



NOTICE OF PROPOSED AMENDMENT (NPA) No 2008-03

DRAFT OPINION OF THE EUROPEAN AVIATION SAFETY AGENCY

**FOR A COMMISSION REGULATION AMENDING
Annex II (Part-145), Annex III (Part-66) and Annex IV (Part-147)
of COMMISSION REGULATION (EC) No 2042/2003 of 20 November 2003 on the
continuing airworthiness of aircraft and aeronautical products, parts and appliances,
and on the approval of organisations and personnel involved in these tasks
and**

**DRAFT DECISION OF THE EXECUTIVE DIRECTOR OF THE EUROPEAN AVIATION SAFETY
AGENCY**

AMENDING

**Annex II (AMC to Part-145), Annex IV (AMC to Part-66) and Annex V (GM to Part-66) of
Decision No 2003/19/RM of the Executive Director of the Agency of 28 November 2003
on acceptable means of compliance and guidance material to Commission Regulation
(EC) No 2042/2003 of 20 November 2003 on the continuing airworthiness of aircraft
and aeronautical products, parts and appliances, and on the approval of organisations
and personnel involved in these tasks.**

“Licences for non-complex aircraft maintenance engineers”

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A. EXPLANATORY NOTE

I. General

1. The purpose of this Notice of Proposed Amendment (NPA) is to envisage amending Commission Regulation (EC) No 2042/2003¹ and amending Decision No 2003/19/RM². This rulemaking task derives from task M.017. The work was developed by the Part-66 subgroup to M.017. This rulemaking activity is registered now as a rulemaking task 66.022, which is part of the 2008 Rulemaking Programme.
2. The European Aviation Safety Agency (the Agency) is directly involved in the rule-shaping process. It assists the Commission in its executive tasks by preparing draft regulations, and amendments thereof, for the implementation of the Basic Regulation³, which are adopted as "Opinions" (Basic Regulation, Article 14(1)). It also adopts acceptable means of compliance (AMC) and guidance material (GM) for the application of Basic Regulation and its implementing rules (Basic Regulation, Article 14(2)).
3. When developing rules, the Agency is bound to following a structured process as required by article 43(1) of the Basic Regulation. Such process has been adopted by the Agency's Management Board and is referred to as "The Rulemaking Procedure"⁴.
4. This rulemaking activity is included in the Agency's Rulemaking Programme for 2008. It implements the following rulemaking task:
 - 66-022 Licences for non-complex aircraft maintenance engineers.
5. The text of this NPA has been developed by the Agency based on the work of a rulemaking group. It is submitted for consultation of all interested parties in accordance with Article 43 of the Basic Regulation and Articles 5(3) and 6 of the Rulemaking Procedure.

II. Consultation

6. To achieve optimal consultation, the Agency is publishing the draft opinion and the draft decision on its internet site. Comments on this proposal should be provided within 3 months in accordance with Article 6(4) of the Rulemaking Procedure. Comments on this proposal should be submitted by one of the following methods:

CRT: Send your comments using the Comment-Response Tool (CRT) available at <http://hub.easa.europa.eu/crt/>

¹ Regulation (EC) No 2042/2003 of 20 November 2003 on the continuing airworthiness of aircraft and aeronautical products, parts and appliances, and on the approval of organisations and personnel involved in these tasks, (OJ L 315, 28.11.2003, p. 1). Regulation as last amended by Commission Regulation (EC) No 376/2007 (OJ L 94, 4.4.2007, p. 18).

² Decision No 2003/19/RM of the Executive Director of the European Aviation Safety Agency of 28 November 2003 on acceptable means of compliance and guidance material to Commission Regulation (EC) No 2042/2003.

³ Regulation (EC) No 1592/2002 of the European Parliament and of the Council of 15 July 2002 on common rules in the field of civil aviation and establishing a European Aviation Safety Agency (OJ L 240, 7.9.2002, p. 1). Regulation as last amended by Regulation (EC) No 334/2007 (OJ L 88, 29.3.2007, p. 39).

⁴ Management Board Decision concerning the procedure to be applied by the Agency for the issuing of opinions, certification specifications and guidance material ("Rulemaking Procedure"), EASA MB/08/2007, 13.6.2007.

E-mail: Only in case the use of CRT is prevented by technical problems these should be reported to the [CRT webmaster](#) and comments sent by email to NPA@easa.europa.eu.

Correspondence: If you do not have access to internet or e-mail you can send your comment by mail to:
Process Support
Rulemaking Directorate
EASA
Postfach 10 12 53
D-50452 Cologne
Germany

Comments should be received by the Agency before 28 June 2008. If received after this deadline they might not be taken into account.

III. Comment response document

7. All comments received in time will be responded to and incorporated in a comment response document (CRD). This may contain a list of all persons and/or organisations that have provided comments. The CRD will be widely available on the Agency's website and in the Comment-Response Tool (CRT).

IV. Content of the draft opinion and the draft decision

A) Background information

8. On 20 November 2003 the European Commission adopted Regulation (EC) No 2042/2003 on the continuing airworthiness of aircraft and aeronautical products, parts and appliances, and on the approval of organisations and personnel involved in these tasks. The provisions of its Annex III (Part-66) include the definition of different categories for aircraft maintenance licenses and describe the associated privileges.
9. Currently, in Regulation (EC) 2042/2003 Appendix III (Part-66), the privileges associated to each aircraft maintenance license category are described as follows:
 - a) A category A aircraft maintenance licence permits the holder to issue certificates of release to service following minor scheduled line maintenance and simple defect rectification within the limits of tasks specifically endorsed on the authorisation. The certification privileges shall be restricted to work that the licence holder has personally performed in a Part-145 organisation.
 - b) A category B1 aircraft maintenance licence shall permit the holder to issue certificates of release to service following maintenance, including aircraft structure, powerplant and mechanical and electrical systems. Replacement of avionic line replaceable units, requiring simple tests to prove their serviceability, shall also be included in the privileges. Category B1 shall automatically include the appropriate A subcategory.
 - c) A category B2 aircraft maintenance licence shall permit the holder to issue certificates of release to service following maintenance on avionic and electrical systems.

- d) A category C aircraft maintenance licence shall permit the holder to issue certificates of release to service following base maintenance on aircraft. The privileges apply to the aircraft in its entirety in a Part-145 organisation.
10. Currently, 145.A.30 shows the following requirements for the availability of certifying staff for aircraft maintenance in Part-145 maintenance organisations:
- a) For aircraft line maintenance, category B1 and B2 certifying staff are required and, additionally, category A certifying staff may also be used.
 - b) For base maintenance of large aircraft, category C certifying staff and B1 and B2 support staff are required.
 - c) For base maintenance of other than large aircraft there is the option of using:
 - Category C certifying staff and B1 and B2 support staff, or
 - Category B1 and B2 certifying staff.

In the case of Part-M, Subpart F maintenance organisations, only category B1 and B2 certifying staff are required. Category A and C are not applicable.

11. Within the B1 category licences, sub-category B1.2 is reserved to piston engine aeroplanes. Feedback received by EASA seems to indicate that the qualification requirements for the B1.2 licence are too strict for the lower spectrum (in terms of complexity) of piston engine aeroplanes. In addition, there is no European licence covering sailplanes and balloons. This need for a European licence that is appropriately adapted to the General Aviation community of aircraft was also identified through the A-NPA14/2006.
12. In order to address these issues, the Agency created a rulemaking task 66.022 and a rulemaking group (a subgroup to M.017), composed of representatives of national authorities and associations of light aircraft and very light aircraft industry. The aim was to evaluate the situation, submit a proposal and develop guidelines for issuing an opinion to modify Part-66 and/or a decision to modify AMC to this Part in relation with the ToR 66-022.
13. During its draft, the group focused its work on licences covering airframe, powerplant and electrical systems plus some limited avionics privileges. The equivalent of a B2 licence adapted to the General Aviation was not considered by the group, as explained in the Regulatory Impact Assessment in Attachment 1, and the industry, represented by the SSCC committee, may need to consider this issue.
14. It is important to note that the group started its work when there was no ELA concept, which is reflected in the Regulatory Impact Assessment. Afterwards, working group MDM.032 presented to the M.017 working group the proposal in Part-21⁵ of the concept of ELA1 and ELA2 certification processes applicable to certain categories of aircraft (and their engines and propellers). In simple terms, the following aircraft would be eligible for the simplified certification processes:

⁵ Regulation (EC) No 1702/2003 of 24 September 2003 laying down implementing rules for the airworthiness and environmental certification of aircraft and related products, parts and appliances, as well as for the certification of design and production organisations, (*OJ L 243, 27.9.2003, p.6*). Regulation as last amended by Regulation (EC) No 375/2007 (*OJ L 94, 4.4.2007, p. 3*).

- **ELA 1:** Non-complex aeroplanes, sailplanes and powered sailplanes below 1000 kg MTOM, plus certain balloons and airships.
- **ELA 2:** Non-complex aeroplanes below 2000 kg MTOM, very light rotorcraft, balloons and certain airships.

15. As a result of the proposals above, working group 66.022 envisaged the following new licences:

- **B3 licence:** applicable to sailplanes, powered sailplanes and piston engine non-pressurised aeroplanes below 2000 Kg MTOM.

It must be noted that this category of aircraft is not as wide as those covered by the ELA2 process, because it does not include rotorcraft, balloons and airships. In addition, it includes sailplanes and powered-sailplanes.

- **ELA licence:** applicable to the following:
 - Sailplanes, powered sailplanes and aeroplanes below 1000 Kg MTOM, not classified as "complex motor-powered aircraft"
 - Balloons
 - Hot-air airships
 - Manned gas airships meeting all the following elements:
 - (i) 3% maximum static heaviness
 - (ii) Non vectored thrust (except reverse thrust)
 - (iii) Conventional and simple design of the:
 - Structure
 - Control system
 - Ballonet system
 - (iv) Non power-assisted controls

It must be noted that this ELA licence includes all aircraft eligible for ELA1 process, plus those balloons and airships eligible for ELA2 process. The reason for this specific definition for balloons and airships is that the technology of ELA2 and ELA1 balloons and airships is very similar and the working group and the Agency did not feel necessary to differentiate them in terms of Part-66 licensing.

16. It must be also considered that in the case of piston engine aeroplanes equal or below 5700 Kg MTOM (among others) certifying staff are currently still exercising certification privileges based on national rules.

The conversion of these certifying staff qualifications valid in the Member States should allow the delivery of B1.2 Part-66 licences, with limitations as appropriate.

As a consequence, the main purpose of the B3 licence envisaged by the NPA is not to address the case of certifying staff currently involved in piston engine aeroplanes but to facilitate the introduction of newcomers to the industry, which is currently facing the problem of the reduction of workforce due to retirement of personnel. Conversion provisions to B3 licence are therefore not needed.

17. In the case of the ELA licence, no provisions for conversion of national qualification were introduced because:

- It is anticipated to be very difficult for the competent authorities to establish an adequate conversion report.
- The training required for the ELA licence is reasonably short.
- Provisions have been introduced where those persons with 2 years experience do not need to receive the training, only being required the corresponding examination.

18. Currently, for aircraft other than aeroplanes and helicopters, Part-66 refers to national rules. Most of these aircraft (except a very limited number of airships) will be covered either by the B3 or the ELA licences. In order to provide an appropriate transition period for those aircraft covered by the proposed licences, a provision has been introduced in order to additionally allow the use of national rules during a period of 5 years.

For those airships that are not covered by neither the B3 nor ELA licence, national rules will continue to apply.

19. Finally, it must be noted that the group initially proposed the possibility for Qualified Entities to perform the following functions:

- Approval of Basic ELA Training Courses, including examinations.
- Performance of ELA examinations.
- Issuance, variation and continuation of the validity of ELA aircraft maintenance licences.

However, since Qualified Entities will be working on behalf of the competent authority, but can not perform the final signature of certificates, and they are included in the new Basic Regulation⁶, there is no need to include in this NPA a reference to them. It is a privilege of the competent authority to designate such Qualified Entities that will act on its behalf.

B) Envisaged changes

20. Based on the work performed by the working group, it is proposed that the following elements should be introduced in 2042/2003 regulation:

- Modification of Part-145 to allow the use of B3 licence certifying staff (however, B3 licence holders are not eligible for category C licence),
- Modification of Part-66 to introduce a B3 licence for certifying maintenance on aircraft in the category "sailplanes, powered-sailplanes and non-pressurised aeroplanes of 2000 Kg MTOM and less",
- Introduction in Part-66 of an ELA licence,
- Amendment of Appendix I to Part-66 "Basic knowledge requirements",
- Amendment of Appendix II to Part-66 "Basic Examination Standard",
- Amendment of Appendix IV to Part-66 "Experience requirements for extending a Part-66 Aircraft Maintenance Licence",
- Amendment of Appendix V to Part-66 "Application Form and Example of Licence Format",
- Creation of Appendixes VI and VII to Part-66 in order to introduce the ELA training syllabus and examination standard,
- Modification of Appendix I to Part 147 on "Basic Training Course Duration",
- Modification of Appendix II to Part 147 on "Approval Certificate",
- Creation of further AMC and GM material to support these changes.

No modification was needed in Part-M as subpart-H "Release to service" by Part-M maintenance organisation refers to certifying staff approved in accordance with Part-66.

⁶ Regulation (EC) No 216/2008 of the European Parliament and of the Council of 20 February 2008 on common rules in the field of civil aviation and establishing a European Aviation Safety Agency, and repealing Council Directive 91/670/EEC, Regulation (EC) No 1592/2002 and Directive 2004/36/EC (OJ L 79, 19/03/2008, p. 1). Regulation (EC) No 216/2008 enters into force on 8 April 2008.

B. DRAFT OPINION AND DRAFT DECISION

The text of the amendment is arranged to show deleted text, new text or new paragraph as shown below:

1. deleted text is shown with a strike through: ~~deleted~~
2. new text is highlighted with grey shading: **new**
3.

Indicates that remaining text is unchanged in front of or following the reflected amendment.

I. Draft Opinion (EC) No 2042/2003

A) Draft Opinion Part-145

Commission Regulation (EC) 2042/2003 Annex II (Part-145) is hereby amended as follows:

Paragraph 145.A.30 is amended as follows:

145.A.30 Personnel requirements

...

(f) The organisation shall ensure that personnel who carry out and/or control a continued airworthiness non-destructive test of aircraft structures and/or components are appropriately qualified for the particular non-destructive test in accordance with the European or equivalent Standard recognised by the Agency. Personnel who carry out any other specialised task shall be appropriately qualified in accordance with officially recognised standards. By derogation to this paragraph those personnel specified in paragraph (g) and (h)(1) and (h)(2), qualified in Part-66 category B1 **or B3** may carry out and/or control colour contrast dye penetrant tests.

(g) Any organisation maintaining aircraft, except where stated otherwise in paragraph (j), shall in the case of aircraft line maintenance, have appropriate aircraft type rated certifying staff qualified as category B1, **and B2 and B3, as necessary**, in accordance with Part-66 and 145.A.35.

In addition such organisations may also use appropriately task trained certifying staff qualified as category A in accordance with Part-66 and 145.A.35 to carry out minor scheduled line maintenance and simple defect rectification. The availability of such category A certifying staff shall not replace the need for Part-66 category B1 and B2 certifying staff to support the category A certifying staff. However, such Part-66 category B1 and B2 staff need not always be present at the line station during minor scheduled line maintenance or simple defect rectification.

(h) Any organisation maintaining aircraft, except where stated otherwise in paragraph (j) shall:

...

2. in the case of base maintenance of aircraft other than large aircraft have either:

(i) appropriate aircraft type rated certifying staff qualified as category B1, **and B2 and B3, as necessary**, in accordance with Part-66 and 145.A.35 or,

(ii) appropriate aircraft type rated certifying staff qualified in category C assisted by B1, **and B2 and B3 support staff, as necessary**, as specified in paragraph (1).

...

Paragraph 145.A.35 is amended as follows:

145.A.35 Certifying staff and category B1, **and B2 and B3 support staff**

(a) In addition to the appropriate requirements of 145.A.30(g) and (h), the organisation shall ensure that certifying staff and category B1, **and B2 and B3** support staff have an adequate understanding of the relevant aircraft and/or components to be maintained together with the associated organisation procedures. In the case of certifying staff, this must be accomplished before the issue or re-issue of the certification authorisation.

'Category B1, ~~and B2~~ and B3 support staff' means those category B1, ~~and B2~~ and B3 staff in the base maintenance environment who do not hold necessarily certification privileges. 'Relevant aircraft and/or components', means those aircraft or components specified in the particular certification authorisation. 'Certification authorisation' means the authorisation issued to certifying staff by the organisation and which specifies the fact that they may sign certificates of release to service within the limitations stated in such authorisation on behalf of the approved organisation.

(b) ...

(c) The organisation shall ensure that all certifying staff and category B1, ~~and B2~~ and B3 support staff are involved in at least six months of actual relevant aircraft or component maintenance experience in any consecutive two year period. For the purpose of this paragraph 'involved in actual relevant aircraft or component maintenance' means that the person has worked in an aircraft or component maintenance environment and has either exercised the privileges of the certification authorisation and/or has actually carried out maintenance on at least some of the aircraft type systems specified in the particular certification authorisation.

(d) The organisation shall ensure that all certifying staff and category B1, ~~and B2~~ and B3 support staff receive sufficient continuation training in each two year period to ensure that such staff has up-to-date knowledge of relevant technology, organisation procedures and human factor issues.

(e) The organisation shall establish a programme for continuation training for certifying staff and category B1, ~~and B2~~ and B3 support staff, including a procedure to ensure compliance with the relevant paragraphs of 145.A.35 as the basis for issuing certification authorisations under this Part to certifying staff, and a procedure to ensure compliance with Part 66.

(f) ...

(g) ...

(h) ...

(i) ...

(j) The organisation shall maintain a record of all certifying staff and category B1, ~~and B2~~ and B3 support staff.

The staff records shall contain:

1. details of any aircraft maintenance licence held under Part-66;
2. all relevant training completed
3. the scope of the certification authorisations issued, where relevant, and
4. particulars of staff with limited or one-off certification authorisations.

The organisation shall retain the record for at least two years after the certifying staff or B1 or B2 or B3 support staff has ceased employment with the organisation or as soon as the authorisation has been withdrawn. In addition, upon request, the maintenance organisation shall furnish certifying staff with a copy of their record on leaving the organisation.

The certifying staff shall be given access on request to their personal records as detailed above.

(k) ...

(l) ...

