

**SECTION 1 – REQUIREMENTS****1      *GENERAL***

This section contains the Requirements for Flight Crew Licensing (Helicopter). It is aligned wherever possible with JAR-FCL 1 (Aeroplane) but remains a 'stand alone' document for helicopter pilots.

**2      *PRESENTATION***

2.1      Each page is identified by the date of issue or the Amendment number under which it is amended or reissued.

2.2      Sub-headings are italic typeface.

2.3      New, amended and corrected text will be enclosed within heavy brackets until a subsequent amendment is issued.

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## SUBPART A – GENERAL REQUIREMENTS

**JAR-FCL 2.001 Definitions and Abbreviations**  
(See IEM FCL 2.001)

Category (of aircraft):

Categorisation of aircraft according to specified basic characteristics, e.g. aeroplane, helicopter, glider, free balloon.

Conversion (of a licence):

The issue of a JAR-FCL licence on the basis of a licence issued by a non-JAA State.

Co-pilot:

“Co-pilot” means a pilot operating other than as pilot-in-command, an aircraft for which more than one pilot is required under the type certification of the aircraft or the operational regulations under which the flight is conducted, but excluding a pilot who is on board the aircraft for the sole purpose of receiving flight instruction for a licence or rating.

Dual instruction time:

Flight time or instrument ground time during which a person is receiving flight instruction from a properly authorised instructor.

Flight time:

[The total time from the moment a helicopter’s rotor blades start turning until the moment the helicopter finally comes to rest at the end of the flight, and the rotor blades are stopped.]

Instrument time:

Instrument flight time or instrument ground time.

Instrument flight time:

Time during which a pilot is controlling an aircraft in flight solely by reference to instruments.

Instrument ground time:

Time during which a pilot is receiving instruction in simulated instrument flight in synthetic training devices (STDs).

Multi-crew co-operation:

The functioning of the flight crew as a team of co-operating members led by the pilot-in-command.

Multi-pilot helicopters:

Helicopters certificated for operation with a minimum crew of at least two pilots or required to be operated by a crew of at least two pilots in accordance with JAR-OPS.

JAR-FCL 2.001 (continued)

Night:

The period between the end of evening civil twilight and the beginning of morning civil twilight, or such other period between sunset and sunrise as may be prescribed by the appropriate Authority.

Private pilot:

A pilot who holds a licence which prohibits the piloting of aircraft in operations for which remuneration is given.

Professional pilot:

A pilot who holds a licence which permits the piloting of aircraft in operations for which remuneration is given.

Proficiency checks:

Demonstrations of skill to revalidate or renew ratings, and including such oral examination as the examiner may require.

Rating:

An entry in a licence stating special conditions, privileges or limitations pertaining to that licence.

Renewal (of e.g. a rating or approval):

The administrative action taken after a rating or approval has lapsed that renews the privileges of the rating or approval for a further specified period consequent upon the fulfilment of specified requirements.

Revalidation (of e.g. a rating or approval):

The administrative action taken within the period of validity of a rating or approval that allows the holder to continue to exercise the privileges of a rating or approval for a further specified period consequent upon the fulfilment of specified requirements.

Single-pilot helicopters:

Helicopters certificated for operation by one pilot.

Skill tests:

Skill tests are demonstrations of skill for licence or rating issue, including such oral examination as the examiner may require.

Solo flight time:

Flight time during which a student pilot is the sole occupant of an aircraft.

JAR-FCL 2.001 (continued)

Flight time as student pilot-in-command (SPIC):

Flight time during which the flight instructor will only observe the student acting as pilot-in-command and shall not influence or control the flight of the aircraft.

Touring Motor Glider (TMG):

A motor glider having a certificate of airworthiness issued or accepted by a JAA Member State having an integrally mounted, non-retractable engine and a non-retractable propeller plus those listed in Appendix 1 to JAR-FCL 1.215.

It shall be capable of taking off and climbing under its own power according to its flight manual.

Type (of aircraft):

All aircraft of the same basic design, including all modifications except those modifications which result in a change of handling, flight characteristics or flight crew complement.

For abbreviations see IEM FCL 2.001

[Amdt. 1, 01.12.00; Amdt. 2, 01.11.02; Amdt. 3, 01.09.03]

### JAR-FCL 2.005 Applicability

(See Appendix 1 to JAR-FCL 2.005)

(See AMC FCL 2.005 & 2.015)

#### (a) General

(1) The requirements set out in JAR-FCL shall apply to all arrangements made for training, testing and applications for the issue of licences, ratings, authorisations, approvals or certificates received by the Authority from 1 January 2000.

(2) Whenever licences, ratings, authorisations, approvals or certificates are mentioned in JAR-FCL, these are meant to be licences, ratings, authorisations, approvals or certificates issued in accordance with JAR-FCL. In all other cases these documents are specified as e.g. ICAO or national licences.

(3) Whenever a reference is made in JAR-FCL to JAA Member State for the purpose of mutual recognition of licences, ratings, authorisations, approvals or certificates, this JAA full Member State.

(4) All synthetic training devices mentioned in JAR-FCL substituting an aircraft for training purposes are to be device qualified in accordance with JAR-STD(H) and user approved in accordance with JAR-FCL for the exercises to be conducted.

JAR-FCL 2.005(a) (continued)

(5) Whenever a reference is made to aeroplanes this does not include microlights as defined nationally, unless otherwise specified.

(6) A licence issued on the basis of the training performed outside a JAA Member State, except training done according to JAR-FCL 2.055(a)(1), shall have an entry to limit the privileges to aircraft registered in the State of licence issue.

(7) Rating(s) issued on the basis of training performed outside a JAA Member State except training performed according to JAR-FCL 2.055(a)(1), shall be limited to aircraft registered in the State of licence issue.

#### (b) Transitional arrangements

(1) Training commenced prior to 1 January 2000 according to national regulations will be acceptable for the issue of licences or ratings under national regulations provided that training and testing is completed before 31 December 2002 for the applicable licence or rating.

(2) Licences and ratings, authorisations, approvals or medical certificates issued in accordance with the national regulations of JAA Member States before 1 January 2000 or issued in accordance with paragraph (1) above, shall continue to be valid with the same privileges, ratings and limitations, if any, provided that after 1 July 2000 all requirements for revalidation or renewal of such licences or ratings, authorisations, approvals or medical certificates shall be in accordance with the requirements of JAR-FCL, except as specified in sub paragraph (4).

(3) Holders of a licence issued in accordance with the national regulations of a JAA Member State before 1 January 2000 or in accordance with (b)(1) above, may apply to the State of licence issue for the issue of the equivalent licence specified in JAR-FCL which extends the privileges to other States as set out in JAR-FCL 2.015(a)(1). For the issue of such licences, the holder shall meet the requirements set out in Appendix 1 to JAR-FCL 2.005.

(4) Holders of a licence issued in accordance with the national regulations of a JAA Member State who do not fully meet the Section 1 requirements of JAR-FCL 3 (Medical) shall be permitted to continue to exercise the privileges of the national licence held.

(c) *Continuation of examiners holding national authorisations.* Examiners holding national authorisations prior to implementation date may be authorised as JAR-FCL examiner provided that they

JAR-FCL 2.005(c) (continued)

have demonstrated a knowledge of JAR-FCL and JAR-OPS to the Authority. The authorisation will be for a maximum of 3 years. Thereafter re-authorisation will be subject to completion of the requirements set out in 2.425(a) and (b).

[Amdt. 1, 01.12.00; Amdt. 2, 01.11.02]

### JAR-FCL 2.010 Basic authority to act as a flight crew member

#### (a) Licence and rating

(1) A person shall not act as a flight crew member of a civil helicopter registered in a JAA Member State unless that person holds a valid licence and rating complying with the requirements of JAR-FCL and appropriate to the duties being performed, or an authorisation as set out in JAR-FCL 2.085 and/or 2.230. The licence shall have been issued by:

- (i) a JAA Member State; or
- (ii) another ICAO Contracting State and rendered valid in accordance with JAR-FCL 2.015(b) or (c).

(2) Pilots holding national motor gliders licences/ratings/authorisations are also permitted to operate touring motor gliders under national regulations.

(3) Pilots holding a restricted national private pilot's licence are permitted under national regulations to operate helicopters registered in the State of licence issue within that State's airspace.

(b) *Exercise of privileges.* The holder of a licence, rating or authorisation shall not exercise privileges other than those granted by that licence, rating or authorisation.

#### (c) Appeals, Enforcement

(1) A JAA Member State may at any time in accordance with its national procedures act on appeals, limit privileges, or suspend or revoke any licence, rating, authorisation, approval or certificate it has issued in accordance with the requirements of JAR-FCL if it is established that an applicant or a licence holder has not met, or no longer meets, the requirements of JAR-FCL or relevant national law of the State of licence issue.

(2) If a JAA Member State establishes that an applicant or licence holder of a JAR-FCL licence issued by another JAA Member State has not met, or no longer meets, the requirements of JAR-FCL or relevant national law of the State in which an aircraft is being flown, the JAA Member State shall inform the State of licence issue and

JAR-FCL 2.010(c)(2) (continued)

the Licensing Division of the Central JAA. In accordance with its national law, a JAA Member State may direct that in the interest of safety an applicant or licence holder it has duly reported to the State of licence issue and the JAA for the above reason may not pilot aircraft registered in that State or pilot any aircraft in that State's airspace.

[Amdt. 2, 01.11.02]

### JAR-FCL 2.015 Acceptance of licences, ratings, authorisations, approvals or certificates

(See Appendix 1 to JAR-FCL 2.015)

(See Appendix 2 to JAR-FCL 2.015)

(See AMC FCL 2.005 & 2.015)

#### (a) Licences, ratings, authorisations, approvals or certificates issued by JAA Member States

(1) Where a person, an organisation or a service has been licensed, issued with a rating, authorisation, approval or certificate by the Authority of a JAA Member State in accordance with the requirements of JAR-FCL and associated procedures, such licences, ratings, authorisations, approvals or certificates shall be accepted without formality by other JAA Member States.

(2) Training performed after 19 June 1997 and in accordance with all the requirements of JAR-FCL and associated procedures shall be accepted for the issuance of JAR-FCL licences and ratings, provided that licences in accordance with JAR-FCL shall not be issued until after 31 December 1999.

#### (b) Licences issued by non-JAA States

(1) A licence issued by a non-JAA State may be rendered valid at the discretion of the Authority of a JAA Member State for use on aircraft registered in that JAA Member State in accordance with Appendix 1 to JAR-FCL 2.015.

(2) Validation of a professional pilot's licence and a private pilot licence with instrument rating shall not exceed one year from the date of validation, provided that the basic licence remains valid. Any further validation for use on aircraft registered in any JAA Member State is subject to agreement by the JAA Member States and to any conditions seen fit within the JAA. The use of a licence validated by a JAA Member State shall comply with the requirements stated in JAR-FCL.

(3) The requirements stated in (1) and (2) above shall not apply where aircraft registered in a

## JAR-FCL 2.015(b)(3) (continued)

JAA Member State are leased to an operator in a non-JAA State, provided that the State of the operator has accepted for the period of lease the responsibility for the technical and/or operational supervision in accordance with JAR-OPS 3.165. The licences of the flight crews of the non-JAA State operator may be validated at the discretion of the Authority of the JAA Member State concerned, provided that the privileges of the flight crew licence validation are restricted for use during the lease period only on nominated aircraft in specified operations and not involving a JAA operator, directly or indirectly, through a wet lease or other commercial arrangement.

(c) *Conversion of a licence issued by a non-JAA State.*

(1) A professional pilot licence and/or IR issued by a non-JAA State may be converted to a JAR-FCL licence provided that an arrangement exists between the JAA Member State and the non-JAA State. This arrangement shall be established on the basis of reciprocity of licence acceptance and shall ensure that an equivalent level of safety exists between the training and testing requirements of the JAA and the non-JAA State. Any arrangement entered into will be reviewed periodically, as agreed by the non-JAA State and the JAA. A licence converted according to such an arrangement shall have an entry indicating the non-JAA State upon which the conversion is based. Other Member States shall not be obliged to accept any such licence.

(2) A private pilot licence issued by a non-JAA Member State may be converted to a JAR-FCL licence with single-pilot type ratings by complying with the requirements shown in Appendix 2 to JAR-FCL 2.015.

[(d) When an Authority issues a licence which deviates from JAR-FCL, an endorsement shall be made on the licence, under item XIII.]

[Amdt. 2, 01.11.02; Amdt. 3, 01.09.03]

**JAR-FCL 2.016 Credit given to a holder of a licence issued by a non-JAA Member State**

(a) An applicant for a JAR-FCL(H) licence and IR(H), if applicable, already holding at least an equivalent licence issued in accordance with ICAO Annex 1 by a non-JAA Member State shall meet all the requirements of JAR-FCL, except that the requirements of course duration, number of lessons and specific training hours may be reduced. The Authority may be guided as to the credits to be

## JAR-FCL 2.016(a) (continued)

granted on the basis of a recommendation from an appropriate training organisation.

(b) The holder of an ATPL(H) with valid IR(H) issued in accordance with ICAO Annex 1 who meets the 1 000 hours flying experience requirements on multi-pilot helicopters as PIC or co-pilot of Appendix 1 to JAR-FCL 2.015 may be exempted from the requirements to undergo approved training prior to undertaking the theoretical knowledge examinations and the skill test, provided that the licence contains a valid multi-pilot type rating with IR(H) privileges for the helicopter to be used for the ATPL(H) skill test in accordance with JAR-FCL 2.295.

[Amdt. 1, 01.12.00; Amdt. 2, 01.11.02]

**JAR-FCL 2.017 Authorisations/Ratings for special purposes**

Authorisations/Ratings for special purposes associated with a licence (e.g. IMC flying, crop dusting, mountain flying, firefighting, etc.) may be established by the Authority in accordance with the requirements of that JAA Member State for use solely within that Member State's airspace. The use of such an authorisation/rating in another JAA Member State's airspace requires the prior agreement of the State(s) visited, except where a bilateral agreement exists.

[Amdt. 1, 01.12.00]

**JAR-FCL 2.020 Credit for military service**  
(See Appendix 1 to JAR-FCL 2.005)

Application for credit:

Military flight crew members applying for licences and ratings specified in JAR-FCL shall apply to the Authority of the State for which they serve(d). The knowledge, experience and skill gained in military service will be credited towards the relevant requirements of JAR-FCL licences and ratings at the discretion of the Authority. The policy for the credit given shall be reported to the JAA. The privileges of such licences shall be restricted to aircraft registered in the State of licence issue until the requirements set out in the Appendix 1 to JAR-FCL 2.005 are met.

**JAR-FCL 2.025 Validity of licences and ratings**

(See IEM FCL 2.025)

(a) A licence holder shall not exercise the privileges granted by any licence or rating issued by a JAA Member State unless the holder maintains competency by meeting the relevant requirements of JAR-FCL.

(b) [*Validity of the licence and revalidation of a rating*]

[(1)] The validity of the licence is determined by the validity of the ratings contained therein and the medical certificate (see IEM FCL 2.025).

[(2) When issuing or revalidating/renewing a rating, the Authority may extend the validity period of the rating until the end of the month in which the validity would otherwise expire, that date remains the expiry date of the rating.]

(c) The licence will be issued for a maximum period of 5 years. Within this period of 5 years the licence will be re-issued by the Authority:

- (1) after initial issue or renewal of a rating;
- (2) when paragraph XII in the licence is completed and no further spaces remain;
- (3) for any administrative reason; or
- (4) at the discretion of the Authority when a rating is revalidated.

Valid ratings will be transferred to the new licence document by the Authority.

The licence holder shall apply to the Authority for the re-issue of the licence.

The application shall include the necessary documentation.

[Amdt. 3, 01.09.03]

**JAR-FCL 2.026 Recent experience for pilots not operating in accordance with JAR-OPS 3**

(a) A pilot shall not operate a helicopter as pilot-in-command carrying passengers unless that pilot has made three circuits, each to include take-offs and landings, as pilot flying in a helicopter of the same type or a flight simulator of the helicopter type to be used, in the preceding 90 days; and

JAR-FCL 2.026 (continued)

(b) A co-pilot shall not operate as pilot at the flight controls of a helicopter carrying passengers during take-off and landing unless that co-pilot has operated as pilot flying during take-off and landing in a helicopter of the same type or a flight simulator, of the helicopter type to be used, in the preceding 90 days.

(c) The holder of a licence which does not include a valid instrument rating (helicopter) shall not act as pilot-in-command of a helicopter carrying passengers at night unless during the previous 90 days the licence holder fulfilled the requirements of JAR-FCL 2.026(a) by night.

[Amdt.1, 01.12.00]

**JAR-FCL 2.030 Arrangements for testing**

(a) *Authorisation of examiners.* The Authority will designate and authorise as examiners suitably qualified persons of integrity to conduct on its behalf, skill tests and proficiency checks. The minimum qualifications for examiners are set out in JAR-FCL 2 Subpart I. Examiners' responsibilities and privileges will be notified to them individually in writing by the Authority.

(b) *Number of examiners.* The Authority will determine the number of examiners it requires, taking account of the number and geographic distribution of its pilot population.

(c) *Notification of examiners.*

(1) The Authority will maintain a list of all examiners it has authorised stating for which roles they are authorised. The list will be made available to TRTOs, FTOs and registered facilities within the JAA Member State. The Authority will determine by which means the examiners will be allocated to the skill test.

(2) The Authority will advise each applicant of the examiner(s) it has designated for the conduct of the skill test for the issue of an ATPL(H).

(d) Examiners shall not test applicants to whom flight instruction has been given by them for that licence or rating except with the expressed consent in writing of the Authority.

(e) *Pre-requisites for applicants undergoing a skill test.* Before a skill test for the issue of a licence or rating is taken the applicant shall have passed the associated theoretical knowledge examination, provided that exceptions may be made by the Authority for applicants undergoing a course of integrated flying training. Instruction for the associated theoretical knowledge examination shall

JAR-FCL 2.030(e) (continued)

always have been completed before such skill tests are taken. Except for ATPL issue, the applicant for a skill test shall be recommended for the test by the organisation/person responsible for the training.

[Amdt. 1, 01.12.00; Amdt. 2, 01.11.02]

**JAR-FCL 2.035 Medical fitness**

(a) *Fitness.* The holder of a medical certificate shall be mentally and physically fit to exercise safely the privileges of the applicable licence.

(b) *Requirement for medical certificate.* In order to apply for or to exercise the privileges of a licence, the applicant or the holder shall hold a medical certificate issued in accordance with the provisions of JAR-FCL 3 (Medical) and appropriate to the privileges of the licence.

(c) *Aeromedical disposition.* After completion of the examination the applicant shall be advised whether fit, unfit or referred to the Authority. The authorised medical examiner (AME) shall inform the applicant of any condition(s) (medical, operational or otherwise) that may restrict flying training and/or the privileges of any licence issued.

[Amdt. 1, 01.12.00]

**JAR-FCL 2.040 Decrease in medical fitness**  
(See IEM FCL 3.040)

(a) Holders of a medical certificate shall not exercise the privileges of their licences, related ratings or authorisations at any time when they are aware of any decrease in their medical fitness which might render them unable to safely exercise those privileges.

(b) Holders of a medical certificate shall not take any prescription or non-prescription medication or drug, or undergo any other treatment, unless they are completely sure that the medication, drug or treatment will not have any adverse effect on their ability to perform safely their duties. If there is any doubt, advice is to be sought from the AMS, an AMC, or an AME. Further advice is given in JAR-FCL 3 (IEM FCL 3.040).

(c) Holders of a medical certificate shall, without undue delay, seek the advice of the AMS, an AMC or an AME when becoming aware of:

- (1) hospital or clinic admission for more than 12 hours; or
- (2) surgical operation or invasive procedure; or
- (3) the regular use of medication; or

JAR-FCL 2.040(c) (continued)

(4) the need for regular use of correcting lenses.

(d) Holders of medical certificates who are aware of:

(1) any significant personal injury involving incapacity to function as a member of a flight crew; or

(2) any illness involving incapacity to function as a member of a flight crew throughout a period of 21 days or more; or

(3) being pregnant,

shall inform the Authority in writing of such injury or pregnancy, and as soon as the period of 21 days has elapsed in the case of illness. The medical certificate shall be deemed to be suspended upon the occurrence of such injury or the elapse of such period of illness or the confirmation of the pregnancy, and:

(4) in the case of injury or illness the suspension shall be lifted upon the holder being medically examined under arrangements made by the Authority and being pronounced fit to function as a member of the flight crew, or upon the Authority exempting, subject to such conditions as it thinks fit, the holder from the requirement of a medical examination; and

(5) in the case of pregnancy, the suspension may be lifted by the Authority for such period and subject to such conditions as it thinks fit and shall cease upon the holder being medically examined under arrangements made by the Authority after the pregnancy has ended and being pronounced fit to resume her functions as a member of the flight crew.

[Amdt. 1, 01.12.00]

**JAR-FCL 2.045 Special circumstances**

(a) It is recognised that the provisions of all parts of JAR-FCL will not cover every possible situation. Where the application of JAR-FCL would have anomalous consequences, or where the development of new training or testing concepts would not comply with the requirements, an applicant may ask the Authority concerned for an exemption. An exemption may be granted only if it can be shown that the exemption will ensure or lead to at least an equivalent level of safety.

(b) Exemptions are divided into short term exemptions and long term exemptions (more than 6 months). The granting of a long term exemption may



JAR-FCL 2.045(b) (continued)

only be undertaken in agreement with the JAA Licensing Sectorial Team.

[Amdt. 2, 01.11.02]

**JAR-FCL 2.050 Crediting of flight time and theoretical knowledge**  
(See Appendix 1 to JAR-FCL 2.050)

(a) *Crediting of flight time*

(1) Unless otherwise specified in JAR-FCL, flight time to be credited for a licence or rating shall have been flown in the same category of aircraft for which the licence or rating is sought.

(2) *Pilot-in-command or under instruction*

(i) An applicant for a licence or rating is credited in full with all solo, dual instruction or pilot-in-command flight time towards the total flight time required for the licence or rating.

(ii) A graduate of an airline transport pilot integrated flying training course is entitled to be credited with up to 50 hours of student pilot-in-command time towards the pilot-in-command time required for the issue of the airline transport pilot licence, commercial pilot licence and a multi-engine type rating.

(3) *Co-pilot*

(i) The holder of a pilot licence, when acting as co-pilot, is entitled to be credited with all of the co-pilot time towards the total flight time required for a higher grade of pilot licence.

(ii) The holder of a pilot licence, when acting as co-pilot performing under the supervision of the pilot-in-command the functions and duties of a pilot-in-command, shall be entitled to be credited in full with this flight time towards the total flight time required for a higher grade of pilot licence, provided that the method of supervision is agreed with the Authority.

(b) *Crediting of theoretical knowledge*

(1) The holder of a IR(A) will be exempted from the theoretical knowledge instruction and examination requirement for a IR(H).

(2) The holder of the following licences will be exempted from the theoretical instruction and examination requirements provided they

JAR-FCL 2.050(b)(2) (continued)

complete the relevant bridge instruction and pass the examination (See Appendix 1 to JAR-FCL 2.050).

(i) The holder of an aeroplane licence for the issue of a PPL(H); or

(ii) the holder of a ATPL(A) for the issue of a CPL(H) or an ATPL (H); or

(iii) the holder of a CPL(A) with the ATPL(A) theoretical knowledge credit for an ATPL(H).

(3) An applicant having passed the theoretical knowledge examination for an ATPL(H) is credited with the theoretical knowledge requirements for PPL(H), CPL(H) and IR(H).

(4) An applicant having passed the theoretical knowledge examination for a CPL(H) is credited with the theoretical knowledge requirements for a PPL(H).

[Amdt. 1, 01.12.00]

**JAR-FCL 2.055 Training organisations and registered facilities**

(See Appendix 1a, 1b, 1c, and Appendix 2 to JAR-FCL 2.055)

(See Appendix 2 to JAR-FCL 2.125)

(a) (1) Flying training organisations (FTO's) wishing to offer training for licences and associated ratings whose principle place of business and registered office is located in a JAA Member State, will be granted approval by that State when in compliance with JAR-FCL. Requirements for approval of FTO's are given in Appendix 1a to JAR-FCL 2.055. Part of the training may be performed outside the JAA Member States (see also Appendix 1b to JAR-FCL 2.055).

(2) FTOs wishing to offer training for licences and associated ratings whose principal place of business and registered office is located outside the JAA Member States, may be granted approval by a JAA full Member Authority in respect of any such location:

(i) if an arrangement has been agreed between the JAA and the non-JAA Authority of the State in which the FTO has its principal place of business and registered office, providing for the participation of that Authority in the approval process and provide regulatory oversight of the FTO;

JAR-FCL 2.055(a)(2) (continued)

or

(ii) (A) if adequate jurisdiction and supervision by the approving Authority can be assured;

(B) the relevant additional requirements of Appendix 1c to JAR-FCL 2.055 are satisfied; and

(C) an approval process in accordance with the administrative procedures accepted by the JAA is applied by the approving Authority.

(b) (1) Type rating training organisations (TRTOs) located in a JAA Member State, wishing to offer training for type ratings will be granted approval when in compliance with JAR-FCL and the approval will be given by that State. Requirements for approval of TRTOs are given in Appendix 2 to JAR-FCL 2.055.

(2) For TRTOs located outside a JAA Member States approval will be granted, when in compliance with JAR-FCL, by the State which receives the application. Requirements for approval of TRTOs are given in Appendix 2 to JAR-FCL 2.055.

(c) Facilities wishing to offer training for PPL only and located in the JAA Member States shall register for that purpose with the Authority (see JAR-FCL 2.125).

[ ]

[Amdt. 1, 01.12.00, Amdt. 2, 01.11.02; Amdt. 3, 01.09.03]

### **JAR-FCL 2.060 Curtailment of privileges of licence holders aged 60 years or more**

(a) *Age 60–64.* The holder of a pilot licence who has attained the age of 60 years shall not act as a pilot of an aircraft engaged in commercial air transport operations except:

(1) as a member of a multi-pilot crew and provided that,

(2) such holder is the only pilot in the flight crew who has attained age 60.

(b) *Age 65.* The holder of a pilot licence who has attained the age of 65 years shall not act as a pilot of an aircraft engaged in commercial air transport operations.

JAR-FCL 2.060 (continued)

### **(CZ)JAR-FCL 2.060 Curtailment of privileges of licence holders aged 60 years or more (Czech Republic)**

*The holder of a pilot licence who has attained the age of 62 years shall not act as a pilot of an aircraft engaged in commercial air transport operations.*

### **(F)JAR-FCL 2.060 Curtailment of privileges of licence holders aged 60 years or more (France)**

*The holder of a pilot licence who has attained the age of 60 years shall not act as a pilot of an aircraft engaged in commercial air transport operations.*

### **(I)JAR-FCL 2.060 Curtailment of privileges of licence holders aged 60 years or more (Italy)**

*The holder of a pilot licence who has attained the age of 60 shall not act as a pilot of an aircraft engaged in commercial air transport operations.*

[Amdt. 1, 01.12.00, Amdt. 2, 01.11.02]

### **JAR-FCL 2.065 State of licence issue**

(a) An applicant shall demonstrate the satisfactory completion of all requirements for licence issue to the Authority of [ ] the 'State of licence issue' (see JAR-FCL 2.010(c)).

(b) [In circumstances agreed by both Authorities, an applicant who has commenced training under the responsibility of one Authority may be permitted to complete the requirements under the responsibility of the other Authority.

The agreement shall allow for:

- (1) theoretical knowledge training and examinations;
- (2) medical examination and assessment;
- (3) flight training and testing,

The Authorities shall agree the 'State of licence issue'.

[(c)] Further ratings may be obtained under JAR-FCL requirements in any JAA Member State and will be entered into the licence by the State of licence issue.

[(d)] For administrative convenience, e.g. revalidation, the licence holder may subsequently transfer a licence issued by the State of licence issue to another JAA Member State, provided that

JAR-FCL 2.065(d) (continued)

employment or normal residency is established in that State (see JAR-FCL 2.070). That State would thereafter become the State of licence issue and would assume the responsibility for licence issue referred to in (a) above.

[(e)] An applicant shall hold only one JAR-FCL licence (Helicopter) and only one medical certificate at any time.

[Amdt. 1, 01.12.00, Amdt. 2, 01.11.02; Amdt. 3, 01.09.03]

### JAR-FCL 2.070 Normal residency

Normal residency means the place where a person usually lives for at least 185 days in each calendar year because of personal and occupational ties or, in the case of a person with no occupational ties, because of personal ties which show close links between that person and the place where she or he is living.

### JAR-FCL 2.075 Format and specifications for flight crew licences (See Appendix 1 to JAR-FCL 2.075)

The flight crew licence issued by a JAA Member State in accordance with JAR-FCL will conform to the following specifications.

(a) *Content.* The item number shown will always be printed in association with the item heading. A standard JAA licence format is shown in Appendix 1 to JAR-FCL 2.075. Items I to XI are the 'permanent' items and items XII to XIV are the 'variable' items which may appear on a separate or detachable part of the main form. Any separate or detachable part shall be clearly identifiable as part of the licence.

(1) *Permanent items*

(I) State of licence issue.

(II) Title of licence.

(III) Serial number commencing with the postal code of the issuing State and followed by a code of numbers and/or letters in Arabic numerals and in Roman script.

(IV) Name of holder, (in Roman alphabet, if script of national language is other than Roman).

(V) Holder's address.

(VI) Nationality of holder.

(VII) Signature of holder.

JAR-FCL 2.075(a)(1) (continued)

(VIII) Authority and, where necessary, conditions under which the licence was issued.

(IX) Certification of validity and authorisation for the privileges granted.

(X) Signature of the officer issuing the licence and the date of issue.

(XI) Seal or stamp of the Authority.

(2) *Variable items*

(XII) Ratings – class, type, instructor, etc., with dates of expiry. Radio telephony (R/T) privileges may appear on the licence form or on a separate certificate.

(XIII) Remarks – i.e. special endorsements relating to limitations and endorsements for privileges.

(XIV) Any other details required by the Authority.

(b) *Material.* The paper or other material used will prevent or readily show any alterations or erasures. Any entries or deletions to the form will be clearly authorised by the Authority.

(c) *Colour.* White material will be used for pilot licences issued in accordance with JAR-FCL.

(d) *Language.* Licences shall be written in the national language and in English and such other languages as the Authority deems appropriate.

[Amdt. 1, 01.12.00]

### JAR-FCL 2.080 Recording of flight time

(a) Details of all flights flown as a pilot shall be kept in a reliable record in a logbook format acceptable to the Authority (see IEM FCL 2.080). Details of flights flown under JAR-OPS 3, may be recorded in an acceptable computerised format maintained by the operator. In this case an operator shall make the records of all flights operated by the pilot, including differences and familiarisation training, available on request to the flight crew member concerned.

(b) The record shall contain the following information:

(1) Personal details:

Name and address of the holder

(2) For each flight:

(i) Name of Pilot-in-command

(ii) Date (day, month, year) of flight

JAR-FCL 2.080(b) (continued)

- (iii) Place and time of departure and arrival (times (UTC) to be block time)
- (iv) Type helicopter make, model and variant) and registration of helicopter
- (v) SE, ME
- (vi) Total time of flight
- (vii) Accumulated total time of flight
- (3) For each simulator or FNPT session:
  - (i) Type and qualification number of training device
  - (ii) Synthetic training device instruction
  - (iii) Date (d/m/y)
  - (iv) Total time of session
  - (v) Accumulated total time
- (4) Pilot function:
  - (i) Pilot-in-command (including solo, SPIC, PICUS time)
  - (ii) Co-pilot
  - (iii) Dual
  - (iv) Flight instructor/Flight examiner
  - (v) A remarks column will be provided to give details of specific functions e.g. SPIC, PICUS, instrument flight time\*, etc.

\* A pilot may log as instrument flight time only that time during which he operates the helicopter solely by reference to instruments, under actual or simulated instrument flight conditions.

- (5) Operational conditions
  - (i) Night
  - (ii) IFR
- (c) Logging of time
  - (1) Pilot-in-command flight time
    - (i) The holder of a licence may log as pilot-in-command time all of the flight time during which he is the pilot-in-command
    - (ii) The applicant for or the holder of a pilot licence may log as pilot-in-command time all solo flight time and flight time as student pilot-in-command provided that such SPIC time is countersigned by the instructor.
    - (iii) The holder of an instructor rating may log as pilot-in-command all

JAR-FCL 2.080(c)(1)(iii) (continued)

flight time during which he acts as an instructor in a helicopter.

(iv) The holder of an examiner's authorisation may log as pilot-in-command all flight time during which he occupies a pilot's seat and acts as an examiner in a helicopter.

(v) A co-pilot acting as pilot-in-command under the supervision of the pilot-in-command on a helicopter on which more than one pilot is required under the type certification of the helicopter or as required by JAR-OPS may log all flight time as pilot-in-command under supervision, provided such pilot-in-command time under supervision is countersigned by the pilot-in-command. (see (c)(5))

(vi) If the holder of a licence carries out a number of flights upon the same day returning on each occasion to the same place of departure and the interval between successive flights does not exceed thirty minutes, such series of flights are to be recorded as a single entry.

(2) Co-pilot flight time

The holder of a pilot licence occupying a pilot seat as co-pilot may log all flight time as co-pilot flight time on a helicopter on which more than one pilot is required under the type certification of the helicopter, or the regulations under which the flight is conducted.

- (3) Intentionally blank
- (4) Instruction time

A summary of all time logged by an applicant for a licence or rating as flight instruction, instrument flight instruction, instrument ground time, etc. shall be certified by the appropriately rated and/or authorised instructor from whom it was received.

(5) PICUS (Pilot-in-command under supervision)

Provided that the method of supervision is acceptable to the Authority, a co-pilot may log as PIC flight time flown as PICUS, when all of the duties and functions of PIC on that flight were carried out, such that the intervention of the PIC in the interest of safety was not required.

(d) Presentation of flight time record

(1) The holder of a licence or a student pilot shall without undue delay present his flight time record for inspection upon request by an authorised representative of the Authority.

**SECTION 1**

**JAR-FCL 2**

JAR-FCL 2.080(d) (continued)

(2) A student pilot shall carry his flight time record logbook with him on all solo cross-country flights as evidence of the required instructor authorisations.

[Amdt. 1, 01.12.00]

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**Appendix 1 to JAR-FCL 2.005****Minimum requirements for the issue of a JAR-FCL licence/authorisation on the basis of a national licence/authorisation issued in a JAA Member State.**

(See JAR-FCL 2.005(b)(3))

(See AMC FCL 2.005 &amp; 2.015)

## 1 Pilot licences

A pilot licence issued by a JAA Member State in accordance with the national requirements of that State may be replaced by a JAR-FCL licence subject, where applicable, to conditions. For the replacement of such licences the holder shall:

(a) complete, as a proficiency check, the type and instrument rating (IR, if applicable) revalidation requirements of JAR-FCL 2.245(b) relevant to the privileges of the licence held;

(b) (i) for ATPL(H) and CPL(H) demonstrate to the satisfaction of the Authority that a knowledge of the relevant parts of JAR-OPS 3 and JAR-FCL (see AMC FCL 2.005 & 2.015) has been acquired;

(ii) for PPL(H) only demonstrate to the satisfaction of the Authority that a knowledge of the relevant parts of JAA Requirements (see AMC FCL 2.125) has been acquired;

(c) demonstrate a knowledge of English in accordance with JAR-FCL 2.200 if IR privileges are held;

(d) comply with the experience requirements and any further requirements as set out in the table below:

National licence held	Total flying hours experience	Any further JAA requirements	Replacement JAR-FCL licence and conditions (where applicable)	Removal of conditions	
(1)	(2)	(3)	(4)	(5)	
ATPL(H) valid IR(H)	>1 000 as PIC on multi-pilot helicopters	none	ATPL(H)	Not applicable	(a)
ATPL(H) no IR(H) privileges	>1 000 as PIC on multi-pilot helicopters	none	ATPL(H) restricted to VFR privileges	Obtain an IR(H) in accordance with JAR-FCL 2 Subpart E	(b)
ATPL(H) valid IR(H)	>1 000 on multi-pilot helicopters	None	ATPL(H), with type rating restricted to co-pilot	demonstrate ability to act as PIC as required by Appendix 1 to JAR-FCL 2.240 and 2.295 paras 9 to 15.	(c)
ATPL(H) no IR(H) privileges	>1 000 on multi-pilot helicopters	None	ATPL(H) restricted to VFR privileges and type rating restricted to co-pilot	(i) obtain an IR(H) in accordance with JAR-FCL 2 Subpart E  (ii) demonstrate ability to act as PIC as required by Appendix 1 to JAR-FCL 2.240 and 2.295 paras 9 to 15.	(d)

## SECTION 1

## JAR-FCL 2

## Appendix 1 to JAR-FCL 2.005 (continued)

National licence held	Total flying hours experience	Any further JAA requirements	Replacement JAR-FCL licence and conditions <i>(where applicable)</i>	Removal of conditions	
(1)	(2)	(3)	(4)	(5)	
ATPL(H) valid IR(H)	>500 on multi-pilot helicopters	Demonstrate to the Authority a knowledge of flight planning and flight performance as required by Appendix 1 to JAR-FCL 2.470	as (4)(c)	as (5)(c)	(e)
ATPL(H) no IR(H) privileges	>500 on multi-pilot helicopters	as (3)(e)	as (4)(d)	as (5)(d)	(f)
CPL/IR(H) and passed an ICAO ATPL(H) theory test in the JAA Member State of licence issue*	>500 on multi-pilot helicopters	(i) demonstrate to the Authority a knowledge of flight planning and flight performance as required by Appendix 1 to JAR-FCL 2.470;  (ii) meet remaining requirements of JAR-FCL 2.250(a)	CPL/IR(H)  [with JAR-FCL ATPL(H) theory credit]	Not applicable	(g)
[CPL/IR(H)]	[>500 hrs on multi-pilot helicopters]	[(i) to pass an examination for JAR-FCL ATPL(H) theoretical knowledge in the JAA Member State of licence issue *(see text below table)  (ii) meet remaining requirements of JAR-FCL 2.250(a)]	[CPL/IR(H)  with JAR-FCL ATPL(H) theory credit]	[Not applicable]	[(h)]
CPL/IR(H)	>500 as PIC on single-pilot helicopters	None	CPL/IR(H) with type ratings restricted to single-pilot helicopters	obtain multi-pilot type rating as required by JAR-FCL 2.240	[(i)]
CPL/IR(H)	<500 as PIC on single-pilot helicopters	Demonstrate to the Authority a knowledge of flight planning and flight performance as required by Appendix 1 to JAR-FCL 2.470	as (4)(h)		[(j)]
CPL(H)	>500 as PIC on single-pilot helicopters	night qualification, if applicable	CPL(H), with type ratings restricted to single-pilot helicopters		[(k)]
CPL(H)	<500 as PIC on single-pilot helicopters	night qualification, if applicable, demonstrate to the Authority a knowledge of flight performance and planning as required by Appendix 1 to JAR-FCL 2.470	as (4) (j)		[(l)]

## Appendix 1 to JAR-FCL 2.005 (continued)

National licence held	Total flying hours experience	Any further JAA requirements	Replacement JAR-FCL licence and conditions (where applicable)	Removal of conditions	
(1)	(2)	(3)	(4)	(5)	
PPL/IR(H)	≥ 75 in accordance with IFR	night qualification; if night flying privileges are not included in the instrument rating	PPL/IR(H) (the IR restricted to PPL)	demonstrate to the Authority a knowledge of flight performance and planning as required by Appendix 1 to JAR-FCL 2.470.	[(m)]
PPL(H)	≥ 75 on helicopters	demonstrate the use of radio navigation aids.	PPL (H)		[(n)]

\* CPL holders already holding a type rating for a multi-pilot helicopter are not required to have passed an examination for ATPL theoretical knowledge whilst they continue to operate that same helicopter type, but will not be given ATPL theory credit for a JAR-FCL licence. If they require another type rating for a different multi-pilot helicopter, they must pass an examination in JAR-FCL ATPL(H) knowledge in the JAA Member State of licence issue.

## 2 Instructor ratings

National rating, authorisation or privileges held	Experience	Any further JAA requirements	Replacement JAA rating
(1)	(2)	(3)	(4)
FI(H)/IRI(H)/TRI(H)	as required under JAR-FCL 2 (Helicopter) for the relevant rating	demonstrate a knowledge of the relevant parts of JAR-FCL 2 (Helicopter) and JAR-OPS as set out in AMC FCL 2.005 and 2.015	FI(H)/IRI(H)/TRI(H)*

\*JAA Member States' instructors fulfilling all the above replacements requirement, but unable to obtain relevant JAR-FCL licence/rating(s) due to present implementation status of their State of licence issue, may be accepted to instruct for JAR-FCL licence and/or rating(s)

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## Appendix 1 to JAR-FCL 2.005 (continued)

## 3 SFI authorisation

A SFI authorisation issued by a JAA State in accordance with the national requirements of that State may be replaced by a JAR-FCL authorisation provided that the holder complies with the experience requirements and any further requirements as set out in the table below:

National authorisation held	Experience	Any further JAA requirements	Replacement JAA authorisation
(1)	(2)	(3)	(4)
SFI(H)	>1 000 hrs as pilot of MPH	(i) hold or have held a professional pilot licence issued by a JAA Member State or a non JAR-FCL professional licence acceptable to the Authority;  (ii) have completed the flight simulator content of the applicable type rating course including MCC.	SFI(H)
SFI(H)	3 years recent experience as a SFI acceptable to the Authority.	have completed the simulator content of the applicable type rating course including MCC	SFI(H)

This authorisation will be for a maximum period of 3 years.

Further re-authorisation will be subject to completion of the requirements set out in JAR-FCL 2.415.

[Amdt. 1, 01.12.00; Amdt. 2, 01.11.02; Amdt. 3, 01.09.03]

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**Appendix 1 to JAR-FCL 2.015****Minimum requirements for the validation of pilot licences of non-JAA States**

(See JAR-FCL 2.015)

1 The minimum requirements for the validation of a pilot licence of a non-JAA State by a JAA Member State are specified below.

Pilot licences for commercial air transportation and other professional activities

2 A pilot licence issued in accordance with ICAO Annex 1 by a non-JAA State may be validated subject to conditions by a JAA Member State in order to permit flights (other than for flight instruction) in helicopters registered in that JAA Member State. To validate such licences, the holder shall:

- (a) complete, as a skill test, the type rating revalidation requirements of JAR-FCL 2.245 relevant to the privileges of the licence held;
- (b) demonstrate to the satisfaction of the Authority that a knowledge of the relevant parts of JAR-OPS and JAR-FCL (see AMC FCL 2.005 and 2.015) has been acquired;
- (c) demonstrate a knowledge of English in accordance with JAR-FCL 2.200;
- (d) hold a valid JAR-FCL Class 1 medical certificate;
- (e) meet any published additional requirements that the JAA Member State deems necessary; and
- (f) comply with the experience requirements set out in column (2) of the following table in relation to the validation conditions specified in column (3):

Licence held	Total flying hours experience	Validation conditions	
(1)	(2)	(3)	
ATPL(H)	>1 000 hours as PIC on multi-pilot helicopters	Commercial air transport in multi-pilot helicopters as PIC	(a)
ATPL(H) or CPL(H)/IR*	>1 000 hours as PIC or co-pilot on multi-pilot helicopters	Commercial air transport in multi-pilot helicopters as co-pilot	(b)
CPL(H)/IR	>1 000 hours as PIC in commercial air transport since gaining an IR	Commercial air transport in single-pilot helicopters as PIC	(c)
CPL(H)	>700 hours in helicopters other than those certificated under JAR-27/29, including 200 hours in the activity role for which validation is sought, and 50 hours in that role in the last 12 months	Activities in helicopters other than commercial air transport	(d)

\*CPL/IR holders on multi-pilot helicopters shall have demonstrated ICAO ATPL level knowledge before validation

**Private pilot licences with Instrument Rating**

3 A private pilot licence with instrument rating issued in accordance with ICAO Annex 1 by a non-JAA State may be validated subject to conditions by a JAA Member State in order to permit flights (other than flight instruction) in helicopters registered in that JAA Member State. To validate such licences, the holder shall:

- (a) complete, as a skill test, all sections of the type skill test in accordance with Appendix 1 and 3 to JAR-FCL 2.240;
- (b) demonstrate to the satisfaction of the Authority in accordance with Subpart J, that a knowledge of Air Law and the Aeronautical Weather codes, subject number 050 10 03 01, as well as the Flight Planning & Performance (IR), subject number 030 00 00 00, Human Performance subject number 040 00 00 00 in accordance with Appendix 1 to JAR-FCL 2.470 has been acquired;
- (c) demonstrate a knowledge of English in accordance with JAR-FCL 2.200;

Appendix 1 to JAR-FCL 2.015 (continued)

(d) hold at least a valid JAR-FCL Class 2 medical certificate, including hearing requirements in accordance with JAR-FCL 3.355(b);

(e) hold R/T privileges acceptable to the Authority,

(f) comply with the experience requirements set out in column (2) of the following table:

Licence held	Total flying hours experience
(1)	(2)
PPL(H)/IR	> 100 hrs PIC instrument flight time

[Amdt. 2, 01.11.02]

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**Appendix 2 to JAR-FCL 2.015****Conversion of a PPL(H) issued by a non-JAA Member State to a JAR-FCL PPL(H)**

See JAR-FCL 2.015(c)(2)

The minimum requirements for the conversion of a private pilot licence(H) issued by a non-JAA Member State to a JAR-FCL(H) licence are:

- (a) the applicant shall hold a licence issued in accordance with ICAO Annex I;
- (b) the applicant shall hold at least a JAR-FCL Class 2 medical certificate;
- (c) to hold R/T privileges acceptable to the Authority,
- (d) the applicant shall comply with the requirements set out in the table below.

National licence held	Experience requirement	Any further JAA requirements
Current and valid national ICAO PPL(H)	≥100 hours as pilot of helicopters	<ul style="list-style-type: none"> <li>(a) Pass a written examination in Air Law and Human Performance and Limitations</li> <li>(b) Pass the PPL(H) skill test as set out in Appendix 1 to JAR-FCL 2.130 and 2.135 and Appendix 2 to JAR-FCL 2.135</li> <li>(c) Fulfil the relevant requirements of Subpart F</li> </ul>

[Amdt. 2, 01.11.02]

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**Appendix 1 to JAR-FCL 2.050****Crediting of theoretical knowledge - Bridge instruction and examination syllabus**

(See JAR-FCL 2.050)

1. The holder of an aeroplane licence for the issue of a PPL(H):

From AMC-FCL 2.125 Syllabus of theoretical knowledge for the Private Pilot Licence(Helicopter) all topics under the following subject heading :

Air Law; Aircraft General Knowledge; Flight Performance and Planning; Operational Procedures and Principles of Flight.

Applicants shall pass a theoretical knowledge bridge examination in Air Law and ATC Procedures as determined by the Authority and PPL(H) theoretical knowledge examinations in the other subjects ( see JAR-FCL 2.130).

2. The holder of an ATPL(A) for the issue of a CPL(H) or an ATPL(H) and the holder of a CPL(A) with the ATPL(A) theoretical knowledge credit for the ATPL(H) :

Subject : 010 AIR LAW AND ATC PROCEDURES	
REFERENCE	WORDING
010 01 01 01	Flight over territory of Contracting States
010 02 00 00	Annex 8 - Airworthiness of aircraft
010 04 00 00	Annex 1 - Personnel licensing
010 05 01 00	Annex 2 - essential definitions, applicability of the rules of the air, general rules
010 09 01 01	Aerodrome/Heliport data
010 09 01 02	Visual aids for navigation
010 09 01 05	Emergency and other services

Subject : 021 AIRFRAME AND SYSTEMS	
REFERENCE	WORDING
021 03 02 02	Types of construction
021 03 04 08	Power plant operation and monitoring
021 03 04 09	Power
021 04 06 00	Emergency flotation system
021 05 00 00	Airframe and Systems - Helicopters

Subject : 022 INSTRUMENTATION - HELICOPTERS	
REFERENCE	WORDING
022 02 01 00	Flight Director
022 02 02 00	Auto-pilot
022 02 03 00	Flight envelope protection
022 02 04 00	Stability Augmentation System
022 03 09 00	Rotor overspeed / underspeed warning
022 04 03 00	RPM indicator
022 04 04 00	Consumption gauge
022 04 06 00	Meaning of coloured sectors
022 04 10 00	Electronic displays
022 04 11 00	Chip detection

Appendix 1 to JAR-FCL 2.050 (continued)

Subject : 031 MASS AND BALANCE - HELICOPTERS	
REFERENCE	WORDING
031 01 01 02	Importance in regard to aircraft stability (cyclic - travel/limitations)
031 01 02 00	Mass and balance limits
031 02 01 03	Zero Fuel Mass
031 02 04 00	Effects of overloading
031 03 01 05	Expression of distance from Datumline
031 03 02 00	Lateral and longitudinal CG
031 03 04 00	Area load, Running load, Supporting

Subject: 033 FLIGHT PLANNING AND FLIGHT MONITORING - HELICOPTERS	
REFERENCE	WORDING
033 01 01 01	Selection of routes, speeds, heights (altitudes) and alternates
033 01 02 01	Computation of planned fuel usage for each leg and total fuel usage for the flight
033 01 02 02	Fuel for holding and diversion to alternates
033 01 02 03	Fuel reserves
033 01 02 04	Total fuel requirements for flight
033 01 02 05	Completion of pre-flight portion of fuel log
033 01 03 03	Revision of fuel reserve estimates
033 01 03 04	Selection of cruise altitude and power settings for new destination Fuel state, fuel requirements, fuel reserves
033 03 03 00	Simple fuel logs
033 06 00 00	Practical completion of a flight plan
033 07 00 00	Offshore or remote area operation

Subject: 034 PERFORMANCE - HELICOPTERS	
REFERENCE	WORDING
034 00 00 00	Performance - Helicopters

Subject: 071 OPERATIONAL PROCEDURES - HELICOPTERS	
REFERENCE	WORDING
071 00 00 00	Operational procedures - Helicopters

Subject: 082 PRINCIPLES OF FLIGHT - HELICOPTERS	
REFERENCE	WORDING
082 00 00 00	Principles of flight - Helicopters

[Amdt. 1, 01.12.00]

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**Appendix 1a to JAR-FCL 2.055****Flying Training Organisations for pilot licences and ratings**

(See JAR-FCL 2.055)

(See AMC-FCL 2.261(c)(2))

(See IEM No. 1 to JAR-FCL 2.055)

(See IEM No. 2 to JAR-FCL 2.055)

(See IEM No. 3 to JAR-FCL 2.055)

[(See IEM No. 4 to JAR-FCL 2.055)]

## INTRODUCTION

1 A Flying Training Organisation (FTO) is an organisation staffed, equipped and operated in a suitable environment offering flying training, and/or synthetic flight instruction [and/or] theoretical knowledge instruction for specific training programmes.

2 An FTO wishing to offer approved training to meet JAR-FCL requirements shall obtain the approval of the Authority of a JAA Member State. No such approval will be granted by the Authority of the member State unless:

- (a) the Authority can enforce the JAR-FCL requirements; and
- (b) the FTO meets all requirements of JAR-FCL.

This Appendix gives the requirements for the issue, revalidation and variation of the approval of an FTO. [A FTO needs only to meet the requirements relevant to the instruction it is providing.]

## OBTAINING APPROVAL

3 An FTO seeking approval shall provide to the Authority such operations and training manuals as required by paragraphs 32 and 33. An FTO shall establish procedures acceptable to the Authority to ensure compliance with all relevant JAR-FCL requirements. The procedures shall include a quality system (See AMC-FCL 2.055 and IEM FCL No. 1 to JAR-FCL 2.055) within the FTO to readily detect any deficiencies for self-remedial action. After consideration of the application the FTO will be inspected to ensure that it meets the requirements set out in this Appendix. Subject to satisfactory inspection, approval of the FTO will initially be granted for a period of one year, revalidation of the approval may be granted for further periods of up to three years. No Authority is obliged to grant an approval for a FTO outside the JAA Member States if the personnel resources are not available or the cost of processing the application for approval and inspections puts undue burden on the Authority.

4 All training courses shall be approved (see IEM FCL 2.055 (to be developed)).

5 The Authority will monitor course standards and will sample training flights with students. During such visits, access shall be given by the FTO to training records, authorisation sheets, technical logs, lectures, study notes and briefings and any other relevant material. A copy of the report on a visit to an FTO will be made available by the Authority to that FTO.

6 Approval will be varied, suspended or revoked by the Authority if any of the approval requirements or standards cease to be maintained to the minimum approved level.

7 If an FTO wishes to make changes to an approved course or to its operations or training manual the approval of the Authority shall be obtained before the changes are implemented. FTOs need not advise the Authority of minor changes in day-to-day operations. Where any doubt exists as to whether a proposed change is minor, the Authority shall be consulted.

8 An FTO may make training arrangements with other training organisations or make use of alternative base aerodromes as part of its overall training organisation, subject to the approval of the Authority.

## Financial resources

9 (a) An FTO shall satisfy the Authority that sufficient funding is available to conduct training to the approved standards. (see IEM No. 2 to JAR-FCL 2.055)

Appendix 1a to JAR-FCL 2.055 (continued)

(b) An FTO shall nominate a person acceptable to the Authority who shall satisfy the Authority that sufficient funding is available to conduct training to approved standard. Such person shall be known as the Accountable Manager.

#### MANAGEMENT AND STAFFING

10 The management structure shall ensure supervision of all grades of staff by persons having the experience and qualities necessary to ensure the maintenance of high standards. Details of the management structure, indicating individual responsibilities, shall be included in the FTO's Operations Manual.

