

## II

(Preparatory Acts)

## COMMISSION

**Proposal for a Regulation of the European Parliament and of the Council on establishing common rules in the field of civil aviation and creating a European Aviation Safety Agency**

(2001/C 154 E/01)

(Text with EEA relevance)

COM(2000) 595 final — 2000/0246(COD)

(Submitted by the Commission on 4 December 2000)

THE EUROPEAN PARLIAMENT AND THE COUNCIL OF THE EUROPEAN UNION,

Having regard to the Treaty establishing the European Community, and in particular Article 80(2) thereof,

Having regard to the proposal from the Commission,

Having regard to the opinion of the Economic and Social Committee,

Having regard to the opinion of the Committee of the Regions,

Acting in accordance with the procedure laid down in Article 251 of the Treaty,

Whereas:

- (1) A high uniform level of protection of the European citizen should at all times be ensured in civil aviation, by the adoption of common safety rules and by measures ensuring that products, persons and organisations operating in the Community comply with such rules and those adopted to protect the environment: this will contribute to facilitating the free movement of goods, persons and organisations in the internal market.
- (2) As a consequence, aeronautical products must be subject to certification to verify their airworthiness and appropriate requirements should be developed to cover persons and organisations involved in aviation safety.
- (3) The Convention on International Civil Aviation, signed in Chicago on 7 December 1944, already provides for minimum standards to ensure the safety of civil aviation. Third-country aircraft, air crew and air operators complying with such standards should enjoy the rights provided for by that Convention.
- (4) Aeronautical products should be certified once they have been found airworthy according to Annex 8 of the Chicago Convention and in compliance with essential

environmental requirements laid down by the Community in line with standards set pursuant to that Convention. The Commission should be empowered to develop the necessary implementing rules.

- (5) In order to achieve the Community objectives as regards the freedom of movement of goods, persons and services, as well as those of the common transport policy, Member States should accept without further requirements or evaluation, products, organisations or persons certified in accordance with this Regulation and the implementing rules adopted for its application.
- (6) Enough flexibility should be provided for addressing urgent circumstances such as urgent safety measures, unforeseen or limited operational needs, and provisions should also be made for reaching an equivalent safety level by other means. Member States shall be entitled to grant exemptions from the requirements of this Regulation and of its implementing rules, provided that they are strictly limited in scope and subject to appropriate Community control.
- (7) The fulfilment of the objectives of this Regulation can be achieved through cooperation with third countries and in that event its provisions and those of related implementing rules may be adapted by mutual recognition agreements concluded by the Community with such third countries. In the absence of such agreements, Member States should nevertheless be allowed, subject to appropriate Community control, to recognise the approvals granted to foreign products, organisations and personnel by a third country.
- (8) It is widely accepted that there is a need for better arrangements in all fields covered by this Regulation, so that certain tasks currently performed at Community or national level could be carried out by a specialised expert body. There is, therefore, a need within the Community's existing institutional structure and balance of powers, to establish a European Aviation Safety Agency which is independent in relation to technical matters and has legal, administrative and financial autonomy. To this end, it is necessary and appropriate that it should be a body of the Community having legal personality and exercising the implementing powers which are conferred on it by this Regulation.

- (9) In order to properly assist the Community, the Agency should be allowed to develop its expertise in all aspects of aviation safety and environmental protection covered by this Regulation. It should assist the Commission in the preparation of the necessary legislation and assist the Member States and the industry in their implementation; it should be able to issue non-binding acceptable means of compliance and guidance material; it should also be able to make technical findings and issue type certificates for all aeronautical products; it should be given the necessary power and authority to fulfil such tasks; and it should assist the Commission in monitoring the application of this Regulation and of the implementing rules taken for its application and should be given the necessary authority to do so.
- (10) In order to effectively control the functions of the Agency Member States, the Commission and the European Parliament should be represented within an Administrative Board entrusted with the necessary powers to establish the budget, verify its execution, adopt the appropriate financial rules, establish transparent working procedures for decision-making by the Agency and appoint the Executive Director. It is also appropriate that the Agency be allowed to conduct research activities and to organise appropriate coordination with the Commission and the Member States. It is desirable that the Agency should assist the Community and its Member States in the field of international relations, including the harmonisation of rules, mutual recognition of approvals and technical cooperation, and that it should be entitled to establish the appropriate relations with the aeronautical authorities of third countries and the international organisations competent in matters covered by this Regulation.
- (11) Public interest requires the Agency to base its safety-related action solely on independent expertise, strictly applying this Regulation and the implementing rules adopted by the Commission for its application. To that end, all safety-related Agency decisions should be made by its Executive Director, who should be left with a high degree of flexibility as to how to seek advice and to organise the internal functioning of the Agency. When, however, the Agency has to develop drafts rules of a general nature to be implemented by national authorities, Member States should be involved in the decision-shaping process.
- (12) It is necessary to ensure that parties affected by decisions made by the Agency enjoy the necessary legal remedies in a manner which is suited to the special character of aviation. An appropriate appeal mechanism should be set up so that decision of the Executive Director can be subject to appeal to a specialised Board of Appeal, whose decisions are, in turn, open to action before the Court of Justice of the European Communities.
- (13) In order to guarantee the full autonomy and independence of the Agency, it is considered necessary to grant it an autonomous budget whose revenue comes essentially from a contribution from the Community and from fees paid by the users of the system. However, the Community budgetary procedure remains applicable as far as any subsidies chargeable to the general budget of the European Communities are concerned. Moreover, the auditing of accounts should be undertaken by the Court of Auditors.
- (14) In accordance with Article 2 of Council Decision 1999/468/EC of 28 June 1999 laying down the procedures for the exercise of implementing powers conferred on the Commission<sup>(1)</sup>, measures for the implementation of this Regulation should be adopted by use of the advisory procedure provided for in Article 3 of that Decision or by use of the regulatory procedure provided for in Article 5 of that Decision, as the case may be.
- (15) In accordance with the principles of subsidiarity and proportionality as set out in Article 5 of the Treaty, the objectives of the proposed action, namely the establishment of common rules in the field of aviation safety and environmental protection complying with the Chicago Convention and their permanent supervision by a European body created for that purpose, cannot be sufficiently achieved by the Member States and can therefore, by reason of the European-wide scope of this Regulation, be better achieved by the Community. This Regulation confines itself to the minimum required in order to achieve those objectives and does not go beyond what is necessary for that purpose.
- (16) This Regulation establishes a more appropriate and comprehensive framework for the definition and implementation of common technical requirements and administrative procedures in the field of civil aviation. Council Regulation (EEC) No 3922/91 of 16 December 1991 on the harmonisation of technical requirements and administrative procedures in the field of civil aviation<sup>(2)</sup> should therefore be repealed, without prejudice to the certification of products, persons and organisations already performed in accordance with that Regulation.