(m) The minimum age for certifying staff and category B1, ~~and B2~~ and B3 support staff is 21 years.

Paragraph 145.A.70 is amended as follows:

145.A.70 Maintenance organisation exposition

(a) «Maintenance organisation exposition» means the document or documents ...

...

6. a list of certifying staff and B1, ~~and B2~~ and B3 support staff;

...

B) Draft Opinion on Part-66

Commission Regulation (EC) No 2042/2003 Annex III (Part 66) is hereby amended as follows:

Title of Section A, Subpart A is amended as follows:

SECTION A

SUBPART A

AIRCRAFT MAINTENANCE LICENCE ~~AEROPLANES AND HELICOPTERS~~

Paragraph 66.A.1 is amended as follows:

66.A.1 Scope

(a) This section establishes the requirements for the issue of an aircraft maintenance licence and conditions of its validity and use, **within** ~~for aeroplanes and helicopters~~ of the following categories:

- Category A
- Category B1
- Category B2
- **Category B3**
- **Category ELA**
- Category C

(b) Categories A and B1 are subdivided into subcategories relative to combinations of aeroplanes, helicopters, turbine and piston engines. The subcategories are:

- A1 and B1.1 Aeroplanes Turbine
- A2 and B1.2 Aeroplanes Piston
- A3 and B1.3 Helicopters Turbine
- A4 and B1.4 Helicopters Piston

(c) **Category B3 is applicable to sailplanes, powered sailplanes and piston-engine non-pressurized aeroplanes of 2000 Kg MTOM and below;**

(d) **Category ELA is applicable to any of the following aircraft:**

- **Sailplanes, powered sailplanes and aeroplanes with MTOM less than 1000 Kg, that are not classified as "complex motor-powered aircraft"**
- **A balloon**
- **A hot-air airship**
- **A manned gas airship meeting all the following elements:**
 - (i) **3% maximum static heaviness**
 - (ii) **Non vectored thrust (except reverse thrust)**
 - (iii) **Conventional and simple design of:**

- Structure
 - Control system
 - Ballonet system
- (iv) Non power-assisted controls

This category is subdivided into the following levels:

- Basic-ELA
- Full-ELA

Each one of these levels is further divided in the following basic ratings:

- Basic ratings for the Basic-ELA licence:
 - Wooden airframe
 - Composite airframe
 - Metal airframe
 - Powerplant
 - Balloons (hot air)
 - Balloons (gas)
 - Airships (hot air)
 - Airships (gas)
- Basic ratings for the Full-ELA licence:
 - Wooden aircraft (airframe + powerplant)
 - Composite aircraft (airframe + powerplant)
 - Metal aircraft (airframe + powerplant)
 - Wooden sailplanes
 - Composite sailplanes
 - Metal sailplanes
 - Balloons (hot air)
 - Balloons (gas)
 - Airships (hot air)
 - Airships (gas)

The levels and basic ratings described above, as applicable, shall be endorsed on the Part-66 aircraft maintenance licence.

Paragraph 66.A.20 is amended as follows:

66.A.20 Privileges

(a) Subject to compliance with paragraph (b), the following privileges shall apply:

1. ...

2. A category B1 aircraft maintenance licence shall permit the holder to issue certificates of release to service following maintenance, including aircraft structure, powerplant and mechanical and electrical systems. Replacement of avionic line replaceable units, requiring simple tests to prove their serviceability, shall also be included in the privileges. Category B1 shall automatically include the appropriate A subcategory. Category B1.2 shall automatically include the B3 category.

3. ...

4. A category B3 aircraft maintenance licence shall permit the holder to issue certificates of release to service following maintenance, including aircraft structure, powerplant and mechanical and electrical systems, as well as maintenance practices covered in Module 7.7 (Appendix I, Part-66). Work on avionic systems requiring simple tests to prove their serviceability shall also be included in the privileges. Avionics troubleshooting is not allowed.

5. A category ELA aircraft maintenance licence shall permit the holder to issue certificates of release to service following maintenance, including aircraft structure, powerplant and mechanical and electrical systems. Work on avionic systems requiring simple tests to prove their serviceability shall also be included in the privileges. Avionics troubleshooting is not allowed.

The Basic-ELA aircraft maintenance licence does not allow the release of complete aircraft after annual inspections and after implementation of major repairs and modifications. These are privileges of the Full-ELA aircraft maintenance licence holder.

The Full-ELA licence automatically includes the Basic-ELA licence.

~~4.~~ 6. ...

(b) ...

Paragraph 66.A.25 is amended as follows:

66.A.25 Basic knowledge requirements

(a) An applicant for an aircraft maintenance licence, other than an ELA licence, or the addition of a category or subcategory to such an aircraft maintenance licence shall demonstrate, by examination, a level of knowledge in the appropriate subject modules in accordance with Appendix I to this Part.

The basic knowledge examinations shall be conducted by a training organisation appropriately approved under Part-147 or by the competent authority.

(b) An applicant for an ELA aircraft maintenance licence shall comply with the basic training and examination requirements described in Appendixes VI and VII to this Part. Basic training courses, including examination, shall be approved by the competent authority or conducted by appropriately approved Part-147 maintenance training organisations.

(c) Notwithstanding paragraph (b), an applicant for a Basic-ELA aircraft maintenance license may replace the training requirements of paragraph (b) by the experience requirements described in 66.A.30(a)7. Examination in accordance with Appendixes VI and VII to this Part is still required.

~~(b)~~ (d) ...

Paragraph 66.A.30 is amended as follows:

66.A.30 Experience requirements

(a) An applicant for an aircraft maintenance licence shall have acquired:

1. for category A, ~~and~~ subcategories B1.2 and B1.4 ~~and category B3:~~
 - (i) three years of practical maintenance experience on operating aircraft, if the applicant has no previous relevant technical training; or
 - (ii) two years of practical maintenance experience on operating aircraft and completion of training considered relevant by the competent authority as a skilled worker, in a technical trade; or
 - (iii) one year of practical maintenance experience on operating aircraft and completion of a Part-147 approved basic training course.
2. ...
3. ...
4. for category C with respect to non large aircraft:

three years of experience exercising category B1 or ~~B-2~~ B2 privileges on non large aircraft or as Part-145 B1 or ~~B-2~~ B2 support staff, or a combination of both; or
5. ...
6. for Basic-ELA applicants qualified in accordance with 66.A.25(b), one year practical experience is required, which shall include a representative cross-section of maintenance activities relevant to the licence subcategory and basic ratings applied for.
7. for Basic-ELA applicants qualified in accordance with 66.A.25(c), two years practical experience is required, which shall include a representative cross-section of maintenance activities relevant to the licence subcategory and basic ratings applied for.
8. for Full-ELA applicants, two years experience exercising the Basic-ELA privileges in the corresponding ratings. The inclusion of an additional rating only requires completion of the corresponding training and examination in accordance with Appendixes VI and VII.

(b) ...

(c) For category A, B1, ~~and~~ B2 ~~and~~ B3 the experience must be practical which means being involved with a representative cross section of maintenance tasks on aircraft.

(d) ...

(e) ...

New paragraphs 66.A.45(i) and (j) are added:

...

(i) The holder of category B3 aircraft maintenance licence may only exercise certification privileges when the aircraft maintenance licence has been endorsed with the rating "*sailplanes, powered sailplanes and piston-engine non-pressurized aeroplanes of 2000 Kg MTOM and below*". This rating shall be granted following demonstration of practical experience which shall include a representative cross-section of maintenance activities relevant to the licence category.

Unless the applicant provides evidence of appropriate experience, the rating granted as per above paragraph, is subject to the following limitations, which shall be stated on the licence:

- aeroplane retractable landing gear,
- variable pitch propeller,
- turbo-charged piston engine,
- electrical and/or jet engine (on powered sailplanes),
- FADEC,
- wooden structure aircraft,
- metal tubing fuselages covered with fabric,
- metal structure aircraft,
- composite structure aircraft.

The holder of a category B3 aircraft maintenance licence may not exercise certification privileges on an aircraft which is affected by one or more of the above limitations when this (these) limitation(s) is(are) mentioned in the aircraft maintenance licence.

The limitations shall be removed following demonstration of appropriate experience or after successfully completed training and examination by a Part-147 approved organisation or as approved by the competent authority.

Nevertheless, the holder of a B3 licence is also entitled to issue certificates of release to service for pilot-owner tasks listed in Appendix VIII of Part-M on all sailplanes, powered sailplanes and piston-engine non-pressurized aeroplanes of 2000 Kg MTOM and below, regardless of installed systems and associated limitations.

- (j) The holder of category ELA aircraft maintenance licence may only exercise certification privileges when the aircraft maintenance licence has been endorsed with the appropriate basic ratings as described in 66.A.1(d).

Unless the applicant provides evidence of appropriate experience, the basic ratings granted are subject to the following limitations, which shall be stated on the licence:

- aeroplane retractable landing gear,
- variable pitch propeller,
- turbo-charged piston engine,
- electrical and/or jet engine (on powered sailplanes)
- FADEC,

The holder of a category ELA aircraft maintenance licence may not exercise certification privileges on an aircraft which is affected by one or more of the above limitations when this(these) limitation(s) is(are) mentioned in the aircraft maintenance licence.

The limitations shall be removed following demonstration of appropriate experience.

Paragraph 66.A.100 is amended as follows:

66.A.100 General

~~Until such time as this Part specifies a requirement for certifying staff of aircraft other than aeroplanes and helicopters, the relevant Member State regulation shall apply.~~

For sailplanes, powered-sailplanes, balloons and those airships covered by the ELA licence, certifying staff may also be qualified in accordance with the relevant Member State regulation until **(INCLUDE DATE 5 YEARS AFTER ENTRY INTO FORCE)**.

For those airships not covered by the ELA licence, the relevant Member State regulation shall apply.

Paragraph 66.B.110 is amended as follows:

66.B.110 Procedure for the amendment of an aircraft maintenance licence to include an additional basic category or subcategory or level

(a) In addition to the documents required under 66.B.100 or 66.B.105, as appropriate, the applicant for additional basic categories or subcategories to an aircraft maintenance licence or for a change of level for an ELA licence, shall submit his/her current original aircraft maintenance licence to the competent authority together with EASA Form 19.

(b) At the completion of the procedure as specified in 66.B.100 or 66.B.105, the competent authority shall endorse the additional basic category or subcategory or level on the aircraft maintenance licence by stamp and signature or reissue the licence. The competent authority file shall be amended accordingly.

...

Paragraph 66.B.115 is amended as follows:

66.B.115 Procedure for the amendment of an aircraft maintenance licence to include an aircraft type or group or basic rating

On receipt of a satisfactory EASA Form 19 and any supporting documentation demonstrating compliance with the applicable type rating and/or group rating and/or, for ELA licences, basic ratings requirements, ~~and~~ together with the accompanying aircraft maintenance licence, the competent authority shall either endorse the applicant's aircraft maintenance licence with the aircraft type, ~~or~~ group or basic rating or reissue the said licence to include the aircraft type, ~~or~~ group or basic rating. The competent authority file shall be amended accordingly.

Appendix I to Part-66 is amended as follows:

Appendix I

Basic knowledge requirements

1. KNOWLEDGE LEVELS – CATEGORY A, B1, B2, B3 AND C AIRCRAFT MAINTENANCE LICENCE

Basic knowledge for categories A, B1, and B2 and B3 are indicated by the allocation of knowledge levels indicators (1, 2 or 3) against each applicable subject. Category C applicants must meet either the category B1 or the category B2 basic knowledge levels.

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2. MODULARISATION

Qualification on basic subjects for each Part-66 aircraft maintenance licence category or subcategory should be in accordance with the following matrix. Applicable subjects are indicated by an 'X':

Subject module	A or B1 aeroplane with:		A or B1 helicopter with:		B2	B3
	Turbine engine(s)	Piston engine(s)	Turbine engine(s)	Piston engine(s)	Avionics	Sailplanes, powered sailplanes and non pressurized piston engine aeroplanes of 2T MTOM and less
1	X	X	X	X	X	X
2	X	X	X	X	X	X
3	X	X	X	X	X	X
4	X	X	X	X	X	X
5	X	X	X	X	X	X
6	X	X	X	X	X	X
7	X	X	X	X	X	X
8	X	X	X	X	X	X
9	X	X	X	X	X	X
10	X	X	X	X	X	X
11	X	X				X
12			X	X		
13					X	

14					X	
15	X		X			
16		X		X		X
17	X	X				X

MODULE 1. MATHEMATICS

	LEVEL			
	A	B1	B2	B3
1.1 Arithmetic Arithmetical terms and signs, methods of multiplication and division, fractions and decimals, factors and multiples, weights, measures and conversion factors, ratio and proportion, averages and percentages, areas and volumes, squares, cubes, square and cube roots.	1	2	2	2
1.2 Algebra (a) Evaluating simple algebraic expressions, addition, subtraction, multiplication and division, use of brackets, simple algebraic fractions;	1	2	2	2
(b) Linear equations and their solutions; Indices and powers, negative and fractional indices; Binary and other applicable numbering systems; Simultaneous equations and second degree equations with one unknown; Logarithms;	-	1	1	1
1.3 Geometry (a) Simple geometrical constructions;	-	1	1	1
(b) Graphical representation; nature and uses of graphs, graphs of equations/functions;	2	2	2	2
(c) Simple trigonometry; trigonometrical relationships, use of tables and rectangular and polar coordinates.	-	2	2	2

MODULE 2. PHYSICS

	LEVEL			
	A	B1	B2	B3
2.1 Matter	1	1	1	1
Nature of matter: the chemical elements, structure of atoms, molecules; Chemical compounds. States: solid, liquid and gaseous; Changes between states.				
2.2 Mechanics				
2.2.1 Statics	1	2	1	1
Forces, moments and couples, representation as vectors; Centre of gravity; Elements of theory of stress, strain and elasticity: tension, compression, shear and torsion; Nature and properties of solid, fluid and gas; Pressure and buoyancy in liquids (barometers).				
2.2.2 Kinetics	1	2	1	1
Linear movement: uniform motion in a straight line, motion under constant acceleration (motion under gravity); Rotational movement: uniform circular motion (centrifugal/ centripetal forces); Periodic motion: pendular movement; Simple theory of vibration, harmonics and resonance; Velocity ratio, mechanical advantage and efficiency.				
2.2.3 Dynamics				
(a)	1	2	1	1
Mass Force, inertia, work, power, energy (potential, kinetic and total energy), heat, efficiency;				
(b)	1	2	2	1
Momentum, conservation of momentum; Impulse; Gyroscopic principles; Friction: nature and effects, coefficient of friction (rolling resistance).				
2.2.4 Fluid dynamics				

	LEVEL			
	A	B1	B2	B3
(a) Specific gravity and density;	2	2	2	2
(b) Viscosity, fluid resistance, effects of streamlining; Effects of compressibility on fluids; Static, dynamic and total pressure: Bernoulli's Theorem, venturi.	1	2	1	1
2.3 Thermodynamics				
(a) Temperature: thermometers and temperature scales: Celsius, Fahrenheit and Kelvin; Heat definition.	2	2	2	2
(b) Heat capacity, specific heat; Heat transfer: convection, radiation and conduction; Volumetric expansion; First and second law of thermodynamics; Gases: ideal gases laws; specific heat at constant volume and constant pressure, work done by expanding gas; Isothermal, adiabatic expansion and compression, engine cycles, constant volume and constant pressure, refrigerators and heat pumps; Latent heats of fusion and evaporation, thermal energy, heat of combustion.	-	2	2	1
2.4 Optics (Light)	-	2	2	-
Nature of light; speed of light; Laws of reflection and refraction: reflection at plane surfaces, reflection by spherical mirrors, refraction, lenses; Fibre optics.				
2.5 Wave Motion and Sound	-	2	2	-
Wave motion: mechanical waves, sinusoidal wave motion, interference phenomena, standing waves; Sound: speed of sound, production of sound, intensity, pitch and quality, Doppler effect.				

