

Advisory Circular

INITIAL QUALIFICATION REQUIREMENTS FOR CERTIFYING STAFF

General.....	1
Purpose.....	1
Applicability.....	1
Cancellation.....	1
Effective Date.....	1
References.....	1
Introduction.....	1
Application Procedure.....	2
Requirements for Certifying Staff in a Category B and/ or C Rated Maintenance Organisation.....	2
Requirements for Certifying Staff in a Category D Rated Maintenance Organisation.....	3
Requirements for Certifying Staff in a MD Rated Distributor Organisation.....	3
Interviewing Certifying Staff Applicants.....	3
SAR-145 AMO Located Outside Singapore.....	4
Appendix 1: Examination Requirements for Certifying Staff based on SAR- 7 Syllabus.....	5
Appendix 1A: SAR-7 Subjects associated to Appendix 1.....	6
Appendix 2: Examination Requirements for Certifying Staff based on SAR- 66 Syllabus.....	8
Appendix 2A: Equivalent SAR-66 Modules Associated to Appendix 2.....	10

- 1. GENERAL.** Pursuant to paragraph 88B of the Air Navigation Order, the Director-General of Civil Aviation (DGCA) may, from time to time, issue advisory circulars (ACs) on any aspect of safety in civil aviation. This AC contains information about standards, practices and procedures acceptable to CAAS. The revision number of the AC is indicated in parenthesis in the suffix of the AC number.
- 2. PURPOSE.** This AC is to provide guidance and information on the initial qualification requirements for certifying staff that are responsible for issuing authorised release certificates for engines and components in a Category B, C, D and/ or MD rated organisation.
- 3. APPLICABILITY.** This AC applies to all organisations holding Category B, C, D and/ or MD ratings in their SAR-145 approval.
- 4. CANCELLATION.** This AC supersedes AC 145-2(3) dated 2 September 2018.
- 5. EFFECTIVE DATE.** This AC is effective on 23 May 2019.
- 6. REFERENCES.** SAR-145.30, SAR-145.35, SAR-145.50, SAR-145.230, SAR-145.250, SAR-66 Appendix 1 and 2.
- 7. INTRODUCTION.** SAR-145.30(f)(5) requires a SAR-145 approved maintenance organisation (AMO) maintaining aircraft components to have certifying staff qualified in accordance with SAR-145.35 and any other requirements as notified by CAAS.

SAR-145.35(a) requires certifying staff to receive human factors training and have an adequate understanding¹ of the aircraft components that are maintained, together with the

¹ The certifying staff has to understand how the aircraft component functions and the common defects and their associated consequences.

associated organisation procedures before being issued a certification authorisation.

SAR 145.35(e) requires all staff whom the organisation intends to appoint as certifying staff be to assessed by the SAR-145 AMO for their competence, qualification and capability to carry out their intended certifying duties in accordance with a procedure acceptable to CAAS before the issue of the certifying staff's certification authorisation.

SAR 145.230(d) requires the certifying staff of SAR-145 Sub-Part D approved distributor organisation to meet the qualifications as specified by CAAS.

This AC is intended to provide guidance for SAR-145 AMO and SAR-145 Sub-Part D distributors on the initial qualification and extension of Category B, C, D and/ or MD rating(s) requirements and the procedure to issue authorisation certification for its certifying staff.

8. APPLICATION PROCEDURE.

- 8.1 AMO and Sub-Part D distributors should use the form 'CAAS (AW)102' when applying for CAAS' acceptance on its certifying staff. The applicant has to be nominated by the Quality Manager or Accountable Manager of the organisation.
- 8.2 The application should include the applicant's resume using the form 'CAAS (AW)22' together with copies of relevant certificates, documents, and a copy of the applicant's interview report.
- 8.3 The Quality Manager should ensure that the applicant meets the requirements prescribed in SAR-145.35 and SAR-145.230. The submission should be made to its Principal Maintenance Inspector. The applicant has to satisfy the requirements specified in Paragraphs 9 – 12.
- 8.4 Upon acceptance by CAAS, the organisation may issue the new certifying staff with a SAR-145 certification authorisation.
- 8.5 The authorisation is restricted to the rating(s) that is accepted by CAAS. CAAS' acceptance is required for any variations to the rating(s).