11 The FTO shall satisfy the Authority that an adequate number of qualified, competent staff are employed. For integrated courses, three persons on the staff shall be employed full time in the following positions:

- Head of Training (HT)
- Chief Flying Instructor (CFI)
- Chief Ground Instructor (CGI)

For modular training courses, these positions may be combined and filled by one or two persons, full time or part time, depending upon the scope of training offered. At least one person on the staff must be full time. [At FTOs conducting theoretical knowledge instruction only, the positions of HT and CGI may be combined. The nominated person shall have a sound managerial capability, hold or have held a professional pilot licence related to the course to be conducted with ratings as appropriate and shall meet the requirements set out in paragraph 19 below.]

12 The number of part time instructors in relation to the scope of training offered shall be acceptable to the Authority.

13 The ratio of all students to flight instructors, excluding the HT, shall not normally exceed 6:1. Class numbers in ground subjects involving a high degree of supervision or practical work shall not normally exceed 12 students.

#### HEAD OF TRAINING (HT)

14 The HT shall have overall responsibility for ensuring satisfactory integration of flying training, synthetic flight training and theoretical knowledge instruction, and for supervising the progress of individual students. The HT shall have had extensive experience in training as a flight instructor for professional pilot licences and possess a sound managerial capability. The HT shall hold or have held in the three years prior to first appointment as a HT, a professional pilot licence and rating(s) issued in accordance with ICAO Annex 1, related to the flying training courses conducted.

#### CHIEF FLYING INSTRUCTOR (CFI)

15 The CFI shall be responsible for the supervision of flight and synthetic flight instructors and for the standardisation of all flight instruction and synthetic flight instruction. The CFI shall:

- (a) hold the highest professional pilot licence related to the flying training courses conducted;
- (b) hold the rating(s) related to the flying training courses conducted;
- (c) hold a flight instructor authorisation for at least one of the types of helicopter used on the course; and
- (d) have completed on helicopters 1 000 hours pilot-in-command flight time of which a minimum of 500 hours shall be on helicopters flying instructional duties related to the flying courses conducted of which 200 hours may be instrument ground time.

#### INSTRUCTORS, OTHER THAN SYNTHETIC FLIGHT INSTRUCTORS

16 Instructors shall hold:

- (a) a professional pilot licence and rating(s) related to the flying training courses they are appointed to conduct;



Appendix 1a to JAR-FCL 2.055 (continued)

(b) an instructor rating relevant to the part of the course being conducted e.g. instrument rating instructor, flight instructor, type/rating instructor, as appropriate; or

(c) an authorisation from the Authority to conduct specific training in an FTO (see JAR-FCL 2.300).

17 The maximum flying hours, maximum flying duty hours and minimum rest time between instructional duties of instructors shall be acceptable to the Authority.

#### INSTRUCTORS FOR SYNTHETIC FLIGHT TRAINING

18 For flight training duties on a FTD and a FNPT I, instructors shall hold or have held 3 years prior to the first appointment, a professional pilot licence and rating(s), except for SFIs having an authorisation according to item 3 of Appendix 1 to JAR-FCL 2.005, appropriate to the training courses they are appointed to conduct, and have had instructional training experience. For flight training duties on a flight simulator and/or FNPT II, instructors shall hold an FI(H) rating or a TRI (MPH) rating or a SFI(H) authorisation.

#### CHIEF GROUND INSTRUCTOR (CGI)

19 The CGI shall be responsible for the supervision of all ground instructors and for the standardisation of all theoretical knowledge instruction. The CGI shall have a practical background in aviation and have undergone a course of training in instructional techniques or have had extensive previous experience in giving theoretical knowledge instruction.

#### THEORETICAL KNOWLEDGE INSTRUCTORS

20 Ground Instructors in licence and ratings examination subjects shall have appropriate experience in aviation and shall, before appointment, provide proof of their competency by giving a test lecture based on material they have developed for the subjects they are required to teach.

#### RECORDS

21 An FTO shall maintain and retain the following records for a period of at least 5 years, using appropriate administrative staff:

(a) details of ground, flying, and simulated flight training given to individual students;

(b) detailed and regular progress reports from instructors including assessments, and regular progress flight tests and ground examinations; and

(c) personal information, e.g. expiry dates of medical certificates, ratings, etc.

22 The format of the student training records shall be specified in the Training Manual.

23 The FTO shall submit training records and reports as required by the Authority.

#### TRAINING PROGRAMME

24 A training programme shall be developed for each type of course offered. This programme shall include a breakdown of flying and theoretical knowledge instruction in either a week-by-week or phase presentation, a list of standard exercises and a syllabus summary. In particular, synthetic flight training and theoretical knowledge instruction shall be phased in such a manner as to ensure that students shall be able to apply to flying exercises the knowledge gained on the ground. Arrangements should be made so that problems encountered in instruction can be resolved during subsequent training. The content and sequence of the training programme shall be acceptable to the Authority.

#### TRAINING AND TESTING HELICOPTER(S)

25 An adequate number of training and testing helicopters appropriate to the courses of training and testing shall be provided. [This number may be affected by the availability of STDs.] Each helicopter shall be fitted with duplicated primary flight controls for use by the instructor and the student. Swing-over flight controls shall not be acceptable. The helicopter(s) shall include, as appropriate to the courses of training, helicopter(s)

Appendix 1a to JAR-FCL 2.055 (continued)

suitable for auto-rotation demonstration and helicopter(s) suitably equipped to simulate instrument meteorological conditions, and suitably equipped for the instrument flight training and testing required. For flight training and testing for IR(H), an adequate number of IFR certificated helicopters shall be available.

26 Only helicopter(s) approved by the Authority for training purposes shall be used. [If the helicopter used for the skill test is of a different type from the FS used for the visual training, the maximum credit shall be limited to that allocated for the FNPT II/III in the relevant flight training programme.]

#### AERODROMES AND SITES

27 The base aerodrome, and any alternative base aerodrome, at which training is being conducted shall meet the following requirements.

(a) Have at least one runway or take-off/landing area that allows training helicopter to make a normal take-off or landing at the maximum take-off or maximum landing mass authorised, and touch down autorotation as appropriate:

(i) under calm wind (not more than four knots) conditions and temperatures equal to the mean high temperature for the hottest month of the year in the operating area;

(ii) clearing all obstacles in the take-off flight path by at least 50 feet;

(iii) with the powerplant operation and the landing gear (if applicable) recommended by the manufacturer; and

(iv) with a smooth transition from lift-off to the best rate of climb speed without exceptional piloting skills or techniques.

(b) Have a wind direction indicator that is visible at ground level from the ends of each runway, take-off/landing area.

(c) Have adequate runways/take-off/landing area lights if used for night training.

(d) Have an air traffic control service except where, with the approval of the Authority, the training requirements may be satisfied safely by another means of air/ground communications.

28 Sites shall be available for:

- confined area operation training
- simulated engine off autorotation
- sloping ground operation

#### FLIGHT OPERATIONS ACCOMMODATION

29 The following accommodation shall be available:

(a) An operations room with facilities to control flying operations.

(b) A flight planning room with the following facilities:

- appropriate current maps and charts
- current AIS information
- current meteorological information
- communications to ATC and the operations room
- maps showing standard cross-country routes
- maps showing current prohibited, danger and confined areas
- any other flight safety related material.

(c) Adequate briefing rooms/cubicles of sufficient size and number.

(d) Suitable offices for the supervisory staff and room(s) to allow flying instructors to write reports on students, complete records, etc.

(e) Furnished crew-room(s) for instructors and students.

Appendix 1a to JAR-FCL 2.055 (continued)

#### THEORETICAL KNOWLEDGE INSTRUCTION FACILITIES

30 The following facilities for theoretical knowledge instruction shall be available:

- (a) Adequate classroom accommodation for the current student population.
- (b) Suitable demonstration equipment to support the theoretical knowledge instruction.
- (c) An R/T training and testing facility.
- (d) A reference library containing publications giving coverage of the syllabus.
- (e) Offices for the instructional staff.

#### REQUIREMENTS FOR ENTRY TO TRAINING

31 A student accepted for training shall possess the appropriate medical certificate for the licence required and shall meet the entrance requirements set by the FTO, as approved by the Authority.

#### TRAINING MANUAL AND OPERATIONS MANUAL

32 The Training Manuals shall state the standards, objectives and training goals for each phase of training that the students are required to comply with and shall include the following:

Part 1 - The Training Plan

Part 2 - Briefing and Air Exercises

Part 3 - Synthetic Flight Training

Part 4 - Theoretical Knowledge Instruction

For further guidance see IEM No. 3 to JAR-FCL 2.055.

33 The Operations Manual shall provide relevant information to particular groups of staff, e.g. FIs, synthetic flight instructors, ground instructors, operations and maintenance staff, etc., and shall include the following:

- (a) General
- (b) Technical
- (c) Route
- (d) Staff Training

For further guidance see IEM No. 3 to JAR-FCL 2.055.

[Amdt. 1, 01.12.00, Amdt 2, 01.11.02; Amdt. 3, 01.09.03]

**Appendix 1b to JAR-FCL 2.055****Partial Training outside JAA Member States**

(See JAR-FCL 2.030)

(See JAR-FCL 2.055(a)(1))

(See JAR-FCL 2.485)

(See Appendix 1a to JAR-FCL 2.055)

(See Appendix 1 to JAR-FCL 2.300)

FTOs partly training outside the territories of a JAA Member State may perform training according to the following:

(a) Provided the requirements set out in this Appendix are met, approval may be granted. Provided that the approving Authority considers proper supervision to be possible, training will be confined to all or part of the ATP(H) integrated course (see Appendix 1 to JAR-FCL 2.300).

(b) The navigation progress check as in Phase 2 in the ATP(H) integrated course may be conducted by a locally based flight instructor not connected with the applicant's training, provided that the instructor holds a JAR-FCL licence containing FI privileges, as appropriate. On completion of the required training, the skill test for a CPL(H) in the ATP(H) integrated course may be taken with a locally based Flight Examiner (Helicopter) (FE(H)), provided that the examiner is authorised in accordance with JAR-FCL 2 Subpart I and completely independent from the relevant FTO except with the express consent in writing of the Authority.

(c) The skill test for the instrument rating is to be taken in any JAA Member State at the discretion of the Authority that approves the training. A FTO providing approved training for the instrument rating outside JAA Member States will need to make arrangements for the approved course to include acclimatisation flying in the JAA Member State of the approving Authority or in the airspace of any JAA Member State at the discretion of the approving Authority prior to any student taking the instrument rating skill test.

(d) Instruction for ATPL theoretical knowledge may be given at an FTO conducting approved training outside JAA Member States. The theoretical knowledge examinations for licence or rating issue shall be conducted by the Authority of the State of licence issue (see JAR-FCL 2.485). The arrangements for testing (see JAR-FCL 2.030) shall be carefully considered in regard to their training outside JAA Member States.

(e) Instruction may only be given under the direct control of a CFI(H) or nominated deputy holding a JAR-FCL licence and instructor rating as set out in paragraph 15 of Appendix 1a to JAR-FCL 2.055, who is to be present when training is given in the non-JAA Member State.

[Amdt. 1, 01.12.00, Amdt. 2, 01.11.02]

**Appendix 1c to JAR-FCL 2.055****Additional Requirements for training in FTOs whose principal place of business and registered office are located outside the JAA States**

(See JAR-FCL 2.055(a)(2))

(See Appendix 1a to JAR-FCL 2.055)

(See Appendix 1 to JAR-FCL 2.300)

**APPROVAL PROCESS**

1 FTOs whose principal place of business and registered office are located outside the JAA States wishing to train for JAR-FCL licences and associated ratings shall apply for approval of such courses to a National Aviation Authority of any full JAA Member State. Approval will be subject to:

(a) The FTO shall meet the requirements of Appendix 1a to JAR-FCL 2.055 and any additional requirements of this Appendix; and

(b) The Authority to which application has been made considers it possible to discharge its regulatory responsibilities for the approval process and an adequate level of supervision as required by the agreed JAA procedures. The cost and process of approval and supervision shall not put undue burden on the resources of the Authority; and

(c) The approving JAA National Aviation Authority can ensure adequate jurisdiction over the FTO during the approval process and the conduct of subsequent training courses.

(d) The National Aviation Authority of the non-JAA State in which the FTO has its principal place of business and registered office may assist the Authority of a JAA Member State in the approval process and provide oversight of training courses subject to an arrangement being agreed between the JAA and that non-JAA State.

2 Subject to satisfactory inspection, the approval of the FTO will be granted for a period of one year, revalidation of the approval may be granted for further periods of one year.

**JURISDICTION**

3 In the context of approval of FTOs located outside JAA Member States, the term 'adequate jurisdiction' shall mean that the Authority of the approving State shall be able to:

(a) conduct initial and routine inspections of the FTO located in that non-JAA State to ensure compliance with the requirements of JAR-FCL; and

(b) conduct flight tests and other standardisation checks as deemed necessary by the approving Authority; and

(c) discharge its legal responsibilities for the grant, variation, suspension or revocation of approvals in accordance with the applicable law of the approving JAA Member State.

The approving Authority may, subject to an arrangement between the JAA and the non-JAA Authority of the State in which the FTO has its principal place of business and registered office, delegate responsibility for the provisions of paragraph 3(a) above to that non-JAA Authority.

**FTOs TRAINING FOR PROFESSIONAL LICENCES AND RATINGS**

4 Provided that the requirements set out in this Appendix are met, approval may be granted if the approving Authority considers adequate supervision in accordance with JAA procedures to be possible.

5 The skill test for the Instrument Rating shall be conducted in the JAA Member State of the approving Authority. FTOs shall make arrangements for the approved course to include acclimatisation flying within the JAA Member State of the approving Authority or any other JAA Member State at the discretion of the approving Authority prior to any student taking the instrument rating skill test with an examiner authorised by the approving Authority.

6 The navigation progress test in Phase 2 of the ATP(H) integrated course may be conducted by a locally-based FI(H) approved by the JAA approving Authority and not connected with the applicant's training, provided that the instructor holds a JAR-FCL licence containing FI(H), as appropriate. On completion of the required training, the skill test for the CPL(H) of the ATP(H) integrated course may be taken with a locally-

Appendix 1c to JAR-FCL 2.055 (continued)

based FE(H) designated and authorised by the JAA approving Authority, provided that the examiner is authorised in accordance with JAR-FCL Subpart I and completely independent from the FTO except with the expressed consent in writing of the approving Authority.

#### FTOs TRAINING FOR THE PPL(H) AND ASSOCIATED RATINGS ONLY

7 Provided that the requirements of this Appendix are met, approval to conduct courses for the JAR-FCL PPL(H) and associated ratings may be granted if the approving Authority considers adequate supervision in accordance with JAA procedures to be possible.

8 Training helicopters, airfields and navigation training routes used for PPL(H) training shall be acceptable to the approving Authority.

9 On completion of the required training the PPL(H) skill test may be taken by a locally-based FE(H) authorised by the approving Authority provided that the examiner has taken no part in the student's flight instruction.

10 The Training and Operations Manuals required by Appendix 1a to JAR-FCL 2.055 may, for FTOs conducting training for the PPL(H) and associated ratings only, be combined and contain only those references relevant to training for the PPL(H).

#### THEORETICAL KNOWLEDGE

11 Training for theoretical knowledge may be given at a FTO conducting approved training outside the JAA Member States. The theoretical knowledge examinations for licence or rating issue shall be conducted by the approving Authority (see JAR-FCL 2.485).

[Amdt. 2, 01.11.02]

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**Appendix 2 to JAR-FCL 2.055****Type Rating Training Organisations for the issue of type ratings only to pilot licence holders**

(See also JAR-FCL 2.261(c) and (d) for approval of courses)

(See JAR-FCL 2.055)

(See also JAR-FCL 2.261(c)&(d) for approval of courses)

(See IEM No. 1 to JAR-FCL 2.055)

(See IEM No. 2 to JAR-FCL 2.055)

(See IEM No. 3 to JAR-FCL 2.055)

(See AMC FCL 2.261(c)(2))

**INTRODUCTION**

1 A Type Rating Training Organisation (TRTO) is an organisation staffed, equipped and operated in a suitable environment offering type rating training, and/or MCC-training, and/or synthetic flight instruction and, if applicable, theoretical instruction for specific training programmes.

2 A TRTO wishing to offer approved training to meet JAR-FCL requirements shall obtain the approval of the Authority of a JAA Member State. No such approval will be granted by the Authority of the member State unless:

- (a) the Authority can enforce the JAR-FCL requirements; and
- (b) the TRTO meets all requirements of JAR-FCL.

This Appendix gives the requirements for the issue, revalidation and variation of the approval of a TRTO.

**OBTAINING APPROVAL**

3 A TRTO seeking approval shall provide to the Authority operations and training manuals, including quality systems, and descriptions of its training schemes as required by paragraph 17 and 26 through 27. After consideration of the application, the TRTO will be inspected to ensure that it meets the requirements set out in this Appendix. Subject to satisfactory inspection, approval of the TRTO will initially be granted for a period of one year, revalidation of the approval may be granted for further periods of up to three years. No Authority is obliged to grant an approval for a TRTO outside the JAA Member States if the personnel resources are not available or the cost of processing the application for approval and inspections puts undue burden on the Authority.

4 All training courses shall be approved ( IEM to be developed).

5 Approval will be varied, suspended or revoked by the Authority if any of the approval requirements or standards cease to be maintained to the minimum approved level.

6 If a TRTO wishes to make changes to an approved course or to its operations or training manual the approval of the Authority shall be obtained before the changes are implemented. TRTOs need not advise the Authority of minor changes in day-to-day operations. Where any doubt exists as to whether a proposed change is minor, the Authority shall be consulted.

7 A TRTO may make training arrangements with other training organisations or make use of alternative base aerodromes as part of its overall training organisation, subject to the approval of the Authority.

**FINANCIAL RESOURCES**

8 (a) A TRTO shall satisfy the Authority that sufficient funding is available to conduct flying training to the approved standards. (See IEM No. 2 to JAR-FCL 2.055)

(b) A TRTO shall nominate a person acceptable to the Authority who shall satisfy the Authority that sufficient funding is available to conduct training to approved standard. Such person shall be known as the Accountable Manager.

**INSPECTION**

9 In addition to the initial inspection, the Authority will make certain inspections to determine the TRTO's compliance with JARs and the approval.

Appendix 2 to JAR-FCL 2.055 (continued)

10 During such visits, access shall be given by the TRTO to training records, authorisation sheets, technical logs, lectures, study notes and briefings and any other relevant material. A copy of any report on a visit to a TRTO will be made available to that TRTO.

#### MANAGEMENT AND STAFFING

11 The management structure shall ensure supervision of all grades of staff by persons having the experience and qualities necessary to ensure the maintenance of high standards. Details of the management structure, indicating individual responsibilities, shall be included in the TRTO's Operations Manual.

12 A Head of Training (HT) acceptable to the Authority shall be nominated. The HT's responsibilities shall include ensuring that the TRTO is in compliance with JAR-FCL requirements. This person is ultimately directly responsible to the Authority.

13 The TRTO shall have adequate personnel necessary to accomplish the training objectives. The duties of each instructor shall be identified and documented.

#### TYPE RATING INSTRUCTOR

14 Type Rating Instructors (TRI) shall hold:

- (a) a professional pilot licence and rating(s) related to the flying training courses they are appointed to conduct;
- (b) a type rating instructor rating for the helicopters used on the course(s); or
- (c) an authorisation from the Authority to conduct specific training in a TRTO (see JAR-FCL 2.300).

#### INSTRUCTORS FOR SYNTHETIC FLIGHT TRAINING

15 For flight training, instructors shall hold or have held, 3 years prior to the first appointment, a professional pilot licence, except for SFIs having an authorisation according to item 3 of Appendix 1 to JAR-FCL 2.005, and have instructional experience appropriate to the training courses they are appointed to conduct. For multi-pilot type rating and/or MCC flight training on a flight simulator and/or FTD, and/or FNPT II, instructors shall hold a TRI(MPH) rating or a SFI(H) authorisation.

#### THEORETICAL KNOWLEDGE INSTRUCTION

16 The theoretical knowledge instruction shall be conducted by an authorised instructor holding the appropriate type rating or any instructor having appropriate experience in aviation and knowledge of the aircraft concerned, e.g. flight engineer, maintenance engineer, flight operations officer.

#### TRAINING STANDARDS

17 The TRTO shall establish a system to ensure that the training centre operations and training are run efficiently and effectively. The quality system shall determine the effectiveness of TRTO policies, procedures, and training.

#### RECORDS

18 A TRTO shall maintain the following records and retain for a period of at least 5 years, using appropriate administrative staff:

- (a) pilot trainee's assessments before and during the course;
- (b) details of theoretical knowledge, flying, and simulated flight training given to individual trainees; and
- (c) personal information, (expiry dates of medical certificates, ratings, etc.) related to TRTO's personnel.

19 The format of the trainee's training records shall be specified in the Training Manual.



Appendix 2 to JAR-FCL 2.055 (continued)

20 The TRTO shall submit training records and reports as required by the Authority.

#### TRAINING PROGRAMME

21 A training programme shall be developed for each type of course offered. This programme shall include a breakdown of flying and ground training in either a week-by-week or phase presentation, a list of standard exercises and a syllabus summary. In particular, synthetic flight training and theoretical knowledge instruction shall be phased in such a manner as to ensure that trainees shall be able to apply to flying exercises the knowledge gained on the ground. Arrangements should be made so that problems encountered in instruction can be resolved during subsequent flight training.

#### TRAINING HELICOPTERS

22 Each helicopter must be equipped as requested in the training specifications concerning the approved course in which it is used, and shall be IFR certificated (if applicable).

#### FACILITIES

23 Suitable training facilities shall be provided.

#### REQUIREMENTS FOR ENTRY TO TRAINING

24 The TRTOs shall be responsible for ensuring that trainees meet at least the pre-requisite conditions for type rating training as set out in JAR-FCL 2.250 [or JAR-FCL 2.255, as applicable].

#### TRAINING MANUAL AND OPERATIONS MANUAL

25 A TRTO shall provide and maintain a Training Manual and an Operations Manual containing information and instructions to enable staff to perform their duties and to give guidance to trainees on how to comply with course requirements. A TRTO shall make available to staff and, where appropriate, to trainees the information contained in the Training Manual, the Operations Manual and the TRTO's approval documentation. The amendment procedure shall be stated and amendments properly controlled.

26 The Training Manual shall state the standards, objectives and training goal for each phase of training that the trainees are required to comply with, including stating the entry requirements for each course, as applicable. It shall include the following:

Part 1 - The Training Plan

Part 2 - Briefing and Air Exercises

Part 3 - Synthetic Flight Training

Part 4 - Theoretical Knowledge Instruction

For further guidance see IEM No. 3 to JAR-FCL 2.055.

27 The Operations Manual shall provide relevant information to particular groups of staff, e.g. TRIs, synthetic flight instructors, ground instructors, operations and maintenance staff, etc. and shall contain the following:

- (a) General
- (b) Technical
- (c) Route
- (d) Staff Training

For further guidance see IEM No. 3 to JAR-FCL 2.055.

[Amdt. 1, 01.12.00; Amdt. 2, 01.11.02; Amdt. 3, 01.09.03]

**[Appendix 3 to JAR-FCL 2.055****Approval of Modular Theoretical Knowledge Distance Learning Courses**

(See Appendix 1 to JAR-FCL 2.130 & 2.135)

(See Appendix 1 to JAR-FCL 2.160 & 2.165(a)(3))

(See Appendix 1 to JAR-FCL 2.205)

(See Appendix 1 to JAR-FCL 2.255)

(See Appendix 1 to JAR-FCL 2.285)

(See ACJ FCL 2.160 & 2.165(a)(3), 2.205 & 2.285)

**TRAINING ORGANISATION**

1. Classroom accommodation shall be available either at the principal place of registration of the training organisation or, subject to the approval of the Authority, within a suitable facility elsewhere. In either case, both classrooms and all associated teaching facilities shall conform to the requirements for organisation approval. Before training commences, approval will be obtained from the Authority to conduct a modular course programme using distance learning.

2. The Head of Training or CGI of an FTO undertaking distance learning shall comply with the requirements of Appendix 1a to JAR-FCL 2.055. All theoretical knowledge instructors shall meet the requirements of JAR-FCL and have appropriate qualification or relevant experience which is satisfactory to the Authority.

3. FTOs delivering only theoretical knowledge training will be subject to the same approval and audit requirements as are applied to FTOs in accordance with Appendix 1a to JAR-FCL 2.055.

4. It is open to the approved FTO to provide some or all of these courses either on a full time attendance basis, or by distance learning. An element of classroom instruction shall be included in all subjects of modular distance learning courses. The amount of time spent in actual classroom instruction shall be not less than 10% of the total duration of the course.

**INSTRUCTORS**

5. All instructors shall be fully conversant in the requirements of the distance learning programme, including the quality assurance system. Their initial training shall take place at the principal place of registration; all subsequent training shall be to the same standard as for resident instructors. Wherever instructors are located, the Quality System shall provide a satisfactory means of monitoring individual performance and adhere to approved training programmes.

**TRAINING COURSES**

6. Distance Learning will only be approved as a component of a course of theoretical knowledge instruction for the following courses:

(a) modular courses of theoretical knowledge instruction for the PPL(H), CPL(H), IR(H) and ATPL(H).

(b) courses of approved pre-entry theoretical knowledge instruction for a first type rating for a multi engine helicopter.]

[Amdt. 3, 01.09.03]

**Appendix 1 to JAR-FCL 2.075**  
**Specifications for flight crew licences**

GENERAL

- 1 A valid licence including and a valid medical certificate has always to be carried by the pilot when exercising the privileges of the licence.
- 2 A document containing a photo shall be carried for purposes of identification of the holder of the licence.
- 3 Any medical endorsements (e.g. use of spectacles, etc.) will be entered on the medical certificate (see JAR-FCL 3 IEM FCL 3.100) .
- 4 In this subpart, the 'Authority' is the Authority of the State of licence issue.

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**STANDARD JAA LICENCE FORMAT**

Cover page

Authority name and logo (English and national language)
JOINT AVIATION AUTHORITIES (English only)
FLIGHT CREW LICENCE (English and national language)
Issued in accordance with ICAO and JAR-FCL Standards (English and national language)

*Requirements*

*Size of each page shall be not less than one eighth A4*

Page 2

<b>I</b>	<b>State of issue</b>
<b>III</b>	<b>Licence number</b>
<b>IV</b>	<b>Last and first name of holder</b>
<b>XIV</b>	<b>Date</b> (see instructions) <b>and</b> <b>Place of birth</b>
<b>V</b>	<b>Address</b> Street, town, area, zip code
<b>VI</b>	<b>Nationality</b>
<b>VII</b>	<b>Signature of holder</b>
<b>VIII</b>	<b>Issuing Authority</b> e.g. This CPL(H) has been issued on the basis of an ATPL issued by.....(non JAA-State)
<b>X</b>	<b>Signature of issuing officer and date</b>
<b>XI</b>	<b>Seal or stamp of issuing Authority</b>

*Requirements*

*Licence number will always commence with the U.N. country code of the State of licence issue.*

*Standard date format is to be used, i.e. day / month / year in full (e.g., 21/01/1995)*

*See JAR-FCL 2.070*

II	<b>Titles of licences, date of initial issue and country code</b>	<i>Abbreviations used will be as used in JAR-FCL (e.g. PPL(H), ATPL(H), etc.) Standard date format is to be used, i.e. day / month / year in full (e.g., 21/01/1995)</i>
IX	<b>Validity:</b> This licence is to be re-issued not later than ..... The privileges of the licence shall be exercised only if the holder has a valid medical certificate for the required privilege. By the application of JAR-FCL 2.015(a)(1), the licence holder is entitled to exercise licence privileges on aircraft registered in any Member State of the Joint Aviation Authorities. A document containing a photo shall be carried for the purposes of identification of the licence holder.	<i>Re-issue is to be not later than 5 years from the date of initial issue shown in item II.</i>  <i>This document is not specified, but a passport would suffice when outside the State of licence issue.</i>
XII	<b>Radiotelephony privileges:</b> The holder of this licence has demonstrated competence to operate R/T equipment on board aircraft in English (other languages specified).	
XIII	<b>Remarks:</b> e.g. valid only on helicopters registered in the State of licence issue.	<i>All additional licensing information required by ICAO, EC Directive / Regulations or JARs to be entered here</i>

<b>XII Ratings to be revalidated</b>		<i>Requirements</i>
<b>Type/IR</b>	<b>Remarks / Restrictions</b>	<i>These pages are intended for use by the Authority to state requirements following the initial issue of ratings, or the renewal of expired ratings Initial issues and renewal of ratings will always be entered by the Authority. Operational limitations will be entered in the Remarks / Restrictions against the appropriate restricted privilege, e.g. IR skill test taken with co-pilot, restricted instruction privileges to one aircraft type, etc. Medical, limitations conditions and variations (e.g. valid only as co-pilot) will be entered as stated in the medical certificate (see IEM FCL 3.100).</i>
<b>Instructors</b>		

Appendix 1 to JAR-FCL 2.075 (continued)

Pages 5, 6 and 7:

*For revalidation of proficiency checks for type, and instrument ratings, the standard JAA licence format allows for these pages to have entries made in the licence by the examiner undertaking the proficiency checks. Alternatively, at the discretion of the Authority, revalidating entries may only be made by that Authority.*

*If a proficiency check performed on a multi-engine helicopter includes the IR part of the check, this will revalidate the IR(H) (with restrictions, if any). If the IR part of a proficiency check is not performed, and IR proficiency checks on other helicopters do not carry across corresponding IFR privileges, the examiner will indicate 'VFR' against the revalidation of that rating.*

*Instructor ratings may also at the discretion of the Authority be revalidated in the licence by the examiner who forms a part of the revalidation process. If an examiner is not involved in the revalidation process, the rating entry will be made by the Authority.*

*Ratings that are not validated will be removed from the licence at the discretion of the Authority and not later than 5 years from the last revalidation.*

XII

Rating	Date of test	Valid until	Examiners authorisation no.	Examiners signature

(Each page will contain 10 spaces for initial issue and revalidation of ratings)

Page 8:

Abbreviations used in this licence	

[e.g. ATPL (Airline Transport Pilot Licence), CPL (Commercial Pilot Licence), IR (Instrument rating), R/T (Radio Telephony), MEP (Multi-engine piston), FI (Flight Instructor), TRE (Type Rating Examiner), etc....]

[Amdt. 1, 01.12.00, Amdt. 2, 01.11.02]

**SUBPART B – STUDENT PILOT (Helicopter)**

**JAR-FCL 2.085 Requirements**

(a) A student pilot shall meet requirements specified by the Authority in the State in which the student intends to train. In prescribing such requirements the Authority shall ensure that the privileges granted would not permit student pilots to constitute a hazard to air navigation.

(b) A student pilot shall not fly solo unless authorised by a flight instructor.

**JAR-FCL 2.090 Minimum age**

A student pilot shall be at least 16 years of age before the first solo flight.

**JAR-FCL 2.095 Medical fitness**

A student pilot shall not fly solo unless that student pilot holds a valid Class 1 or Class 2 medical certificate.

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## SUBPART C – PRIVATE PILOT LICENCE (Helicopter) – PPL(H)

**JAR-FCL 2.100 Minimum age**

An applicant for a PPL(H) shall be at least 17 years of age.

**JAR-FCL 2.105 Medical fitness**

An applicant for a PPL(H) shall hold a valid Class 1 or Class 2 medical certificate. In order to exercise the privileges of a PPL(H) a valid Class 1 or Class 2 medical certificate shall be held.

**JAR-FCL 2.110 Privileges and conditions**

(a) *Privileges.* Subject to any other conditions specified in JARs, the privileges of the holder of a PPL(H) are to act, but not for remuneration, as pilot-in-command or co-pilot of any helicopter engaged in non-revenue flights.

(b) *Conditions*

(1) An applicant for a PPL(H) who has complied with the conditions specified in JAR-FCL 2.100, 2.105, 2.120, 2.125(a) and (b), 2.130, 2.135 and 2.261(a) shall have fulfilled the requirements for the issue of a PPL(H) including at least the type rating for the helicopter used in the skill test.

(2) If the privileges of the licence are to be exercised at night, the holder shall have complied with JAR-FCL 2.125(c).

[Amdt. 1, 01.12.00]

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[Amdt. 1, 01.12.00]

**JAR-FCL 2.120 Experience and crediting**

An applicant for a PPL(H) shall have completed at least 45 hours flight time as a pilot of helicopters; a total of 5 hours of this 45 hours may have been completed in a FNPT or a flight simulator. Holders of pilot licences or equivalent privileges for aeroplanes, microlights having fixed wings and moveable aerodynamic control surfaces acting in all three dimensions, microlight helicopters, gyroplanes, gliders, self-sustaining gliders or self-launching gliders may be credited with 10% of their total flight time as pilot-in-command in such aircraft up to a maximum of 6 hours towards a PPL(H).

**JAR-FCL 2.125 Training course**

(See Appendix 1, 2 and 3 to JAR-FCL 2.125)  
(See AMC FCL 2.125)

(a) *General.* An applicant for a PPL(H) shall complete at a FTO or an accepted registered facility the required instruction in accordance with the syllabus as set out in Appendix 1 to JAR-FCL 2.125. A registered facility is limited to giving training on single-engine helicopters with a maximum certificated seating capacity of not more than 4 persons. In exceptional circumstances existing SE training helicopters may continue to be used when approved in registered facilities for PPL training by the Authority under the terms of an exemption. The requirements for registration are set out in Appendix 2 and 3 to JAR-FCL 2.125.

(b) *Flight instruction.* An applicant for a PPL(H) shall have completed on one type of helicopter, having a certificate of airworthiness issued or accepted by a JAA Member State, at least 25 hours dual instruction, to include at least 5 hours instrument dual instruction time, and at least 10 hours of supervised solo flight time, including at least five hours of solo cross-country flight time with at least one cross-country flight of at least 185km (100NM), during which full stop landings at two aerodromes different from the aerodrome of departure shall be made.

(c) *Night qualification*

(1) If the privileges of the licence are to be exercised at night, the holder of a PPL(H) shall have a night qualification in accordance with Appendix 4 to JAR-FCL 2.125.

(2) An applicant who holds, or has held, an IR(A) shall complete in accordance with Appendix 4 to JAR-FCL 2.125 exercises 4 to 6, and shall complete a minimum of 5 hours helicopter dual instrument instruction time for exercises 1 to 3 at the discretion of a FI.

(3) This qualification will be endorsed on the licence.

[Amdt. 1, 01.12.00]

**JAR-FCL 2.130 Theoretical knowledge examination**

(See Appendix 1 to JAR-FCL 2.130 and 2.135)

The applicant for a PPL(H) shall have demonstrated to the Authority a level of theoretical knowledge appropriate to the privileges granted to the holder of a PPL(H). The requirements and

JAR-FCL 2.130 (continued)

procedures for the theoretical knowledge examinations are set out in Appendix 1 to JAR-FCL 2.130 & 2.135 and JAR-FCL 2.261(a).

**JAR-FCL 2.135 Skill**

(See Appendix 1 to JAR-FCL 2.130 and 2.135)

An applicant for a PPL(H) shall have demonstrated the ability to perform as pilot-in-command of a helicopter the relevant procedures and manoeuvres described in Appendix 1 to JAR-FCL 2.130 and 2.135 and Appendix 2 to JAR-FCL 2.135 with a degree of competency appropriate to the privileges granted to the holder of a PPL(H). The skill test shall be taken within six months of completing the flight instruction (see JAR-FCL 2.125(a)).

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**Appendix 1 to JAR-FCL 2.125****PPL(H) training course – Summary**

(See JAR-FCL 2.125)

(See AMC FCL 2.125)

1 The aim of the PPL(H) course is to train the student pilot to fly safely and efficiently under Visual Flight Rules.

**THEORETICAL KNOWLEDGE INSTRUCTION**

2 The theoretical knowledge syllabus of the PPL(H) course shall cover the following :

Air Law, Aircraft General Knowledge, Flight Performance and Planning, Human Performance and Limitations, Meteorology, Navigation, Operational Procedures, Principles of Flight and Communication.

Further details of all theoretical knowledge instruction are set out in AMC FCL 2.125.

**FLIGHT INSTRUCTION**

3 The PPL(H) flight instruction syllabus shall cover the following:

(a) pre-flight operations, including mass and balance determination, helicopter inspection and servicing;

(b) aerodrome and traffic pattern operations, collision avoidance precautions and procedures;

(c) control of the helicopter by external visual reference;

(d) take-offs, landings, hovering, look out turns and normal transitions from and to the hover;

(e) emergency procedures, basic autorotations, simulated engine failure, ground resonance recovery if relevant to type;

(f) sideways and backwards flight, turns on the spot;

(g) incipient vortex ring recognition and recovery;

(h) touchdown autorotations, simulated engine-off landings, practice forced landings. Simulated equipment malfunctions and emergency procedures relating to malfunctions of engines, controls, electrical and hydraulic circuits;

(i) steep turns;

(j) transitions, quick stops, out of wind manoeuvres, sloping ground landings and take-offs;

(k) limited power and confined area operations including selection of and operations to and from unprepared sites;

(l) flight by sole reference to basic flight instruments including completion of a level 180° turn and recovery from unusual attitudes to simulate inadvertent entry into cloud (this training may be conducted by an FI(H));

(m) cross-country flying by using visual reference, dead reckoning and, where available, radio navigation aids;

(n) operations to, from and transiting controlled aerodromes; compliance with air traffic services procedures, communication procedures and phraseology;

**TRAINING AND TESTING HELICOPTER(S)**

4 An adequate number of training and testing helicopters appropriate to the courses of training and testing shall be provided. Each helicopter shall be fitted with duplicated primary flight controls for use by the instructor and the student. Swing-over flight controls shall not be acceptable. The helicopter(s) shall include, as appropriate to the courses of training, helicopter(s) suitable for auto-rotation demonstration and helicopter(s) suitably equipped to simulate instrument meteorological conditions, and suitably equipped for the instrument flight training and testing required. For flight training and testing for IR(H), an adequate number of IFR certificated helicopters shall be available.

Appendix 1 to JAR-FCL 2.125 (continued)

Helicopters used for training shall be approved by the Authority for training purposes.

#### AERODROMES AND SITES

5 The base aerodrome, and any alternative base aerodrome, at which training is being conducted shall meet the following requirements.

(a) Have at least one runway or take-off/landing area that allows training helicopter to make a normal take-off or landing at the maximum take-off or maximum landing mass authorised, and touch down autorotation as appropriate:

(i) under calm wind (not more than four knots) conditions and temperatures equal to the mean high temperature for the hottest month of the year in the operating area;

(ii) clearing all obstacles in the take-off flight path by at least 50 feet;

(iii) with the powerplant operation and the landing gear (if applicable) recommended by the manufacturer; and

(iv) with a smooth transition from lift-off to the best rate of climb speed without exceptional piloting skills or techniques.

(b) Have a wind direction indicator that is visible at ground level from the ends of each runway, take-off/landing area.

(c) Have adequate runways/take-off/landing area lights if used for night training.

(d) Have available a means of air/ground communications acceptable to the Authority.

6 Sites shall be available for:

- confined area operation training
- simulated engine off autorotation
- sloping ground training

For all details see AMC FCL 2.125.

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**Appendix 2 to JAR-FCL 2.125****Registration of facilities for PPL instruction only**

(See JAR-FCL 2.125(a))

- 1 Application for acceptance of registration shall be made by the owner or responsible person in charge of the facility to the Authority of the JAA Member State in which the facility is located which will provide the applicant with a registration form.
- 2 The application form for registration shall contain the information as shown in Appendix 3 to JAR-FCL 2.125.
- 3 Upon receipt of the completed application form the Authority of the JAA Member State in which the facility is located will register the facility to conduct PPL training within that State, at the discretion of the Authority, without formal approval procedure, unless it has reason to doubt that the instruction can be carried out safely. The Authority will inform the applicant to this effect.
- 4 Any changes to the information entered on this form shall be communicated to the Authority.
- 5 The facility will remain registered until the Authority is informed by its operator that PPL training is to cease, or the Authority establishes that instruction is not being carried out safely and/or in compliance with JAR-FCL. In both these situations the registration of the facility will be revoked.

[Amdt. 1, 01.12.00]

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**Appendix 3 to JAR-FCL 2.125****Contents of an application form for registration of a facility for PPL instruction**

(See JAR-FCL 2.125)

a	Name and address under which the facility operates, i.e. Club, School, Group;
b	Name of Owner(s);
c	Date of intended commencement of operations;
d	Name, address and telephone number of FI's and qualifications;
e	(i) Name and address of aerodrome, if applicable, from which training operations are to be conducted; (ii) Name of aerodrome operator;
f	List of helicopters to be used, including any means of synthetic flight instruction (if applicable) to be used by the facility, stating:  Type of helicopters, Registration(s), Registered Owner(s), C of A Categories;
g	Type of training to be conducted by the facility: <input type="checkbox"/> Theoretical knowledge instruction for PPL(H) (see JAR-FCL 2.130) <input type="checkbox"/> Flight instruction for] PPL(H) [with associated single-engine type rating (see JAR-FCL 2.125(a))] <input type="checkbox"/> <input type="checkbox"/> Night qualification <input type="checkbox"/> Others (specify) (see JAR-FCL [2.017])
h	Details of aircraft insurance held;
i	State whether your facility intends to operate full or part time;
j	Any additional information the Authority may require;
k	A declaration below by the applicant that the information provided in (a) to (j) above is correct and that training will be conducted in accordance with JAR-FCL 2.
Date:	
Signature:	

[Amdt. 2, 01.11.02]

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**Appendix 4 to JAR-FCL 2.125**  
**PPL(H) Night Qualification Course**  
(See JAR-FCL 2.125(c))

1. The aim of the course is to qualify PPL(H) holders to exercise the privileges of the licence at night.
2. A holder of PPL(H) applying for a night qualification shall have completed at least 100 hours of flight time as pilot of helicopters after the issue of the licence, including at least 60 hours as PIC of helicopters and 20 hours cross-country flight.
3. The course shall be completed within 6 months.
4. For licence endorsement a certificate of satisfactory completion of the course shall be issued by the FI or Head of Training.

**THEORETICAL KNOWLEDGE**

5. The theoretical knowledge syllabus shall comprise at least 5 hours of instruction, covering the revision and/or explanation of :
  - night VMC minima
  - rules regarding airspace control at night and facilities available
  - rules regarding aerodrome ground/runway/landing site/obstruction lighting
  - aircraft navigation lights and collision avoidance rules
  - physiological aspects of night vision and orientation
  - dangers of disorientation at night
  - dangers of weather deterioration at night
  - instrument systems/functions and errors
  - instrument lighting and emergency cockpit lighting systems
  - map marking for use under cockpit lighting
  - practical navigation principles
  - radio navigation principles
  - planning and use of safety altitude
  - danger from icing conditions, avoidance and escape manoeuvres

**FLYING TRAINING**

6. In all cases, exercises 4 to 6 of the night qualification flight syllabus shall be completed.
7. For exercises 1 to 3, up to 50 % of the required flight training may be completed in a STD(H) (- to be developed -). However, all items within each exercise must be practised in a helicopter in flight.
8. Items marked (\*) shall be completed in simulated IMC and may be completed in daylight.
9. Exercises 1 to 3 of flying training syllabus shall comprise at least 10 hours instruction.
10. Exercises 4 to 6 of flying training syllabus shall comprise at least 5 hours, including at least 3 hours dual instruction and 5 solo night circuits. Each circuit shall include a take-off and a landing.
11. The flying exercises shall comprise :
  - Exercise 1  
(repeat as necessary until the student achieves a safe and competent standard)
    - revise basic manoeuvres when flying by sole reference to instruments\*
    - explain and demonstrate transition to instrument flight from visual flight\*
    - explain and revise recovery from unusual attitudes by sole reference to instruments\*
  - Exercise 2  
(repeat as necessary until the student achieves a safe and competent standard)
    - explain and demonstrate use of radio navigation aids when flying by sole reference to instruments, to include position finding and tracking\*

Appendix 4 to JAR-FCL 2.125 (continued)

- Exercise 3  
(repeat as necessary until the student achieves a safe and competent standard)
  - explain and demonstrate the use of Radar Assistance \*
- Exercise 4  
(repeat as necessary until the student achieves a safe and competent standard)
  - explain and demonstrate use and adjustment of landing light
  - explain and demonstrate night hovering:
    - higher and slower than by day
    - avoidance of unintended sideways or backwards movements
  - explain and demonstrate night take-off techniques
  - explain and demonstrate night circuit technique
  - explain and demonstrate night approaches (constant angle) with or without visual approach aids to:
    - heliports
    - illuminated touchdown areas
  - practise take-off's, circuits and approaches
  - explain and demonstrate night Emergency procedures to include:
    - simulated engine failure,  
(to be terminated with power recovery at a safe altitude)
    - simulated engine failure including single engine approach and landing, (multi-engine only)
    - simulated inadvertent entry to IMC (not on base leg or final)
    - simulated hydraulic control failure (to include landing)
    - internal and external lighting failure
    - other Malfunctions and Emergency procedures as required by the Aircraft Flight Manual
- Exercise 5
  - solo night circuits
- Exercise 6
  - explain and demonstrate night cross country techniques
  - practise night cross country dual and as SPIC to a satisfactory standard

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**Appendix 1 to JAR–FCL 2.130 & 2.135****Theoretical knowledge examination and skill test for the PPL(H)**

(See JAR–FCL 2.130 and 2.135)

## THEORETICAL KNOWLEDGE EXAMINATION

1 This examination shall be in written form and may be taken on one or more days at the discretion of the Authority and shall comprise nine Subjects as indicated below. An examination paper may cover several Subjects. There shall be a total of at least 120 questions. The times shall not exceed the following :

Subject	Time (not more than)
Air Law and ATC Procedures	0h45
Aircraft General Knowledge	0h30
Flight Performance and Planning	1h00
Human Performance and Limitations	0h30
Meteorology	0h30
Navigation	1h00
Operational Procedures	0h30
Principles of Flight	0h45
Communications	0h30
Total	6h00

At the discretion of the Authority, Communication practical classroom testing may be conducted separately.

2 The majority of the questions shall be multiple choice.

3 The examinations will be provided in the language(s) considered appropriate by the Authority. The Authority shall inform applicants of the language(s) in which the examinations will be conducted.

4 A pass in a Subject will be awarded to an applicant achieving at least 75% of the marks allocated to that Subject. Marks shall only be awarded for correct answers.

5 Subject to any other conditions in JAR–FCL 2, an applicant shall be deemed to have successfully completed the theoretical examinations for the PPL(H) when awarded a pass in all parts within a period of 12 months. A pass in the theoretical knowledge examination will be accepted for the grant of the private pilot licence during the 24 months from the date of first gaining a pass in any part of the examination.

## SKILL TEST

6 An applicant for a skill test for the PPL(H) shall have received instruction on the same type of helicopter to be used for the skill test. The applicant shall be permitted to choose to take the test on a single-engine helicopter or, subject to the experience requirement in JAR–FCL 2.255 of 70 hours flight time as pilot-in-command, on a multi-engine helicopter. The helicopter used for the skill test shall meet the requirements for training helicopters (see Appendix 1 to JAR–FCL 2.125).

7 The administrative arrangements for confirming the applicant's suitability to take the test, including disclosure of the applicant's training record to the examiner, will be determined by the Authority.

8 An applicant shall pass sections 1 through 5 of the skill test. If any item in a section is failed, that section is failed. Failure in more than one section will require the applicant to take the entire test again. An applicant failing only one section shall take the failed section again. Failure in any items of the re-test and failure in any other items already passed, will require the applicant to take the entire test again. All sections of the skill test shall be completed within six months.

9 Further training may be required following any one failed skill test. Failure to achieve a pass in all sections of the test in two attempts will require further training as determined by the Authority. There is no limit to the number of skill tests that may be attempted.

## CONDUCT OF THE TEST

- 10 The Authority will provide the FE with adequate safety advice to ensure that the test is conducted safely.
- 11 Should the applicant choose to terminate a skill test for reasons considered inadequate by the FE, the applicant shall retake the entire skill test. If the test is terminated for reasons considered adequate by the FE, only those sections not completed shall be tested in a further flight.
- 12 Any manoeuvre or procedure of the test may be repeated once by the applicant. The FE may stop the test at any stage if it is considered that the applicant's demonstration of flying skill requires a complete re-test.
- 13 An applicant shall be required to fly the helicopter from a position where the pilot-in-command functions can be performed and to carry out the test as if there is no other crew member. Responsibility for the flight shall be allocated in accordance with national regulations.
- 14 The area and route to be flown shall be chosen by the FE and all low level and hover work shall be at an accepted aerodrome/site. Routes used for section 3 may end at the aerodrome of departure or at another aerodrome. The applicant shall be responsible for the flight planning and shall ensure that all equipment and documentation for the execution of the flight are on board. The navigation section of the test, as set out in Appendix 2 to JAR-FCL 2.135 shall consist of at least 3 legs, each leg of a minimum duration of 10 minutes. The skill test may be conducted in 2 flights.
- 15 An applicant shall indicate to the FE the checks and duties carried out, including the identification of radio facilities. Checks shall be completed in accordance with the authorised check list or pilot operating handbook for the helicopter on which the test is being taken. During pre-flight preparation for the test the applicant is required to determine power settings and speeds. Performance data for take-off, approach and landing shall be calculated by the applicant in compliance with the operations manual or flight manual for the helicopter used.
- 16 The FE will take no part in the operation of the helicopter except where intervention is necessary in the interests of safety or to avoid unacceptable delay to other traffic.

## FLIGHT TEST TOLERANCE

- 17 The applicant shall demonstrate the ability to:
- operate the helicopter within its limitations;
  - complete all manoeuvres with smoothness and accuracy;
  - exercise good judgement and airmanship;
  - apply aeronautical knowledge; and
  - maintain control of the helicopter at all times in such a manner that the successful outcome of a procedure or manoeuvre is never seriously in doubt.
- 18 The following limits are for general guidance. The FE will make allowance for turbulent conditions and the handling qualities and performance of the helicopter used.

## Height

normal forward flight	± 150 feet
with simulated major emergency	± 200 feet
hovering I.G.E. flight	± 2 feet

## Heading / Tracking of radio aids

normal flight	± 10°
with simulated major emergency	± 15°

## Speed

take-off approach	– 10 knots/+15 knots
all other flight regimes	± 15 knots

## Ground drift

T.O. hover I.G.E.	± 3 feet
landing	no sideways or backwards movement

Appendix 1 to JAR-FCL 2.130 & 2.135 (continued)

**CONTENT OF THE SKILL TEST**

19 The skill test contents and sections set out in Appendix 2 to JAR-FCL 2.135 shall be used for the skill test for the issue of a PPL(H) on single- or multi-engine helicopters . Where the skill test is taken on a multi-engine helicopter, the applicant shall fulfil the requirement of JAR-FCL 2.255. The format and application form for the skill test may be determined by the Authority (see IEM FCL 2.135).

[Amdt. 1, 01.12.00]

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**Appendix 2 to JAR-FCL 2.135****Contents of the skill test for the issue of a PPL(H)**

(See JAR-FCL 2.135)

(See IEM FCL 2.135)

Note: Use of checklist, airmanship, control of helicopter by external visual reference, anti-icing procedures, etc., apply in all sections.

<b>SECTION 1 PRE-FLIGHT/POST-FLIGHT CHECKS AND PROCEDURES</b>	
a	Helicopter knowledge, (e.g. technical log, fuel, mass and balance, performance), Flight Planning, NOTAMS, Weather
b	Pre-flight inspection/action, location of parts and purpose
c	Cockpit inspection, Starting procedure
d	Communication and navigation equipment checks, selecting and setting frequencies
e	Pre-take-off procedure, R/T procedure, ATC liaison-compliance
f	Parking, Shutdown and Post-flight procedure
<b>SECTION 2 HOVER MANOEUVRES, ADVANCED HANDLING AND CONFINED AREAS</b>	
a	Take-off and landing (lift off and touch down)
b	Taxi, hover taxi
c	Stationary hover with head/cross/tail wind
d	Stationary hover turns, 360° left and right (spot turns)
e	Forward, sideways and backwards hover manoeuvring
f	Simulated engine failure from the hover
g	Quick stops into and downwind
h	Sloping ground/unprepared sites landings and take-offs
i	Take-offs (various profiles)
j	Crosswind, downwind take-off (if practicable)
k	Take-off at maximum take-off mass (actual or simulated)
l	Approaches (various profiles)
m	Limited power take-off and landing
n	Autorotations, (FE to select two items from - Basic, range, low speed, and 360° turns)
o	Autorotative landing
p	Practice forced landing with power recovery
q	Power checks, reconnaissance technique, approach and departure technique

Appendix 2 to JAR-FCL 2.135 (continued)

<b>SECTION 3 NAVIGATION - EN ROUTE PROCEDURES</b>	
a	Navigation and orientation at various altitudes/heights, map reading
b	Altitude/height, speed, heading control, observation of airspace, altimeter setting
c	Monitoring of flight progress, flight-log, fuel usage, endurance, ETA, assessment of track error and re-establishment of correct track, instrument monitoring
d	Observation of weather conditions, diversion planning
e	Use of navigation aids (where available)
f	ATC liaison and observance of regulations, etc.
<b>SECTION 4 FLIGHT PROCEDURES AND MANOEUVRES</b>	
a	Level flight, control of heading, altitude/height and speed
b	Climbing and descending turns to specified headings
c	Level turns with up to 30° bank, 180° to 360° left and right
d	Level turns 180° left and right by sole reference to instruments
<b>SECTION 5 ABNORMAL AND EMERGENCY PROCEDURES (SIMULATED WHERE APPROPRIATE)</b>	
Note (1) Where the test is conducted on a multi-engine helicopter a simulated engine failure drill, including a single engine approach and landing shall be included in the test.	
Note (2) The FE shall select 4 items from the following:	
a	Engine malfunctions, including governor failure, carburetor/engine icing, oil system, as appropriate
b	Fuel system malfunction
c	Electrical system malfunction
d	Hydraulic system malfunction, including approach and landing without hydraulics, as applicable
e	Main rotor and/or anti-torque system malfunction (flight simulator or discussion only)
f	Fire drills, including smoke control and removal, as applicable
g	Other abnormal and Emergency procedures as outlined in appropriate flight manual and with reference to Appendix 3 to JAR-FCL 2.240, sections 7 and 8, including for multi-engine helicopters: <ul style="list-style-type: none"> <li>- Simulated engine failure at take-off: <ul style="list-style-type: none"> <li>- rejected take-off at or before TDP or safe forced landing at or before DPATO</li> <li>- shortly after TDP or DPATO</li> </ul> </li> <li>- Landing with simulated engine failure: <ul style="list-style-type: none"> <li>- landing or go-around following engine failure before LDP or DPBL</li> <li>- following engine failure after LDP or safe forced landing after DPBL</li> </ul> </li> </ul>

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## SUBPART D – COMMERCIAL PILOT LICENCE (Helicopter) – CPL(H)

JAR-FCL 2.155(a)(1) (continued)

**JAR–FCL 2.140 Minimum age**

An applicant for a CPL(H) shall be at least 18 years of age.

