

Singapore Airworthiness Requirements Part 147 Approved Maintenance Training Organisations

Publication of the
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SINGAPORE AIRWORTHINESS REQUIREMENTS

PART 147

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**SINGAPORE AIRWORTHINESS REQUIREMENTS
PART 147**

SECTION 1 – REQUIREMENTS

SUB-PART A - GENERAL

SAR-147.1 General

Pursuant to paragraph 17A of the Air Navigation Order, the SAR-147 prescribes the requirements of an approved maintenance training organisation. An organisation seeking to obtain a maintenance training organisation approval shall demonstrate compliance with the requirements of the SAR-147 and all other applicable requirements published by the Minister or the Director-General of Civil Aviation.

SAR-147.3 Effectivity

- (a) The SAR-147 replaces the SAR Chapter 6.7 for approval of maintenance training organisations was issued on 15 November 2005 and became effective from 1 January 2006. Amendment 1 is issued and effective on 23 July 2010. Amendment 2 is issued and effective on 28 September 2011. Amendment 3 is issued and effective on 8 March 2013.
- (b) Amendment 4 is issued and effective on 26 February 2016.

SAR-147.5 Definitions

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

'Accountable Manager' means the manager who has corporate authority for ensuring that training can be finance and carried out to the standards required by the Director-General of Civil Aviation.

'Assessors' are persons authorised by the maintenance training organisation to conduct practical training assessment.

'Director-General of Civil Aviation (DGCA)' refers to the 'Chief Executive' as defined in the Air Navigation Order. This will include any person authorised by him to act on his behalf and any person acting in that capacity.

'Examiners' are persons authorised by the maintenance training organisation to conduct theoretical knowledge examination.

'Instructors' are persons authorised by the maintenance training organisation to conduct theoretical instruction and/or practical training.

'Quality system' means the documented organizational procedures and policies; internal audit of those policies and procedures; management review and recommendation for quality improvement.

SAR-147.10 Applicability

This SAR-147 establishes the requirements to be met by organisations seeking approval to conduct:

- (a) training and examination as specified in SAR-66.
- (b) training and examination for qualifying certifying staff of SAR-145 organisations holding Class C ratings.

SAR-147.15 Application and Issue

- (a) An application for an approval or for the amendment of an existing maintenance training organisation approval shall be made in a form and manner as determined by the DGCA.
- (b) An applicant who meets the requirements of this SAR-147 and has paid any fees prescribed under the Air Navigation Order may be granted a maintenance training organisation approval.

SUB-PART B - ORGANISATIONAL REQUIREMENTS

SAR-147.100 Facility requirements

- (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 class size for knowledge training and the measures put in place to ensure effective training shall be specified in the maintenance training organisation exposition and subject to the approval of the DGCA.

- (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 sub-paragraph (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 maintenance training 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 DGCA shall require access to any such 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 SAR-147.115(d).
- (f) The maximum number of students undergoing practical training during any training course shall not exceed 16 per 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 SAR-147.125. The storage facilities and office accommodation may be combined, subject to adequate security.
- (i) A library shall be provided containing all technical material appropriate to the scope and level of training undertaken.
- carried out to the standard required by this SAR-147.
- (b) A senior person or group of persons acceptable to the DGCA, whose responsibilities include ensuring that the maintenance training organisation is in compliance with the requirements of this SAR-147, shall be nominated. Such person(s) must 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 sub-paragraph (a).
- (c) The accountable manager shall nominate a sub-paragraph (b) senior person, with responsibility for monitoring the SAR-147.130 internal quality assurance system including the associated feedback system. Such senior person must have direct access to the accountable manager to ensure that the accountable manager is kept properly informed on quality, standards and compliance matters.
- (d) The maintenance training organisation shall employ or contract sufficient qualified staff to plan, manage and carry out the knowledge and practical training, and to conduct knowledge examinations and practical assessments in accordance with the approval.
- (e) Notwithstanding sub-paragraph (d), when the practical training and assessments are contracted to another organisation, the contracted organisation staff may be nominated to carry out the practical training and assessments.
- (f) Notwithstanding sub-paragraph (e), when another organisation is contracted to provide practical training and assessments, such organisation's staff may be nominated to carry out practical training and assessment.
- (g) Any person may carry out any combination of the roles of instructor, knowledge examiner and practical assessor, subject to compliance with sub-paragraph (h).
- (h) The experience, qualifications and competency of instructors, knowledge examiners and practical assessors shall be established to a standard acceptable to the DGCA and must be appropriate to the course(s) being taught or examined. Potential instructors must be trained in instructional techniques.
- (i) The maintenance training organisation shall establish a programme to update instructors,

