations and practical assessments, compliance with and adequacy of the procedures, and
 - 2. a feedback system of the audit findings to the person(s) and ultimately to the accountable manager referred to in MAR 147.105(a) to ensure, as necessary, corrective action(s) is/are properly implemented in a timely manner.

MAR 147.135 Examinations

(See AMC and GM 147.135)

- (a) The examination staff shall ensure the security of all questions.
- (b) Any student found during a knowledge examination to be cheating or in possession of material pertaining to the examination subject other than the examination papers and associated authorised documentation shall be disqualified from taking the examination and may not take any examination for at least 12 months after the date of the incident. The AACM shall be informed of any such incident together with the details of any enquiry within one calendar month.
- (c) Any examiner found during a knowledge examination to be providing question answers to any student being examined shall be disqualified from acting as an examiner and the examination declared void. The AACM shall be informed of any such occurrence within one calendar month.

MAR 147.140 Maintenance training organisation exposition

(See AMC 147.140)

- (a) The organisation shall provide an exposition for use by the organisation describing the organisation and its procedures and containing the following information:
 - 1. a statement signed by the accountable manager confirming that the maintenance training organisation exposition and any associated manuals define the maintenance training organisation's compliance with this MAR-147 and shall be complied with at all times.
 - 2. the title(s) and name(s) of the person(s) nominated in accordance with MAR 147.105(b).
 - 3. the duties and responsibilities of the person(s) specified in point (a)(2), including matters on which they may deal directly with the AACM on behalf of the maintenance training organisation.
 - 4. a maintenance training organisation chart showing associated chains of responsibility of the person(s) specified in point (a)(2).
 - 5. a list of the training instructors, knowledge examiners and practical assessors.
 - 6. a general description of the training and examination facilities located at each address specified in the maintenance training organisation's approval certificate, and if appropriate any other location, as required by MAR 147.145(b).

7. a list of the maintenance training courses which form the extent of the approval.
 8. the maintenance training organisation's exposition amendment procedure.
 9. the maintenance training organisation's procedures, as required by MAR 147.130(a).
 10. the maintenance training organisation control procedure, as required by MAR 147.145(c), when authorised to conducting training, examination and assessments in locations different from those specified in MAR 147.145(b).
 11. a list of the locations pursuant to MAR 147.145(b).
 12. a list of organisations, if appropriate, as specified in MAR 147.145(d).
- (b) The maintenance training organisation's exposition and any subsequent amendments shall be approved by the AACM.
- (c) Notwithstanding point(b) minor amendments to the maintenance training organisation exposition may be approved through an exposition procedure (hereinafter called indirect approval).

MAR 147.145 Privileges of the maintenance training organisation

(See AMC and GM 147.145)

- (a) The maintenance training organisation may carry out the following as permitted by and in accordance with the maintenance training organisation exposition:
- (i) basic training courses to the MAR-66 syllabus, or part thereof.
 - (ii) aircraft type / task training courses in accordance with MAR-66.
 - (iii) the examination of students who attended the basic or aircraft type training course at the maintenance training organisation.
 - (iv) The examinations of students who did not attend the aircraft type training course at the maintenance training organisation.
 - (v) the examinations of students who did not attend the basic training course at the maintenance training organisation, provided that the examination is conducted at one of the locations identified in the approval certificate.
 - (vi) the issue of certificates in accordance with Appendix 3 to MAR-147 following successful completion of the approved basic or aircraft type training courses and examinations specified in point (a)(i), (a)(ii), (a)(iii), (a)(iv) and (a)(v), as applicable.
- (b) Training, knowledge examinations and practical assessments may only be carried out at the locations identified in the MAR-147 approval certificate and/or at any location specified in the maintenance training organisation exposition.
- (c) By derogation to point (b), the maintenance training organisation may only conduct training, knowledge examinations and practical assessments in locations different from the point (b) locations in accordance with a control procedure specified in the maintenance training organisation exposition. Such locations need not be listed in the maintenance training organisation exposition.
- (d)
1. The maintenance training organisation may subcontract the conduct of basic theoretical training, type training and related examinations to a non maintenance training organisation only when under the control of the maintenance training organisation quality system.
 2. The subcontracting of basic theoretical training and examination is limited to Appendix 1 to MAR-66, Modules 1, 2, 3, 4, 5, 6, 8, 9 and 10.
 3. The subcontracting of type training and examination is limited to powerplant and avionic systems.
- (e) An organisation may not be approved to conduct only examinations unless approved to conduct the corresponding training.
- (f) By derogation from point (e), an organisation approved to provide basic knowledge training or type training may also be approved to provide type examination in the cases where type training is not required.

MAR 147.150 Changes to the maintenance training organisation

- (a) The maintenance training organisation shall notify the AACM of any proposed changes to the organisation that affect the approval before any such change takes place, in order to enable the AACM to determine continued compliance with this MAR-147 and to amend if necessary the maintenance training organisation approval certificate.
- (b) The AACM may prescribe the conditions under which the MAR-147 approved maintenance training organisation may operate during such changes unless the AACM determines that the maintenance training organisation approval shall be suspended.
- (c) Failure to inform the AACM of such changes may result in suspension or revocation of the maintenance training organisation approval certificate backdated to the actual date of the changes.

MAR 147.155 Continued validity

- (a) Unless the MAR-147 approval has previously been surrendered, superseded, suspended, revoked or expired by virtue of exceeding any expiry date that may be specified in the approval certificate, the continued validity of the approval is dependent upon:
 - 1. the organisation remaining in compliance with this MAR-147, in accordance with the provisions related to the handling of findings as specified in MAR 147.160; and
 - 2. the AACM being granted access to the organisation to determine continued compliance with this MAR-147; and
- (b) Upon surrender or revocation, the approval certificate shall be returned to the AACM.