9. REQUIREMENTS FOR CERTIFYING STAFF IN A CATEGORY B AND/ OR C RATED MAINTENANCE ORGANISATION.

- 9.1 This section is applicable to all SAR-145 AMO holding Category B and/ or C class ratings.
- 9.2 Pursuant to SAR145.30(f)(5), to qualify as certifying staff, the SAR-145 AMO should ensure that the applicant:
 - (a) Has at least two years of related aviation maintenance experience if intended to certify a complete engine or APU; or have at least one year of related aviation maintenance experience if intended to certify components other than a complete engine or APU;
 - (b) Is assessed by the organisation to have met the requirements specified in SAR-145.35 and is competent to be a certifying staff;
 - (c) Is a full-time employee of the organisation and is able to meet the requirements specified in SAR-145.50;

Has passed the CAAS Air Legislation examination paper M10, L11, L12 or CO1, and those examinations prescribed in **Appendix 1**; which are based on SAR-7 syllabus, or **Appendix 2** which are based on SAR-66 syllabus.

Note: Appendix 1A provides a table of SAR-7 subjects associated to Appendix 1. Appendix 2A provides a table of equivalent SAR-66 subjects associated to Appendix 2.

- (d) Has demonstrated his or her ability to be a certifying staff through an interview (See paragraph 12).

9.3 In lieu of passing CAAS examinations as per para 9.2(d) above, an applicant may also choose to attend an appropriate Workshop Certifying Staff (WCS) training programme(s) and pass the relevant examination(s) with an approved SAR-147 maintenance training organisation.

10. REQUIREMENTS FOR CERTIFYING STAFF IN A CATEGORY D RATED MAINTENANCE ORGANISATION.

10.1 This section is applicable to all SAR-145 AMO holding Category D class ratings.

10.2 Pursuant to SAR145.30(f)(5), To qualify as a certifying staff, the SAR-145 AMO should ensure that the applicant:

- (a) Has at least six months of related aviation maintenance experience;
- (b) Is assessed by the organisation to meet the requirements specified in SAR-145.35 and is competent to be a certifying staff;
- (c) Is a full time employee in the organisation and is be able to meet the requirements specified in SAR-145.50;
- (d) Has passed the CAAS Air Legislation examination paper M10, L11, L12 or CO1; and
- (e) Has demonstrated his or her ability to be a certifying staff through an interview (See Paragraph 12).

11. REQUIREMENTS FOR CERTIFYING STAFF IN A MD RATED DISTRIBUTOR ORGANISATION.

11.1 This section is applicable to SAR-145 Sub-Part D approved distributor organisations holding Category MD class ratings.

11.2 Pursuant to SAR145.230(d), to qualify as a certifying staff, the SAR-145 Sub-Part D approved distributor organisation should ensure that the applicant:

- (a) Has at least six months of supervisory or experience in an aviation distributor organisation;
- (b) Has passed the CAAS Air Legislation examination M10, L11, L12 or CO1;
- (c) Is assessed by the organisation to be familiar with Sub-Part D of the SAR-145, aviation materials and part control system and acceptable certificate system; and
- (d) Has demonstrated his or her ability to be a certifying staff through an interview (See paragraph 12).

12. INTERVIEWING CERTIFYING STAFF APPLICANTS.

12.1 Quality managers are to interview the applicants formally and to keep a record/ report of the interview. The interview should assess the knowledge of the applicant covering the following:

- (a) Singapore Airworthiness Requirements which include documentation procedures, maintenance procedures, airworthiness data and quality systems;
- (b) Qualification and experience requirements as stipulated in this AC;
- (c) Maintenance Organisation Exposition and organisational procedures;
- (d) Responsibilities of being a certifying staff;

- (e) Understanding of products and services that the applicant will be authorised to certify;
and
- (f) Human factors.