<sup>(1)</sup> OJ L 184, 17.7.1999, p. 23.

<sup>(2)</sup> OJ L 373, 31.12.1991, p. 4; Regulation as last amended by Regulation (EC) No 1069/1999 (OJ L 130, 26.5.1999, p. 16).

(17) It has been widely recognised that a wide involvement of European countries not Members of the European Union should be pursued, so as to ensure a proper pan-European dimension in order to facilitate the improvement of aviation safety throughout Europe. Only those European countries that have concluded agreements with the Community to fully adopt and apply the Community *acquis* in the field covered by this Regulation can be associated with its work according to conditions to be agreed in the framework of such agreements,

HAVE ADOPTED THIS REGULATION:

#### CHAPTER I

#### PRINCIPLES

##### Article 1

##### Scope

1. This Regulation shall be applicable to:
  - (a) the design, production, maintenance and operation of aeronautical products and appliances;
  - (b) personnel and organisation involved in the tasks described in point (a);
  - (c) products, personnel and organisations involved in air navigation facilities.

It shall not apply when such products and appliances, personnel and organisations are engaged in military, customs or police operations.

2. Each Member State shall ensure that military, customs or police operations are compatible with the objectives of this Regulation.

##### Article 2

##### Objective

1. The principal objective of this Regulation is to establish a high uniform level of aviation safety in Europe.
2. Additional objectives are, in the fields covered by this Regulation:
  - (a) to facilitate the free movement of goods, persons and services;
  - (b) to promote cost-efficiency in the regulatory and certification processes;
  - (c) to ensure a common interpretation of the provisions and Annexes of the Chicago Convention dealing with subjects

covered by this Regulation, in order to facilitate their uniform implementation in the Community; and

- (d) to promote Community views of aviation safety standards and rules throughout the world by establishing appropriate cooperation with third countries and international organisations.

3. The means of achieving the objectives set out in paragraphs 1 and 2 shall be:

- (a) the preparation, adoption and uniform application of all necessary acts;
- (b) the recognition without additional requirements of certificates, licences, approvals or other documents granted to products, personnel and organisations in accordance with this Regulation and implementing rules taken for its application;
- (c) the establishment of a European Aviation Safety Agency.

##### Article 3

##### Definitions

1. For the purpose of this Regulation:
  - (a) 'continuing oversight': shall mean the tasks to be conducted to verify that the conditions under which a certificate has been granted continue to be fulfilled at any time during its period of validity, as well as the taking of any safeguard measure;
  - (b) 'Chicago Convention': shall mean the Convention on International Civil Aviation and its annexes, signed in Chicago on 7 December 1944, as subsequently amended, as in force and as applicable to all Member States at the entry into force of this Regulation;
  - (c) 'product': shall mean an aircraft, engine or propeller;
  - (d) 'appliance': shall mean any instrument, equipment, mechanism, apparatus or accessory used or intended to be used in operating an aircraft in flight, whether installed in, intended to be installed in, or attached to, an aircraft, but without forming part of an airframe, engine or propeller;
  - (e) 'certification': shall mean any form of recognition that a product, organisation or person complies with the applicable requirements including the provisions of this Regulation and the implementing rules taken for its application, as well as the issuance of the relevant certificate, licence, approval or other document attesting such compliance;

- (f) 'type certificate': shall mean a document which certifies that the type of products or appliance complies with the provisions of this Regulation and any implementing rules taken for its application;
- (g) 'commercial transportation': shall mean carriage performed by aircraft of passengers, mail and/or cargo for remuneration and/or hire;
- (h) 'qualified entity': shall mean a body — whether national aviation authority or any other legal person — which may conduct certification tasks under the control and the responsibility of the Agency.

2. In accordance with the procedure referred to in Article 53(3), Articles 3(1)b and 5(1) of this Regulation may be adapted and its Annex may be amended, in order to apply, for the purpose of this Regulation, subsequent amendments to the Chicago Convention, which enter into force after the adoption of this Regulation and which become applicable in all Member States.

## CHAPTER II

### SUBSTANTIVE REQUIREMENTS

#### Article 4

##### Basic principles

1. Products and appliances shall not be used in the territory of the Member States unless they are certified as complying with the provisions of this Regulation relating to airworthiness and those relating to environmental protection.
2. Paragraph 1 shall apply to third-country aircraft, organisations and personnel without prejudice to their rights as specified in applicable international Conventions and to the Chicago Convention.

#### Article 5

##### Essential requirements for airworthiness

1. Products and appliances shall be considered as airworthy if they meet the standards prescribed in parts I, III and IV of Annex 8 to the Chicago Convention shown in the Annex to this Regulation, and if they are maintained in such a way that flight safety continues to be ensured.
2. When products and appliances have been shown to be airworthy and maintained in accordance with paragraph 1, the appropriate certificate shall be granted. Such a certificate shall include the conditions under which products and appliances are allowed to operate and their conditions of maintenance.
3. The Commission shall adopt, in accordance with the procedure laid down in Article 53(3), the implementing rules for the application of paragraphs 1 and 2 specifying the conditions under which products and appliances are certified and maintained.

#### Article 6

##### Essential requirements for environmental protection

1. Products and appliances shall be subject to noise certification in accordance with the provisions of Council Directive 80/51/EEC <sup>(1)</sup>.
2. The Commission shall prescribe the necessary implementing rules for the certification referred to in paragraph 1 in accordance with the procedure laid down in Article 53(3).

#### Article 7

##### Other basic principles and essential requirements

With regard to the basic principles and essential requirements for the fields covered by points (b) and (c) of Article 1(1), the Commission shall, where appropriate and as soon as possible, submit proposals thereon to the European Parliament and the Council for adoption on the basis of Article 80(2) of the Treaty.

#### Article 8

##### Recognition of certificates

1. Member States shall, without further technical requirements or evaluation, recognise the certificates issued in accordance with this Regulation. When the original recognition is for a particular purpose, or purposes, any subsequent recognition shall only cover the same purpose(s).
2. Pending the adoption of the necessary implementing rules and without prejudice to Article 56, certificates which cannot be issued in accordance with this Regulation may be issued on the basis of the current national regulations.