MAR 147.160 Findings

- (a) A level 1 finding is one or more of the following:
 - 1. any significant non-compliance with the examination process which would invalidate the examination(s),
 - 2. failure to give the AACM access to the organisation's facilities during normal operating hours after two written requests,
 - 3. the lack of an accountable manager,
 - 4. a significant non-compliance with the training process.
- (b) A level 2 finding is any non-compliance with the training process other than level 1 findings.
- (c) A level 3 finding is any observed potential deficiency, by objective evidence, which could lead to a non-compliance.
- (d) After receipt of notification of findings, the holder of the maintenance training organisation approval shall define a corrective action plan and demonstrate corrective action to the satisfaction of the AACM within a period agreed with the AACM.

SUBPART C – APPROVED BASIC TRAINING COURSE

MAR 147.200 The approved basic training course

(See AMC 147.200)

- (a) The approved basic training course shall consist of knowledge training, knowledge examination, practical training and practical assessment.
- (b) The knowledge training element shall cover the subject matter for a category or sub-category aircraft maintenance license as specified in MAR-66.
- (c) The knowledge examination element shall cover a representative cross section of subject matter from the point (b) training element.
- (d) The practical training element shall cover the practical use of common tooling/equipment, the disassembly/assembly of a representative selection of aircraft parts and the participation in representative maintenance activities being carried out relevant to the particular MAR-66 complete module.
- (e) The practical assessment element shall cover the practical training and determine whether the student is competent at using tools and equipment and working in accordance with maintenance manuals.
- (f) The duration of basic training courses shall be in accordance with Appendix 1 to MAR-147.
- (g) The duration of conversion courses between (sub)categories shall be determined through an assessment of the basic training syllabus and the related practical training needs.

MAR 147.205 Basic knowledge examinations

(See AMC 147.205)

Basic knowledge examinations shall:

- (a) be in accordance with the standard defined in MAR-66.
- (b) be conducted without the use of training notes.
- (c) cover a representative cross section of subjects from the particular module of training completed in accordance with MAR-66.

MAR 147.210 Basic practical assessment

(See AMC 147.210)

- (a) Basic practical assessments shall be carried out during the basic maintenance training course by the nominated practical assessors at the completion of each visit period to the practical workshops/maintenance facility.
- (b) The student shall achieve an assessed pass with respect to MAR 147.200(e).

SUBPART D – AIRCRAFT TYPE/TASK TRAINING**MAR 147.300 Aircraft type/task training**

(See AMC 147.300)

A maintenance training organisation shall be approved to carry out MAR-66 aircraft type and/or task training subject to compliance with the standard specified in MAR 66.45.

MAR 147.305 Aircraft type examinations and task assessments

A maintenance training organisation approved in accordance with MAR 147.300 to conduct aircraft type training shall conduct the aircraft type examinations or aircraft task assessments specified in MAR-66 subject to compliance with the aircraft type and/or task standard specified in MAR 66.45.

SUBPART E – EQUIVALENT SAFETY AND REVOCATION

MAR 147.400 Equivalent safety cases

(See AMC 147.400)

- (a) The AACM may exempt a maintenance training organisation from any requirement in this MAR-147 when satisfied that a situation exists not covered by this MAR-147 and subject to compliance with any supplementary condition(s) the AACM considers necessary to ensure equivalent safety. Such supplementary condition(s) shall be agreed by the AACM to ensure continued recognition of the approval.
- (b) The AACM may exempt an education institution from the need to comply with all the requirements of this MAR-147 subject to the AACM being satisfied that training and examination standards are equivalent to MAR-66, that the training hours are in accordance with MAR 147.200 and access is permitted in accordance with MAR 147.155. Such an education institution shall be issued an approval certificate on the basis of this exemption.

MAR 147.405 Revocation, suspension, limitation of the maintenance training organisation approval

The AACM may:

- (a) suspend an approval on reasonable grounds in the case of potential safety threat; or
- (b) suspend, revoke or limit an approval pursuant to MAR147.160 (a).

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Section 2 Acceptable Means of Compliance and Guidance Material (AMC & GM)

AMC 147.20(c) Applicability

(See MAR 147.20(c))

For the AACM to be satisfied that there is a need, the potential applicant is required to provide evidence from an AACM approved MAR-145 maintenance organisation that such organisation would like to use the potential applicant's facilities for maintenance training. The evidence should be in the form of a letter(s) from the Macao based organisation(s) giving the reasons for the need. The AACM reserves the right to be satisfied that the need is genuine before accepting such application.

AMC 147.100(i) Facilities requirements

(See MAR 147.100(i))

1. For approved basic maintenance training courses this means holding and ensuring reasonable access to copies of all Macao aviation legislation, regulations and requirements, examples of typical aircraft maintenance manuals and service bulletins, airworthiness directives, aircraft and component records, release documentation, procedures manuals and aircraft maintenance programmes.
2. Except for the Macao aviation legislations, regulations and requirements, the remainder of the documentation should represent typical examples for both large and small aircraft and cover both aeroplanes and helicopters as appropriate. Avionic documentation should cover a representative range of available equipment. All documentation should be reviewed and updated on a regular basis.

GM 147.100(i) Facilities requirements

(See MAR 147.100(i))

Where the organisation has an existing library of regulations, manuals and documentation required by another MAR, it is not necessary to duplicate such a facility subject to student access being under controlled supervision.