**JAR–FCL 2.145 Medical fitness**

An applicant for a CPL(H) shall hold a valid Class 1 medical certificate. In order to exercise the privileges of the CPL(H) a valid Class 1 medical certificate shall be held.

**JAR–FCL 2.150 Privileges and conditions**

(a) *Privileges.* Subject to any other conditions specified in JARs, the privileges of the holder of a CPL(H) are to:

- (1) exercise all the privileges of the holder of a PPL(H);
- (2) act as pilot-in-command or co-pilot of any helicopter engaged in operations other than commercial air transportation;
- (3) act as pilot-in-command in commercial air transportation of any single-pilot helicopter.
- (4) act as co-pilot in commercial air transportation in helicopters required to be operated with a co-pilot.

(b) *Conditions.* An applicant for a CPL(H) who has complied with the conditions specified in JAR–FCL 2.140, 2.145, 2.155 through 2.170, and 2.261(a) shall have fulfilled the requirements for the issue of at least a CPL(H) containing the type rating for the helicopter used on the skill test and, if an instrument rating course and test completed in accordance with JAR-FCL 2 Subpart E are included, the instrument rating.

[Amdt. 2, 01.11.02]

**JAR–FCL 2.155 Experience and crediting**  
(See Appendix 1 to JAR–FCL 2.160 & 2.165(a)(1) through (3))  
(See AMC FCL 2.160 & 2.165(a)(1) through (3))

(a) *Integrated courses*

(1) *Experience.* An applicant for a CPL(H) who has satisfactorily followed and completed an integrated flying training course

shall have completed as a pilot of helicopters having a certificate of airworthiness issued or accepted by a JAA Member State at least 135 hours of flight time.

(2) *Crediting.* For details on crediting of flight time required in paragraph (a)(1), see Appendix 1 to JAR-FCL 2.160 & 2.165(a)(1) paragraph 4 or Appendix 1 to JAR-FCL 2.160 & 2.165(a)(2) paragraph 4.

(b) *Modular courses*

(1) *Experience.* An applicant for a CPL(H) who is not a graduate from an integrated flying training course shall have completed as a pilot on helicopters having a certificate of airworthiness issued or accepted by a JAA Member State at least 185 hours of flight time.

(2) *Crediting.* From the 185 hours of flight time:

- (i) 20 hours as pilot-in-command holding a PPL(A); or
- (ii) 50 hours as pilot-in-command holding a CPL(A) may have been completed in aeroplanes; or
- (iii) 10 hours as pilot-in-command in touring motor gliders or gliders.

(c) *Flight time.* The applicant shall have completed in helicopters at least (see also JAR-FCL 2.050 (a)(3)):

(1) 50 hours as pilot-in-command, or 35 hours as pilot-in-command if completed during a course of integrated flying training as set out in Appendix 1 to JAR–FCL 2.160 & 2.165(a)(1) and (2) and AMC FCL 2.160 & 2.165(a)(1) and (2);

(2) 10 hours of cross-country flight time as pilot-in-command, including a cross-country flight totalling at least 185 km (100 NM) in the course of which full-stop landings at two aerodromes different from the aerodromes of departure shall be made;

(3) 10 hours of instrument dual instruction time, of which not more than 5 hours is to be instrument ground time; and

(4) 5 hours of night flight time, as set out in JAR–FCL 2.165(b).

[Amdt.1, 01.12.00; Amdt. 2, 01.11.02]

**JAR-FCL 2.160 Theoretical knowledge**  
 (See Appendix 1 to JAR-FCL 2.160 & 2.165(a)(1) through (3))  
 (See AMC FCL 2.160 & 2.165(a)(1) through (3))

(a) *Course.* An applicant for a CPL(H) shall have received theoretical knowledge instruction at an approved flying training organisation (FTO) [ ]. The course should be combined with a flying training course as set out in JAR-FCL 2.165.

(b) *Examination.* An applicant for a CPL(H) shall have demonstrated a level of knowledge appropriate to the privileges granted to the holder of a CPL(H) and shall meet the requirements set out in JAR-FCL 2.261(a) and Subpart J.

(c) An applicant who has undertaken an integrated flying training course shall demonstrate at least the level of knowledge required by that course, as set out in the relevant Appendix 1 to JAR-FCL 2.160 & 2.165(a)(1) and (2).

[Amdt. 3, 01.09.03]

**JAR-FCL 2.165 Flight instruction**  
 (See Appendix 1 to JAR-FCL 2.160 & 2.165(a)(1) through (3) and AMC FCL 2.160 & 2.165(a)(1) through (3))

(a) *Course.* An applicant for a CPL(H) shall have completed an approved course of integrated or modular flying training (on helicopters having a certificate of airworthiness issued or accepted by a JAA Member State) at an approved flying training organisation. The course should be combined with a theoretical knowledge training course. For details of the approved courses see as follows:

(1) ATP(H) integrated course – Appendix 1 to JAR-FCL 2.160 & 2.165(a)(1) and AMC FCL 2.160 & 2.165(a)(1);

(2) CPL(H) integrated course – Appendix 1 to JAR-FCL 2.160 & 2.165(a)(2) and AMC FCL 2.160 & 2.165(a)(2); and

(3) CPL(H) modular course – Appendix 1 to JAR-FCL 2.160 & 2.165(a)(3) and AMC FCL 2.160 & 2.165(a)(3).

(b) *Night training.* The applicant shall have completed at least 5 hours flight time in helicopters at night comprising at least 3 hours of dual instruction, including at least 1 hour of cross-country navigation, and 5 solo take-offs and 5 full-stop landings, each to include one circuit.

**JAR-FCL 2.170 Skill**  
 (See Appendices 1 and 2 to JAR-FCL 2.170)  
 (See Appendix 1 to JAR-FCL 2.160 & 2.165(a)(1), (2) and (3))

An applicant for a CPL(H) shall have demonstrated the ability to perform as pilot-in-command of a helicopter the relevant procedures and manoeuvres described in Appendices 1 and 2 to JAR-FCL 2.170 with a degree of competency appropriate to the privileges granted to the holder of a CPL(H). An applicant shall take the skill test as required by the relevant Appendix 1 to JAR-FCL 2.160 & 2.165(a)(1), (2) and (3), and AMC FCL 2.160 & 2.165(1), (2) and (3).

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**Appendix 1 to JAR-FCL 2.160 & 2.165(a)(1)****ATP(H) integrated course**

(See JAR-FCL 2.160, 2.165 and 2.170)

(See Appendix 1 and 2 to JAR-FCL 2.170)

(See Appendix 1 and 2 to JAR-FCL 2.210)

(See AMC FCL 2.160 & 2.165(a)(1))

(See Appendix 1 to JAR-FCL 2.470)

(See IEM FCL 2.170)

1 The aim of the ATP(H) integrated course is to train pilots to the level of proficiency necessary to enable them to operate as co-pilot on multi-pilot, multi-engine helicopters in commercial air transportation and to obtain the CPL(H)/IR, but not any further specialisation (e.g. aerial work activities).

2 An applicant wishing to undertake an ATP(H) integrated course shall, under the supervision of the Head of Training of an approved flying training organisation (FTO), complete all the instructional stages in one continuous approved course of training as arranged by that FTO.

3 The course shall last for between 12 and 36 months. Special arrangements may be made with the approval of the Authority to extend the course beyond 36 months where additional flying training or ground instruction is provided by the FTO.

4 An applicant may be admitted to training either as an ab-initio entrant, or as a holder of a PPL(H) issued in accordance with ICAO Annex 1. An ab-initio entrant shall meet the student pilot requirements of JAR-FCL Subpart B. In the case of a PPL(H) entrant, 50% of the helicopter hours flown by the entrant prior to the course may be credited towards the required flight instruction (see JAR-FCL 2.165(a)(1) and Appendix 1 to JAR-FCL 2.160 & 2.165(a)(1) paragraph 13), to a maximum of :

(a) up to 40 hours, of which up to 20 hours may be dual instruction, or

(b) if a helicopter night qualification has been obtained, up to 50 hours, of which up to 25 hours may be dual instruction.

This credit for the hours flown shall be at the discretion of the FTO and entered into the applicant's training record. In case of a student pilot who does not hold a pilot licence and with the approval of the Authority, a FTO may designate certain dual exercises (see AMC FCL 2.160 & 2.165(a)(1) phase 2 and 3) to be flown in an aeroplane or a TMG up to a maximum of 20 hours.

5 An applicant failing or unable to complete the entire ATP(H) course may apply to the Authority for the theoretical knowledge examination and skill test for a lower licence and, if applicable, an instrument rating.

6 Any applicant wishing to transfer to another FTO during a course of training shall apply to the Authority for a formal assessment of the further hours of training required at another FTO.

7 The FTO shall ensure that before being admitted to the course the applicant has sufficient knowledge of Mathematics, Physics and English to facilitate an understanding of the theoretical knowledge instruction content of the course. The required level of English shall be accordance with Appendix 1 to JAR-FCL 2.200.

8 The course shall comprise:

(a) theoretical knowledge instruction to the ATPL(H) knowledge level;

(b) visual and instrument flying training; and

(c) training in multi-crew co-operation for the operation of multi-pilot helicopters.

9 The successful completion of the type rating theoretical knowledge training and checking requirements, the theoretical knowledge examination(s) at paragraph 12 and the skill tests at paragraph 14 fulfils the theoretical knowledge and skill requirements for the issue of a CPL(H) including a type rating for the helicopter(s) used in the test(s) and an instrument rating(H).

Appendix 1 to JAR-FCL 2.160 & 2.165(a)(1) (continued)

### THEORETICAL KNOWLEDGE

10 The theoretical knowledge syllabus is set out in Appendix 1 to JAR-FCL 2.470. The requirements for type ratings are set out in JAR-FCL 2.240. An approved ATP(H) theoretical knowledge course shall comprise at least 750 hours (1 hour = 60 minutes instruction) of instruction which can include classroom work, interactive video, slide/tape presentation, learning carrels, computer based training, and other media as approved by the Authority, in suitable proportions.

The 750 hours of instruction shall be divided in such a way that in each subject the minimum hours are:

<b>Subject</b>	<b>hours</b>
Air Law	40
Aircraft General Knowledge	80
Flight Performance & Planning	90
Human Performance & Limitations	50
Meteorology	60
Navigation	150
Operational Procedures	20
Principles of Flight	30
Communications	30

Other sub-division of hours may be agreed between the Authority and the FTO.

11 The MCC course shall comprise at least 25 hours of theoretical knowledge instruction exercises.

### Theoretical knowledge examination

12 An applicant shall demonstrate the level of knowledge appropriate to the privileges of the holder of an ATPL(H), in accordance with the requirements in JAR-FCL Subpart J.

### FLYING TRAINING

13 The flying training shall comprise a total of at least 195 hours, to include all progress test [ ]. Within the total of 195 hours, applicants shall complete at least:

- (a) [125] hours of dual instruction,
- (b) [70] hours as pilot-in-command [to include at least 14 hours solo day, 1 hour solo night and may include 55 hours as SPIC.]

(SPIC time shall be credited as pilot-in-command time, unless the flight instructor had to influence or control any part of the flight. A ground de-briefing by the flight instructor does not affect the crediting as pilot-in-command time);

(c) 50 hours of cross-country flight, at least 10 hours of cross country flight as student pilot-in-command including a VFR cross country flight totalling at least 185 km (100 nm) in the course of which landings at two different aerodromes from the aerodrome of departure shall be made;

(d) 5 hours flight time [ ] in helicopters shall be completed at night comprising 3 hours of dual instruction including at least 1 hour of cross-country navigation and [5 solo night circuits. Each circuit shall include a take-off and a landing]; and

(e) [50] hours of instrument time comprising:

(i) 35 hours of instrument flight time\_instruction of which up to 10 hours may be instrument ground time in a FNPT I, or 20 hours if all the instrument ground training is conducted in an FNPT II or flight simulator;

(ii) 15 hours as SPIC; and

(iii) [ ]

[(f) 15 hours multi-crew co-operation.]

[(g) of the 125 hours of dual instruction up to:

Appendix 1 to JAR-FCL 2.160 & 2.165(a)(1) (continued)

- (i) 75 hours visual instruction may include:
  - (1) 30 hours in a helicopter FS level C/D, or
  - (2) 20 hours in a helicopter FNPT II/III, or
  - (3) 20 hours in an aeroplane or TMG.
- (ii) 35 hours instrument instruction may include:
  - (1) up to 20 hours in a helicopter FNPT II/III or FS, or
  - (2) 10 hours in at least a helicopter FNPT I or aeroplane FNPT I or an aeroplane
- (iii) 15 hours multi-crew co-operation, for which a helicopter FS or helicopter FNPT II/III(MCC) may be used.

If the helicopter used for the flying training is of a different type from the helicopter FS used for the visual training, the maximum credit shall be limited to that allocated for the helicopter FNPT II/III.]

See AMC-FCL 2.160 & 2.165(a)(1) for flight instruction syllabus.

#### SKILL TESTS

14 On completion of the related flying training the applicant shall take the CPL(H) skill test on a multi-engine helicopter in accordance with Appendix 1 and 2 to JAR-FCL 2.170 and the instrument rating skill test on either a multi-engine or a single-engine helicopter in accordance with Appendix 1 and 2 to JAR-FCL 2.210 and such other tests as are required by JAR FCL 2.262(c).

[Amdt. 1, 01.12.00; Amdt. 2, 01.11.02; Amdt. 3, 01.09.03]

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**Appendix 1 to JAR-FCL 2.160 & 2.165(a)(2)****CPL(H) integrated course**

(See JAR-FCL 2.160, 2.165 and 2.170)

(See Appendix 1 and 2 to JAR-FCL 2.170)

(See AMC FCL 2.160 & 2.165(a)(2))

(See Appendix 1 to JAR-FCL 2.470)

(See IEM-FCL 2.170)

1 The aim of the CPL(H) integrated course is to train pilots to the level of proficiency necessary for the issue of a CPL(H), but not the instrument rating or any further specialisation (e.g. aerial work activities).

2 An applicant wishing to undertake a CPL(H) integrated course shall, under the supervision of the Head of Training of an approved flying training organisation (FTO), complete all the instructional stages in one continuous approved course of training as arranged by that FTO.

3 The course shall last for between 9 and 24 months.

4 An applicant may be admitted to training either as an ab-initio entrant, or as the holder of a private pilot licence (helicopter) (PPL(H)) issued in accordance with ICAO Annex 1. An ab-initio entrant shall meet the student pilot requirements of JAR-FCL Subpart B. In the case of a PPL(H) entrant, 50% of the helicopter hours flown by the entrant prior to the course may be credited towards the required flight instruction (see JAR-FCL 2.165(a)(2) and Appendix 1 to JAR-FCL 2.160 & 2.165 (a)(2) paragraph 12), to a maximum of:

(a) up to 40 hours, of which up to 20 hours may be dual instruction, or

(b) if a helicopter night qualification has been obtained, up to 50 hours, of which up to 25 hours may be dual instruction.

This credit for the hours flown shall be at the discretion of the FTO and entered into the applicant's training record. In case of a student pilot who does not hold a pilot licence and with the approval of the Authority a FTO may designate certain dual exercises (see AMC FCL 2.160 & 2.165 (a)(2) phase 2) to be flown in an aeroplane or a TMG up to a maximum of 20 hours.

5 An applicant failing or unable to complete the entire CPL(H) course may apply to the Authority for the theoretical knowledge examination and skill test for a lower licence.

6 Any applicant wishing to transfer to another FTO during a course of training shall apply to the Authority for a formal assessment of the further hours of training required at another FTO.

7 The FTO shall ensure that before being admitted to the course the applicant has sufficient knowledge of Mathematics and Physics to facilitate an understanding of the theoretical knowledge instruction content of the course.

8 The course shall comprise:

(a) theoretical knowledge instruction to CPL(H) knowledge level; and

(b) visual and instrument flying training.

9 The successful completion of the type rating training and checking requirements (see Appendix 1 of JAR-FCL 2.261 and AMC FCL 2.261), the theoretical knowledge examinations at paragraph 11 and of the skill test(s) at paragraph 13 fulfill the knowledge and skill requirements for the issue of a CPL(H) including a type rating for the helicopter(s) used in the test(s).

**THEORETICAL KNOWLEDGE**

10 The theoretical knowledge syllabus for the CPL(H) is set out in Appendix 1 to JAR-FCL 2.470. The requirements for type ratings are set out in JAR-FCL 2.240. An approved CPL(H) theoretical knowledge course shall comprise at least 550 hours (1 hour = 60 minutes instruction) of instruction (or 500 hours if the applicant is the holder of a PPL) which can include classroom work, inter-active video, slide/tape presentation, learning carrels, computer based training, and other media as approved by the Authority, in suitable proportions.

Appendix 1 to JAR-FCL 2.160 & 2.165(a)(2) (continued)

### Theoretical knowledge examination

11 An applicant shall demonstrate a level of knowledge appropriate to the privileges of the holder of a CPL(H) in accordance with the requirements in JAR-FCL Subpart J.

### FLYING TRAINING

12 The flying training shall comprise a total of at least 135 hours, to include all progress tests, of which up to 5 hours for the entire course may be instrument ground time. Within the 135 hours total, applicants shall complete at least:

- (a) 100 hours of dual instruction [ ];
- (b) 35 hours as pilot-in-command; [to include at least 14 hours solo day, 1 hour solo night and may include 20 hours as SPIC.

SPIC time shall be credited as pilot-in-command time, unless the flight instructor had to influence or control any part of the flight. A ground de-briefing by the flight instructor does not affect the crediting as pilot-in-command time;]

- (c) 10 hours dual cross-country flying;

(d) 10 hours of cross-country flight as pilot-in-command including a VFR cross-country flight totalling at least 185km (100 NM) in the course of which full stop landings at two different aerodromes from the aerodrome of departure shall be made;

(e) 5 hours flight time [ ] in helicopters shall be completed at night comprising 3 hours of dual instruction including at least 1 hour of cross-country navigation and 5 [solo night circuits. Each circuit shall include a take-off and a landing;]

- (f) 10 hours of instrument [dual] instruction [time, including at least] 5 hours [in a helicopter].

[(g) Of the 100 hours of dual instruction up to:

- (i) 90 hours visual instruction may include:

- (1) 40 hours in a helicopter FS level C/D, or
- (2) 30 hours in a helicopter FNPT II/III, or
- (3) 20 hours in an aeroplane or TMG.

- (ii) 10 hours instrument instruction, which may include 5 hours in at least an aeroplane FNPT I or helicopter FNPT I or an aeroplane.

If the helicopter used for the flying training is of a different type from the FS used for the visual training, the maximum credit shall be limited to that allocated for the FNPT II/III.]

See AMC-FCL 2.160 & 2.165(a)(2) for flight instruction syllabus.

### SKILL TEST

13 On completion of the related flying training, the applicant shall take the CPL(H) skill test in accordance with Appendix 1 and 2 to JAR-FCL 2.170.

[Amdt. 1, 01.12.00; Amdt. 2, 01.11.02; Amdt. 3, 01.09.03]

**Appendix 1 to JAR-FCL 2.160 & 2.165(a)(3)****CPL(H) modular course**

(See JAR-FCL 2.160, 2.165 and 2.170)

(See Appendix 1 and 2 to JAR-FCL 2.170)

(See AMC FCL 2.160 & 2.165(a)(3))

(See Appendix 1 to JAR-FCL 2.470)

(See IEM-FCL 2.170)

1 The aim of the CPL(H) modular course is to train PPL(H) holders to the level of proficiency necessary for the issue of a CPL(H), but not in the instrument rating or any further specialisation (e.g. aerial work activities).

2 Before commencing a CPL(H) modular course an applicant shall:

(a) be the holder of a PPL(H) issued in accordance with ICAO Annex 1;

(b) have completed 155 hours flight time as a pilot in helicopters, including 50 hours as PIC of which 10 hours shall be cross-country (105 hours as pilot in helicopters if holder of a CPL(A), 135 hours as pilot in helicopters if holder of a PPL(A); and

(c) have complied with JAR-FCL 2.225 and 2.240 if a multi-engine helicopter is to be used on the skill test.

3 An applicant wishing to undertake a modular CPL(H) course shall, under the supervision of the Head of Training of an approved flying training organisation (FTO), complete all the instructional stages in one continuous approved course of training as arranged by that FTO. The theoretical knowledge instruction may be given at [an approved FTO conducting theoretical knowledge instruction only], in which case the Head of Training of that organisation shall supervise that part of the course.

4 The course of theoretical knowledge shall be completed within 18 months. The flight instruction and skill test shall be completed within the period of validity of the pass in the theoretical examinations, as set out in JAR-FCL 2.495.

5 The FTO shall ensure that before being admitted to the course the applicant has sufficient knowledge of mathematics and physics to facilitate an understanding of the theoretical knowledge instruction content of the course.

6 The course shall comprise:

(a) theoretical knowledge instruction to CPL(H) knowledge level; and

(b) visual and instrument flying training.

7 The successful completion of the theoretical knowledge examination at paragraph 9 and of the skill test at paragraph 12 fulfill the knowledge and skill requirements for the issue of a CPL(H) including a type rating for the helicopter used in the test.

**THEORETICAL KNOWLEDGE**

8 The theoretical knowledge syllabus for the CPL(H) is set out in Appendix 1 to JAR-FCL 2.470. The requirements for type ratings are set out in JAR-FCL 2.240. An approved CPL(H) theoretical knowledge course shall comprise at least 500 hours (1 hour = 60 minutes instruction) of instruction, which can include classroom work, inter-active video, slide/tape presentation, learning carrels, computer based training, and other media as approved by the Authority, in suitable proportions. Approved distance learning (correspondence) courses may also be offered as part of the course at the discretion of the Authority.

**THEORETICAL KNOWLEDGE EXAMINATION**

9 An applicant shall demonstrate a level of knowledge appropriate to the privileges of the holder of a CPL(H) in accordance with the requirements in JAR-FCL Subpart J.

Appendix 1 to JAR-FCL 2.160 & 2.165(a)(3)

#### FLYING TRAINING

[ 10 (a) Applicants without an instrument rating shall be given at least 30 hours dual flight instruction (See AMC FCL 2.160 and 2.165(a)(3)).

(b) Applicants holding a valid IR(H) shall be fully credited towards the dual instrument instruction time.

(c) Applicants holding a valid IR(A) shall complete at least 5 hours of the dual instrument instruction time in a helicopter

(d) Of the 30 hours dual instruction time, up to:

(i) 20 hours visual instruction may include 5 hours in a helicopter FNPT II/III or FS, and

(ii) 10 hours instrument instruction, which may include 5 hours in at least an aeroplane FNPT I or helicopter FNPT I or an aeroplane.]

11 Applicants without a night flying qualification helicopter shall be given additionally at least 5 hours night flight instruction (see JAR-FCL 2.125(c) and Appendix 4 to JAR-FCL 2.125).

See AMC-FCL 2.160 & 2.165(a)(3) for flight instruction syllabus.

#### SKILL TEST

12 On completion of the related flying training and relevant experience, the applicant shall take the CPL(H) skill test in accordance with Appendix 1 and 2 to JAR-FCL 2.170.

[Amdt. 1, 01.12.00; Amdt. 2, 01.11.02; Amdt. 3, 01.09.03]

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**Appendix 1 to JAR-FCL 2.170**  
**Skill test for the issue of the CPL(H)**

(See JAR-FCL 2.170)

(See Appendix 2 to JAR-FCL 2.170)

(See IEM FCL 2.170)

1 An applicant for a skill test for the CPL(H) shall have satisfactorily completed all of the required training, including instruction on the same type of helicopter to be used in the test. An applicant graduating from an ATP(H) integrated course shall take the test on a multi-engine helicopter. An applicant graduating from a CPL(H) integrated course, or a CPL(H) modular course, may take the test on either a single engine helicopter or, subject to the experience requirement set out in JAR-FCL 2.255(a) to have 70 hours as pilot in command of helicopters, a multi-engine helicopter. The helicopter used for the skill test shall meet the requirements for training helicopters set out in Appendix 1 to JAR-FCL 2.055.

2 The administrative arrangements for confirming the applicant's suitability to take the test, including disclosure of the applicant's training record to the examiner, will be determined by the Authority.

3 An applicant shall pass sections 1 through 5 of the skill test. Failure in more than one section will require the applicant to take the entire test again. If any item in a section is failed, that section is failed. An applicant failing only one section shall take the failed section again. Failure in any items of the re-test and failure in any other items already passed, will require the applicant to take the entire test again. All sections of the skill test shall be completed within six months.

4 Further training may be required following any failed skill test. Failure to achieve a pass in all sections of the test in two attempts shall require further training as determined by the Authority. There is no limit to the number of skill tests that may be attempted.

**CONDUCT OF THE TEST**

5 The Authority will provide the FE with adequate safety advice to ensure that the test is conducted safely.

6 Should the applicant choose to terminate a skill test for reasons considered inadequate by the FE, the applicant shall retake the entire skill test. If the test is terminated for reasons considered adequate by the FE, only those sections not completed shall be tested in a further flight.

7 At the discretion of the FE, any manoeuvre or procedure of the test may be repeated once by the applicant. The FE may stop the test at any stage if it is considered that the applicant's demonstration of flying skill requires a complete re-test.

8 An applicant shall be required to fly the helicopter from a position where the pilot-in-command functions can be performed and to carry out the test as if there is no other crew member. Responsibility for the flight shall be allocated in accordance with national regulations.

9 The area and route to be flown shall be chosen by the FE and all low level and hover work shall be at an approved aerodrome/site. Routes used for section 3 may end at the aerodrome of departure or at another aerodrome and one destination shall be a controlled aerodrome. The applicant shall be responsible for the flight planning and shall ensure that all equipment and documentation for the execution of the flight are on board. The skill test may be conducted in 2 flights.

10 An applicant shall indicate to the FE the checks and duties carried out, including the identification of radio facilities. Checks shall be completed in accordance with the authorised check list for the helicopter on which the test is being taken. During pre-flight preparation for the test the applicant is required to determine power settings and speeds. Performance data for take-off, approach and landing shall be calculated by the applicant in compliance with the operations manual or flight manual for the helicopter used.

11 The FE shall take no part in the operation of the helicopter except where intervention is necessary in the interests of safety or to avoid unacceptable delay to other traffic.

**FLIGHT TEST TOLERANCES**

12 The applicant shall demonstrate the ability to:

- operate the helicopter within its limitations;
- complete all manoeuvres with smoothness and accuracy;



Appendix 1 to JAR-FCL 2.170 (continued)

- exercise good judgement and airmanship;
- apply aeronautical knowledge; and
- maintain control of the helicopter at all times in such a manner that the successful outcome of a procedure or manoeuvre is never seriously in doubt.

13 The following limits are for general guidance. The FE shall make allowance for turbulent conditions and the handling qualities and performance of the helicopter used.

Height	
normal flight	±100 feet
simulated major emergency	±150 feet
Tracking on radio aids	±10°
Heading	
normal flight	±10°
simulated major emergency	±15°
Speed	
take-off and approach multi-engine	±5 knots
all other flight regimes	±10 knots
Ground drift	
T.O. hover I.G.E.	±3 feet
landing	no sideways or backwards movement

#### CONTENT OF THE TEST

14 The skill test contents and sections set out in Appendix 2 to JAR-FCL 2.170 shall be used for the skill test. Items in Section 4 may be performed in a FNPT (H) or a flight simulator(H). The format and application form for the skill test may be determined by the Authority (see IEM FCL 2.170)

[Amdt. 1, 01.12.00]

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**Appendix 2 to JAR-FCL 2.170****Content of the skill test for the issue of the CPL(H)**

(See JAR-FCL 2.170)

(See IEM FCL 2.170)

Note: Use of checklist, airmanship, control of helicopter by external visual reference, anti-icing procedures, etc., apply in all sections.

<b>SECTION 1 PRE-FLIGHT/POST-FLIGHT CHECKS AND PROCEDURES</b>	
a	Helicopter knowledge, (e.g. technical log, fuel, mass and balance, performance), Flight Planning, NOTAMS, Weather
b	Pre-flight inspection/action, location of parts and purpose
c	Cockpit inspection, Starting procedure
d	Communication and navigation equipment checks, selecting and setting frequencies
e	Pre-take-off procedure, R/T procedure, ATC liaison-compliance
f	Parking, Shutdown and Post-flight procedure
<b>SECTION 2 HOVER MANOEUVRES, ADVANCED HANDLING AND CONFINED AREAS</b>	
a	Take-off and landing, (lift off and touch down)
b	Taxi, hover taxi
c	Stationary hover with head/cross/tail wind
d	Stationary hover turns, 360° left and right (spot turns)
e	Forward, sideways and backwards hover manoeuvring
f	Simulated engine failure from the hover
g	Quick stops into and downwind
h	Sloping ground/unprepared sites landings and take-offs
i	Take-offs (various profiles)
j	Crosswind, downwind take-off (if practicable)
k	Take-off at maximum take-off mass (actual or simulated)
l	Approaches (various profiles)
m	Limited power take-off and landing
n	Autorotations (FE to select two items from - Basic, range, low speed, and 360° turns)
o	Autorotative landing
p	Practice forced landing with power recovery
q	Power checks, reconnaissance technique, approach and departure technique

Appendix 2 to JAR-FCL 2.170 (continued)

<b>SECTION 3 NAVIGATION - EN ROUTE PROCEDURES</b>	
a	Navigation and orientation at various altitudes/heights, map reading
b	Altitude/height, speed, heading control, observation of airspace, altimeter setting
c	Monitoring of flight progress, flight log, fuel usage, endurance, ETA, assessment of track error and re-establishment of correct track, instrument monitoring
d	Observation of weather conditions, diversion planning
e	Tracking, positioning (NDB and/or VOR), identification of facilities
f	ATC liaison and observance of regulations, etc.
<b>SECTION 4 FLIGHT PROCEDURES AND MANOEUVRES BY SOLE REFERENCE TO INSTRUMENTS</b>	
a	Level flight, control of heading, altitude/height and speed
b	Rate 1 level turns onto specified headings, 180° to 360° left and right
c	Climbing and descending, including turns at rate 1 onto specified headings
d	Recovery from unusual attitudes
e	Turns with 30° bank, turning up to 90° left and right
<b>SECTION 5 ABNORMAL AND EMERGENCY PROCEDURES (SIMULATED WHERE APPROPRIATE)</b>	
Note (1) Where the test is conducted on a multi-engine helicopter a simulated engine failure drill, including a single engine approach and landing shall be included in the test.	
Note (2) The FE shall select 4 items from the following:	
a	Engine malfunctions, including governor failure, carburetor/engine icing, oil system, as appropriate
b	Fuel system malfunction
c	Electrical system malfunction
d	Hydraulic system malfunction, including approach and landing without hydraulics, as applicable
e	Main rotor and/or anti-torque system malfunction (flight simulator or discussion only)
f	Fire drills, including smoke control and removal, as applicable
g	Other abnormal and Emergency procedures as outlined in appropriate flight manual and with reference to Appendix 3 to JAR-FCL 2.240, sections 7 and 8, including for multi-engine helicopters: <ul style="list-style-type: none"> <li>- Simulated engine failure at take-off: <ul style="list-style-type: none"> <li>- rejected take-off at or before TDP or safe forced landing at or before DPATO</li> <li>- shortly after TDP or DPATO</li> </ul> </li> <li>- Landing with simulated engine failure: <ul style="list-style-type: none"> <li>- landing or go-around following engine failure before LDP or DPBL</li> <li>- following engine failure after LDP or safe forced landing after DPBL</li> </ul> </li> </ul>

[Amdt. 1, 01.12.00]

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## SUBPART E – INSTRUMENT RATING (Helicopter) – IR(H)

**JAR-FCL 2.174 Medical fitness**

An applicant for an IR(H) shall be medically fit in accordance with JAR-FCL 3.355(b).

[Amdt. 2, 01.11.02]

**JAR-FCL 2.175 Circumstances in which an IR(H) is required**

(a) The holder of a pilot licence shall not act in any capacity as a pilot of a helicopter under Instrument Flight Rules (IFR), except as a pilot undergoing skill testing or dual training, unless the holder has an instrument rating (IR) appropriate to the category of aircraft issued in accordance with JAR-FCL.

(b) In JAA Member States where national legislation requires flight in accordance with IFR under specified circumstances (eg. at night), the holder of a pilot licence may fly under IFR, provided he holds a qualification appropriate to the circumstances, airspace and flight conditions in which the flight is conducted. National qualifications permitting pilots to fly in accordance with IFR other than in VMC without being the holder of a valid IR(H) shall be restricted to use of the airspace of the State of licence issue only.

[Amdt. 1, 01.12.00]

**JAR-FCL 2.180 Privileges and conditions**

(a) *Privileges.*

(1) Subject to the rating restrictions imposed by use of another pilot functioning as a co-pilot (multi-pilot restriction) during the skill test set out in Appendices 1 and 2 to JAR-FCL 2.210, and any other conditions specified in JARs, the privileges of a holder of an IR(H) are to pilot helicopters under IFR with a minimum decision height of 200 feet (60m).

(2) Decision heights lower than 200 feet (60m) may be authorised by the Authority after further training and testing in accordance with JAR-OPS, AMC FCL 2.261(a) paragraph 6 and with Appendix 4 to JAR-FCL 2.240 & 2.295.

(b) *Conditions.* An applicant who has complied with the conditions specified in JAR-FCL 2.174 through JAR-FCL 2.210 shall have fulfilled the requirements for the issue of an IR(H).

[Amdt. 1, 01.12.00; Amdt. 2, 01.11.02]

**JAR-FCL 2.185 Validity, revalidation and renewal**

(a) An IR(H) is valid for one year. If an IR(H) is to be revalidated the holder shall complete the instrument requirements of JAR-FCL 2.245(b)(1), which may be conducted in a flight simulator, or a FNPT II as set out in paragraph 14 to Appendix 1 to JAR-FCL 2.210.

(b) If the IR(H) is valid for use in single-pilot helicopters, the revalidation shall be completed on either multi-pilot helicopters or single-pilot helicopters. If the IR(H) is restricted for use in multi-pilot operations only, the revalidation shall be completed in multi-pilot operations.

(c) An applicant who fails to achieve a pass in all sections of a proficiency check before the expiry date of an IR(H) shall not exercise the privileges of that rating until a new proficiency check has successfully been completed.

(d) If the rating is to be renewed, the holder shall meet the requirements above and any additional requirements as determined by the Authority. If the privileges of the IR(H) have not been exercised for more than 7 years from the date of initial issue or revalidation date, the holder will be required to retake the IR(H) theoretical knowledge examination.

[Amdt. 1, 01.12.00]

**JAR-FCL 2.190 Experience**

An applicant for an IR(H) shall hold a PPL(H) including a night qualification or CPL(H) and shall have completed at least 50 hours cross-country flight time as pilot-in-command in helicopters or aeroplanes of which at least 10 hours shall be in helicopters.

**JAR-FCL 2.195 Theoretical knowledge**

(a) *Course.* An applicant for an IR(H) shall have received theoretical knowledge instruction on an approved course at an approved flying training organisation [(FTO)]. The course should, wherever possible, be combined with a flying training course.

(b) An applicant shall demonstrate a level of knowledge appropriate to the privileges granted to the holder of an IR(H) and shall meet the requirements set out in JAR-FCL Subpart J.

[Amdt. 3, 01.09.03]

**JAR-FCL 2.200 Use of English Language**  
(See Appendix 1 to JAR-FCL 2.200)

(a) An applicant for an IR(H) or validation shall have demonstrated the ability to use the English language as set out in Appendix 1 to JAR-FCL 2.200.

(b) The holder of an IR(H) issued in accordance with Appendix 1 to JAR-FCL 2.200 shall have the PPL(H), CPL(H) or ATPL(H) extended with radiotelephony privileges in English.

[Amdt. 2, 01.11.02]

**JAR-FCL 2.205 Flight instruction**  
(See Appendix 1 to JAR-FCL 2.205)

An applicant for an IR(H) shall have participated in a course of integrated flying training which includes training for the IR(H) (see JAR-FCL 2.165) or shall have completed an approved modular flying training course as set out in Appendix 1 to JAR-FCL 2.205. If the applicant is the holder of an IR(A) the total amount of flight instruction required by Appendix 1 to JAR-FCL 2.205 may be reduced to 10 hours.

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**JAR-FCL 2.210 Skill**  
(See Appendices 1 and 2 to JAR-FCL 2.210)

*General.* An applicant for an IR(H) shall have demonstrated the ability to perform the procedures and manoeuvres as set out in Appendices 1 and 2 to JAR-FCL 2.210 with a degree of competency appropriate to the privileges granted to the holder of an IR(H). An applicant wishing to obtain a type rating for the helicopter used in skill test shall also meet the requirements of JAR-FCL [2.240].

[Amdt. 3, 01.09.03]

**Appendix 1 to JAR-FCL 2.200**  
**IR(H) – Use of English language**

(See JAR-FCL 2.200)

(See Appendix 1 to JAR-FCL 2.005)

(See Appendix 1 to JAR-FCL 2.015)

## USE OF ENGLISH LANGUAGE

1 An applicant for or the holder of the IR(H) shall have the ability to use the English language for the following purposes:

- (a) flight:  
radio telephony relevant to all phases of flight, including emergency situations.

This item is considered to be fulfilled, if the applicant has passed an IR or ATPL skill test or proficiency check during which the two-way radiotelephony communication is performed in English.

- (b) ground:  
all information relevant to the accomplishment of a flight, e.g.
- \* be able to read and demonstrate an understanding of technical manuals written in English, e.g. an Operations Manual, a Helicopter Flight Manual, etc.
  - \* pre-flight planning, weather information collection, NOTAMs, ATC Flight Plan, etc.
  - \* use of all aeronautical en-route, departure and approach charts and associated documents written in English.

This item is considered to be fulfilled, if the applicant has graduated from a IR or ATP course given in English or if he/she has passed the theoretical IR or ATPL examination in English

- (c) communication:  
be able to communicate with other crew members in English during all phases of flight, including flight preparation

This item is considered to be fulfilled, if the applicant for or the holder of an IR(H) has graduated from a MCC-course given in English and is holding a certificate of satisfactory completion of that course in accordance with JAR-FCL 2.250 (a)(2) or if he has passed a multi-pilot skill test/proficiency check in accordance with Appendix 1 to JAR-FCL 2.240 & 2.295, during which the two-way radiotelephony communication and the communication with other crew members are performed in English.

2 Alternatively, the above stated requirements may be demonstrated by having passed a specific examination given by the Authority after having undertaken a course of training enabling the applicant to meet all the objectives listed in 1(a), (b) and (c) above.

[Amdt. 2, 01.11.02]

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**Appendix 1 to JAR-FCL 2.205****IR(H) – Modular flying training course**

(See JAR-FCL 2.205)

- 1 The aim of the IR(H) modular flying training course is to train pilots to the level of proficiency necessary to operate helicopters under IFR and in IMC in accordance with ICAO PANS-OPS Document 8168.
- 2 An applicant for a modular IR(H) course shall be the holder of a PPL(H) with a night qualification issued in accordance with Appendix 4 to JAR-FCL 2.125, or a CPL(H) issued in accordance with ICAO Annex 1. [Prior to commencing the IR(H) course, the applicant shall be the holder of the helicopter type rating used for the IR(H) skill test, or have completed approved type rating training on that type.]
- 3 An applicant wishing to undertake a modular IR(H) course shall be required, under the supervision of the Head of Training of an approved flying training organisation (FTO), to complete all the instructional stages in one continuous approved course of training as arranged by that FTO. The theoretical knowledge instruction may be given at [an approved FTO conducting theoretical knowledge instruction only], in which case the Head of Training of that organisation shall supervise that part of the course.
- 4 The course of theoretical instruction shall be completed within 18 months. The flight instruction and the skill test shall be completed within the period of validity of the pass in the theoretical examinations, as set out in JAR-FCL 2.495.
- 5 The course shall comprise:
  - (a) theoretical knowledge instruction to the instrument rating knowledge level;
  - (b) instrument flight instruction.
- 6 The successful completion of the theoretical knowledge examination(s) at paragraph 8 and of the skill test at paragraph 14 fulfil the knowledge and skill requirements for the issue of an IR(H).

**THEORETICAL KNOWLEDGE**

7 The theoretical knowledge syllabus for the IR(H) is set out in Appendix 1 to JAR-FCL 2.470. An approved modular IR(H) course shall comprise at least 200 hours (1 hour = 60 minutes instruction) of instruction, which can include classroom work, inter-active video, slide/tape presentation, learning carrels, computer based training, and other media as approved by the Authority, in suitable proportions. Approved distance learning (correspondence) courses may also be offered as part of the course at the discretion of the Authority

**Theoretical knowledge examination**

8 An applicant shall demonstrate a level of knowledge appropriate to the privileges of an IR(H) in accordance with the procedures in JAR-FCL Subpart J.

**FLYING TRAINING**

- 9 A single-engine IR(H) course shall comprise at least 50 hours instrument time under instruction of which;
 

[ ]

  - [(a) up to 20 hours may be instrument ground time in a FNPT I(H) or (A). These 20 hours instruction time in FNPT I (H) or (A) may be substituted by 20 hours instruction time for IR(H) in an aeroplane, approved for this course, or
  - (b) up to 35 hours may be instrument ground time in a helicopter FNPT II/III or FS.

The instrument flight instruction shall include at least 10 hours in an IFR-certificated helicopter.]

- 10 A multi-engine IR(H) course shall comprise at least 55 hours instrument time under instruction of which;
 

[ ]

  - [(a) up to 20 hours may be instrument ground time in a FNPT I (H) or (A). These 20 hours instruction time in FNPT I (H) or (A) may be substituted by 20 hours instruction time for IR(H) in an aeroplane, approved for this course, or
  - (b) up to 40 hours may be instrument ground time in a helicopter FNPT II/III or FS. ]



Appendix 1 to JAR-FCL 2.205 (continued)

[The instrument flight instruction shall include at least 10 hours in an IFR-certificated multi-engine helicopters.]

11 The holder of a PPL(H) with a night qualification issued in accordance with Appendix 4 to JAR-FCL 2.125, or a CPL(H) issued in accordance with ICAO may have the total amount of training required in paragraphs 9 or 10 above reduced by 5 hours.

12 The flying exercises up to the IR(H) skill test shall comprise:

(a) pre-flight procedures for IFR flights, including the use of the flight manual and appropriate air traffic services documents in the preparation of an IFR flight plan;

(b) procedure and manoeuvres for IFR operation under normal, abnormal and emergency conditions covering at least

- transition from visual to instrument flight on take off
- standard instrument departures and arrivals
- en-route IFR procedures
- holding procedures
- instrument approaches to specified minima
- missed approach procedures
- landings from instrument approaches, including circling;

(c) in flight manoeuvres and particular flight characteristics;

(d) if required, operation of a multi-engine helicopter in the above exercises, including operation of the helicopter solely by reference to instruments with one engine simulated inoperative and engine shut down and restart (the latter exercise to be carried out at a safe altitude unless carried out in a flight simulator or FNPT II).

#### SKILL TESTS

13 On completion of the related flying training and relevant experience as stated in JAR-FCL 2.190 the applicant shall take the IR(H) skill test in the helicopter type used during the course in accordance with Appendix 1 and 2 to JAR-FCL 2.210.

[Amdt. 1, 01.12.00; Amdt. 2, 01.11.02; Amdt. 3, 01.09.03]

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**Appendix 1 to JAR-FCL 2.210****IR(H) – Skill test and proficiency check**

(See JAR-FCL 2.185 and 2.210)

(See IEM FCL 2.210)

1 An applicant for a skill test for the IR(H) shall have received instruction on the same type of helicopter to be used for the skill test. The helicopter used for the skill test shall meet the requirements for training helicopters set out in Appendix 1 to JAR-FCL 2.055.

2 The administrative arrangements for confirming the applicant's suitability to take the test, including disclosure of the applicant's training record to the examiner, will be determined by the Authority which approved the applicant's training.

3 An applicant shall pass all sections of the skill test. Failure in more than one section will require the applicant to take the entire test again. An applicant failing only one section shall take the failed section again. Failure in any section of the re-test, including those sections that have been passed on a previous attempt, will require the applicant to take the entire test again. All sections of the skill test shall be completed within six months.

4 Further training may be required following any failed skill test. Failure to achieve a pass in all sections of the test in two attempts shall require further training as determined by the Authority. There is no limit to the number of skill tests that may be attempted.

**CONDUCT OF THE TEST**

5 The test is intended to simulate a practical flight. The route to be flown shall be chosen by the examiner. An essential element is the ability of the applicant to plan and conduct the flight from routine briefing material. The applicant shall undertake the flight planning and shall ensure that all equipment and documentation for the execution of the flight are on board. The duration of the flight shall be at least one hour.

6 The Authority will provide the examiner with safety advice to be observed in the conduct of the test.

7 Should the applicant choose to terminate a skill test for reasons considered inadequate by the examiner, the applicant shall retake the entire skill test. If the test is terminated for reasons considered adequate by the examiner, only those sections not completed shall be tested in a further flight.

8 At the discretion of the examiner, any manoeuvre or procedure of the test may be repeated once by the applicant. The examiner may stop the test at any stage if it is considered that the applicant's demonstration of flying skill requires a complete re-test.

9 An applicant shall fly the helicopter from a position where the pilot-in-command functions can be performed and carry out the test/check as if there is no other crew member. The examiner shall take no part in the operation of the helicopter, except when intervention is necessary in the interests of safety or to avoid unacceptable delay to other traffic. Whenever the examiner or another pilot functions as a co-pilot during the test/check, the privileges of the instrument rating will be restricted to multi-pilot operations. This restriction may be removed by the applicant carrying out another initial instrument rating skill test acting as if there was no other crew member on a single-pilot helicopter. Responsibility for the flight shall be allocated in accordance with national regulations.

10 Decision heights/altitude, minimum descent heights/altitudes and missed approach point shall be determined by the applicant and agreed by the examiner.

11 An applicant shall indicate to the examiner the checks and duties carried out, including the identification of radio facilities. Checks shall be completed in accordance with the authorised check list for the helicopter on which the test is being taken. During pre-flight preparation for the test the applicant is required to determine power settings and speeds. Performance data for take-off, approach and landing shall be calculated by the applicant in compliance with the operations manual or flight manual for the helicopter used. Decision heights/altitudes, minimum descent heights/altitudes and missed approach point shall be determined by the applicant. During the proficiency check for revalidation or renewal of the IR(H) according to JAR-FCL 2.185(a) the licence holder has to demonstrate the same as above to the examiner involved.

Appendix 1 to JAR-FCL 2.210 (continued)

#### FLIGHT TEST TOLERANCES

- 12 The applicant shall demonstrate the ability to:
- operate the helicopter within its limitations;
  - complete all manoeuvres with smoothness and accuracy;
  - exercise good judgement and airmanship;
  - apply aeronautical knowledge; and
  - maintain control of the helicopter at all times in such a manner that the successful outcome of a procedure or manoeuvre is never seriously in doubt.
- 13 The following limits are for general guidance. The examiner shall make allowance for turbulent conditions and the handling qualities and performance of the helicopter used.

#### Height

Generally	±100 feet
Starting a go-around at decision height	+50 feet/-0 feet
Minimum descent height/MAP/altitude	+50 feet/-0 feet

#### Tracking

on radio aids	±5°
Precision approach	half scale deflection, azimuth and glide path

#### Heading

all engines operating	±5°
with simulated engine failure	±10°

#### Speed

all engines operating	±5 knots
with simulated engine failure	+10 knots/-5 knots

#### CONTENT OF THE TEST

- 14 The skill test contents and sections set out in Appendix 2 to JAR-FCL 2.210 shall be used for the skill test. The format and application form for the skill test may be determined by the Authority (see IEM FCL 2.210).

[Amdt. 1, 01.12.00]

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**Appendix 2 to JAR-FCL 2.210****Contents of the skill test/proficiency check for the issue and revalidation of an IR(H)**

(See JAR-FCL 2.185 and 2.210)

(See IEM FCL 2.210)

<b>SECTION 1 DEPARTURE</b>	
a	Use of flight manual (or equivalent) especially aircraft performance calculation; mass and balance
b	Use of Air Traffic Services document, weather document
c	Preparation of ATC flight plan, IFR flight plan/log
d	Pre-flight inspection
e	Weather minima
f	Taxying/Air taxi in compliance with ATC or instructions of instructor
g	Pre-take off briefing, procedures and checks
h	Transition to instrument flight
i	Instrument departure procedures
<b>SECTION 2 GENERAL HANDLING</b>	
a	Control of the helicopter by reference solely to instruments, including:
b	Climbing and descending turns with sustained rate one turn
c	Recoveries from unusual attitudes, including sustained 30° bank turns and steep descending turns

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Appendix 2 to JAR-FCL 2.210 (continued)

<b>SECTION 3 EN-ROUTE IFR PROCEDURES</b>	
a	Tracking, including interception, e.g. NDB, VOR, RNAV
b	Use of radio aids
c	Level flight, control of heading, altitude and airspeed, power setting
d	Altimeter settings
e	Timing and revision of ETAs
f	Monitoring of flight progress, flight log, fuel usage, systems management
g	Ice protection procedures, simulated if necessary and applicable
h	ATC liaison and compliance, R/T procedures
<b>SECTION 4 PRECISION APPROACH</b>	
a	Setting and checking of navigational aids, identification of facilities
b	Arrival procedures, altimeter checks
c	Approach and landing briefing, including descent/approach/landing checks
d*	Holding procedure
e	Compliance with published approach procedure
f	Approach timing
g	Altitude, speed, heading control, (stabilised approach)
h*	Go-around action
i*	Missed approach procedure / landing
j	ATC liaison – compliance, R/T procedures
<i>* to be performed in Section 4 or Section 5</i>	

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Appendix 2 to JAR-FCL 2.210 (continued)

<b>SECTION 5 NON-PRECISION APPROACH</b>	
a	Setting and checking of navigational aids, identification of facilities
b	Arrival procedures, altimeter checks
c	Approach and landing briefing, including descent/approach/landing checks
d*	Holding procedure
e	Compliance with published approach procedure
f	Approach timing
g	Altitude, speed, heading control, (stabilised approach)
h*	Go around action
i*	Missed approach procedure*/landing
j	ATC liaison – compliance, R/T procedures
<i>* to be performed in Section 4 or Section 5</i>	
<b>SECTION 6 ABNORMAL AND EMERGENCY PROCEDURES</b>	
<i>This section may be combined with sections 1 through 5. The test shall have regard to control of the helicopter, identification of the failed engine, immediate actions (touch drills), follow up actions and checks, and flying accuracy, in the following situations:</i>	
a	Engine failure after take-off and on/during approach* (at a safe altitude unless carried out in a flight simulator or FNPT II) <i>*Multi-engine helicopter only</i>
b	Failure of stability augmentation devices/hydraulic system (if applicable)
c	Limited panel
d	Autorotation and recovery to a pre-set altitude
e	Precision approach manually without flight director* Precision approach manually with flight director* <i>*Only one item to be tested</i>

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## SUBPART F – TYPE RATINGS (Helicopter)

**JAR-FCL 2.215** Intentionally blank**JAR-FCL 2.220** **Type ratings (H)**  
(See Appendix 1 to JAR-FCL 2.220)

(a) *Criteria.* For the establishment of type ratings for helicopters, all of the following shall be considered:

- (1) airworthiness type certificate;
- (2) handling characteristics;
- (3) certificated minimum flight crew complements;
- (4) level of technology.

(b) *Divisions.* Type ratings for helicopters shall be established for each type of helicopter.

(c) *Listing.* Type ratings for helicopters will be issued according to the list of types. In order to change to another variant of the helicopter within the same type rating, differences or familiarisation training is required. (See Appendix 1 to JAR-FCL 2.220).

(d) The issue and the revalidation/renewal of autogyro/gyroplane type ratings are at the discretion of the Authority.

[Amdt. 1, 01.12.00]

**JAR-FCL 2.225** **Circumstances in which type ratings are required**

The holder of a pilot licence shall not act in any capacity as a pilot of a helicopter except as a pilot undergoing skill testing or receiving flight instruction unless the holder has a valid and appropriate type rating. When a type rating is issued limiting the privileges to acting as co-pilot only, or to any other conditions agreed within JAA, such limitations shall be endorsed on the rating.

**JAR-FCL 2.230** **Special authorisation of type rating**

For the special purpose non-revenue flights e.g. aircraft flight testing, special authorisation may be provided in writing to the licence holder by the Authority in place of issuing the type rating in accordance with JAR-FCL 2.225. This authorisation shall be limited in validity to completing a specific task.

**JAR-FCL 2.235** **Type ratings – Privileges, number and variants**  
(See Appendix 1 to JAR-FCL 2.220)

(a) *Privileges.* Subject to JAR-FCL 2.220(c) above, the privileges of the holder of a type rating are to act as a pilot on the type of aircraft specified in the rating.

(b) *Number of type ratings held.* There is no JAR-FCL limit to the number of ratings that may be held at one time. JAR-OPS, however, may restrict the number of ratings that can be exercised at any one time.

(c) *Variants.* If the variant has not been flown within a period of 2 years following the differences training, further differences training or a proficiency check in that variant will be required..