MODULE 3. ELECTRICAL FUNDAMENTALS

	LEVEL			
	A	B1	B2	B3
3.1 Electron Theory Structure and distribution of electrical charges within: atoms, molecules, ions, compounds; Molecular structure of conductors, semiconductors and insulators.	1	1	1	1
3.2 Static Electricity and Conduction Static electricity and distribution of electrostatic charges; Electrostatic laws of attraction and repulsion; Units of charge, Coulomb's Law; Conduction of electricity in solids, liquids, gases and a vacuum.	1	2	2	1
3.3 Electrical Terminology The following terms, their units and factors affecting them: potential difference, electromotive force, voltage, current, resistance, conductance, charge, conventional current flow, electron flow.	1	2	2	1
3.4 Generation of Electricity Production of electricity by the following methods: light, heat, friction, pressure, chemical action, magnetism and motion.	1	1	1	1
3.5 DC Sources of Electricity Construction and basic chemical action of: primary cells, secondary cells, lead acid cells, nickel cadmium cells, other alkaline cells; Cells connected in series and parallel; Internal resistance and its effect on a battery; Construction, materials and operation of thermocouples; Operation of photo-cells.	1	2	2	1
3.6 DC Circuits Ohms Law, Kirchoff's Voltage and Current Laws; Calculations using the above laws to find resistance, voltage and current; Significance of the internal resistance of a supply.	-	2	2	1
3.7 Resistance/Resistor (a)	-	2	2	1

	LEVEL			
	A	B1	B2	B3
Resistance and affecting factors; Specific resistance; Resistor colour code, values and tolerances, preferred values, wattage ratings; Resistors in series and parallel; Calculation of total resistance using series, parallel and series parallel combinations; Operation and use of potentiometers and rheostats; Operation of Wheatstone Bridge.				
(b)	-	1	1	-
Positive and negative temperature coefficient conductance; Fixed resistors, stability, tolerance and limitations, methods of construction; Variable resistors, thermistors, voltage dependent resistors; Construction of potentiometers and rheostats; Construction of Wheatstone Bridge;				
3.8 Power	-	2	2	1
Power, work and energy (kinetic and potential); Dissipation of power by a resistor; Power formula; Calculations involving power, work and energy.				
3.9 Capacitance/Capacitor	-	2	2	1
Operation and function of a capacitor; Factors affecting capacitance area of plates, distance between plates, number of plates, dielectric and dielectric; Constant, working voltage, voltage rating; Capacitor types, construction and function; Capacitor colour coding; Calculations of capacitance and voltage in series and parallel circuits; Exponential charge and discharge of a capacitor, time constants; Testing of capacitors.				
3.10 Magnetism				
(a)	-	2	2	1

	LEVEL			
	A	B1	B2	B3
Theory of magnetism; Properties of a magnet; Action of a magnet suspended in the Earth's magnetic field; Magnetisation and demagnetisation; Magnetic shielding; Various types of magnetic material; Electromagnets construction and principles of operation; Hand clasp rules to determine: magnetic field around current carrying conductor.				
(b) Magnetomotive force, field strength, magnetic flux density, permeability, hysteresis loop, retentivity, coercive force reluctance, saturation point, eddy currents; Precautions for care and storage of magnets.	-	2	2	1
3.11 Inductance/Inductor Faraday's Law; Action of inducing a voltage in a conductor moving in a magnetic field; Induction principles; Effects of the following on the magnitude of an induced voltage: magnetic field strength, rate of change of flux, number of conductor turns; Mutual induction; The effect the rate of change of primary current and mutual inductance has on induced voltage; Factors affecting mutual inductance: number of turns in coil, physical size of coil, permeability of coil, position of coils with respect to each other; Lenz's Law and polarity determining rules; Back emf, self induction; Saturation point; Principle uses of inductors.	-	2	2	1
3.12 DC Motor/Generator Theory Basic motor and generator theory; Construction and purpose of components in DC generator; Operation of, and factors affecting output and direction of current flow in DC generators; Operation of, and factors affecting output power, torque, speed and direction of rotation of DC motors; Series wound, shunt wound and compound motors; Starter Generator construction.	-	2	2	1

	LEVEL			
	A	B1	B2	B3
<p>3.13 AC Theory</p> <p>Sinusoidal waveform: phase, period, frequency, cycle;</p> <p>Instantaneous, average, root mean square, peak, peak to peak current values and calculations of these values, in relation to voltage, current and power;</p> <p>Triangular/Square waves;</p> <p>Single/3 phase principles.</p>	1	2	2	1
<p>3.14 Resistive (R), Capacitive (C) and Inductive (L) Circuits</p> <p>Phase relationship of voltage and current in L, C and R circuits, parallel, series and series parallel;</p> <p>Power dissipation in L, C and R circuits;</p> <p>Impedance, phase angle, power factor and current calculations;</p> <p>True power, apparent power and reactive power calculations.</p>	-	2	2	1
<p>3.15 Transformers</p> <p>Transformer construction principles and operation;</p> <p>Transformer losses and methods for overcoming them;</p> <p>Transformer action under load and no-load conditions;</p> <p>Power transfer, efficiency, polarity markings;</p> <p>Calculation of line and phase voltages and currents;</p> <p>Calculation of power in a three phase system;</p> <p>Primary and Secondary current, voltage, turns ratio, power, efficiency;</p> <p>Auto transformers.</p>	-	2	2	1
<p>3.16 Filters</p> <p>Operation, application and uses of the following filters: low pass, high pass, band pass, band stop.</p>	-	1	1	-
<p>3.17 AC Generators</p> <p>Rotation of loop in a magnetic field and waveform produced;</p> <p>Operation and construction of revolving armature and revolving field type AC generators;</p> <p>Single phase, two phase and three phase alternators;</p> <p>Three phase star and delta connections advantages and uses;</p> <p>Permanent Magnet Generators.</p>	-	2	2	1
<p>3.18 AC Motors</p>	-	2	2	1

	LEVEL			
	A	B1	B2	B3
<p>Construction, principles of operation and characteristics of: AC synchronous and induction motors both single and polyphase;</p> <p>Methods of speed control and direction of rotation;</p> <p>Methods of producing a rotating field: capacitor, inductor, shaded or split pole.</p>				

MODULE 4. ELECTRONIC FUNDAMENTALS

	LEVEL			
	A	B1	B2	B3
<p>4.1 Semiconductors</p> <p>4.1.1 Diodes</p> <p>(a)</p> <p>Diode symbols;</p> <p>Diode characteristics and properties;</p> <p>Diodes in series and parallel;</p> <p>Main characteristics and use of silicon controlled rectifiers (thyristors), light emitting diode, photo conductive diode, varistor, rectifier diodes;</p> <p>Functional testing of diodes.</p> <p>(b)</p> <p>Materials, electron configuration, electrical properties;</p> <p>P and N type materials: effects of impurities on conduction, majority and minority characters;</p> <p>PN junction in a semiconductor, development of a potential across a PN junction in unbiased, forward biased and reverse biased conditions;</p> <p>Diode parameters: peak inverse voltage, maximum forward current, temperature, frequency, leakage current, power dissipation;</p> <p>Operation and function of diodes in the following circuits: clippers, clampers, full and half wave rectifiers, bridge rectifiers, voltage doublers and triplers;</p> <p>Detailed operation and characteristics of the following devices: silicon controlled rectifier (thyristor), light emitting diode, Schottky diode, photo conductive diode, varactor diode, varistor, rectifier diodes, Zener diode.</p> <p>4.1.2 Transistors</p> <p>(a)</p> <p>Transistor symbols;</p> <p>Component description and orientation;</p> <p>Transistor characteristics and properties.</p> <p>(b)</p>				
	-	2	2	1
	-	-	2	-
	-	1	2	1
	-	-	2	-

	LEVEL			
	A	B1	B2	B3
<p>Construction and operation of PNP and NPN transistors; Base, collector and emitter configurations; Testing of transistors; Basic appreciation of other transistor types and their uses; Application of transistors: classes of amplifier (A, B, C); Simple circuits including: bias, decoupling, feedback and stabilisation; Multistage circuit principles: cascades, push-pull, oscillators, multivibrators, flip-flop circuits.</p>				
<p>4.1.3 Integrated Circuits</p>				
<p>(a)</p> <p>Description and operation of logic circuits and linear circuits/operational amplifiers.</p>	-	1	-	1
<p>(b)</p> <p>Description and operation of logic circuits and linear circuits; Introduction to operation and function of an operational amplifier used as: integrator, differentiator, voltage follower, comparator; Operation and amplifier stages connecting methods: resistive capacitive, inductive (transformer), inductive resistive (IR), direct; Advantages and disadvantages of positive and negative feedback.</p>	-	-	2	-
<p>4.2 Printed Circuit Boards</p> <p>Description and use of printed circuit boards.</p>	-	1	2	-
<p>4.3 Servomechanisms</p>				
<p>(a)</p> <p>Understanding of the following terms: Open and closed loop systems, feedback, follow up, analogue transducers; Principles of operation and use of the following synchro system components/features: resolvers, differential, control and torque, transformers, inductance and capacitance transmitters.</p>	-	1	-	1
<p>(b)</p> <p>Understanding of the following terms: Open and closed loop, follow up, servomechanism, analogue, transducer, null, damping, feedback, deadband; Construction operation and use of the following synchro system components: resolvers, differential, control and torque, E and I transformers, inductance transmitters, capacitance transmitters, synchronous transmitters; Servomechanism defects, reversal of synchro leads, hunting.</p>	-	-	2	-

MODULE 5. DIGITAL TECHNIQUES ELECTRONIC INSTRUMENT SYSTEMS

	LEVEL				
	A	B1-1 B1-3	B1-2 B1-4	B2	B3
<p>5.1 Electronic Instrument Systems</p> <p>Typical systems arrangements and cockpit layout of electronic instrument systems</p>	1	2	2	3	1
<p>5.2 Numbering Systems</p> <p>Numbering systems: binary, octal and hexadecimal; Demonstration of conversions between the decimal and binary, octal and hexadecimal systems and vice versa.</p>	-	1	-	2	-
<p>5.3 Data Conversion</p> <p>Analogue Data, Digital Data; Operation and application of analogue to digital, and digital to analogue converters, inputs and outputs, limitations of various types.</p>	-	1	-	2	-
<p>5.4 Data Buses</p> <p>Operation of data buses in aircraft systems, including knowledge of ARINC and other specifications.</p>	-	2	-	2	-
<p>5.5 Logic Circuits</p> <p>(a) Identification of common logic gate symbols, tables and equivalent circuits; Applications used for aircraft systems, schematic diagrams.</p> <p>(b) Interpretation of logic diagrams.</p>	-	2	-	2	-
<p>5.6 Basic Computer Structure</p> <p>(a) Computer terminology (including bit, byte, software, hardware, CPU, IC, and various memory devices such as RAM, ROM, PROM); Computer technology (as applied in aircraft systems).</p> <p>(b)</p>	1	2	-	-	-
	-	-	-	2	-

	LEVEL				
	A	B1-1 B1-3	B1-2 B1-4	B2	B3
Computer related terminology; Operation, layout and interface of the major components in a micro computer including their associated bus systems; Information contained in single and multiaddress instruction words; Memory associated terms; Operation of typical memory devices; Operation, advantages and disadvantages of the various data storage systems.					
5.7 Microprocessors	-	-	-	2	-
Functions performed and overall operation of a microprocessor; Basic operation of each of the following microprocessor elements: control and processing unit, clock, register, arithmetic logic unit.					
5.8 Integrated Circuits	-	-	-	2	-
Operation and use of encoders and decoders; Function of encoder types; Uses of medium, large and very large scale integration.					
5.9 Multiplexing	-	-	-	2	-
Operation, application and identification in logic diagrams of multiplexers and demultiplexers.					
5.10 Fibre Optics	-	1	1	2	-
Advantages and disadvantages of fibre optic data transmission over electrical wire propagation; Fibre optic data bus; Fibre optic related terms; Terminations; Couplers, control terminals, remote terminals; Application of fibre optics in aircraft systems.					
5.11 Electronic Displays	-	2	1	2	1
Principles of operation of common types of displays used in modern aircraft, including Cathode Ray Tubes, Light Emitting Diodes and Liquid Crystal Display.					
5.12 Electrostatic Sensitive Devices	1	2	2	2	1

	LEVEL				
	A	B1-1 B1-3	B1-2 B1-4	B2	B3
Special handling of components sensitive to electrostatic discharges; Awareness of risks and possible damage, component and personnel anti-static protection devices.					
5.13 Software Management Control	-	2	1	2	1
Awareness of restrictions, airworthiness requirements and possible catastrophic effects of unapproved changes to software programmes.					
5.14 Electromagnetic Environment	-	2	2	2	1
Influence of the following phenomena on maintenance practices for electronic system: EMC-Electromagnetic Compatibility EMI-Electromagnetic Interference HIRF-High Intensity Radiated Field Lightning/lightning protection					
5.15 Typical Electronic/Digital Aircraft Systems	-	2	2	2	1
General arrangement of typical electronic/digital aircraft systems and associated BITE (Built In Test Equipment) testing such as: ACARS-ARINC Communication and Addressing and Reporting System ECAM-Electronic Centralised Aircraft Monitoring EFIS-Electronic Flight Instrument System EICAS-Engine Indication and Crew Alerting System FBW-Fly by Wire FMS-Flight Management System GPS-Global Positioning System IRS-Inertial Reference System TCAS-Traffic Alert Collision Avoidance System					

MODULE 6. MATERIALS AND HARDWARE

	LEVEL			
	A	B1	B2	B3
6.1 Aircraft Materials — Ferrous				
(a) Characteristics, properties and identification of common alloy steels used in aircraft; Heat treatment and application of alloy steels.	1	2	1	2
(b) Testing of ferrous materials for hardness, tensile strength, fatigue strength and impact resistance.	-	1	1	1
6.2 Aircraft Materials — Non-Ferrous				
(a) Characteristics, properties and identification of common non-ferrous materials used in aircraft; Heat treatment and application of non-ferrous materials;	1	2	1	2
(b) Testing of non-ferrous material for hardness, tensile strength, fatigue strength and impact resistance.	-	1	1	1
6.3 Aircraft Materials — Composite and Non-Metallic				
<i>6.3.1 Composite and non-metallic other than wood and fabric</i>				
(a) Characteristics, properties and identification of common composite and non-metallic materials, other than wood, used in aircraft; Sealant and bonding agents.	1	2	2	2
(b) The detection of defects/deterioration in composite and non-metallic material. Repair of composite and non-metallic material.	1	2	-	2
<i>6.3.2 Wooden structures</i>				
Construction methods of wooden airframe structures; Characteristics, properties and types of wood and glue used in aeroplanes; Preservation and maintenance of wooden structure; Types of defects in wood material and wooden structures; The detection of defects in wooden structure;	1	2	-	2

	LEVEL			
	A	B1	B2	B3
Repair of wooden structure.				
<i>6.3.3 Fabric covering</i>	1	2	-	2
Characteristics, properties and types of fabrics used in aeroplanes; Inspections methods for fabric; Types of defects in fabric; Repair of fabric covering.				
6.4 Corrosion				
(a)	1	1	1	1
Chemical fundamentals; Formation by, galvanic action process, microbiological, stress;				
(b)	2	3	2	2
Types of corrosion and their identification; Causes of corrosion; Material types, susceptibility to corrosion.				
6.5 Fasteners				
<i>6.5.1 Screw threads</i>	2	2	2	2
Screw nomenclature; Thread forms, dimensions and tolerances for standard threads used in aircraft; Measuring screw threads.				
<i>6.5.2 Bolts, studs and screws</i>	2	2	2	2
Bolt types: specification, identification and marking of aircraft bolts, international standards; Nuts: self locking, anchor, standard types; Machine screws: aircraft specifications; Studs: types and uses, insertion and removal; Self tapping screws, dowels.				
<i>6.5.3 Locking devices</i>	2	2	2	2

	LEVEL			
	A	B1	B2	B3
Tab and spring washers, locking plates, split pins, pal-nuts, wire locking, quick release fasteners, keys, circlips, cotter pins.				
<i>6.5.4 Aircraft rivets</i>	1	2	1	2
Types of solid and blind rivets: specifications and identification, heat treatment.				
6.6 Pipes and Unions				
(a)	2	2	2	2
Identification of, and types of rigid and flexible pipes and their connectors used in aircraft;				
(b)	2	2	1	2
Standard unions for aircraft hydraulic, fuel, oil, pneumatic and air system pipes.				
6.7 Springs	-	2	1	1
Types of springs, materials, characteristics and applications.				
6.8 Bearings	1	2	2	1
Purpose of bearings, loads, material, construction;				
Types of bearings and their application.				
6.9 Transmissions	1	2	2	1
Gear types and their application;				
Gear ratios, reduction and multiplication gear systems, driven and driving gears, idler gears, mesh patterns;				
Belts and pulleys, chains and sprockets.				
6.10 Control Cables	1	2	1	2
Types of cables;				
End fittings, turnbuckles and compensation devices;				
Pulleys and cable system components;				
Bowden cables;				
Aircraft flexible control systems.				
6.11 Electrical Cables and Connectors	1	2	2	2
Cable types, construction and characteristics;				
High tension and co-axial cables;				
Crimping;				
Connector types, pins, plugs, sockets, insulators, current and voltage rating,				

	LEVEL			
	A	B1	B2	B3
coupling, identification codes.				

MODULE 7. MAINTENANCE PRACTICES

	LEVEL			
	A	B1	B2	B3
<p>7.1 Safety Precautions-Aircraft and Workshop</p> <p>Aspects of safe working practices including precautions to take when working with electricity, gases especially oxygen, oils and chemicals. Also, instruction in the remedial action to be taken in the event of a fire or another accident with one or more of these hazards including knowledge on extinguishing agents.</p>	3	3	3	3
<p>7.2 Workshop Practices</p> <p>Care of tools, control of tools, use of workshop materials; Dimensions, allowances and tolerances, standards of workmanship; Calibration of tools and equipment, calibration standards.</p>	3	3	3	3
<p>7.3 Tools</p> <p>Common hand tool types; Common power tool types; Operation and use of precision measuring tools; Lubrication equipment and methods. Operation, function and use of electrical general test equipment;</p>	3	3	3	3
<p>7.4 Avionic General Test Equipment</p> <p>Operation, function and use of avionic general test equipment.</p>	-	2	3	-
<p>7.5 Engineering Drawings, Diagrams and Standards</p> <p>Drawing types and diagrams, their symbols, dimensions, tolerances and projections; Identifying title block information; Microfilm, microfiche and computerised presentations; Specification 100 of the Air Transport Association (ATA) of America; Aeronautical and other applicable standards including ISO, AN, MS, NAS and MIL; Wiring diagrams and schematic diagrams.</p>	1	2	2	2

	LEVEL			
	A	B1	B2	B3
<p>7.6 Fits and Clearances</p> <p>Drill sizes for bolt holes, classes of fits; Common system of fits and clearances; Schedule of fits and clearances for aircraft and engines; Limits for bow, twist and wear; Standard methods for checking shafts, bearings and other parts.</p>	1	2	1	2
<p>7.7 Electrical Cables and Connectors</p> <p>Continuity, insulation and bonding techniques and testing; Use of crimp tools: hand and hydraulic operated; Testing of crimp joints; Connector pin removal and insertion; Co-axial cables: testing and installation precautions; Wiring protection techniques: Cable looming and loom support, cable clamps, protective sleeving techniques including heat shrink wrapping, shielding.</p>	1	2	2	2
<p>7.8 Riveting</p> <p>Riveted joints, rivet spacing and pitch; Tools used for riveting and dimpling; Inspection of riveted joints.</p>	1	2	-	2
<p>7.9 Pipes and Hoses</p> <p>Bending and belling/flaring aircraft pipes; Inspection and testing of aircraft pipes and hoses; Installation and clamping of pipes.</p>	1	2	-	2
<p>7.10 Springs</p> <p>Inspection and testing of springs.</p>	1	2	-	1
<p>7.11 Bearings</p> <p>Testing, cleaning and inspection of bearings; Lubrication requirements of bearings; Defects in bearings and their causes.</p>	1	2	-	2
<p>7.12 Transmissions</p> <p>Inspection of gears, backlash; Inspection of belts and pulleys, chains and sprockets; Inspection of screw jacks, lever devices, push-pull rod systems.</p>	1	2	-	2

	LEVEL			
	A	B1	B2	B3
7.13 Control Cables	1	2	-	2
Swaging of end fittings; Inspection and testing of control cables; Bowden cables; aircraft flexible control systems.				
7.14 Material handling				
<i>7.14.1 Sheet Metal</i>	-	2	-	2
Marking out and calculation of bend allowance; Sheet metal working, including bending and forming; Inspection of sheet metal work.				
<i>7.14.2 Composite and non-metallic</i>	-	2	-	2
Bonding practices; Environmental conditions; Inspection methods.				
7.15 Welding, Brazing, Soldering and Bonding				
(a)	-	2	2	2
Soldering methods; inspection of soldered joints.				
(b)	-	2	-	2
Welding and brazing methods; Inspection of welded and brazed joints; Bonding methods and inspection of bonded joints.				
7.16 Aircraft Weight and Balance				
(a)	-	2	2	2
Centre of Gravity/Balance limits calculation: use of relevant documents;				
(b)	-	2	-	2
Preparation of aircraft for weighing; Aircraft weighing				
(c)	-	-	-	1
Sailplanes water ballast (only required for B3)				
7.17 Aircraft Handling and Storage	2	2	2	2