#### Article 9

##### Acceptance of third-country approvals

1. By way of derogation from the provisions of this Regulation and the rules adopted for its implementation, Member States or the Agency may issue certificates on the basis of certificates issued by aeronautical authorities of a third country, as provided for in mutual recognition agreements between the Community and that country.
2. In the absence of any mutual recognition agreement, where a Member State intends to issue certificates on the basis of certification issued by the competent authorities of a third country, it shall notify the Commission and the Member States of the scope and the detailed conditions under which the certificates should be issued.

<sup>(1)</sup> OJ L 18, 24.1.1980, p. 26; Directive as amended by Directive 83/206/EEC (OJ L 117, 4.5.1983, p. 15).

The Commission may, in accordance with the procedure laid down in Article 53(2), require a Member State to modify the certificates it proposes to issue, or may require it not to issue such certificates if, within three months of the notification, the Commission considers that:

- (a) the conditions under which such certificates would be issued do not provide a level of safety equivalent to that specified by this Regulation and the rules taken for its application; and/or
- (b) such certificates would give an unfair advantage to a third country, or are contrary to Community policy vis-à-vis such third country.

Certificates issued on the basis of the first subparagraph shall expire upon the entry into force of an agreement between the Community and the third country in question, but not later than two years after the issuance of such certificates. Upon request by the Member State concerned, in respect of the issuance of any certificates, the Commission may, in accordance with the procedure laid down in Article 53(2), authorise the extension of such two-year period as appropriate, provided that the circumstances envisaged in the second subparagraph do not obtain.

#### Article 10

##### Flexibility provisions

1. The provisions of this Regulation and of rules adopted for its implementation shall not prevent a Member State from reacting immediately to a safety problem which involves a product, a person or an organisation subject to the provisions of this Regulation. In such a case the Member State shall notify to the Commission and to the other Member States the measures taken and the reasons therefor.

2. The Commission shall decide, in accordance with the procedure referred to in Article 53(3), whether an inadequate level of safety or a shortcoming in this Regulation or the rules adopted for its application justify the continuing application of the measures adopted pursuant to paragraph 1. In that event, it shall also take the necessary steps to amend the related rule. If the Member State's measures are found not to be justified, the Member State shall revoke the measures in question.

3. Member States may grant exemptions from the substantive requirements laid down in this Regulation and the rules adopted for its implementation in the event of unforeseen urgent operational circumstances or operational needs of a limited duration. In these cases the Commission and the other Member States shall be notified as soon as possible.

4. The Commission, acting in accordance with the procedure referred to in Article 53(3), may decide that exemptions granted under paragraph 3 do not comply with

the objectives of this Regulation, or some other rule of Community law. In such a case the Member State shall revoke the exemption.

5. In circumstances where a safety level equivalent to that attained by the application of the implementing rules for Articles 4 to 7, can be achieved by other means, Member States may, without discrimination on grounds of nationality of the applicants and having regard to the need not to distort competition, grant approval derogating from those Articles. In such cases, the Member State concerned shall notify the Commission before granting such approval and shall give reasons demonstrating the need to derogate, as well as the conditions foreseen to ensure that an equivalent level of safety is achieved.

6. The Commission, acting in accordance with the procedure referred to in Article 53(3), shall decide whether a proposed approval affords an equivalent level of safety and can be granted. In such a case, it will notify its decision to all Member States, which shall also be entitled to apply that measure. The relevant implementing rules may also be amended to reflect such a measure. The provisions of Article 8 shall apply to the measure in question.

#### Article 11

##### Dissemination and protection of information

1. The information collected during the application of this Regulation by the Commission, the Agency, and national aviation authorities shall be confidential and subject to Directive 95/46/EC of the European Parliament and of the Council <sup>(1)</sup>.

2. The Commission, the Agency, national aviation authorities and any entity entrusted under Council Directive 94/56/EC <sup>(2)</sup> with the investigation of civil aviation accidents and incidents within the Community shall have access to information referred to in paragraph 1.

3. The Commission may, in accordance with the procedures referred to in Article 53(3), decide on the release of selected information to interested parties. Such decisions, which may be generic or individual, shall be based on the need:

- (a) to provide persons and organisations with the information they need to improve aviation safety; and
- (b) to limit the dissemination of information to what is strictly required for the purpose of its users.

4. In order to inform the public of the general safety level, a safety review shall be published annually by the Agency.

<sup>(1)</sup> OJ L 281, 23.11.1995, p. 31.

<sup>(2)</sup> OJ L 319, 12.12.1994, p. 14.

## CHAPTER III

**THE EUROPEAN AVIATION SAFETY AGENCY**

## Section 1

**Tasks***Article 12***Establishment and functions of the Agency**

1. For the purpose of the implementation of this Regulation, a European Aviation Safety Agency, hereinafter referred to as 'the Agency', is established.
2. In order to ensure the proper functioning and development of aviation safety the Agency shall:
  - (a) undertake any task and formulate opinions on all matters covered by this Regulation;
  - (b) assist the Commission by preparing measures to be taken for the implementation of this Regulation and provide it with the necessary technical, scientific and administrative support to exercise its tasks;
  - (c) adopt the necessary acts within the powers conferred to it by this Regulation or any applicable Community legislation;
  - (d) conduct inspections and investigations as necessary to fulfil its tasks.

*Article 13***Typology of acts**

The Agency may adopt the following:

- (a) opinions addressed to the Commission;
- (b) non-binding acceptable means of compliance and any guidance material for the application of this Regulation and of the rules for its implementation;
- (c) decisions for the application of Articles 15, 46 and 47.

*Article 14***Development of opinions, acceptable means of compliance and guidance material**

1. In order to assist the Commission in the preparation of proposals for basic principles and essential requirements to be presented to the European Parliament and to the Council and

the adoption of the necessary implementing rules, including those applicable to products and appliances foreseen in Articles 5(3) and 6(2), the Agency shall prepare drafts thereof. These drafts shall be submitted by the Agency as opinions to the Commission.

2. The Agency shall, in strict compliance with this Regulation and the implementing rules adopted by the Commission for its implementation, in accordance with Article 44, develop non-binding acceptable means of compliance and guidance material to be used in the certification process.

*Article 15***Certification**

With regard to products and appliances, the Agency shall:

- (a) conduct, itself or through qualified entities, technical inspections required to check that their type is airworthy, in accordance with the rules adopted in respect of the design of products and appliances according to the conditions set in the implementing rules adopted pursuant to Article 5(3);
- (b) issue the appropriate type certificates, including the certification of design organisations according to the conditions set out in the implementing rules adopted pursuant to Article 5(3), and ensure continuing oversight;
- (c) modify, suspend or revoke the relevant type certificate if a legal or natural person fails to fulfil the obligations imposed on it by this Regulation or rules adopted for its implementation;
- (d) react immediately to any safety problem for products and appliances it has certified; in such cases, the procedures referred to in Article 10, paragraphs 1 and 2, shall apply.