(1) Differences training requires additional knowledge and training on an appropriate training device or helicopter. The differences training shall be entered in the pilot's logbook or equivalent document and signed by a TRI/SFI(H) or FI(H) as appropriate.

(2) Familiarisation training requires the acquisition of additional knowledge.

This differences training shall be entered in the pilot's logbook or equivalent document and signed by a TRI/SFI(H) or FI(H) as appropriate.

[Amdt. 1, 01.12.00]

**JAR-FCL 2.240** **Type ratings – Requirements**  
(See Appendices 1 to 3 to JAR-FCL 2.240)

(a) *General*

(1) An applicant for a type rating for a multi-pilot type of helicopter shall comply with the requirements for type ratings set out in JAR-FCL 2.250, 2.261 and 2.262; and

(2) An applicant for a type rating for a single-pilot type of helicopter shall comply with the requirements set out in JAR-FCL 2.255, 2.261 and 2.262.

(3) The type rating course, including theoretical knowledge, shall be completed within the 6 months preceding the skill test.

(4) The holder of an IR(H) valid for a single-engine helicopter type wishing to extend the IR(H) to a multi-engine helicopter type shall satisfactorily complete a course comprising at

## JAR-FCL 2.240(a)(4) (continued)

least 5 hours dual instrument instruction time in that type.

(5) At the discretion of the Authority, a helicopter type rating may be issued to an applicant who meets the requirements for that rating of a non-JAA Member State, provided JAR-FCL 2.250 or 2.255 as applicable, are met. Such a rating will be restricted to helicopters registered in that non-JAA Member State, or operated by an operator of that non-JAA Member State. The restriction may be removed when the holder has completed at least 500 hours of flight as a pilot on the type and complied with the revalidation requirements of JAR-FCL 2.245.

(6) A type rating contained in a licence issued by a non-JAA State may be transferred to a JAR-FCL licence, subject to the appropriate proficiency check, provided the applicant is in current flying practice and has not less than 500 hours flying experience as a pilot on that type, provided JAR-FCL 2.250 or 2.255 as applicable, are met.

(7) A valid type rating contained in a licence issued by a JAA Member State may be transferred to a JAR-FCL licence provided it is currently valid and the last revalidation/renewal of the rating was performed in accordance with the requirements of JAR-FCL 2.250 or 2.255, as applicable.

(b) *Skill test*

(1) The skill test contents and sections for a rating for multi-engine multi-pilot helicopters are set out in Appendices 1 and 2 to JAR-FCL 2.240; and

(2) the skill test contents and sections for a rating for multi-engine single-pilot helicopters and for single-engine helicopters are set out in Appendices 1 and 3 to JAR-FCL 2.240.

Each applicable item in the appropriate skill test shall be satisfactorily completed within the six months immediately preceding the date of receipt of the application for the rating.

[Amdt. 1, 01.12.00; Amdt.2, 01.11.02]

**JAR-FCL 2.245 Type ratings – Validity, revalidation and renewal**  
(See Appendices 1 and 3 to JAR-FCL 2.240)

(a) *Type ratings, helicopter – Validity.* Type ratings for helicopters are valid for one year from the date of issue, or the date of expiry if revalidated within the validity period.

## JAR-FCL 2.245 (continued)

(b) *Type ratings, helicopter – Revalidation.* For revalidation of type ratings, helicopter, the applicant shall complete:

(1) a proficiency check in accordance with Appendix 1 to JAR-FCL 2.240 in the relevant type of helicopter within the three months immediately preceding the expiry date of the rating; and

(2) at least 2 hours as a pilot of the relevant helicopter type within the validity period of the rating.

(3) for single-engine piston helicopters, as listed in Appendix 1 to JAR-FCL 2.245(b)(3), at least the proficiency check in accordance with JAR-FCL 2.245 (b)(1) on one of the applicable types held provided that the applicant has fulfilled at least 2 hours pilot-in-command flight time on the other type(s) during the validity period to which that revalidation proficiency check shall carry across.

(4) The revalidation of an IR(H), if held should be combined with the type rating revalidation requirements in (1) above, in accordance with JAR-FCL 2.185.

(c) An applicant who fails to achieve a pass in all sections of a proficiency check before the expiry date of a type rating shall not exercise the privileges of that rating, or ratings according to Appendix 1 to JAR-FCL 2.245 (b)(3), until a new proficiency check has successfully been completed.

(d) Extension of the validity period or revalidation of ratings in special circumstances:

(1) When the privileges of a helicopter type or instrument rating are being exercised solely on a helicopter registered in a non-JAA Member State, the Authority may at its discretion extend the validity period of the rating, or revalidate the rating provided the requirements of that non-JAA Member State are fulfilled.

(2) When the privileges of a helicopter type or instrument rating are being exercised in a JAA registered helicopter being operated by an operator of a non-JAA Member State under the provisions of Article 83bis of the International Convention on Civil Aviation, Chicago, the Authority may at its discretion extend the validity period of the rating, or revalidate the rating provided the requirements of that non-JAA Member State are fulfilled.

(3) Any rating revalidated or of which the validity period has been extended under the provisions of (1) or (2) above shall be revalidated in accordance with JAR-FCL 2.245(b) and, if applicable, JAR-FCL 2.185 before the privileges



JAR-FCL 2.245(d)(3) (continued)

are exercised on helicopters registered in and operated by an operator of a JAA Member State.

(4) A rating issued or used in a non-JAA Member State may remain in a JAR-FCL licence at the discretion of the Authority provided the requirements of that non - JAA Member State are fulfilled and the rating is restricted to helicopters registered in or operated by an operator of that non- JAA Member State.

(e) *Expired ratings.* If a type rating has expired, the applicant shall meet any refresher training requirements as determined by the Authority and complete a proficiency check in accordance with Appendix 1 to JAR-FCL 2.240 in the relevant type of helicopter. The rating will be valid from the date of completion of the renewal requirements.

[Amdt. 1, 01.12.00, Amdt. 2, 01.11.02]

#### **JAR-FCL 2.250 Type rating, multi-pilot – Conditions**

(See AMC FCL 2.261(d))

(See Appendix 1 to JAR-FCL 2.261(d))

(a) *Pre-requisite conditions for training:* An applicant for the issue of a first type rating for a multi-pilot helicopter type shall:

(1) have at least [70] hours as pilot-in-command of helicopters [except that an applicant for a multi-pilot type rating graduating from a CPL(H) integrated course who has less than 70 hours as pilot-in-command of helicopters shall have the type rating issued limiting the privileges to co-pilot privileges only. To remove this limitation, an applicant shall:]

[(i) have completed 70 hours as pilot-in-command or PICUS of helicopters; and

(ii) have passed the multi-pilot skill test on the applicable helicopter type as pilot-in-command in accordance with JAR-FCL 2.262(b).]

;and

(2) hold a certificate of satisfactory completion of MCC. If the MCC course is to be added to the type rating course (see JAR-FCL 2.261 and 2.262 and AMC FCL 2.261(d) and Appendix 1 to JAR-FCL 2.261(d)), this requirement is not applicable; and

(3) [(i) for a VFR type rating have completed the course and passed the examination in accordance with JAR-FCL 2.160(a) and (b); or

JAR-FCL 2.250(a)(3) (continued)

(ii) for a type-rating including IR(H) privileges hold a CPL(H) and IR(H) or meet the requirements of JAR-FCL 2.285 and hold an IR(H).]

(b) The level of knowledge assumed to be held by holders of the PPL(H) or CPL(H) and type ratings for multi-pilot helicopters issued under requirements other than JAR-FCL will not be a substitute for showing compliance with the requirements of (3) above.

[Amdt. 2, 01.11.02; Amdt. 3, 01.09.03]

#### **JAR-FCL 2.255 Type rating, single-pilot – Conditions**

*[Pre-requisite conditions for training:* An applicant for the issue of a first type rating for a multi-engine helicopter shall:

(a) hold a certificate of satisfactory completion of a pre-entry approved course in accordance with Appendix 1 to JAR-FCL 2.255 to be conducted by a FTO or a TRTO or have passed at least the CPL(H) theoretical knowledge examinations in accordance with JAR-FCL 2.470; and

(b) have completed at least 70 hours as pilot-in-command of helicopters.

(c) The possession of a certificate of satisfactory completion of the pre-entry approved courses in accordance with Appendix 1 to JAR-FCL 2.255 shall not be a substitute for showing compliance with JAR-FCL 2.160(b) for the grant of a CPL(H).]

[Amdt. 3, 01.09.03]

#### **JAR-FCL 2.260 Intentionally blank**

#### **JAR-FCL 2.261 Type ratings – Knowledge and flight instruction**

(See Appendix 1 to JAR-FCL 2.261(a) and AMC FCL 2.261(a))

(See Appendix 1, 2 and 3 to JAR-FCL 2.240)

(See Appendix 2 to JAR-FCL 2.055)

(See AMC FCL 2.261(c)(2))

(See AMC FCL 2.261(d))

(See Appendix 1b to JAR-FCL 2.261(d))

(a) *Theoretical knowledge instruction and checking requirements.* An applicant for a type rating

## JAR-FCL 2.261(a) (continued)

for single- or multi-engine helicopters shall have completed the required theoretical knowledge instruction (see Appendix 1 to JAR-FCL 2.261(a) and AMC FCL 2.261(a)) and demonstrated the level of knowledge required for the safe operation of the applicable helicopter type.

(b) *Flight instruction*

(1) An applicant for a type rating for single-engine and multi-engine single-pilot helicopters shall have completed a course of flight instruction related to the type rating skill test (see Appendix 3 to JAR-FCL 2.240).

(2) An applicant for a type rating for multi-pilot helicopters shall have completed a course of flight instruction related to the type rating skill test (see Appendix 2 to JAR-FCL 2.240).

(c) *Conduct of training courses*

(1) Training courses for the above purpose shall be conducted by a FTO or a TRTO. Training courses may also be conducted by a facility or a sub-contracted facility provided by an operator or a manufacturer or, in special circumstances, by a individually authorised instructor.

(2) Such courses shall be approved by the Authority (see AMC FCL 2.261(c)(2)) and such facilities shall meet the relevant requirements of Appendix 2 to JAR-FCL 2.055, as determined by the Authority.

(d) *Multi-crew co-operation training* (see also JAR-FCL 2.250(a)(2))

(1) The course is intended to provide MCC training in two circumstances:

(i) for students attending an ATP integrated course in accordance with the aim of that course (see Appendix 1 to JAR-FCL 2.160 & 2.165(a)(1))

(ii) for PPL(H) and CPL(H) holders who have not graduated from an ATP integrated course but who wish to obtain an initial type rating on multi-pilot helicopters (see JAR-FCL 2.250(a)(2)).

The MCC course shall comprise at least 25 hours of theoretical knowledge instruction and exercises and 20 hours of MCC training. Students attending an ATP integrated course may have the practical training reduced by 5 hours. Wherever possible, the MCC training should be combined with the initial type rating course on multi-pilot helicopters.

(2) The MCC training shall be accomplished within six months under the supervision of either the Head of Training of an

## JAR-FCL 2.261(d)(2) (continued)

approved flying training organisation or an approved type rating training organisation or on an approved training course conducted by an operator. A course conducted by an operator shall meet the relevant requirements of Appendix 2 to JAR-FCL 2.055, as determined by the Authority. For further details on MCC training see Appendix 1 to JAR-FCL 2.261(d) and AMC FCL 2.261(d). A FNPT II or a flight simulator shall be used. Whenever possible, the MCC training should be combined with the initial type rating training for a multi-pilot helicopter, in which case the practical MCC training may be reduced to not less than 10 hours if the same flight simulator is used for both MCC and type rating training.

[Amdt. 1, 01.12.00; Amdt. 2, 01.11.02]

**JAR-FCL 2.262 Type ratings – Skill**

(See Appendices 1, 2 and 3 to JAR-FCL 2.240)

(a) *Single-pilot skill test.* An applicant for a type rating for a single-pilot helicopter shall have demonstrated the skill required for the safe operation of the applicable type of helicopter, as set out in Appendices 1 and 3 to JAR-FCL 2.240.

(b) *Multi-pilot skill test.* An applicant for a type rating for a multi-pilot helicopter shall have demonstrated the skill required for the safe operation of the applicable type of helicopter in a multi-crew environment as a pilot-in-command or a co-pilot as applicable, as set out in Appendices 1 and 2 to JAR-FCL 2.240.

(c) *Multi-crew co-operation.* On completion of the MCC training the applicant shall either demonstrate the ability to perform the duties of a pilot on multi-pilot helicopter by passing the type rating skill test on multi-pilot helicopters as set out in Appendices 1 and 2 to JAR-FCL 2.240, or shall be given a certificate of completion of MCC as shown in Appendix 1 to AMC FCL 2.261(d).

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**Appendix 1 to JAR-FCL 2.220****List of type of helicopter**

(See JAR-FCL 2.220(c))

This Appendix includes helicopters type certificated in JAA member States and does not include:

- (i) helicopters not type certificated in accordance with FAR/JAR 27, FAR/JAR 29 or BCAR;
- (ii) helicopters type certificated in a JAA member State under special registration such as military, ex-military, experimental or vintage helicopters;

Helicopters not listed may be entered into a JAR-FCL licence, but the rating privileges are restricted to helicopters on the register of the State of rating issue.

Explanation of table (refer to JAR-FCL 2.235(c)):

- (a) If a dividing line exists in column 2, this indicates a variant,
- (b) the symbol (D) between variants of types of helicopter used in column 3 indicates that differences training is required;
- (c) although the licence endorsement (column 4) contains all helicopters listed in column 2, the required familiarisation or differences training has still to be completed;
- (d) The specific variant on which the skill test for the type rating has been completed will be recorded according to JAR-FCL 2.080.

1 Manufacturer	2 Helicopter	3	4 Licence endorsement
<b>Agusta</b>			
- SE Turbine -	A 119 KOALA		A119
- ME Turbine -	A 109 A	(D)	A109/109K/109E
	A 109 A II		
	A 109 C		
	A 109 K		
	A 109 E		
<b>Agusta-Bell</b>			
- SE Piston -	Agusta Bell 47G-2 Agusta Bell 47G-2A-1 Agusta Bell 47G-3B-1 Agusta Bell 47G-4 Agusta Bell 47G-4A Agusta Bell 47J Agusta Bell 47J-2 Agusta Bell 47J-3		Bell47
- SE Turbine -	Agusta Bell 206 A Agusta Bell 206 B	(D)	Bell206/206L
	Agusta Bell 206 L		

Appendix 1 to JAR-FCL 2.220 (continued)

1 Manufacturer	2 Helicopter	3	4 Licence endorsement
	Agusta Bell 204	(D)	Bell204/205/[UH-1D]
	Agusta Bell 205		
- ME Turbine -	Agusta Bell 212		Bell212/412 [ ]
	Agusta Bell 412		
	Agusta Bell 412 SP		
<b>Agusta Sikorsky</b>			
- ME Turbine -	Agusta S-61 N 1		SK-61
<b>Bell Helicopters</b>			
- SE Piston -	Bell 47 D		Bell47
	Bell 47 G		
	Bell 47 G-1		
	Bell 47 G-2		
	Bell 47 G-3 B-1		
	Bell 47 G-4		
	Bell 47 G-4A		
	Bell 47 G-5		
	Bell 47 H-1		
	Bell 47 J		
	Bell 47 J-2		
	Bell 47 J-2 A		
	- SE Turbine -		
Bell 47 TA			
Bell 204		(D)	Bell204/205/UH-1D
Bell 205 A-1			
UH-1D			
Bell 206 A		(D)	Bell206/206L
Bell 206 B			
Bell 206 B 2			
Bell 206 B 3			
Bell 206 L			
Bell 206 L-1			
Bell 206 L-3			
Bell 206 L-4			Bell214
Bell 214 B			
Bell 214 B 1			

Appendix 1 to JAR-FCL 2.220 (continued)

1 Manufacturer	2 Helicopter	3	4 Licence endorsement	
	Bell 407		Bell407	
- ME Turbine -	Bell 206 LT Twinranger		Bell206LT	
	Bell 212	(D)	Bell212/412	
	Bell 412 Bell 412 SP Bell 412 HP Bell 412 EP			
	Bell 214 ST			Bell 214ST
	Bell 222 Bell 222 A Bell 222 B Bell 222 UT Bell 222 SP	(D)	Bell222/230/430	
	Bell 230			
	Bell 430			
		Bell 427		Bell427
	<b>Boeing-Vertol</b>			
- ME Turbine -	Boeing 234 LR		BV234	
<b>Bristol Aircraft</b>				
- SE Piston -	B-171-B		Bristol171B	
<b>Brantley</b>				
- SE Piston -	B-2 B-2 B		BrantleyB2	
<b>Breda Nardi</b>				
- SE Piston -	Breda Nardi 269		HU269	
- SE Turbine -	Breda Nardi 369		HU369	
<b>EH Industries</b>				
- ME Turbine	EH 101		EH101	
<b>Enstrom</b>				
- SE Piston -	F 28 A - D F 28 C 2 F 28 F F 280 C F 280 F F 280 FX F 280 D		ENF28	

Appendix 1 to JAR-FCL 2.220 (continued)

1 Manufacturer	2 Helicopter	3	4 Licence endorsement	
- SE Turbine -	F 480		ENF480	
<b>Eurocopter</b>				
- SE Turbine -	AS 350 B AS 350 B 1 AS 350 B 2 [ ] AS 350 D AS 350 B A [AS 350 BB]	(D)	AS350/350B3	
	AS 350 B 3			
	[EC 130 B 4]		[EC130B4]	
	EC 120		EC120	
	SA 341 G SA 342 J		SA341/342	
	SA 3180 SA 318 B SA 318 C SE 3130 SE 313 B		SA318/SE313	
	SE 3160 SA 316 B SA 316 C SA 319 B SA 315 B	(D)	SA316/319/315	
	SA 360			
	SO 1221		SO1221	
	- ME Turbine -	AS 332 C AS 332 C 1 AS 332 L AS 332 L 1	(D)	AS332/332L2
		AS 332 L 2		
		[EC 225 LP]		[EC 225LP]
		AS 355 E AS 355 F AS 355 F 1 AS 355 F 2	(D)	AS355/355N
AS 355 N				

Appendix 1 to JAR-FCL 2.220 (continued)

1 Manufacturer	2 Helicopter	3	4 Licence endorsement
	BO 105 A BO 105 C BO 105 D BO 105 LS A-1 BO 105 LS A-3 BO 105 S BO 105 CBS		BO105/105LS/105CBS
	[ ]	[ ]	[ ]
	[ ]		
	[EC 135 T1 CDS] [EC 135 P1 CDS]		[EC135]
	[EC 135 T1 CPDS] [EC 135 P1 CPDS] [EC 135 T2 CPDS] [EC 135 P2 CPDS]	[D]	
	MBB-BK 117 A-1 MBB-BK 117 A-3 MBB-BK 117 A-4 MBB-BK 117 B-1 MBB-BK 117 B-2	(D)	BK117
	MBB-BK 117 C-1 [ ]		
	[MBB-BK 117 C-2] [ ]		
	SA 330 F SA 330 G SA 330 J		SA330
	SA 365 SA 365 C 1 SA 365 C 2 SA 365 C 3	(D)	SA365/365N
	SA 365 N SA 365 N 1 SA 365 N 2		
	SA 365 N 3		
	EC 155		EC155
<b>Hiller</b>			
- SE Piston -	UH 12 A UH 12 B UH 12 E		UH12

Appendix 1 to JAR-FCL 2.220 (continued)

1 Manufacturer	2 Helicopter	3	4 Licence endorsement
<b>Hughes/Schweitzer</b>			
- SE Piston -	269 A 269 B 269 C 300 C 300 CB		HU269
- SE Turbine -	330 SP		SC330
<b>Kaman</b>			
- SE Turbine -	Kaman K 1200		K1200
<b>McDonnell Douglas Helicopters</b>			
- SE Turbine -	Hughes 369 D Hughes 369 E Hughes 369 HE Hughes 369 HS MD 500 N (NOTAR) MD 520 N MD 600	(D)	HU369/MD500N/600
- ME Turbine -	MD 900 MD 902	(D)	MD900/902
<b>Robinson</b>			
- SE Piston	R 22 R 22 A R 22 B R 44		R22 R44
<b>Silvercraft</b>			
- SE Piston -	SV 4		SV4
<b>Sikorsky</b>			
- SE Piston -	S 55 S 58		SK55 SK58
- ME Turbine -	S 58 T S 76 A S 76 A+ S 76 A++ S 76 B S 76 C	(D)	SK58T SK76/76B/76C/76C+



Appendix 1 to JAR-FCL 2.220 (continued)

1 Manufacturer	2 Helicopter	3	4 Licence endorsement
	S-61 N S-61 S		SK61
<b>Westland</b>			
- SE Piston -	Westland Bell 47 G3 B-1		Bell47
<b>Westland Helicopters</b>			
- SE Piston -	Westland S 55 Series 1	(D)	WHS55
- SE Turbine -	Westland S 55 Series 3		
<b>Ministry of Aviation Industry of Russia</b>			
- ME Piston -	Kamov KA 26 D		KA26D
- ME Turbine -	Kamov KA 32 A		KA32
	MIL Mi-8		Mi8
	MIL Mi 17		
	MiL Mi 171		
MiL Mi 172			
<b>P.Z.L. Swidnik, Poland</b>			
- ME Turbine -	MIL Mi-2		Mi-2
	PZL KANIA		KANIA
	PZL W-3	(D)	W-3SOKOL
	PZL W-3A		

[Amdt. 1, 01.12.00, Amdt. 2, 01.11.02; Amdt. 3, 01.09.03]

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**Appendix 1 to JAR-FCL 2.240 & 2.295****Skill test and proficiency check for helicopter type ratings and ATPL**

(See JAR-FCL 2.240 through 2.262 and 2.295)

(See AMC FCL 2.261(a))

(See IEM FCL 2.240(1) and (2))

(See Appendix 1 to JAR-FCL 2.261(a))

1 The applicant shall have completed the required instruction in accordance with the syllabus (see also Appendix 1 to JAR-FCL 2.261(a) and Appendices 2 and 3 to JAR-FCL 2.240). The administrative arrangements for confirming the applicant's suitability to take the test, including disclosure of the applicant's training record to the examiner, shall be determined by the Authority.

2 Items to be covered in skill tests/proficiency checks are given in the applicable Appendix 2 and 3 to JAR-FCL 2.240. With the approval of the Authority, several different skill test/proficiency check scenarios may be developed containing simulated line operations. The examiner will select one of these scenarios. Flight simulators, if available and other training devices as approved shall be used.

3 (a) An applicant shall pass [all sections] of the skill test/proficiency check. Failure in more than [5 items] will require the applicant to take the entire test/check again. [ ] An applicant failing [not more than 5 items] shall take the failed [section] again. Failure in any item of the re-test/re-check and failure in any other items already passed, will require the applicant to take the entire test/check again. [All sections of the skill test/proficiency check shall be completed within six months.]

(b) If an additional authorisation for instrument approaches down to a decision height of less than 60m/200ft (cat II/III) is sought, the applicant shall pass the items in Appendix 4 to JAR-FCL 2.240 on the relevant type

4 Further training may be required after a failed test/check. Failure to achieve a valid pass in all sections in two attempts shall require further training as determined by the examiner. There is no limit to the number of skill tests/proficiency checks that may be attempted.

**CONDUCT OF THE TEST/CHECK – GENERAL**

5 The Authority will provide the examiner with safety criteria to be observed in the conduct of the test/check.

6 Should an applicant choose not to continue with a test/check for reasons considered inadequate by the examiner, the applicant will be regarded as having failed those items not attempted. If the test/check is terminated for reasons considered adequate by the examiner, only those items not completed shall be tested in a further flight.

7 At the discretion of the examiner any manoeuvre or procedure of the test/check may be repeated once by the applicant. The examiner may stop the test/check at any stage if it is considered that the applicant's competency requires a complete re-test/re-check.

8 Checks and procedures shall be completed in accordance with the authorised check list for the helicopter used in the test/check and, if applicable, with the MCC concept. Performance data for take-off, approach and landing shall be calculated by the applicant in compliance with the operations manual or flight manual for the helicopter used. Decision heights/altitude, minimum descent heights/altitudes and missed approach point shall be determined by the applicant for the ATPL(H) and/or for the type rating holder during the proficiency check, as applicable.

**SPECIAL REQUIREMENTS FOR THE SKILL TEST/PROFICIENCY CHECK FOR A MULTI-PILOT HELICOPTER TYPE RATING AND FOR THE SKILL TEST REQUIRED FOR THE ATPL(H)**

9 The test/check for a multi-pilot helicopter shall be performed in a multi-crew environment. Another applicant or another pilot, may function as second pilot. If a helicopter, rather than a flight simulator, is used for the test/check, the second pilot shall be an instructor.

10 An applicant for the initial issue of a multi-pilot helicopter type rating or ATPL(H) shall be required to operate as 'pilot flying' (PF) during all sections of the test/check (in accordance with Appendix 2 to JAR-FCL 2.240 & 2.295). In addition, the applicant shall also demonstrate the ability to act as 'pilot not flying' (PNF). The applicant may choose either the left hand or the right hand seat for the test/check.

Appendix 1 to JAR-FCL 2.240 & 2.295 (continued)

11 The following matters shall be specifically checked when testing/checking applicants for the ATPL(H) or a type rating for multi-pilot helicopters extending to the duties of a pilot-in-command, irrespective of whether the applicant acts as PF or PNF:

- (a) management of crew co-operation;
- (b) maintaining a general survey of the helicopter operation by appropriate supervision; and
- (c) setting priorities and making decisions in accordance with safety aspects and relevant rules and regulations appropriate to the operational situation, including emergencies.

12 The test/check should be accomplished under IFR, if applicable and as far as possible in a simulated commercial air transport environment. An essential element is the ability to plan and conduct the flight from routine briefing material.

#### FLIGHT TEST TOLERANCE

13 The applicant shall demonstrate the ability to:

- (a) operate the helicopter within its limitations;
- (b) complete all manoeuvres with smoothness and accuracy;
- (c) exercise good judgement and airmanship;
- (d) apply aeronautical knowledge;
- (e) maintain control of the helicopter at all times in such a manner that the successful outcome of a procedure or manoeuvre is never in doubt;
- (f) understand and apply crew co-ordination and incapacitation procedures, if applicable; and
- (g) communicate effectively with the other crew members, if applicable.

14 The following limits are for general guidance. The examiner shall make allowance for turbulent conditions and the handling qualities and performance of the type of helicopter used.

#### Height

Generally	±100 feet
Starting a go-around at decision height	+50 feet/-0 feet
Minimum descent height/altitude	+50 feet/-0 feet

#### Tracking

on radio aids	± 5°
Precision approach	half scale deflection, azimuth and glide path

#### Heading

all engines operating	± 5°
with simulated engine failure	± 10°

#### Speed

all engines operating	± 5 knots
with simulated engine failure	+10 knots/ -5 knots

#### Ground drift

T.O. hover I.G.E.	±3 feet
landing	±2 feet (with 0 feet rearward or lateral flight)

#### CONTENT OF THE SKILL TEST/PROFICIENCY CHECK

15 The skill test and proficiency check contents and sections are set out in Appendix 2 to JAR-FCL 2.240 for multi-pilot helicopters and at Appendix 3 to JAR-FCL 2.240 for single-pilot helicopters. The format and application form to the skill test may be determined by the Authority (See IEM FCL 2.240(1) and (2)).

[Amdt. 1, 01.12.00; Amdt. 2, 01.11.02; Amdt. 3, 01.09.03]

**Appendix 2 to JAR-FCL 2.240 & 2.295****Contents of the ATPL/type rating/training/skill test and proficiency check on multi-pilot helicopters**

(See JAR-FCL 2.240 through 2.262 and 2.295)

1 The following symbols mean:

P = Trained as Pilot-in-command or Co-pilot and as Pilot Flying (PF) and Pilot Not Flying (PNF) for the issue of a type rating as applicable.

2 The practical training shall be conducted at least at the training equipment level shown as (P), or may be conducted up to any higher equipment level shown by the arrow (---->).

The following abbreviations are used to indicate the training equipment used:

FS = Flight Simulator

FTD = Flight Training Device

H = Helicopter

3.1 The starred items (\*) shall be flown in actual or simulated IMC only by applicants wishing to renew or revalidate an IR for MPH, or extend the privileges of that rating to another type.

3.2 Instrument flight procedures (Sections 4 ) shall be performed only by applicants wishing to renew or revalidate an IR or extend the privileges of that rating to another type.

3.3 For the skill test for the issue of an ATPL(H), all starred items shall be flown in actual or simulated IMC.

4 Where the letter 'M' appears in the skill test/ proficiency check column this will indicate the mandatory exercise.

5 A flight simulator shall be used for practical training and testing if the flight simulator forms part of an approved type-rating course. The following considerations will apply to the approval of the course:

- (a) the qualification of the flight simulator as set out in JAR-STD;
- (b) the qualifications of the instructor and examiner;
- (c) the amount of line-orientated flight training provided on the course;
- (d) the qualifications and previous line operating experience of the pilot under training; and
- (e) the amount of supervised line flying experience provided after the issue of the new type rating.

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**SECTION 1**

**JAR-FCL 2**

Appendix 2 to JAR-FCL 2.240 & 2.295 (continued)

Manoeuvres / Procedures (Including MCC)		Practical Training				Skill Test/ Proficiency Check	
		Trained in :			Instructor's initials when training completed	Chkd. in	Examiner's initials when test/check passed
		FTD	FS	H		FS, H	
<b>SECTION 1</b>							
1	Pre-flight preparations and checks						
1.1	Helicopter exterior visual inspection; location of each item and purpose of inspection.			P		M	
1.2	Cockpit inspection		P	---->		M	
1.3	Starting procedures, radio and navigation equipment check, selection and setting of navigation and communication frequencies	P	---->	---->		M	
1.4	Taxiing /air taxiing in compliance with air traffic control instructions or on instructions of an instructor		P	---->		M	
1.5	Pre take off procedures and checks	P	---->	---->		M	
<b>SECTION 2</b>							
2	Take-offs						
2.1	Take-offs (various profiles )		P	---->			
2.2	Cross wind take-off (if practicable)		P	---->			
2.3	Take-off at maximum take-off mass (actual or simulated maximum take-off mass)		P	---->			
2.4	Take-offs with simulated engine failure:						
2.4.1	shortly before reaching TDP, or DPATO		P	---->		M	
2.4.2	shortly after reaching TDP, or DPATO		P*	----> *		M*	
<b>SECTION 3</b>							
3	Flight manoeuvres and procedures						
3.1	Turns		P	-->			
3.2	Landings, various profiles		P	-->			
3.2.1	Go around or landing following simulated engine failure before LDP or DPBL		P	-->		M	
3.2.2	Landing following simulated engine failure after LDP or DPBL		P	-->			
3.3	Normal and abnormal operations of the following systems and procedures:					M	(A mandatory minimum of 3 items shall be selected from 3.3.1–3.3.17 inclusive)
3.3.1	Engine	P	----->	----->			
3.3.2	Air conditioning (heating, ventilation)	P	----->	----->			
3.3.3	Pitot/static system	P	----->	----->			
3.3.4	Fuel System	P	----->	----->			
3.3.5	Electrical system	P	----->	----->			
3.3.6	Hydraulic system	P	----->	----->			
3.3.7	Flight control and Trim-system	P	----->	----->			
3.3.8	Anti- and de-icing system	P	----->	----->			

Appendix 2 to JAR-FCL 2.240 &amp; 2.295 (continued)

Manoeuvres / Procedures (Including MCC)		Practical Training				Skill Test/ Proficiency Check	
		Trained in :			Instructor's initials when training completed	Chkd. in	Examiner's initials when test/check passed
		FTD	FS	H		FS, H	
3.3.9	Autopilot/Flight director	P	---->	---->			
3.3.10	Stability augmentation devices	P	---->	---->			
3.3.11	Weather radar, radio altimeter, transponder	P	---->	---->			
3.3.12	Area Navigation System	P	---->	---->			
3.3.13	Landing gear system	P	---->	---->			
3.3.14	Tail rotor control failure (if applicable)		P	---->			
3.3.15	Tail rotor loss (if applicable)		P	Helicopter shall not be used for this exercise			
3.3.16	Auxiliary power unit	P	---->	---->			
3.3.17	Radio, navigation equipment, instruments flight management system	P	---->	---->			
3.4	Abnormal and emergency procedures					M	A mandatory minimum of 3 items shall be selected from 3.4.1 to 3.5 inclusive
3.4.1	Fire drills (including evacuation if applicable)	P	---->	---->			
3.4.2	Smoke control and removal	P	---->	---->			
3.4.3	Engine failures, shut down and restart at a safe height	P	---->	---->			
3.4.4	Fuel dumping (simulated)	P	---->	---->			
3.4.5	Autorotation descent		P	---->		M	
3.4.6	Autorotative landing or power recovery		P	---->			
3.4.7	Incapacitation of crew member	P	---->	---->			
3.4.8	Other emergency procedures as outlined in the appropriate Flight Manual	P	---->	---->			
3.5	Turns with 30 degrees bank, 180 degrees to 360 degrees left and right, by sole reference to instruments		P	---->			
<b>SECTION 4</b>							
4	Instrument Flight Procedures (To be performed in IMC or simulated IMC).						
4.1	Instrument take-off : transition to instrument flight is required as soon possible after becoming airborne		P*	---->*			
4.2	Adherence to departure and arrival routes and ATC instructions	P*	---->*	---->*		M*	
4.3	Holding procedures	P*	---->*	---->*			

**SECTION 1**

**JAR-FCL 2**

Appendix 2 to JAR-FCL 2.240 & 2.295 (continued)

Manoeuvres / Procedures (Including MCC)		Practical Training				Skill Test/ Proficiency Check	
		Trained in :				Instructor's initials when training completed	Chkd. in
		FTD	FS	H		FS, H	
4.4	ILS-approaches down to CAT 1 decision height						
4.4.1	manually, without flight director		P*	---->*		M*	
4.4.2	manually, with flight director		P*	---->*			
4.4.3	with coupled autopilot		P*	---->*			
4.4.4	manually, with one engine simulated inoperative. (Engine failure has to be simulated during final approach before passing the outer marker (OM) until touchdown, or through the complete missed approach procedure)		P*	---->*		M*	
4.5	Non-precision approach down to the minimum descent altitude MDA/H		P*	---->*		M*	
4.6	INTENTIONALLY LEFT BLANK						
4.7	Missed Approach Procedures						
4.7.1	Go-around with all engines operating on reaching decision height/MDA		P*	---->*			
4.7.2	Other missed approach procedures		P*	---->*			
4.7.3	Go-around with one engine simulated inoperative on reaching decision height/MDA		P*	---->*		M*	
4.7.4	IMC autorotation with power recovery		P*	---->*		M*	
<b>SECTION 5</b>							
5	Use of optional equipment		P	---->			

[Amdt. 2, 01.11.02]

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**Appendix 3 to JAR-FCL 2.240****Contents of the type rating/training/skill test and proficiency check for single-engine and multi-engine single-pilot helicopters**

(See JAR-FCL 2.240 through 2.262)

(See Appendix 1 to JAR-FCL 2.160 & 2.165(a) (3))

1 The following symbols mean:

P = Trained as Pilot-in-command for the issue of a type rating.

2 The practical training shall be conducted at least at the training equipment level shown as (P), or may be conducted up to any higher equipment level shown by the arrow (--->).

The following abbreviations are used to indicate the training equipment used:

FS = Flight Simulator

FTD = Flight Training Device

H = Helicopter

3.1 The starred items (\*) shall be flown in actual or simulated IMC, only by applicants wishing to renew or revalidate an IR, or extend the privileges of that rating to another type.

3.2. Instrument flight procedures (Section 6) shall be performed only by applicants wishing to renew or revalidate an IR or extend the privileges of that rating to another type.

4 Where the letter 'M' appears in the skill test/ proficiency check column this will indicate the mandatory exercise.

5 A flight simulator shall be used for practical training and training if the flight simulator forms part of an approved type rating course. The following considerations will apply to the approval of the course:

- (a) the qualification of the flight simulator as set out in JAR-STD;
- (b) the qualifications of the instructor and examiner;
- (c) the amount of line-orientated flight training provided on the course;
- (d) the qualifications and previous line operating experience of the pilot under training; and
- (e) the amount of supervised line flying experience provided after the issue of the new type rating.

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## SECTION 1

## JAR-FCL 2

Appendix 3 to JAR-FCL 2.240 (continued)

Manoeuvres / Procedures		Practical Training				Skill Test/ Proficiency Check	
		Trained in :			Instructor's initials when training completed	Chkd. in	Examiner's initials when check passed
		FTD	FS	H		FS, H	
<b>SECTION 1</b>							
1	Pre-flight Checks and Preparations						
1.1	Helicopter exterior visual inspection; location of each item and purpose of inspection.			P		M	
1.2	Cockpit inspection		P	---->		M	
1.3	Prior to starting engines, starting procedures, radio and navigation equipment check, selection and setting of navigation and communication frequencies	P	---->	---->		M	
1.4	Taxiing/air taxiing in compliance with air traffic control instructions or on instructions of an instructor		P	---->		M	
1.5	Pre take off procedures	P	---->	---->		M	
<b>SECTION 2</b>							
2	Take-offs						
2.1	Take-offs (various profiles)		P	---->		M	
2.2	Cross wind take-off (if practicable)		P	---->			
2.3	Take-off at maximum take-off mass (actual or simulated maximum take-off mass)		P	---->			
2.4	Take-offs with simulated engine failure:						
2.4.1	shortly before reaching TDP, or DPATO		P	---->		M	
2.4.2	shortly after reaching TDP, or DPATO		P*	---->*		M*	
<b>SECTION 3</b>							
3	Flight manoeuvres and procedures						
3.1	Climbing and descending turns to specified headings	P	---->	---->		M	
3.2	Turns with 30 degrees bank, 180 degrees to 360 degrees left and right, by sole reference to instruments if equipped	P	---->	---->		M	
<b>SECTION 4</b>							
4	Autorotations						
4.1	Descent in autorotations		P*	---->*		M*	
4.2	Autorotation landing or power recovery		P	---->		M	
<b>SECTION 5</b>							
5	Landings						
5.1	Landings		P	---->		M	
5.1.1	Go around or landing following simulated engine failure before LDP or DPBL		P	---->		M	
5.1.2	Landing following simulated engine failure after LDP or DPBL		P	---->		M	

Appendix 3 to JAR-FCL 2.240 (continued)

Manoeuvres / Procedures		Practical Training				Skill Test/ Proficiency Check	
		Trained in :			Instructor's initials when training completed	Chkd. in	Examiner's initials when check passed
		FTD	FS	H		FS, H	
<b>SECTION 6</b>							
6	Instrument flight procedures to be performed in IMC or simulated IMC						
6.1	Instrument take-off: transition to instrument flight is required immediately after being established in the climb. Adherence to departure and arrival routes and ATC instructions		P*	---->*		M*	
6.2	Holding procedures	P*	----->*	---->*			
6.3	ILS-approaches down to CAT 1 decision height						
6.3.1	Manually, without flight director		P*	---->*		M*	
6.3.2	Manually, with flight director		P*	---->*			
6.3.3	With coupled autopilot		P*	---->*			
6.4	NDB or VOR/LOC-approach down to the minimum descent altitude (MDA/H)		P*	---->*		M*	
6.5	INTENTIONALLY LEFT BLANK						
6.6	Missed Approach Procedures						
6.6.1	Go-around after an ILS approach on reaching decision height		P*	---->*		M*	
6.6.2	Other missed approach procedures		P*	---->*			
6.6.3	Go around with one engine inoperative		P*	---->*		M*	
6.7	IMC autorotation and power recovery		P*	---->*		M*	

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**SECTION 1**

**JAR-FCL 2**

Appendix 3 to JAR-FCL 2.240 (continued)

		Practical Training				Skill Test/ Proficiency Check	
Manoeuvres / Procedures		Trained in:			Instructor's initials when training completed	Chkd. in	Examiner's initials when check passed
		FTD	FS	H		FS, H	
<b>SECTION 7</b>							
7	Normal and abnormal operations of following systems and procedures:					M	(A mandatory minimum of 3 items shall be selected from 7.1 – 7.16 inclusive)
7.1	Engine	P	---->	---->			
7.2	Air-conditioning (heatings, ventilation)	P	---->	---->			
7.377 7	Pitot/static system	P	---->	---->			
7.4	Fuel system	P	---->	---->			
7.5	Electrical system	P	---->	---->			
7.6	Hydraulic system	P	---->	---->			
7.7	Flight control and Trim-system	P	---->	---->			
7.8	Anti- and de-icing system	P	---->	---->			
7.9	Autopilot/Flight director	P	---->	---->			
7.10	Stability augmentation devices	P	---->	---->			
7.11	Weather radar, radio altimeter, transponder	P	---->	---->			
7.12	Area Navigation System	P	---->	---->			
7.13	Landing gear system	P	---->	---->			
7.14	Tail rotor control failure (if applicable)		P	---->			
7.15	Tail rotor loss (if applicable)		P	X			
7.16	Radio, navigation equipment, instruments, flight management system	P	---->	---->			
<b>SECTION 8</b>							
8	Abnormal and emergency procedures						
8.1	Fire drills (including evacuation if applicable)					M	
8.2	Smoke control and removal	P	---->	---->		M	
8.3	Other emergency procedures as outlined in the appropriate Flight Manual	P	---->	---->		M	
8.4	Engine failure, shut down and restart at safe altitude	P	---->				
<b>SECTION 9</b>							
9	Use of optional equipment		P	---->			

[Amdt. 1, 01.12.00; Amdt. 2, 01.11.02]

**Appendix 4 to JAR-FCL 2.240**

**Additional authorisation on a type rating for instrument approaches down to a decision height of less than 60m (200 ft) (CAT II/III)**

(See AMC FCL 2.261(a))

**A. Theoretical knowledge instruction (additional)**

1 Special requirements for extension of a type rating for Instrument Approaches down to a decision height of less than 200 ft (60 m)

2 Equipment, procedures and limitations

**B. Manoeuvres and Procedures (additional)**

Manoeuvres / Procedures (including MCC)	Practical Training				Skill Test/ Proficiency Check		
	Trained in:				Instructor's initials when training completed	Chkd. in	Examiner's initials when test/check passed
		FTD	FS	H		FS, H	
Additional authorisation on a type rating for instrument approaches down to a decision height of less than 60 m (200 ft) (CAT II/III) Following manoeuvres and procedures are to be trained for the purpose of type rating extension to instrument approach down to a DH of less than 60 m (200 ft). During the following instrument approaches and missed approach procedures all equipment necessary for type certification of instrument approaches down to a decision height of less than 60 m (200 ft) shall be used							
1 Aborted take-off: at take-off weather minima			P *	-----> *		M *	
2 ILS approach down to a decision height applied for using flight guidance system. Standard procedures of crew co-ordination (task sharing, calling procedures, mutual surveillance, information and support) are to be observed particularly			P *	-----> *		M *	
3 Go-around After approaches as indicated in 2 on reaching decision height. The transition training also shall include go-around due to (simulated) insufficient runway visual range, wind shear, aircraft deviation more than tolerable for a successful approach, and ground/airborne equipment failure prior to reaching decision height, furthermore, go-around with airborne equipment failure. Special attention shall be given to go-around procedures with pre-calculated manual or automatic go-around attitude guidance			P *	-----> *		M *	
4 Landing(s) With visual reference established at decision height following an instrument approach. Depending on the specific flight guidance system, an automatic landing shall be performed.			P *	-----> *		M *	

[Amdt. 2, 01.11.02]

**Appendix 1 to JAR-FCL 2.245(b)(3)**  
**Cross-Crediting of Proficiency Checks for revalidation of type ratings**  
 (See JAR-FCL 2.245(b)(3) and JAR-FCL 2.245(c) )

This Appendix includes a list of single-engine piston helicopter types and licence endorsement for the purpose of revalidation of type ratings according to JAR-FCL 2.245 (b) (3).

<b>Manufacturer</b>	<b>Helicopter Type and Licence Endorsement</b>
<b>Agusta-Bell</b>	
- SE piston	Bell47
<b>Bell Helicopters</b>	
- SE piston	Bell47
<b>Brantley</b>	
-SE piston	BrantleyB2
<b>Breda Nardi</b>	
- SE piston	HU269
<b>Enstrom</b>	
- SE piston	ENF28
<b>Hiller</b>	
- SE piston	UH12
<b>Hughes/Schweitzer</b>	
- SE piston	HU269
<b>Westland</b>	
- SE piston	Bell47

[Amdt. 1, 01.12.00]

**[Appendix 1 to JAR-FCL 2.255****Contents of the approved pre-entry course for the purpose of a first type rating for a multi-engine helicopter**

(See JAR-FCL 2.255(a))

(See Appendix 2 to JAR-FCL 2.055, para. 24)

1. The approved pre-entry course shall comprise the following subjects of the CPL(H) theoretical knowledge course:

020 Aircraft General Knowledge:

- airframe/systems/power plant
- instrument/electronics

030 Flight Performance and Planning:

- mass and balance
- performance

2. At the end of the course the applicant shall receive a certificate of satisfactory completion.]

[Amdt. 3, 01.09.03]

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**Appendix 1 to JAR-FCL 2.261(a)****Theoretical knowledge instruction requirements for skill test/proficiency checking for type ratings**

(See JAR-FCL 2.261(a))

(See AMC FCL 2.261(a))

1 The theoretical knowledge instruction shall be conducted by an authorised instructor holding the appropriate type rating or any instructor having appropriate experience in aviation and knowledge of the aircraft concerned, e.g. flight engineer, maintenance engineer, flight operations officer.

2 The theoretical knowledge instruction shall cover the syllabus in AMC FCL 2.261(a), as appropriate to the helicopter type concerned. Depending on the equipment and systems installed, the instruction shall include but is not limited to the following contents:

- (a) Helicopter structure, transmissions, rotor and equipment, normal and abnormal operation of systems.
  - Dimensions
  - Engine including aux. power unit, rotors and transmissions
  - Fuel system-
  - Air-conditioning
  - Ice protection, windshield wipers and rain repellent
  - Hydraulic system
  - Landing gear
  - Flight controls, stability augmentation and autopilot systems
  - Electrical power supply
  - Flight instruments, communication, radar and navigation equipment
  - Cockpit, cabin and cargo compartment
  - Emergency equipment
- (b) Limitations
  - General limitations, according to the helicopter flight manual
  - Minimum equipment list
- (c) Performance, flight planning and monitoring
  - Performance
  - Flight planning
- (d) Load and balance and servicing
  - Load and balance
  - Servicing on ground
- (e) Emergency procedures
- (f) Special requirements for helicopters with electronic flight instrument systems (EFIS)
- (g) Optional equipment

3 For the initial issue of type ratings for multi-pilot helicopters the written or computer based examination shall comprise at least one hundred multiple-choice questions distributed appropriately across the main subjects of the syllabus. The pass mark shall be 75% in each of the main subjects of the syllabus.

4 For the initial issue of type ratings for single-pilot helicopters the number of multi-choice questions in the written or computer based examination shall depend on the complexity of the helicopters. The pass mark shall be 75%.

5 For proficiency checks multi-pilot and single-pilot multi-engine helicopters theoretical knowledge shall be verified by a multi-choice questionnaire or other suitable methods.

[Amdt. 1, 01.12.00; Amdt. 2, 01.11.02]

**Appendix 1 to JAR-FCL 2.261(d)**  
**Multi-crew co-operation course (Helicopter)**

(See JAR-FCL 2.261(d))

(See AMC FCL 2.261(d))

1 The aim of the course is to enable pilots to become proficient in multi-crew co-operation (MCC) in order to operate safely multi-pilot helicopters under IFR and VFR.

a. The pilot-in-command fulfils his managing and decision-making functions irrespective whether he is PF or PNF.

b. The tasks of PF and PNF are clearly specified and distributed in such a manner that the PF can direct his full attention to the handling and control of the aircraft.

c. Co-operation is effected in an orderly manner appropriate to the normal, abnormal or emergency situations encountered.

d. Mutual supervision, information and support is ensured at all times.

**INSTRUCTORS**

2 Instructors for MCC training should be thoroughly familiar with human factors and crew resource management (CRM). They should be current with the latest developments in human factors training and CRM techniques.

**THEORETICAL KNOWLEDGE**

3 The theoretical knowledge syllabus is set out in AMC FCL 2.261(d). An approved MCC theoretical knowledge course shall comprise not less than 25 hours.

**FLYING TRAINING**

4 The flying training syllabus is set out in AMC FCL 2.261(d).

**CERTIFICATE OF COMPLETION**

5 On completion of the course, the applicant may be issued with a certificate of satisfactory completion of the course.

**CROSS-CREDITING**

6 A holder of a certificate of completion of MCC training on aeroplanes or experience of more than 500 hours as pilot on multi-pilot aeroplanes shall be exempted from the requirement to complete the theoretical knowledge syllabus as set out in AMC FCL 2.261(d).

[Amdt. 2, 01.11.02]



## SUBPART G – AIRLINE TRANSPORT PILOT LICENCE (Helicopter) – ATPL(H)

JAR-FCL 2.280(a)(2) (continued)

**JAR-FCL 2.265 Minimum age**

An applicant for an ATPL(H) shall be at least 21 years of age.

**JAR-FCL 2.270 Medical fitness**

An applicant for an ATPL (H) shall hold a valid Class 1 medical certificate. In order to exercise the privileges of the ATPL(H), a valid Class 1 medical certificate shall be held.

**JAR-FCL 2.275 Privileges and conditions**

(a) *Privileges.* Subject to any other conditions specified in JARs, the privileges of the holder of an ATPL(H) are to:

(1) exercise all the privileges of the holder of a PPL(H) and CPL(H); and

(2) act as pilot-in-command or co-pilot in helicopters engaged in air transportation.

(b) *Conditions.* An applicant for an ATPL(H) who has complied with the conditions specified in JAR-FCL 2.265, 2.270 and 2.280 through 2.295 shall have fulfilled the requirements for the issue of an ATPL(H) containing a type rating for the helicopter type used on the skill test.

**JAR-FCL 2.280 Experience and crediting**

(a) An applicant for an ATPL(H) shall have completed as a pilot of helicopters at least 1 000 hours of flight time (see also JAR-FCL 2.050(a)(3)) of which a maximum of 100 hours may have been completed in a [STD, of which not more than 25 hours in a FNPT], including at least:

(1) 350 hours in multi-pilot operations in helicopters type certificated for a minimum of two pilots under IFR in accordance with FAR/JAR 27 and 29 helicopter category, or equivalent code; or in helicopters required to be operated by two pilots under JAR-OPS.

(2) 250 hours either as pilot-in-command or at least 100 hours as pilot-in-command and 150 hours as co-pilot performing, under the supervision of the pilot-in-command the duties and functions of a

pilot-in-command provided that the method of supervision is acceptable to the Authority;

(3) 200 hours of cross-country flight time of which at least 100 hours shall be as pilot-in-command or as co-pilot performing under the supervision of the pilot-in-command the duties and functions of a pilot-in-command, provided that the method of supervision is acceptable to the Authority;

(4) 70 hours of instrument time of which not more than 30 hours may be instrument ground time; and

(5) 100 hours of night flight as pilot-in-command or as co-pilot.

(b) Holders of a pilot licence or equivalent document for other categories of aircraft will be credited with flight time in such other categories of aircraft as set out in JAR-FCL 2.155(a) except flight time in aeroplanes which will be credited up to 50% of all the flight time requirements of sub-paragraph (a).

(c) The experience required shall be completed before the skill test given in JAR-FCL 2.295 is taken.

[Amdt. 3, 01.09.03]

**JAR-FCL 2.285 Theoretical knowledge**

(See Appendix 1 to JAR-FCL 2.285)

[(See Appendix 1 to JAR-FCL 2.005)]

(a) *Course.* An applicant for an ATPL(H) shall have received theoretical knowledge instruction at an approved flying training organisation (FTO) [ ]. An applicant who has not received the theoretical knowledge instruction during an integrated course of training shall take the course set out in Appendix 1 to JAR-FCL 2.285. The holder of a CPL(H) and IR(H) satisfies the knowledge requirements for the issue of an ATPL(H).

(b) *Examination.* An applicant for an ATPL(H) shall have demonstrated a level of knowledge appropriate to the privileges granted to the holder of an ATPL(H) and in accordance with the requirements in JAR-FCL Subpart J.

[ Amdt. 3, 01.09.03]

**JAR-FCL 2.290 Flight instruction**

(See AMC FCL 2.261(d))

(See Appendix 1 to JAR-FCL 2.261(d))

An applicant for an ATPL(H) shall be the holder of a CPL(H) [ ], a multi-engine instrument rating (H) and have received instruction in multi-crew co-operation as required by JAR-FCL 2.261(d) (see Appendix 1 to JAR-FCL 2.261(d) and AMC FCL 2.261(d)).

[Amdt.2, 01.11.02; Amdt. 3, 01.09.03]

**JAR-FCL 2.295 Skill**

(a) An applicant for an ATPL(H) shall have demonstrated the ability to perform as pilot-in-command of a helicopter type certificated for a minimum crew of two pilots under IFR in accordance with FAR/JAR 27 and 29 helicopter category, or equivalent code; or helicopter required to be operated by two pilots under JAR-OPS, the procedures and manoeuvres described in JAR-FCL Appendix 1 and 2 to JAR-FCL 2.240 and 2.295 with a degree of competency appropriate to the privileges granted to the holder of an ATPL(H).

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(b) The ATPL(H) skill test may serve at the same time as a skill test for the issue of the licence and a proficiency check for the revalidation of the type rating for the helicopter used in the test and may be combined with the skill test for the issue of a multi-pilot type rating.

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**Appendix 1 to JAR-FCL 2.285****ATPL(H) – Modular theoretical knowledge course**

(See JAR-FCL 2.285)

(See Appendix 1 to JAR-FCL 2.470)

1 The aim of this course is to train pilots who have not received the theoretical knowledge instruction during an integrated course to the level of theoretical knowledge required for the ATPL(H).