AMC 147.105 Personnel requirements

(See MAR 147.105)

1. The larger maintenance training organisation (an organisation with the capacity to provide training for 50 students or more) should appoint a training manager with the responsibility for managing the training organisation on a day-to-day basis. Such person could also be the accountable manager. In addition, the organisation should appoint a quality manager with the responsibility for managing the quality system as specified in MAR 147.130(b) and an examination manager with the responsibility for managing the relevant MAR-147 Subpart C or Subpart D examination system. Such person(s) may also be an instructor and/or examiner.
2. The smaller maintenance training organisation (an organisation with the capacity to provide training for less than 50 students) may combine any or all of the sub-paragraph (1) positions subject to the AACM verifying and being satisfied that all functions can be properly carried out in combination.
3. When the organisation is also approved against other MAR which contain some similar functions then such functions may be combined.

AMC 147.105(b) Personnel requirements

(See MAR 147.105(b))

With the exception of the accountable manager, an appropriate personnel nomination form should be completed for each person nominated to hold a position required by 147.105 (b).

GM 147.105(c) Personnel requirements

(See MAR 147.105(c))

The maintenance training organisation should have a nucleus of permanently employed staff to undertake the minimum amount of maintenance training proposed but may contract, on a part-time basis, instructors for subjects which are only taught on an occasional basis.

AMC 147.105(f) Personnel requirements

(See MAR 147.105(f))

Paragraph 3 of Appendix 3 to AMC to MAR-66 provides criteria to establish the qualification of assessors.

GM 147.105(f) Personnel requirements

(See MAR 147.105(f))

It is recommended that potential instructors be trained in instructional techniques.

GM 147.105(g) Personnel requirements

(See MAR 147.105(g))

Examiners should demonstrate a clear understanding of the examination standard required by MAR-66 and have a responsible attitude to the conduct of examinations such that the highest integrity is ensured.

AMC 147.105(h) Personnel requirements

(See MAR 147.105(h))

Updating training should normally be of 35 hours duration but may be adjusted to the scope of training of the organisation and particular instructor/examiner.

GM 147.105(h) Personnel requirements

(See MAR 147.105(h))

1. Records should show for each instructor/examiner when the updating training was scheduled and when it took place.
2. The updating training may be subdivided during the 24 months into more than one element and may include such activities as attendance at relevant lectures and symposiums.

AMC 147.110 Records of instructors, examiners and assessors

(See MAR 147.110)

1. The following minimum information relevant to the scope of activity should be kept on record in respect of each instructor, knowledge examiner and practical assessor:
 - (a) Name
 - (b) Date of Birth
 - (c) Personnel Number
 - (d) Experience
 - (e) Qualifications
 - (f) Training history (before entry)
 - (g) Subsequent Training
 - (h) Scope of activity
 - (i) Starting date of employment/contract
 - (j) If appropriate – ending date of employment/contract.
2. The record may be kept in any format but should be under the control of the organisation's quality system.
3. Persons authorised to access the system should be maintained at a minimum to ensure that records cannot be altered in an unauthorised manner or that such confidential records become accessible to unauthorised persons.
4. The AACM is an authorised entity when investigating the records system for initial and continued approval or when the AACM has cause to doubt the competence of a particular person.

GM 147.110 Records of Instructors, examiners and assessors

(See MAR 147.110)

Instructors, knowledge examiners and practical assessors should be provided with a copy of their Terms of Reference.

GM 147.115(a) Instructional equipment

(See MAR 147.115(a))

1. Synthetic training devices are working models of a particular system or component and include computer simulations.
2. A synthetic training device is considered beneficial for complex systems and fault diagnostic purposes.

AMC 147.115(c) Instructional equipment

(See MAR 147.115(c))

1. An appropriate selection of aircraft parts means appropriate in relation to the particular subject module or sub-module of MAR-66 being instructed. For example the turbine engine module should require the provision of sufficient parts from different types of turbine engine to show what such parts look like, what the critical areas are from a maintenance viewpoint and to enable disassembly/assembly exercises to be completed.
2. Appropriate aircraft, engines, aircraft parts and avionic equipment means appropriate in relation to the particular subject module or sub-module of MAR-66 being instructed. For example MAR-66 category B2 avionic training

should require amongst other equipment, access to at least one type of installed autopilot and flight director system such that maintenance and system functioning can be observed and therefore more fully understood by the student in the working environment.

3. 'Access' may be interpreted to mean, in conjunction with the facilities requirement of MAR 147.100(d), that there may be an agreement with a maintenance organisation approved under MAR-145 to access such parts, etc.

AMC 147.120(a) Maintenance training material

(See MAR 147.120(a))

Training course notes, diagrams and any other instructional material should be accurate. Where an amendment service is not provided, a written warning to this effect should be given.

AMC 147.130(a) Training procedures and quality system

(See MAR 147.130(a))

This guidance material provides some clarifications for the incorporation of new training methods and training technologies in the procedures for aircraft maintenance training.

The classic training method is a teacher lecturing the pupils in a classroom. Commonly the training tools are a blackboard and training manuals. New technologies make it possible to develop new training methods and use other training tools, e.g. multimedia-based training and virtual reality. A combination of several training methods/tools is recommended in order to increase the overall effectiveness of the training.

Simulation cannot be eligible as a sole training or assessment tool for basic hand skills such as wiring, welding, drilling, filing, wire locking, riveting, bonding or any other skill where competence may only be achievable by performing a hands-on activity.

Three tables are provided to illustrate the possibilities for the use of different training methods and tools:

Table 1: Training tools

Table 2: Training methods

Table 3: Combination of training methods and tools and their use

Table 1 lists existing training tools that may be selected for basic training.

Table 1: Training tools

Training tools		Description
1	Slideshow presentation	A structured presentation of slides.
2	Manuals	Comprehensive and controlled publication of a particular topic.
3	Computer (desktop PC, laptop, etc.)	An electronic processing device that can hold and display information in various media.
4	Mobile devices (such as, but not limited to, tablets, smart phones,	A mobile electronic processing device that can hold and display information in various media.