*Article 16***Monitoring the application of rules**

1. The Agency shall conduct inspections to verify the application by the Member States of this Regulation and of any implementing rules adopted by the Commission, and shall report to the Commission.

2. The Agency shall conduct technical investigations into the application of Article 10 and any rules adopted for the implementation of this Regulation, subject to requirements to be adopted in accordance with the procedure referred to in Article 53(2).

*Article 17***Research**

1. The Agency may develop and finance research activities strictly relating to the improvement activities in its field of competence, without prejudice to the applicable Community law.
2. The Agency shall coordinate its research and development activities with those of the Commission and the Member States so as to ensure that policies and actions are mutually consistent.

*Article 18***Relations with third countries**

1. The Agency may assist the Community and its Member States in their relations with third countries in accordance with the relevant Community legislation. It shall, in particular, upon request, assist the Commission in its negotiations for the harmonisation of the relevant rules and for the mutual recognition of approvals attesting the satisfactory application of rules.
2. The Agency may cooperate with the aeronautical authorities of third countries and the international organisations competent in matters covered by this Regulation in the framework of working arrangements concluded by the Commission with those bodies.

**Section 2****Internal structure***Article 19***Legal status, location, local offices**

1. The Agency shall be a body of the Community. It shall have legal personality.
2. In each of the Member States, the Agency shall enjoy the most extensive legal capacity accorded to legal persons under their laws. It may in particular, acquire or dispose of movable and immovable property and may be a party to legal proceedings.
3. The location of the Agency shall be decided by the competent authorities, at the latest six months after the adoption of this Regulation, on a proposal from the Commission. With the consent of the Administrative Board referred to in Article 24, the Agency may establish its own local offices in the Member States, subject to their consent.
4. The Agency shall be represented by its Executive Director.

*Article 20***Staff**

1. The Staff Regulations of Officials of the European Communities, the Conditions of Employment of Other Servants of the European Communities and the rules adopted jointly by the institutions of the European Communities for purposes of the application of those Staff Regulations and conditions of Employment shall apply to the staff of the Agency, without prejudice to the application of Article 33 of this Regulation to the members of the Board of Appeal.
2. Without prejudice to Article 30, the powers conferred on the appointing authority by the Staff Regulations, and by the Conditions of Employment of Other Servants, shall be exercised by the Agency in respect of its own staff.
3. The Agency's staff shall consist of a strictly limited number of officials assigned or seconded by the Commission or Member States to carry out management duties. The remaining staff shall consist of other employees recruited by the Agency for a period strictly limited to its requirements.

*Article 21***Privileges and immunities**

The Protocol on the Privileges and Immunities of the European Communities shall apply to the Agency.

*Article 22***Liability**

1. The contractual liability of the Agency shall be governed by the law applicable to the contract in question.
2. The Court of Justice of the European Communities shall have jurisdiction to give judgment pursuant to any arbitration clause contained in a contract concluded by the Agency.
3. In the case of non-contractual liability, the Agency shall, in accordance with the general principles common to the laws of the Member States, make good any damage caused by its departments or by its servants in the performance of their duties.
4. The Court of Justice shall have jurisdiction in disputes relating to compensation for the damage referred to in paragraph 3.
5. The personal liability of its servants towards the Agency shall be governed by the provisions laid down in the Staff Regulations or Conditions of Employment applicable to them.

*Article 23***Languages**

1. English shall be the working language of the Agency. Opinions addressed to the Commission for the application of Article 14(1) shall be presented in all official languages of the Community. Acceptable means of compliance and guidance material for the application of Article 14(2) shall be available in English. Applications to the Agency for certification, the documents required to process such applications and all other papers submitted may be filed in one of the official languages of the Community and, when so required by the relevant rule, in English. Individual decisions and procedures linked to such application shall be available in the language used by the addressee.

2. The translation services required for the functioning of the Agency shall be provided by the Translation Centre of the Bodies of the Union.

*Article 24***Creation and powers of the Administrative Board**

1. An Administrative Board is hereby set up.
2. The Administrative Board shall:
  - (a) appoint the Executive Director in accordance with Article 30;
  - (b) before 31 March each year, adopt the general report of the Agency for the previous year and forward it to the European Parliament, the Council, the Commission and the Member States;
  - (c) before 30 September each year, and after approval from the Commission, adopt the Agency's programme of work for the coming year and forward it to the European Parliament, the Council, the Commission and the Member States;
  - (d) adopt guidelines for the allocation of certification tasks to qualified entities after approval from the Commission;
  - (e) establish procedures for making decisions by the Executive Director as referred to in Articles 44 and 45;
  - (f) carry out its functions relating to the Agency's budget pursuant to Articles 49, 50 and 51;
  - (g) appoint the members of the Board of Appeal pursuant to Article 33;
  - (h) exercise disciplinary authority over the officials referred to in Article 30(1) and (3).
3. The Administrative Board shall establish an advisory body of interested parties, which it shall consult prior to making decisions in the fields referred in points (c), (e) and (f) of paragraph 2.

*Article 25***Composition of the Administrative Board**

The Administrative Board shall be composed of one representative of each Member State, one representative of the Commission and one representative appointed by the European Parliament, and their alternates. The duration of the terms of office shall be five years. This term of office shall be renewable.

*Article 26***Chairmanship of the Administrative Board**

1. The Administrative Board shall elect a chairman and a Deputy Chairman from among its members. The Deputy Chairman shall *ex-officio* replace the Chairman in the event of his being prevented from attending to his duties.
2. The terms of office of the Chairman and Deputy Chairman shall expire when their respective membership of the Administrative Board ceases. Subject to this provision, the duration of the terms of office of the Chairman or Deputy Chairman shall be three years. These terms of office shall be renewable.

*Article 27***Meetings**

1. Meetings of the Administrative Board shall be convened by its Chairman.
2. The Executive Director of the Agency shall take part in the deliberations.
3. The Administrative Board shall hold an ordinary meeting once a year; in addition it shall meet at the instance of the Chairman or at the request of the Commission or of one-third of the Member States.
4. The Administrative Board may invite observers to attend its meetings.
5. The secretariat for the Administrative Board shall be provided by the Agency.

*Article 28***Voting**

1. The Administrative Board shall take its decisions by a two-thirds majority.
2. Each member shall have one vote. The Executive Director of the Agency shall not vote.