2 An applicant wishing to undertake an ATPL(H) modular course of theoretical knowledge instruction shall be required under the supervision of the Head of Training of an approved FTO to complete 650 hours (1 hour = 60 minutes instruction) of instruction for ATPL theory within a period of 18 months. An applicant shall be the holder of a PPL(H) [issued in accordance with ICAO Annex 1.]

Holders of an IR(H) may have the theoretical instruction hours reduced by 200 hours. [ ]

3 The FTO shall ensure that before being admitted to the course the applicant has a sufficient level of knowledge of Mathematics and Physics to facilitate an understanding of the content of the course.

4 The instruction shall cover all items in the relevant syllabi set out in the AMC FCL 2.470(a). An approved course should include formal classroom work and may include the use of such facilities as inter-active video, slide/tape presentation, learning carrels and computer based training and other media as approved by the Authority. Approved distance learning (correspondence) courses may also be offered as part of the course at the discretion of the Authority.

[Amdt.2, 01.11.02; Amdt. 3, 01.09.03]

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**SUBPART H – INSTRUCTOR RATINGS (Helicopter)****JAR-FCL 2.300 Instruction – General**  
(See Appendix 1 to JAR-FCL 2.300)

(a) A person shall not carry out the flight instruction required for the issue of any pilot licence or rating unless that person has:

(1) a pilot licence containing an instructor rating; or

(2) a specific authorisation granted by a JAA Member State in cases where:

(i) new helicopters are introduced; or

(ii) vintage helicopters or helicopters of special manufacture are registered, for which no person has an instructor rating; or

(iii) training is conducted outside JAA Member States by instructors not holding a JAR-FCL licence (see Appendix 1 to JAR-FCL 2.300).

(b) A person shall not carry out synthetic flight instruction unless holding a FI(H), TRI(H), IRI(H) rating or SFI(H) authorisation

[Amdt. 1, 01.12.00]

**JAR-FCL 2.305 Instructor ratings and authorisation – Purposes**

Four instructor categories are recognised.

(a) Flight instructor rating- helicopter (FI(H)).

(b) Type rating instructor rating- helicopter (TRI(H)).

(c) Instrument rating instructor rating – helicopter (IRI(H)).

(d) Synthetic flight instructor authorisation – helicopter (SFI(H)).

**JAR-FCL 2.310 Instructor ratings – General**

(a) *Pre-requisites.* All instructors shall hold at least the licence, rating and qualification for which instruction is being given (unless specified otherwise) and shall be entitled to act as pilot-in-command of the aircraft during such training.

(b) *Multiple roles.* Provided that they meet the qualification and experience requirements set out in this Subpart for each role undertaken, instructors are

JAR-FCL 2.310(b) (continued)

not confined to a single role as flight instructors (FIs), type rating instructors (TRIs) or instrument rating instructors (IRIs).

(c) *Credit towards further ratings.* Applicants for further instructor ratings may be credited with the teaching and learning skills already demonstrated for the instructor rating held.

**JAR-FCL 2.315 Instructor ratings – Period of validity**

(a) All instructor ratings and [ ] authorisations are valid for a period of 3 years.

(b) An applicant who fails to achieve a pass in all sections of a proficiency check before the expiry date of an instructor rating shall not exercise the privileges of that rating until a new proficiency check has successfully been completed.

[Amdt. 1, 01.12.00, Amdt. 2, 01.11.02; Amdt. 3, 01.09.03]

**JAR-FCL 2.320 Flight Instructor rating (helicopter) (FI(H)) – Minimum age**

An applicant for a flight instructor rating shall be at least 18 years of age.

**JAR-FCL 2.325 FI(H) – Restricted privileges**

(a) *Restricted period.* Until the holder of a FI(H) rating has completed at least 100 hours flight instruction and, in addition, has supervised at least 25 student solo flights, the privileges of the rating are restricted. The restrictions will be removed from the rating when the above requirements have been met and on the recommendation of the supervising FI(H).

(b) *Restrictions.* The privileges are restricted to carrying out under the supervision of a FI(H) approved for this purpose:

(1) flight instruction for the issue of the PPL(H) – or those parts of integrated courses at PPL(H) level – and type ratings for single-engine helicopters, excluding approval of first solo flights by day or by night and first solo navigation flights by day or by night; and

(2) night flying instruction, provided a helicopter night qualification is held, the ability to instruct at night has been demonstrated to a FI(H) authorised to conduct FI(H) training in accordance

JAR-FCL 2.325(b)(2) (continued)

with JAR-FCL 2.330(f) and the night currency requirement of JAR-FCL 2.026 is satisfied.

[Amdt. 2, 01.11.02]

**JAR-FCL 2.330 FI(H) – Privileges and requirements**

(See JAR-FCL 2.325)

(See JAR-FCL 2.365)

(See Appendix 1 to JAR-FCL 2.330 & 2.345)

(See AMC FCL 2.395)

(See Appendix 1 to JAR-FCL 2.395)

[Provided that in the preceding 12 months the FI(H) has completed not less than 15 hours of flight instruction (which may include skill testing/proficiency checking) on single-pilot helicopters, or passed, as a proficiency check, the skill test set out in Appendices 1 & 2 to JAR-FCL 2.330 and 2.345,] the privileges of the holder of FI(H) rating (for restrictions see JAR-FCL 2.325) are to conduct flight instruction for [the issue of]:

(a) [a] PPL(H) [ ]

(b) [ ] a CPL(H), provided that the FI(H) has completed at least 500 hours of flight time as a pilot of helicopters including at least 200 hours of flight instruction;

(c) [type ratings for single-pilot single-engine helicopters]

[(d) a helicopter] night [qualification]

[(e)] [ ] an instrument rating, provided that the [FI(H)] has:

(1) at least 200 hours [of instrument] flight time in helicopters [ ] of which up to 50 hours may be instrument ground time in a flight simulator or FNPT II; and

(2) completed as a student an approved course comprising at least 5 hours of flight instruction in a helicopter, flight simulator or FNPT II (see Appendix 1 to JAR-FCL 2.395 and AMC FCL 2.395) and has passed the appropriate skill test as set out in Appendix 1 to JAR-FCL 2.330 and 2.345;

[(f)] [ ] a single-pilot multi-engine type rating, provided that the [FI(H)] meets the requirements of JAR-FCL 2.365 (a), (b), (d) and (f); and [has]

(1) [ ] at least 50 hours as pilot-in-command of single-pilot multi-engine helicopters, including at least 5 hours flight time on the same type of helicopter to be used for the skill test,

JAR-FCL 2.330(f) (continued)

(2) [ ] completed as a student an approved course of at least [5] hours of flight instruction on the helicopter or a flight simulator of the helicopter type concerned (see Appendix 1 to JAR-FCL 2.365 and AMC FCL 2.365); and

(3) [ ] passed a skill test for the initial issue of a single-pilot multi-engine FI(H) rating as set out in Appendix 1 to JAR-FCL 2.330 and 2.345;

[(g)] [ ] a FI(H) rating, provided that the [FI(H)] has:

(1) [ ] completed at least 500 hours of [flight] instruction in helicopters;

(2) [ ] demonstrated to a FI[E](H) [ ] the ability to instruct a FI(H) during a skill test conducted in accordance with Appendix 1 to JAR-FCL 2.330 and 2.345; and

(3) is authorised by the Authority for this purpose.

[Amdt. 1, 01.12.00; Amdt. 2, 01.11.02; Amdt. 3, 01.09.03]

**JAR-FCL 2.335 FI(H) – Pre-requisite requirements**

(See Appendix 3 to JAR-FCL 2.240)

(See Appendix 1 to JAR-FCL 2.470)

Before being permitted to begin an approved course of training for a FI(H) rating an applicant shall have:

(a) completed at least 300 hours of flight time of which at least 100 hours shall be as pilot-in-command if holding a ATPL(H) or CPL(H) or 200 hours as pilot-in-command if holding a PPL(H);

(b) met the knowledge requirements for a CPL(H) as set out in Appendix 1 to JAR-FCL 2.470;

(c) received at least 10 hours instrument flight instruction of which not more than five hours may be instrument ground time in a FNPT II or a flight simulator;

(d) completed at least 20 hours of cross-country flight as pilot-in-command; and

(e) passed a specific pre-entry flight test with an FI qualified as in JAR-FCL 2.330(f) based upon the proficiency check as set out in Appendix 3 to JAR-FCL 2.240 within the six months preceding the start of the course. The flight test will assess the ability of the applicant to undertake the course.

[Amdt. 2, 01.11.02]

**JAR-FCL 2.340 FI(H) – Course**  
(See AMC FCL 2.340)  
(See Appendix 1 to JAR-FCL 2.340)

(a) An applicant for the FI(H) rating shall have completed an approved course of theoretical knowledge instruction and flight training at an approved FTO (see Appendix 1 to JAR-FCL 2.340 and AMC FCL 2.340).

(b) The course is intended to train the applicant to give instruction on single-engine single-pilot helicopters up to PPL(H) standard. The flight instruction shall comprise at least 30 hours of flight training, of which 25 hours shall be dual flight instruction. The remaining five hours may be mutual flying (i.e. two applicants flying together to practice flight demonstrations). Of the 25 hours, five hours may be conducted in a flight simulator or FNPT approved for this purpose by the Authority. The skill test is additional to the course training time.

[Amdt. 2, 01.11.02]

**JAR-FCL 2.345 FI(H) – Skill**  
(See Appendix 1 and 2 to JAR-FCL 2.330 & 2.345)

An applicant for a FI(H) rating shall demonstrate to an examiner notified by the Authority for this purpose the ability to instruct a student pilot to the level required for the issue of a PPL(H), including pre-flight, post-flight and theoretical knowledge instruction, in accordance with the requirements of Appendices 1 and 2 to JAR-FCL 2.330 & 2.345.

**JAR-FCL 2.350 FI(H) – Rating issue**

An applicant for a FI(H) rating who has complied with the conditions specified in JAR-FCL 2.310, 2.315 and 2.335 through 2.345 shall have fulfilled the requirements for the issue of a FI(H) rating, subject to the initial restrictions set out in JAR-FCL 2.325.

**JAR-FCL 2.355 FI(H) – Revalidation and renewal**  
(See Appendices 1 and 2 to JAR-FCL 2.330 & 2.345)  
(See AMC FCL 2.355(a)(2))  
(See IEM FCL 2.355)

(a) For revalidation of a FI(H) rating the holder shall fulfil two of the following three requirements:

(1) completed at least 100 hours of flight instruction in helicopters as FI, IRI or as Examiner during the period of validity of the rating, including at least 30 hours of flight instruction (which may include skill testing/proficiency checking) within the 12 months preceding the expiry date of the FI rating;

(2) attended a FI refresher seminar (see AMC FCL 2.355(a)(2)), as approved by the Authority, within the validity period of the FI rating;

(3) passed, as a proficiency check, the skill test set out in Appendices 1 and 2 to JAR-FCL 2.330 & 2.345 within the 12 months preceding the expiry date of the FI rating.

(b) [For at least each alternate revalidation of a FI(H) rating the holder shall pass, as a proficiency check, the skill test set out in Appendices 1 and 2 to JAR-FCL 2.330 & 2.345 as one of the two requirements to be fulfilled to comply with JAR-FCL 2.355(a).]

[(c)] If the rating has lapsed, the applicant shall meet the requirements as set out in (a)(2) and (a)(3) above within the last 12 months before renewal .

[Amdt. 1, 01.12.00; Amdt. 2, 01.11.02; Amdt. 3, 01.09.03]

**JAR-FCL 2.360 Type rating instructor rating (helicopter) (TRI(H)) – Privileges**  
(See AMC FCL 2.261(d))  
(See JAR-FCL 2.261(d))  
(See Appendix 1 to JAR-FCL 2.261(d))

[Provided that in the preceding 12 months the TRI(H) has completed not less than 15 hours of type rating instruction (which may include skill testing/proficiency checking) on helicopters, or meets the requirements of JAR-FCL 2.370(a)(2),] the privileges of the holder of a TRI(H) rating are to instruct licence holders for the issue of a type rating, [and] the instruction required for multi-crew co-operation as applicable (see JAR-FCL 2.261(d), Appendix 1 to JAR-FCL 2.261(d) and AMC FCL 2.261(d)).

[Amdt. 2, 01.11.02; Amdt. 3, 01.09.03]

**JAR-FCL 2.365 TRI(H) – Requirements**  
 (See AMC FCL 2.365)  
 (See Appendix 1 to JAR-FCL 2.365)

An applicant for the initial issue of a TRI(H) rating shall have:

(a) successfully completed an approved TRI course at an approved FTO or TRTO (see Appendix 1 to JAR-FCL 2.365 and AMC FCL 2.365);

(b) for a TRI(H) rating for single-pilot single-engine and multi-engine helicopters, completed at least 500 hours as a pilot of helicopters;

(c) for a TRI(H) rating for multi-pilot helicopters, completed at least 1000 hours flight time as a pilot of helicopters, to include at least 350 hours as a pilot of multi-pilot helicopters;

(d) completed within the 12 months preceding the application at least 30 hours flight time, to include at least 10 take-offs and landings as pilot-in-command or co-pilot on the applicable helicopter type, or a similar type as agreed by the Authority, of which not more than 15 hours may be completed in a flight simulator; and

(e) conducted on a complete type rating course at least 3 hours of flight instruction related to the duties of a TRI on the applicable type of helicopter or flight simulator under the supervision and to the satisfaction of a TRI authorised by the Authority for this purpose.

(f) Before the privileges are extended to further types of helicopter, the holder shall have:

(1) completed within the 12 months preceding the application at least 15 hours flight time, to include 10 take-offs and landings as pilot-in-command or co-pilot on the applicable helicopter type, or a similar type as agreed by the Authority, of which not more than 7 hours may be completed in a flight simulator;

(2) successfully completed the relevant technical training content of an approved TRI course (see Appendix 1 to JAR-FCL 2.365 and AMC FCL 2.365); and

(3) conducted on a complete type rating course at least 3 hours of flight instruction related to the duties of a TRI on the applicable type of helicopter or flight simulator under the supervision of a TRI authorised by the Authority for this purpose.

[Amdt. 1, 01.12.00, Amdt. 2, 01.11.02]

**JAR-FCL 2.370 TRI(H) – Revalidation and renewal**  
 (See AMC FCL 2.365)  
 (See Appendix 1 to JAR-FCL 2.365)

(a) For revalidation of a TRI(H) rating, the applicant shall within the last 12 months, preceding the expiry date of the rating:

(1) conduct one of the following parts of a complete type rating/refresher/recurrent training course:

(i) one flight simulator session of at least 3 hours; or

(ii) one air exercise of at least 1 hour comprising a minimum of 2 take offs and landings;

or

(2) receive TRI(H) refresher training acceptable to the Authority.

(b) If the rating has lapsed the applicant shall have:

(1) completed within the 12 months preceding the application at least 30 hours flight time, to include take-offs and landings as pilot-in-command or co-pilot on the applicable helicopter type, or a similar type as agreed by the Authority, of which not more than 15 hours may be completed in a flight simulator;

(2) successfully completed the relevant parts as agreed by the Authority of an approved TRI(H) course (see Appendix 1 to JAR-FCL 2.365 and AMC FCL 2.365), taking into account the recent experience of the applicant; and

(3) conducted on a complete type rating course at least 3 hours of flight instruction related to the duties of a TRI(H) on the applicable type of helicopter or flight simulator under the supervision of a TRI notified by the Authority for this purpose.

[Amdt. 2, 01.11.02]

**JAR-FCL 2.375 Intentionally blank**

**JAR-FCL 2.380 Intentionally blank**

**JAR-FCL 2.385 Intentionally blank**



**JAR-FCL 2.390 Instrument rating  
instructor rating  
(helicopter) (IRI(H)) –  
Privileges**

The privileges of the holder of an IRI(H) rating are limited to conduct flight instruction for the issue of an IR(H).

**JAR-FCL 2.395 IRI(H) – Requirements**  
(See Appendix 1 to JAR-FCL  
2.330 & 2.345)  
(See AMC FCL 2.395)  
(See Appendix 1 to JAR-FCL  
2.395)

An applicant for an IRI(H) rating shall have:

(a) completed at least 500 hours flight time under IFR of which at least 250 hours shall be in helicopters;

(b) successfully completed an approved course at an approved FTO (see Appendix 1 to JAR-FCL 2.395 and AMC FCL 2.395) comprising theoretical knowledge instruction and at least ten hours of flight instruction on a helicopter, flight simulator or FNPT II; and

(c) passed a skill test as set out in Appendices 1 and 2 to JAR-FCL 2.330 & 2.345.

[Amdt.1, 01.12.00, Amdt. 2, 01.11.02]

**JAR-FCL 2.400 IRI(H) – Revalidation and  
renewal**

(a) For revalidation of an IRI(H) rating the holder shall meet the requirements set out in JAR-FCL 2.355(a).

(b) If the rating has lapsed, the holder shall meet the requirements of JAR-FCL 2.355(b), and any other requirements determined by the Authority.

**JAR-FCL 2.405 Synthetic flight instructor  
authorisation (helicopter)  
(SFI(H)) – Privileges**

The privileges of the holder of a SFI(H) authorisation are to carry out synthetic flight instruction for type ratings, and the instruction required for multi-crew co-operation (see JAR-FCL 2.261(d)).

**JAR-FCL 2.410 SFI(H) – Requirements**  
(See Appendix 1 to JAR-FCL  
2.240)  
(See AMC FCL 2.365)  
(See Appendix 1 to JAR-FCL  
2.365)

(a) An applicant for a SFI(H) authorisation shall:

(1) hold or have held a professional pilot licence issued by a JAA Member State or a non JAR-FCL professional licence acceptable to the Authority;

(2) have completed the flight simulator content of the applicable type rating course at an approved FTO or TRTO;

(3) have at least 1 000 hours flying experience as pilot on multi-pilot helicopters;

(4) have completed an approved TRI(H) course (see Appendix 1 to JAR-FCL 2.365 and AMC FCL 2.365);

(5) have conducted on a complete type rating course at least one flight simulator session of at least 3 hours related to the duties of a TRI(H) on the applicable type of helicopter under the supervision and to the satisfaction of a TRI(H) notified by the Authority for this purpose;

(6) have completed within a period of 12 months, preceding the application, a proficiency check as set out in Appendix 1 to JAR-FCL 2.240 on a flight simulator of the applicable type; and

(7) have completed within a period of 12 months, preceding the application, at least 1 hour flight time as an observer on the flight deck of the applicable type [or similar type as agreed by the Authority].

(b) If the privileges are to be extended to further types of multi-pilot helicopters the holder shall have:

(1) satisfactorily completed the flight simulator content of the relevant type rating course; and

(2) conducted on a complete type rating course at least one flight simulator session of at least 3 hours related to the duties of a TRI(H) on the applicable type of helicopter under the supervision of a TRI(H) notified by the Authority for this purpose.

[Amdt. 1, 01.12.00, Amdt. 2, 01.11.02; Amdt. 3, 01.09.03]

**JAR-FCL 2.415 SFI(H) – Revalidation and renewal**

(a) For revalidation of a SFI(H) authorisation the applicant shall within the last 12 months of the validity period of the authorisation:

(1) conduct one simulator session of at least 3 hours as part of a complete type rating/refreshers/recurrent training course, and

(2) have completed a proficiency check as set out in Appendix 1 to JAR-FCL 2.240 on a flight simulator of the appropriate type.

(b) If the authorisation has lapsed the applicant shall have:

(1) completed the flight simulator content of the applicable type rating course;

(2) successfully completed an approved TRI(H) course as agreed by the Authority (see Appendix 1 to JAR-FCL 2.365 and AMC FCL 2.365);

(3) conducted on a complete type rating course at least one flight simulator session of at least 3 hours related to the duties of a TRI(H) on the applicable type of helicopter under the supervision and to the satisfaction of a TRI(H) notified by the Authority for this purpose; and

(4) have completed a proficiency check as set out in Appendix 1 to JAR-FCL 2.240 on a flight simulator of the appropriate type.

[Amdt. 1, 01.12.00; Amdt. 2, 01.11.02]

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**Appendix 1 to JAR-FCL 2.300****Requirements for a specific authorisation for instructors not holding a JAR-FCL licence to instruct in a FTO or TRTO outside JAA member States**

(See JAR-FCL 2.300(a)(2)(iii))

- 1 (a) Instructors seeking to instruct for a JAR-FCL licence including instrument ratings shall:
  - (i) hold at least a CPL and ratings issued in accordance with ICAO Annex I required by the respective non-JAA Member State for the instruction to be given on aircraft registered in that State;
  - (ii) have completed at least 500 hours of flight time as a pilot of helicopters of which at least 200 hours shall be as a flight instructor relevant to the intended training to be given and meet the experience requirements of JAR-FCL 2.330(a), (b), (c), (d) and /or (e);
  - (iii) have completed in accordance with JAR-FCL the approved relevant course(s) of theoretical instruction and flight training. The course may be modified, as approved by the Authority, taking into account the previous training and the experience of the applicant, but shall comprise at least 30 hours of ground instruction and 15 hours of dual flight instruction performed by a flight instructor holding a JAR-FCL licence and rating in accordance with JAR-FCL 2.330(f);
  - (iv) have passed the skill test set out in JAR-FCL 2.345;
  - (v) validity period of the authorisation is at the discretion of the Authority but not exceeding 3 years;
  - (vi) revalidation or renewal of any authorisation issued in accordance with para (i) - (iv) above shall be in accordance with JAR-FCL 2.355.
- (b) The authorisation will be restricted as follows:
  - (i) no instruction for the issue of any instructor ratings;
  - (ii) no instruction within a JAA Member State;
  - (iii) instruction to students only who have sufficient knowledge of the language in which the instruction is given;
  - (iv) to those parts of the ATP integrated course where the instructor can demonstrate the experience relevant to the intended training according to paragraph 1 (a)(ii).
  - (v) no instruction for MCC training as defined in Appendix 1 to JAR-FCL 2.261(d) and AMC FCL 2.261(d).
- 2 (a) Instructors seeking to instruct for a JAR-FCL type rating shall:
  - (i) hold at least the licence and ratings issued in accordance with ICAO Annex I required by the respective non-JAA Member State for the instruction to be given on aircraft registered in that State;
  - (ii) comply with the experience requirements of JAR-FCL 2.365(a) and (d) in order to act as TRI(H) or with JAR-FCL 2.410(a)(3) and (7) in order to act as SFI(H);
  - (iii) have completed as a type rating instructor (TRI(H) or equivalent) at least 100 hours of flight or simulator instruction time;
  - (iv) validity period of the authorisation is at the discretion of the Authority but not exceeding 3 years;
  - (v) have complied with the revalidation requirements of JAR-FCL 2.370 acting as TRI(H) or JAR-FCL 2.145 acting as SFI(H).
- (b) The authorisation will be restricted as follows:
  - (i) no instruction for the issue of any instructor ratings;
  - (ii) no instruction within a JAA Member State;

Appendix 1 to JAR-FCL 2.300 (continued)

- (iii) instruction to students only who have sufficient knowledge of the language in which the instruction is given
- (iv) no instruction for MCC training as defined in Appendix 1 to JAR-FCL 2.261(d) and AMC FCL 2.261(d).

[Amdt. 1, 01.12.00; Amdt. 2, 01.11.02]

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**Appendix 1 to JAR-FCL 2.330 & 2.345****Arrangements for the flight instructor rating (FI(H)) skill test, proficiency check and oral theoretical knowledge examination**

(See JAR-FCL 2.330, 2.345, 2.355 and 2.395)

1 The skill test for a FI(H) rating is set out in Appendix 2 to JAR-FCL 2.330 & 2.345. The test comprises oral theoretical examinations on the ground, pre-flight and post flight briefings and in-flight FI(H) demonstrations during skill tests in a helicopter.

2 An applicant for the skill test shall have received instruction on the same type of helicopter used for the test. The helicopter used for the test shall meet the requirements set out in Appendix 1a to JAR-FCL 2.055, paragraph 25.

3 Before taking the skill test an applicant shall have completed the required training. The FTO shall produce the applicant's training records when required by the examiner.

4 Section 1, the oral theoretical knowledge examination part of the skill test, is sub-divided into two parts:

(a) the applicant is required to give a lecture under test conditions to other 'student(s)', one of whom will be the examiner. The test lecture is to be selected from items a-h of Section 1. The amount of time for preparation of the test lecture shall be agreed beforehand with the examiner. Appropriate literature may be used by the applicant. The test lecture should not exceed 45 minutes.

(b) the applicant is tested orally by an examiner for knowledge of items a-i of Section 1 and the 'teaching and learning' content given in the FI(H) courses.

5 Sections 2, 3 and 7 are for a FI(H) rating for single-engine (SE) single-pilot helicopters [SPHs]. These parts comprise exercises to demonstrate the ability to be an FI(H) (i.e. instructor demonstration exercises) chosen by the examiner from the flight syllabus of the FI(H) training courses (see AMC FCL 2.340 and 2.395). The applicant will be required to demonstrate FI(H) abilities, including briefing, flight instruction and debriefing.

6 Section 4 is intentionally blank and may be used for the inclusion of other FI(H) demonstration exercises, as decided by the examiner and acknowledged by the applicant before the skill test.

7 Section 5 comprises additional instructor demonstration exercises for a FI(H) rating for multi-engine (ME) SPHs. This part, if required, shall use a ME SPH, flight simulator or FNPT II. If a flight simulator or FNPT is used, this shall simulate a ME helicopter. This part shall be completed in addition to sections 2, 3, 4 (if applicable) and 7.

8 Section 6 is intentionally blank. This part will include additional FI(H) rating demonstration exercises, as decided by the examiner and agreed with the applicant before the skill test, for an FI(H) rating for instrument ratings (IR). These exercises will be related to the training requirements for the initial issue of an IR.

9 During the skill test the applicant shall occupy the seat normally occupied by the FI(H). The examiner or another FI(H) shall function as the 'student'. The applicant shall be required to explain the relevant exercises and to demonstrate their conduct to the 'student', where appropriate. Thereafter, the 'student' shall execute the same manoeuvre including typical mistakes of inexperienced students. The applicant is expected to correct mistakes orally and/or, if necessary, by intervening.

10 Sections 1 and 2 through 7 (as relevant) shall be completed within a period of six months but all sections should, wherever possible, be completed on the same day. Failure in any exercise within sections 2, 3 and 4 (if applicable) and 5/6 (if relevant) requires a re-test covering all exercises. Section 1, if failed, may be retaken separately.

Appendix 1 to JAR-FCL 2.330 & 2.345 (continued)

11 The examiner may terminate the test at any stage if it is considered that the applicant's demonstration of flying or instructional skills require a re-test.

12 The examiner shall be the pilot-in-command, except in circumstances agreed by the examiner when another FI(H) is designated as pilot-in-command for the flight. Responsibility for the flight shall be allocated in accordance with national regulations.

13 The skill test contents and sections set out in Appendix 2 to JAR-FCL 2.330 and 2.345 shall be used for the skill test. The format and application form for the skill test may be determined by the Authority (see IEM FCL 2.330).

[Amdt. 1, 01.12.00]

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**Appendix 2 to JAR-FCL 2.330 and 2.345****Contents of the flight instructor rating (FI(H)) skill test, oral theoretical knowledge examination and proficiency check**

(See JAR-FCL 2.330 and 2.345)

(See IEM FCL 2.330)

<b>SECTION 1 THEORETICAL KNOWLEDGE ORAL</b>	
a	Air law
b	Aircraft General Knowledge
c	Flight Performance and Planning
d	Human Performance and Limitations
e	Meteorology
f	Navigation
g	Operational Procedures
h	Principles of Flight
i	Training Administration

## SECTIONS 2 AND 3 SELECTED MAIN EXERCISE:

<b>SECTION 2 PRE-FLIGHT BRIEFING</b>	
a	Visual Presentation
b	Technical Accuracy
c	Clarity of Explanation
d	Clarity of Speech
e	Instructional Technique
f	Use of Models and Aids
g	Student Participation

Appendix 2 to JAR-FCL 2.330 &amp; 2.345 (continued)

<b>SECTION 3 FLIGHT</b>	
a	Arrangement of Demo
b	Synchronisation of Speech with Demo
c	Correction of Faults
d	Helicopter Handling
e	Instructional Technique
f	General Airmanship/Safety
g	Positioning; use of Airspace
<b>SECTION 4 OTHER EXERCISES</b>	
a	
b	
c	
d	
e	
f	
g	
<b>SECTION 5 MULTI-ENGINE EXERCISES</b>	
a	<sup>1</sup> Actions following an Engine failure shortly after take-off
b	<sup>1</sup> A single-engine approach and go around
c	<sup>1</sup> A single-engine approach and landing
d	
e	
f	
g	

<sup>1</sup>These exercises shall be demonstrated at the skill test for the single-pilot multi-engine instructor rating.



Appendix 2 to JAR-FCL 2.330 & 2.345 (continued)

<b>SECTION 6 INSTRUMENT EXERCISES</b>	
a	
b	
c	
d	
e	
f	
g	
<b>SECTION 7 POSTFLIGHT DE-BRIEFING</b>	
a	Visual Presentation
b	Technical Accuracy
c	Clarity of Explanation
d	Clarity of Speech
e	Instructional Technique
f	Use of Models and Aids
g	Student Participation

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**Appendix 1 to JAR-FCL 2.340****Flight Instructor rating (Helicopter) (FI(H)) course**

See JAR-FCL 2.340

See AMC FCL 2.340

**COURSE OBJECTIVE**

1 The aim of the FI(H) course is to train helicopter licence holders to the level of proficiency necessary for the issue of a FI(H) rating and, for that purpose, to:

- a. refresh and bring up to date the technical knowledge of the student instructor;
- b. train the student instructor to teach the ground subjects and air exercises;
- c. ensure that the student instructor's flying is of a sufficiently high standard; and
- d. teach the student instructor the principles of basic instruction and to apply them at the PPL level.

2 With the exception of the section on Teaching and Learning, all the subject detail contained in the Ground and Flight Training Syllabus is complementary to the PPL(H) course syllabus and should already be known by the applicant.

3 The FI(H) course shall give particular stress to the role of the individual in relation to the importance of human factors in the man-machine and theoretical knowledge environment interaction. Special attention should be paid to the applicant's maturity and judgement including an understanding of adults, their behavioural attitudes and variable levels of education.

4 During the course, the applicants shall be made aware of their own attitudes to the importance of flight safety. Improving safety awareness shall be a fundamental objective throughout the course. It will be of major importance for the course of training to aim at giving applicants the knowledge, skills and attitudes relevant to a flight instructor's task.

5 On successful completion of the course and final test the applicant may be issued with a FI(H) rating.

**TEACHING AND LEARNING**

6 The syllabus is set out in AMC FCL 2.340 part 1. An approved FI(H) theoretical knowledge course shall comprise not less than 125 hours including progress tests. Pilots holding or having held a FI(A) rating are credited with 75 hours towards the 125 hours of the Teaching and Learning part 1 of the FI(H) course.

**FLYING TRAINING**

7 The flying training syllabus is set out in AMC FCL 2.340 part 2. An approved FI(H) course shall comprise not less than 30 hours of flight instruction.

**SKILL TEST**

On completion of the course, the applicant shall take the skill test in accordance with Appendices 1 and 2 to JAR-FCL 2.330 & 2.345.

[Amdt. 2, 01.11.02]

**Appendix 1 to JAR-FCL 2.365****Course for the type rating instructor (helicopter) for, as applicable, single or multi-pilot helicopters certificated for VFR or IFR operation (TRI(H))**

See JAR-FCL 2.365

See AMC FCL 2.365

1 The aim of the TRI(H) course is to train helicopter licence holders to the level of proficiency necessary for the issue of a TRI(H) rating and, for that purpose, to:

- a. refresh and bring up to date technical knowledge;
- b. train the applicant to teach the theoretical knowledge subjects and air exercises;
- c. ensure that the applicant's flying is of a sufficiently high standard.

2 All the subject detail contained in the Theoretical Knowledge and Flight Training Syllabus shall already be known by the applicant.

3 The TRI(H) course shall give particular stress to the role of the individual in relation to the importance of human factors in the man-machine environment. Special attention shall be paid to the applicant's maturity and judgement including an understanding of adults, their behavioural attitudes and variable levels of ability.

4 During the course, the applicants shall be made aware of their own attitudes to the importance of flight safety. Safety awareness shall be a fundamental objective throughout the course. It will be of major importance for the course of training to aim at giving applicants the knowledge, skills and attitudes relevant to a type rating instructor's task.

5 On successful completion of the course and final test, the applicant may be issued with a type rating instructor (helicopter) rating permitting the holder to give theoretical knowledge instruction and flight instruction (and may include synthetic flight instruction) in order to instruct for any helicopter type rating for which the applicant is qualified (see JAR-FCL 2.365).

**TEACHING AND LEARNING**

6 The syllabus is set out in AMC FCL 2.365 part 1. An approved TRI(H) Teaching and Learning course shall comprise not less than 25 hours. Pilots holding or having held one of the following ratings are credited for the TRI(H) Teaching and Learning part of the TRI(H) course :

FI(H), IRI(H);

FI(A), CRI(A), TRI(A), SFI(A) and IRI(A).

**TECHNICAL TRAINING**

7 The technical training syllabus is set out in AMC FCL 2.365 part 2.

**FLIGHT TRAINING**

8 The amount of flight training will vary depending on the complexity of the helicopter type. At least 5 hours flight training for a single-pilot VFR certificated helicopter, and at least 10 hours for a multi-pilot multi-engine IFR certificated helicopter, shall be given by a TRI instructor designated by the Authority for this purpose. The flight training shall aim to ensure that the applicant is able to teach the air exercises safely and efficiently and shall be related to the type of helicopter on which the applicant wishes to instruct. The content of the training programme therefore shall only cover training exercises applicable to the helicopter type.

9 If a TRI rating for multi-pilot helicopters is sought particular attention shall be given to multi-crew cooperation.

If a TRI rating for revalidating of instrument ratings is sought then the applicant shall hold a valid instrument rating.

[Amdt. 2, 01.11.02]

**Appendix 1 to JAR-FCL 2.395****Course for the instrument rating instructor rating (helicopter) (IRI(H))**

See JAR-FCL 2.395

See AMC FCL 2.395

1. The aim of this course is to train helicopter licence holders with at least 500 hours flight time under IFR of which at least 250 hours shall be on helicopters to the level of proficiency necessary for the issue of an IRI(H) rating. The course shall be designed to give the applicant adequate training in theoretical knowledge instruction and flight instruction (and may include synthetic flight instruction) in order to instruct for the IR(H).

**TEACHING AND LEARNING**

2. The syllabus is set out in AMC FCL 2.395. An approved IRI(H) Teaching and Learning course shall comprise not less than 25 hours based on the Teaching and Learning content of the FI(H) course as set out in AMC FCL 2.340. Pilots holding or having held one of the following ratings are credited for the IRI(H) Teaching and Learning part of the IRI(H) course :

Fi(H), TRI(H) and SFI(H) ;

FI(A), CRI(A), SFI(A) and TRI(A).

Pilots holding an IRI(A) who meet the requirement set out in JAR-FCL 2.395(a) are credited of the course except for the “Long Briefing 2”, “Air Exercises 2”, and Skill Test.

**FLIGHT TRAINING**

3. An approved IRI(H) course shall comprise not less than 10 hours of flight instruction on a helicopter type, flight simulator or FPNT II.

**SKILL TEST**

4. On completion of the course, the applicant shall take the skill test in accordance with Appendices 1 and 2 to JAR FCL 2.330 & 2.345.

[Amdt. 2, 01.11.02]

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## SUBPART I – EXAMINERS (Helicopter)

**JAR-FCL 2.420 Examiners – Purposes**

Five roles of an examiner are recognised:

- (a) Flight examiner (FE(H)).
- (b) Type rating examiner (TRE(H))
- (c) Instrument rating examiner (IRE(H)).
- (d) Flight instructor examiner (FIE(H)).
- (e) Synthetic flight examiner (SFE(H)).

**JAR-FCL 2.425 Examiners – General**  
 (See AMC FCL 2.425)  
 (See IEM FCL 2.425)  
 [(See Appendix 1 to JAR-FCL 2.425)]

(a) *Pre-requisites*

(1) Examiners shall hold a licence and rating at least equal to the licence or rating for which they are authorised to conduct skill tests or proficiency checks and, unless specified otherwise, the privilege to instruct for this licence or rating.

(2) Examiners shall be qualified to act as pilot-in-command of the aircraft during a skill test or proficiency check and shall meet the applicable experience requirements set out in JAR-FCL 2.435 through 2.460. Where no qualified examiner is available and, at the discretion of the Authority, examiners/inspectors may be authorised without meeting the relevant instructor/type rating requirements as mentioned above.

(3) The applicant for an examiner authorisation shall have conducted at least one skill test in the role of an examiner for which authorisation is sought, including briefing, conduct of the skill test, assessment of the applicant to whom the skill test is given, debriefing and recording/documentation. This ‘Examiner Authorisation Acceptance Test’ will be supervised by an inspector of the Authority or by a senior examiner specifically authorised by the Authority for this purpose.

(b) *Multiple roles.* Provided that they meet the qualification and experience requirements set out in this Subpart for each role undertaken, examiners are not confined to a single role as FE(H), TRE(H), IRE(H) or FIE(H).

(c) *Compliance with JARs.* Examiners will be authorised in accordance with JAR-FCL 2.030. The examiner shall comply with appropriate examiners’

JAR-FCL 2.425(c) (continued)

standardisation arrangements made or approved by the Authority (see [Appendix 1 to JAR-FCL 2.425.] AMC FCL 2.425 and IEM FCL 2.425).

(d) *Entries in the licence.* In licences where revalidation entries may be made by the examiner, the Examiner will:

(1) complete the following details: ratings, date of check, valid until, authorisation number and signature;

(2) submit the original of the skill test check form to the issuing Authority and hold one copy of the check form on personal file.

[Amdt. 2, 01.11.02]

**JAR-FCL 2.430 Examiners – Period of validity**

An examiner’s authorisation is valid for not more than three years. Examiners are re-authorised at the discretion of the Authority, [and in accordance with Appendix 1 to JAR-FCL 2.425.]

[Amdt. 2, 01.11.02]

**JAR-FCL 2.435 Flight examiner (helicopter) (FE (H)) – Privileges / Requirements**

The privileges of a FE(H) are to conduct:

(a) skill tests for the issue of the PPL(H) and skill tests and proficiency checks for the helicopter single-pilot type rating provided that the examiner has completed not less than 1 000 hours flight time as a pilot of helicopters, including not less than 250 hours flight instruction;

(b) skill tests for the issue of CPL(H) and skill tests and proficiency checks for the helicopter single-pilot type ratings provided that the examiner has completed not less than 2 000 hours flight time as a pilot of helicopters, including not less than 250 hours flight instruction.

[Amdt. 1, 01.12.00]

**JAR-FCL 2.440 Type rating examiner (helicopter) (TRE(H)) – Privileges/Requirements**

The privileges of a TRE(H) are to conduct :

- (a) for multi-pilot helicopters
  - (i) skill tests for the issue of type ratings
  - (ii) proficiency checks for revalidation or renewal of multi-pilot type ratings;
  - (iii) proficiency checks for revalidation or renewal of instrument ratings provided that the TRE(H) holds a valid IR(H);
  - (iv) skill tests for ATPL(H) issue;

provided that the examiner has completed not less than 1 500 hours as pilot on multi-pilot helicopters of which at least 500 hours shall be as pilot-in-command and holds or has held a TRI(H) rating or authorisation.

- (b) for single-pilot helicopters
  - (i) skill tests for the issue of type ratings;
  - (ii) proficiency checks for revalidation or renewal of single-pilot helicopter type and instrument ratings;

provided that the examiner holds a professional helicopter pilot licence and, when applicable, a valid IR(H) and has completed not less than 750 hours as a pilot of helicopters.

**JAR-FCL 2.445 Intentionally blank****JAR-FCL 2.450 Instrument rating examiner (helicopter) (IRE(H)) – Privileges/Requirements**

The privileges of an IRE(H) are to conduct skill tests for the initial issue and proficiency checks for the revalidation or renewal of instrument ratings, provided that the examiner has completed not less than 2 000 hours flight time as a pilot of helicopters, including not less than 300 hours flight time under IFR of which 200 hours shall be as a flight instructor.

**JAR-FCL 2.455 Synthetic flight examiner (helicopter) (SFE (H)) – Privileges/Requirements**

The privileges of an SFE(H) are to conduct type and instrument rating proficiency checks on multi-pilot helicopters in a flight simulator, provided that the examiner holds an ATPL(H), has completed not less than 1 000 hours of flight time as a pilot of multi-pilot helicopters and is entitled to exercise the privileges of a SFI(H) (see JAR-FCL 2.405).

**JAR-FCL 2.460 Flight instructor examiner (helicopter) (FIE(H)) – Privileges/Requirements**

The privileges of an FIE(H) are to conduct skill tests and proficiency checks for the issue and revalidation or renewal of flight instructor ratings, provided that the examiner has completed not less than 2 000 hours as a pilot of helicopters, including not less than 100 hours flight time instructing applicants for a FI(H) rating.

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**[Appendix 1 to JAR-FCL 2.425  
Standardisation arrangements for examiners  
See JAR-FCL 2.425 and 2.430  
See AMC FCL 2.425**

GENERAL

1 Each JAA Member State will publish and submit to JAA a list of authorised examiners specifying each role and any additional matters for which they have been authorised.

2 Examiners shall consistently apply JAR-FCL standards during a test/check. However, as the circumstances of each test/check conducted by an examiner may vary, it is also important that an examiner's test/check assessment takes into account any adverse condition(s) encountered during the test/check.

EXAMINERS DESIGNATION AND AUTHORISATION

3 An examiner will be designated and authorised in accordance with JAR-FCL and will be:

- (a) a flight inspector from an Authority; or
- (b) an instructor from a Registered Facility, FTO, TRTO; manufacturer's facility or subcontracted facility; or
- (c) a pilot holding a specific authorisation from a JAA Member State.

4 All Examiners must be suitably trained, qualified and experienced for their role on the relevant type of helicopter. No specific rules on qualification can be made because the particular circumstance of each organisation will differ. It is important, however, that in every instance, the Examiner should, by background and experience, have the professional respect of the aviation community.

EXAMINER RE-AUTHORISATION

5 Examiners may be re-authorised in accordance with JAR-FCL 2.430. To be re-authorised, the examiner shall have conducted at least two skill tests or proficiency checks in every yearly period within the three year authorisation period. One of the skill tests or proficiency checks given by the examiner within the validity period of the authorisation shall have been observed by an inspector of the Authority or by a senior examiner specifically authorised for this purpose.]

[Amdt. 2, 01.11.02]

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**SUBPART J – THEORETICAL KNOWLEDGE REQUIREMENTS AND PROCEDURES FOR THE  
CONDUCT OF THEORETICAL KNOWLEDGE EXAMINATIONS FOR PROFESSIONAL PILOT  
LICENCES AND INSTRUMENT RATINGS**

**JAR-FCL 2.465 Requirements**

An applicant for a professional pilot licence or an instrument rating shall demonstrate a level of knowledge appropriate to the privileges of the licence or rating for which application is made by passing theoretical knowledge examinations in accordance with the procedures set out in JAR-FCL 2.470 through 2.495.

**JAR-FCL 2.470 Contents of theoretical knowledge examinations**  
(See Appendix 1 to JAR-FCL 2.470)

(a) An applicant for the ATPL(H) shall demonstrate a level of knowledge appropriate to the privileges granted in the following subjects : Air Law; Aircraft General Knowledge; Flight Performance and Planning; Human Performance and Limitations; Meteorology; Navigation; Operational Procedures; Principles of flight; Communications. The breakdown of subjects into examination papers and times allowed will be agreed within JAA Member States.

(b) An applicant for the CPL(H) shall demonstrate a level of knowledge appropriate to the privileges granted in the following subjects: Air Law; Aircraft General Knowledge; Flight Performance and Planning; Human Performance and Limitations; Meteorology; Navigation; Operational Procedures; Principles of flight; Communications. The breakdown of subjects into examination papers and times allowed will be agreed within JAA Member States.

(c) An applicant for an IR(H) shall demonstrate a level of knowledge appropriate to the privileges granted in the following subjects: Air Law/Operational Procedures; Aircraft General Knowledge; Flight Performance and Planning; Human Performance and Limitations; Meteorology; Navigation; Communications. The breakdown of subjects into examination papers and times allowed will be agreed within JAA Member States.

[Amdt. 2, 01.11.02]

**JAR-FCL 2.475 Questions**

(See IEM FCL 2.475 (a) and (b))

(See Appendix 1 to JAR-FCL 2.470)

(a) *The Central Question Bank.* Questions appropriate to the syllabuses (see Appendix 1 to JAR-FCL 2.470) will be held in a JAA Central Question Bank (CQB). Questions entered in the CQB will be composed in English, according to a method described in IEM FCL 2.475(a), using abbreviations (see IEM FCL 2.475(b)), and compiled in a computer compatible format. The questions will be in multiple choice format. An Authority may exercise discretion in the presentation of questions in an examination according to JAR-FCL 2.480.

(b) *Publication.* Samples of questions and multiple choice answers will be published from time to time by JAA.

[Amdt. 1, 01.06.00, Amdt. 2, 01.11.02]

**JAR-FCL 2.480 Examination procedure**

(See Appendix 1 to JAR-FCL 2.470)

(a) *Frequency.* A JAA Member State will provide the opportunity for an applicant to complete the required examinations in accordance with the procedures set out in this Subpart. A complete examination for a licence or instrument rating will comprise an examination in each of the subjects detailed in [Appendix 1 to JAR-FCL 2.470(a), (b) and (c)].

(b) *Language.* The examinations will be provided in the language(s) considered appropriate by the Authority. The Authority will inform applicants of the language(s) in which that Authority's examinations will be conducted.

(c) *Content.* Questions for an examination will be selected by the Authority from the CQB according to a common method which allows coverage of the entire syllabi in each subject. The content of the questions will not be changed other than, where necessary, to facilitate translation into the national language(s). The style of answer to questions requiring numerical computation or graphical interpretation may be varied to other forms considered appropriate by the Authority. The examination in Communications may be provided separately from those in other subjects, as decided by the Authority. An applicant who has previously

JAR-FCL 2.480(c) (continued)

passed either or both of the examinations in VFR and IFR Communications will not be re-examined in the relevant sections.

(d) *Oral Examinations.* Oral examinations will not be conducted in lieu of written or computer based examinations.

(e) *Facilities.* The Authority will [determine how to] provide suitable charts, maps, [ ] data sheets [and equipment], as required, to answer the questions. [ ]

(f) *Security.* The identity of the applicant will be established before an examination is taken.

(g) *Confidentiality.* The contents of the examination papers will retain a confidential status.

[Amdt. 1, 01.12.00, Amdt. 2, 01.11.02; Amdt. 3, 01.09.03]

#### **JAR-FCL 2.485 Responsibilities of the applicant**

(a) An applicant shall take the entire set of examinations in one JAA Member State.

(b) [An applicant shall be recommended for an examination by the approved FTO responsible for applicant's training when the applicant has completed the appropriate elements of the course of theoretical knowledge instruction to a satisfactorily standard. An applicant who has failed to complete the examination within the limits imposed by JAR-FCL 1.490 will in addition be required to produce evidence from an approved Training Organisation of further training.]

(c) If the Authority considers that the applicant is not complying with examination procedures during the examination, this misconduct will be considered with a view to failing the applicant, either in the examination of a single subject or in the examination as a whole.

[Amdt. 1, 01.12.00; Amdt. 3, 01.09.03]

#### **JAR-FCL 2.490 Pass standards**

(a) A Pass in an examination paper will be awarded to an applicant achieving at least 75% of the marks allocated to that paper. There is no penalty marking.

[(b)] Subject to any other conditions in JARs, an applicant will be deemed to have successfully completed the required theoretical knowledge examination for the appropriate pilot licence or rating when awarded a pass in all of the required subjects within a period of [ ] 18 months [ ],

JAR-FCL 2.490(b) (continued)

counted from the end of the calendar month when the applicant first attempted an examination.

[(c) an applicant shall re-enter the complete examination as though for an initial attempt if he has failed to pass any single examination paper within four attempts, or has failed to pass all papers within either six sittings or the period mentioned in paragraph (b) above. Before re-entry to the examinations the applicant shall undertake further training as determined by the Authority.]

[Amdt. 1, 01.12.00; Amdt. 2, 01.11.02; Amdt. 3, 01.09.03]

#### **JAR-FCL 2.495 Acceptance period**

(a) A pass in the theoretical knowledge examinations given in accordance with JAR-FCL 2.490 will be accepted for the grant of the CPL(H) or IR(H) during the 36 months from the date of [ ] gaining a Pass [ ] in [all] the required examination [papers].

(b) Provided that an IR(H) is obtained in accordance with (a) above, a pass in the ATPL(H) [theoretical] knowledge examination will remain valid for a period of 7 years from the last validity date of the IR(H) entered in the CPL(H) for the issuance of an ATPL(H).

(c) A pass in the ATPL(H) theoretical knowledge examination will remain valid for a period of 7 years from the last validity date of a type rating entered in a F/E licence.

[Amdt. 1, 01.12.00; Amdt. 3, 01.09.03]

## Appendix 1 to JAR-FCL 2.470

## Theoretical knowledge examination subjects / sections and length of examinations – ATPL, CPL and IR

(See JAR-FCL 2.470)

Subject	Aeroplane (A)						Helicopter (H)					
	ATPL		CPL		IR		ATPL		CPL		IR	
	Airline Transport Pilot Licence		Commercial Pilot Licence		Instrument Rating (Aircraft)		Airline Transport Pilot Licence		Commercial Pilot Licence		Instrument Rating (Aircraft)	
	Paper no	Exam length time	Paper no	Exam length time	Paper no	Exam length time	Paper no	Exam length time	Paper no	Exam length time	Paper no	Exam length time
010 Air Law (B)	1	1.40	1	0.45			1	1.40	1	1.00		
010 Air Law / Operational Procedures					1	1.00					1	1.00
020 Aircraft General Knowledge (B)			2	2.30	2	1.15			2	2.30	2	1.15
airframe/systems/power plant	2	2.00		(1.30)		(0.15)	2	2.00		(1.30)		(0.15)
instruments/electronics	3	1.30		(1.00)		(1.00)	3	1.30		(1.00)		(1.00)
030 Flight Performance and Planning (B)			3	3.00	3	2.00			3	3.30	3	2.00
mass and balance	4	1.00		(0.45)			4	1.00		(1.00)		
Performance	5	1.00		(0.45)			5	1.00		(1.00)		
flight planning & monitoring	6	3.00		(1.30)		(2.00)	6	3.00		(1.30)		(2.00)
040 Human Performance & Limitations	7	1.00	4	0.30	4	0.30	7	1.00	4	0.30	4	0.30
050 Meteorology (B)	8	2.30	5	1.30	5	1.30	8	2.30	5	1.00	5	1.30
060 Navigation (B)			6	1.30	6	2.00			6	1.30	6	2.00
general navigation	9	2.00		(1.00)		(0.30)	9	2.00		(1.00)		(0.30)
radio navigation	10	1.30		(0.30)		(1.30)	10	1.30		(0.30)		(1.30)
070 Operational Procedures (B)	11	1.20	7	0.45			11	1.20	7	1.20		
080 Principles of Flight (B)	12	1.00	8	0.45			12	1.00	8	1.00		
090 Communications			9	0.30	7	0.30			9	0.30	7	0.30
VFR communications	13	0.30		(0.30)			13	0.30		(0.30)		
IFR communications	14	0.30				(0.30)	14	0.30				(0.30)
<b>Total</b>	<b>14</b>	<b>20.30</b>	<b>9</b>	<b>11.45</b>	<b>7</b>	<b>8.45</b>	<b>14</b>	<b>20.30</b>	<b>9</b>	<b>12.50</b>	<b>7</b>	<b>8.45</b>

Note 1: refer to JAR-FCL 1.050(b) and 2.050(b) for crediting of flight time and theoretical knowledge.

Note 2: (B) indicates that 'Bridge' examinations are required to convert from an Aeroplane licence to an Helicopter licence, and vice-versa. See Appendix 1 to JAR-FCL 1.050 and Appendix 1 to JAR-FCL 2.050.

Note 3: the syllabus combines the theoretical knowledge syllabuses for Aeroplane and Helicopter. Column boxes marked with a cross ('x') indicate that knowledge of the relevant *topic* is required to be taught for the particular licence level. Column boxes marked with a bullet point (•) indicate that the *sub-topic* is NOT applicable to the particular licence level.