Training tools		Description
	etc.)	
5	Videos	Electronic media for broadcasting moving visual images.
6	MSTD — Maintenance simulation training device	A training device that is intended to be used in maintenance training, examination, and/or assessment for a component, system or entire aircraft. The MSTD may consist of hardware and software elements.
7	Mock-up	A scaled or full-size replica of a component, system or entire aircraft that preserves (i.e. is an exact replica of) the geometrical, operational or functional characteristics of the real component, system or entire aircraft for which maintenance training is delivered with the use of such a replica.
8	Virtual reality	A computer-generated three-dimensional (3D) environment which can be explored and possibly interacted with.
9	MTD — Maintenance training device	Maintenance training device is any training device other than an MSTD used for maintenance training and/or examination and/or assessment. It may include mock-ups.
10	Real aircraft	<p>A suitable aircraft whose condition allows teaching a selection of maintenance tasks that are representative of the particular aircraft or of the aircraft category.</p> <p>‘Suitable’ means an aircraft of the type or licence (sub)category (if the licence (sub)category aircraft is outfitted with the same equipment subject to the particular lesson module(s) and is sufficiently similar so that the lesson objective(s) can be satisfactorily accomplished) for type training, or an aircraft representative of the licence (sub)category for basic training, and excludes ‘virtual aircraft’.</p> <p>‘Condition’ means that the aircraft is equipped with its main components and that the systems can be activated/operated when this is required by the learning objectives.</p>
11	Aircraft component	A suitable aircraft component used to teach specific maintenance tasks off-the-wing. This may include but is not limited to tasks such as borescope inspections, minor repairs, testing, or the assembly/disassembly of sub-components. ‘Suitable’ means that the condition of the component should fit the learning objectives of the tasks and, when appropriate, may feature existing defects or damages.
12	Augmented reality	An enhancement (modification, enrichment, alteration or manipulation) of one’s current perception of reality elements of a physical, real-world environment following user’s inputs picked up by sensors transferred to rapid streaming computer images. By contrast, virtual reality replaces the real world with a simulated one.
13	Embedded training	A maintenance training function that is originally integrated into the aircraft component’s design (i.e. a centralised fault display system).
14	Classroom	A physical, appropriate location where learning takes place.
15	Virtual classroom	A simulated, not physical, location where synchronous learning takes place.
16	Virtual aircraft	A simulated, not physical, aircraft that may be used in theoretical training, practical

Training tools		Description
		training, examination or assessment.
<p>Note: Synthetic training devices (STDs) is a generic term used for systems using hardware and/or software, simulating the behaviour of one or more aircraft systems or a complete aircraft, such as maintenance simulation training devices (MSTDs), maintenance training devices (MTDs) and flight simulation training devices (FSTDs).</p>		

Table 2 lists existing training methods that may be selected for basic training.

Table 2: Training methods

Training method	Description	Instructor-centred ⁽¹⁾	Student-centred ⁽²⁾	Blended training ⁽³⁾
Assisted learning (mentoring)	Assisted learning or mentorship represents an ongoing, close relationship of dialogue and learning between an experienced /knowledgeable instructor and a less experienced/knowledgeable student in order to develop experience/knowledge of students.	X	X	X
Computer-based training (CBT)	CBT is any interactive means of structured training using a computer to deliver a content. (Note: Not to be confused with competency-based training that also uses the acronym 'CBT')	X	X	X
Demonstration	A method of teaching by example rather than explanation.	X		X
Distance learning asynchronous	Distance learning reflects training situations in which instructors and students are physically separated. It is asynchronous if the teacher and the students do not interact at the same time.		X	X
Distance learning synchronous	Distance learning reflects training situations in which instructors and students are physically separated. It is synchronous if the teacher and the students interact at the same time (real time).	X		X
e-learning	Training via a network or electronic means, with or without the support of instructors (e-tutors).	X	X	X
Lecturing (instructor-led/face to face)	Practice of face-to-face delivery of training and learning material between an instructor and students, either individuals or groups.	X		X
Mobile learning (M-learning)	Any sort of learning that happens when the student is not at a fixed, predetermined location, using mobile technologies.	X	X	X

Training method	Description	Instructor-centred ⁽¹⁾	Student-centred ⁽²⁾	Blended training ⁽³⁾
Multimedia-based training ⁽⁴⁾	Any combined use of different training media.	X	X	X
Simulation	Any type of training that uses a simulator imitating a real-world process or system.	X	X	X
Web-based training (WBT)	Generic term for training or instruction delivered over the internet or an intranet using a web browser.	X	X	X

Note: The purpose of this table is to provide a short definition for each associated training method and to relate each method to the focus of the learning. It is not meant to comprehensively explore and identify the capabilities of each training method herein included.

(1) 'Instructor-centred' means that the instructor is responsible for teaching the student.

(2) 'Student-centred' means that the student is responsible for the learning progress.

(3) 'Blended training' includes different instructional methods and tools, different delivery methods, different scheduling (synchronous/asynchronous) or different levels of guidance. Blended training allows the integration of a range of learning opportunities.

(4) 'Multimedia-based training' by definition uses various media to achieve its objective, thus, none of the single media listed is per se a complete solution for training.

Table 3 presents the combination of training methods and tools that may be taken into account for theoretical and practical training.

The table is intended to support potential delivery methods. Additional training methods and further use of those methods could be acceptable to the AACM when demonstrated as supporting learning objectives.