*Article 29***Functions and powers of the Executive Director**

1. The Agency shall be managed by its Executive Director, who shall be completely independent in the performance of his/her duties. Without prejudice to the respective competencies of the Commission and the Administrative Board, the Executive Director shall neither seek nor take instructions from any government or from any other body.

2. The Executive Director shall have the following functions and powers:

- (a) He/she shall adopt the acts of the Agency as defined in Article 13 within the limits specified by this Regulation, the rules adopted for its implementation and any applicable law.
- (b) He/she shall decide on inspections and investigations as provided for in Articles 47 and 48.
- (c) He/she shall allocate certification tasks to qualified entities according to guidelines set by the Administrative Board.
- (d) He/she shall undertake any international functions and technical cooperation with third countries pursuant to Article 18.
- (e) He/she shall take all necessary steps, including the adoption of internal administrative instructions and the publication of notices, to ensure the functioning of the Agency in accordance with the provisions of this Regulation.
- (f) He/she shall prepare each year a draft general report and submit it to the Administrative Board.
- (g) He/she shall exercise in respect of the staff the powers laid down in Article 20(2).
- (h) He/she shall draw up estimates of the revenues and expenditure of the Agency pursuant to Article 49, and shall implement the budget pursuant to Article 50.
- (i) He/she may delegate his/her powers to other members of the Agency's staff subject to rules to be adopted in accordance with the procedure referred to in Article 53(2).

*Article 30***Appointment of senior officials**

1. The Executive Director of the Agency shall be appointed or dismissed by the Administrative Board on a proposal from the Commission.

2. The term of office of the Executive Director shall be five years. This term of office shall be renewable.

3. The Executive Director may be assisted by one or more Directors. If the Executive Director is absent or indisposed, one of the Directors shall take his/her place.

4. The Directors of the Agency shall be appointed or dismissed as provided for in paragraphs 1 and 2, after consulting the Executive Director.

*Article 31***Establishment and powers of the Boards of Appeal**

1. One or more Boards of Appeal shall be established within the Agency.

2. The Board or Boards of Appeal shall be responsible for deciding on appeals against the decisions referred to in Article 35.

3. The Board or Boards of Appeal shall be convened as necessary. The number of Boards of Appeal and the work allocation shall be determined by the Commission according to the procedure referred to in Article 53(2).

*Article 32***Composition of the Boards of Appeal**

1. A Board of Appeal shall consist of a Chairman and two other members.

2. The Chairman shall select for each case the other members and their respective alternates from the list of qualified members established pursuant to Article 33(1).

Where the Board of Appeal considers that the nature of the appeal so requires, it may call up to two further members from the aforesaid list for that case.

3. The qualifications required for the members of each Board of Appeal, the powers of individual members in the preparatory phase of the decisions and the voting conditions shall be determined by the Commission according to the procedure referred to in Article 53(2).

*Article 33***Independence of the members of the Boards of Appeal**

1. The members of the Boards of Appeal, as well as their Chairmen and their respective alternates shall be appointed by the Administrative Board from a list of candidates which shall be proposed by the Commission. The term of office shall be five years. It shall be renewable.

2. The members of the Boards of Appeal shall be independent. In making their decisions they shall not be bound by any instructions.

3. The members of the Boards of Appeal may not perform any other duties in the Agency. The function of the members of the Boards of Appeal may be a part-time function.

4. The members of the Boards may not be removed either from office or from the list during their respective terms, unless there are serious grounds for such removal and the Court of Justice, on application by the Commission after obtaining the opinion of the Administrative Board, takes a decision to this effect.

#### Article 34

##### Exclusion and objection

1. Members of the Boards of Appeal may not take part in any appeal proceedings if they have any personal interest therein, or if they have previously been involved as representatives of one of the parties to the proceedings, or if they participated in the decision under appeal.

2. If, for one of the reasons mentioned in paragraph 1 or for any other reason, a member of a Board of Appeal considers that he/she should not take part in any appeal proceedings, he shall inform the Board of Appeal accordingly.

3. Members of the Boards of Appeal may be objected to by any party to the appeal proceedings on any of the grounds mentioned in paragraph 1, or if suspected of partiality. An objection shall not be admissible if, while being aware of a reason for objecting, the party to the appeal proceedings has taken a procedural step. No objection may be based on the nationality of members.

4. The Boards of Appeal shall decide as to the action to be taken in the cases specified in paragraphs 2 and 3 without the participation of the member concerned. For the purposes of taking this decision, the member concerned shall be replaced on the Board of Appeal by his alternate.

#### Article 35

##### Decisions subject to appeal

1. An appeal may be brought against decisions of the Agency which have been taken pursuant to Article 15 or Article 48, as well as against decisions relating to the fees pursuant to Article 52.

2. An appeal lodged pursuant to paragraph 1 shall not have suspensory effect. The Agency may, however, if it considers that circumstances so permit, suspend the application of the contested decision.

3. An appeal against a decision which does not terminate proceedings as regards one of the parties may only be made in conjunction with an appeal against the final decision, unless the decision provides for separate appeal.

#### Article 36

##### Persons entitled to appeal

Any natural or legal person may appeal, subject to Article 42, against a decision addressed to that person, or against a decision which, although in the form of a decision addressed to another person, is of direct and individual concern to the former. The parties to proceedings may be party to the appeal proceedings.

#### Article 37

##### Time-limit and form

The appeal, together with the statement of grounds thereof, shall be filed in writing at the Agency within two months of the notification of the measure to the person concerned, or, in the absence thereof, of the day on which it came to the knowledge of the latter, as the case may be.

#### Article 38

##### Interlocutory revision

1. If the body of the Agency which has prepared the decision considers the appeal to be admissible and well-founded, the Agency shall rectify the decision. This shall not apply where the appellant is opposed to another party to the appeal proceedings.

2. If the decision is not rectified within one month after receipt of the statement of grounds for the appeal, the Agency shall forthwith decide whether or not to suspend the application of the decision pursuant to the second sentence of Article 35(2), and shall remit the appeal to the Board of Appeal.

#### Article 39

##### Examination of appeals

1. If the appeal is admissible, the Board of Appeal shall examine whether the appeal is well-founded.

2. When examining the appeal, the Board of Appeal shall as often as necessary invite the parties to the appeal proceedings to file observations on notifications issued by itself or on communications from the other parties to the appeal proceedings, within specified time-limits. Parties to the appeal proceedings shall be entitled to make oral presentations.