13. SAR-145 AMO LOCATED OUTSIDE SINGAPORE.

- 13.1 SAR-145 AMO located outside Singapore should ensure that its certifying staff meet the requirements of SAR-145.30 and 145.35.
- 13.2 Certifying staff of SAR-145 AMO located outside Singapore are not required to take any CAAS examination. However, the Quality Manager should ensure that such certifying staff are familiar with the SAR-145.

APPENDIX 1

EXAMINATION REQUIREMENTS FOR CERTIFYING STAFF BASED ON SAR-7 SYLLABUS

Organisation Rating	Category	Required CAAS Papers	
		Mechanical	Avionics
B1 & B3	Complete turbine engines / APU	B11, B13, C14 & C15	N/A
B2	Complete piston engines	B11, B13, C11 & C12	N/A
C1	Air conditioning & pressurisation	B11 & A16	F11 & F13
C2	Auto flight	N/A	F11 & I13 or I14
C3	Communications & navigation	N/A	F11 & R11
C4	Doors – hatches	B11 & A12	F11 & F12
C5	Electrical Power & Lights	N/A	F11 & F12
C6	Equipment	B11	F11
C7	Engine / APU	B11 plus C11 or C14	F11 & F13
C8	Flight Controls	B11& B12	F11 & F13
C9	Fuel	B11	F13
C10	Helicopter – rotors	B11 & A15	N/A
C11	Helicopter – transmission	B11 & A15	N/A
C12	Hydraulic Power	B11 & A14	F11 & F13
C13	Indicating / Recording Systems	N/A	F11 & I11
C14	Landing Gear	B11 & A14	F11 & F13
C15	Oxygen	B11	B11
C16	Propellers	B11 & C13	N/A
C17	Pneumatic & Vacuum	B11 & A14	F11 & F13
C18	Protection ice/rain/fire	B11	F11
C19	Windows	B11	N/A
C20	Structural	B11 & A12	N/A

APPENDIX 1A

SAR-7 SUBJECTS ASSOCIATED TO APPENDIX 1

Code	Subject
A12	Structures and Repairs
A14	Hydraulic & Pneumatic Power Systems
A15	Rotorcraft
A16	Air-Conditioning & Pressurisation Systems
B11	Maintenance Practices and Materials
B12	Aerodynamics and Manual Controls
B13	Electrical and Instrument Systems
C11	Piston Engine Theory & Construction
C12	Piston Engine Systems
C13	Propellers
C14	Gas Turbine Engine Theory & Construction
C15	Gas turbine Engine Systems
F11	Maintenance Practices and Aerodynamics
F12	Electrical Fundamentals
F13	Servomechanisms and Electronics
I11	Instrument Systems
I13	Automatic Pilots - Aeroplanes
I14	Automatic Pilots – Rotorcraft
R11	Radio Fundamentals

1. Possible Examination Credits

- 1.1 An applicant with a relevant engineering degree, diploma or technical training may be relieved from passing the examination papers B11 and F11. An applicant with a relevant electrical engineering degree, diploma or technical training may also be relieved from passing the examination paper F12.
- 1.2 The above scenarios are only applicable to an applicant using SAR-7 examination credits.

2. Application for Examination

An applicant may apply for examinations by selecting 'Application for Workshop Certifying Staff Examination' on the following web page: <https://www.caas.gov.sg/e-services-forms/forms/aircraft-maintenance-licensing-examination>

3. Discontinuation of Examinations in Appendix 1

CAAS will discontinue the examinations listed in this appendix on 23 August 2019, beyond which applicants can only book examinations listed in Appendix 2.