Training method	Training tools	Theoretical elements			Practical elements	OJT	Learning objectives		
		Level 1	Level 2	Level 3			Knowledge	Skills	Attitude
See Table 2	See Table 1								
Lecturing (instructor-led /face to face)	1, 2, 3, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 16	X	X	X	X	X Only type	X	X	X Only type
Assisted learning (mentoring)	1, 2, 3, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,	X	X	X	X	X Only type	X	X	X Only type

	15, 16								
e-learning	1, 2, 3, 4, 5, 8, 12, 14, 15, 16	X	X	X ⁽¹⁾	X ⁽¹⁾		X	X ⁽¹⁾	X ⁽¹⁾
Computer-based training	1, 2, 3, 4, 5, 8, 12, 14, 15, 16	X	X	X	X ⁽¹⁾		X Only type	X ⁽¹⁾	
Multimedia-based training	1, 2, 3, 4, 5, 8, 12, 13, 14, 15, 16	X	X	X	X ⁽¹⁾		X Only type	X ⁽¹⁾	X ⁽¹⁾
Web-based training (WBT)	1, 2, 3, 4, 5, 8, 12, 14, 15, 16	X	X	X ⁽¹⁾	X ⁽¹⁾		X Only type	X ⁽¹⁾ Only type	X ⁽¹⁾
M-learning	1, 2, 3, 4, 5, 12, 15, 16	X	X	X ⁽¹⁾	X ⁽¹⁾		X ⁽¹⁾ Type unlimited	X ⁽¹⁾	
Distance learning synchronous	1, 2, 3, 4, 5, 8, 15, 16	X	X	X ⁽¹⁾	X ⁽¹⁾		X ⁽¹⁾ Type unlimited	X ⁽¹⁾	X ⁽¹⁾ Only type
Distance learning asynchronous	1, 2, 3, 4, 5, 8, 16	X	X	X ⁽¹⁾			X ⁽¹⁾ Type unlimited	X ⁽¹⁾	X ⁽¹⁾ Only type
Demonstration	1, 2, 3, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16	X	X	X ⁽¹⁾	X	X ⁽¹⁾ Only type	X	X	X ⁽¹⁾ Only type
Simulation	1, 3, 4, 6, 7, 8, 9, 10, 12, 14,	X	X	X ⁽¹⁾	X		X	X	X Only type

	15 ⁽¹⁾ , 16								
This table relates a given training method to a list of acceptable training tools (code), oriented to deliver the theoretical elements, practical elements or on-the-job training associated with their specific learning objectives.									
(1) Limited suitability. It means that the respective training method may be used but with limited results, thus requiring the support of a complementary training method to fulfil the learning objectives.									
NOTE: Instructor (human) involvement should be considered in Basic Knowledge Modules 9A/9B.									

AMC 147.130(b) Training procedures and quality system

(See MAR 147.130(b))

1. The independent audit procedure should ensure that all aspects of MAR-147 compliance should be checked at least once in every 12 months and may be carried out as one complete single exercise or subdivided over a 12-month period in accordance with a scheduled plan.
2. In a small maintenance training organisation the independent audit function may be contracted to another maintenance training organisation approved under MAR-147 or a competent person acceptable to the AACM. Where the small training organisation chooses to contract the audit function it is conditional on the audit being carried out twice in every 12-month period with one such audit being unannounced.
3. Where the maintenance training organisation is also approved to another MAR requiring a quality system, then such quality system may be combined.
4. When training or examination is carried out under the sub-contract control system:
 - (i) a pre audit procedure should be established whereby the MAR-147 approved maintenance training organisation should audit a prospective sub-contractor to determine whether the services of the sub-contractor meet the intent of MAR-147.
 - (ii) a renewal audit of the subcontractor should be performed at least once every 12 months to ensure continuous compliance with the MAR-147 standard.
 - (iii) the sub-contract control procedure should record audits of the sub-contractor and to have a corrective action follow-up plan.
5. The independence of the audit system should be established by always ensuring that audits are carried out by personnel not responsible for the function or procedure being checked.

GM 147.130(b) Training procedures and quality system

(See MAR 147.130(b))

1. The primary objective of the quality system is to enable the MAR-147 approved maintenance training organisation to satisfy itself that it can deliver properly trained students and that the organisation remains in compliance with MAR-147.
2. The independent audit is a process of routine sample checks of all aspects of the MAR-147 approved maintenance training organisation's ability to carry out all training and examinations to the required standards. It represents an overview of the complete training system and does not replace the need for instructors to ensure that they carry out training to the required standard.
3. A report should be raised each time an audit is carried out describing what was checked and any resulting findings. The report should be sent to the affected department(s) for rectification action giving target rectification dates. Possible rectification dates may be discussed with the affected department(s) before the quality department confirms such dates on the report. The affected department(s) should rectify any findings

and inform the quality department of such rectification.

4. A large training organisation (an organisation with the capacity to provide training for 50 students or more) should have a dedicated quality audit group whose sole function is to conduct audits, raise finding reports and follow up to ensure that findings are being rectified. For the small training organisation (an organisation with the capacity to provide training for less than 50 students) it is acceptable to use competent personnel from one section/department not responsible for the function or procedure to check the section/department that is responsible subject to the overall planning and implementation being under the control of the quality manager.
5. The management control and follow up system should not be contracted to outside persons. The principal function is to ensure that all findings resulting from the independent audit are corrected in a timely manner and to enable the accountable manager to remain properly informed of the state of compliance. Apart from rectification of findings the accountable manager should hold routine meetings to check progress on rectification except that in the large training organisation such meetings may be delegated on a day to day basis to the quality manager as long as the accountable manager meets at least once per year with the senior staff involved to review the overall performance.

AMC 147.135 Examinations

(See MAR 147.135)

1. Examinations may be computer- or hard-copy-based or a combination of both.
2. The actual questions to be used in a particular examination should be determined by the examiners.

GM 147.135(c) Examinations

(See MAR 147.135(c))

The AACM will determine when or if the disqualified examiner may be reinstated.