	LEVEL			
	A	B1	B2	B3
Aircraft taxiing/towing and associated safety precautions; Aircraft jacking, chocking, securing and associated safety precautions; Aircraft storage methods; Refuelling/defuelling procedures; De-icing/anti-icing procedures; Electrical, hydraulic and pneumatic ground supplies. Effects of environmental conditions on aircraft handling and operation.				
7.18 Disassembly, Inspection, Repair and Assembly Techniques				
(a) Types of defects and visual inspection techniques. Corrosion removal, assessment and re-protection.	2	3	2	3
(b) General repair methods, Structural Repair Manual; Ageing, fatigue and corrosion control programmes;	-	2	-	2
(c) Non destructive inspection techniques including, penetrant, radiographic, eddy current, ultrasonic and boroscope methods.	-	2	1	2
(d) Disassembly and re-assembly techniques.	2	2	2	2
(e) Trouble shooting techniques	-	2	2	2
7.19 Abnormal Events				
(a) Inspections following lightning strikes and HIRF penetration.	2	2	2	2
(b) Inspections following abnormal events such as heavy landings and flight through turbulence.	2	2	-	2

	LEVEL			
	A	B1	B2	B3
7.20 Maintenance Procedures	1	2	2	2
Maintenance planning;				
Modification procedures;				
Stores procedures;				
Certification/release procedures;				
Interface with aircraft operation;				
Maintenance Inspection/Quality Control/Quality Assurance;				
Additional maintenance procedures.				
Control of life limited components				

MODULE 8. BASIC AERODYNAMICS

	LEVEL			
	A	B1	B2	B3
8.1 Physics of the Atmosphere	1	2	2	1
International Standard Atmosphere (ISA), application to aerodynamics.				
8.2 Aerodynamics	1	2	2	1
Airflow around a body;				
Boundary layer, laminar and turbulent flow, free stream flow, relative airflow, upwash and downwash, vortices, stagnation;				
The terms: camber, chord, mean aerodynamic chord, profile (parasite) drag, induced drag, centre of pressure, angle of attack, wash in and wash out, fineness ratio, wing shape and aspect ratio;				
Thrust, Weight, Aerodynamic Resultant;				
Generation of Lift and Drag: Angle of Attack, Lift coefficient, Drag coefficient, polar curve, stall;				
Aerofoil contamination including ice, snow, frost.				
8.3 Theory of Flight	1	2	2	1
Relationship between lift, weight, thrust and drag;				
Glide ratio;				
Steady state flights, performance;				
Theory of the turn;				
Influence of load factor: stall, flight envelope and structural limitations;				
Lift augmentation.				

	LEVEL			
	A	B1	B2	B3
8.4 Flight Stability and Dynamics Longitudinal, lateral and directional stability (active and passive).	1	2	2	1

MODULE 9. HUMAN FACTORS

	LEVEL			
	A	B1	B2	B3
9.1 General The need to take human factors into account; Incidents attributable to human factors/human error; 'Murphy's' law.	1	2	2	2
9.2 Human Performance and Limitations Vision; Hearing; Information processing; Attention and perception; Memory; Claustrophobia and physical access.	1	2	2	2
9.3 Social Psychology Responsibility: individual and group; Motivation and de-motivation; Peer pressure; 'Culture' issues; Team working; Management, supervision and leadership.	1	1	1	1
9.4 Factors Affecting Performance Fitness/health; Stress: domestic and work related; Time pressure and deadlines; Workload: overload and underload; Sleep and fatigue, shiftwork; Alcohol, medication, drug abuse.	2	2	2	2

	LEVEL			
	A	B1	B2	B3
9.5 Physical Environment	1	1	1	1
Noise and fumes;				
Illumination;				
Climate and temperature;				
Motion and vibration;				
Working environment.				
9.6 Tasks	1	1	1	1
Physical work;				
Repetitive tasks;				
Visual inspection;				
Complex systems.				
9.7 Communication	2	2	2	2
Within and between teams;				
Work logging and recording;				
Keeping up to date, currency;				
Dissemination of information.				
9.8 Human Error	1	2	2	2
Error models and theories;				
Types of error in maintenance tasks;				
Implications of errors (i.e accidents);				
Avoiding and managing errors.				
9.9 Hazards in the Workplace	1	2	2	2
Recognising and avoiding hazards;				
Dealing with emergencies.				

MODULE 10. AVIATION LEGISLATION

	LEVEL			
	A	B1	B2	B3
10.1 Regulatory Framework	1	1	1	1
Role of International Civil Aviation Organisation;				
Role of EASA;				
Role of the Member States;				

	LEVEL			
	A	B1	B2	B3
Relationship between Part-145, Part-66, Part-147 and Part-M; Relationship with other Aviation Authorities.				
10.2 Part-66 — Certifying Staff — Maintenance	2	2	2	2
Detailed understanding of Part-66.				
10.3 Part-145 - Part-M Subpart F — Approved Maintenance Organisations	2	2	2	2
Detailed understanding of Part-145.				
10.4 JAR-OPS — Commercial Air Transportation	1	1	1	-
Air Operators Certificates; Operators Responsibilities; Documents to be Carried; Aircraft Placarding (Markings);				
10.5 Aircraft Certification				
<i>(a) General</i>	-	1	1	1
Certification rules: such as EACS 23/25/27/29; Type Certification; Supplemental Type Certification; Part-21 Design/Production Organisation Approvals.				
<i>(b) Documents</i>	-	2	2	2
Certificate of Airworthiness; Certificate of Registration; Noise Certificate; Weight Schedule; Radio Station Licence and Approval.				
10.6 Part-M	2	2	2	2
Detailed understanding of Part-M.				
10.7 Applicable National and International Requirements for (if not superseded by EU requirements)				
<i>(a)</i>	1	2	2	2
Maintenance Programmes, Maintenance checks and inspections; Master Minimum Equipment Lists, Minimum Equipment List, Dispatch Deviation Lists; Airworthiness Directives;				

	LEVEL			
	A	B1	B2	B3
Service Bulletins, manufacturers service information; Modifications and repairs; Maintenance documentation: maintenance manuals, structural repair manual, illustrated parts catalogue, etc.;				
(b)	-	1	1	1
Continuing airworthiness; Test flights; ETOPS, maintenance and dispatch requirements; All Weather Operations, Category 2/3 operations and minimum equipment requirements.				

MODULE 11A. TURBINE AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS

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MODULE 11B. PISTON AEROPLANE, SAILPLANE AND POWERED SAILPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS

Note: The scope of this Module should reflect the technology of aeroplanes, sailplanes and powered sailplanes to the A2, and B1.2 and B3 category.

	LEVEL			
	A	B1	B2	B3
11.1 Theory of Flight				
<i>11.1.1 Aeroplane Aerodynamics and Flight Controls</i>				
Operation and effect of: — roll control: ailerons and spoilers; — pitch control: elevators, stabilators, variable incidence stabilisers and canards; — yaw control, rudder limiters; Control using elevons, ruddervators; High lift devices, slots, slats, flaps, flaperons; Drag inducing devices, spoilers, lift dumpers, speed brakes; Effects of wing fences, saw tooth leading edges; Boundary layer control using, vortex generators, stall wedges or leading edge devices; Operation and effect of trim tabs, balance and anti-balance (leading) tabs, servo tabs, spring tabs, mass balance, control surface bias, aerodynamic balance panels;	1	2	-	1
<i>11.1.2 High Speed Flight — N/A</i>	-	-	-	-

	LEVEL			
	A	B1	B2	B3
11.2 Airframe Structures — General Concepts				
(a)	2	2	-	2
Airworthiness requirements for structural strength; Structural classification, primary, secondary and tertiary; Fail safe, safe life, damage tolerance concepts; Zonal and station identification systems; Stress, strain, bending, compression, shear, torsion, tension, hoop stress, fatigue; Drains and ventilation provisions; System installation provisions; Lightning strike protection provision; Aircraft bonding.				
(b)	1	2	-	2
Construction methods of: stressed skin fuselage, formers, stringers, longerons, bulkheads, frames, doublers, struts, ties, beams, floor structures, reinforcement, methods of skinning, anti-corrosive protection, wing, empennage and engine attachments; Structure assembly techniques: riveting, bolting, bonding; Methods of surface protection, such as chromating, anodising, painting; Surface cleaning; Airframe symmetry: methods of alignment and symmetry checks.				
11.3 Airframe Structures — Aeroplanes				
<i>11.3.1 Fuselage (ATA 52/53/56)</i>	1	2	-	1
Construction and pressurisation sealing; Wing, tail-plane pylon and undercarriage attachments; Seat installation; Doors and emergency exits: construction and operation; Window and windscreen attachment.				
<i>11.3.2 Wings (ATA 57)</i>	1	2	-	1
Construction; Fuel storage; Landing gear, pylon, control surface and high lift/drag attachments.				
<i>11.3.3 Stabilisers (ATA 55)</i>	1	2	-	1
Construction; Control surface attachment.				

	LEVEL			
	A	B1	B2	B3
<p><i>11.3.4 Flight Control Surfaces (ATA 55/57)</i></p> <p>Construction and attachment; Balancing — mass and aerodynamic.</p>	1	2	-	1
<p><i>11.3.5 Nacelles/Pylons (ATA 54)</i></p> <p>(a)</p> <p>Nacelles/Pylons: — Construction; — Firewalls; — Engine mounts.</p>	1	2	-	1
<p>11.4 Air Conditioning and Cabin Pressurisation (ATA 21)</p> <p>(a)</p> <p>Pressurisation and air conditioning systems; Cabin pressure controllers, protection and warning devices. Heating systems</p>	1	3	-	-
<p>(b)</p> <p>Heating systems</p>	-	-	-	1
<p>11.5 Instruments/Avionic Systems</p> <p><i>11.5.1 Instrument Systems (ATA 31)</i></p> <p>Pitot static: altimeter, air speed indicator, vertical speed indicator; Gyroscopic: artificial horizon, attitude director, direction indicator, horizontal situation indicator, turn and slip indicator, turn coordinator; Compasses: direct reading, remote reading; Angle of attack indication, stall warning systems. Other aircraft system indication.</p>	1	2	-	1
<p><i>11.5.2 Avionic Systems</i></p> <p>Fundamentals of system lay-outs and operation of: — Auto Flight (ATA 22); — Communications (ATA 23); — Navigation Systems (ATA 34).</p>	1	1	-	1

	LEVEL			
	A	B1	B2	B3
11.6 Electrical Power (ATA 24)	1	3	-	2
Batteries Installation and Operation;				
DC power generation;				
Voltage regulation;				
Power distribution;				
Circuit protection;				
Inverters, transformers.				
11.7 Equipment and Furnishings (ATA 25)				
(a)	2	2	-	2
Emergency equipment requirements;				
Seats, harnesses and belts.				
(b)	1	1	-	-
Cabin lay-out;				
Equipment lay-out;				
Cabin Furnishing Installation (level 2);				
Cabin entertainment equipment;				
Galley installation;				
Cargo handling and retention equipment;				
Airstairs.				
11.8 Fire Protection (ATA 26)				
(a)	1	3	-	1
Fire extinguishing systems;				
Fire and smoke detection and warning systems;				
System tests.				
(b)	1	3	-	2
Portable fire extinguisher.				
11.9 Flight Controls (ATA 27)	1	3	-	3
Primary controls: aileron, elevator, rudder;				
Trim tabs;				
High lift devices;				
System operation: manual;				
Gust locks;				

	LEVEL			
	A	B1	B2	B3
Balancing and rigging; Stall warning system.				
11.10 Fuel Systems (ATA 28)	1	3	-	2
System lay-out; Fuel tanks; Supply systems; Cross-feed and transfer; Indications and warnings; Refuelling and defuelling.				
11.11 Hydraulic Power (ATA 29)	1	3	-	2
System lay-out; Hydraulic fluids; Hydraulic reservoirs and accumulators; Pressure generation: electric, mechanical; Pressure Control; Power distribution; Indication and warning systems.				
11.12 Ice and Rain Protection (ATA 30)	1	3	-	1
Ice formation, classification and detection; De-icing systems: electrical, hot air, pneumatic and chemical; Probe and drain heating; Wiper systems.				
11.13 Landing Gear (ATA 32)	2	3	-	2
Construction, shock absorbing; Extension and retraction systems: normal and emergency; Indications and warning; Wheels, brakes, antiskid and autobraking; Tyres; Steering.				

	LEVEL			
	A	B1	B2	B3
<p>11.14 Lights (ATA 33)</p> <p>External: navigation, anti collision, landing, taxiing, ice; Internal: cabin, cockpit, cargo; Emergency.</p>	2	2	-	2
<p>11.15 Oxygen (ATA 35)</p> <p>System lay-out: cockpit, cabin; Sources, storage, charging and distribution; Supply regulation; Indications and warnings;</p>	1	3	-	2
<p>11.16 Pneumatic/Vacuum (ATA 36)</p> <p>System lay-out; Sources: engine/APU, compressors, reservoirs, ground supply; Pressure and vacuum pumps Pressure control; Distribution; Indications and warnings; Interfaces with other systems.</p>	1	3	-	2
<p>11.17 Water/Waste (ATA 38)</p> <p>Water system lay-out, supply, distribution, servicing and draining; Toilet system lay-out, flushing and servicing; Corrosion aspects.</p>	2	3	-	-
<p>11.18 Electrical engine / jet engine (for motor-powered sailplanes)</p> <p>Electrical propulsion Battery system Propulsion interface Retraction system</p> <p>Jet propulsion Fuel system Propulsion interface Retraction system</p>	-	-	-	2

MODULE 12. HELICOPTER AERODYNAMICS, STRUCTURES AND SYSTEMS

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MODULE 13. AIRCRAFT AERODYNAMICS, STRUCTURES AND SYSTEMS

.....

MODULE 14. PROPULSION

.....

MODULE 15. GAS TURBINE ENGINE

.....

MODULE 16. PISTON ENGINE

	LEVEL			
	A	B1	B2	B3
<p>16.1 Fundamentals</p> <p>Mechanical, thermal and volumetric efficiencies; Operating principles – 2 stroke, 4 stroke, Otto and Diesel; Piston displacement and compression ratio; Engine configuration and firing order.</p>	1	2	-	2
<p>16.2 Engine Performance</p> <p>Power calculation and measurement; Factors affecting engine power; Mixtures/leaning, pre-ignition.</p>	1	2	-	2
<p>16.3 Engine Construction</p> <p>Crank case, crank shaft, cam shafts, sumps; Accessory gearbox; Cylinder and piston assemblies; Connecting rods, inlet and exhaust manifolds; Valve mechanisms; Propeller reduction gearboxes.</p>	1	2	-	2
<p>16.4 Engine Fuel Systems</p> <p><i>16.4.1 Carburettors</i></p>	1	2	-	2

	LEVEL			
	A	B1	B2	B3
Types, construction and principles of operation; Icing and heating.				
<i>16.4.2 Fuel injection systems</i>	1	2	-	2
Types, construction and principles of operation.				
<i>16.4.3 Electronic engine control</i>	1	2	-	2
Operation of engine control and fuel metering systems including electronic engine control (FADEC); Systems lay-out and components.				
16.5 Starting and Ignition Systems	1	2	-	2
Starting systems, pre-heat systems; Magneto types, construction and principles of operation; Ignition harnesses, spark plugs; Low and high tension systems.				
16.6 Induction, Exhaust and Cooling Systems	1	2	-	2
Construction and operation of: induction systems including alternate air systems; Exhaust systems, engine cooling systems — air and liquid.				
16.7 Supercharging/Turbocharging	1	2	-	2
Principles and purpose of supercharging and its effects on engine parameters; Construction and operation of supercharging/turbocharging systems; System terminology; Control systems; System protection.				
16.8 Lubricants and Fuels	1	2	-	2
Properties and specifications; Fuel additives; Safety precautions.				
16.9 Lubrication Systems	1	2	-	2
System operation/lay-out and components.				

	LEVEL			
	A	B1	B2	B3
<p>16.10 Engine Indication Systems</p> <p>Engine speed; Cylinder head temperature; Coolant temperature; Oil pressure and temperature; Exhaust Gas Temperature; Fuel pressure and flow; Manifold pressure.</p>	1	2	-	2
<p>16.11 Powerplant Installation</p> <p>Configuration of firewalls, cowlings, acoustic panels, engine mounts, anti-vibration mounts, hoses, pipes, feeders, connectors, wiring looms, control cables and rods, lifting points and drains.</p>	1	2	-	2
<p>16.12 Engine Monitoring and Ground Operation</p> <p>Procedures for starting and ground run-up; Interpretation of engine power output and parameters; Inspection of engine and components: criteria, tolerances, and data specified by engine manufacturer.</p>	1	3	-	2
<p>16.13 Engine Storage and Preservation</p> <p>Preservation and depreservation for the engine and accessories/systems.</p>	-	2	-	1

MODULE 17. PROPELLER

	LEVEL			
	A	B1	B2	B3
<p>17.1 Fundamentals</p> <p>Blade element theory; High/low blade angle, reverse angle, angle of attack, rotational speed; Propeller slip; Aerodynamic, centrifugal, and thrust forces; Torque; Relative airflow on blade angle of attack; Vibration and resonance.</p>	1	2	-	2

	LEVEL			
	A	B1	B2	B3
<p>17.2 Propeller Construction</p> <p>Composite and metal propellers; Blade station, blade face, blade shank, blade back and hub assembly; Fixed pitch, controllable pitch, constant speed propeller; Propeller/spinner installation.</p>	1	2	-	2
<p>17.3 Propeller Pitch Control</p> <p>Speed control and pitch change methods, mechanical and electrical/electronic; Feathering and reverse pitch; Overspeed protection.</p>	1	2	-	2
<p>17.4 Propeller Synchronising</p> <p>Synchronising and synchrophasing equipment.</p>	-	2	-	2
<p>17.5 Propeller Ice Protection</p> <p>Fluid and electrical de-icing equipment.</p>	1	2	-	2
<p>17.6 Propeller Maintenance</p> <p>Static and dynamic balancing; Blade tracking; Assessment of blade damage, erosion, corrosion, impact damage, delamination; Propeller treatment/repair schemes; Propeller engine running.</p>	1	3	-	2
<p>17.7 Propeller Storage and Preservation</p> <p>Propeller preservation and depreservation.</p>	1	2	-	2

Appendix II to Part-66 is amended as follows:

Appendix II

Basic Examination Standard

1. *Standardisation Basis For Examinations*

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2. *Question Numbers for the Part-66 Appendix I Modules*

2.1. Subject Module 1 Mathematics:

Category A-16 multi-choice and 0 essay questions. Time allowed 20 minutes.