## Appendix 1 to JAR-FCL 2.470 (continued)

		Aeroplane			Helicopter		
		ATPL	CPL	IR	ATPL	CPL	IR
<b>010 00 00 00</b>	<b>AIR LAW AND ATC PROCEDURES</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>
<b>010 01 00 00</b>	<b>INTERNATIONAL AGREEMENTS AND ORGANISATIONS</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>
010 01 01 00	The Convention of Chicago	x	x	x	x	x	x
010 01 01 01	Part I Air Navigation <ul style="list-style-type: none"> <li>– general principles and application: sovereignty, territory</li> <li>– flight over territory of Contracting States: right of non-scheduled flight, scheduled air services, cabotage, landing at customs airports, applicability of air regulations, rules of the air, search of aircraft</li> <li>– measures to facilitate air navigation: customs duty, conditions to be fulfilled with respect to aircraft: certificates of airworthiness, licences of personnel, recognition of certificates and licences, cargo restrictions, photographic apparatus: documents to be carried in aircraft</li> <li>– international standards and recommended practices: adoption of international standards and procedures, endorsement of certificates and licences, validity of endorsed certificates and licences: departure from international standards and procedures (notification of differences)</li> </ul>	x	x	x	x	x	x
010 01 01 02	Part II The International Civil Aviation Organisation <ul style="list-style-type: none"> <li>– objectives and composition</li> </ul>	x	x	x	x	x	x
010 01 01 03	Regional structure and offices	x	x		x	x	
010 01 01 04	Duties in relation to: <ul style="list-style-type: none"> <li>– annexes to the convention</li> <li>– standards and recommended practices</li> <li>– procedures for air navigation services</li> <li>– regional supplementary procedures</li> <li>– regional air navigation</li> <li>– manuals and circulars</li> </ul>	x			x	x	
010 01 02 00	Other International agreements	x	x	x	x	x	x
010 01 02 01	The International Air Transport Agreement: <ul style="list-style-type: none"> <li>– the five freedoms</li> </ul>	x	x		x	x	
010 01 02 02	The Convention of Tokyo, La Haye, Montreal <ul style="list-style-type: none"> <li>– jurisdiction</li> <li>– authority of the pilot-in-command of the aircraft</li> </ul>	x	x		x	x	
010 01 02 03	European organisations name, composition, objectives and relevant documents <ul style="list-style-type: none"> <li>– European Civil Aviation Conference (ECAC), including Joint Aviation Authorities (JAA)</li> <li>– Eurocontrol</li> <li>– European Commission (EC)</li> </ul>	x	x	x	x	x	x
010 01 02 04	Warsaw Convention	x	x		x	x	
010 01 03 00	PIC authority and responsibility regarding safety and security	x	x		x	x	
010 01 04 00	Operators and pilots liabilities towards persons and goods on the ground, in case of damage and injury caused by the operation of the aircraft.	x	x		x	x	

## SECTION 1

## JAR-FCL 2

Appendix 1 to JAR-FCL 2.470 (continued)

		Aeroplane			Helicopter		
		ATPL	CPL	IR	ATPL	CPL	IR
010 01 05 00	Commercial practices and associated rules (leasing) – Dry lease – Wet lease	X	X		X	X	
<b>010 02 00 00</b>	<b>ANNEX 8 – AIRWORTHINESS OF AIRCRAFT</b> – applicability	<b>X</b>	<b>X</b>		<b>X</b>	<b>X</b>	
<b>010 03 00 00</b>	<b>ANNEX 7 – AIRCRAFT NATIONALITY AND REGISTRATION MARKS</b> – applicability	<b>X</b>	<b>X</b>		<b>X</b>	<b>X</b>	
<b>010 04 00 00</b>	<b>ANNEX 1 – PERSONNEL LICENSING</b> – applicability – relation between ANNEX 1 and JAR-FCL	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>
<b>010 05 00 00</b>	<b>RULES OF THE AIR (based on ANNEX 2)</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>
010 05 01 00	Annex 2: – essential definitions, applicability of the rules of the air, general rules (except water operations), visual flight rules, instrument flight rules, signals, interception of civil aircraft, table of cruising levels	X	X	X	X	X	X
<b>010 06 00 00</b>	<b>PROCEDURES FOR AIR NAVIGATION – AIRCRAFT OPERATIONS Doc. 8168-OPS/611, VOLUME 1</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>
010 06 01 00	Foreword – introduction	X		X	X		X
010 06 02 00	Definitions and abbreviations (see general statements)	X		X	X		X
010 06 03 00	Departure procedures – general criteria – standard instrument departures – omnidirectional departures – published information – simultaneous operations on parallel or near-parallel instrument runways – area navigation (RNAV) departure procedures based on VOR/DME – use of FMS/RNAV equipment to follow conventional departure procedures	X		X	X		X

## Appendix 1 to JAR-FCL 2.470 (continued)

		Aeroplane			Helicopter		
		ATPL	CPL	IR	ATPL	CPL	IR
010 06 04 00	Approach procedures <ul style="list-style-type: none"> <li>– general criteria (except tables)</li> <li>– approach procedure design: instrument approach areas, accuracy of fixes (only intersection fix tolerance factors, other fix tolerance factors, accuracy of facility providing track, approach area splays, descent gradient)</li> <li>– arrival and approach segments: general, standard instrument arrival, initial approach segment (only general), intermediate approach segment, final approach segment (except tables), missed approach segment (only general)</li> </ul>	X		X	X		X
	<ul style="list-style-type: none"> <li>– visual manoeuvring (circling) in the vicinity of the aerodrome: general, the visual manoeuvring (circling) area (except table), visual manoeuvring (circling) area not considered for obstacle clearance (except table), minimum descent altitude/height, visual flight manoeuvre, missed approach whilst circling</li> <li>– simultaneous ILS operations on parallel or near-parallel runways</li> <li>– area navigation (RNAV) approach procedures based on VOR/DME</li> <li>– use of FMS/RNAV equipment to follow conventional non-precision approach procedures</li> </ul>						
010 06 05 00	Holding procedures <ul style="list-style-type: none"> <li>– in flight procedures (except table), entry, holding</li> <li>– obstacle clearance (except table)</li> </ul>	X		X	X		X
010 06 06 00	Altimeter setting procedures (including ICAO Doc. 7030 – regional supplementary procedures) <ul style="list-style-type: none"> <li>– basic requirements (except tables), procedures applicable to operators and pilots (except tables)</li> </ul>	X	X	X	X	X	X
010 06 07 00	Secondary surveillance radar transponder operating procedures (including ICAO Doc. 7030 – regional supplementary procedures) <ul style="list-style-type: none"> <li>– operation of transponders</li> <li>– operation of ACAS equipment</li> <li>– phraseology</li> </ul>	X	X	X	X	X	X
<b>010 07 00 00</b>	<b>AIR TRAFFIC SERVICES (based on ANNEX 11 and Doc. 4444)</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>
010 07 01 00	Air Traffic Services – Annex 11 <ul style="list-style-type: none"> <li>– definitions (see general statements)</li> </ul>	X	X	X	X	X	X
010 07 01 01	General <ul style="list-style-type: none"> <li>– objectives of ATS, divisions of ATS, designation of the portions of the airspace and controlled aerodromes where ATS will be provided, classification of airspaces (appendix 4 of annex 11), required navigation performance (RNP), establishment and designation of the units providing ATS, specifications for flight information regions, control areas and control zones, minimum flight altitudes, priority in the event of an aircraft in emergency, in-flight contingencies, time in ATS</li> </ul>	X	X	X	X	X	X
010 07 01 02	Air Traffic Control <ul style="list-style-type: none"> <li>– application</li> <li>– provision of air traffic control service, operation of air traffic control service, separation minima, contents of clearances, co-ordination of clearances, control of persons and vehicles at aerodromes</li> </ul>	X	X	X	X	X	X

## SECTION 1

## JAR-FCL 2

Appendix 1 to JAR-FCL 2.470 (continued)

		Aeroplane			Helicopter		
		ATPL	CPL	IR	ATPL	CPL	IR
010 07 01 03	Flight Information Service – application – scope of flight information service – operational flight information service broadcasts	X	X	X	X	X	X
010 07 01 04	Alerting Service – application, notification of rescue co-ordination centres (only INCERFA, ALERFA, DETRESFA), information to aircraft operating in the vicinity of an aircraft in a state of emergency	X	X	X	X	X	X
010 07 01 05	Principles governing the identification of RNP types and the identification of ATS routes other than standard departure and arrival routes (Appendix 1)	X	X	X	X	X	X
010 07 03 00	Rules of the air and air traffic services (ICAO Doc. 4444 – RAC/501/11 and ICAO Doc. 7030 – Regional supplementary procedures) – definitions (see general statements) – relationship to other document	X	X	X	X	X	X
010 07 03 01	General provisions – general air traffic services operating practices: submission of a flight plan, change from IFR to VFR flight, clearances and information, control of air traffic flow, altimeter setting procedures, indication of heavy wake turbulence category and MLS capacity, position reporting, air traffic incident report, procedures in regard to aircraft equipped with airborne collision avoidance systems (ACAS) – Appendix 1	X	X	X	X	X	X
010 07 03 02	Area Control Service – general provisions for the separation of controlled traffic – vertical separation: vertical separation application, vertical separation minimum, minimum cruising level, assignment of cruising level, vertical separation during ascent or descent – horizontal separation: lateral separation application, lateral separation application, longitudinal separation application (except between supersonic aircraft) – reduction in separation minima – air traffic control clearances: contents, description of air traffic control clearances, clearance to fly maintaining own separations while in visual meteorological conditions, essential traffic information, clearance of a requested change in flight plan – emergency and communication failure: emergency procedures (only general priority, emergency descent, action by pilot-in-command), air-ground communication failure (only concerning the actions by pilot-in-command), interception of civil aircraft	X	X	X	X	X	X
010 07 03 03	Approach Control Service – departing aircraft: general procedures for departing aircraft, clearances for departing aircraft to climb maintaining own separation while in visual meteorological conditions, information for departing aircraft – arriving aircraft: general procedures for arriving aircraft, clearance to descend subject to maintaining own separation in visual meteorological conditions, visual approach, instrument approach, holding, approach sequence, expected approach time, information for arriving aircraft	X	X	X	X	X	X

## Appendix 1 to JAR-FCL 2.470 (continued)

		Aeroplane			Helicopter		
		ATPL	CPL	IR	ATPL	CPL	IR
010 07 03 04	Aerodrome Control Service – functions of aerodrome control towers: general, alerting service provided by aerodrome control towers, suspension of VFR operations by aerodrome control towers – traffic and taxi circuits: selection of runway-in-use – information to aircraft by aerodrome control towers: information related to the operation of the aircraft, information on aerodrome conditions – control of aerodrome traffic: order of priority for arriving and departing aircraft, control of departing and arriving aircraft, wake turbulence categorisation of aircraft and increased longitudinal separation minima, authorisation of special VFR flights	X	X	X	X	X	X
010 07 03 05	Flight Information Service and Alerting Service – flight information service – alerting service	X	X	X	X	X	X
010 07 03 06	Use of radar in Air Traffic Services – general provisions: limitations in the use of radar, identification procedures (only establishment of radar identity), position information, radar vectoring – use of radar in the air traffic control service	X		X	X	X	X
<b>010 08 00 00</b>	<b>AERONAUTICAL INFORMATION SERVICE (based on ANNEX 15)</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>
010 08 01 00	Annex 15 – essential definitions – applicability	X	X	X	X	X	X
<b>010 09 00 00</b>	<b>AERODROMES (based on ANNEX 14, VOL 1 &amp; 2)</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>
010 09 01 00	Annex 14 – definitions	X	X	X	X	X	X
010 09 01 01	Aerodrome data: – conditions of the movement area and related facilities	X	X	X	X	X	X
010 09 01 02	Visual aids for navigation – indicators and signalling devices – markings – lights – signs – markers	X	X	X	X	X	X
010 09 01 03	Visual aids for denoting obstacles – marking of objects – lighting of objects	X	X	X	X	X	X
010 09 01 04	Visual aids for denoting restricted use of areas	X	X	X	X	X	X
010 09 01 05	Emergency and other services – rescue and fire fighting – apron management service – ground servicing of aircraft	X	X	X	X	X	X
010 09 01 06	Attachment A to Annex 14 – calculation of declared distances – radio altimeter operating areas – approach lighting systems	X	X	X	X	X	X



## SECTION 1

## JAR-FCL 2

Appendix 1 to JAR-FCL 2.470 (continued)

		Aeroplane			Helicopter		
		ATPL	CPL	IR	ATPL	CPL	IR
<b>010 10 00 00</b>	<b>FACILITATION (based on ANNEX 9)</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>
	– definitions						
010 10 01 00	Entry and departure of aircraft	x	x	x	x	x	x
	– description, purpose and use of aircraft documents: general declaration						
010 10 02 00	Entry and departure of persons and their baggage	x	x	x	x	x	x
	– entry requirement and procedures crew and other operator's personnel						
<b>010 11 00 00</b>	<b>SEARCH AND RESCUE (based on ANNEX 12)</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>
010 11 01 00	Annex 12	x	x	x	x	x	x
	– definitions						
010 11 01 01	Organisation	x	x	x	x	x	x
	– establishment and provision of SAR service						
	– establishment of SAR regions						
	– establishment and designation of SAR services units						
010 11 01 02	Co-operation	x	x	x	x	x	x
	– co-operation between States						
	– co-operation with other services						
010 11 01 03	Operating procedures	x	x	x	x	x	x
	– procedures for pilots-in-command at the scene of an accident						
	– procedures for pilots-in-command intercepting a distress transmission						
	– search and rescue signals						
010 11 01 04	Search and rescue signals:	x	x	x	x	x	x
	– signals with surface craft						
	– ground/air visual signal code						
	– air/ground signals						
<b>010 12 00 00</b>	<b>SECURITY (based on ANNEX 17)</b>	<b>x</b>	<b>x</b>		<b>x</b>	<b>x</b>	
010 12 01 00	Annex 17	x	x		x	x	
010 12 01 01	General:	x	x		x	x	
	– aims and objectives						
010 12 01 02	Organisation	x	x		x	x	
	– co-operation and co-ordination						
010 12 01 03	Operators: operators security programme	x	x		x	x	
<b>010 13 00 00</b>	<b>AIRCRAFT ACCIDENT INVESTIGATION (based on ANNEX 13)</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>
010 13 01 00	Annex 13	x	x		x	x	
	– definitions						
	– applicability						
<b>010 14 00 00</b>	<b>JAR-FCL</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>
<b>010 15 00 00</b>	<b>NATIONAL LAW</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>
010 15 01 00	National law and differences to relevant ICAO Annexes and JARs	x	x	x	x	x	x

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## SECTION 1

## JAR-FCL 2

Appendix 1 to JAR-FCL 2.470 (continued)

[		Aeroplane			Helicopter		
		ATPL	CPL	IR	ATPL	CPL	IR
	<b>AIRCRAFT GENERAL KNOWLEDGE</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>
<b>021 00 00 00</b>	<b>AIRFRAME AND SYSTEMS, ELECTRICS, POWERPLANT, EMERGENCY EQUIPMENT – AEROPLANES</b>	<b>x</b>	<b>x</b>				
<b>021 00 00 00</b>	<b>AIRFRAME AND SYSTEMS, ELECTRICS, POWERPLANT, EMERGENCY EQUIPMENT – HELICOPTERS</b>				<b>x</b>	<b>x</b>	
<b>021 00 00 00</b>	<b>AIRFRAME AND SYSTEMS, ELECTRICS, POWERPLANT, EMERGENCY EQUIPMENT – AIRCRAFT</b>			<b>x</b>			<b>x</b>
<b>021 01 00 00</b>	<b>AIRFRAME AND SYSTEMS – AEROPLANES</b>	<b>x</b>	<b>x</b>	<b>x</b>			<b>x</b>
021 01 01 00	Fuselage <ul style="list-style-type: none"> <li>– types of construction</li> <li>– structural components and materials</li> <li>– stress</li> </ul>	x	x				
021 01 02 00	Cockpit and cabin windows <ul style="list-style-type: none"> <li>– construction (laminated glass)</li> <li>– structural limitations</li> </ul>	x	x				
021 01 03 00	Wings <ul style="list-style-type: none"> <li>– types of construction</li> <li>– structural components and materials</li> <li>– stress relief of engines, etc.</li> <li>– stress</li> </ul>	x	x				
021 01 04 00	Stabilising surfaces <ul style="list-style-type: none"> <li>– vertical, horizontal and V-tail surfaces</li> <li>– construction materials</li> <li>– efforts</li> <li>– 'flutter'</li> <li>– compensation system</li> <li>– mach trim</li> </ul>	x	x				
021 01 05 00	Landing Gear <ul style="list-style-type: none"> <li>– types</li> <li>– construction</li> <li>– locking devices and emergency extension systems</li> <li>– accidental retraction prevention devices</li> <li>– position, movement lights and indicators</li> <li>– nose wheel steering</li> <li>– wheels and tyres (construction, limitations)</li> <li>– braking systems <ul style="list-style-type: none"> <li>– construction</li> <li>– parking brake</li> <li>– mode of operation of anti-skid system</li> <li>– mode of operations of auto brake system</li> <li>– operation, indications and warning systems</li> </ul> </li> </ul>	x	x				
021 01 06 00	Flight Controls (construction and operation)	x	x				

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## Appendix 1 to JAR-FCL 2.470 (continued)

[		Aeroplane			Helicopter		
		ATPL	CPL	IR	ATPL	CPL	IR
021 01 06 01	Primary controls: – elevator, aileron and rudder – trim – mode of actuation (mechanical, hydraulic, electrical, fly-by-wire) – operation, indicators, warning devices and controls – efforts to transmit	X	X				
021 01 06 02	Secondary controls: – leading and trailing edge lift augmentation devices – lift dumping and speed brakes – variable elevator – mode of actuation (mechanical, hydraulic, electrical, fly-by-wire) – operation, indicators, warning devices – danger situations and potential failures	X	X				
021 01 07 00	Hydraulics	X	X				
021 01 07 01	Basic principles of hydromechanics – hydraulic fluids – schematic construction and functioning of hydraulic systems	X	X				
021 01 07 02	Hydraulic systems – main, standby and emergency systems – operation, indicators, warning systems – ancillary systems	X	X				
021 01 08 00	Air driven systems (piston engines only)	X	X	X			X
021 01 08 01	Pneumatic systems – power sources – schematic construction and functioning of pneumatic systems	X	X				
021 01 08 02	Air conditioning system – heating and cooling – construction, functioning and controls	X	X				
021 01 08 03	Pressurisation – cabin altitude, maximum cabin altitude, differential pressure – pressurised zones in the aircraft – operation and indicators – safety devices and warning systems – rapid decompression, cabin altitude warning – emergency procedures	X	X				
021 01 08 04	De-ice systems – pneumatic leading edge de-icing of wings and control surfaces – schematic construction – operational limitations – initiation/timing of de-icing system usage	X	X	X			X
021 01 09 00	Air Driven Systems (Turbopropeller and Jet aircraft)	X	X	X			X

## SECTION 1

## JAR-FCL 2

Appendix 1 to JAR-FCL 2.470 (continued)

[		Aeroplane			Helicopter		
		ATPL	CPL	IR	ATPL	CPL	IR
021 01 09 01	Pneumatic system – power sources – schematic construction – potential failures, warning devices – operation, indicators, warning systems – pneumatic operated systems	X	X				
021 01 09 02	Air conditioning system – construction, functioning, operation, indicators and warning devices – heating and cooling – temperature regulation – automatic and manual – ram air ventilation – schematic construction	X	X				
021 01 09 03	Anti-ice systems – aerofoil (Aeroplane), aerofoil/rotors (Helicopter) and control surfaces, powerplant, air intakes, windshield – schematic construction, operating limitations and initiation, timing of de-icing system usage – ice warning system	X	X	X			X
021 01 09 04	Pressurisation – cabin altitude, maximum cabin altitude, differential pressure – pressurised zones in the aircraft – operation and indicators – safety devices and warning systems – rapid decompression, cabin altitude warning – emergency procedures	X	X				
021 01 10 00	Non-pneumatic operated de-ice and anti-ice systems	X	X	X			X
021 01 10 01	Schematic construction, functioning and operation of: – air intake – propeller (Aeroplane); propeller/rotors (Helicopter) – pitot, static pressure sensor and stall warning devices – windshield – weeping wing system – rain repellent system	X	X	X			X
021 01 11 00	Fuel system	X	X				
021 01 11 01	Fuel tanks – structural components and types – location of tanks on single-and multi-engine aircraft – sequence and types of refuelling – unusable fuel	X	X				
021 01 11 02	Fuel feed – gravity and pressure feed – crossfeed – schematic construction	X	X				
021 01 11 03	Fuel dumping system	X	X				

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Appendix 1 to JAR-FCL 2.470 (continued)

[		Aeroplane			Helicopter		
		ATPL	CPL	IR	ATPL	CPL	IR
021 01 11 04	Fuel system monitoring – operation, indicators, warning systems – fuel management (sequencing of fuel tank switching) – dip stick	x	x				
<b>021 02 00 00</b>	<b>ELECTRICS</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>
021 02 01 00	Direct Current (DC) (ATPL and CPL); Direct/Alternating Current (DC/AC) (IR)	x	x	x	x	x	x
021 02 01 01	General – electric circuits – voltage, current, resistance – Ohm's law – resistive circuits – resistance as a function of temperature – electrical power, electrical work – fuses (function, type and operation) – the electrical field – the capacitor (function)	x	x	x	x	x	x
021 02 01 02	Batteries – types, characteristics – capacity – uses – hazards	x	x	x	x	x	x
021 02 01 03	Magnetism – permanent magnetism – electromagnetism: – relay, circuit breaker, solenoid valve (principle, function and applications) – electromagnetic power – electromagnetic induction	x	x	x	x	x	x
021 02 01 04	Generators – alternator: – principle, function and applications – monitoring devices – regulation, control and protection – modes of excitation – starter generator	x	x	x	x	x	x
021 02 01 05	Distribution – current distribution (buses) – monitoring of electrical flight instruments/systems: – ammeter, voltmeter – annunciators – electrical consumers – DC power distribution: – construction, operation and system monitoring – elementary switching circuits	x	x	x	x	x	x
021 02 01 06	Inverter (applications)	x	x	x	x	x	x

## Appendix 1 to JAR-FCL 2.470 (continued)

[		Aeroplane			Helicopter		
		ATPL	CPL	IR	ATPL	CPL	IR
021 02 01 07	The aircraft structure as an electrical conductor	X	X		X	X	
021 02 02 00	Alternating Current (AC)	X	X		X	X	
021 02 02 01	General <ul style="list-style-type: none"> <li>– single and multi-phase AC</li> <li>– frequency</li> <li>– phase shift</li> <li>– AC components</li> </ul>	X	X		X	X	
021 02 02 02	Generators <ul style="list-style-type: none"> <li>– 3-phase generator</li> <li>– brushless generator (construction and operation)</li> <li>– generator drive: <ul style="list-style-type: none"> <li>– constant speed drive</li> <li>– integrated drive</li> </ul> </li> </ul>	X	X		X	X	
021 02 02 03	AC power distribution <ul style="list-style-type: none"> <li>– construction, operation and monitoring</li> <li>– protection circuits, paralleling of AC-generators</li> </ul>	X	X		X	X	
021 02 02 04	Transformers <ul style="list-style-type: none"> <li>– function</li> <li>– types and applications</li> </ul>	X	X		X	X	
021 02 02 05	Synchronous and asynchronous motors <ul style="list-style-type: none"> <li>– operation</li> <li>– application</li> </ul>	X	X		X	X	
021 02 02 06	Transformer/rectifier units	X	X		X	X	
021 02 03 00	Semiconductors <ul style="list-style-type: none"> <li>– principles of semiconductors</li> <li>– semiconductor resistors (properties and application)</li> <li>– rectifier (function and applications)</li> <li>– transistor (function and applications)</li> <li>– diode (function and applications)</li> </ul>	X	X		X	X	
021 02 04 00	Basic knowledge of computers	X	X		X	X	
021 02 04 01	Logic circuits	X	X		X	X	
021 02 04 02	Logical symbols	X	X		X	X	
021 02 04 03	Switching circuits and logical symbols	X	X		X	X	
021 02 05 00	Basic radio propagation theory	X	X	X	X	X	X
021 02 05 01	Basic principles <ul style="list-style-type: none"> <li>– electromagnetic waves</li> <li>– wave length, amplitude, phase angle, frequency</li> <li>– frequency bands, sideband, single sideband</li> <li>– pulse characteristics</li> <li>– carrier, modulation, demodulation</li> <li>– kinds of modulation (amplitude, frequency, pulse, multiplex)</li> <li>– oscillation circuits</li> </ul>	X	X	X	X	X	X

## Appendix 1 to JAR-FCL 2.470 (continued)

[		Aeroplane			Helicopter		
		ATPL	CPL	IR	ATPL	CPL	IR
021 02 05 02	Antennas – characteristics – polarisation – types of antennas	X	X	X	X	X	X
021 02 05 03	Wave propagation – ground waves – space waves – propagation with the frequency bands – frequency prognosis (MUF) – fading – factors affecting propagation (reflection, absorption, interference, twilight, shoreline, mountain, static)	X	X	X	X	X	X
<b>021 03 00 00</b>	<b>POWERPLANT</b>	<b>X</b>	<b>X</b>		<b>X</b>	<b>X</b>	
021 03 01 00	Piston engine	X	X		X	X	
021 03 01 01	General – design types – principles of the 4-stroke internal combustion engine – mechanical components	X	X		X	X	
021 03 01 02	Lubrication system – function – schematic construction – monitoring instruments and indicators – lubricants	X	X		X	X	
021 03 01 03	Air cooling – system monitoring – cylinder head temperature – cowl flaps	X	X		X	X	
021 03 01 04	Ignition – schematic construction and function – types of ignition – magneto check	X	X		X	X	
021 03 01 05	Engine fuel supply – carburettor (construction and mode of operation, carburettor icing) – fuel injection (construction and mode of operation) – alternate air	X	X		X	X	
021 03 01 06	Engine performance – pressure/density altitude – performance as a function of pressure and temperature	X	X		X	X	
021 03 01 07	Power augmentation devices – turbocharger, supercharger (construction and effect on engine performance)	X	X		X	X	



## SECTION 1

## JAR-FCL 2

Appendix 1 to JAR-FCL 2.470 (continued)

[		Aeroplane			Helicopter		
		ATPL	CPL	IR	ATPL	CPL	IR
021 03 01 08	Fuel – types, grades – detonation characteristics, octane rating – colour coding	X	X		X	X	
	– additives – water content, ice formation – fuel density – alternate fuels, differences in specifications, limitations						
021 03 01 09	Mixture – rich and lean mixture – maximum power and fuel economy mixture setting	X	X		X	X	
021 03 01 10	Propeller – fixed pitch and constant speed propeller – principles and operation of propellers on single and multi-engine aircraft – propeller check – propeller efficiency as a function of airspeed – aircraft and engine protection (propeller operation: ground/air, coarse/fine pitch limitations)	X	X				
021 03 01 11	Engine handling and manipulation – power setting, power range – mixture setting – operational limitations	X	X		X	X	
021 03 01 12	Operational criteria – maximum and minimum RPM – (induced) engine vibration and critical RPM – remedial action by abnormal engine start, run-up and in-flight	X	X		X	X	
021 03 02 00	Turbine engine	X	X		X	X	
021 03 02 01	Principles of operation	X	X		X	X	
021 03 02 02	Types of construction – centrifugal – axial flow – free turbine – single shaft turbine – turboprop – turbojet – turbofan	X	X		X	X	
021 03 03 00	Engine construction	X	X		X	X	
021 03 03 01	Air inlet – function	X	X		X	X	

## Appendix 1 to JAR-FCL 2.470 (continued)

[		Aeroplane			Helicopter		
		ATPL	CPL	IR	ATPL	CPL	IR
021 03 03 02	Compressor – function – construction and mode of operation – effects of damage – compressor stall and surge (cause and avoidance) – compressor characteristics	X	X		X	X	
021 03 03 03	Diffusor – function	X	X		X	X	
021 03 03 04	Combustion chamber – function, types and working principles – mixing ratios – fuel injectors – thermal load	X	X		X	X	
021 03 03 05	Turbine – function, construction and working principles – thermal and mechanical stress – effects of damage – monitoring of exhaust gas temperature	X	X		X	X	
021 03 03 06	Jet pipe – function – different types – noise silencing devices	X	X				
021 03 03 07	Pressure, temperature and airflow in a turbine engine	X	X		X	X	
021 03 03 08	Reverse thrust – function, types and principles of operation – degree of efficiency – use and monitoring	X	X				
021 03 03 09	Performance and thrust augmentation – water injection, principles of operation – use and system monitoring	X	X				
021 03 03 10	Bleed air – effect of use of bleed air on thrust, exhaust temperature, RPM and pressure ratio – effect of use of bleed air on performance	X	X		X	X	
021 03 03 11	Auxiliary gearbox – function	X	X		X	X	
021 03 04 00	Engine systems	X	X		X	X	
021 03 04 01	Ignition – function, types, components, operation, safety aspects	X	X		X	X	
021 03 04 02	Starter – function, type, construction and mode of operation – control and monitoring – self sustaining and idle speeds	X	X		X	X	

]

## SECTION 1

## JAR-FCL 2

Appendix 1 to JAR-FCL 2.470 (continued)

[		Aeroplane			Helicopter		
		ATPL	CPL	IR	ATPL	CPL	IR
021 03 04 03	Engine start malfunctions – cause and avoidance	X	X		X	X	
021 03 04 04	Fuel system – construction, components – operation and monitoring – malfunctions	X	X		X	X	
021 03 04 05	Lubrication – construction, components – operation and monitoring – malfunctions	X	X		X	X	
021 03 04 06	Fuel – effects of temperature – impurities – additives	X	X		X	X	
021 03 04 07	Thrust – thrust formula – flat rated engine – thrust as a function of airspeed, air density, pressure, temperature and RPM	X	X				
021 03 04 08	Powerplant operation and monitoring	X	X		X	X	
021 03 04 09	Power – power sharing engines – function of density – flat rated engine				X	X	
021 03 05 00	Auxiliary Power Unit (APU)	X	X		X	X	
021 03 05 01	General – function, types – location – operation and monitoring	X	X		X	X	
021 03 05 02	Ram air turbine – function	X	X				
<b>021 04 00 00</b>	<b>EMERGENCY EQUIPMENT</b>	<b>X</b>	<b>X</b>		<b>X</b>	<b>X</b>	
021 04 01 00	Doors and emergency exits – accessibility – normal and emergency operation – markings – floor exit markings – crew emergency exits – passenger emergency exits – evacuation slides, general usage or as life rafts or flotation devices	X	X		X	X	• •
021 04 02 00	Smoke detection – location, indicators, function test	X	X		X	X	

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## Appendix 1 to JAR-FCL 2.470 (continued)

[		Aeroplane			Helicopter		
		ATPL	CPL	IR	ATPL	CPL	IR
021 04 03 00	Fire detection – location, warning mode, function test	X	X		X	X	
021 04 04 00	Fire fighting equipment – location, operation, contents, gauge, function test	X	X		X	X	
021 04 05 00	Aircraft oxygen equipment – principles of operation	X	X		X	X	
	– protection and surveillance devices – drill, use of equipment in case of rapid decompression – comparison of constant flow and demand outlet masks – oxygen generators – dangers of oxygen use, safety measures				•	•	
021 04 06 00	Emergency equipment – portable, hand-held fire extinguisher – smoke mask, smoke protection hood – portable oxygen system – emergency locator beacon, transmitter – life jacket, life raft – pocket lamp, emergency lighting – megaphone – crash axe – fireproof gloves – emergency flotation system	X	X		X	X	
		•	•				
<b>021 05 00 00</b>	<b>AIRFRAME AND SYSTEMS – HELICOPTERS</b>				<b>X</b>	<b>X</b>	
021 05 01 00	Helicopter configurations – single rotor – tandem rotor – coaxial rotor – side by side rotor				X	X	
021 05 02 00	Controls and rotors				X	X	
021 05 02 01	Control systems – types – components – adjustments – primary controls (cyclic, collective, directional)				X	X	
021 05 02 02	Rotorheads – types – components – material				X	X	
021 05 02 03	Tailrotors/Notar – types – components – material				X	X	
021 05 02 04	Blades – types – section – construction				X	X	

]

## SECTION 1

## JAR-FCL 2

Appendix 1 to JAR-FCL 2.470 (continued)

[		Aeroplane			Helicopter		
		ATPL	CPL	IR	ATPL	CPL	IR
	<ul style="list-style-type: none"> <li>- material</li> <li>- adjustment</li> </ul>						
021 05 02 05	Control surfaces <ul style="list-style-type: none"> <li>- vertical horizontal</li> <li>- construction</li> <li>- material</li> </ul>				X	X	
021 05 03 00	Fuselage <ul style="list-style-type: none"> <li>- types of construction</li> <li>- structural components, materials, limitations</li> </ul>				X	X	
021 05 04 00	Cockpit and cabin <ul style="list-style-type: none"> <li>- construction</li> <li>- structural limitations</li> </ul>				X	X	
021 05 05 00	Landing gear <ul style="list-style-type: none"> <li>- types e,g floats, skids, wheels, etc,,</li> <li>- construction</li> <li>- locking devices and emergency extension systems</li> <li>- accidental retraction prevention devices</li> <li>- position, movement lights and indicators</li> <li>- wheels and tyres</li> <li>- braking systems :               <ul style="list-style-type: none"> <li>- construction</li> <li>- parking brake</li> <li>- operation, indications and warning systems</li> </ul> </li> </ul>				X	X	
021 05 06 00	Transmission systems				X	X	
021 05 06 01	Drive shafts <ul style="list-style-type: none"> <li>- types</li> <li>- components</li> <li>- material</li> </ul>				X	X	
021 05 06 02	Gearboxes <ul style="list-style-type: none"> <li>- types</li> <li>- construction</li> <li>- material</li> <li>- lubrication</li> <li>- indications</li> </ul>				X	X	
021 05 06 03	Clutches <ul style="list-style-type: none"> <li>- types</li> <li>- components</li> </ul>				X	X	
021 05 06 04	Freewheeling <ul style="list-style-type: none"> <li>- types</li> <li>- components</li> </ul>				X	X	
021 05 07 00	Rotorbrake <ul style="list-style-type: none"> <li>- components</li> <li>- construction</li> </ul>				X	X	
021 05 08 00	Inspection <ul style="list-style-type: none"> <li>- vibration</li> <li>- balancing</li> </ul>				X	X	

]

## Appendix 1 to JAR-FCL 2.470 (continued)

[		Aeroplane			Helicopter		
		ATPL	CPL	IR	ATPL	CPL	IR
	– tracking						
021 05 09 00	Hydraulics				X	X	
021 05 09 01	Basic principles of hydromechanics – hydraulic fluids – schematic construction and functioning of hydraulic systems				X	X	
021 05 09 02	Hydraulic systems – main, standby and emergency systems – operation, indicators, warning systems – ancillary systems – auxiliary systems				X	X	
021 05 10 00	Air driven systems				X	X	
021 05 10 01	Pneumatic systems – power sources – schematic construction – potential failures, safety devices – operation, indicators, warning systems – pneumatic operated systems				X	X	
021 05 10 02	Air conditioning system – construction, functioning, operation, indicators and warning devices – heating and cooling – temperature regulation – automatic and manual – ram air ventilation				X	X	
021 05 11 00	De ice and anti-ice systems – schematic construction, functioning and operation of – air intake – rotors (main tailrotor) – pitot, static pressure sensor – windshield – control surfaces (horizontal stabiliser) – rain repellent system – ice warning systems				X	X	
021 05 12 00	Fuel system				X	X	
021 05 12 01	Fuel tanks (main and auxiliary) – structural components and types – location of tanks on single and multi-engine helicopter – sequence and types of refuelling – unusable fuel – crashworthiness				X	X	
021 05 12 02	Fuel feed – gravity and pressure feed – crossfeed – schematic construction				X	X	
021 05 12 03	Fuel dumping system				X	X	
021 05 12 04	Fuel system monitoring – operation, indicators, warning systems				X	X	

]

**SECTION 1**

**JAR-FCL 2**

Appendix 1 to JAR-FCL 2.470 (continued)

[

		<i>Aeroplane</i>			<i>Helicopter</i>		
		ATPL	CPL	IR	ATPL	CPL	IR
	- fuel management (sequencing of fuel tank switching)						
	- dip stick						

Appendix 1 to JAR-FCL 2.470 (continued)

[		Aeroplane			Helicopter		
		ATPL	CPL	IR	ATPL	CPL	IR
022 00 00 00	<b>INSTRUMENTATION – AEROPLANES</b>	<b>x</b>	<b>x</b>				
022 00 00 00	<b>INSTRUMENTATION – AIRCRAFT</b>			<b>x</b>			<b>x</b>
022 00 00 00	<b>INSTRUMENTATION – HELICOPTERS</b>				<b>x</b>	<b>x</b>	
022 01 00 00	<b>FLIGHT INSTRUMENTS</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>
022 01 01 00	Air data instruments	x	x	x	x	x	x
022 01 01 01	Pitot and static system <ul style="list-style-type: none"> <li>– pitot tube, construction and principles of operation</li> <li>– static source</li> <li>– malfunction</li> <li>– heating</li> <li>– alternate static source</li> </ul>	x	x	x	x	x	x
022 01 01 02	Altimeter <ul style="list-style-type: none"> <li>– construction and principles of operation</li> <li>– display and setting</li> <li>– errors</li> <li>– correction tables</li> <li>– tolerances</li> </ul>	x	x	x	x	x	x
022 01 01 03	Airspeed indicator <ul style="list-style-type: none"> <li>– construction and principles of operation</li> <li>– speed indications (IAS)</li> <li>– meaning of coloured sectors</li> <li>– maximum speed indicator, V<sub>mo</sub>/M<sub>mo</sub> pointer</li> <li>– errors</li> </ul>	x	x	x	x	x	x
022 01 01 04	Mach meter <ul style="list-style-type: none"> <li>– mach number formula</li> <li>– construction and principles of operation</li> <li>– display</li> <li>– construction types</li> <li>– errors</li> </ul>	x					
022 01 01 05	Vertical Speed Indicator (VSI) <ul style="list-style-type: none"> <li>– aneroid and instantaneous VSI (IVSI)</li> <li>– construction and principles of operation</li> <li>– display</li> </ul>	x	x	x	x	x	x
022 01 01 06	Air Data Computer (ADC) <ul style="list-style-type: none"> <li>– principles of operation</li> <li>– input and output data, signals</li> <li>– uses of output data</li> <li>– block diagram</li> <li>– system monitoring</li> </ul>	x			x	x	
022 01 02 00	Gyroscopic instruments	x	x	x	x	x	x



## SECTION 1

## JAR-FCL 2

Appendix 1 to JAR-FCL 2.470 (continued)

[		Aeroplane			Helicopter		
		ATPL	CPL	IR	ATPL	CPL	IR
022 01 02 01	Gyro fundamentals – theory of gyroscopic forces (stability, precession) – types, construction and principles of operation: – vertical gyro – directional gyro – rate gyro – rate integrating gyro – single degree-of-freedom gyro – ring laser gyro – apparent drift – random drift – mountings – drive types, monitoring	X	X	X	X	X	X
022 01 02 02	Directional gyro – construction and principles of operation	X	X	X	X	X	X
022 01 02 03	Slaved gyro compass – construction and principles of operation – components – mounting and modes of operation – turn and acceleration errors – application, uses of output data	X	X	X	X	X	X
022 01 02 04	Attitude indicator (vertical gyro) – construction and principles of operation – display types – turn and acceleration errors – application, uses of output data	X	X	X	X	X	X
022 01 02 05	Turn and bank indicator (rate gyro) – construction and principles of operation – display types – application errors – application, uses of output data – turn co-ordinator	X	X	X	X	X	X
022 01 02 06	Gyro stabilised platform (gimballed platform) – types in use – accelerometer, measurement systems – construction and principles of operation – platform alignment – applications, uses of output data	X			X	X	
022 01 02 07	Fixed installations (strap down systems) – construction and principles of operation – types in use – input signals – application, uses of output data	X			X	X	
022 01 03 00	Magnetic compass – construction and principles of operation – errors (deviation, effect of inclination)	X	X	X	X	X	X

]

## Appendix 1 to JAR-FCL 2.470 (continued)

[		Aeroplane			Helicopter		
		ATPL	CPL	IR	ATPL	CPL	IR
022 01 04 00	Radio Altimeter – components – frequency band – principle of operation – display – errors	X	X	X	X	X	X
022 01 05 00	Electronic Flight Instrument System (EFIS) – information display types – data input – control panel, display unit – example of a typical aircraft installation	X	X	X	X	X	X
022 01 06 00	Flight Management System (FMS) – general principles – inputs and outputs of data	X			X	X	
<b>022 02 00 00</b>	<b>AUTOMATIC FLIGHT CONTROL SYSTEMS</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>
022 02 01 00	Flight Director – function and application – block diagram, components – mode of operation – operation set-up for various flight phases – command modes (bars) – mode indicator – system monitoring – limitations, operational restrictions	X	X	X	X	X	X
022 02 02 00	Autopilot – function and application – types (different axes) – block diagram, components – lateral modes – longitudinal modes – common modes – autoland, sequence of operation – system concepts for autoland, go around, take-off, fail passive, fail operational (redundant) – control modes – signal interfacing to control surfaces – operation and programming for various flight phases – system monitoring – limitations, operational restrictions	X	X	X	X	X	X
022 02 03 00	Flight envelope protection – function – input data, signals	X			X	X	
	– output data, signals – system monitoring						

## SECTION 1

## JAR-FCL 2

Appendix 1 to JAR-FCL 2.470 (continued)

[		Aeroplane			Helicopter		
		ATPL	CPL	IR	ATPL	CPL	IR
022 02 04 00	Yaw Damper / Stability augmentation system – function – block diagram, components – signal interfacing to vertical stabiliser	X	X	X	X	X	X
022 02 05 00	Automatic pitch trim – function – input data, signals – mode of operation – horizontal stabiliser, trim tab actuator – system monitoring, safety of operation	X					
022 02 06 00	Thrust computation – function – components – input data, signals – output data, signals – system monitoring	X					
022 02 07 00	Auto-thrust – function and applications – block diagrams, components – mode of operation – automatic operation mode selection – signal interfacing to throttle level mechanism – operation and programming for various flight phases – system monitoring – limitations, operational restrictions	X					
<b>022 03 00 00</b>	<b>WARNING AND RECORDING EQUIPMENT</b>	<b>X</b>	<b>X</b>		<b>X</b>	<b>X</b>	
022 03 01 00	Warnings general – classification of warning – display, indicator systems	X	X		X	X	
022 03 02 00	Altitude alert system – function – block diagram, components – operation and system monitoring	X			X	X	
022 03 03 00	Ground proximity warning system (GPWS) – function – block diagram, components – input data, signals – warning modes – system integrity test	X			X	X	
022 03 04 00	Traffic collision avoidance system (TCAS) – function – warning modes	X			X	X	

## Appendix 1 to JAR-FCL 2.470 (continued)

[		Aeroplane			Helicopter		
		ATPL	CPL	IR	ATPL	CPL	IR
022 03 05 00	Overspeed warning – function – input data, signals – display, indicators – function test – effects on operation in case of failure	X					
022 03 06 00	Stall warning – function – constituent components of a simplified system – block diagram, components of a system with angle-of-attack indicator – operation	X	X				
022 03 07 00	Flight data recorder – function – block diagram, components – operation – system monitoring	X			X	X	
022 03 08 00	Cockpit voice recorder – function – block diagram, components – operation	X			X	X	
022 03 09 00	Rotors and engine over/underspeed warning – function – input data, signals – display, indicators – function test – effects on operation in case of failure				X	X	
<b>022 04 00 00</b>	<b>POWERPLANT AND SYSTEM MONITORING INSTRUMENTS</b>	<b>X</b>	<b>X</b>		<b>X</b>	<b>X</b>	
022 04 01 00	Pressure gauge – sensors – pressure indicators – meaning of coloured sectors	X	X		X	X	
022 04 02 00	Temperature gauge – sensors – ram rise, recovery factor – temperature indicators – meaning of coloured sectors	X	X		X	X	
022 04 03 00	RPM indicator – interfacing of signal pick-up to RPM gauge – RPM indicators, piston and turbine engines – meaning of coloured sectors	X	X		X	X	
022 04 04 00	Consumption gauge – fuel flowmeter (function, indicators) – high pressure line fuel flowmeter (function, indications, failure warnings)	X	X		X	X	

## SECTION 1

## JAR-FCL 2

Appendix 1 to JAR-FCL 2.470 (continued)

[

		<i>Aeroplane</i>			<i>Helicopter</i>		
		ATPL	CPL	IR	ATPL	CPL	IR
022 04 05 00	Fuel gauge – measurement of volume/mass, units – measuring sensors – content, quantity indicators – reasons for incorrect indications	X	X		X	X	
022 04 06 00	Torque meter – indicators, units – meaning of coloured sectors	X	X		X	X	
022 04 07 00	Flight hour meter – drive source – indicators	X	X		X	X	
022 04 08 00	Vibration monitoring – indicators, units – interfacing to bypass turbofan engines – warning system	X	X				
022 04 09 00	Remote (signal) transmission system – mechanical – electrical	X	X		X	X	
022 04 10 00	Electronic Displays – EFIS – EICAS – ECAM	X •	X •		X	X	
022 04 11 00	Chip detection – indicators – principles				X	X	

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Appendix 1 to JAR-FCL 2.470 (continued)

[		Aeroplane			Helicopter		
		ATPL	CPL	IR	ATPL	CPL	IR
030 00 00 00	<b>FLIGHT PERFORMANCE AND PLANNING</b>	x	x	x	x	x	x
031 00 00 00	<b>MASS AND BALANCE – AEROPLANES</b>	x	x				
031 00 00 00	<b>MASS AND BALANCE – HELICOPTERS</b>				x	x	
031 01 00 00	<b>INTRODUCTION TO MASS AND BALANCE</b>	x	x		x	x	
031 01 01 00	Centre of gravity (cg)	x	x		x	x	
031 01 01 01	Definition	x	x		x	x	
031 01 01 02	Importance in regard to aircraft stability (Aeroplane); Importance in regard to helicopter stability (cyclic stick – travel/limitations) (Helicopter)	x	x		x	x	
031 01 02 00	Mass and balance limits	x	x		x	x	
031 01 02 01	Consult aeroplane/helicopter flight manual for: – cg limits for take-off, landing, cruise configurations	x	x		x	x	
031 01 02 02	Maximum floor load	x	x		x	x	
031 01 02 03	Maximum ramp and taxi mass (Aeroplane); Maximum taxi mass (Helicopter)	x	x		x	x	
031 01 02 04	Factors determining maximum permissible mass: – structural limitations – performance limitations such as: runway available for take-off and landing – weather conditions (temperature, pressure, wind, precipitation); rate-of-climb and altitude requirements for obstacle clearance; engine-out performance requirements	x	x		x	x	
031 01 02 05	Factors determining cg limits: – aircraft stability, helicopter stability; ability of flight controls and surfaces to overcome mass and lift pitching moments under all flight conditions – changes in cg location during flight due to consumption of fuel, raising and lowering of undercarriage, and intentional relocation of passengers or cargo, transfer of fuel – movement of centre of lift because of changes in position of wing flaps (Aeroplane); Influence of hoist and external load operation (Helicopter)	x	x		x	x	
031 02 00 00	<b>LOADING</b>	x	x		x	x	
031 02 01 00	Terminology	x	x		x	x	
031 02 01 01	Empty mass	x	x		x	x	
031 02 01 02	Dry Operating Mass (empty mass + crew + operating items + unusable fuel )	x	x		x	x	
031 02 01 03	Zero Fuel Mass	x	x		x	x	
031 02 01 04	Standard mass – crew, passengers and baggage – fuel, oil, water (volume/mass conversion factors) – carry-on luggage	x	x		x	x	
031 02 01 05	Useful load (traffic load + usable fuel)	x	x		x	x	

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## SECTION 1

## JAR-FCL 2

Appendix 1 to JAR-FCL 2.470 (continued)

[		Aeroplane			Helicopter		
		ATPL	CPL	IR	ATPL	CPL	IR
031 02 02 00	Aircraft mass checks	x	x		x	x	
031 02 02 01	Procedure (in general terms, details not necessary)	x	x		x	x	
031 02 02 02	Requirements for re-weighing of aircraft	x	x		x	x	
031 02 02 03	Equipment lists	x	x		x	x	
031 02 03 00	Procedures for determining aeroplane mass and balance documentation; Procedures for determining helicopter mass and balance documentation	x	x		x	x	
031 02 03 01	Determine Dry Operating Mass (crew, equipment, etc.)	x	x		x	x	
031 02 03 02	Intentionally left blank	x	x		x	x	
031 02 03 03	Add mass of passengers and cargo (including passengers baggage) (standard mass)	x	x		x	x	
031 02 03 04	Add mass of fuel	x	x		x	x	
031 02 03 05	Check that applicable maximum gross mass limits are not exceeded (mass within legal limits)	x	x		x	x	
031 02 04 00	Effects of overloading	x	x		x	x	
031 02 04 01	Higher take-off and safety speeds	x	x		x	x	
031 02 04 02	Longer take-off and landing distances	x	x		x	x	
031 02 04 03	Lower rate-of-climb	x	x		x	x	
031 02 04 04	Influence on range and endurance (Aeroplane); Decreased range and endurance (Helicopter)	x	x		x	x	
031 02 04 05	Decreased engine-out performance	x	x		x	x	
031 02 04 06	Possible structural damage in extreme cases	x	x		x	x	
<b>031 03 00 00</b>	<b>CENTRE OF GRAVITY (cg)</b>	<b>x</b>	<b>x</b>		<b>x</b>	<b>x</b>	
031 03 01 00	Basis of cg calculations (load and balance documentation)	x	x		x	x	
031 03 01 01	Datum – explanation of term – location – use in cg calculation	x	x		x	x	
031 03 01 02	Moment arm – explanation of term – determination of algebraic signs – use	x	x		x	x	
031 03 01 03	Moment – explanation – moment = mass x moment arm	x	x		x	x	
031 03 01 04	Expression in percentage of mean aerodynamic chord (% MAC)	x	x				
031 03 01 05	Expression of distance from Datumline				x	x	
031 03 02 00	Calculation of cg (Aeroplane); Calculation of cg longitudinal and lateral (including computer calculations) (Helicopter)	x	x		x	x	
031 03 02 01	Cg at empty mass – determined when aircraft is weighed; determined when helicopter is weighed – recorded in aircraft documentation cg at Dry Operating Mass (Aeroplane); recorded in helicopter documentation	x	x		x	x	

]

Appendix 1 to JAR-FCL 2.470 (continued)

[

	cg at Dry Operating Mass	Aeroplane			Helicopter		
		ATPL	CPL	IR	ATPL	CPL	IR
031 03 02 02	Movement of cg with addition of fuel, load and ballast	X	X		X	X	
031 03 02 03	Practical methods of calculation – computation method using either mathematical computations or specially designed slide rule – graph method – table method	X	X		X	X	
031 03 02 04	Intentional relocation of passengers or cargo to remain within cg limits				X	X	
031 03 03 00	Securing of load	X	X		X	X	
031 03 03 01	Importance of adequate tie-down – equipments for cargo compartment and cargo aircraft – container – pallet	X	X		X	X	
031 03 03 02	Effect of loadshift – movement of cg, possible out of limits – possible damage due to inertia of a moving load – effect of acceleration of the aircraft load	X	X		X	X	
031 03 04 00	Area Load, Running Load, Supporting	X	X		X	X	

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## SECTION 1

## JAR-FCL 2

Appendix 1 to JAR-FCL 2.470 (continued)

[		Aeroplane			Helicopter		
		ATPL	CPL	IR	ATPL	CPL	IR
<b>032 00 00 00</b>	<b>PERFORMANCE – AEROPLANES</b>	<b>x</b>	<b>x</b>				
<b>032 01 00 00</b>	<b>PERFORMANCE OF SINGLE-ENGINE AEROPLANES NOT CERTIFIED UNDER JAR/FAR 25 – PERFORMANCE CLASS B</b>	<b>x</b>	<b>x</b>				
032 01 01 00	Definitions of terms and speeds used	x	x				
032 01 02 00	Take-off and landing performance	x	x				
032 01 02 01	Effect of aeroplane mass, wind, density, altitude, runway slope, runway conditions	x	x				
032 01 02 02	Use of aeroplane flight manual data	x	x				
032 01 03 00	Climb and cruise performance	x	x				
032 01 03 01	Use of aeroplane flight data	x	x				
032 01 03 02	Effect of density altitude and aeroplane mass	x	x				
032 01 03 03	Endurance and the effects of the different recommended power settings	x	x				
032 01 03 04	Still air range with various power settings	x	x				
<b>032 02 00 00</b>	<b>PERFORMANCE OF MULTI-ENGINE AEROPLANES NOT CERTIFIED UNDER JAR/FAR 25 – PERFORMANCE CLASS B</b>	<b>x</b>	<b>x</b>				
032 02 01 00	Definitions of terms and speeds	x	x				
032 02 01 01	Any new terms used for multi-engine aeroplane performance (032 01 01 00)	x	x				
032 02 02 00	Importance of performance calculations	x	x				
032 02 02 01	Determination of performance under normal conditions	x	x				
032 02 02 02	Consideration of effects of pressure altitude, temperature, wind, aeroplane mass, runway slope, and runway conditions	x	x				
032 02 03 00	Elements of performance	x	x				
032 02 03 01	Take-off and landing distances – obstacle clearance at Take-off	x	x				
032 02 03 02	Rate of climb and descent – effects of selected power settings, speeds, and aircraft configuration	x	x				
032 02 03 03	Cruise altitudes and altitude ceiling – en-route requirements	x	x				
032 02 03 04	Payload/range trade-offs	x	x				
032 02 03 05	Speed/economy trade-offs	x	x				
032 02 04 00	Use of performance graphs and tabulated data	x	x				
032 02 04 01	Performance section of flight manual	x	x				
<b>032 03 00 00</b>	<b>PERFORMANCE OF AEROPLANES CERTIFIED UNDER JAR/FAR 25 – PERFORMANCE CLASS A</b>	<b>x</b>					
032 03 01 00	Take-off	x					