AMC 147.140 Maintenance training organisation exposition

(See MAR 147.140)

1. A recommended format of the maintenance training organisation exposition is included in Section 4 Appendix 1 to AMC to MAR-147.
2. When the MAR-147 approved maintenance training organisation is approved in accordance with any other MAR which also requires an exposition, the exposition required by the other MAR may form the basis of the maintenance training organisation exposition in a combined document, as long as the other exposition contains the information required by MAR 147.140 and a cross reference index is included based upon Section 4 Appendix 1 to AMC to MAR-147.
3. When training or examination is carried out under the sub-contract control system the maintenance training organisation exposition should contain a specific procedure on the control of sub-contractors as per Appendix 1 to AMC to MAR-147 item 2.18 plus a list of sub-contractors as required by MAR 147.140 (a)(12) and detailed in Section 4 Appendix 1 to AMC to MAR-147 item 1.7.
4. The AACM may approve a delegated exposition approval system for all changes other than those affecting the MAR-147 approval.

AMC 147.145(d) Privileges of the MAR-147 approved maintenance training organisation

(See MAR 147.145(d))

1. When training or examination is carried out under the sub-contract control system it means that for the duration of such training or examination, the MAR-147 approval has been temporarily extended to include the sub-contractor. It therefore follows that those parts of the sub-contractor's facilities, personnel and procedures involved with the MAR-147 approved maintenance training organisation's students should meet requirements of MAR-147 for the duration of that training or examination and it remains the MAR-147 organisation's responsibility to ensure such requirements are satisfied.
2. The MAR-147 approved maintenance training organisation is not required to have complete facilities and personnel for training that it needs to sub-contract but it should have its own expertise to determine that the sub-contractor meets the MAR-147 standards. Particular attention should be given to ensuring that the training that is delivered also meets the requirements of MAR-66 and the aircraft technologies as appropriate.
3. The contract between the MAR-147 approved maintenance training organisation and the sub-contractor should contain:
 - a provision for the AACM to have the right of access to the sub-contractor.
 - a provision for the sub-contractor to inform the MAR-147 approved maintenance training organisation of any change that may affect its MAR-147 approval, before any such change takes place.

GM 147.145(d) Privileges of the MAR-147 approved maintenance training organisation

(See MAR 147.145(d))

1. The pre audit procedure should focus on establishing compliance with the training and examination standards set out in MAR-147 and MAR-66.
2. The fundamental reason for allowing a MAR-147 approved maintenance training organisation to sub-contract certain basic theoretical training courses is to permit the approval of maintenance training organisations which may not have the capacity to conduct training courses on all MAR-66 modules.
3. The reason for allowing the subcontracting of training modules 1 to 6 and 8 to 10 only is, most of the related subjects can generally also be taught by training organisations not specialised in aircraft maintenance and the practical training element as specified in MAR 147.200 does not apply to them. On the contrary training modules 7 and 11 to 17 are specific to aircraft maintenance and include the practical training element as specified in MAR 147.200. The intent of the 'limited subcontracting' option as specified in paragraph MAR 147.145 is to grant MAR-147 approvals only to those organisations having themselves at least the capacity to teach on aircraft maintenance specific matters.

GM 147.145(d)3 Privileges of the MAR-147 approved maintenance training organisation

(See MAR 147.145(d))

In the case of type training and examination, the reason for allowing only subcontracting to powerplant and avionic systems is that the related subjects can generally also be imparted by certain organisations specialised in these domains such as the Type Certificate Holder of the powerplant or the OEMs of these avionics systems. In such a case, the type training course should make clear how the interfaces with the airframe are addressed and by whom (the subcontracted organisation or the MAR-147 approved maintenance training organisation itself).

AMC 147.145(f)**Privileges of the maintenance training organisation**

(See MAR 147.145(f))

When an organisation approved to provide basic knowledge training or type training is also approved to provide type examination in the cases where type training is not required, appropriate procedures in the MTOE should be developed and approved, including:

- The development and the conduct of the type examination;
- The qualification of the examiners and their currency.

In particular, emphasis should be put when such an examination is not regularly conducted or when the examiners are not normally involved in aircraft or activities with technology corresponding to the aircraft type subject to examination. An example would be the case of an organisation providing basic knowledge training only for the B1.1 licence. This organisation should justify how they run type examinations for single piston-engine helicopters in the case of a B1.4 licence.

AMC 147.200(b)**The approved basic training course**

(See MAR 147.200(b))

Each MAR-66 licence category or sub-category basic training course may be subdivided into modules or sub-modules of knowledge and may be intermixed with the practical training elements subject to the required time elements of MAR 147.200(f) and (g) being satisfied.

AMC 147.200(d)**The approved basic training course**

(See MAR 147.200(d))

1. Where the maintenance training organisation contracts the practical training element either totally or in part to another organisation in accordance with MAR 147.100(d), the organisation in question should ensure that the practical training elements are properly carried out.
2. At least 30% of the practical training element should be carried out in an actual maintenance working environment.

AMC 147.200(f)**The approved basic training course**

(See MAR 147.200(f))

1. In order to follow pedagogical and human factors principles, the maximum number of training hours per day for the theoretical training should not be more than 6 hours. A training hour means 60 minutes of tuition excluding any breaks, examination, revision, preparation and aircraft visit. In exceptional cases, the AACM may allow deviation from this standard when it is properly justified that the proposed number of hours follows pedagogical and human factors principles. These principles are especially important in those cases where:
 - Theoretical and practical training are performed at the same time;
 - Training and normal maintenance duty/apprenticeship are performed at the same time.
2. The minimum participation time for the trainee to meet the objectives of the course should not be less than 90 %

of the tuition hours. Additional training may be provided by the training organisation in order to meet the minimum participation time. If the minimum participation defined for the course is not met, a certificate of recognition should not be issued.