SAR-147.105 Personnel requirements

- (a) The maintenance training organisation shall appoint an accountable manager who has corporate authority for ensuring that all training commitments can be financed and

knowledge examiners and practical assessors at least once in every 24 months. The update training shall cover the latest technology, practical skills, human factors and the latest training techniques appropriate to the scope of his authorisation.

SAR-147.110 Records of instructors, examiners and assessors

- (a) The maintenance training 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. Such persons must be provided with a copy of their Terms of Reference.

SAR-147.115 Instructional equipment

- (a) Each classroom shall have appropriate 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 SAR-147.100(d) must 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 SAR-147.100(d) must have an appropriate selection of aircraft, engines, aircraft parts and avionics equipment.
- (d) The aircraft type training organisation as specified in SAR-147.100(e) must have access to the appropriate aircraft type. Synthetic training devices may be used when the DGCA is satisfied that such synthetic training devices ensure adequate training standards.

SAR-147.120 Maintenance training material

- (a) Maintenance training course material shall be provided to the student and cover as applicable:

- (1) the basic knowledge syllabus specified in SAR-66 for the relevant aircraft maintenance licence category or subcategory;

- (2) the basic knowledge syllabus for certifying staff in SAR-145 organisations holding Class C ratings

- (3) the type course content required by SAR-66 for the relevant aircraft type and aircraft maintenance licence category or subcategory.

- (b) Students shall have access to examples of maintenance documentation and technical information of the library as specified in SAR-147.100(i).

SAR-147.125 Records

- (a) The maintenance training organisation shall keep all student training, examination and assessment records for at least five years following completion of the particular student's course.
- (b) Details of each approved course shall be kept for at least five years following the cessation of the course.

SAR-147.130 Training procedures and internal quality assurance system

- (a) The maintenance training organisation shall establish procedures acceptable to the DGCA to ensure proper training and examination standards and compliance with all relevant requirements in this SAR-147.
- (b) The maintenance training organisation shall establish a quality system including:
 - (1) an independent audit function to monitor training and examination standards, the integrity of knowledge examinations and practical assessments, and compliance with and adequacy of the procedures; and
 - (2) a feedback system of audit findings to the person(s) and ultimately to the accountable manager referred to in 147.105(a) to ensure, as necessary, timely implementation of effective corrective and preventive action.

SAR-147.135 Examinations

- (a) The maintenance training organisation shall establish procedures to ensure appropriate control of access and security of all questions.
- (b) Any student found during a knowledge examination to be cheating, abetting or

attempting to cheat, 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 DGCA shall be informed of any such incident within 7 days and provided with the details of any inquiry within one calendar month.

- (c) Any examiner found during an examination to be providing answers to any student being examined shall be disqualified from acting as an examiner and the examination declared void. The DGCA shall be informed of any such occurrence within 7 days and provided with details of any inquiry within one calendar month.