## Article 40

**Decisions on appeal**

The Board of Appeal may exercise any power which lies within the competence of the Agency, or it may remit the case to the competent body of the Agency. The latter shall be bound by the decision of the Board of Appeal.

## Article 41

**Actions before the Court of Justice**

1. Actions may be brought before the Court of Justice against decisions of the Boards of Appeal on appeals.
2. The action may be brought on grounds of lack of competence, infringement of an essential procedural requirement, infringement of the Treaty, of this Regulation or of any rule of law relating to its application, or misuse of power.
3. The Court of Justice has jurisdiction to annul or to alter the contested decision.
4. The action shall be open to any party to proceedings before the Board of Appeal adversely affected by its decision.
5. The action shall be brought before the Court of Justice within two months of the date of notification of the decision of the Board of Appeal.
6. The Agency shall be required to take the necessary measures to comply with the judgment of the Court of Justice.

## Article 42

**Representative**

Persons who are not domiciled or do not have a seat or an establishment within the territory of the Member States may participate as party to proceedings before the Agency only if they have designated a procedural representative who is domiciled or has his seat or an establishment within the territory of the Community.

## Article 43

**Direct appeal**

1. Member States may lodge a direct appeal before the Court of Justice against decisions of the Agency pursuant to Article 15.
2. The provisions laid down in Article 41 shall apply *mutatis mutandis*.

## Section 3

**Working methods**

## Article 44

**Procedures for the development of opinions, acceptable means of compliance and guidance material**

1. As soon as possible after the entry into force of this Regulation, the Administrative Board shall establish transparent procedures for adopting opinions, acceptable means of compliance and guidance material referred to in points (a) and (b) of Article 13.

Those procedures shall:

- (a) draw on expertise available in the aviation regulatory authorities of Member States;
- (b) as appropriate, involve experts from relevant interested parties when the Agency develops opinions and guidance material;
- (c) ensure that the Agency publishes and consults widely, according to a timetable and a procedure which includes an obligation on the Agency to make a written response to the consultation process.

2. When the Agency, pursuant to Article 14, develops opinions and guidance material to be applied by Member States, it may create a working group in which each Member State is entitled to designate an expert.

3. Acts referred to in points (a) and (b) of Article 13 and the procedures adopted pursuant to paragraph 1 of this Article shall be published in an official publication of the Agency.

4. Special procedures may be developed to address immediate action to be taken by the Agency to react to a safety problem and to inform the relevant interested parties of the action they are to take.

## Article 45

**Decisions**

1. The Administrative Board shall establish transparent procedures for taking individual decisions as provided for in point (c) of Article 13.

Those procedures shall:

- (a) ensure the hearing of the natural or legal person to be addressed in the decision;

- (b) provide for the procedure of notification of a decision to a natural or legal person and its publication;
- (c) inform the natural or legal person to whom a decision is addressed of the legal remedies available to that person under this Regulation.

The Administrative Board shall also adopt procedures specifying the conditions under which decisions are notified while taking due account of the appeal procedure.

2. Special procedures may be developed to address immediate action to be taken by the Agency to react to a safety problem and to inform the relevant interested parties of the action they are to take.

#### Article 46

##### **Investigating powers**

Without prejudice to the enforcement powers conferred by the Treaty to the Commission, the Agency may undertake all necessary investigations and inspections for the purpose of carrying out the duties assigned to it by this Regulation. It may also allocate investigation tasks to qualified entities in accordance with the guidelines to be adopted by the Administrative Board after approval from the Commission.

#### Article 47

##### **Inspections of Member States**

1. For the application of this Regulation and its implementing rules, inspections of Member States and qualified entities shall be undertaken by the Agency. To this end, the officials authorised by the Agency are empowered:

- (a) to examine relevant records, data, procedures and any other material relevant to the achievement of aviation safety levels in accordance with this Regulation;
- (b) to take copies of or extracts from such records, data, procedures and other material;
- (c) to ask for oral explanations on site;
- (d) to enter any premises, land or means of transport.

2. The officials of the Agency authorised for the purpose of these inspections shall exercise their powers upon production of an authorisation in writing specifying the subject-matter, the purpose of the inspection and the date on which it is to begin. In good time before the inspection, the Agency shall inform the Member State concerned of the inspection and of the identity of the authorised officials.

3. The Member State concerned shall submit to such inspections and shall ensure that bodies or persons concerned also submit to inspections.

4. When an inspection under the terms of this Article entails an inspection of an undertaking or an association of undertakings, and where an undertaking opposes such inspection, the Member State concerned shall afford the necessary assistance to officials authorised by the Agency to enable them to make their inspection.

#### Article 48

##### **Investigation of undertakings**

1. For the application of Article 15, investigation of undertakings shall be undertaken by the Agency or by qualified entities. To this end, the officials authorised under this Regulation, are empowered:

- (a) to examine the relevant records, data, procedures and any other material relevant to the achievement of aviation safety levels in accordance with this Regulation;
- (b) to take copies of or extracts from such records, data, procedures and other material;
- (c) to ask for an oral explanation on site;
- (d) to enter any premises, lands or means of transport.

2. The officials authorised for the purpose of these investigations shall exercise their powers upon production of an authorisation in writing specifying the subject-matter and purpose of the investigation.

3. In good time before the investigation, the Agency shall inform the Member State concerned in whose territory the investigation is to be made, of the investigation and of the identity of the authorised officials. Officials of the Member State concerned shall, at the request of the Agency, assist the authorised officials in carrying out their duties.

#### Section 4

##### **Financial requirements**

#### Article 49

##### **Budget**

- 1. The revenues of the Agency shall consist of:
  - (a) a contribution from the Community and from any European third country with which the Community has concluded agreements referred to in Article 54;

(b) the fees paid by applicants for and holders of certificates and approvals issued by the Agency; and

(c) charges for publications, training and any other services provided by the Agency.

2. The expenditure of the Agency shall include the staff, administrative, infrastructural and operational expenses.

3. The Executive Director shall draw up an estimate of the revenues and expenditure of the Agency for the following financial year and shall forward it to the Administrative Board together with an establishment plan.

4. Revenue and expenditure shall be in balance.

5. The Administrative Board shall, by 31 March, at the latest, adopt the draft budget and forward it to the Commission and to the States with which the Community has concluded the agreements referred to in Article 54.

On the basis of that draft budget, the Commission shall establish the relevant estimates in the preliminary draft general budget of the European Communities, which it shall put before the Council pursuant to Article 272 of the Treaty.

After receiving the draft budget, the States referred to in the first subparagraph will establish their own preliminary draft budget.