Category B1-30 multi-choice and 0 essay questions. Time allowed 40 minutes.

Category B2-30 multi-choice and 0 essay questions. Time allowed 40 minutes.

Category B3-30 multi-choice and 0 essay questions. Time allowed 40 minutes.

2.2. Subject Module 2 Physics:

Category A-30 multi-choice and 0 essay questions. Time allowed 40 minutes.

Category B1-50 multi-choice and 0 essay questions. Time allowed 65 minutes.

Category B2-50 multi-choice and 0 essay questions. Time allowed 65 minutes.

Category B3-30 multi-choice and 0 essay questions. Time allowed 40 minutes.

2.3. Subject Module 3 Electrical Fundamentals:

Category A- 0 multi-choice and 0 essay questions. Time allowed 25 minutes.

Category B1-50 multi-choice and 0 essay questions. Time allowed 65 minutes.

Category B2-50 multi-choice and 0 essay questions. Time allowed 65 minutes.

Category B3-23 multi-choice and 0 essay questions. Time allowed 30 minutes.

2.4. Subject Module 4 Electronic Fundamentals:

Category A-None.

Category B1-20 multi-choice and 0 essay questions. Time allowed 25 minutes.

Category B2-40 multi-choice and 0 essay questions. Time allowed 50 minutes.

Category B3-9 multi-choice and 0 essay questions. Time allowed 12 minutes.

2.5. Subject Module 5 Digital Techniques/Electronic Instrument Systems:

Category A-16 multi-choice and 0 essay questions. Time allowed 20 minutes.

Category B1.1 & B1.3-40 multi-choice and 0 essay questions. Time allowed 50 minutes.

Category B1.2 & B1.4-20 multi-choice and 0 essay questions. Time allowed 25 minutes.

Category B2-70 multi-choice and 0 essay questions. Time allowed 90 minutes.

Category B3-16 multi-choice and 0 essay questions. Time allowed 20 minutes.

2.6. Subject Module 6 Materials and Hardware:

Category A-50 multi-choice and 0 essay questions. Time allowed 65 minutes.

Category B1-70 multi-choice and 0 essay questions. Time allowed 90 minutes.

Category B2-60 multi-choice and 0 essay questions. Time allowed 75 minutes.

Category B3-70 multi-choice and 0 essay questions. Time allowed 90 minutes.

2.7. Subject Module 7 Maintenance Practices:

Category A-70 multi-choice and 2 essay questions. Time allowed 90 minutes plus 40 minutes.

Category B1-80 multi-choice and 2 essay questions. Time allowed 100 minutes plus 40 minutes.

Category B2-60 multi-choice and 2 essay questions. Time allowed 75 minutes plus 40 minutes.

Category B3-80 multi-choice and 2 essay questions. Time allowed 100 minutes plus 40 minutes.

2.8. Subject Module 8 Basic Aerodynamics:

Category A-20 multi-choice and 0 essay questions. Time allowed 25 minutes.

Category B1-20 multi-choice and 0 essay questions. Time allowed 25 minutes.

Category B2-20 multi-choice and 0 essay questions. Time allowed 25 minutes.

Category B3-20 multi-choice and 0 essay questions. Time allowed 25 minutes.

2.9. Subject Module 9 Human factors:

Category A-20 multi-choice and 1 essay question. Time allowed 25 minutes plus 20 minutes.

Category B1-20 multi-choice and 1 essay question. Time allowed 25 minutes plus 20 minutes.

Category B2-20 multi-choice and 1 essay question. Time allowed 25 minutes plus 20 minutes.

Category B3-20 multi-choice and 1 essay questions. Time allowed 25 minutes plus 20 minutes.

2.10. Subject Module 10 Aviation Legislation:

Category A-30 multi-choice and 1 essay question. Time allowed 40 minutes plus 20 minutes.

Category B1-40 multi-choice and 1 essay question. Time allowed 50 minutes plus 20 minutes.

Category B2-40 multi-choice and 1 essay question. Time allowed 50 minutes plus 20 minutes.

Category B3-40 multi-choice and 1 essay questions. Time allowed 50 minutes plus 20 minutes.

2.11. Subject Module 11a Turbine Aeroplane Aerodynamics, Structures and Systems:

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2.12. Subject Module 11b Piston Aeroplane Aerodynamics, Structures and Systems:

Category A-70 multi-choice and 0 essay questions. Time allowed 90 minutes.

Category B1-100 multi-choice and 0 essay questions. Time allowed 125 minutes.

Category B2-None.

Category B3-70 multi-choice and 0 essay questions. Time allowed 90 minutes.

2.13. Subject Module 12 Helicopter Aerodynamics, Structures and Systems:

.....

2.14. Subject Module 13 Aircraft Aerodynamics, Structures and Systems:

.....

2.15. Subject Module 14 Propulsion:

.....

2.16. Subject Module 15 Gas Turbine Engine:

.....

2.17. Subject Module 16 Piston Engine:

Category A-50 multi-choice and 0 essay questions. Time allowed 65 minutes.

Category B1-70 multi-choice and 0 essay questions. Time allowed 90 minutes.

Category B2-None.

Category B3-70 multi-choice and 0 essay questions. Time allowed 90 minutes.

2.18. Subject Module 17 Propeller:

Category A-20 multi-choice and 0 essay questions. Time allowed 25 minutes.

Category B1-30 multi-choice and 0 essay questions. Time allowed 40 minutes.

Category B2-None.

Category B3-30 multi-choice and 0 essay questions. Time allowed 40 minutes.

Appendix IV and V to Part-66 are amended as follows:

Appendix IV

Experience requirements for extending a Part-66 Aircraft Maintenance Licence

The table below shows the experience requirements for adding a new category or subcategory to an existing Part-66 licence.

The experience must be practical maintenance experience on operating aircraft in the subcategory relevant to the application.

The experience requirement will be reduced by 50 % if the applicant has completed an approved Part-147 course relevant to the subcategory.

To From	A1	A2	A3	A4	B1.1	B1.2	B1.3	B1.4	B2	B3
A1		6 months	6 months	6 months	2 years	6 months	2 years	1 year	2 years	6 months
A2	6 months		6 months	6 months	2 years	6 months	2 years	1 year	2 years	6 months
A3	6 months	6 months		6 months	2 years	1 year	2 years	6 months	2 years	1 year
A4	6 months	6 months	6 months		2 years	1 year	2 years	6 months	2 years	1 year
B1.1	None	6 months	6 months	6 months		6 months	6 months	6 months	1 year	6 months
B1.2	6 months	None	6 months	6 months	2 years		2 years	6 months	2 years	-
B1.3	6 months	6 months	None	6 months	6 months	6 months		6 months	1 year	6 months
B1.4	6 months	6 months	6 months	None	2 years	6 months	2 years		2 years	6 months
B2	6 months	6 months	6 months	6 months	1 year	1 year	1 year	1 year		1 year
B3	6 months	None	6 months	6 months	2 years	6 months	2 years	1 year	2 years	

Appendix V

Application Form and Example of Licence Format

This appendix contains an example of the Part-66 aircraft maintenance licence and the relevant application form for such licence.

The competent authority of the Member State may modify the EASA Form 19 to include additional information necessary to support the case where the National requirements permit or require the Part-66 aircraft maintenance licence to be used outside the Part-145 requirement for non-commercial air transport purposes.

APPLICATION FOR INITIAL / AMENDMENT / RENEWAL OF PART-66 AIRCRAFT MAINTENANCE LICENCE (AML)	EASA FORM 19																																																							
<p>APPLICANTS DETAILS:</p> <p>Name:</p> <p>Address:</p> <p>.....</p> <p>Nationality: Date and Place of Birth:</p>																																																								
<p>Part-66 AML DETAILS (if applicable):</p> <p>Licence No: Date of Issue:</p>																																																								
<p>EMPLOYERS DETAILS:</p> <p>Name:</p> <p>Address:</p> <p>.....</p> <p>AMO Approval Reference: Fax:</p>																																																								
<p>APPLICATION FOR: (Tick (V) relevant box(es))</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 25%;">Initial AML</td> <td style="width: 25%;">Amendment of AML</td> <td style="width: 10%; text-align: center;"><input type="checkbox"/></td> <td style="width: 20%;">Renewal of AML</td> <td style="width: 20%; text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td>Rating</td> <td>A B1 B2 C B3</td> <td></td> <td>Basic-ELA</td> <td>Full-ELA</td> </tr> <tr> <td>Aeroplane Turbine</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td></td> <td></td> </tr> <tr> <td>Aeroplane Piston</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td></td> <td></td> </tr> <tr> <td>Helicopter Turbine</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td></td> <td></td> </tr> <tr> <td>Helicopter Piston</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td></td> <td></td> </tr> <tr> <td>Sailplanes, Powered Sailplanes and Piston Aeroplanes <= 2t (non-press.)</td> <td></td> <td><input type="checkbox"/></td> <td></td> <td></td> </tr> <tr> <td>Aircraft listed in 66.A.1(d)</td> <td></td> <td></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td>Avionics</td> <td></td> <td><input type="checkbox"/></td> <td></td> <td></td> </tr> <tr> <td>Large Aircraft</td> <td></td> <td></td> <td></td> <td><input type="checkbox"/></td> </tr> <tr> <td>Non-large Aircraft</td> <td></td> <td></td> <td><input checked="" type="checkbox"/></td> <td></td> </tr> </table>		Initial AML	Amendment of AML	<input type="checkbox"/>	Renewal of AML	<input type="checkbox"/>	Rating	A B1 B2 C B3		Basic-ELA	Full-ELA	Aeroplane Turbine	<input type="checkbox"/>	<input type="checkbox"/>			Aeroplane Piston	<input type="checkbox"/>	<input type="checkbox"/>			Helicopter Turbine	<input type="checkbox"/>	<input type="checkbox"/>			Helicopter Piston	<input type="checkbox"/>	<input type="checkbox"/>			Sailplanes, Powered Sailplanes and Piston Aeroplanes <= 2t (non-press.)		<input type="checkbox"/>			Aircraft listed in 66.A.1(d)			<input type="checkbox"/>	<input type="checkbox"/>	Avionics		<input type="checkbox"/>			Large Aircraft				<input type="checkbox"/>	Non-large Aircraft			<input checked="" type="checkbox"/>	
Initial AML	Amendment of AML	<input type="checkbox"/>	Renewal of AML	<input type="checkbox"/>																																																				
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Large Aircraft				<input type="checkbox"/>																																																				
Non-large Aircraft			<input checked="" type="checkbox"/>																																																					

Type endorsements / Ratings endorsements (including ELA basic ratings as per 66.A.1(d))(if applicable):

I wish to apply for initial / amendment / renewal of Part-66 AML, as indicated and confirm that the information contained in this form was correct at the time of application.

I hereby confirm that:

1. I am not holding any Part-66 AML, issued in another Member State,
2. I have not applied for any Part-66 AML in another Member State and
3. I never had a Part-66 AML issued in another Member State which was revoked or suspended in any other Member State.

I also understand that any incorrect information could disqualify me from holding a Part-66 AML.

Signed: Name:

Date:

I wish to claim the following credits (if applicable):

Experience credit due Part-147 training

Examination credit due equivalent exam certificates

Enclose relevant certificates

Recommendation (if applicable): It is hereby certified that the applicant has met the relevant maintenance knowledge and experience requirements of Part-66 and it is recommended that the competent authority grants or endorses the Part-66 AML.

Signed: Name:

Position: Date:

EUROPEAN UNION
STATE
AUTHORITY NAME & LOGO

Part-66

**AIRCRAFT MAINTENANCE
LICENCE**

THIS LICENCE IS RECOGNISED BY ALL EU MEMBERS

EASA FORM 26

Conditions:

1. This licence must be signed by the holder and be accompanied by an identity document containing a photograph of the licence holder.
2. Endorsement of any (sub)categories on the page(s) entitled Part-66 (SUB)CATEGORIES **only**, does **not** permit the holder to issue a certificate of release to service for an aircraft.
3. This licence when endorsed with an aircraft type rating meets the intent of ICAO annex 1.
4. The privileges of the holder of this licence are prescribed by Part-66 and the applicable requirements of Part-M and Part-145.
5. This licence remains valid until the date specified on the limitation page unless previously suspended or revoked.
6. The privileges of this licence may not be exercised unless in the preceding two year period the holder has had either six months of maintenance experience in accordance with the privileges granted by the licence, or met the provision for the issue of the appropriate privileges.

1. State of issue
2. Licence number
3. Full name of holder
4. Date and place of birth
5. Address of holder
6. Nationality
7. Signature of holder
8. Signature of issuing officer & date:
9. Seal and stamp of issuing Authority

Part-66 (SUB) CATEGORIES						
	A	B1	B2	C	B3	ELA
Aeroplanes Turbine			n/a	n/a	n/a	n/a
Aeroplanes Piston			n/a	n/a	n/a	n/a
Helicopters Turbine			n/a	n/a	n/a	n/a
Helicopters Piston			n/a	n/a	n/a	n/a
Avionics	n/a	n/a		n/a	n/a	n/a
Large Aircraft	n/a	n/a	n/a		n/a	n/a
Non Large Aircraft	n/a	n/a	n/a		n/a	n/a
Sailplanes, Powered Sailplanes, Piston Aeroplanes <= 2T (non-pressurized)	n/a	n/a	n/a	n/a		n/a
ELA Aircraft <input type="checkbox"/> Basic <input type="checkbox"/> Full	n/a	n/a	n/a	n/a	n/a	

Part-66 AIRCRAFT TYPE RATINGS (Basic ratings for ELA licences)		
A/C Type or Group	Category	Official Stamp & Date
LIC NO:		

...

New Appendixes VI and VII to Part-66 are added:

Appendix VI

ELA training requirements

According to 66.A.45 (j) the holder of a category ELA aircraft maintenance licence may only exercise certification privileges when the aircraft maintenance licence has been endorsed with the appropriate basic ratings as described in 66.A.1(d).

For each subcategory of ELA licence it is possible to have one or a combination of basic ratings.

For a particular rating in the Full ELA, it is necessary to complete the training requirements for both Basic-ELA and Full-ELA.

The ratings "Wooden aircraft", "Composite aircraft" and "Metal aircraft" require training in the corresponding "Airframe" and "Powerplant" areas.

The table below shows the modules of training required for each basic rating corresponding to the Basic-ELA and Full-ELA licences. The content for each particular module is described in the syllabus further below.

RATING	Wooden airframe	Composite airframe	Metal airframe	Power- plant	Balloons & Airships
Basic-ELA licence	MODULES 1, 2, 3, 4, 7	MODULES 1, 2, 3, 5, 7	MODULES 1, 2, 3, 6, 7	MODULES 1, 2, 3, 8, 9	MODULES 1, 2, 3 + Any of the following: 12, or 13, or 12+14, or 13+14
	+ Examination				
Full-ELA licence (In addition to the modules required for the Basic-ELA licence)	MODULES 3, 4, 7, 11	MODULES 3, 5, 7, 11	MODULES 3, 6, 7, 11	MODULES 3, 10, 11	MODULES 3, 11 + Any of the following: 12, or 13, or 12+14, or 13+14
	+ Examination				

DURATION OF TRAINING:**Basic-ELA licence:**

Module 1 "Basic Knowledge":	10 hours
Module 2 "Human Factors":	7 hours
Module 3 "Legislation":	14 hours
Module 4 "Airframe-Wooden":	20 hours
Module 5 "Airframe-Composite":	20 hours
Module 6 "Airframe-Metal":	20 hours
Module 7 "Airframe-General":	37 hours
Module 8 "Powerplant":	20 hours
Module 9 "Practical Powerplant Training":	10 hours
Module 12 "Hot Air Balloon"	15 hours
Module 13 "Gas Balloon"	15 hours
Module 14 "Add-on course to mod 12 or 13 for Airships"	15 hours

Full-ELA licence:

Module 3 "Legislation":	5 hours
Module 4 "Airframe-Wooden":	10 hours
Module 5 "Airframe-Composite":	10 hours
Module 6 "Airframe-Metal":	10 hours
Module 7 "Airframe-General":	22 hours
Module 10 "Powerplant-Advanced":	15 hours
Module 11 "Procedures of Physical Inspection"	10 hours
Module 12 "Hot Air Balloon"	22 hours
Module 13 "Gas Balloon"	22 hours
Module 14 "Add-on course to mod 12 or 13 for Airship"	15 hours

RATINGS (acronyms):

B.W:	Basic ELA - Wooden airframe
F.W:	Full ELA - Wooden airframe
B.C:	Basic ELA - Composite airframe
F.C:	Full ELA - Composite airframe
B.M:	Basic ELA - Metal airframe
F.M:	Full ELA - Metal airframe

B.P:	Basic ELA - Powerplant
F.P:	Full ELA - Powerplant
B.BA:	Basic ELA - Balloons and Airships
F.BA:	Full ELA - Balloons and Airships
B.BHA:	Basic ELA - Balloons Hot Air
F.BHA:	Full ELA - Balloons Hot Air
B.BG:	Basic ELA - Balloons Gas
F.BG:	Full ELA - Balloons Gas
B.A:	Add-on syllabus for Basic ELA - Airship
F.A:	Add-on syllabus for Full ELA - Airship

	Levels									
	B.W	F.W	B.C	F.C	B.M	F.M	B.P	F.P	B.BA	F.BA
1 Basic Knowledge	1		1		1		1		1	
1.1 Mathematics Arithmetic Algebra Geometry 1.2 Physics Matter Mechanics Temperature: thermometers and temperature scales 1.3. Electrics DC Circuits Resistance/Resistor 1.4 Physics of the Atmosphere Aerodynamics Theory of Flight Flight Stability and Dynamics										

	Levels									
	B.W	F.W	B.C	F.C	B.M	F.M	B.P	F.P	B.BA	F.BA
2 Human Factors	1		1		1		1		1	
2.1 General 2.2. Human Performance and Limitations 2.3 Social Psychology 2.4 Factors Affecting Performance 2.5 Physical Environment 2.6 Tasks										