SAR-147.140 Maintenance training organisation exposition

- (a) The maintenance training 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 SAR-147 and shall be complied with at all times.
- (2) the title(s) and name(s) of the person(s) accepted by the DGCA in accordance with SAR-147.105(b).
- (3) the duties and responsibilities of the person(s) specified in sub-paragraph (a)(2), including matters on which they may deal directly with the competent authority on behalf of the maintenance training organisation.
- (4) a maintenance training organisation chart showing associated chains of responsibility of the person(s) specified in sub-paragraph (a)(2).
- (5) a list of the training instructors, knowledge examiners and practical assessors, which may be kept in a separate document.
- (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 SAR-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 and internal quality assurance system as required by SAR-147.130(a).
- (10) the maintenance training organisation's control procedure, as required by SAR-147.145(c), when authorised to conduct training, examination and assessments in locations different from those specified in SAR-147.145(b).
- (11) a list of the locations pursuant to SAR-147.145(b).
- (12) a list of organisations, if appropriate, as specified in SAR-147.145(d).

- (b) The maintenance training organisation's exposition and any subsequent amendments shall be approved by the DGCA.

SAR-147.145 Privileges of the maintenance training organisation

- (a) The maintenance training organisation may carry out the following as permitted by and in accordance with the maintenance training organisation exposition:

- (1) basic training courses to the SAR-66 syllabus, or part thereof.
- (2) aircraft type/task training courses in accordance with SAR-66.
- (3) aircraft type examinations on behalf of the DGCA at the end of each course.
- (4) basic knowledge courses for certifying staff in SAR-145 organisations holding Class C ratings.
- (5) the issue of certificates in accordance with Appendix 3 following successful completion of the approved basic or aircraft type training courses.

- (b) Training, knowledge examinations and practical assessments may only be carried out at the locations identified in the approval

certificate and/or at any location specified in the maintenance training organisation exposition.

- (c) Notwithstanding sub-paragraph (b), the maintenance training organisation may only conduct training, knowledge examinations and practical assessments in locations different from the sub-paragraph (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 an organisation not approved in accordance with the SAR-147 only when under the control of the maintenance training organisation quality system.
- (2) The subcontracting of basic theoretical training is limited to SAR-66, Appendix 1, 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 training.

SAR-147.150 Changes to the maintenance training organisation

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

SAR-147.155 Continued validity of approval

- (a) Unless the maintenance training organisation's approval has previously been surrendered, superseded, suspended, revoked or expired by virtue of exceeding the expiry date specified in the approval certificate, the continued validity of the approval is dependent upon:
- (1) the maintenance training organisation remaining in compliance with this SAR-147 and any other conditions specified by the DGCA;
 - (2) the DGCA being granted access to the maintenance training organisation to determine continued compliance with this SAR-147; and
 - (3) the payment of any fees prescribed under the Air Navigation Order. Failure to pay entitles the DGCA to suspend, but does not automatically render the approval invalid.
- (b) Upon surrender or revocation of the maintenance training organisation approval, the certificate of approval shall be returned to the DGCA.

SAR-147.160 Equivalent Training Standard

- (a) The DGCA may exempt a SAR-147 approved maintenance training organisation from a requirement in this SAR-147 when satisfied that a situation exists not envisaged by a SAR-147 requirement and subject to compliance with any supplementary condition(s) that the Authority considers necessary to ensure equivalent training standard.
- (b) The DGCA may exempt an organisation from a requirement in SAR-147 on an individual case by case permission basis only subject to compliance with any supplementary condition(s) the Authority considers necessary to ensure equivalent training standard.

SUB-PART C - THE APPROVED BASIC TRAINING COURSE

SAR-147.200 The approved basic training course

- (a) Unless otherwise agreed with the DGCA in accordance with a procedure in the maintenance training organisation exposition, each new basic training course must be approved by the DGCA before implementation.

- (b) The approved basic training course shall consist of knowledge training, knowledge examination, practical training and a practical assessment, where applicable.

Note: Basic Knowledge Examinations are conducted by the Safety Policy & Licensing Division of the Civil Aviation Authority of Singapore (CAAS). Basic knowledge examinations conducted by maintenance training organisations will be deemed to be preparatory examinations and are not considered equivalent to the SAR-66 Basic Knowledge Examinations conducted by the Safety Policy & Licensing Division of CAAS.