AMC 147.200(g) The approved basic training course

(See MAR 147.200(g))

Typical conversion durations are given below:

- (a) The approved basic training course to qualify for conversion from holding a MAR-66 aircraft maintenance licence in sub-category A1 to sub-category B1.1 or B2 should not be less than 1600 hours and for conversion from holding a MAR-66 aircraft maintenance licence in sub-category A1 to sub-category B1.1 combined with B2 should not be less than 2200 hours. The course should include between 60% and 70% knowledge training.
- (b) The approved basic training course to qualify for conversion from holding a MAR-66 aircraft maintenance licence in sub-category B1.1 to B2 or category B2 to B1.1 should not be less than 600 hours, and should include between 80% and 85% knowledge training.
- (c) The approved basic training course to qualify for conversion from holding a MAR-66 aircraft maintenance licence in sub-category B1.2 to sub-category B1.1 should not be less than 400 hours, and should include between 50% and 60% knowledge training.
- (d) The approved basic training course to qualify for conversion from holding a MAR-66 aircraft maintenance licence in one sub-category A to another sub-category A should not be less than 70 hours, and should include between 30% and 40% knowledge training.

AMC 147.205 Basic knowledge examinations

(See MAR 147.205)

The AACM may accept that the maintenance training organisation can conduct examination of students who did not attend an approved basic course at the organisation in question.

AMC 147.210(a) Basic practical assessments

(See MAR 147.210(a))

Where the maintenance training organisation approved under MAR-147 contracts the practical training element either totally or in part to another organisation in accordance with MAR 147.100(d) and chooses to nominate practical assessors from the other organisation, the organisation in question should ensure that the basic practical assessments are carried out.

AMC 147.210(b) Basic practical assessments

(See MAR 147.210(b))

An assessed pass for each student should be granted when the practical assessor is satisfied that the student meets the criteria of MAR 147.200(e). This means that the student has demonstrated the capability to use relevant tools/equipment/test equipment as specified by the tool/equipment/test equipment manufacturer and the use of

maintenance manuals in that the student can carry out the required inspection/testing without missing any defects, can readily identify the location of components and is capable of correct removal/fitment/adjustment of such components. The student is only required to carry out enough inspection/testing and component removal/fitment/adjustments to prove capability. The student should also show an appreciation of the need to ensure clean working conditions and the observance of safety precautions for the student and the product. In addition, the student should demonstrate a responsible attitude in respect to flight safety and airworthiness of the aircraft.

Appendix 3 to AMC to MAR-66 provides criteria for the competence assessment performed by the designated assessors (and their qualifications).

AMC 147.300 Aircraft type/task training

(See MAR 147.300)

Aircraft type training may be sub-divided into airframe and/or powerplant and/or avionics/electrical systems type training courses. A MAR-147 approved maintenance training organisation may be approved to conduct airframe type training only, powerplant type training only or avionics/electrical systems type training only or any combination thereof.

1. Airframe type training course means a type training including all relevant aircraft structure and electrical and mechanical systems excluding the powerplant.
2. Powerplant type training course means type training on the bare engine, including the build-up to a quick engine change unit.
3. The Interface of the engine/airframe systems should be addressed by either airframe or powerplant type training course. In some cases, such as for general aviation, it may be more appropriate to cover the interface during the airframe course due to the large variety of aircraft that can have the same engine type installed.
4. Avionic/electrical systems type training course means type training on avionics and electrical systems covered by but not necessarily limited to ATA (Air Transport Association) chapters 22, 23, 24, 25, 27, 31, 33, 34, 42, 44, 45, 46, 73 and 77 or equivalent.

AMC 147.400 Equivalent safety cases

(See MAR 147.400)

All proposed equivalent safety cases should be submitted to the AACM for consideration as an acceptable case.

AMC 147.400(b) Equivalent safety cases

(See MAR 147.400(b))

Education institutions may be exempt from:

1. The need to be an organisation as specified in MAR 147.10.
2. The need for an accountable manager but subject to the limitation that the institution appoints a senior person to manage the training organisation and such person has a budget sufficient to operate the organisation to the standard of MAR-147.

The need for the independent audit part of a quality system subject to the institution operating an independent schools inspectorate to audit the MAR-147 approved maintenance training organisation at the frequency required by MAR-147.

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Section 3 – Appendices to MAR-147

Appendix 1 to MAR-147 – Basic training course duration

The minimum duration of a complete basic training course shall be as follows:

Basic Course	Duration (in hours)	Theoretical Training Ratio (in %)
A1	800	30 to 35
A2	650	30 to 35
A3	800	30 to 35
A4	800	30 to 35
B1.1	2400	50 to 60
B1.2	2000	50 to 60
B1.3	2400	50 to 60
B1.4	2400	50 to 60
B2	2400	50 to 60
B3	1000	50 to 60

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Appendix 2 to MAR-147 – (Reserved)

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Appendix 3 to MAR-147 – Certificates of Recognition referred to in MAR-147

1. Basic Training/Examination

The basic training certificate template (AACM FORM 148) shall be used for recognition of completion of either the basic training or the basic examination, or both the basic training and basic training examinations. The training certificate shall clearly identify each individual module examination by date passed together with the corresponding version of Appendix 1 to MAR-66.

2. Type Training/Examination

The type training certificate template (AACM FORM 149) shall be used for recognition of completion of either the theoretical elements or the practical elements, or both the theoretical and practical elements of the type rating training course.

The certificate shall indicate the airframe/engine combination for which the training was imparted. The appropriate references shall be deleted as applicable and the course type box shall detail whether only the theoretical elements or the practical elements were covered or whether theoretical and practical elements were covered.

The training certificate shall clearly identify if the course is a complete course or a partial course (such as an airframe or powerplant or avionic/electrical course) or a difference course based upon the applicant previous experience, for instance A340 (CFM) course for A320 technicians. If the course is not a complete one, the certificate shall identify whether the interface areas have been covered or not.