	Levels									
	B.W	F.W	B.C	F.C	B.M	F.M	B.P	F.P	B.BA	F.BA
2.7 Communication										
2.8 Human Error										
2.9 Hazards in the Workplace										

	Levels									
	B.W	F.W	B.C	F.C	B.M	F.M	B.P	F.P	B.BA	F.BA
3 Legislation										
3.1 Part M, Section A Part 66, Section A	2		2		2		2		2	
3.2 Part M, Section A, Subpart G + I (additional to 3.1)		2		2		2		2		2
3.3 Part 21, Section A, Subparts D, E, M	2		2		2		2		2	
3.4 Certification Specifications and Industry Standards: Applicable topics		1		1		1		1		1
3.5 Execution of repair measures Assessment Work organization Execution of repairs (→ DOA, Agency → approved repairs) Checks during and after repairs	3		3		3		3		3	
3.6 Maintenance records Equipment specifications, airworthiness directives (AD), technical notes of manufacturer (TN) Other maintenance records, trade literature Aircraft inspection and repair FAA AC 43.13 1A (for reference)	3		3		3		3		3	
3.7 Noise limits Explanation of concept of "noise level" Noise certificate Enhanced sound-proofing Possibilities for the reduction of noise emission							1			

	Levels									
	B.W	F.W	B.C	F.C	B.M	F.M	B.P	F.P	B.BA	F.BA
3.8 Subpart F Organisation The maintenance organisation manual Legal status and organization Scope of license Regulation of responsibilities Responsibilities and tasks of technical personnel Content and nature of test programs Form management	3		3		3		3		3	
3.9 Work safety General requirements Construction and equipment General information Floors, walkways Exits Squeezing hazards on windows, doors, gates Electrical installations and operating materials Hoisting and support devices Filling of tires Safeguards against falling, stationary and mobile docking systems Ventilation of work areas Maintenance work on not degassed tanks and containers Labeling of work areas Lighting fixtures Safekeeping of substances hazardous to health Labeling of containers and lines First-aid material Fire extinguishing devices Operation General information Job restrictions, user manuals, instruction Personal protective gear, work clothes; skin protection, skin care and skin cleaning agents Walkways, escape routes, emergency exits Fall protection Flammable, poisonous and health hazardous gases,	2		2		2		2		2	

	Levels									
	B.W	F.W	B.C	F.C	B.M	F.M	B.P	F.P	B.BA	F.BA
vapors or suspended matter Maintenance work on tanks for flammable liquids Work involving fire Hygienic measures Smoking ban Measures for the prevention of explosions and incipient fires Handling of fire extinguishing devices Execution of first-aid measures Safeguarding of aircraft (aeronautical devices) against movements Work on oxygen systems										
3.10 Environmental protection Hazardous materials, hazard designation Dangerous Materials and Substances Hazards for persons and the environment Substance-related safety information (chemical and physical properties, toxicological properties, hydrological properties, personal protective gear, medical measures, measures during cases of damage) Labeling and storage of hazardous materials Protective measures and rules of conduct Proper disposal of hazardous materials	1		1		1		1		1	

	Levels									
	B.W	F.W	B.C	F.C	B.M	F.M	B.P	F.P	B.BA	F.BA
4. Airframe - Wooden										
4.1 Airframe - Wooden/Composite Lumber, plywood, glues, preservation, power line, properties, machining Covering (covering materials, adhesive varnishes, also polyester fabrics and adhesives) Paint assembly and repair technologies Recognition of damages with overstraining of	2									

	Levels									
	B.W	F.W	B.C	F.C	B.M	F.M	B.P	F.P	B.BA	F.BA
<p>airframes in wooden construction/fuselages in composite construction</p> <p>Deterioration of wood components and coverings</p> <p>Crack test (optical procedure, e.g., magnifying glass) with metal components, corrosion and methods for prevention Health and fire protection</p>										
<p>4.2 Material science (material capability specification sheets LN, DIN)</p> <p>Types of wood, stability, features, machining</p> <p>Steel and light alloys, fittings, fracture inspections, weld seams</p> <p>Plastics (overview, perceptibility, properties)</p> <p>Colors and paints</p> <p>Glues, adhesives</p> <p>Covering materials and technologies (cotton, polyester)</p>	2									
<p>4.3 Identifying damage</p> <p>Overstressed wood and composite construction airframes</p> <p>Load transfers</p> <p>Fatigue strength and crack test</p>		3								
<p>4.4 Occupational safety and fire protection</p> <p>Handing of flammable and health hazardous materials</p> <p>Shop regulations</p> <p>Precautionary measures</p> <p>Handing of solvents, fuels and lubricants</p> <p>Dust guard and respiratory protective device, skin protection</p>	2									
<p>4.5 Performance of practical activities</p> <p>Safeguarding of pin, screws, castellated nuts, turnbuckles</p> <p>Thimble splice</p> <p>Nicopress and Talurit clamping joint</p> <p>Hood repair</p> <p>Repair of coverings</p> <p>Execution of planned inspection (maintenance inspection or 100-hour inspections) on a wood or composite airframe</p> <p>Execution of planking repair; shanks of</p>	3									

	Levels									
	B.W	F.W	B.C	F.C	B.M	F.M	B.P	F.P	B.BA	F.BA
plywood/stringers										
4.6 Performance of practical activities Shaft exercises (plywood, stringer, handrails, planking) Thimble splice Clamp repairs (Nicopress, Talurit) Transparency repairs Execution of coverings Weight and balance Measurement of hinge moments, bending vibration frequency of the airfoil, rudder settings, measurement of operating forces		3								

	Levels									
	B.W	F.W	B.C	F.C	B.M	F.M	B.P	F.P	B.BA	F.BA
5. Airframe - Composite										
5.1 Airframe - Fiber-reinforced plastic (FRP) Basic principles of FRP construction Resins (EP, polyester, phenolic resins, vinyl ester resins) Reinforcement materials glass, aramid and carbon fibers, features Fillers Supporting cores (balsa, honeycombs, foamed plastics) Constructions, load transfers (solid FRP shell, sandwiches) Identification of damage during overstraining of components Shop instruction for FRP jobs (according to MOM) including storage conditions Health and fire protection			2							
5.2 Material science Plastics Thermosetting plastics, thermoplastic polymers,			2							

	Levels									
	B.W	F.W	B.C	F.C	B.M	F.M	B.P	F.P	B.BA	F.BA
<p>conversion products</p> <p>Perceptibility, properties, machining technologies, detaching, bonding, welding</p> <p>Resins for FRP: epoxy resins, polyester resins, vinyl ester resins, henolic resins</p> <p>Reinforcement materials</p> <p>From elementary fiber to filaments (release agent, finish), owing, modes of weaving</p> <p>Parameters of individual reinforcement materials (E-glass fiber, aramid fiber, carbon fiber)</p> <p>Problem with multiple-material systems, matrix</p> <p>Adhesion/cohesion various behaviors of fiber materials</p> <p>Filling materials and pigments</p> <p>Technical requirements for filling materials</p> <p>Property change of the resin composition through E-glass, micro balloon, aerosols, cotton, minerals, metal powder, organic substances</p> <p>Paint assembly and repair technologies</p> <p>Support materials</p> <p>Honeycombs (paper, FRP, metal), balsa wood, Divinycell (Contizell), development trends</p>										
<p>5.3 Assembly of airframes in Fiber reinforced composite structure (FRP)</p> <p>Solid shell</p> <p>Sandwiches</p> <p>Assembly of airfoils, fuselages, rudders</p>				2						
<p>5.4 Identifying damage</p> <p>Behavior of FRP components in the event of overstraining</p> <p>Identifying delaminations, loose bonds</p> <p>Bending vibration frequency in airfoils</p> <p>Load transfer</p> <p>Frictional connection and positive locking</p> <p>Fatigue strength and corrosion of metal parts</p> <p>Metal bonding, surface finishing of steel and aluminum components during conglutination with FRP</p>			2	3						
<p>5.5 Mold making</p> <p>Plaster molds, mold ceramics</p>				3						

	Levels									
	B.W	F.W	B.C	F.C	B.M	F.M	B.P	F.P	B.BA	F.BA
GFK molds, Gelcoat, reinforcement materials, rigidity problems Metal molds Positive and negative molds										
5.6 Health protection and work safety Handing of various resins/temper types Handing of solvents Utilities, auxiliary materials Dust guard and respiratory protective device, skin protection			2							
5.7 Performance of practical activities Safeguarding of pin, screws, castellated nuts, turnbuckles Thimble splice Nicopress and Talurit clamping joint Hood repair Repair of coverings Execution of a scheduled inspection on an FRP airframe (maintenance or 100-hour inspection) Performance of a repair on a sandwich shell (minor repair ≤ 20 cm)			3							
5.8 Performance of practical activities Repair of solid FRP shells Mold fabrication/deformation of a component (e.g. fuselage nose, chassis fairing, wing tip edge, winglet) Repair of sandwich shell where interior and top layer are destroyed Repair of sandwich shell by pressing with vacuum Determining the position of center of gravity Measurement of hinge moments, bending vibration frequency of the airfoil, rudder settings, operating forces Hood repair (PMMA) with one- and two-component adhesive Bonding of hood with the hood frame Tempering of hoods and other components				3						

	Levels									
	B.W	F.W	B.C	F.C	B.M	F.M	B.P	F.P	B.BA	F.BA

	Levels									
	B.W	F.W	B.C	F.C	B.M	F.M	B.P	F.P	B.BA	F.BA
6. Airframe – Metal										
6.1 Airframe – Pure Metal Metallic materials and semi-finished products, machining methods Fatigue strength and crack test Assembly of components in metal construction, riveted joints, adhesive joints Identification of damage in overstressed components, chemical effects Health and fire protection					2					
6.2 Material science (material capability specification sheets LN, DIN) Steel and its light alloys Light metals and their light alloys Rivet materials Plastics (overview) Colors and paints Metal adhesives Types of corrosion Covering materials and technologies (cotton, polyester)					2					
6.3 Identifying damage Overstressed metal airframes, leveling, measurement of symmetry Load transfers Fatigue strength and crack test Identifying unriveted joints						3				
6.4 Assembly of airframes in metal and composite construction Planking Frames Stringers and handrails					2					

	Levels									
	B.W	F.W	B.C	F.C	B.M	F.M	B.P	F.P	B.BA	F.BA
Framing construction Problems in multiple-material systems										
6.5 Fasteners Classifications of fits Metric and inch system Oversize bolt					2					
6.6 Work safety Fuels and lubricants Handling of magnesium alloys Handling of solvents, colors and paints Handling of metal adhesives Machining tools					2					
6.7 Performance of practical activities Safeguarding of pin, screws, castellated nuts, turnbuckles Thimble splice Nicopress and Talurit clamping joint Transparency (windows canopies) repair Repair of coverings, surface damage, drilling off cracks Execution of a scheduled inspection (maintenance inspection or 100-hour inspection of a metal airframe) Execution of riveting jobs (small repair according to available documents)					3					
6.8 Performance of practical activities Cutting out sheet metals (light metal and alloys, steel and alloys) Edge bending, bending, edging, welding, beating, smoothening, beading Repair riveting of metal airframes according to repair instruction or drawings Evaluation of rivet errors Thimble splice Clamp repairs (Nicopress, Talurit) Transparency repairs Determining the position of center of gravity Measurement of hinge moments, bending vibration frequency of the airfoil, rudder settings, operating						3				

	Levels									
	B.W	F.W	B.C	F.C	B.M	F.M	B.P	F.P	B.BA	F.BA
forces										

	Levels									
	B.W	F.W	B.C	F.C	B.M	F.M	B.P	F.P	B.BA	F.BA
7 Airframe General										
7.1 Flight control system Evaluation of rudder, rudder bearings, trimming, valve gear with guide bearing Evaluation of control cables including guides, connections and turnbuckles	2		2		2					
7.2 Airframe Characteristics of individual suspension and damping systems Recognizing overstraining Evaluation of the condition of tires Permissible maintenance measures by the technician Towing/lifting equipment Surfaces out of fabric material	2		2		2					
7.3. Fasteners Reliability of pins, rivets, screws Control cables, turnbuckles Quick-release couplings (L'Hotellier, SZD - Poland)	2		2		2					
7.4 Locking equipment Admissibility of locking methods, locking pins, spring steel pins, locking wire, stop nuts, paint Rapid-release couplings	2		2		2					
7.5 Weight and Balance	2	3	2	3	2	3				
7.6 Rescue Systems	2	3	2	3	2	3				
7.7 On-board modules Flight instruments: airspeed indicator, altimeter, vertical speed indicator, testing of correct connection and functioning	2		2		2					

	Levels									
	B.W	F.W	B.C	F.C	B.M	F.M	B.P	F.P	B.BA	F.BA
Gyroscopes, other indicating instruments; testing of function Magnetic compass: characteristics to be considered during installation and compensation										
7.8 On-board modules Flight instruments, mounting requirements (emergency landing conditions as per JAR 22) Electric wiring, power sources, types of storage batteries, electrical parameters, electric generator, circuit breaker, energy balance, earth / ground		2		2		2				
7.9 Radio/ELT Channel spacing Length of antenna required – counterweight Coax cable Radio shielding – interference with ignition system		2		2		2				
7.10 Transponder Basic operation Typical installation Installation requirements power, inputs, antennas Explanation of Mode A, C, S. Practical Testing Safety precautions Self test Test equipment Use of test equipment Typical test. Typical defects.		2		2		2				
7.11 Electrical propulsion Battery system Propulsion interface Retraction system	2	3	2	3	2	3				
7.12 Jet propulsion Fuel system Propulsion interface Retraction system	2	3	2	3	2	3				

	Levels									
	B.W	F.W	B.C	F.C	B.M	F.M	B.P	F.P	B.BA	F.BA

	Levels									
	B.W	F.W	B.C	F.C	B.M	F.M	B.P	F.P	B.BA	F.BA
8 Powerplant							2			
8.1 Piston engines Constructional characteristics, modules, interplay of components and modules Four-stroke spark ignition engine, air-cooled, fluid cooling Two-stroke engine Rotary piston engine Efficiency and influencing factors (pressure-volume diagram, power curve) Noise problems							2			
8.2 Propeller Actions and technical parameters of propellers and their constructions Variable pitch propeller, adjustable propellers, mechanical, electric, hydraulic Balancing (static, dynamic) Noise problems							2			
8.3 Engine control devices Mechanical control devices Electrical control devices Tank displays Functions, characteristics, typical errors and error indications							2			
8.4 Hose pipes Material and machining of gas and oil hoses Permissible operating hours							2			
8.5 Accessories Operation of magneto ignition Maintenance intervals and indications of characteristics of various types							2			

	Levels									
	B.W	F.W	B.C	F.C	B.M	F.M	B.P	F.P	B.BA	F.BA
Operation of carburetors Maintenance instructions on characteristic features Reliability of electric gas pumps Operation of propeller controls Electrically operated propeller control Hydraulically operated propeller control										
8.6 Ignition system Constructions: coil ignition, magneto ignition, thyristor ignition Efficiency of the ignition and pre-heat system Modules of the ignition and pre-heat system Evaluation of the functional safety of a spark plug							2			
8.7 FADEC							2			
8.8 Exhaust systems Operation and assembly Sound absorbers and heating installations Evaluation of functional safety CO test							2			
8.9 Fuels and lubricants Fuel characteristics Labeling, environmentally friendly storage Lubricating oils mineral, synthetic and their parameters: labeling, characteristics, application Environmentally friendly storage and proper disposal of used oil							2			
8.10 Documentation Maintenance documents for the engine and propeller Repair manuals TBO and possibilities of extension Airworthiness Directives, technical notes and service bulletins							2			
8.11 Health protection Handling of fuels and lubricants Startup of engines, features of ignition system Handling of cleansing agents and solvents							2			

	Levels									
	B.W	F.W	B.C	F.C	B.M	F.M	B.P	F.P	B.BA	F.BA
8.12 Illustrative material: Cylinder unit with valve Carburetor High-tension magneto Differential pressure gauge for cylinders Overheated/damaged pistons Spark plugs of engines that were operated differently							2			

	Levels									
	B.W	F.W	B.C	F.C	B.M	F.M	B.P	F.P	B.BA	F.BA
9 Practical Powerplant Training										
9.1 Performance of practical activities Work safety/accident prevention (handing of fuels and lubricants, startup of engines) Setting engine control rods and Bowden cables Setting of no-load speed Checking and setting the ignition point Operation test of magnets Checking the ignition system Evaluation and cleaning of spark plugs Execution of inspection of the engine and the aggregate according to manufacturer instruction Execution of pressure differential measurement of the cylinder Execution of static test and evaluation of the engine run Documentation of maintenance work as well as replacement of components							3			

	Levels
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	Levels									
	B.W	F.W	B.C	F.C	B.M	F.M	B.P	F.P	B.BA	F.BA
	B.W	F.W	B.C	F.C	B.M	F.M	B.P	F.P	B.BA	F.BA
10 Powerplant - Advanced								2		
Specialist and practical training										
10.1 Gas exchange in internal-combustion engines										
4-stroke reciprocating engine and control units										
Energy losses										
Ignition timing										
Direct flow behavior of control units										
Wankel engine and control units										
2-stroke engine and control units										
Scavenging										
Energy losses										
Scavenging blower										
10.2 Ignition, combustion and carburetion										
Ignition										
Spark plug										
Ignition system										
Combustion process										
Normal combustion										
Efficiency and medium pressure										
Engine knock										
Combustion chamber shapes										
Carburetion in the carburetor										
Carburetor principle, carburetor equation										
The simple carburetor										
Problems of the simple carburetor and their solutions										
Carburetor models										
Carburetion during injection										
Mechanically controlled injection										
Electronically controlled injection										
Continuous injection										
Carburetor-injection comparison										