- (c) The knowledge training element shall cover the subject matter for a category or subcategory A, B1 or B2 aircraft maintenance licence as specified in SAR-66.
- (d) Reserved
- (e) 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 SAR-66 complete module.
- (f) 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.
- (g) The duration of basic training courses shall not be less than those specified in Appendix 1.
- (h) 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.
- (i) A minimum attendance policy shall be established by the maintenance training organisation.

Note : As a minimum standard, students who have missed more than 15 percent of the course through absences shall be deemed not to have completed the course.

SAR-147.205 Knowledge examinations for workshop certifying staff

Knowledge examinations for certifying staff of SAR-145 organisations holding Class C ratings shall:

- (a) be in accordance with established procedures.

- (b) be conducted without the use of training notes.
- (c) cover a representative cross section of subjects taught.

Note: Knowledge examinations described in this paragraph are those conducted in accordance with the privileges of the maintenance training organisation under SAR-147.145(a)(4) and are not considered SAR-66 Basic Knowledge Examinations.

SAR-147.210 Basic practical assessment

- (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 SAR-147.200(e) to be deemed to have completed the relevant module.

SUB-PART D - AIRCRAFT TYPE/TASK TRAINING

SAR-147.300 Aircraft type/task training

- (a) Unless otherwise agreed with the DGCA in accordance with a procedure in the maintenance training organisation exposition, each new type/task training course must be approved by the DGCA before implementation.
- (b) A maintenance training organisation may be approved to carry out SAR-66 aircraft type and/or task training when in compliance with the standard specified in SAR-66.
- (c) A minimum attendance policy shall be established by the maintenance training organisation.

Note : As a minimum standard, students who have missed more than 15 percent of the course through absences shall be deemed not to have completed the course.

SAR-147.305 Aircraft type examinations and task assessments

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

**SINGAPORE AIRWORTHINESS REQUIREMENTS
PART 147**

SECTION 2 - ACCEPTABLE MEANS OF COMPLIANCE (AMC)

1 GENERAL

- 1.1 This section contains Acceptable Means of Compliance (AMC) that has been included in the SAR-147 to assist the SAR-147 approved maintenance training organisation in meeting the necessary requirements.
- 1.2 Where a particular SAR paragraph does not have an Acceptable Means of Compliance, it is considered that no supplementary material is required.
- 1.3 In addition, Advisory Circulars issued by the DGCA may contain further Acceptable Means of Compliance.

2 PRESENTATION

- 2.1 The Acceptable Means of Compliance are presented in full-page width on loose pages, each page being identified by the date of issue or the change number under which it is amended or re-issued.
- 2.2 A numbering system has been used in which the Acceptable Means of Compliance uses the same number as the paragraph in SAR to which it refers. The number is preceded by the letters AMC to distinguish the material from the SAR itself.
- 2.3 The acronym AMC also indicate the nature of the material and for this purpose is defined as follows:

Acceptable Means of Compliance (AMC) illustrate a means, or several alternative means, but not necessarily the only possible means by which a requirement can be met. It should however, be noted that where a new AMC is developed, any such AMC (which may be additional to an existing AMC) may be amended into the document or issued as a separate Advisory Circular.

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AMC 147.100(i) Facility requirements

- 1 For approved basic maintenance training courses this means holding and ensuring reasonable access to copies of the Air Navigation Order, relevant Singapore Airworthiness Requirements, notices and circulars issued by the DGCA, examples of typical aircraft maintenance manuals, service bulletins, airworthiness directives, aircraft and component records, release documentation procedures manuals and aircraft maintenance programmes.
- 2 Except for the Air Navigation Order, relevant Singapore Airworthiness Requirements, and notices and circulars issued by the DGCA, 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.