APPENDIX 2

EXAMINATION REQUIREMENTS FOR CERTIFYING STAFF BASED ON SAR-66 SYLLABUS

Organisation Rating	Category	Required CAAS SAR-66 Papers	
		Mechanical	Avionics/ Electrical
B1 & B3	Complete turbine engines/ APU	CO2, TM1 & M15	N/A
B2	Complete piston engines	CO2, TM1 & M16	N/A
C1	Air conditioning & pressurisation	CO2, TM1 & SM2	CO2, TE1, *TA2/TE2 & SE2
C2	Auto flight	N/A	CO2, TA1, TA2 & SA1
C3	Communications & navigation	N/A	CO2, TA1, TA2 & SA1
C4	Doors – hatches	CO2, TM1 & SM4	CO2, TE1 & *TA2/TE2
C5	Electrical Power & Lights	N/A	CO2, TE1, *TA2/TE2 & SE3
C6	Equipment	CO2 & TM1	CO2, TE1 & *TA2/TE2
C7	Engine/ APU	CO2, TM1 & M15 or M16	CO2, TE1, *TA2/TE2 & M14
C8	Flight Controls	CO2, TM1 & SM1	CO2, TE1, *TA2/TE2 & SE1
C9	Fuel	CO2, TM1 & SM3	CO2, TE1, *TA2/TE2 & SE3
C10	Helicopter – rotors	CO2, TM1 & SM5	N/A
C11	Helicopter – transmission	CO2, TM1 & SM5	N/A
C12	Hydraulic Power	CO2, TM1 & SM1	CO2, TE1, *TA2/TE2 & SE1
C13	Indicating/ Recording Systems	N/A	CO2, TE1, TA2 & SA1
C14	Landing Gear	CO2, TM1 & SM1	CO2, TE1, *TA2/TE2 & SE1
C15	Oxygen	CO2, TM1 & SM2	CO2, TE1, *TA2/TE2 & SE2
C16	Propellers	CO2, TM1 & M17	N/A
C17	Pneumatic & Vacuum	CO2, TM1 & SM2	CO2, TE1, *TA2/TE2 & SE2
C18	Protection ice/ rain/ fire	CO2, TM1 & SM3	CO2, TE1, *TA2/TE2 & SE3
C19	Windows	CO2, TM1 & SM4	N/A

C20	Structural	CO2, TM1 & SM4	N/A
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* Where TA2/ TE2 is listed in the extreme right hand column of the above table, TA2 is applicable to applicants who will be required to issue CRS for electronic computer boxes, modules or cards; otherwise, only TE2 is applicable.

Legend on Paper prefixes

- CO: **C**ommon papers
- TA: **T**rade (**A**vionics) papers
- TE: **T**rade (**E**lectrical) papers
- TM: **T**rade (**M**echanical) papers
- SA: **S**pecialisation (**A**vionics)
- SE: **S**pecialisation (**E**lectrical)
- SM: **S**pecialisation (**M**echanical)
- M: SAR-66 papers

APPENDIX 2A

EQUIVALENT SAR-66 MODULES ASSOCIATED TO APPENDIX 2

Code	Subject	Equivalent SAR-66 Module(s)	SAR-66 Module Topic Codes	No. of Ques.	Exam duration (min.)
CO1	Airworthiness Administration (Common)	-	AC 145-5 Appendix 1	20	25
CO2	Physics and Aerodynamics (Common)	M2-B1 & M8-B1	All	56	70
TA1	Aircraft Materials and Hardware, and Maintenance Practices (Avionics)	M6-B2 & M7-B2	All	56	70
TA2	Electronics Fundamentals, and Digital Techniques and Electronic Instrument Systems (Avionics)	M4-B2 & M5-B2	All	72	90
TE1	Aircraft Materials and Hardware, and Maintenance Practices (Electrical)	M6-B2 & M7-B2	All	56	70
TE2	Electrical Fundamentals and Electronics Fundamentals (Electrical)	M3-B2 & M4-B2	All	72	90
TM1	Aircraft Materials and Hardware, and Maintenance Practices (Mechanical)	M6-B1 & M7-B1	All	72	90
SA1	Avionics and Auto-flight (Avionics)	M13-B2	13.3, 13.4, 13.8 & 13.10	64	80
SE1	Flight Controls, Hydraulics and Landing Gear (Electrical)	M13-B2	13.7, 13.14 & 13.16	48	60
SE2	Air Conditioning and Cabin Pressurisation, Oxygen, Pneumatics and Vacuum (Electrical)	M13-B2	13.11, 13.17 & 13.18	40	50
SE3	Electrical Power, Lights, Fire Protection, Fuel, and Ice and Rain Protection (Electrical)	M13-B2	13.5, 13.9, 13.12, 13.13 & 13.15	48	60
SM1	Flight Controls, Hydraulics and Landing Gear (Mechanical)	M11A-B1	11.9, 11.11 & 11.13	48	60
SM2	Air-conditioning, Cabin Pressurisation, Oxygen, Pneumatics and Vacuum (Mechanical)	M11A-B1	11.4, 11.15 & 11.16	40	50
SM3	Fire Protection, Ice and Rain Protection, and Fuel (Mechanical)	M11A-B1	11.8, 11.10 & 11.12	40	50
SM4	Aeroplane Structures, Doors and Windows (Mechanical)	M11A-B1	11.2 & 11.3	40	50