	Levels									
	B.W	F.W	B.C	F.C	B.M	F.M	B.P	F.P	B.BA	F.BA
<p>10.3 Charging</p> <p>Charging process</p> <p>Gradation of the charging process</p> <p>Embodiments</p> <p>Increase of output through charging</p> <p>Air application and output</p> <p>Medium pressure and cylinder reloading</p> <p>Mechanical charging</p> <p>Actual charge</p> <p>Operating behavior of the mechanically charged engine</p> <p>Waste gas turbo charging</p> <p>Waste gas turbo charger</p> <p>Interplay with engine (accumulation mode)</p> <p>Use of waste gas energy</p> <p>Impulse charging</p> <p>Performance limits</p> <p>Charging with a dynamic pressure machine (Comprex charging)</p> <p>10.4 Flight instruments in aircraft with injection engines</p> <p>Special instruments of flight instruments (injection engine)</p> <p>Interpretation of indications in a static test</p> <p>Interpretation of indications in flight on various flight levels</p> <p>10.5 Flight instruments in aircraft with supercharged engines</p> <p>Special instruments of flight instruments (supercharged engine)</p> <p>Interpretation of indications in a static test</p> <p>Interpretation of indications in flight on various flight levels</p> <p>10.6 Maintenance of aircraft engines with injection system</p> <p>Documentation, manufacturer's documents, etc.</p>										

	Levels									
	B.W	F.W	B.C	F.C	B.M	F.M	B.P	F.P	B.BA	F.BA
General maintenance instructions (hourly inspections)										
Functional tests										
Ground test run										
Test flight										
Troubleshooting in the event of faults in the injection system and their correction										
10.7 Maintenance of aircraft engines with charger systems										
Documentation, manufacturer's documents, etc.										
General maintenance instructions (hourly inspections)										
Functional tests										
Ground test run										
Test flight										
Troubleshooting in the event of faults in the charger system and their correction										
10.8 Work safety and safety provisions										
Work safety and safety provisions for work on injection systems										
Work safety and safety provisions for work on charger systems										
10.9 Visual aids:										
Carburetor										
Components of injection system										
Components of charger system										
Airplane with injection engine										
Airplane with supercharged engine										
Tool for work on injection systems										
Tool for work on charger systems										
10.10 FADEC										

	Levels									
	B.W	F.W	B.C	F.C	B.M	F.M	B.P	F.P	B.BA	F.BA

	Levels									
	B.W	F.W	B.C	F.C	B.M	F.M	B.P	F.P	B.BA	F.BA
11 Procedures of Physical Inspection		3		3		3		3		3
Measurement tools										
Measure of controls deflection										
Screw torque										
Measure and calculation of centre of gravity										
Wear of slide bearings etc.										
Procedures for testing of flight instruments										
Test flight: programme and evaluation										

	Levels					
	BBHA	FBHA	BBG	FBG	BA	FA
12 Balloon – hot air						
12.1 Basic principles and assembly of hot-air balloons	2					
Assembly and individual parts						
Cladding material, belts, cables						
Envelopes, ripping panel, valve (parachute), turning vent, scoop/skirt						
Burner, burner frame and burner frame stanchions						
Compressed-gas tanks and compressed-gas hoses						
Basket and alternative devices (seats)						
Rigging accessories						
Maintenance and servicing jobs						
Annual inspection						
Flight papers						
Flight- and Maintenance Manuals						
Rigging and launch preparation						
Launch						
12.2 Practical training	3					
Operating controls, maintenance and servicing jobs (according to						

	Levels					
	BBHA	FBHA	BBG	FBG	BA	FA
flight manual)						
12.3 Envelope						
Fabrics						
Load tapes, ripstoppers						
Load cables						
Parachute						
Ripping panel	2	3				
Turning valve						
Rollers, pulleys						
Control and shroud lines						
Temperature control strip, envelope thermometer						
Flying wires						
12.4 Burner and fuel system						
Burner coils						
Blast-, liquid- and pilot-valves						
Burners/nozzles	2	3				
Pilot burners/nozzles						
Burner frame						
Fuel lines/hoses						
Fuel cylinders or tanks and valves and fittings						
12.5 Basket and basket suspension (incl. alternative devices)						
Kinds of baskets (incl. alternative devices)						
Basket cables						
Carabiner, shackle and pins	2	3				
Burner support rods						
Fuel cylinder straps						
Accessories and packing diagrams						
12.6 Equipment						
Fire extinguisher, fire blanket	2	3				
Instruments (single or combined)						
12.7 Minor repairs						
Stitching	2	3				
Bonding						
12.8 Radio/ELT						
Channel spacing		2				
Length of antenna required – counterweight						

	Levels					
	BBHA	FBHA	BBG	FBG	BA	FA
Coax cable Radio shielding – interference with ignition system						
12.9 Transponder Basic operation Typical installation Installation requirements power, inputs, antennas Explanation of Mode A, C, S. Practical Testing Safety precautions Self test Test equipment Use of test equipment Typical test. Typical defects.		2				

	Levels					
	BBHA	FBHA	BBG	FBG	BA	FA
13 Gas balloon (free/tethered)						
13.1 Basic principles and assembly of gas balloons Assembly of individual parts Envelope and netting material Envelope, ripping panel, emergency opening, cords and belts Rigid gas valve Flexible gas valve (parachute) Netting Load ring Basket and accessories (incl. and alternative devices) Electrostatic discharge paths Mooring line and drag rope Maintenance and servicing Annual inspection Flight papers Flight- and Maintenance Manuals Rigging and launch preparation Launch			2	3		

	Levels					
	BBHA	FBHA	BBG	FBG	BA	FA
13.2 Practical training Operating controls, maintenance and servicing jobs (according to flight manual), safety rules when using hydrogen as lifting gas			2	3		
13.3 Envelope Fabrics Poles and reinforcement of pole Ripping panel and cord Parachute and shroud lines Valves and cords Filler neck, Pöschl-ring and cords Electrostatic discharge paths			2	3		
13.4 Valve Springs Gaskets Screwed joints Control lines Electrostatic discharge paths			2	3		
13.5 Netting or rigging (netless) Kinds of net and other lines Mesh sizes and angles Net ring Knotting methods Electrostatic discharge paths			2	3		
13.6 Load ring			2	3		
13.7 Basket (incl. alternative devices) Kinds of baskets (incl. alternative devices) Strops and toggles Ballast system (bags and supports) Electrostatic discharge paths			2	3		
13.8 Ripping cord and valve cords			2	3		
13.9 Mooring line and drag rope			2	3		
13.10 Minor repairs Bonding Splicing hemp ropes			2	3		
13.11 Equipment			2	3		

	Levels					
	BBHA	FBHA	BBG	FBG	BA	FA
Instruments (single or combined)						
13.12 Tether cable (TGB only) Kinds of cables Acceptable damage of cable Cable swivel Cable clamps			2	3		
13.13 Winch (TGB only) Kinds of winches Mechanical system Electrical system Emergency system Grounding/ballasting of winch			2	3		
13.14 Radio/ELT Channel spacing Length of antenna required – counterweight Coax cable Radio shielding – interference with ignition system				2		
13.15 Transponder Basic operation Typical installation Installation requirements power, inputs, antennas Explanation of Mode A, C, S. Practical Testing Safety precautions Self test Test equipment Use of test equipment Typical test. Typical defects.				2		

	Levels					
	BBHA	FBHA	BBG	FBG	BA	FA
14 AIRSHIPS Hot Air/Gas (add-on to modules 12 or 13)						

	Levels					
	BBHA	FBHA	BBG	FBG	BA	FA
14.1 Basic principles and assembly of small airships Envelope, ballonets Valves, openings Gondola Propulsion Flight- and Maintenance Manuals Rigging and launch preparation					2	3
14.2 Practical training Operating controls, maintenance and servicing jobs (according to flight manual)					2	3
14.3 Envelope Fabrics Ripping panel and cords Valves Catenary system					2	3
14.4 Gondola (incl. alternative devices) Kinds of gondolas (incl. alternative devices) Airframe according to 4.1-3., 5.1-4 or 6.1-3					2	3
14.5 Electrical system Basics about on-board electrical circuits Electrical sources (accumulators, fixation, ventilation, corrosion) Lead-, NiCd- or other accumulators, dry batteries Generators Wiring, electrical connections Fuses External power source Energy balance					2	3
14.6 Propulsion Engine Main principles of piston engines (two/four stroke, rotary, carburettor, injection electrical, etc.) Performance Main parts (casing, pistons, cylinders, crankshaft, gear,) Other parts (lubrication, ignition, filters, exhaust, controls,etc.) Troubles Demounting of parts at installed engines					2	3

	Levels					
	BBHA	FBHA	BBG	FBG	BA	FA
Fuel and lubrication Basics about fuel Basics about lubricants Fire extinguishing means Propeller Main principles of propellers Kinds of propellers (fixed/adjustable) Performance Acceptable repairs Evaluation of damages Propulsion instruments Basics about measuring and instruments Revolution measuring Pressure measuring Temperature measuring Available fuel/power measuring						
14.7 Equipment Fire extinguisher, fire blanket Instruments (single or combined)					2	3

Appendix VII**ELA Examination Standard****1. Standardisation Basis for Examinations**

1.1. All examinations must be carried out using the multi-choice question format as specified below. The incorrect alternatives must seem equally plausible to anyone ignorant of the subject. All of the alternatives should be clearly related to the question and of similar vocabulary, grammatical construction and length. In numerical questions, the incorrect answers should correspond to procedural errors such as corrections applied in the wrong sense or incorrect unit conversions: they must not be mere random numbers.

1.2. Each multi-choice question must have three alternative answers of which only one must be the correct answer and the candidate must be allowed a time per module which is based upon a nominal average of 75 seconds per question.

1.3. The pass mark for each module is 75 %.

1.4. Penalty marking systems must not be used to determine whether a candidate has passed.

2. Number of questions:**Basic-ELA:**

Module 1 "Basic Knowledge":	12 questions
Module 2 "Human Factors":	8 questions
Module 3 "Legislation":	16 questions
Module 4 "Airframe-Wooden":	20 questions
Module 5 "Airframe-Composite":	20 questions
Module 6 "Airframe-Metal":	20 questions
Module 7 "Airframe-General":	40 questions
Module 8 "Powerplant":	20 questions
Module 9 "Practical Powerplant Training":	12 questions
Module 12 "Hot Air Balloon"	16 questions
Module 13 "Gas Balloon"	16 questions
Module 14 "Add-on course to mod 12 or 13 for Airships"	16 questions

Full-ELA:

Module 3 "Legislation":	8 questions
Module 4 "Airframe-Wooden":	12 questions
Module 5 "Airframe-Composite":	12 questions
Module 6 "Airframe-Metal":	12 questions
Module 7 "Airframe-General":	24 questions

Module 10 "Powerplant-Advanced":	16 questions
Module 11 "Procedures of Physical Inspection"	12 questions
Module 12 "Hot Air Balloon"	24 questions
Module 13 "Gas Balloon"	24 questions
Module 14 "Add-on course to mod 11 or 12 for Airships"	16 questions

C) Draft Opinion on Part-147

Commission Regulation (EC) No 2042/2003 Annex IV (Part-147) is hereby amended as follows:

Paragraph 147.A.200 is amended as follows:

147.A.200 The approved basic training course

...

(b) The knowledge training element shall cover the subject matter for a category or subcategory A, B1, ~~or B2,~~ B3 or ELA aircraft maintenance licence as specified in Part-66.

...

Appendix I to Part-147 is amended as follows:

Appendix I

Basic Training Course Duration

Minimum duration of complete basic courses

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	900	50 to 60

ELA training courses shall have the duration specified in Part-66 Appendix VI (will depend on the modules taken)

Appendix II to Part-147 is amended as follows:

Appendix II

Approval Certificate

.....

TRAINING / EXAMINATION APPROVAL SCHEDULE			
Organisation:			
Approval Referente:			
CLASS	RATINGS LICENCE CATEGORIES	RATINGS	LIMITATIONS
BASIC	-B1	TB1.1 TB1.2 TB1.3 TB1.4	AEROPLANES TURBINE AEROPLANES PISTON HELICOPTERS TURBINE HELICOPTERS PISTON
	-B2	TB2	AVIONICS
	-B3	TB3	SAILPLANES & POWERED SAILPLANES AND NON-PRESSURISED PISTON AEROPLANES of 2T MTOM AND LESS
	-A	TA.1 TA.2 TA.3 TA.4	AEROPLANES TURBINE AEROPLANES PISTON HELICOPTERS TURBINE HELICOPTERS PISTON
	-ELA	T-ELA	ELA AIRCRAFT IN 66.A.1(d)
TYPE / TASKS	-B1	T1	QUOTE AIRCRAFT TYPE
	-B2	T2	QUOTE AIRCRAFT TYPE
	A	T3	QUOTE AIRCRAFT TYPE
	C	T4	QUOTE AIRCRAFT TYPE
This training / examination approval schedule is valid when working in accordance with Part-147 approved maintenance training organisation exposition:			
Date of issue:			
Signed:			
For the Member State / EASA			
EASA Form 11			

II. Draft Decision 2003/19/RM**A) Draft Decision AMC to Part-145**

Decision No 2003/19/RM Annex II is hereby amended as follows:

Paragraph AMC to 145.A.30(h)1 is amended as follows:

AMC 145.A.30 (h)(1) Personnel requirements

The category B1, ~~and B2~~ **and B3** support staff need not hold a certifying authorisation in accordance with 145.A.35 (b) but the organisation may use such appropriately authorised certifying staff to satisfy the requirement.

Titles of AMCs to 145.A.35(a), (b), (d), (e) and (f) are amended as follows:

AMC 145.A.35(a) Certifying staff and category B1, ~~and B2~~ **and B3 support staff**

AMC 145.A.35(b) Certifying staff and category B1, ~~and B2~~ **and B3 support staff**

AMC 145.A.35(d) Certifying staff and category B1, ~~and B2~~ **and B3 support staff**

AMC 145.A.35(e) Certifying staff and category B1, ~~and B2~~ **and B3 support staff**

AMC 145.A.35(f) Certifying staff and category B1, ~~and B2~~ **and B3 support staff**

Paragraph AMC to 145.A.35(j) are amended as follows:

AMC 145.A.35 (j) Certifying staff and category B1, ~~and B2~~ **and B3 support staff**

1. The following minimum information as applicable should be kept on record in respect of each certifying person or category B1, ~~or B2~~ **or B3** support person:

...

Paragraph AMC to 145.A.70(a) is amended as follows:

AMC 145.A.70(a) Maintenance organisation exposition

...

3.4 Certifying staff and category B1, ~~and B2~~ **and B3** support staff qualification and training procedures.

...

B) Draft Decision AMC to Part-66

Decision No 2003/19/RM Annex IV is hereby amended as follows:

A new AMC to 66.1 is added as follows:

AMC 66.1

A competent authority may be a ministry, a national aviation authority, or any aviation body designated by the Member State and located within that Member State. A Member State may designate more than one competent authority to cover different areas of responsibility, as long as the designation decision contains a list of the competencies of each authority and there is only one competent authority responsible for each given area of responsibility.

A new AMC to 66.A.1(d) is added as follows:

AMC 66.A.1(d) Scope

An ELA licence may be issued for one or for a combination of basic ratings.

For a Basic-ELA licence:

- The ratings "Wooden airframe", "Composite airframe" and "Metal airframe" mean to cover only the airframe of aeroplanes and sailplanes, without the powerplant.
- The rating "Powerplant" may be endorsed as a separate rating.
- The rating balloon or airship as appropriate may be endorsed with the characteristics "hot air" or "gas".

For a Full-ELA licence:

- The ratings "Wooden aircraft", "Composite aircraft" and "Metal aircraft" mean to cover complete aeroplanes and sailplanes including motor-powered sailplanes. They include the corresponding powerplants.
- The ratings "Wooden sailplane", "Composite sailplane" and "Metal sailplane" mean to cover complete sailplanes. They do not include motor-powered sailplanes.

A new AMC to 66.A.25(b) is added as follows:

AMC 66.A.25(b)

For aircraft with an airframe fabricated out of a combination of wood, metal or composite material, the corresponding combination of training should be attended. Only the material of the primary structure should be considered.

For example, for an aircraft with metal fuselage and wooden wings, the corresponding training for wooden and metal material should be attended.

New AMCs to 66.A.30(a)6, 7 and 8 are added as follows:

AMC 66.A.30(a)6, 7 and 8

The practical experience necessary to include the corresponding basic ratings in Basic-ELA and Full-ELA licences should cover an acceptable cross section including at least 50% of tasks from Appendix II to AMC relevant to the licence subcategory and basic ratings applied for.

Experience can be full time or part-time either as professional or on a voluntary basis.

Paragraph AMC to 66.A.30(e) is amended as follows:

AMC 66.A.30(e)

1. For category A the additional experience of civil aircraft maintenance should be a minimum of 6 months. For category B1, ~~or B2~~ **or B3** the additional experience of civil aircraft maintenance should be a minimum of 12 months.
2. ...

Paragraph AMC to 66.A.30(e) is amended as follows:

AMC 66.A.45(e) Type/task training and ratings

Category C certifying staff may not carry out the duties of category B1, ~~or B2~~ **or B3** or equivalent within base maintenance, unless they hold the relevant B1, ~~or B2~~ **or B3** category and have passed type training corresponding to the relevant B1 or B2 category.

Paragraph AMC to 66.A.45(g) are amended as follows:

AMC 66.A.45(g) Type/task training and ratings

1. "Aircraft types representative of a group" means that:
 - for the B1 category the aircraft type should include typical systems and engines relevant to the group (e.g. retractable undercarriage, pressurisation, variable pitch propeller, etc. for the single piston engine metal subgroup) and,
 - for the B2 category the aircraft type should include complex avionics systems such as radio coupled autopilot, EFIS (Electronic flight instrument system), flight guidance systems, etc .
2. A "multiple engines" group automatically includes the corresponding "single engine" group.

A new AMC to 66.A.45 (i) is added as follows:

AMC 66.A.45(i)

The practical experience necessary to include the rating "sailplanes, powered sailplanes and piston-engine non-pressurized aeroplanes of 2000 Kg MTOM and below" in B3 aircraft maintenance licences should cover an acceptable cross section including at least 50% of tasks from Appendix II to AMC relevant to the licence category.

C) Draft Decision GM to Part-66

Decision No 2003/19/RM Annex V is hereby amended as follows:

The first paragraph GM.A.20(a) is amended as follows:

GM 66.A.20(a) Privileges

1. The following titles shown against each category designator below are intended to provide a readily understandable indication of the job function:

Category A: Line maintenance certifying mechanic.

Category B1: Maintenance certifying technician - mechanical.

Category B2: Maintenance certifying technician - avionic.

Category B3: Light aircraft maintenance certifying technician - mechanical

Category ELA: ELA maintenance certifying mechanic.

Category C: Base maintenance certifying engineer.

The titles adopted by each competent authority may differ from those shown to reflect titles used in the national language for the above functions but the designators A, B1, B2, B3, ELA and C are required by 66.A.20.