6. The Administrative Board shall adopt the Agency's budget, adjusting it where necessary to the Community contribution.

#### Article 50

##### Implementation and control of the budget

1. The Executive Director shall implement the budget of the Agency.

2. Control of commitment and payment of all expenditure and control of the existence and recovery of all revenue of the Agency shall be carried out by the Financial Controller of the Commission.

3. By 31 March each year at the latest, the Executive Director shall submit to the Commission, the Administrative Board and the Court of Auditors the detailed accounts of all revenue and expenditure from the previous financial year.

The Court of Auditors shall examine those accounts in accordance with Article 248 of the Treaty. It shall publish a report on the Agency's activities every year.

4. The Administrative Board shall, on recommendation of the European Parliament, give a discharge to the Executive Director of the Agency in respect of the implementation of the budget.

#### Article 51

##### Financial provisions

The Administrative Board, having received the agreement of the Commission and the opinion of the Court of Auditors, shall adopt the Agency's Financial Regulation, which shall in particular specify the procedure to be used for drawing up and implementing the Agency's budget, in accordance with Article 142 of the Financial Regulation applicable to the general budget of the European Communities.

#### Article 52

##### Fees regulation

1. The Commission, acting in accordance with the procedure laid down in Article 53(3), shall adopt the fees regulation.

2. The fees regulation shall determine in particular the matters for which fees pursuant to Article 49(1) are due, the amount of the fees and the way in which they are to be paid.

3. Fees shall be charged for:

(a) the issuing and renewal of certificates, as well as the related continuing oversight functions;

(b) the provision of services or documentation; they shall reflect the actual cost of each individual provision;

(c) the processing of appeals.

All fees shall be expressed, and payable, in euro.

4. The amount of the fees shall be fixed at such a level as to ensure that the revenue in respect thereof is in principle sufficient to cover the full cost of the services delivered.

The contribution referred to in Article 49(1), may cover, for a transitional period ending on 31 December of the fourth year from the entry into force of this Regulation, the expenditure relating to the initial running phase of the Agency. In accordance with the procedure laid down in Article 53(3), this period may be extended, if necessary, for no more than one year.

#### CHAPTER IV

##### FINAL PROVISIONS

#### Article 53

##### Committee

1. The Commission shall be assisted by a committee composed of representatives of the Member States and chaired by the representative of the Commission.

2. Where reference is made to this paragraph, the advisory procedure laid down in Article 3 of Decision 1999/468/EC shall apply in compliance with Article 7 and Article 8 thereof.

3. Where reference is made to this paragraph, the regulatory procedure laid down in Article 5 of Decision 1999/468/EC shall apply in compliance with Article 7 and Article 8 thereof.

The period provided for in Article 5(6) of Decision 1999/468/EC shall be one month.

#### Article 54

##### **Participation of European third countries**

The Agency shall be open to the participation of European third countries which are Contracting Parties to the Chicago Convention and which have entered into agreements with the European Community whereby they have adopted and are applying Community law in the field covered by this Regulation and any rule adopted for its implementation.

Under the relevant provisions of these agreements, arrangements will be developed which shall, *inter alia*, specify the nature and extent of, and the detailed rules for, the participation by these countries in the work of the Agency, including provisions on financial contributions and staff.

#### Article 55

##### **Commencement of Agency's operation**

The Agency shall assume fully the tasks incumbent upon it pursuant to this Regulation as from 12 months after the entry into force of the Regulation.

#### Article 56

##### **Repeal**

Regulation (EEC) No 3922/91 is hereby repealed.

The provisions of Article 8 of this Regulation shall apply to products, appliances, organisations and persons that have been certified in accordance with Regulation (EEC) No 3922/91.

#### Article 57

##### **Entry into force**

This Regulation shall enter into force on the twentieth day following that of its publication in the *Official Journal of the European Communities*.

Articles 5, 6 and 7 shall apply as provided for in their implementing rules.

This Regulation shall be binding in its entirety and directly applicable in all Member States.

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## ANNEX

## INTERNATIONAL STANDARDS

## AIRWORTHINESS OF AIRCRAFT

**Annex 8 to the Convention on International Civil Aviation***Eighth edition — July 1988*

## PART I — DEFINITIONS

When the following terms are used in the Standards for the Airworthiness of Aircraft they have the following meanings:

*Aeroplane.* A power-driven heavier-than-air aircraft, deriving its lift in flight chiefly from aerodynamic reactions on surfaces which remain fixed under given conditions of flight.

*Aircraft.* Any machine that can derive support in the atmosphere from the reactions of the air other than the reactions of the air against the earth's surface.

*Anticipated operating conditions.* Those conditions which are known from experience or which can be reasonably envisaged to occur during the operational life of the aircraft taking into account the operations for which the aircraft is made eligible, the conditions so considered being relative to the meteorological state of the atmosphere, to the configuration of terrain, to the functioning of the aircraft, to the efficiency of personnel and to all the factors affecting safety in flight. Anticipated operating conditions do not include:

- (a) those extremes which can be effectively avoided by means of operating procedures, and
- (b) those extremes which occur so infrequently that to require the Standards to be met in such extremes would give a higher level of airworthiness than experience has shown to be necessary and practical.

*Appropriate airworthiness requirement.* The comprehensive and detailed airworthiness codes established by a Contracting State for the class of aircraft under consideration.

*Approved.* Accepted by a Contracting State as suitable for a particular purpose.

*Configuration (as applied to the aeroplane).* A particular combination of the positions of the moveable elements, such as wing flaps, landing gear, etc., which affect the aerodynamic characteristics of the aeroplane.

*Critical power-unit(s).* The power-unit(s) failure of which gives the most adverse effect on the aircraft characteristics relative to the case under consideration.

*Design landing mass.* The maximum mass of the aircraft at which, for structural design purposes, it is assumed that it will be planned to land.

*Design take-off mass.* The maximum mass at which the aircraft for structural design purposes, is assumed to be planned to be at the start of the take-off run.

*Design taxiing mass.* The maximum mass of the aircraft at which structural provision is made for load liable to occur during use of the aircraft on the ground prior to the start of take-off.

*Factor of safety.* A design factor used to provide for the possibility of loads greater than those assumed, and for uncertainties in design and fabrication.

*Final approach and take-off area (FATO).* A defined area over which the final phase of the approach manoeuvre to hover or landing is completed and from which the take-off manoeuvre is commenced. Where the FATO is to be used by performance Class 1 helicopters, the defined area includes the rejected take-off area available.

*Helicopter.* A heavier-than-air aircraft supported in flight chiefly by the reactions of the air on one or more power driven rotors on substantially vertical axes.