AMC 147.105 Personnel requirements

- 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 of 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 of managing the internal quality assurance system as specified in paragraph SAR-147.130(b) and an examination manager with the responsibility of managing the relevant SAR-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 DGCA verifying and being satisfied that all functions can be properly carried out in combination.
- 3 When the organisation is also approved against other parts of the Singapore Airworthiness Requirements which contain some similar functions then such functions may be combined.

AMC 147.105(b) and (g) Personnel requirements

The qualifications and experience of each person nominated to hold a position required by SAR-147.105(b) should be submitted to the DGCA using form CAAS(AW) 21T.

AMC 147.105(f) Personnel requirements

Any person currently accepted by the DGCA prior to SAR-147 coming into force may continue to be accepted in accordance with SAR-147.105(f).

AMC 147.105(h) Personnel requirements

At least 35 hours of updating training should be provided but may be adjusted to the scope of training of the maintenance training organisation and the particular instructor/examiner.

AMC 147.110(a) Records of instructors, examiners and assessors

- 1 The following minimum information as applicable should be kept on record in respect of each instructor, knowledge examiner and practical assessor:
 - (a) Name
 - (b) Date of Birth
 - (c) Experience
 - (d) Qualifications

- (e) Training History (before entry)
 - (f) Subsequent Training
 - (g) Scope of activity
 - (h) Date of employment/contract
- 2 The record may be kept in any format but should be under the control of the maintenance training 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 Authority is an authorised person when investigating the records system for initial and continued approval or when the Authority has cause to doubt the competence of a particular person.

AMC 147.115(c) and (d) Instructional equipment

- 1 An *appropriate selection of aircraft parts* means appropriate in relation to the particular subject module or sub-module of SAR-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 SAR-66 being instructed. For example 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 SAR-147.100(d), that there may be an agreement with a maintenance organisation approved under SAR-145 to access such parts, equipment, engines or aircraft.

AMC 147.120(a) Maintenance training material

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 147.125(b) Records

Details of the approved course should at least include the following information:

- 1 Name of course
- 2 Course control number and revision status
- 3 Course objectives
- 4 Name of instructors
- 5 Reference material
- 6 Syllabus, including any practical training session, if applicable
- 7 Course duration including number of training hours for each topic
- 8 Course timetable detailing the topics to be covered for each day of the course
- 9 Format of examination
- 10 Signature(s) of senior person responsible for the development of the course

AMC 147.130(b) Training procedures and internal quality assurance system

- 1 The independent audit procedure should ensure that all aspects of SAR-147 compliance be checked at least once in every 12 months by trained auditing personnel and may be carried out as a complete single exercise or subdivided over a 12-month period in accordance with a scheduled plan.
- 2 The internal quality assurance system should also include:
 - (a) procedures to ensure quality indicators, such as personnel and customer feedback and examination pass rates are monitored to identify existing problems or potential causes of problems within the system and;
 - (b) management review procedures to measure the effectiveness of any corrective action taken and to ensure the continuing effectiveness of internal quality assurance system in satisfying the requirements of SAR-147
- 3 In a small maintenance training organisation the independent audit function may be contracted to another maintenance training organisation approved under SAR-147 or a competent person acceptable to the DGCA. 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.
- 4 Where the maintenance training organisation is also approved under another part of the Singapore Airworthiness Requirements requiring a quality system, then such quality systems may be combined.
- 5 When training or examination is carried out under the sub-contract control system:
 - (a) a pre audit procedure should be established for the SAR-147 approved maintenance training organisation to audit a prospective sub-contractor to determine whether the services of the sub-contractor meet the intent of the SAR-147.
 - (b) a renewal audit of the subcontractor should be performed at least once every 12 months to ensure continuous compliance with the SAR-147.
 - (c) the sub-contract control procedure should record audits of the subcontractor and to have a corrective action follow-up plan.
- 6 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.

AMC 147.135 Examinations

- 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 examination staff.