## Appendix 1 to JAR-FCL 2.470 (continued)

[		Aeroplane			Helicopter		
		ATPL	CPL	IR	ATPL	CPL	IR
032 03 01 01	Definitions of terms and speeds used <ul style="list-style-type: none"> <li>– appropriate speed definitions associated with take-off performance, with emphasis on:               <ul style="list-style-type: none"> <li>– <math>V_1</math>: decision speed in event of engine failure on take-off</li> <li>– <math>V_R</math>: rotation speed</li> </ul> </li> </ul>	X					
	<ul style="list-style-type: none"> <li>– <math>V_2</math>: take-off safety speed</li> <li>– appropriate distance definitions associated with take-off:               <ul style="list-style-type: none"> <li>– balanced field length</li> <li>– take-off run available (TORA)</li> <li>– take-off distance available (TODA)</li> <li>– accelerate stop distance available (ASDA)</li> <li>– clearways, stopways</li> <li>– mass/altitude/temperature limits</li> </ul> </li> <li>– other appropriate speeds:               <ul style="list-style-type: none"> <li>– <math>V_{MCG}</math></li> <li>– <math>V_{MCA}</math></li> <li>– <math>V_{MU}</math></li> <li>– <math>V_{LOF}</math></li> <li>– <math>V_{MBE}</math></li> </ul> </li> </ul>						
032 03 01 02	Runway variables <ul style="list-style-type: none"> <li>– length, slope, surface</li> <li>– strength of runway (load classification number, single isolated wheel loading)</li> </ul>	X					
032 03 01 03	Aeroplane variables <ul style="list-style-type: none"> <li>– mass</li> <li>– flap angle</li> <li>– reduced power settings</li> <li>– increased <math>V_2</math></li> <li>– use of anti-ice and de-ice</li> <li>– use of bleed air (ECS)</li> </ul>	X					
032 03 01 04	Meteorological variables <ul style="list-style-type: none"> <li>– pressure altitude and temperature (density altitude), wind gust factor, surface conditions (standing water, snow, ice etc.)</li> </ul>	X					
032 03 01 05	Take-off speeds <ul style="list-style-type: none"> <li>– computation of <math>V_1</math>, <math>V_R</math> and <math>V_2</math>; initial climb speed, landing gear and flap retraction speeds</li> </ul>	X					
032 03 01 06	Take-off distance <ul style="list-style-type: none"> <li>– computations of take-off distance</li> <li>– include consideration of aeroplane, runway, and meteorological variables when computing take-off distance and take-off speed</li> <li>– effects of early or late rotation on take-off distance; possibility of ground stall with early rotation</li> </ul>	X					
032 03 02 00	Accelerate-stop distance	X					

## SECTION 1

## JAR-FCL 2

Appendix 1 to JAR-FCL 2.470 (continued)

[		Aeroplane			Helicopter		
		ATPL	CPL	IR	ATPL	CPL	IR
032 03 02 01	Concept of balanced field length – review of definitions (032 03 00 00) – relationship between balanced/unbalanced field length and $V_1$	x					
032 03 02 02	Use of flight manual charts – computing accelerate-stop distances – decision time and deceleration procedure assumptions: – time-to-decide allowance – use of brakes – use of reverse thrust	x					
	– brake energy absorption limits: – delayed temperature rise – tyre limitations						
032 03 03 00	Initial climb	x					
032 03 03 01	Climb segments – undercarriage and flap retraction – take-off mass limitation with regard to climb requirements	x					
032 03 03 02	All engines operating – climb speed – rate of climb – noise abatement procedure	x					
032 03 03 03	Engine inoperative operation – best angle-of-climb speed – best rate-of-climb speed – rates of climb: – effect of density altitude on climb performance	x					
032 03 03 04	Obstacle clearance requirements – climb to clear obstacles – turning to avoid obstacles: – effect turns have on climb performance	x					
032 03 04 00	Climb	x					
032 03 04 01	Use of flight manual performance charts – effect of aeroplane mass – effect of density altitude change – time-to-climb calculations for reaching cruise altitude	x					
032 03 04 02	Significant airspeeds for climb – flap retraction speeds – normal (all engines operating) climb speeds: – best angle-of-climb – best rate-of-climb	x					
032 03 04 03	One engine inoperative climb – climb airspeeds: – best rate-of-climb – best angle-of-climb – maximum cruise height	x					

## Appendix 1 to JAR-FCL 2.470 (continued)

[		Aeroplane			Helicopter		
		ATPL	CPL	IR	ATPL	CPL	IR
032 03 05 00	Cruise	x					
032 03 05 01	Use of cruise charts – determination of cruise heights – maximum attainable cruise height – increase of maximum cruise speeds and power settings	x					
032 03 05 02	Cruise control – maximum range: power settings, speeds, fuel consumption – maximum endurance: power settings, speeds, fuel consumption – speed/range trade-offs, for cruise power settings – maximum cruise power settings: resultant speeds, fuel consumption	x					
032 03 05 03	En-route One Engine Inoperative – engine inoperative charts – range and endurance – One-engine Out Service Ceiling: – maximum continuous power settings – ETOPS operations	x					
032 03 05 04	Obstacle clearance en-route – net flight path – vertical and horizontal – overhead mass limitations – drift-down procedures	x					
032 03 05 05	Enroute – Aeroplanes with Three or More Engines, two engines inoperative – requirements and limitations	x					
032 03 06 00	Descent and landing	x					
032 03 06 01	Use of descent charts – time to start descent – fuel consumption in descent – limiting speed, e.g. – normal operating airspeed – maximum operating airspeed – speed for max glide ratio – maximum rate of descent speed (cabin pressure rate of descent)	x					
032 03 06 02	Maximum permitted landing mass – structural limit specified by aircraft manufacturer and the State airworthiness authorities	x					

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## Appendix 1 to JAR-FCL 2.470 (continued)

[		Aeroplane			Helicopter		
		ATPL	CPL	IR	ATPL	CPL	IR
032 03 06 03	<p>Approach and Landing data calculations</p> <ul style="list-style-type: none"> <li>- suitability of selected landing runway:               <ul style="list-style-type: none"> <li>- landing distance available</li> <li>- computation of maximum landing mass for the given runway conditions</li> <li>- computation of minimum runway length for the given</li> <li>- other factors: runway slope, surface conditions, wind temperature, density altitude</li> </ul> </li> <li>- computation of expected actual landing mass</li> <li>- computations of approach and landing speeds</li> <li>- computations should be completed for alternate aerodromes as well</li> <li>- definitions of terms and speed used:               <ul style="list-style-type: none"> <li>- VTH, Threshold speed</li> <li>- Discontinued Approach Climb</li> <li>- Landing climb</li> <li>- Landing distance, Dry, Wet and Contaminated runways</li> <li>- Landing Distance required                   <ul style="list-style-type: none"> <li>- Destination airport</li> <li>- Alternate airport</li> </ul> </li> </ul> </li> <li>- Landing –               <ul style="list-style-type: none"> <li>- Landing configuration (all engine)</li> <li>- Approach configuration (one engine out)</li> </ul> </li> </ul>	X					
032 03 07 00	Practical application of an airplane performance manual	X					
032 03 07 01	<p>Use of typical turbojet or turboprop aeroplane performance manual</p> <ul style="list-style-type: none"> <li>- take-off and landing mass calculations</li> <li>- take-off data computations:               <ul style="list-style-type: none"> <li>- effects of runway variables, aeroplane variables and meteorological variables</li> <li>- computation of the various 'V' speeds for take-off and initial climb</li> <li>- computation of runway distance factors</li> <li>- rate and gradient of initial climb</li> <li>- obstacle clearance</li> <li>- appropriate engine-out calculations</li> </ul> </li> <li>- climb computations:               <ul style="list-style-type: none"> <li>- climb rates and gradients</li> <li>- time-to-climb</li> <li>- fuel used</li> <li>- engine-out calculations</li> </ul> </li> </ul>	X					

Appendix 1 to JAR-FCL 2.470 (continued)

[

		<i>Aeroplane</i>			<i>Helicopter</i>		
		ATPL	CPL	IR	ATPL	CPL	IR
032 03 07 02	Cruise computations <ul style="list-style-type: none"> <li>– power settings and speeds for maximum range, maximum endurance and normal cruise</li> <li>– fuel consumption</li> <li>– engine-out operation; pressurisation failure, effect of lower altitude on range and endurance</li> <li>– ETOPS flight</li> <li>– additional considerations concerning fuel consumption:                             <ul style="list-style-type: none"> <li>– effects of altitude and aircraft mass</li> <li>– fuel for holding, approach and cruise to alternate</li> <li>– in normal and abnormal conditions</li> <li>– after jet engine failure</li> <li>– after decompression</li> </ul> </li> </ul>	X					

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## SECTION 1

## JAR-FCL 2

Appendix 1 to JAR-FCL 2.470 (continued)

[		Aeroplane			Helicopter		
		ATPL	CPL	IR	ATPL	CPL	IR
033 00 00 00	<b>FLIGHT PLANNING AND FLIGHT MONITORING – AEROPLANES</b>	x	x				
033 00 00 00	<b>FLIGHT PLANNING AND FLIGHT MONITORING – HELICOPTERS</b>				x	x	
033 00 00 00	<b>FLIGHT PLANNING AND FLIGHT MONITORING – AIRCRAFT</b>			x			x
033 01 00 00	<b>FLIGHT PLANS FOR CROSS-COUNTRY FLIGHTS</b>	x	x	x	x	x	x
033 01 01 00	Navigation plan	x	x	x	x	x	x
033 01 01 01	Selection of routes, speeds, heights (altitudes) and alternate airfield/landing sites <ul style="list-style-type: none"> <li>– terrain and obstacle clearance</li> <li>– cruising levels appropriate for direction of flight</li> <li>– navigation check points, visual or radio</li> </ul>	x	x	x	x	x	x
033 01 01 02	Measurement of tracks and distances	x	x	x	x	x	x
033 01 01 03	Obtaining wind velocity forecast for each leg	x	x	x	x	x	x
033 01 01 04	Computations of headings, ground speeds, and time en-route from tracks, true airspeed and wind velocities	x	x	x	x	x	x
033 01 01 05	Completion of pre-flight portion of navigation flight log	x	x	x	x	x	x
033 01 02 00	Fuel plan	x	x	x	x	x	x
033 01 02 01	Computation of planned fuel usage for each leg and total fuel usage for the flight <ul style="list-style-type: none"> <li>– flight manual figures for fuel flow during climb , en-route and during descent</li> <li>– navigation plan for times en-route</li> </ul>	x	x	x	x	x	x
033 01 02 02	Fuel for holding and diversion to alternate airfield	x	x	x	x	x	x
033 01 02 03	Reserves	x	x	x	x	x	x
033 01 02 04	Total fuel requirements for flight	x	x	x	x	x	x
033 01 02 05	Completion of pre-flight portion of fuel log	x	x	x	x	x	x
033 01 03 00	Flight monitoring and in-flight replanning	x	x	x	x	x	x
033 01 03 01	In-flight fuel computations <ul style="list-style-type: none"> <li>– recording of fuel quantities remaining at navigational checkpoints</li> </ul>	x	x	x	x	x	x
033 01 03 02	Calculation of actual consumption rate <ul style="list-style-type: none"> <li>– comparison of actual and planned fuel consumption and fuel state</li> </ul>	x	x	x	x	x	x
033 01 03 03	Revision of fuel reserve estimates	x	x	x	x	x	x
033 01 03 04	In-flight replanning in case of problems <ul style="list-style-type: none"> <li>– selection of cruise altitude and power settings for new destination</li> <li>– time to new destination</li> <li>– fuel state, fuel requirements, fuel reserves</li> </ul>	x	x	x	x	x	x

]

## Appendix 1 to JAR-FCL 2.470 (continued)

[		Aeroplane			Helicopter		
		ATPL	CPL	IR	ATPL	CPL	IR
033 01 04 00	Radio communication and navigation aids	X	X	X	X	X	X
033 01 04 01	Communication frequencies and call signs for appropriate control agencies and in-flight service facilities such as weather stations	X	X	X	X	X	X
033 01 04 02	Radio navigation and approach aids, if appropriate – type – frequencies – identification	X	X	X	X	X	X
<b>033 02 00 00</b>	<b>ICAO ATC FLIGHT PLAN</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>
033 02 01 00	Types of flight plan	X	X	X	X	X	X
033 02 01 01	ICAO flight plan – format – information included in completed plan – repetitive flight plan	X	X	X	X	X	X
033 02 02 00	Completing the flight plan	X	X	X	X	X	X
033 02 02 01	Information for flight plan obtained from – navigation flight plan – fuel plan – operator's records for basic aircraft information – mass and balance records	X	X	X	X	X	X
033 02 03 00	Filing the flight plan	X	X	X	X	X	X
033 02 03 01	Procedures for filing	X	X	X	X	X	X
033 02 03 02	Agency responsible for processing the flight plan	X	X	X	X	X	X
033 02 03 03	Requirements of the State concerning when a flight plan must be filed	X	X	X	X	X	X
033 02 04 00	Closing the flight plan	X	X	X	X	X	X
033 02 04 01	Responsibilities and procedures	X	X	X	X	X	X
033 02 04 02	Processing agency	X	X	X	X	X	X
033 02 04 03	Checking slot time	X	X	X	X	X	X
033 02 05 00	Adherence to flight plan	X	X	X	X	X	X
033 02 05 01	Tolerances allowed by the State for various types of flight plans	X	X	X	X	X	X
033 02 05 02	In-flight amendment of flight plan – conditions under which a flight plan must be amended – pilot's responsibilities and procedures for filing an amendment – agency to which amendments are submitted	X	X	X	X	X	X
<b>033 03 00 00</b>	<b>PRACTICAL FLIGHT PLANNING</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>
033 03 01 00	Chart preparation	X	X	X	X	X	X
033 03 01 01	Plot tracks and measure directions and distances	X	X	X	X	X	X
033 03 02 00	Navigation plans	X	X	X	X	X	X
033 03 02 01	Completing the navigation plan using: – tracks and distances from prepared charts – wind velocities as provided	X	X	X	X	X	X

]



## SECTION 1

## JAR-FCL 2

Appendix 1 to JAR-FCL 2.470 (continued)

[		Aeroplane			Helicopter		
		ATPL	CPL	IR	ATPL	CPL	IR
	– true airspeeds as appropriate						
033 03 03 00	Simple fuel plans	X	X	X	X	X	X
033 03 03 01	Preparation of fuel logs showing planned values for: – fuel used on each leg – fuel remaining at end of each leg – endurance, based on fuel remaining and planned consumption rate, at end of each leg	X	X	X	X	X	X
033 03 04 00	Radio planning practice	X	X	X	X	X	X
033 03 04 01	Communications – frequencies and call signs of air traffic control agencies and facilities and for in-flight services such as weather information	X	X	X	X	X	X
033 03 04 02	Navigation aids – frequencies and identifiers of en-route terminal facilities, if appropriate	X		X	X	X	X
<b>033 04 00 00</b>	<b>IFR (AIRWAYS) FLIGHT PLANNING</b>	<b>X</b>		<b>X</b>	<b>X</b>		<b>X</b>
033 04 01 00	Meteorological considerations	X		X	X		X
033 04 01 01	Analysis of existing weather patterns along possible routes	X		X	X		X
033 04 01 02	Analysis of winds aloft along prospective routes	X		X	X		X
033 04 01 03	Analysis of existing and forecast weather conditions at destination and possible alternates	X		X	X		X
033 04 02 00	Selection of routes to destination and alternates	X		X	X		X
033 04 02 01	Preferred airways routings	X		X	X		X
033 04 02 02.	Extraction of tracks and distances from RAD/NAV chart	X		X	X		X
033 04 02 03	Frequencies and identifiers of en-route radio navigation aids	X		X	X		X
033 04 02 04	Minimum en-route altitudes, minimum crossing and reception altitudes	X		X	X		X
033 04 02 05	Standard Instrument Departures (SIDs) and Standard Arrival Routes (STARs)	X		X	X		X
033 04 03 00	General flight planning tasks	X		X	X		X
033 04 03 01	Checking of AIP and NOTAM for latest airfield and en-route status information	X		X	X		X
033 04 03 02	Selection of altitudes or flight levels for each leg of the flight	X		X	X		X
033 04 03 03	Application of wind velocity on each leg to obtain heading and ground speeds	X		X	X		X
033 04 03 04	Calculation of en-route times for each leg to the destination and to the alternate and determination of total time en-route	X		X	X		X
033 04 03 05	Completion of fuel plan	X		X	X		X
033 04 03 06	Preliminary study of instrument approach procedures and minima at destination and alternate	X		X	X		X
033 04 03 07	Filling out and filing air traffic flight plan	X		X	X		X
<b>033 05 00 00</b>	<b>JET AEROPLANES FLIGHT PLANNING (Additional</b>	<b>X</b>					

]

Appendix 1 to JAR-FCL 2.470 (continued)

[		Aeroplane			Helicopter		
		ATPL	CPL	IR	ATPL	CPL	IR
	<b>considerations) – JAR-OPS 1</b>						
033 05 01 00	Additional flight planning aspects for jet aeroplanes (advanced flight planning)	x					
033 05 01 01	Fuel planning <ul style="list-style-type: none"> <li>– en-route contingency fuel</li> <li>– destination, holding and diversion fuel</li> <li>– island reserves</li> <li>– importance of altitude selection when planning for diversion to alternate</li> <li>– use of performance chart to plan fuel usage and requirements based on planned climb, en-route cruise and descent</li> <li>– reserve fuel requirements</li> <li>– influence of centre of gravity on fuel consumption</li> </ul>	x					
033 05 01 02	Computation of point-of-equal-time (PET) and point-of-safe-return (PSR)	x					
033 05 02 00	Computerised flight planning	x					
033 05 02 01	General principles of present systems <ul style="list-style-type: none"> <li>– advantages</li> <li>– shortcomings and limitations</li> </ul>	x					
<b>033 06 00 00</b>	<b>PRACTICAL COMPLETION OF A 'FLIGHT PLAN' (flight plan, flight log, nav log ATC plan, etc.)</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>
033 06 01 00	Extraction of data	x	x	x	x	x	x
033 06 01 01	Extraction of navigational data	x	x	x	x	x	x
033 06 01 02	Extraction of meteorological data	x	x	x	x	x	x
033 06 01 03	Extraction of performance data	x	x	x	x	x	x
033 06 01 04	Completion of navigation flight plan	x	x	x	x	x	x
033 06 01 05	Completion of fuel plan <ul style="list-style-type: none"> <li>– time and fuel to top-of-climb</li> <li>– cruise sector times and fuel used</li> <li>– total time and fuel required to destination</li> <li>– fuel required for missed approach, climb en-route altitude, and cruise alternate</li> <li>– reserve fuel</li> </ul>	x	x	x	x	x	x
033 06 01 06.	Computation of PET (point-of-equal-time), including equi-fuel and equi-time points, and PSR (point-of-safe-return)	x			x	x	
033 06 01 07	Completion of air traffic flight plan	x	x	x	x	x	x
<b>033 07 00 00</b>	<b>OFFSHORE OR REMOTE AREA OPERATION</b>				<b>x</b>	<b>x</b>	
033 07 01 00	Additional flight planning aspects for offshore or remote area operation				x	x	
033 07 01 01	Fuel planning <ul style="list-style-type: none"> <li>– en route contingency fuel</li> <li>– destination holding and diversion fuel</li> </ul>				x	x	
	<ul style="list-style-type: none"> <li>– destination onshore reserve</li> <li>– use of performance chart to plan fuel usage and requirements based on planned climb en-route cruise</li> </ul>						

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**SECTION 1**

**JAR-FCL 2**

Appendix 1 to JAR-FCL 2.470 (continued)

[

		<i>Aeroplane</i>			<i>Helicopter</i>		
		ATPL	CPL	IR	ATPL	CPL	IR
	and descent – reserve fuel requirements – one engine out (OEI) considerations						
033 07 01 02	Computation of point-of-equal-time (PET) and point-of-safe-return (PSR)				X	X	
033 07 02 00	Computerised flight planning				X	X	
033 07 02 01	General principles of present systems – advantages – shortcomings and limitations				X	X	

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Appendix 1 to JAR-FCL 2.470 (continued)

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		Aeroplane			Helicopter		
		ATPL	CPL	IR	ATPL	CPL	IR
<b>034 00 00 00</b>	<b>PERFORMANCE – HELICOPTERS</b>				<b>x</b>	<b>x</b>	
<b>034 01 00 00</b>	<b>AIRWORTHINESS – REQUIREMENTS</b>				<b>x</b>	<b>x</b>	
034 01 01 00	Definitions of terms and speeds used in: – JAR/FAR part 27 & 27.1 applicability – JAR/FAR part 29 & 29.1 applicability				x	x	
<b>034 02 00 00</b>	<b>DEFINITIONS OF TERMS</b> – masses – velocities : $V_{LE}$ , $V_{LO}$ , $V_x$ , $V_y$ , $V_{toss}$ : ( $V_1$ ) $V_{NE}$ $V_{NO}$ $V_{mini}$ – velocity of best range and of maximum endurance – power limitations AEO OEI – altitudes – performance class 1, 2, 3 operations (see ICAO Annex 6 Part III and JAR OPS 3 Subpart F, G, H and I)				<b>x</b>	<b>x</b>	
<b>034 03 00 00</b>	<b>TAKE OFF – CRUISE – LANDING PERFORMANCE</b> – Use and interpretation of diagrams and tables associated with CAT A, CAT B, procedures in order to select and develop class 1, 2, 3 performance profiles according to available heliport size and location (surface or elevated). See JAR-OPS 3 Subpart F, G, H, I				<b>x</b>	<b>x</b>	
<b>034 04 00 00</b>	<b>PERFORMANCE OF HELICOPTERS JAR OPS 3, SUBPARTS F, G, H, I</b>				<b>x</b>	<b>x</b>	
034 04 01 00	Applicability – Performance Class 1, 2 and 3				x	x	
034 04 02 00	General – helicopter mass – approved performance data in Helicopter Flight Manual				x	x	
034 04 03 00	Terminology – terms used in Subpart F, G, H and I and not defined in JAR-1				x	x	
<b>034 05 00 00</b>	<b>PERFORMANCE CLASS 1 SUBPART G</b>				<b>x</b>	<b>x</b>	
034 05 01 00	General and Applicability – take off from surface level heliports – take-off from elevated heliports/helidecks – critical power unit failure prior to TDP and after TDP				x	x	
034 05 02 01	Account of : – take-off mass – pressure altitude – ambient temperature – take-off technique – head-wind component – tail-wind component				x	x	

## SECTION 1

## JAR-FCL 2

Appendix 1 to JAR-FCL 2.470 (continued)

[		Aeroplane			Helicopter		
		ATPL	CPL	IR	ATPL	CPL	IR
034 05 02 02	Take-off flight path – Critical power unit inoperative take-off flight path – Obstacle vertical and lateral margins and change of direction clearance margins				X	X	
034 05 03 00	En route critical power unit inoperative				X	X	
034 05 03 01	En route flight path – out of sight of the surface – areas of mountainous terrain – Visual meteorological conditions and, in sight of surface – flight path altitudes – effects of winds on the flight path – fuel jettisons – width margins flight path reductions				X	X	
034 05 04 00	Landing: to surface level heliports; to elevated heliports/helidecks; with critical power failure prior LDP and after LDP				X	X	
034 05 04 01	Account of : – landing mass – pressure altitude – ambient temperature – landing technique – head-wind component – tail-wind component				X	X	
<b>034 06 00 00</b>	<b>SUBPART H – PERFORMANCE CLASS 2</b>				<b>X</b>	<b>X</b>	
034 06 01 00	General and Applicability				X	X	
034 06 02 00	Take-off – surface level heliports – elevated heliports/helidecks				X	X	
034 06 02 01	Take-off flight path – critical power unit failure prior and/or after DPATO				X	X	
034 06 03 00	En route – critical power unit inoperative				X	X	
034 06 04 00	Landing – critical power unit failure prior to/or after DPBL				X	X	
034 06 04 01	Landing mass – surface level heliports – elevated heliports and helidecks				X	X	
<b>034 07 00 00</b>	<b>SUBPART 1 PERFORMANCE CLASS 3</b>				<b>X</b>	<b>X</b>	
034 07 01 00	General applicability aircraft certificated in either Category A or B – operation conducted only from aerodromes – heliports and route areas and diversions that permit a safe forced landing in the event of a power unit failure				X	X	
034 07 01 01	Operations – ceiling and visibility limits – overwater in a hostile environment limits				X	X	
034 07 01 02	Operations with exposure time				X	X	

]

Appendix 1 to JAR-FCL 2.470 (continued)

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		<i>Aeroplane</i>			<i>Helicopter</i>		
		ATPL	CPL	IR	ATPL	CPL	IR
034 07 02 00	Take-off				X	X	
034 07 03 00	En route				X	X	
034 07 04 00	Landing				X	X	

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Appendix 1 to JAR-FCL 2.470 (continued)

[		Aeroplane			Helicopter		
		ATPL	CPL	IR	ATPL	CPL	IR
040 00 00 00	<b>HUMAN PERFORMANCE AND LIMITATIONS</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>
040 01 00 00	<b>Human Factors: basic concepts</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>
040 01 01 00	Human Factors in aviation	x	x	x	x	x	x
040 01 01 01	Competence and limitations	x	x	x	x	x	x
040 01 01 02	Becoming a competent pilot – the traditional approach towards 'proficiency' – the human factors approach towards 'professionalism'	x	x	x	x	x	x
040 01 02 00	Accident statistics	x	x	x	x	x	x
040 01 03 00	Flight safety concepts	x	x	x	x	x	x
040 02 00 00	<b>Basic aviation physiology and health maintenance</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>
040 02 01 00	Basics of flight physiology	x	x	x	x	x	x
040 02 01 01	The atmosphere – composition – gas Laws – oxygen requirement of tissues	x	x	x	x	x	x
040 02 01 02	Respiratory and circulatory systems – functional anatomy – hypobaric environment – pressurisation, decompression – rapid decompression – entrapped gases, barotrauma – counter measures, hypoxia – symptoms – time of useful consciousness – hyperventilation – accelerations	x	x	x	x	x	x
040 02 01 03	High altitude environment – ozone – radiation – humidity	x			x		
040 02 02 00	Man and Environment: the sensory system	x	x	x	x	x	x
040 02 02 01	Central and peripheral nervous system – sensory threshold, sensitivity, adaptation – habituation – reflexes and biological control systems	x	x	x	x	x	x
040 02 02 02	Vision – functional anatomy – visual field, foveal and peripheral vision – binocular and monocular vision – monocular vision cues – night vision	x	x	x	x	x	x

]

## Appendix 1 to JAR-FCL 2.470 (continued)

[		Aeroplane			Helicopter		
		ATPL	CPL	IR	ATPL	CPL	IR
040 02 02 03	Hearing – functional anatomy – flight related hazards to hearing	X	X	X	X	X	X
040 02 02 04	Equilibrium – functional anatomy – motion, acceleration, verticality – motion sickness	X	X	X	X	X	X
040 02 02 05	Integration of sensory inputs – spatial disorientation – illusions – physical origin – physiological origin – psychological origin – approach and landing problems	X	X	X	X	X	X
040 02 03 00	Health and hygiene	X	X	X	X	X	X
040 02 03 01	Personal hygiene	X	X	X	X	X	X
040 02 03 02	Common minor ailments – cold – influenza – gastro-intestinal upset	X	X	X	X	X	X
040 02 03 03	Problem areas for pilots – hearing loss – defective vision – hypotension, hypertension, coronaric disease – obesity – nutrition hygiene – tropical climates – epidemic diseases	X	X	X	X	X	X
040 02 03 04	Intoxication – tobacco – alcohol – drugs and self-medication – various toxic materials	X	X	X	X	X	X
040 02 03 05	Incapacitation – symptoms and causes – recognition – operating coping procedures	X	X	X	X	X	X
<b>040 03 00 00</b>	<b>BASIC AVIATION PSYCHOLOGY</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>
040 03 01 00	Human information processing	X	X	X	X	X	X
040 03 01 01	Attention and vigilance – selectivity of attention – divided attention	X	X	X	X	X	X



## SECTION 1

## JAR-FCL 2

Appendix 1 to JAR-FCL 2.470 (continued)

[		Aeroplane			Helicopter		
		ATPL	CPL	IR	ATPL	CPL	IR
040 03 01 02	Perception – perceptual illusions	X	X	X	X	X	X
	– subjectivity of perception – 'bottom-up'/'top-down' processing						
040 03 01 03	Memory – sensory memory – working memory – long term memory – motor memory (skills)	X	X	X	X	X	X
040 03 01 04	Response selection – learning principles and techniques – drives – motivation and performance	X	X	X	X	X	X
040 03 02 00	Human error and reliability	X	X	X	X	X	X
040 03 02 01	Reliability of human behaviour	X	X	X	X	X	X
040 03 02 02	Hypotheses on reality – similarity, frequency – completion causality	X	X	X	X	X	X
040 03 02 03	Theory and model of human error	X	X	X	X	X	X
040 03 02 04	Error generation – internal factors (cognitive styles) – external factors – ergonomics – economics – social environment (group, organisation)	X	X	X	X	X	X
040 03 03 00	Decision making	X	X	X	X	X	X
040 03 03 01	Decision-making concepts – structure (phases) – limits – risk assessment – practical application	X	X	X	X	X	X
040 03 04 00	Avoiding and managing errors: cockpit management	X	X	X	X	X	X
040 03 04 01	Safety awareness – risk area awareness – identification of error proneness (oneself) – identification of error sources (others) – situational awareness	X	X	X	X	X	X
040 03 04 02	Co-ordination (multi-crew concepts)	X			X		
040 03 04 03	Co-operation – small group dynamics – leadership, management styles – duty and role	X			X		

]

## Appendix 1 to JAR-FCL 2.470 (continued)

[		Aeroplane			Helicopter		
		ATPL	CPL	IR	ATPL	CPL	IR
040 03 04 04	Communication – communication model(s) – verbal and non-verbal communication – communication barriers – conflict management	X	X	X	X	X	X
040 03 05 00	Personality	X	X	X	X	X	X
040 03 05 01	Personality and attitudes – development – environmental influences	X	X	X	X	X	X
040 03 05 02	Individual differences in personality – self-concepts (e.g., action vs. state-orientation)	X	X	X	X	X	X
040 03 05 03	Identification of hazardous attitudes (error proneness)	X			X		
040 03 06 00	Human overload and underload	X	X	X	X	X	X
040 03 06 01	Arousal	X	X	X	X	X	X
040 03 06 02	Stress – definition(s), concept(s), model(s) – anxiety and stress – effects of stress	X	X	X	X	X	X
040 03 06 03	Fatigue – types, causes, symptoms – effects of fatigue	X	X	X	X	X	X
040 03 06 04	Body rhythm and sleep – rhythm disturbances – symptoms, effects, management	X	X	X	X	X	X
040 03 06 05	Fatigue and stress management – coping strategies – management techniques – health and fitness programmes – relaxation techniques – religious practices – counselling techniques	X	X	X	X	X	X
040 03 07 00	Advanced cockpit automation	X	X	X	X	X	X
040 03 07 01	Advantages and disadvantages (criticalities)	X	X	X	X	X	X
040 03 07 02	Automation complacency	X	X	X	X	X	X
040 03 07 03	Working concepts	X			X		

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## SECTION 1

## JAR-FCL 2

Appendix 1 to JAR-FCL 2.470 (continued)

		Aeroplane			Helicopter		
		ATPL	CPL	IR	ATPL	CPL	IR
<b>050 00 00 00</b>	<b>METEOROLOGY</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>
<b>050 01 00 00</b>	<b>THE ATMOSPHERE</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>
050 01 01 00	Composition, extent, vertical division	x	x	x	x	x	x
050 01 01 01	Composition, extent, vertical division	x	x	x	x	x	x
050 01 02 00	Temperature	x	x	x	x	x	x
050 01 02 01	Vertical distribution of temperature	x	x	x	x	x	x
050 01 02 02	Transfer of heat – solar and terrestrial radiation – conduction – convection – advection and turbulence	x	x	x	x	x	x
050 01 02 03	Lapse rate, stability and instability	x	x	x	x	x	x
050 01 02 04	Development of inversions, types of inversions	x	x	x	x	x	x
050 01 02 05	Temperature near the earth's surface, surface effects, diurnal variation, effect of clouds, effect of wind	x	x	x	x	x	x
050 01 03 00	Atmospheric pressure	x	x	x	x	x	x
050 01 03 01	Barometric pressure, isobars	x	x	x	x	x	x
050 01 03 02	Pressure variation with height, contours (isohypses)	x	x	x	x	x	x
050 01 03 03	Reduction of pressure to mean sea level, QFF	x	x	x	x	x	x
050 01 03 04	Surface low/upper-air low, surface high/upper-air high	x	x	x	x	x	x
050 01 04 00	Atmospheric density	x	x	x	x	x	x
050 01 04 01	Interrelationship of pressure, temperature and density	x	x	x	x	x	x
050 01 05 00	International Standard Atmosphere (ISA)	x	x	x	x	x	x
050 01 05 01	International Standard Atmosphere	x	x	x	x	x	x
050 01 06 00	Altimetry	x	x	x	x	x	x
050 01 06 01	Pressure altitude, true altitude	x	x	x	x	x	x
050 01 06 02	Height, altitude, flight level	x	x	x	x	x	x
050 01 06 03	Altimeter settings: QNH, QFE, 1013.25 hPa	x	x	x	x	x	x
050 01 06 04	Calculation of terrain clearance, lowest usable flight level, rule of thumb for temperature and pressure influences	x		x	x		x
050 01 06 05	Effect of accelerated airflow due to topography	x	x	x	x	x	x
<b>050 02 00 00</b>	<b>WIND</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>
050 02 01 00	Definition and measurement	x	x	x	x	x	x
050 02 01 01	Definition and measurement	x	x	x	x	x	x
050 02 02 00	Primary cause of wind	x	x	x	x	x	x
050 02 02 01	Primary cause of wind, pressure gradient, coriolis force, gradient wind	x	x	x	x	x	x
050 02 02 02	Relationship between isobars and wind	x	x	x	x	x	x
050 02 02 03	Effects of convergence and divergence	x			x	x	

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## Appendix 1 to JAR-FCL 2.470 (continued)

		<i>Aeroplane</i>			<i>Helicopter</i>		
		ATPL	CPL	IR	ATPL	CPL	IR
050 02 03 00	General circulation	x	x	x	x	x	x
050 02 03 01	General circulation around the globe	x	x	x	x	x	x
050 02 04 00	Turbulence	x	x	x	x	x	x
050 02 04 01	Turbulence and gustiness, types of turbulence	x	x	x	x	x	x
050 02 04 02	Origin and location of turbulence	x	x	x	x	x	x
050 02 05 00	Variation of wind with height	x	x	x	x	x	x
050 02 05 01	Variation of wind in the friction layer	x	x	x	x	x	x
050 02 05 02	Variation of the wind caused by fronts	x			x	x	
050 02 06 00	Local winds	x	x	x	x	x	x
050 02 06 01	Anabatic and catabatic winds, land and sea breezes, venturi effects	x	x	x	x	x	x
050 02 07 00	Jet streams	x			x		
050 02 07 01	Origin of jet streams	x			x		
050 02 07 02	Description and location of jet streams	x			x		
050 02 07 03	Names, heights and seasonal occurrence of jet streams	x			x		
050 02 07 04	Jet stream recognition	x			x		
050 02 07 05	CAT: cause, location and forecasting	x			x		
050 02 08 00	Standing waves	x	x	x	x	x	x
050 02 08 01	Origin of standing waves	x	x	x	x	x	x
<b>050 03 00 00</b>	<b>THERMODYNAMICS</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>
050 03 01 00	Humidity	x	x	x	x	x	x
050 03 01 01	Water vapour in the atmosphere	x	x	x	x	x	x
050 03 01 02	Temperature/dewpoint, mixing ratio, relative humidity	x	x	x	x	x	x
050 03 02 00	Change of state of aggregation	x		x	x	x	x
050 03 02 01	Condensation, evaporation, sublimation, freezing and melting, latent heat	x		x	x	x	x
050 03 03 00	Adiabatic processes	x		x	x	x	x
050 03 03 01	Adiabatic processes	x		x	x	x	x
<b>050 04 00 00</b>	<b>CLOUDS AND FOG</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>
050 04 01 00	Cloud formation and description	x	x	x	x	x	x
050 04 01 01	Cooling by adiabatic expansion and by advection	x		x	x	x	x
050 04 01 02	Cloud types, cloud classification	x	x	x	x	x	x
050 04 01 03	Influence of inversions on cloud development	x	x	x	x	x	x
050 04 01 04	Flying conditions in each cloud type	x		x	x		x
050 04 02 00	Fog, mist, haze	x	x	x	x	x	x
050 04 02 01	Radiation fog	x	x	x	x	x	x
050 04 02 02	Advection fog	x	x	x	x	x	x
050 04 02 03	Steaming fog	x	x	x	x	x	x

## SECTION 1

## JAR-FCL 2

Appendix 1 to JAR-FCL 2.470 (continued)

		Aeroplane			Helicopter		
		ATPL	CPL	IR	ATPL	CPL	IR
050 04 02 04	Frontal fog	X	X	X	X	X	X
050 04 02 05	Orographic fog	X	X	X	X	X	X
<b>050 05 00 00</b>	<b>PRECIPITATION</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>
050 05 01 00	Development of precipitation	X	X	X	X	X	X
050 05 01 01	Development of precipitation	X	X	X	X	X	X
050 05 02 00	Types of precipitation	X	X	X	X	X	X
050 05 02 01	Types of precipitation, relationship with cloud types	X	X	X	X	X	X
<b>050 06 00 00</b>	<b>AIRMASSES AND FRONTS</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>
050 06 01 00	Types of airmasses	X	X	X	X	X	X
050 06 01 01	Description, factors affecting the properties of an airmass	X	X	X	X	X	X
050 06 01 02	Classification of airmasses, modifications of airmasses, areas of origin	X	X	X	X	X	X
050 06 02 00	Fronts	X	X	X	X	X	X
050 06 02 01	Boundaries between airmasses (fronts), general situation, geographic differentiation	X	X	X	X	X	X
050 06 02 02	Warm front, associated clouds and weather	X	X	X	X	X	X
050 06 02 03	Cold front, associated clouds and weather	X	X	X	X	X	X
050 06 02 04	Warm sector, associated clouds and weather	X	X	X	X	X	X
050 06 02 05	Weather behind the cold front	X	X	X	X	X	X
050 06 02 06	Occlusions, associated clouds and weather	X	X	X	X	X	X
050 06 02 07	Stationary front, associated clouds and weather	X	X	X	X	X	X
050 06 02 08	Movement of fronts and pressure systems, life cycle	X	X	X	X	X	X
<b>050 07 00 00</b>	<b>PRESSURE SYSTEMS</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>
050 07 01 00	Location of the principal pressure areas	X	X	X	X	X	X
050 07 01 01	Location of the principal pressure areas	X	X	X	X	X	X
050 07 02 00	Anticyclone	X	X	X	X	X	X
050 07 02 01	Anticyclones, types, general properties, cold and warm anticyclones, ridges and wedges, subsidence	X	X	X	X	X	X
050 07 03 00	Non frontal depressions	X	X	X	X	X	X
050 07 03 01	Thermal-, orographic- and secondary depressions, cold air pools, troughs	X	X	X	X	X	X
050 07 04 00	Tropical revolving storms	X			X	X	
050 07 04 01	Development of tropical revolving storms	X			X	X	
050 07 04 02	Origin and local names, location and period of occurrence	X			X	X	
<b>050 08 00 00</b>	<b>CLIMATOLOGY</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>
050 08 01 00	Climatic zones	X			X	X	
050 08 01 01	General seasonal circulation in the troposphere and lower stratosphere	X			X	X	

## Appendix 1 to JAR-FCL 2.470 (continued)

		Aeroplane			Helicopter		
		ATPL	CPL	IR	ATPL	CPL	IR
050 08 01 02	Tropical rain climate, dry climate, mid-latitude climate, sub-arctic climate with cold winter, snowclimate	X			X	X	
050 08 02 00	Tropical climatology	X			X	X	
050 08 02 01	Cause and development of tropical showers: humidity, temperature, tropopause	X			X	X	
050 08 02 02	Seasonal variations of weather and wind, typical synoptic situations	X			X	X	
050 08 02 03	Intertropical convergence zone (ITCZ), weather in the ITCZ, general seasonal movement	X			X	X	
050 08 02 04	Climatic elements relative to the area (monsoon, tradewinds, sandstorms, cold air outbreaks)	X			X	X	
050 08 02 05	Easterly waves	X			X	X	
050 08 03 00	Typical weather situations in mid-latitudes	X	X	X	X	X	X
050 08 03 01	Westerly waves	X	X	X	X	X	X
050 08 03 02	High pressure area	X	X	X	X	X	X
050 08 03 03	Uniform pressure pattern	X	X	X	X	X	X
050 08 03 04	Cold pool	X	X	X	X	X	X
050 08 04 00	Local seasonal weather and wind	X	X	X	X	X	X
050 08 04 01	Local seasonal weather and wind – Foehn, Mistral, Bora, Scirocco – Khamsin, Harmattan, Ghibli and Pampero	X	X	X	X	X	X
			•	•			•
<b>050 09 00 00</b>	<b>FLIGHT HAZARDS</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>
050 09 01 00	Icing	X	X	X	X	X	X
050 09 01 01	Weather conditions for ice accretion, topographical effects	X	X	X	X	X	X
050 09 01 02	Types of ice accretion	X		X	X	X	X
050 09 01 03	Hazards of ice accretion, avoidance	X		X	X	X	X
050 09 02 00	Turbulence	X	X	X	X	X	X
050 09 02 01	Effects on flight, avoidance	X	X	X	X	X	X
050 09 02 02	CAT: effects on flight	X			X	X	
050 09 03 00	Windshear	X	X	X	X	X	X
050 09 03 01	Definition of windshear	X	X	X	X	X	X
050 09 03 02	Weather conditions for windshear	X	X	X	X	X	X
050 09 03 03	Effects on flight	X	X	X	X	X	X
050 09 04 00	Thunderstorms	X	X	X	X	X	X
050 09 04 01	Structure of thunderstorms, squall lines, life history, storm cells, electricity in the atmosphere, static charges	X	X	X	X	X	X
050 09 04 02	Conditions for and process of development, forecast, location, type specification	X	X	X	X	X	X
050 09 04 03	Thunderstorm avoidance, ground/airborne radar, stormscope	X	X	X	X	X	X
050 09 04 04	Development and effect of downbursts	X	X	X	X	X	X
050 09 04 05	Development of lightning discharges and effect of lightning	X	X	X	X	X	X

## SECTION 1

## JAR-FCL 2

Appendix 1 to JAR-FCL 2.470 (continued)

		Aeroplane			Helicopter		
		ATPL	CPL	IR	ATPL	CPL	IR
	strike on aircraft and flight execution						
050 09 05 00	Tornadoes	X			X	X	
050 09 05 01	Occurrence	X			X	X	
050 09 06 00	Low and high level inversions	X	X	X	X	X	X
050 09 06 01	Influence on aircraft performance	X	X	X	X	X	X
050 09 07 00	Stratospheric conditions	X			X	X	
050 09 07 01	Tropopause influence on aircraft performance	X			X	X	
050 09 07 02	Effect of ozone, radioactivity				X		
050 09 08 00	Hazards in mountainous areas	X	X	X	X	X	X
050 09 08 01	Influence of terrain on clouds and precipitation, frontal passage	X	X	X	X	X	X
050 09 08 02	Vertical movements, mountain waves, windshear, turbulence, ice accretion	X	X	X	X	X	X
050 09 08 03	Development and effect of valley inversions	X	X	X	X	X	X
050 09 09 00	Visibility reducing phenomena	X	X	X	X	X	X
050 09 09 01	Reduction of visibility caused by mist, smoke, dust, sand and precipitation	X	X	X	X	X	X
050 09 09 02	Reduction of visibility caused by low drifting and blowing snow	X	X	X	X	X	X
050 09 09 03	Micro meteorology				X	X	
<b>050 10 00 00</b>	<b>METEOROLOGICAL INFORMATION</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>
050 10 01 00	Observation	X	X	X	X	X	X
050 10 01 01	On the ground – surface wind, visibility and runway visual range, transmissometers; Clouds – type, amount, height of base and tops, movement; Weather – including all types of precipitation, air temperature, relative humidity, dewpoint, atmospheric pressure	X	X	X	X	X	X
050 10 01 02	Upper air observations	X		X	X	X	X
050 10 01 03	Satellite observations, interpretation	X		X	X	X	X
050 10 01 04	Weather radar observations ground and airborne, interpretation	X		X	X	X	X
050 10 01 05	Aircraft observations and reporting, data link systems, PIREPS	X	X	X	X	X	X
050 10 02 00	Weather charts	X	X	X	X	X	X
050 10 02 01	Significant weather charts	X	X	X	X	X	X
050 10 02 02	Surface charts	X	X	X	X	X	X
050 10 02 03	Upper air charts	X	X	X	X	X	X
050 10 02 04	Symbols and signs on analysed and prognostic charts	X	X	X	X	X	X
050 10 03 00	Information for flight planning	X	X	X	X	X	X
050 10 03 01	Aeronautical codes: METAR, TAF, SPECI, SIGMET, SNOWTAM, runway report	X	X	X	X	X	X

Appendix 1 to JAR-FCL 2.470 (continued)

		<i>Aeroplane</i>			<i>Helicopter</i>		
		ATPL	CPL	IR	ATPL	CPL	IR
050 10 03 02	Meteorological broadcasts for aviation: VOLMET, ATIS, HF-VOLMET, ACARS	X	X	X	X	X	X
050 10 03 03	Content and use of pre-flight meteorological documents	X	X	X	X	X	X
050 10 03 04	Meteorological briefing and advice	X	X	X	X	X	X
050 10 03 05	Measuring and warning systems for low level windshear, inversion	X	X	X	X	X	X
050 10 03 06	Special meteorological warnings	X	X	X	X	X	X
050 10 03 07	Information for computer flight planning	X			X	X	

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Appendix 1 to JAR-FCL 2.470 (continued)

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		Aeroplane			Helicopter		
		ATPL	CPL	IR	ATPL	CPL	IR
<b>060 00 00 00</b>	<b>NAVIGATION</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>
<b>061 00 00 00</b>	<b>GENERAL NAVIGATION</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>
<b>061 01 00 00</b>	<b>BASICS OF NAVIGATION</b>	<b>x</b>	<b>x</b>		<b>x</b>	<b>x</b>	
061 01 01 00	The solar system – seasonal and apparent movements of the sun	x	x		x	x	
061 01 02 00	The earth – great circle, small circle, rhumb line – convergency, conversion angle – latitude, difference of latitude – longitude, difference of longitude – use of latitude and longitude co-ordinates to locate any specific position	x	x		x	x	
061 01 03 00	Time and time conversions – apparent time – UTC – LMT – standard times – dateline – determination of sunrise, sunset and civil twilight	x	x		x	x	
061 01 04 00	Directions – terrestrial magnetism: declination, deviation and compass variations – magnetic poles, isogonals, relationship between true and magnetic – gridlines, isogrives	x	x		x	x	
061 01 05 00	Distance – units of distance and height used in navigation: nautical miles, statute miles, kilometres, metres, yards and feet – conversion from one unit to another – relationship between nautical miles and minutes of latitude	x	x		x	x	
<b>061 02 00 00</b>	<b>MAGNETISM AND COMPASSES</b>	<b>x</b>	<b>x</b>		<b>x</b>	<b>x</b>	
061 02 01 00	General principles – terrestrial magnetism – resolution of the earth's total magnetic force into vertical and horizontal components – the effects of change of latitude on these components – directive force – magnetic dip – variation	x	x		x	x	

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## Appendix 1 to JAR-FCL 2.470 (continued)

[		Aeroplane			Helicopter		
		ATPL	CPL	IR	ATPL	CPL	IR
061 02 02 00	Aircraft magnetism – hard iron and vertical soft iron – the resulting magnetic fields – the variation in directive force	X	X		X	X	
	– change of deviation with change of latitude and with change in the aircraft's heading – turning and acceleration errors – keeping magnetic materials clear of the compass						
061 02 03 00	Knowledge of the principles, standby and landing or main compasses and remote reading compasses – detailed knowledge of the use of these compasses – serviceability tests – advantages and disadvantages of the remote indicating compass – adjustment and compensation of direct reading magnetic compass	X	X		X	X	
<b>061 03 00 00</b>	<b>CHARTS</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>
061 03 01 00	General properties of miscellaneous types of projections – Mercator – Lambert conformal conic – polar stereographic – transverse mercator – oblique mercator	X	X		X	X	
061 03 02 00	The representation of meridians, parallels, great circles and rhumb lines – direct Mercator – Lambert conformal conic – polar stereographic	X	X		X	X	
061 03 03 00	The use of current aeronautical charts – plotting positions – methods of indicating scale and relief – conventional signs – measuring tracks and distances – plotting bearings	X	X	X	X	X	X
<b>061 04 00 00</b>	<b>DEAD RECKONING NAVIGATION (DR)</b>	<b>X</b>	<b>X</b>		<b>X</b>	<b>X</b>	
061 04 01 00	Basics of dead reckoning – track – heading (compass, magnetic, true, grid) – wind velocity – airspeed ( IAS, CAS, TAS, Machnumber) – groundspeed – ETA – drift, wind correction angle – DR-position, fix	X	X		X	X	

## Appendix 1 to JAR-FCL 2.470 (continued)

[		Aeroplane			Helicopter		
		ATPL	CPL	IR	ATPL	CPL	IR
061 04 02 00	Use of the navigational computer – speed – time – distance – fuel consumption – conversions – heading	x	x		x	x	
	– airspeed – wind velocity						
061 04 03 00	The triangle of velocities, methods of solution for the determination of – heading – ground speed – wind velocity – track and drift angle, track error – time and distance problems	x	x		x	x	
061 04 04 00	Determination of DR position – need for DR – confirmation of flight progress (mental DR) – lost procedures – heading and TAS vector since last confirmed position – application of wind velocity vector – last known track and ground speed vector – assessment of accuracy of DR position	x	x		x	x	
061 04 05 00	Measurement of DR elements – calculation of altitude, adjustments, corrections, errors – determination of temperature – determination of appropriate speed – determination of mach number	x	x		x	x	
061 04 06 00	Resolution of current DR problems by means of – Mercator charts – Lambert charts – polar stereographic projections	x	x				
061 04 07 00	Measurements of – maximum range – radius of action – point-of-safe-return and point-of-equal-time	x	x		x	x	
061 04 08 00	Miscellaneous DR uncertainties and practical means of correction	x	x		x	x	
<b>061 05 00 00</b>	<b>IN-FLIGHT NAVIGATION</b>	<b>x</b>	<b>x</b>		<b>x</b>	<b>x</b>	
061 05 01 00	Use of visual observations and application to in-flight navigation	x	x		x	x	
061 05 02 00	Navigation in climb and descent – average airspeed – average wind velocity – ground speed/distance covered during climb or descent	x	x		x	x	

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Appendix 1 to JAR-FCL 2.470 (continued)

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		Aeroplane			Helicopter		
		ATPL	CPL	IR	ATPL	CPL	IR
061 05 03 00	Navigation in cruising flight, use of fixes to revise navigation data as – ground speed revision – off-track corrections – calculation of wind speed and direction – ETA revisions	x	x		x	x	
061 05 04 00	Flight log (including navigation records)	x	x		x	x	
061 05 05 00	Purposes of FMS (flight management systems)	x			x	x	
<b>061 06 00 00</b>	<b>INERTIAL NAVIGATION SYSTEMS (INS)</b>	<b>x</b>					
061 06 01 00	Principles and practical application – gyroscopic principles – platform mounting – accelerometer principles – integrator principles – Shuler-tuned platform – navigation computer – strapdown systems	x					
061 06 02 00	Alignment procedures – gyrocompassing – levelling	x					
061 06 03 00	Accuracy, reliability, errors and coverage	x					
061 06 04 00	Flight deck equipment and operation – mode selector unit (MSU) – control display unit (CDU) – horizontal situation indicator (HSI)	x					
061 06 05 00	INS operation – normal flight, position and waypoint entries – flight plan changes – bypassing waypoint – change of waypoint data – system check and updating	x					

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Appendix 1 to JAR-FCL 2.470 (continued)

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		Aeroplane			Helicopter		
		ATPL	CPL	IR	ATPL	CPL	IR
<b>062 00 00 00</b>	<b>RADIO NAVIGATION</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>
<b>062 01 00 00</b>	<b>RADIO AIDS</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>
062 01 01 00	Ground D/F (including classification of bearings) – principles – presentation and interpretation – coverage – range – errors and accuracy – factors affecting range and accuracy	x	x	x	x	x	x
062 01 02 00	ADF (including associated beacons and use of the radio magnetic indicator) – principles – presentation and interpretation – coverage – range – errors and accuracy – factors affecting range and accuracy	x	x	x	x	x	x
062 01 03 00	VOR and Doppler-VOR (including the use of the radio magnetic indicator) – principles – presentation and interpretation – coverage – range – errors and accuracy – factors affecting range and accuracy	x	x	x	x	x	x
062 01 04 00	DME (distance measuring equipment) – principles – presentation and interpretation – coverage – range – errors and accuracy – factors affecting range and accuracy	x	x	x	x	x	x
062 01 05 00	ILS (instrument landing system) – principles – presentation and interpretation – coverage – range – errors and accuracy – factors affecting range and accuracy	x		x	x		x
062 01 06 00	MLS (microwave landing systems) – principles – presentation and interpretation – coverage – range – errors and accuracy – factors affecting range and accuracy	x		x	x		x

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## Appendix 1 to JAR-FCL 2.470 (continued)

[		Aeroplane			Helicopter		
		ATPL	CPL	IR	ATPL	CPL	IR
<b>062 02 00 00</b>	<b>BASIC RADAR PRINCIPLES</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>
062 02 01 00	Pulse techniques and associated terms	x		x	x	x	x
062 02 02 00	Ground radar <ul style="list-style-type: none"> <li>– principles</li> <li>– presentation and interpretation</li> <li>– coverage</li> <li>– range</li> <li>– errors and accuracy</li> <li>– factors affecting range and accuracy</li> </ul>	x		x	x	x	x
062 02 03 00	Airborne weather radar <ul style="list-style-type: none"> <li>– principles</li> <li>– presentation and interpretation</li> <li>– coverage</li> <li>– range</li> <li>– errors and accuracy</li> <li>– factors affecting range and accuracy</li> <li>– application for navigation</li> </ul>	x		x	x		x
062 02 04 00	SSR secondary surveillance radar and transponder <ul style="list-style-type: none"> <li>– principles</li> <li>– presentation and interpretation</li> <li>– modes and codes, including mode S</li> </ul>	x	x	x	x	x	x
062 02 05 00	Use of radar observations and application to in-flight navigation	x			x	x	
<b>062 05 00 00</b>	<b>AREA NAVIGATION SYSTEMS</b>	<b>x</b>		<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>
062 05 01 00	General philosophy <ul style="list-style-type: none"> <li>– use of radio navigation systems or an inertial navigation system</li> </ul>	x		x	x		x
062 05 02 00	Typical flight deck equipment and operation <ul style="list-style-type: none"> <li>– means of entering and selecting waypoints and desired course information (keyboard entry system)</li> <li>– means of selecting, tuning and identifying ground stations</li> <li>– instrumentation for en-route course guidance</li> <li>– for some types of systems, instrumentation for presenting distance travelled, distance to go and, if necessary, ground speed information</li> <li>– instrumentation for presenting current position data</li> </ul>	x		x	x		x
062 05 03 00	Instrument indications	x		x	x		x
062 05 04 00	Types of area navigation system inputs <ul style="list-style-type: none"> <li>– self-contained on-board systems (inertial navigation systems, doppler)</li> <li>– external sensor systems (VOR/DME, LORAN-C, Decca)</li> <li>– air data inputs (true airspeed, altitude, magnetic heading)</li> </ul>	x		x	x		x
062 05 05 00	VOR/DME area navigation (RNAV) <ul style="list-style-type: none"> <li>– principle of operation</li> <li>– advantages and disadvantages</li> <li>– accuracy, reliability, coverage</li> <li>– flight deck equipment</li> </ul>	x		x	x		x