AMC to Appendix 3 to MAR-147

As stated in Appendix 3 to MAR-147, the AACM Form 148 ‘Certificate of Recognition for Basic Training/Examination’ may be issued after completion of either basic training, basic examination or both basic training and basic examination.

Some examples of cases where an AACM Form 148 could be issued are the following:

- After successful completion of a full basic course in one licence (sub) category including successful completion of the examinations of all the corresponding modules.
- After successful completion of a full basic course in one licence (sub) category without performing examinations. The examinations may be performed at a different MAR-147 organisation (this organisation will issue the corresponding Certificate of Recognition for those examinations) or at the AACM.
- After successful completion of all module examinations corresponding to a licence (sub) category.
- After successful completion of certain modules/sub-modules/subjects. It must be noted that ‘successful completion of a course’ (without the module examinations) means successful completion of the theoretical and practical training including the corresponding practical assessment.

CERTIFICATE OF RECOGNITION**(AACM Form 148)**

Reference: [XXXXXX]

The certificate of recognition is issued to:

[NAME]

[DATE and PLACE OF BIRTH]

By:

[COMPANY NAME AND ADDRESS]

Reference: [YYYYYY]

a maintenance training organisation approved to provide training and conduct examinations within its approval schedule and in accordance with MAR-147 (as amended) as published under the Aeronautical Circular No. AC/PEL/014.

This certificate confirms that the above named person either successfully passed the approved basic training course (**) or the basic examination (**) stated below:

[BASIC TRAINING COURSE (**)] or/and [BASIC EXAMINATION (**)]

[LIST OF MAR-66 MODULES/DATE OF EXAMINATION PASSED]

Date:

Signed:

For: [COMPANY NAME]

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CERTIFICATE OF RECOGNITION**(AACM Form 149)**

Reference: [XXXXXX]

The certificate of recognition is issued to:

[NAME]

[DATE and PLACE OF BIRTH]

By:

[COMPANY NAME AND ADDRESS]

Reference: [YYYYYY]

a maintenance training organisation approved to provide training and conduct examinations within its approval schedule and in accordance with MAR-147 (as amended) as published under the Aeronautical Circular No. AC/PEL/014.

This certificate confirms that the above named person either successfully passed the theoretical (**) and/or the practical elements (**) of the approved type training course stated below:

[AIRCRAFT TYPE TRAINING COURSE (**)]

[START and END DATES]

[SPECIFY THEORETICAL ELEMENTS AND/OR PRACTICAL ELEMENTS]

or

[AIRCRAFT TYPE EXAMINATION (**)]

[END DATE]

Date:

Signed:

For: [COMPANY NAME]

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Section 4 – APPENDICES TO AMC TO MAR-147

Appendix 1 to AMC to MAR-147 – Maintenance Training Organisation Exposition (MTOE)

1. The following subject headings form the basis of the MTOE required by MAR 147.140.
2. Whilst this format is recommended, it is not mandatory to assemble the MTOE in this manner as long as a cross reference index is included in the MTOE as an Appendix and the Part 1 items remain in Part 1.
3. Part 2, 3 and 4 material may be produced as separate detailed manuals subject to the main exposition containing the part 2, 3 and 4 fundamental principles and policy on each item. It is then permitted to delegate the approval of these separate manuals to the senior person but this fact and the procedure should be specified in para 1.11.
4. Where an organisation is approved in accordance with any other MAR(s) which require an exposition, it is acceptable to combine the exposition requirements by merging the Part 1 items and adding the parts 2, 3 and 4. When this method is used, it is essential to include the cross reference index of Part 4 item 4.3.

PART 1 – MANAGEMENT

- 1.1. Corporate commitment by accountable manager
- 1.2. Management personnel
- 1.3. Duties and responsibilities of management personnel, instructors, knowledge examiners and practical assessors
- 1.4. Management personnel organisation chart
- 1.5. List of Instructional and Examination Staff

Note: A separate document may be referenced
- 1.6. List of approved addresses
- 1.7. List of Sub-contractors as per MAR 147.145(d)
- 1.8. General description of facilities at para 1.6 addresses
- 1.9. Specific list of courses approved by the Authority
- 1.10. Notification procedures regarding changes to organisation
- 1.11. Exposition and associated manuals amendment procedure

PART 2 – TRAINING AND EXAMINATION PROCEDURES

- 2.1. Organisation of courses

- 2.2. Preparation of course material
- 2.3. Preparation of classrooms and equipment
- 2.4. Preparation of workshops/maintenance facilities and equipment
- 2.5. Conduct of theoretical training & practical training (during basic knowledge training and type/task training)
- 2.6. Records of training carried out
- 2.7. Storage of training records
- 2.8. Training at locations not listed in para 1.6
- 2.9. Organisation of examinations
- 2.10. Security and preparation of examination material
- 2.11. Preparation of examination rooms
- 2.12. Conduct of examinations (basic knowledge examinations, type/task training examinations and type examinations)
- 2.13. Conduct of practical assessments (during basic knowledge examinations and type/task training)
- 2.14. Marking and record of examinations
- 2.15. Storage of examination records
- 2.16. Examinations at locations not listed in para 1.6
- 2.17. Preparation, control & issue of basic training course certificates
- 2.18. Control of sub-contractors

PART 3 – TRAINING SYSTEM QUALITY PROCEDURES

- 3.1. Audit of training
- 3.2. Audit of examinations
- 3.3. Analysis of examination results
- 3.4. Audit and analysis remedial action
- 3.5. Accountable manager annual review
- 3.6. Qualifying the instructors
- 3.7. Qualifying the examiners and the assessors
- 3.8. Records of qualified instructors & examiners

PART 4 – APPENDICES

- 4.1. Example of documents and forms used
- 4.2. Syllabus of each training course
- 4.3. Cross reference index - if applicable