AMC 147.140 Maintenance training organisation exposition

- 1 A recommended format of the exposition is included in Appendix 2.
- 2 When the maintenance training organisation is approved in accordance with any other part of the Singapore Airworthiness Requirements which also requires an exposition, the exposition required by the other Singapore Airworthiness Requirements 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 SAR-147.140 and a cross reference index is included based on Appendix 2.
- 3 Maintenance training organisations located outside Singapore approved by another authority under the regulations of that authority may use a common exposition provided that all SAR-147 requirements are met. Differences between the SAR-147 requirements and the requirements of the other

authority/authorities should be identified and indicated. The common exposition should have an index based on Appendix 2 showing where those parts pertaining to the SAR-147 are covered.

- 4 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 2 item 2.18 plus a list of sub-contractors as required by SAR-147.140(a)(12) and detailed in Appendix 2 item 1.7.
- 5 The DGCA may approve a delegated exposition approval system for all changes other than those affecting the approval.

AMC 147.145(a) Privileges of the maintenance training organisation

- 1 An approved course certificate should contain the following statement:

[Name of the student] has successfully passed the above approved course and in that respect has met part of the requirements for the [e.g. issue of a SAR-66 B1.1 licence] under the Singapore Airworthiness Requirements

- 2 A typical template for an approved course certificate is as follows:-

COURSE CERTIFICATE SERIAL NUMBER
NAME OF APPROVED SAR-147 ORGANISATION
MTO APPROVAL NUMBER
NAME OF THE APPROVED COURSE AND COURSE REFERENCE/ID CODE
MODULES PASSED
DURATION OF THE APPROVED COURSE
NAME OF STUDENT
<i>has successfully passed the above approved course and in that respect has met part of the requirements for the [e.g. issue of a SAR-66 B1.1 licence] under the Singapore Airworthiness Requirements</i>
NAME AND AUTHORISED SIGNATURE(S) OF PERSON ISSUING THE CERTIFICATE

AMC 147.145(d) Privileges of the maintenance training organisation

- 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 SAR-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 SAR-147 approved maintenance training organisation's students should meet requirements of SAR-147 for the duration of that training or examination and it remains the SAR-147 organisation's responsibility to ensure such requirements are satisfied.
- 2 The maintenance training organisation approved under SAR-147 is not required to have complete facilities and personnel for training that it needs to subcontract but it should have its own expertise to determine that the sub-contractor meets the SAR-147 standards. Particular attention should be given to ensuring that the training that is delivered also meets the requirements of SAR-66 and the aircraft technologies as appropriate.
- 3 The contract between the maintenance training organisation approved under SAR-147 and the sub-contractor should contain:

- (a) a provision for the DGCA to have right of access to the sub-contractor;
- (b) a provision for the sub-contractor to inform the SAR-147 approved maintenance training organisation of any change that may affect its SAR-147 approval, before any such change takes place.

AMC 147.200 The approved basic training course

For the purpose of this paragraph, a training hour means 60 minutes' training, without pauses.

AMC 147.200(a) The approved basic training course

CAAS may approve a partial basic training course for licence categories B1 and B2 provided the course meets the following conditions relating to the modules to be completed and the approximate course duration:

Licence Category	Modules to be offered in the partial basic training course	Approximate Course Duration (hours)
B1	M01, M02, M03, M04, M05, M06, M07, M08, M09, M10 (including practical for M06, M07) or the remainder of modules required for the Category B1 aircraft maintenance licence, as required under Appendix 1 of SAR-66	1355
B2	M01, M02, M03, M04, M05, M06, M07, M08, M09, M10 (including practical for M06, M07) or the remainder of modules required for the Category B2 aircraft maintenance licence, as required under Appendix 1 of SAR-66	1340

AMC 147.200(b) The approved basic training course

Each licence category or subcategory 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 SAR-147.200(f) to (g) inclusive being satisfied.

AMC 147.200(e) The approved basic training course

- 1 Where the maintenance training organisation approved under SAR-147 contracts the practical training element either totally or in part to another organisation in accordance with SAR-147.100(d), the contracting organisation should ensure that the practical training elements are properly carried out.
- 2 At least 30% of the practical training element should be carried in an actual maintenance working environment.