Appendix 1 to JAR-FCL 2.470 (continued)

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		<i>Aeroplane</i>			<i>Helicopter</i>		
		ATPL	CPL	IR	ATPL	CPL	IR
062 05 06 00	Flight director and autopilot coupling	X			X	X	
<b>062 06 00 00</b>	<b>SELF-CONTAINED AND EXTERNAL-REFERENCED NAVIGATION SYSTEMS</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>
062 06 01 00	Doppler – principles of operation (airborne system) – ground speed and drift calculation – advantages and disadvantages – accuracy and reliability – flight deck equipment	X			X		
062 06 03 00	Loran-C – principle of operation	X			X	X	
062 06 04 00	Decca navigation system – principle of operation	X			X	X	
062 06 05 00	Satellite assisted navigation : GPS/GLONASS/DGPS – principle of operation – advantages and disadvantages	X	X	X	X	X	X

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Appendix 1 to JAR-FCL 2.470 (continued)

[		Aeroplane			Helicopter		
		ATPL	CPL	IR	ATPL	CPL	IR
070 00 00 00	<b>OPERATIONAL PROCEDURES</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>
071 00 00 00	<b>OPERATIONAL PROCEDURES – AEROPLANE</b>	<b>x</b>	<b>x</b>				
071 00 00 00	<b>OPERATIONAL PROCEDURES – SPECIAL AND EMERGENCY PROCEDURES –</b>				<b>x</b>	<b>x</b>	
071 00 00 00	<b>OPERATIONAL PROCEDURES – AIRCRAFT</b>			<b>x</b>			<b>x</b>
071 01 00 00	<b>GENERAL</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>
071 01 01 00	ICAO Annex 6, Parts I, II and III (as applicable – – definitions – applicability – general framework and contents	x	x		x	x	
071 01 02 00	JAR-OPS – Requirements	x	x	x	x	x	x
071 01 02 01	General requirements about : – quality system – additional crew members – method of carriage of persons – admission to flight deck – unauthorised carriage – portable electronic devices – endangering safety – additional informations and forms to be carried – informations retained on ground – power to inspect – production of documentation and records – preservation of documentation – leasing	x	x		x	x	
071 01 02 02	Operator certification and supervision requirements : – general rules for Air Operator Certification – issue – variation and continued validity of an AOC – administrative requirements	x	x		x	x	
071 01 02 03	Operational procedures requirements : – operational control and supervision – use of Air Traffic Services – instrument departure and approach procedures – carriage of person with reduced mobility – carriage of inadmissible passengers, deportees or persons in custody – stowage of baggages and cargo – passengers seating – securing of passenger cabin and galley(s) – smoking on board – take-off conditions – application of take-off minimas	x	x		x	x	



## SECTION 1

## JAR-FCL 2

Appendix 1 to JAR-FCL 2.470 (continued)

[		Aeroplane			Helicopter		
		ATPL	CPL	IR	ATPL	CPL	IR
071 01 02 04	All weather operations requirements: low visibility operations <ul style="list-style-type: none"> <li>– Aerodrome Operating Minimas – General</li> <li>– Terminology</li> <li>– Low visibility operations – General operating rules</li> <li>– Low visibility operations – Aerodrome considerations</li> <li>– Low visibility operations – Training and qualifications</li> <li>– Low visibility operations – Operating procedures</li> <li>– Low visibility operations – Minimum equipment</li> <li>– VFR Operating minima</li> </ul>	X	X	X	X	X	X
071 01 02 05	Instrument and safety equipment requirements: <ul style="list-style-type: none"> <li>– general introduction</li> <li>– circuit protection devices</li> <li>– windshield wipers</li> <li>– airborne weather radar equipment</li> <li>– flight crew interphone system</li> <li>– public address system</li> <li>– internal doors and curtains</li> <li>– first aid kits</li> <li>– emergency medical kit</li> <li>– first aid oxygen</li> <li>– supplemental oxygen – pressurised aeroplanes</li> <li>– supplemental oxygen – non-pressurised aeroplanes</li> <li>– crew protective breathing equipment</li> <li>– hand fire extinguishers</li> <li>– crash axes and crowbars</li> <li>– marking of break-in points</li> <li>– means for emergency evacuation</li> <li>– megaphones</li> <li>– emergency lightings</li> <li>– automatic emergency locator transmitter</li> <li>– life jackets</li> <li>– life rafts and survival ELTs for extended overwater flights</li> <li>– survival equipment</li> </ul>	X	X		X	X	
071 01 02 06	Communication and navigation equipment requirements: <ul style="list-style-type: none"> <li>– radio equipment</li> <li>– audio selector panel</li> <li>– radio equipment VFR</li> <li>– communication and navigation IFR and VFR</li> </ul>	X	X		X	X	
071 01 02 07	Aircraft maintenance: <ul style="list-style-type: none"> <li>– terminology</li> <li>– application for and approval of the operator's maintenance system</li> <li>– maintenance management</li> <li>– quality system</li> <li>– operator's maintenance management exposition</li> <li>– operator's aircraft maintenance program</li> <li>– continued validity of the Air Operator's certificate in respect of maintenance system</li> <li>– equivalent safety case</li> </ul>	X	X		X	X	



## SECTION 1

## JAR-FCL 2

Appendix 1 to JAR-FCL 2.470 (continued)

[		Aeroplane			Helicopter		
		ATPL	CPL	IR	ATPL	CPL	IR
071 02 05 00	Fire/smoke – carburettor fire – engine fire – fire in the cabin, cockpit, freight compartment (choice of appropriate fire extinguishing agents according to fire classification and use of the extinguishers) – actions in case of overheated brakes after aborted take-off and landing – smoke in the cockpit and cabin (effects and actions taken)	X	X		X	X	
071 02 06 00	Decompression of pressurised cabin – slow decompression – rapid or explosive decompression – dangers and action taken	X	X				
071 02 07 00	Windshear, microburst – definition and description – effects and recognition during departure and approach – actions to avoid and actions taken during encounter	X	X		X	X	
071 02 08 00	Wake turbulence – cause – influence of speed and mass, wind – actions taken when crossing traffic, during take-off and landing	X	X	X	X	X	X
071 02 09 00	Security – unlawful events	X	X		X	X	
071 02 10 00	Emergency and precautionary landings Operations in various terrain – water (i.e. slopes, mountains, jungle, offshore) – definition – cause – factors to be considered (wind, terrain, preparation, flight tactics, landing in various terrain and water) – passenger information – evacuation – action after landing	X	X		X	X	
071 02 11 00	Fuel jettisoning – safety aspects – legal aspects	X	X		X	X	
071 02 12 00	Transport of dangerous goods – Annex 18 – practical aspects	X	X		X	X	
071 02 13 00	Contaminated runways – kinds of contamination – braking action, brake coefficient – performance corrections and calculations	X	X		X	X	
071 02 14 00	Rotor downwash				X	X	

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Appendix 1 to JAR-FCL 2.470 (continued)

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		Aeroplane			Helicopter		
		ATPL	CPL	IR	ATPL	CPL	IR
071 02 15 00	Operation influence by meteorological conditions i.e. : – icing – white out – strong winds – windshear, microburst				X	X	
071 03 00 00	<b>EMERGENCY PROCEDURES</b> influence by technical problems i.e. – engine failure – fire in cabin cockpit engine – tail/rotor/directional control failure – ground/resonance – blade/stall – settling with power (vortex ring) – overpitch – overspeed – sudden stoppage – dynamic rollover/mast bumping				X	X	

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## SECTION 1

## JAR-FCL 2

Appendix 1 to JAR-FCL 2.470 (continued)

[		Aeroplane			Helicopter		
		ATPL	CPL	IR	ATPL	CPL	IR
080 00 00 00	<b>PRINCIPLES OF FLIGHT</b>	x	x		x	x	
081 00 00 00	<b>PRINCIPLES OF FLIGHT – AEROPLANE</b>	x	x				
081 01 00 00	<b>SUBSONIC AERODYNAMICS</b>	x	x				
081 01 01 00	Basics, laws and definitions	x	x				
081 01 01 01	Laws and definitions <ul style="list-style-type: none"> <li>– units</li> <li>– laws of Newton</li> <li>– ideal gas equation</li> <li>– equation of impulse</li> <li>– equation of continuity</li> <li>– Bernoulli's theorem</li> <li>– static pressure</li> <li>– dynamic pressure</li> <li>– viscosity</li> <li>– density</li> <li>– IAS, CAS, EAS, TAS</li> </ul>	x	x				
081 01 01 02	Basics about airflow <ul style="list-style-type: none"> <li>– stationary airflow</li> <li>– not stationary airflow</li> <li>– streamline</li> <li>– streamtube</li> <li>– two-dimensional airflow</li> <li>– three-dimensional airflow</li> </ul>	x	x				
081 01 01 03	Aerodynamic forces on surfaces <ul style="list-style-type: none"> <li>– resulting airforce</li> <li>– lift</li> <li>– drag</li> <li>– angle of attack</li> <li>– forces and equilibrium of forces during climb, level, descent and turn</li> </ul>	x	x				
081 01 01 04	Shape of an aerofoil <ul style="list-style-type: none"> <li>– thickness to chord ratio</li> <li>– chordline</li> <li>– camberline</li> <li>– nose radius</li> <li>– camber</li> <li>– angle of attack</li> <li>– angle of incidence</li> </ul>	x	x				
081 01 01 05	The wing shape <ul style="list-style-type: none"> <li>– aspect ratio</li> <li>– root chord</li> <li>– tip chord</li> <li>– tapered wings</li> <li>– shape of wing surface</li> <li>– mean aerodynamic chord (MAC)</li> </ul>	x	x				
081 01 02 00	The two-dimensional airflow about an aerofoil	x	x				

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## Appendix 1 to JAR-FCL 2.470 (continued)

[		Aeroplane			Helicopter		
		ATPL	CPL	IR	ATPL	CPL	IR
081 01 02 01	Streamline pattern	x	x				
081 01 02 02	Stagnation point	x	x				
081 01 02 03	Pressure distribution	x	x				
081 01 02 04	Centre of pressure/Cma.c.	x	x				
081 01 02 05	Lift and downwash	x	x				
081 01 02 06	Drag and wake (loss of impulse)	x	x				
081 01 02 07	Influence of angle of attack	x	x				
081 01 02 08	Flow separation at high angles of attack	x	x				
081 01 02 09	The Lift – $\alpha$ graph	x	x				
081 01 03 00	The coefficients	x	x				
081 01 03 01	The lift coefficient $C_l$ – the lift formula – $C_l - \alpha$ graph – $C_{lmax}$ and $\alpha$ – Normal Values of $C_{lmax}$ , $\alpha_{crit}$ , $\alpha_{stall}$ , and the slope of the $C_l/A.o.A$ curve	x	x				
081 01 03 02	The drag coefficient $C_d$ – the drag formula: – zero lift drag – lift induced drag – $C_d - \alpha$ graph – $C_l - C_d$ graph, profile polar – $C_l - C_d$ ratio – normal values of the $C_l - C_d$ ratio	x	x				
081 01 04 00	The three-dimensional airflow about an aeroplane	x	x				
081 01 04 01	Streamline pattern – span-wise flow and causes – tip vortices and local $\alpha$ – tip vortices and angle of attack – up-wash and down-wash due to tip vortices – span-wise lift distribution – wake turbulence behind an aircraft (causes, distribution, duration of the phenomenon)	x	x				

## Appendix 1 to JAR-FCL 2.470 (continued)

[		Aeroplane			Helicopter		
		ATPL	CPL	IR	ATPL	CPL	IR
081 01 04 02	Induced drag – influence of tip vortices on the angle of attack – the induced local $\alpha$ – influence of induced angle of attack on the direction of the lift vector – induced drag and angle of attack – induced drag and speed – induced drag and wing aspect ratio – induced drag and wing planform – induced drag coefficient – induced drag coefficient and angle of attack – influence of the induced drag on the $C_L - \alpha$ graph	X	X				
	– influence of the induced drag on the $C_L - C_D$ graph, airplane polar, lift drag ratio – parabolic airplane polar in a graph and as a formula – influence of plan of section – winglets – tip-tanks – wing span loading – influence of wing twist – influence of change of camber						
081 01 05 00	The total drag	x	x				
081 01 05 01	The parasite drag – profile drag – interference drag – friction drag	x	x				
081 01 05 02	The profile drag and speed	x	x				
081 01 05 03	The induced drag and speed	x	x				
081 01 05 04	The total drag	x	x				
081 01 05 05	The total drag and speed	x	x				
081 01 05 06	Minimum drag	x	x				
081 01 05 07	The drag – speed graph	x	x				
081 01 06 00	The ground effect	x	x				
081 01 06 01	Effect on $C_{Di}$	x	x				
081 01 06 02	Effect on $\alpha_{crit}$	x	x				
081 01 06 03	Effect on $C_L$	x	x				
081 01 06 04	Effect on take-off and landing characteristics of an aircraft	x	x				
081 01 07 00	The relation between the lift coefficient and the speed for constant lift	x	x				
081 01 07 01	As a formula	x	x				
081 01 07 02	In a graph	x	x				
081 01 08 00	The stall	x	x				

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## Appendix 1 to JAR-FCL 2.470 (continued)

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		Aeroplane			Helicopter		
		ATPL	CPL	IR	ATPL	CPL	IR
081 01 08 01	Flow separation at increasing angles of attack <ul style="list-style-type: none"> <li>– the boundary layer:               <ul style="list-style-type: none"> <li>– laminar layer</li> <li>– turbulent layer</li> <li>– transition</li> </ul> </li> <li>– separation point</li> <li>– influence of angle of attack</li> <li>– influence on:               <ul style="list-style-type: none"> <li>– pressure distribution</li> <li>– location of centre of pressure</li> <li>– <math>C_L</math></li> <li>– <math>C_D</math></li> <li>– pitch moments</li> <li>– down-wash at horizontal stabiliser</li> </ul> </li> </ul>	X	X				
	<ul style="list-style-type: none"> <li>– buffet</li> <li>– use of controls</li> </ul>						
081 01 08 02	The stall speed <ul style="list-style-type: none"> <li>– in the lift formula</li> <li>– 1g stall speed</li> <li>– FAA stall speed</li> <li>– influence of:               <ul style="list-style-type: none"> <li>– the centre of gravity</li> <li>– power setting</li> <li>– altitude (IAS)</li> <li>– wing loading, W/S</li> <li>– load factor n:                   <ul style="list-style-type: none"> <li>– definition</li> <li>– turns</li> <li>– forces</li> </ul> </li> </ul> </li> </ul>	X	X				
081 01 08 03	The initial stall in span-wise direction <ul style="list-style-type: none"> <li>– influence of plan form</li> <li>– aerodynamic twist (wash out)</li> <li>– geometric twist</li> <li>– use of ailerons</li> <li>– influence of fences, vortilons, saw teeth and vortex generators</li> </ul>	X	X				
081 01 08 04	Stall warning <ul style="list-style-type: none"> <li>– importance of stall warning</li> <li>– speed margin</li> <li>– buffet</li> <li>– stall strip</li> <li>– flapper switch</li> <li>– AOA vane</li> <li>– AOA probe</li> <li>– stick shaker</li> <li>– recovery from stall</li> </ul>	X	X				

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## SECTION 1

## JAR-FCL 2

Appendix 1 to JAR-FCL 2.470 (continued)

[

		Aeroplane			Helicopter		
		ATPL	CPL	IR	ATPL	CPL	IR
081 01 08 05	Special phenomena of stall <ul style="list-style-type: none"> <li>– the power-on stall</li> <li>– climbing and descending turns</li> <li>– swept back wings</li> <li>– super- or deep-stall, stick pusher</li> <li>– canards</li> <li>– T-tailed aircraft</li> <li>– avoidance of spins:               <ul style="list-style-type: none"> <li>– spin development</li> <li>– spin recognition</li> <li>– spin recovery</li> </ul> </li> <li>– ice (in stagnation point and on surface):               <ul style="list-style-type: none"> <li>– absence of stall warning</li> <li>– abnormal behaviour of the stall</li> <li>– stabiliser stall</li> </ul> </li> </ul>	X	X				
081 01 09 00	$C_{Lmax}$ augmentation	X	X				
081 01 09 01	Trailing edge flaps and the reasons for use in take-off and landing <ul style="list-style-type: none"> <li>– different types of flaps:               <ul style="list-style-type: none"> <li>– split flap</li> <li>– plain flap</li> <li>– slotted flap</li> <li>– fowler flap</li> </ul> </li> <li>– their influence on the <math>C_L - \alpha</math> graph</li> <li>– their influence on the <math>C_L - C_D</math> graph</li> <li>– flap asymmetry</li> <li>– influence on pitch movement</li> </ul>	X	X				
081 01 09 02	Leading edge devices and the reasons for use in take-off and landing <ul style="list-style-type: none"> <li>– different types:               <ul style="list-style-type: none"> <li>– krueger flaps</li> <li>– variable camber flaps</li> <li>– slats</li> </ul> </li> <li>– their influence on the <math>C_L - \alpha</math> graph</li> <li>– their influence on the <math>C_L - C_D</math> graph</li> <li>– slat asymmetry</li> <li>– normal/automatic operation</li> </ul>	X	X				
081 01 09 03	Vortex generators <ul style="list-style-type: none"> <li>– aerodynamic principles</li> <li>– advantages</li> <li>– disadvantages</li> </ul>	X	X				
081 01 10 00	Means to decrease the $C_L - C_D$ ratio, increasing drag	X	X				

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## Appendix 1 to JAR-FCL 2.470 (continued)

[		Aeroplane			Helicopter		
		ATPL	CPL	IR	ATPL	CPL	IR
081 01 10 01	Spoilers and the reasons for use in the different phases of flight – different functions: – flight spoilers (speedbrakes) – ground spoilers (lift dumpers) – roll spoilers – spoiler-mixer – their influence on the $C_L - \alpha$ graph – their influence on the $C_L - C_D$ graph and ratio	x	x				
081 01 10 02	Speedbrakes as a means of increasing drag and the reasons for use in the different phases of flight – the influence on the $C_L - C_D$ graph and ratio	x	x				
081 01 11 00	The boundary layer	x	x				
081 01 11 01	Different types – laminar – turbulent	x	x				
081 01 11 02	Their advantages and disadvantages on pressure drag and friction drag	x	x				
081 01 12 00	Special circumstances	x	x				
081 01 12 01	Ice and other contamination – ice in stagnation point – ice on the surface (frost, snow, clear ice)	x	x				
	– rain – contamination of the leading edge – effects on stall – effects on loss of controllability – effects on control surface moment – influence on high lift devices during take-off, landing and low speeds – affect on lift/drag ratio						
081 01 12 02	Deformation and modification of airframe, ageing aircraft	x	x				
<b>081 02 00 00</b>	<b>TRANSONIC AERODYNAMICS</b>	<b>x</b>					
081 02 01 00	The Mach number definition	x					
081 02 01 01	Speed of sound	x					
081 02 01 02	Influence of temperature and altitude	x					
081 02 01 03	Compressibility	x					
081 02 02 00	Normal shockwaves	x					
081 02 02 01	$M_{crit}$ and exceeding $M_{crit}$	x					
081 02 02 02	Influence of : – Mach number – control deflection – angle of attack – aerofoil thickness – angle of sweep – area ruling	x					
081 02 02 03	Influence on :	x					

## SECTION 1

## JAR-FCL 2

Appendix 1 to JAR-FCL 2.470 (continued)

[		Aeroplane			Helicopter		
		ATPL	CPL	IR	ATPL	CPL	IR
	<ul style="list-style-type: none"> <li>- <math>C_L - \alpha</math> graph</li> <li>- <math>C_{Lmax}</math></li> <li>- <math>C_D</math></li> <li>- <math>C_L - C_D</math></li> </ul>						
081 02 02 04	Aerodynamic heating	x					
081 02 02 05	Shock stall/Mach buffet	x					
081 02 02 06	Influence on : <ul style="list-style-type: none"> <li>- drag</li> <li>- pitch (Mach trim): <ul style="list-style-type: none"> <li>- contribution of: <ul style="list-style-type: none"> <li>- movement of the centre of pressure</li> <li>- angle of sweep</li> <li>- down-wash</li> </ul> </li> </ul> </li> </ul>	x					
081 02 02 07	Buffet margin, aerodynamic ceiling	x					
081 02 03 00	Means to avoid the effects of exceeding $M_{crit}$	x					
081 02 03 01	Vortex generators	x					
081 02 03 02	Supercritical profile <ul style="list-style-type: none"> <li>- shape</li> <li>- influence of aerofoil shape on shockwaves</li> <li>- advantages and disadvantages of supercritical aerofoil</li> </ul>	x					
<b>081 03 00 00</b>	<b>SUPERSONIC AERODYNAMICS</b>	<b>x</b>					
081 03 01 00	Oblique shockwaves	x					
081 03 01 01	Mach cone	x					
081 03 01 02	Influence of aircraft weight	x					
081 03 01 03	Expansion waves	x					
081 03 01 04	Centre of pressure	x					
081 03 01 05	Wave drag <ul style="list-style-type: none"> <li>- control surface hinge moment</li> <li>- control surface efficiency</li> </ul>	x					
<b>081 04 00 00</b>	<b>STABILITY</b>	<b>x</b>	<b>x</b>				
081 04 01 00	Condition of equilibrium in stable horizontal flight	x	x				
081 04 01 01	Precondition for static stability	x	x				
081 04 01 02	Sum of moments <ul style="list-style-type: none"> <li>- lift and weight</li> <li>- drag and thrust</li> </ul>	x	x				
081 04 01 03	Sum of forces <ul style="list-style-type: none"> <li>- in horizontal plane</li> <li>- in vertical plane</li> </ul>	x	x				
081 04 02 00	Methods of achieving balance	x	x				
081 04 02 01	Wing and empennage (tail and canard)	x	x				
081 04 02 02	Control surfaces	x	x				
081 04 02 03	Ballast or weight trim	x	x				

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## Appendix 1 to JAR-FCL 2.470 (continued)

[		Aeroplane			Helicopter		
		ATPL	CPL	IR	ATPL	CPL	IR
081 04 03 00	Longitudinal stability	x	x				
081 04 03 01	Basics and definitions <ul style="list-style-type: none"> <li>– static stability, positive, neutral and negative</li> <li>– precondition for dynamic stability</li> <li>– dynamic stability, positive, neutral and negative</li> <li>– damping: <ul style="list-style-type: none"> <li>– phugoid</li> <li>– short period</li> </ul> </li> <li>– effect of high altitude on dynamic stability</li> </ul>	x	x				
081 04 03 02	Static stability	x	x				
081 04 03 03	Neutral point/location of neutral point <ul style="list-style-type: none"> <li>– definition</li> </ul>	x	x				
081 04 03 04	Contribution of : <ul style="list-style-type: none"> <li>– aircraft geometry</li> <li>– down-wash: <ul style="list-style-type: none"> <li>– a.c. of the wing</li> </ul> </li> </ul>	x	x				
081 04 03 05	Location of centre of gravity <ul style="list-style-type: none"> <li>– aft limit, minimum stability margin</li> <li>– forward position</li> <li>– effects on static and dynamic stability</li> </ul>	x	x				
081 04 03 06	The $C_M - \alpha$ graph	x	x				
081 04 03 07	Contribution of : <ul style="list-style-type: none"> <li>– location of centre of gravity</li> <li>– control deflection</li> <li>– major aircraft parts (wings, fuselage, tail)</li> <li>– configuration: <ul style="list-style-type: none"> <li>– flap deflection</li> <li>– gear extension</li> </ul> </li> </ul>	x	x				
081 04 03 08	The elevator position – speed graph (IAS)	x	x				
081 04 03 09	Contribution of : <ul style="list-style-type: none"> <li>– location of centre of gravity</li> <li>– trim (trim tab)</li> <li>– trim (stabiliser trim)</li> </ul>	x	x				
081 04 03 10	The stick force speed graph (IAS)	x	x				
081 04 03 11	Contribution of : <ul style="list-style-type: none"> <li>– location of centre of gravity</li> <li>– trim (trim tab)</li> <li>– trim (stabiliser trim)</li> <li>– Mach number/Mach trim</li> <li>– friction in the system</li> <li>– downspring</li> <li>– Bob Weight</li> </ul>	x	x				
081 04 03 12	The manoeuvring/stick force per g	x	x				

## SECTION 1

## JAR-FCL 2

Appendix 1 to JAR-FCL 2.470 (continued)

[		Aeroplane			Helicopter		
		ATPL	CPL	IR	ATPL	CPL	IR
081 04 03 14	Contribution of : – location of centre of gravity – trim – spring – Bob Weight	X	X				
081 04 03 15	Stick force per g and the limit load factor – category of certification	X	X				
081 04 03 16	Special circumstances – ice: – effects of flap extension – effects of stabiliser ice – rain – deformation of airframe	X	X				
081 04 04 00	Static directional stability	X	X				
081 04 04 01	Slip angle $\beta$	X	X				
081 04 04 02	Yaw moment coefficient $C_N$	X	X				
081 04 04 03	$C_N - \beta$ graph	X	X				
081 04 04 04	Contribution of – location of centre of gravity – angle of sweep of the wing – fuselage at high angles of attack – strakes – dorsal fin and angle of sweep of fin – major aircraft parts	X	X				
081 04 05 00	Static lateral stability	X	X				
081 04 05 01	Bank angle $\varnothing$	X	X				
081 04 05 02	The roll moment coefficient $C_l$	X	X				
081 04 05 03	Contribution of angle of slip $\beta$	X	X				
081 04 05 04	The $C_l - \beta$ graph	X	X				
081 04 05 05	Contribution of – angle of sweep of wing – ventral fin – location of the wing – dihedral/anhedral	X	X				
081 04 05 06	Effective lateral stability	X	X				
081 04 06 00	Dynamic lateral stability	X	X				
081 04 06 01	Effects of asymmetric propeller slipstream	X	X				
081 04 06 02.	Tendency to spiral dive	X	X				
081 04 06 03	Dutch roll – causes – Mach – yaw damper	X	X				
081 04 06 04	Effects of altitude on dynamic stability	X	X				

]

## Appendix 1 to JAR-FCL 2.470 (continued)

[		Aeroplane			Helicopter		
		ATPL	CPL	IR	ATPL	CPL	IR
<b>081 05 00 00</b>	<b>CONTROL</b>	<b>x</b>	<b>x</b>				
081 05 01 00	General	x	x				
081 05 01 01	Basics, the Three Planes and Three Axis	x	x				
081 05 01 02	Camber change	x	x				
081 05 01 03	Angle of attack change	x	x				
081 05 02 00	Pitch control	x	x				
081 05 02 01	Elevator	x	x				
081 05 02 02	Down-wash effects	x	x				
081 05 02 03	Ice on tail	x	x				
081 05 02 04	Location of centre of gravity	x	x				
081 05 03 00	Yaw control	x	x				
081 05 03 01	Pedal/Rudder ratio changer	x	x				
081 05 03 02	Moments due to engine thrust – direct – induced	x	x				
081 05 03 03	Engine failure (n – 1) – rudder limitations at asymmetric thrust – meaning of $V_{MCA}$ , $V_{MCG}$	x	x				
081 05 04 00	Roll control	x	x				
081 05 04 01	Ailerons – inboard ailerons – outboard ailerons – function in different phases of flight	x	x				
081 05 04 03	Spoilers	x	x				
081 05 04 04	Adverse yaw	x	x				
081 05 04 05	Means to avoid adverse yaw – frise ailerons – differential aileron deflection – coupling ailerons to rudder by spring – roll spoilers – effects of asymmetric propeller slip stream	x	x				
081 05 05 00	Interaction in different planes (yaw/roll)	x	x				
081 05 05 01	Limitations of asymmetric power	x	x				
081 05 06 00	Means to reduce control forces	x	x				
081 05 06 01	Aerodynamic balance – nose balance – hornbalances – internal balances – balance tab, antibalance tab – servo tab – spring tab	x	x				
081 05 06 02	Artificial	x	x				

## Appendix 1 to JAR-FCL 2.470 (continued)

[		Aeroplane			Helicopter		
		ATPL	CPL	IR	ATPL	CPL	IR
	<ul style="list-style-type: none"> <li>– power assisted controls</li> <li>– fully powered controls</li> <li>– artificial feel:               <ul style="list-style-type: none"> <li>– inputs:                   <ul style="list-style-type: none"> <li>– dynamic pressure q</li> <li>– stabiliser setting</li> </ul> </li> </ul> </li> </ul>						
081 05 07 00	Mass balance	x	x				
081 05 07 01	Reasons to balance <ul style="list-style-type: none"> <li>– means</li> </ul>	x	x				
081 05 08 00	Trimming	x	x				
081 05 08 01	Reasons to trim	x	x				
081 05 08 02	Trim tabs	x	x				
081 05 08 03	Stabiliser trim/Trim rate versus IAS <ul style="list-style-type: none"> <li>– position of Centre of Gravity influence on trim/stabiliser setting for take-off</li> </ul>	x	x				
<b>081 06 00 00</b>	<b>LIMITATIONS</b>	<b>x</b>	<b>x</b>				
081 06 01 00	Operating limitations <ul style="list-style-type: none"> <li>– flutter</li> <li>– aileron reversal</li> <li>– gear/flap operating</li> </ul>	x	x • • •				
081 06 01 01	$V_{MO}$ , $V_{NO}$ , $V_{NE}$	x	x				
081 06 01 02	$M_{MO}$	x					
081 06 02 00	Manoeuvring envelope	x	x				
081 06 02 01	Manoeuvring load diagram <ul style="list-style-type: none"> <li>– load factor</li> <li>– accelerated stall speed</li> <li>– <math>V_A</math>, <math>V_C</math>, <math>V_D</math>.</li> <li>– manoeuvring limit load factor/certification category</li> </ul>	x	x				
081 06 02 02	Contribution of : <ul style="list-style-type: none"> <li>– mass</li> <li>– altitude</li> <li>– Mach number</li> </ul>	x	x •				
081 06 03 00	Gust envelope	x	x				
081 06 03 01	Gust load diagram <ul style="list-style-type: none"> <li>– vertical gust speeds</li> <li>– accelerated stall speed</li> <li>– <math>V_B</math>, <math>V_C</math>, <math>V_D</math></li> <li>– gust limit load factor</li> <li>– <math>V_{RA}</math></li> </ul>	x	x				
081 06 03 02	Contribution of : <ul style="list-style-type: none"> <li>– mass</li> <li>– altitude</li> <li>– Mach number</li> </ul>	x	x •				

]

## Appendix 1 to JAR-FCL 2.470 (continued)

[		Aeroplane			Helicopter		
		ATPL	CPL	IR	ATPL	CPL	IR
<b>081 07 00 00</b>	<b>PROPELLERS</b>	<b>x</b>	<b>x</b>				
081 07 01 00	Conversion of engine torque to thrust	x	x				
081 07 01 01	Meaning of pitch	x	x				
081 07 01 02	Blade twist	x	x				
081 07 01 03	Fixed pitch and variable pitch/constant speed	x	x				
081 07 01 04	Propeller efficiency versus speed	x	x				
081 07 01 05	Effects of ice on propeller	x	x				
081 07 02 00	Engine failure or engine stop	x	x				
081 07 02 01	Windmilling drag – influence on yaw moment when asymmetric power	x	x				
081 07 02 02	Feathering – influence on glide performance – influence on yaw moment when asymmetric power	x	x				
081 07 03 00	Design feature for power absorption	x	x				
081 07 03 01	Aspect ratio of blade	x	x				
081 07 03 02	Diameter of propeller	x	x				
081 07 03 03	Number of blades	x	x				
081 07 03 04	Propeller noise	x	x				
081 07 04 00	Moments and couples due to propeller operation	x	x				
081 07 04 01	Torque reaction	x	x				
081 07 04 02	Gyroscopic precession	x	x				
081 07 04 03	Asymmetric slipstream effect	x	x				
081 07 04 04	Asymmetric blade effect	x	x				
<b>081 08 00 00</b>	<b>FLIGHT MECHANICS</b>	<b>x</b>	<b>x</b>				
081 08 01 00	Forces acting on an airplane	x	x				
081 08 01 01	Straight horizontal steady flight	x	x				
081 08 01 02	Straight steady climb	x	x				
081 08 01 03	Straight steady descent	x	x				
081 08 01 04	Straight steady glide	x	x				
081 08 01 05	Steady coordinated turn – bank angle – load factor – turn radius – angular velocity – rate one turn	x	x				
081 08 02 00	Asymmetric thrust	x	x				
081 08 02 01	Moments about the vertical axis	x	x				
081 08 02 02	Forces on vertical fin	x	x				
081 08 02 03	Influence of bank angle – overbanking	x	x				

]



Appendix 1 to JAR-FCL 2.470 (continued)

[		Aeroplane			Helicopter		
		ATPL	CPL	IR	ATPL	CPL	IR
	– finstall						
081 08 02 04	Influence of aircraft weight	X	X				
081 08 02 05	Influence of use of ailerons	X	X				
081 08 02 06	Influence of special propeller effects on roll moments	X	X				
	– propeller torque						
	– propeller wash on flaps						
081 08 02 07	Influence of slipangle on roll moments	X	X				
081 08 02 08	V <sub>MCA</sub>	X	X				
081 08 02 09	V <sub>MCL</sub>	X	X				
081 08 02 10	V <sub>MCG</sub>	X	X				
081 08 02 11	Influence of altitude	X	X				
081 08 03 00	Emergency descent	X	X				
081 08 03 01	Influence of configuration	X	X				
081 08 03 02	Influence of chosen mach number and IAS	X	X				
081 08 03 03	Typical points on polar curve	X	X				
081 08 04 00	Windshear	X	X				

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Appendix 1 to JAR-FCL 2.470 (continued)

[		Aeroplane			Helicopter		
		ATPL	CPL	IR	ATPL	CPL	IR
082 00 00 00	<b>PRINCIPLES OF FLIGHT – HELICOPTER</b>				<b>x</b>	<b>x</b>	
082 01 00 00	<b>SUBSONIC AERODYNAMICS</b>				<b>x</b>	<b>x</b>	
082 01 01 00	Basics laws and definitions				x	x	
082 01 01 01	Components of aircraft				x	x	
082 01 01 02	Aircraft configuration				x	x	
082 01 01 03	Units of measurement of <ul style="list-style-type: none"> <li>– length</li> <li>– area</li> <li>– volume</li> <li>– velocity</li> <li>– mass</li> <li>– pressure</li> <li>– temperature</li> <li>– density</li> <li>– force</li> <li>– power</li> <li>– energy</li> </ul>				x	x	
082 01 01 04	Terms used to describe aerodynamic phenomena				x	x	
082 01 01 05	Reference speeds				x	x	
082 01 01 06	Abbreviations				x	x	
082 01 02 00	Derivation of lift				x	x	
082 01 02 01	Equation of continuity				x	x	
082 01 02 02	Bernoulli's theorem				x	x	
082 01 02 03	Streamline flow				x	x	
082 01 02 04	Angle of attack				x	x	
082 01 02 05	Pressure distribution about a wing (transverse and longitudinal)				x	x	
082 01 02 06	Centre of pressure				x	x	
082 01 02 07	Aerofoil shape (plan and section) and its effect on lift				x	x	
082 01 02 08	Lift formula				x	x	
082 01 02 09	Lift/drag ratio				x	x	
082 01 03 00	Drag				x	x	
082 01 03 01	Profile drag <ul style="list-style-type: none"> <li>– causes</li> <li>– variation with speed</li> <li>– methods of minimising it</li> </ul>				x	x	
082 01 03 02	Induced drag <ul style="list-style-type: none"> <li>– causes</li> <li>– vortices</li> <li>– variation with speed</li> <li>– design factors affecting it</li> </ul>				x	x	
082 01 03 03	Total effect of the combination of profile and induced drag				x	x	

]

## SECTION 1

## JAR-FCL 2

Appendix 1 to JAR-FCL 2.470 (continued)

		Aeroplane			Helicopter		
		ATPL	CPL	IR	ATPL	CPL	IR
082 01 04 00	Distribution of forces –				X	X	
082 01 04 01	Lift/weight and thrust/drag couples				X	X	
082 01 04 02	Necessity to achieve balance				X	X	
082 01 04 03	Methods of achieving balance				X	X	
082 01 05 00	Stability				X	X	
082 01 05 01	Aircraft axes and planes of rotation				X	X	
082 01 05 02	Static stability				X	X	
082 01 05 03	Dynamic stability				X	X	
082 01 05 04	Effects of design features on stability				X	X	
082 01 05 05	Inter-action between stability in different planes				X	X	
082 01 05 06	Effect of altitude/speed on stability				X	X	
082 01 05 07	Roll and yaw dampers				X	X	
082 01 06 00	Blade-stall				X	X	
082 01 06 01	Angle of Attack				X	X	
082 01 06 02	Boundary layer and reasons for stalling				X	X	
082 01 06 03	Variation of lift and drag in the stall				X	X	
082 01 06 04	Movement of the centre of pressure				X	X	
082 01 07 00	Transonic effects on blades				X	X	
082 01 07 01	Shock waves – the reasons for their formation at subsonic speed – their effect on the handling and operation of the helicopter				X	X	
082 01 08 00	Limitations				X	X	
082 01 08 01	Manoeuvring and gust envelope				X	X	
082 01 09 00	Performance degradation				X	X	
082 01 09 01	Adverse on performance due to profile contamination – icing – rain – modification to and condition of the airframe				X	X	
<b>082 02 00 00</b>	<b>HELICOPTER AERODYNAMICS</b>				<b>X</b>	<b>X</b>	
082 02 01 00	The helicopter and associated terminology				X	X	
082 02 01 01	Comparison with fixed wing and autogyro				X	X	
082 02 01 02	Plane of rotation				X	X	
082 02 01 03	Axes of rotation				X	X	
082 02 01 04	Rotor shaft axis				X	X	
082 02 01 05	Tip path plane				X	X	
082 02 01 06	Rotor disc				X	X	
082 02 01 07	Disc loading				X	X	
082 02 01 08	Blade loading				X	X	

]

## Appendix 1 to JAR-FCL 2.470 (continued)

[		Aeroplane			Helicopter		
		ATPL	CPL	IR	ATPL	CPL	IR
082 02 02 00	The forces diagram and associated terminology				X	X	
082 02 02 01	Pitch angle				X	X	
082 02 02 02	Rotational airflow				X	X	
082 02 02 03	Induced airflow				X	X	
082 02 02 04	Relative airflow to the blade				X	X	
082 02 02 05	Angle of attack				X	X	
082 02 02 06	Lift-blade				X	X	
082 02 02 07	Drag-blade				X	X	
082 02 02 08	Total reaction – blade				X	X	
082 02 02 09	Rotor thrust				X	X	
082 02 02 10	Rotor drag				X	X	
082 02 02 11	Torque				X	X	
082 02 02 12	Weight				X	X	
082 02 03 00	Uniformity of rotor thrust along blade span				X	X	
082 02 03 01	Blade twist				X	X	
082 02 03 02	Taper				X	X	
082 02 03 03	Coning angle				X	X	
082 02 03 04	Centrifugal force				X	X	
082 02 03 05	Limits of rotor RPM				X	X	
082 02 03 06	Centrifugal turning moments				X	X	
082 02 04 00	Helicopter Controls				X	X	
082 02 04 01	Collective lever – collective pitch changes – relationship with rotor thrust and rotor drag				X	X	
082 02 04 02	Cyclic stick – cyclic pitch changes – rotor disc attitude – rotor thrust tilt				X	X	
082 02 04 03	Yaw pedals – fuselage torque – tail rotor drift – tail rotor roll – fenestron tail – tandem rotors – co axial rotors – notar				X	X	
082 02 05 00	Rotor blade freedom of movement				X	X	
082 02 05 01	Feathering – the feathering hinge – pitch angle				X	X	

## SECTION 1

## JAR-FCL 2

Appendix 1 to JAR-FCL 2.470 (continued)

[		Aeroplane			Helicopter		
		ATPL	CPL	IR	ATPL	CPL	IR
082 02 05 02	Flapping – the flapping hinge – alleviation of bending stresses – flapping to equality				X	X	
082 02 05 03	Dragging – the drag hinge – drag dampers – leading/lagging – periodic drag changes – blade cg (conservation of angular momentum) – hookes joint effect				X	X	
082 02 06 00	Phase lag and advance angle				X	X	
082 02 06 01	The control orbit				X	X	
082 02 06 02	Pitch operating arm movement				X	X	
082 02 06 03	Rate of pitch change				X	X	
082 02 06 04	Rate of blade flapping				X	X	
082 02 06 05	Resulting disc attitude				X	X	
082 02 06 06	Phase lag definition				X	X	
082 02 06 07	Advantage angle – definition				X	X	
082 02 07 00	Vertical flight				X	X	
082 02 07 01	Take off				X	X	
082 02 07 02	Vertical climb				X	X	
082 02 07 03	Vertical descent				X	X	
082 02 07 04	Hover outside ground effect				X	X	
082 02 07 05	Ground effect				X	X	
082 02 07 06	Factors affecting ground cushion				X	X	
082 02 07 08	Dynamic roll-over avoidance of				X	X	
082 02 08 00	Forces in balance				X	X	
082 02 08 01	At the hover				X	X	
082 02 08 02	In forward flight				X	X	
082 02 08 03	Influence of cg				X	X	
082 02 08 04	Influence of rotor shaft tilt				X	X	
082 02 09 00	Translational lift				X	X	
082 02 09 01	Effect of horizontal airflow on induced flow				X	X	
082 02 09 02	Variation of total flow through the disc with forward flight				X	X	
082 02 09 03	The relationship between pitch angle and angle of attack				X	X	
082 02 10 00	Power Requirements				X	X	
082 02 10 01	Rotor profile power				X	X	
082 02 10 02	Power absorption – tail rotor and ancillary equipment				X	X	
082 02 10 03	Rotor profile power variation with forward speed				X	X	

]

## Appendix 1 to JAR-FCL 2.470 (continued)

[		Aeroplane			Helicopter		
		ATPL	CPL	IR	ATPL	CPL	IR
082 02 10 04	Induced drag				X	X	
082 02 10 05	Parasite drag				X	X	
082 02 10 06	Total power required				X	X	
082 02 10 07	Power available				X	X	
082 02 11 00	Further aerodynamics of forward flight				X	X	
082 02 11 01	Transition from and to the hover				X	X	
082 02 11 02	Symmetry and asymmetry of rotor thrust				X	X	
082 02 11 03	Main rotor flapback				X	X	
082 02 11 04	Tail rotor flapback and methods of removal				X	X	
082 02 11 05	Factors affecting maximum forward speed – design limits of cyclic stick – airflow reversal – retreating blade stall – symptoms and recovery actions – compressibility – flow separation – shock stall – ‘G’ stall				X	X	
082 02 11 06	Inflow roll				X	X	
082 02 12 00	Factors affecting cyclic stick limits				X	X	
082 02 12 01	All up mass (AUM)				X	X	
082 02 12 02	Density altitude				X	X	
082 02 12 03	Cg position				X	X	
082 02 13 00	The flare – power flight				X	X	
082 02 13 01	Thrust reversal				X	X	
082 02 13 02	Effect on aircraft attitude				X	X	
082 02 13 03	Increase in rotor thrust				X	X	
082 02 13 04	Decrease in rotor drag				X	X	
082 02 13 05	Increase in rotor RPM				X	X	
082 02 13 06	Effect of deceleration				X	X	
082 02 14 00	Settling with power (vortex ring)				X	X	
082 02 14 01	Tip vortices				X	X	
082 02 14 02	Comparison induced flow and external flow				X	X	
082 02 14 03	Development				X	X	
082 02 14 04	Change in relative airflow along blade span – root stall and turbulence				X	X	
082 02 15 00	Blade sailing				X	X	
082 02 15 01	Rotor RPM and blade rigidity				X	X	
082 02 15 02	Effect of adverse wind				X	X	
082 02 15 03	Minimising the danger				X	X	

## SECTION 1

## JAR-FCL 2

Appendix 1 to JAR-FCL 2.470 (continued)

[		Aeroplane			Helicopter		
		ATPL	CPL	IR	ATPL	CPL	IR
082 02 16 00	Autorotation – vertical				X	X	
082 02 16 01	Rate of decent airflow				X	X	
082 02 16 02	Effective airflow				X	X	
082 02 16 03	Relative airflow				X	X	
082 02 16 04	Inflow and Inflow angle				X	X	
082 02 16 05	Autorotative force				X	X	
082 02 16 06	Rotor drag				X	X	
082 02 16 07	Effect of mass and altitude				X	X	
082 02 16 08	Control of rotor RPM with lever				X	X	
082 02 16 09	Rotor RPM stability				X	X	
082 02 17 00	Autorotation – forward flight				X	X	
082 02 17 01	Factors affecting inflow angle				X	X	
082 02 17 02	Effect of forward speed on rate of descent				X	X	
082 02 17 03	Asymmetry of autorotative disc area in forward flight				X	X	
082 02 17 04	Turning				X	X	
082 02 17 05	The flare – rotor RPM increase from movment of autorotative section – increase in rotor thrust – reduction in rate of descent				X	X	
082 02 17 06	Range and endurance				X	X	
082 02 17 07	Autorotative landing				X	X	
082 02 17 08	Height/velocity avoidance graph				X	X	
082 02 18 00	Stability				X	X	
082 02 18 01	Hover				X	X	
082 02 18 02	Forward Flight				X	X	
082 02 18 03	Rearward Flight				X	X	
082 02 18 04	Stability aids – stabilisers and effects of centre of gravity – gyro controlled stabiliser system – stabiliser bars – delta hinge effect				X	X	
082 02 18 05	Effect of lever application on attitude in translational flight				X	X	
082 02 19 00	Control power				X	X	
082 02 19 01	The teetering head				X	X	
082 02 19 02	Fully articulated head				X	X	
082 02 19 03	The rigid rotor				X	X	
082 02 19 04	Effect on stability				X	X	
082 02 19 05	Effect on dynamic/static rollover				X	X	
082 02 20 00	Power requirements – graphs				X	X	

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Appendix 1 to JAR-FCL 2.470 (continued)

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		<i>Aeroplane</i>			<i>Helicopter</i>		
		ATPL	CPL	IR	ATPL	CPL	IR
082 02 20 01	Power required/power available graph				X	X	
082 02 20 02	Maximum rate of climb speed				X	X	
082 02 20 03	Operating with limited power				X	X	
082 02 20 04	Best angle of climb speed				X	X	
082 02 20 05	Maximum speed				X	X	
082 02 20 06	Range and endurance				X	X	
082 02 20 07	Overpitch				X	X	
082 02 20 08	Overtorque				X	X	
082 02 20 09	Turning				X	X	
082 02 20 10	Comparison of piston and turbine engine helicopters				X	X	
	– range and endurance						
	– effect of density altitude						
	– effect of aircraft weight						

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Appendix 1 to JAR-FCL 2.470 (continued)

[		Aeroplane			Helicopter		
		ATPL	CPL	IR	ATPL	CPL	IR
090 00 00 00	<b>COMMUNICATIONS</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>
091 00 00 00	<b>VFR COMMUNICATIONS</b>	<b>x</b>	<b>x</b>		<b>x</b>	<b>x</b>	
091 01 00 00	<b>DEFINITIONS</b>	<b>x</b>	<b>x</b>		<b>x</b>	<b>x</b>	
091 01 01 00	Meanings and significance of associated terms	x	x		x	x	
091 01 02 00	Air Traffic Services abbreviations	x	x		x	x	
091 01 03 00	Q-code groups commonly used in RTF air-ground communications	x	x		x	x	
091 01 04 00	Categories of messages	x	x		x	x	
091 02 00 00	<b>GENERAL OPERATING PROCEDURES</b>	<b>x</b>	<b>x</b>		<b>x</b>	<b>x</b>	
091 02 01 00	Transmission of letters	x	x		x	x	
091 02 02 00	Transmission of numbers (including level information)	x	x		x	x	
091 02 03 00	Transmission of time	x	x		x	x	
091 02 04 00	Transmission technique	x	x		x	x	
091 02 05 00	Standard words and phrases (relevant RTF phraseology included)	x	x		x	x	
091 02 06 00	Radiotelephony call signs for aeronautical stations including use of abbreviated call signs	x	x		x	x	
091 02 07 00	Radiotelephony call signs for aircraft including use of abbreviated call signs	x	x		x	x	
091 02 08 00	Transfer of communication	x	x		x	x	
091 02 09 00	Test procedures including readability scale	x	x		x	x	
091 02 10 00	Read back and acknowledgement requirements	x	x		x	x	
091 02 11 00	Radar procedural phraseology	x	x		x	x	
091 03 00 00	<b>RELEVANT WEATHER INFORMATION TERMS (VFR)</b>	<b>x</b>	<b>x</b>		<b>x</b>	<b>x</b>	
091 03 01 00	Aerodrome weather	x	x		x	x	
091 03 02 00	Weather broadcast	x	x		x	x	
091 04 00 00	<b>ACTION REQUIRED TO BE TAKEN IN CASE OF COMMUNICATION FAILURE</b>	<b>x</b>	<b>x</b>		<b>x</b>	<b>x</b>	
091 05 00 00	<b>DISTRESS AND URGENCY PROCEDURES</b>	<b>x</b>	<b>x</b>		<b>x</b>	<b>x</b>	
091 05 01 00	Distress (definition – frequencies – watch of distress frequencies – distress signal – distress message)	x	x		x	x	
091 05 02 00	Urgency (definition – frequencies – urgency signal – urgency message)	x	x		x	x	
091 06 00 00	<b>GENERAL PRINCIPLES OF VHF PROPAGATION AND ALLOCATION OF FREQUENCIES</b>	<b>x</b>	<b>x</b>		<b>x</b>	<b>x</b>	
092 00 00 00	<b>IFR COMMUNICATIONS</b>	<b>x</b>		<b>x</b>	<b>x</b>		<b>x</b>
092 01 00 00	<b>DEFINITIONS</b>	<b>x</b>		<b>x</b>	<b>x</b>		<b>x</b>

]

## Appendix 1 to JAR-FCL 2.470 (continued)

[		Aeroplane			Helicopter		
		ATPL	CPL	IR	ATPL	CPL	IR
092 01 01 00	Meanings and significance of associated terms	X		X	X		X
092 01 02 00	Air Traffic Control abbreviations	X		X	X		X
092 01 03 00	Q-code groups commonly used in RTF air-ground communications	X		X	X		X
092 01 04 00	Categories of messages	X		X	X		X
<b>092 02 00 00</b>	<b>GENERAL OPERATING PROCEDURES</b>	<b>X</b>		<b>X</b>	<b>X</b>		<b>X</b>
092 02 01 00	Transmission of letters	X		X	X		X
092 02 02 00	Transmission of numbers (including level information)	X		X	X		X
092 02 03 00	Transmission of time	X		X	X		X
092 02 04 00	Transmission technique	X		X	X		X
092 02 05 00	Standard words and phrases (relevant RTF phraseology included)	X		X	X		X
092 02 06 00	Radiotelephony call signs for aeronautical stations including use of abbreviated call signs	X		X	X		X
092 02 07 00	Radiotelephony call signs for aircraft including use of abbreviated call signs	X		X	X		X
092 02 08 00	Transfer of communication	X		X	X		X
092 02 09 00	Test procedures including readability scale; establishment of RTF communication	X		X	X		X
092 02 10 00	Read back and acknowledgement requirements	X		X	X		X
092 02 11 00	Radar procedural phraseology	X		X	X		X
092 02 12 00	Level changes and reports	X		X	X		X
<b>092 03 00 00</b>	<b>ACTION REQUIRED TO BE TAKEN IN CASE OF COMMUNICATION FAILURE</b>	<b>X</b>		<b>X</b>	<b>X</b>		<b>X</b>
<b>092 04 00 00</b>	<b>DISTRESS AND URGENCY PROCEDURES</b>	<b>X</b>		<b>X</b>	<b>X</b>		<b>X</b>
092 04 01 00	PAN medical	X		X	X		X
092 04 02 00	Distress (definition – frequencies – watch of distress frequencies – distress signal – distress message)	X		X	X		X
092 04 03 00	Urgency (definition – frequencies – urgency signal – urgency message)	X		X	X		X
<b>092 05 00 00</b>	<b>RELEVANT WEATHER INFORMATION TERMS (IFR)</b>	<b>X</b>		<b>X</b>	<b>X</b>		<b>X</b>
092 05 01 00	Aerodrome weather	X		X	X		X
092 05 02 00	Weather broadcast	X		X	X		X
<b>092 06 00 00</b>	<b>GENERAL PRINCIPLES OF VHF PROPAGATION AND ALLOCATION OF FREQUENCIES</b>	<b>X</b>		<b>X</b>	<b>X</b>		<b>X</b>
<b>092 07 00 00</b>	<b>MORSE CODE</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>

[Amdt. 1, 01.12.00; Amdt. 2, 01.11.02]