2. Individual aircraft maintenance licence holders need not be restricted to a single category. Provided that each qualification requirement is satisfied, any combination of categories may be granted.

The second paragraph GM.A.20(a) is amended as follows:

GM 66.A.20(a) Privileges

...

3. The category B1, B3 and ELA licences also permits the certification of work involving avionic systems, providing the serviceability of the system can be established by a simple self-test facility, other on-board test systems/equipment or by simple ramp test equipment. Defect rectification involving test equipment which requires an element of decision making in its application - other than a simple go/no-go decision - cannot be certified. The categories B2 and B3 will need to be qualified as category A in order to carry out simple mechanical tasks and be able to make certifications for such work.
4. The category C certification authorisation permits certification of scheduled base maintenance by the issue of a single certificate of release to service for the complete aircraft after the completion of all such maintenance. The basis for this certification is that the maintenance has been carried out by competent mechanics and ~~both~~ category B1, ~~and~~ B2 and B3 staff, as appropriate, have signed for the maintenance under their respective specialisation. The principal function of the category C certifying staff is to ensure that all required maintenance has been called up and signed off by the category B1, ~~and~~ B2 and B3 staff, as appropriate, before issue of the certificate of release to service. Category C personnel who also hold category B1 ~~or~~ ~~and~~ B2 ~~or~~ B3 qualifications may perform both roles in base maintenance.

The paragraph GM. 66.A.25(a) is amended as follows:

GM 66.A.25(a) Basic knowledge requirements

The levels of knowledge are directly related to the complexity of certifications appropriate to the particular 66.A.1 category, which means that category A must demonstrate a limited but adequate level of knowledge, whereas category B1, and B2 and B3 must demonstrate a complete level of knowledge in the appropriate subject modules.

Category C certifying staff must meet the relevant level of knowledge for B1 or B2.

Paragraph GM 66.A.30(a) is amended as follows:

GM 66.A.30(a) ~~Basic knowledge requirements~~ Experience requirements

.....

Paragraph GM 66.B.200 is amended as follows:

GM 66.B.200 Examination by the competent authority

.....

6. Essay question generation

(a)

(b) Questions should be written so as to be broad enough to be answered by candidates for all licence category or sub-categories (Cat A, B1, & B2 and B3) and comply with the following general guidelines.

.....

C. ATTACHMENTS

I. Regulatory Impact Assessment

Part-66 subgroup to M.017

<p>1.Purpose and Intended Effect</p>	<p>a. <u>Issue which the NPA is intended to address:</u> Discussions with general aviation stakeholders and the ToR of working group MDM.032 "A concept of better regulation for general aviation" proposed to create a new level of license for maintenance personnel working on general aviation aircraft (a 'light' Part-66 license). A first review of comments received after publication of A-NPA 14/2006 from MDM.032 indicates support for this option.</p> <p>b. <u>Scale of the issue (quantified if possible):</u> Major issue: Part 147 training organisations, Competent Authorities, individuals applying for a Part-66 licence for "Light aircraft", Subpart-F and Part-145 maintenance organisations.</p> <p>c. <u>Brief statement of NPA objectives:</u> Submission of paragraphs amending Part-66 and AMCs to better adapt the rule to the complexity of the light aircraft category.</p>
<p>2.Options</p>	<p>The initial intent of the ToR was to create a new level of license for maintenance personnel working on general aviation aircraft (a 'light' Part-66 license). The group confirmed the need identified by the Advance-NPA 14-2006 for proposing a lighter licence, but confirmed also the fact that this need does not affect all categories of "light aircraft", but only a portion of them below a certain weight.</p> <p>Different considerations were made related to the size and weight of the aircraft to be affected, and where to adjust the mass limit of the aircraft in order to address properly the subject of the ToR, and further balance the scope of work between the B3 licence holder with the one of the B1.2 holder. Aircraft size and complexity were considered and it was felt that the B3 licence should cover aircraft such as Beech 76 Duchess, PA-44, Beech Bonanza series and all Cessna from 150 to 180, as examples, but should not cover aircraft such as Cessna 310, 335, Beech Baron B55 to 58P, Piper PA 34, Beech Queen Air, Cessna Caravan, all Cessna from 421 to Cessna 441 and Piper PA 31 to PA-31T, Viking DHC-2 and -3, which are larger, heavier and, in most cases, more sophisticated.</p> <p>The group had some thoughts for identifying the group of aircraft affected by the B3 licence. The purpose was to provide the licence holder to be able to issue a CRS on a majority of the aircraft currently used in general aviation, limited to a certain level of complexity. The intent was to limit the complexity to non-pressurised structures, but also the systems installed. By limiting the size of the aircraft as defined here, this limited at the same time the complexity of the airframe, of components and the power of engines installed.</p> <p>Consequently a limit of 2000 Kg MTOM was finally retained and rotorcraft was kept outside the scope of the licence due to their higher complexity.</p>

For the purpose of this B3 licence, the group retained the family of aircraft concerned by the B3 licence as: Non-pressurized piston-engine aeroplane with a take-off mass less than 2000 Kg.

Although sailplanes and balloons are currently released by personnel qualified in accordance with national rules, the group proposed that this B3 licence would also give the possibility to maintain and release sailplanes and powered sailplanes, as the technology of such sailplanes is very similar to the one of the aeroplanes of the same size.

The proposal was made in the impact assessment on the basis of: sailplanes, powered sailplanes and piston-engine non-pressurized aeroplanes of 2000 Kg MTOM and below.

The importance of such change needed that safety, economical and human aspects be evaluated, and a Regulatory Impact Assessment as provided by the Rulemaking procedure was used to review properly the impacts of such licence. The following questions were first raised, which results were further assessed through the RIA:

Question a): Is there a need for proposing a B3 licence?

Option a.1: Do nothing; in such case, there may be a shortage of B1 licence holders available for certification of "light aircraft" due to better employment prospects in the large aircraft industry, further aggravated by the retirement of personnel involved in maintenance of "light aircraft".

Option a.2: Create a B3 licence; this would help in filling the gap mentioned in option 1, and easing access for personnel to be certifying staff on this category of aircraft.

The assumption was to start the evaluation on a licence based on the following considerations:

- Inclusion of aeroplanes of simple technology.
- Inclusion of sailplanes and powered sailplanes, as the technology is very similar to those of aeroplanes of same mass.
- Exclusion of rotorcraft, since their technology leads to a different level of criticality.
- Privileges limited to airframe, powerplant and electrical systems, plus some limited avionics (similar to B1.2).
- Basic knowledge requirements significantly reduced in relation to the size and mass of the aircraft.
- The licence would include all the aircraft covered by the scope of the licence, with basic ratings (sailplanes, aeroplanes, balloons, but without the use of type ratings. This is replaced by the inclusion of limitations on the type of structure and on some systems, which can be removed based

on appropriate experience.

- Possibility to upgrade from B3 to other categories/subcategories.

➤ The preferred option selected (if possible):

Option a.2: Create a B3 licence.

The group considered also some concerns presented by some members in relation to the B2 licence. The agency received during this working group strong input from aviation avionics industry showing that the qualification level of the B2 licence is excessively high in comparison to the systems and equipment installed on board these light aircraft. It shows also that in the field of general aviation, the number of B2 licence holders may decrease in the future. Strong support was made by this industry to propose a licence for avionics on general aviation aircraft.

The concern was taken by the group through the next question:

Question b): Is there a need to create a licence for certifying maintenance on avionics for light aircraft?

The following options were proposed by the group:

- Option b.1) do nothing: the privileges of the B3 licences remain unchanged in relation to those proposed by option a.2.
- Option b.2) the privileges of the newly created B3 light aircraft maintenance licence would be extended to cover more complex avionics maintenance tasks,
- Option b.3) a licence to certify maintenance tasks on avionics on light aircraft would be created.

Option b.1 Do nothing (in addition to a.2);

In this case, the maintenance carried out on aircraft and which affects avionics outside the scope of a B3) would be released by a B2 licence holder; with the risk that in the future few certifying staff would be available for general aviation.

Option b.2 Extend the privileges of B3 to include more complex avionics tasks;

The basic knowledge and experience of the B3 licence would include theoretical and practical experience on light aircraft electronics and more complex avionic maintenance tasks. It was felt that extending the privilege to more than simple avionics tasks was not reasonable, as engineers used to carry out maintenance activities on mechanical and electrical parts would not feel comfortable if avionics tasks were added in their scope, as this activity is usually not their initial trade.

This would further extend the basic knowledge requirements from the B3 licence proposed in a.2, not allowing a significant reduction of basic knowledge requirements in relation to the B1.2 licence.

As the privileges of the B1 licence holder are proposed to be modified by NPA

2007-07 by working group 66-006 (Privileges of B1 and B2 licence holders), the privileges of the B3 in this option would be granted on a similar basis. Therefore it was felt that there was no need for this option.

Option b.3 a licence to certify maintenance tasks on avionics on light aircraft would be created:

Although the group felt that there is a need to review the requirements for obtaining a B2 licence because of its complexity and the unsuitability to general aviation, this is outside of the ToR of this group. However, it was felt by some members of the group that there might be room for a light B2 licence (B4) for avionics certifying engineers for general aviation aircraft. The majority of the group decided to make a recommendation for a further rulemaking task and not consider this option in this rulemaking task.

➤ The preferred option selected (if possible):

Option b.1: Do nothing (in addition to option a.2)

ELA licence:

It is important to note that the group started its work and performed the above impact assessment when there was no ELA concept. Afterwards, working group MDM.032 presented to the M.017 working group the proposal in Part-21 of the concept of ELA1 and ELA2 certification processes applicable to certain categories of aircraft (and their engines and propellers). In simple terms, the following aircraft would be eligible for the simplified certification processes:

- **ELA 1:** Non-complex aeroplanes, sailplanes and powered sailplanes below 1000 kg MTOM, plus certain balloons and airships.
- **ELA 2:** Non-complex aeroplanes below 2000 kg MTOM, very light rotorcraft, balloons and certain airships.

The 66.022 group accepted the proposal since it would standardise the qualification requirements that are currently covered only by national rules. Feedback received shows that these national rules have different levels of knowledge requirements, and a common set of rules with the appropriate standards should fill the gaps and improve the overall level of safety in Europe.

In addition, this would allow the free movement of persons qualified in accordance with the new requirements.

Another aspect is that some Member States do not currently have a licensing system for this type of certifying staff.

However, ICAO Annex 6, Part II, 8.1.3 for general aviation aeroplane maintenance, requires that "when maintenance release is not issued by an approved maintenance organisation in accordance with ICAO Annex 6, Part I, 8.7, the person signing the maintenance release shall be licensed in accordance with Annex I".

As a consequence, the creation of the new standard would allow free movement of aircraft.

Question c): Is there a need for proposing an ELA licence?

Option c.1: Do nothing; in such case, the maintenance and certification of release of aircraft other than aeroplanes and helicopters would remain under national regulation, and this would lead to different levels of safety between the different Member States because of the different standards required on the training and experience. This would not allow the free movement of qualified persons within the EU.

In addition, some Member States would continue not meeting the ICAO Annex 6, Part II, 8.1.3 requirements, with the corresponding limitation to the free movement of aircraft.

Option c.2: Create an ELA licence; this would help addressing the issues mentioned in option c.1.

The group considered that this type of licence should cover not only aeroplanes but also, sailplanes, powered-sailplanes, balloons and airships.

The following considerations were made in order to establish the scope of the ELA licence:

- All sailplanes and powered sailplanes should be covered.
- Aeroplanes of simple technology and of less than 1000 Kg MTOM should also be covered. Aeroplanes with more than 1000 Kg are either covered by the B3 or the B1 licence.
- Balloons and airships eligible for ELA1 or ELA2 certification process should be covered because they have basically the same technology:
 - All Balloons.
 - All Hot-air airships.
 - Manned gas airships meeting all the following elements:
 - (i) 3% maximum static heaviness
 - (ii) Non vectored thrust (except reverse thrust)
 - (iii) Conventional and simple design of the:
 - Structure
 - Control system
 - Ballonet system
 - (iv) Non power-assisted controls
- Exclusion of rotorcraft, since their technology leads to a different level of criticality.
- Privileges limited to airframe, powerplant and electrical systems, plus some limited avionics (similar to B3 and B1.2).
- Basic knowledge training and examination adapted to the size and mass of the aircraft.
- Two levels of training with some years of experience for each level, giving different privileges.
- The licence would contain basic ratings covering different categories of aircraft and different construction materials, but without the use of type ratings. Additionally, the licence may include limitations on some particular systems, which can be removed based on appropriate

	<p>experience.</p> <ul style="list-style-type: none"> • The ELA licence would not be a basis for gaining the B3 licence, as the basic requirements do not have a common part. • No provisions for conversion of national qualification are considered because: <ul style="list-style-type: none"> ○ It is anticipated to be very difficult for the competent authorities to establish an adequate conversion report. ○ The training required for the ELA licence is reasonably short. • Those aircraft covered by the ELA licence should have a transition period during which the national rules may still be applied. <p>➤ The preferred option selected (if possible): Option c.2: Create an ELA licence.</p>
3.Sectors concerned	Part 147 training organisations, Competent Authorities, individuals applying for a Part-66 licence for "Light aircraft", Subpart-F and Part-145 maintenance organisations.
4.Impacts	<p><u>Question a): Is there a need for proposing a B3 licence?</u></p> <p><u>i. Safety</u></p> <p>Option a.1 Do nothing: No impact</p> <p>Option a.2 Create a B3 licence: Positive impact because there will likely be a lack of B1 certifying engineers for this category of aircraft, due to better employment prospects in non- light aircraft maintenance and to the current retirement rate of qualified personnel. The introduction of the B3 licence may encourage the employment of engineers with knowledge and experience to stay within this category of aircraft. The maintenance organisations may find it easier to employ and keep licensed personnel which may ensure continuity and enhanced safety.</p> <p>The B3 licence may reduce the cost of maintenance, which may encourage greater use of light aircraft giving more pilot experience and improving safety.</p> <p><u>ii. Economic</u></p> <p>Option a.1 Do nothing: No impact, but keeping a requirement for B1 licensed personnel in General Aviation may cause important labour costs.</p> <p>Option a.2 Create a B3 licence: Positive impact because the employment of B3 licensed personnel may reduce the labour cost.</p> <p>For training organisations, there is a need to create new courses for the B3</p>

basic knowledge requirement, which is largely compensated by new business opportunities. Overall positive impact.

The B3 licence may reduce the cost of flight hours, which may encourage greater use of light aircraft.

iii. Environmental

Option a.1 Do nothing:

No impact

Option a.2 Create a B3 licence:

No impact

iv. Social

Option a.1 Do nothing:

No impact

Option a.2 Create a B3 licence:

Positive impact because it may encourage new personnel to take employment in Light aircraft industry. It could also provide a stepping stone towards the B1 licence.

The maintenance organisations may find it easier to employ licensed personnel.

Question b): Is there a need to create a licence for certifying maintenance on avionics for light aircraft?

Option b.3 has not been included in the impact assessment since it is outside the ToR of the group.

i. Safety

Option b.1 Do nothing (in addition to option a.2):

No impact additional to option a.2

Option b.2 Create a B3 licence with extended privileges for avionic tasks:

Much lower positive impact than option a.2 because the licence would have higher basic knowledge requirements that would keep a significant number of persons from going through the process, preferring to meet the requirements of the B1 or B2 licence. In addition, the basic knowledge requirements to introduce more extended avionics tasks is not their initial trade, which may lead to less accurate maintenance tasks implementation.

ii. Economic**Option b.1 Do nothing (in addition to option a.2):**

No impact additional to option a.2

Option b.2 Create a B3 licence with extended privileges for avionic tasks:

Negative impact because:

- The course and the exams may be more expensive because of the additional modules,
- Maintenance organisations may need to conduct more continuation training for their personnel.

Positive impact because:

- the maintenance organisations may need employing fewer B2 certifying staff,

The global effect is a lower positive impact than the option a.2.

iii. Environmental**Option b.1 Do nothing:**

No impact

Option b.2 Create a B3 licence:

No impact

iv. Social**Option b.1 Do nothing:**

No impact

Option b.2 Create a B3 licence with extended privileges for avionic tasks:

Negative impact as B2 licence engineers may find less opportunities of employment, compensated by the retirement of B2 maintenance personnel;

Positive impact as the maintenance organisations may find it easier to employ licensed personnel.

Globally small positive impact.

Question c): Is there a need for proposing an ELA licence?**i. Safety****Option c.1 Do nothing:**

No impact. However, the problems expressed in paragraph 2. **Options** are not addressed.

Option c.2 Create an ELA licence:

Positive overall impact. No European wide statistics are available in the field of general aviation as there are no common standards for recording data. However a positive impact may result from the fact that a great part of the persons who are currently interested or already carrying maintenance of recreational aviation will likely apply to such licence to maintain and certify aircraft in this category, and this would ensure a safer level of maintenance in those Member States where the qualification standards are below average.

ii. Economic

Option c.1 Do nothing:

No impact.

Option c.2 Create an ELA licence:

This option would require current certifying staff to apply for an ELA licence (after the corresponding transition period), which means to attend training and examinations (although the training may be replaced by appropriate experience), which may have some costs.

However, this may be compensated by the economic benefit resulting from the free movement of licence holders, as well as the free movement of aircraft (ICAO compliant licence).

iii. Environmental

Option c.1 Do nothing:

No impact

Option c.2 Create an ELA licence:

No impact

iv. Social

Option c.1 Do nothing:

No impact

Option c.2 Create an ELA licence:

This option would require current certifying staff to apply for an ELA licence (after the corresponding transition period), which means to attend training and examinations (although the training may be replaced by appropriate experience), which may have some costs.

However, this may be compensated by the economic benefit resulting from the

	free movement of licence holders, as well as the free movement of aircraft (ICAO compliant licence).
5.	<p><u>Equity and fairness in terms of distribution of positive and negative impacts among concerned sectors.</u></p> <p>No issues of equity and fairness have been identified.</p>
6.Summary and Final Assessment	<p><u>a. A summary of who would be affected by these impacts and analysing issues of equity and fairness:</u></p> <p>Part 147 training organisations, Competent Authorities, individuals applying for a Part-66 licence for "Light aircraft", Subpart-F and Part-145 maintenance organisations.</p> <p><u>b. Final assessment and recommendation of a preferred option:</u></p> <p>Option a.2 + b.1 "Creation of a B3 licence with privileges for airframe, powerplant, electrical systems and very limited avionic tasks (similar to B1.2)".</p> <p>Option c.2 "Creation of an ELA licence".</p>