AMC 147.200(g) The approved basic training course

The duration for any refresher training conducted should not be used to satisfy the minimum duration specified in Appendix 1.

AMC 147.200(h) The approved basic training course

Typical conversion durations are given below:

SAR-66 Licence Category/Subcategory Currently Held	Basic Training Course to Qualify for SAR-66 Licence Category/Subcategory	Minimum Duration	Remarks
A1	B1.1 or B2	1,600 hours	60%-70% knowledge training
A1	B1.1 and B2	2,200 hours	60%-70% knowledge training
B1.1	B2	600 hours	80%-85% knowledge training
B2	B1.1	600 hours	80%-85% knowledge training
B1.2	B1.1	400 hours	50%-60% knowledge training
Any 'A' subcategory	Any other 'A' subcategory	70 hours	30%-40% knowledge training

AMC 147.210(a) Basic practical assessment

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

AMC 147.210(b) Basic practical assessment

An assessed pass for each student should be granted when the practical assessor is satisfied that the student meets the criteria of SAR-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.

AMC 147.300 Aircraft type/task training

- 1 Aircraft type training may be sub-divided in airframe type training, powerplant type training, or avionic systems type training. A maintenance training organisation approved under SAR-147 may be approved to conduct airframe type training only, powerplant type training only or avionics/electrical systems type training only.
- 2 Airframe type training means type training including all relevant aircraft structure and electrical and mechanical systems excluding the powerplant.
- 3 Powerplant type training means type training on the bare engine, including the build-up to a quick engine change unit.
- 4 The interface of the engine/airframe systems should be addressed by either airframe or powerplant type training.
- 5 Avionic/electrical systems type training 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.

**SINGAPORE AIRWORTHINESS REQUIREMENTS
PART 147****APPENDIX 1****BASIC COURSE DURATION****Minimum duration of complete basic courses**

Basic Course to qualify for SAR-66 Licence Category/Sub-category	Duration (in hours)	Theoretical training ratio (in percentage)
A1	800	30 – 35
A2	650	30 – 35
A3	800	30 – 35
A4	800	30 – 35
B1.1	2,400	50 – 60
B1.2	2,400	50 – 60
B1.3	2,400	50 – 60
B1.4	2,400	50 – 60
B2	2,400	50 – 60

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**SINGAPORE AIRWORTHINESS REQUIREMENTS
PART 147**

APPENDIX 2

RECOMMENDED FORMAT OF A MAINTENANCE TRAINING ORGANISATION EXPOSITION

Maintenance training organisation exposition (MTOE)

- 1 The following subject headings form the basis of the MTOE required by SAR-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 paragraph 1.10.
- 4 Where an organisation is approved in accordance with any other parts of the Singapore Airworthiness Requirements 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 assessor
- 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 147.145(d)
- 1.8 General description of facilities at paragraph 1.6 addresses
- 1.9 Specific list of courses approved by the competent 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 basic knowledge & practical training
- 2.6 Records of training carried out
- 2.7 Storage of training records
- 2.8 Training at locations not listed in paragraph 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
- 2.13 Conduct of basic practical assessments
- 2.14 Marking and record of examinations
- 2.15 Storage of examination records
- 2.16 Examinations at locations not listed in paragraph 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
- 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

**SINGAPORE AIRWORTHINESS REQUIREMENTS
PART 147**

APPENDIX 3

TYPICAL EXAMPLE OF AN APPROVED COURSE CERTIFICATE

Information to be provided in an approved course certificate

- 1 An approved course certificate shall include at least the following information:
 - i) Serial number of the certificate
 - ii) Name and approval number of the maintenance training organisation
 - iii) Name of the course and course reference number
 - iv) Modules passed
 - v) Duration of the course in days
 - vi) Name of the student
 - vii) Signature of the authorised person(s) issuing the certificate

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