SM5	Helicopter Structures, Flight Control, Rotors and Transmission (Mechanical)	M12-B1	12.1, 12.2, 12.3, 12.4 & 12.5	48	60
M14	Propulsion	M14-B2	All	24	30
M15	Gas Turbine Engine	M15-B1	All	92	115
M16	Piston Engine	M16-B1	All	72	90
M17	Propeller	M17-B1	All	32	40

1. Possible Examination Credits

1.1 An applicant with a relevant technical diploma from a local polytechnic² and a Cumulative Grade Point Average (CGPA) of ≥ 3.0 , or a relevant degree from a local university³, may be relieved from the examination requirements in the table below.

1.2 Qualifications obtained from non-local institutions of higher learning may be considered for possible examination credits on a case-by-case basis.

Local polytechnic diploma (CGPA ≥ 3.0) or local university degree	Possible examination credit
Electrical, Electronics or Mechatronics Engineering	1. TA2 2. TE2
Aerospace Engineering (Category B1 equivalent) from <u>IHL without SAR-147 approval</u>	1. CO2 2. TM1
Aerospace Engineering (Category B2 equivalent) from <u>IHL without SAR-147 approval</u>	1. CO2 2. TA1 3. TE1 4. TA2 5. TE2
Aerospace Engineering (Category B1) from <u>IHL with SAR-147 approval for Modules 1 - 10</u>	1. *CO1 2. CO2 3. TM1 4. *Human Factors training (Ref: SAR-145.35(a))
Aerospace Engineering (Category B2) from <u>IHL with SAR-147 approval for Modules 1 - 10</u>	1. *CO1 2. CO2 3. TA1 4. TE1 5. TA2 6. TE2 7. *Human Factors training (Ref: SAR-145.35(a))

*These examination credits are not applicable if more than 5 years had passed since the date of issue of the diploma or degree at the time when the AMO submits the application to CAAS to seek acceptance of the potential certifying staff to whom the degree or diploma has been awarded.

² Local polytechnic refers to one of the following: Nanyang Polytechnic, Ngee Ann Polytechnic, Republic Polytechnic, Singapore Polytechnic and Temasek Polytechnic.

³ Local university refers to one of the following: Nanyang Technological University, National University of Singapore, and Singapore Institute of Technology. Singapore University of Social Sciences and Singapore University of Technology and Design would also be considered if they choose run relevant undergraduate courses.

2. Application for Examination

- 2.1 An applicant may apply for examinations by selecting 'Application for Workshop Certifying Staff Examination' on the following web page: <https://www.caas.gov.sg/e-services-forms/forms/aircraft-maintenance-licensing-examination>
- 2.2 An applicant should select 'Workshop Certifying Staff Examinations (SAR-66 syllabus)' against the Specialisation field when making booking online for an examination with subject codes that are prefixed CO, TA, TE, TM, SA, SE and SM. He/ she should select 'SAR-66 Examinations' against the Specialisation field when making booking online for an examination with subject codes prefixed M.

3. Commencement of Workshop Certifying Staff Examinations based on SAR-66 Syllabus

Workshop Certifying Staff Examinations based on SAR-66 syllabus will be available for booking from 23 May 2019.