*Landing surface.* That part of the surface of an aerodrome which the aerodrome authority has declared available for the normal ground or water run of aircraft landing in a particular direction.

*Limit loads.* The maximum loads assumed to occur in the anticipated operating conditions.

*Load factor.* The ratio of a specified load to the weight of the aircraft, the former being expressed in terms of aerodynamic forces, inertia forces, or ground reactions.

*Performance Class 1 helicopter.* A helicopter with performance such that, in case of engine failure, it is able to land on the rejected take-off area or safely continue the flight to an appropriate landing area.

*Performance Class 2 helicopter.* A helicopter with performance such that, in case of engine failure, it is able to safely continue the flight, except when the failure occurs prior to a defined point after take-off or after a defined point before landing, in which cases a forced landing may be required.

*Performance Class 3 helicopter.* A helicopter with performance such that, in case of engine failure at any point in the flight profile, a forced landing must be performed.

*Power-unit.* A system of one or more engines and ancillary parts which are together necessary to provide thrust, independently of the continued operation of any other power-unit(s), but not including short period thrust-producing devices.

*Pressure-altitude.* An atmospheric pressure expressed in terms of altitude which corresponds to that pressure in the standard atmosphere.

*Rendering (a Certificate of Airworthiness) valid.* The action taken by a Contracting State, as an alternative to issuing its own Certificate of Airworthiness, in accepting a Certificate of Airworthiness issued by any other Contracting State as the equivalent of its own Certificate of Airworthiness.

*Standard atmosphere.* An atmosphere defined as follows:

(a) the air is a perfect dry gas;

(b) the physical constants are:

— Sea level mean molar mass:

$$M_0 = 28,964420 \times 10^{-3} \text{ kg mol}^{-1}$$

— Sea level atmospheric pressure:

$$P_0 = 1\,013,250 \text{ hPa}$$

— Sea level temperature.

$$t_0 = 15 \text{ }^\circ\text{C}$$

$$T_0 = 288,15 \text{ K}$$

— Sea level atmospheric density:

$$P_0 = 1,2250 \text{ kg m}^{-3}$$

— Temperature of the ice point:

$$T_i = 273,15 \text{ K}$$

— Universal gas constant:

$$R^* = 8,31432 \text{ JK}^{-1}\text{mol}^{-1}$$

(c) the temperature gradients are:

Geopotential altitude (km)		Temperature gradient (Kelvin per standard geopotential kilometre)
From	To	
- 5,0	11,0	- 6,5
11,0	20,0	0,0
20,0	32,0	+ 1,0
32,0	47,0	+ 2,8
47,0	51,0	0,0
51,0	71,0	- 2,8
71,0	80,0	- 2,0



*State of Design.* The State having jurisdiction over the organisation responsible for the type design.

*State of Manufacture.* The State having jurisdiction over the organisation responsible for the final assembly of the aircraft.

*State of Registry.* The State on whose register the aircraft is entered.

*Take-off surface.* That part of the surface of an aerodrome which the aerodrome authority has declared available for the normal ground or water run of aircraft taking off in a particular direction.

*Ultimate load.* The limit load multiplied by the appropriate factor of safety.

## PART III — AEROPLANES

### CHAPTER 1 — GENERAL

#### 1.1. **Applicability**

1.1.1. The Standards of Part III, except the specified in 8.4, are applicable in respect of all aeroplanes designated in 1.1.3, that are of types of which prototype is submitted to the appropriate national authorities for certification on or after 13 June 1960.

1.1.2. The Standards specified in 8.4 of Part III are applicable in respect of all aeroplanes designated in 1.1.3 that are of types of which the prototype is submitted to the appropriate national authorities for certification on or after 22 March 1985.

1.1.3. The Standards of Part III shall apply to aeroplanes of over 5 700 kg maximum certificated take-off mass intended for the carriage of passengers or cargo or mail in international air navigation.

1.1.4. The level of airworthiness defined by the appropriate parts of the comprehensive and detailed national code referred to in 2.2 of Part II for the aeroplanes designated in 1.1.3 shall be at least substantially equivalent to the over-all level intended by the broad Standards of Part III.

1.1.5. Unless otherwise stated, the Standards apply to the complete aeroplane including power-units, systems and equipment.

#### 1.2. **Number of power-units**

The aeroplane shall have not less than two power-units.

#### 1.3. **Limitations**

1.3.1. Limiting conditions shall be established for the aeroplane, its power-units and its equipment (see 9.2). Compliance with the Standards of Part III shall be established assuming that the aeroplane is operated within the limitations specified. The limitations shall be sufficiently removed from any condition(s) prejudicial to the safety of the aeroplane to render the likelihood of accidents arising therefrom extremely remote.

1.3.2. Limiting ranges of mass, centre of gravity location, load distribution, speeds, and altitude or pressure-altitude shall be established within which compliance with all the pertinent Standards in Part III is shown, except that combinations of conditions which are fundamentally impossible to achieve need not be considered.

#### 1.4. **Unsafe features and characteristics**

The aeroplane shall not possess any feature or characteristic which renders it unsafe under the anticipated operating conditions.

#### 1.5. **Proof of compliance**

1.5.1. Compliance with the appropriate airworthiness requirements shall be based on evidence either from tests, from calculations, or from calculations based on tests, provided that in each case the accuracy achieved will ensure a level of airworthiness equal to that which would be achieved were direct tests conducted.

1.5.2. The tests of 1.5.1 shall be such as to provide reasonable assurance that the aeroplane, its components, and equipment are reliable and function correctly under the anticipated operating conditions.

**CHAPTER 2 — FLIGHT****2.1. General**

- 2.1.1. Compliance with the Standards prescribed in Chapter 2 shall be established by flight or other tests conducted upon an aeroplane or aeroplanes of the type for which a Certificate of Airworthiness is sought, or by calculations based on such tests, provided that the results obtained by calculations are equal in accuracy to, or conservatively represent, the results of direct testing.
- 2.1.2. Compliance with each Standard shall be established for all applicable combinations of aeroplane mass and centre of gravity position, within the range of loading conditions for which certification is sought.
- 2.1.3. Where necessary, appropriate aeroplane configurations shall be established for the determination of performance in the various stages of flight and for the investigation of the aeroplane's flying qualities.

**2.2. Performance****2.2.1. General**

- 2.2.1.1. Sufficient data on the performance of the aeroplane shall be determined and scheduled in the aeroplane flight manual to provide operators with the necessary information for the purpose of determining the total mass of the aeroplane on the basis of the values, peculiar to the proposed flight, of the relevant operational parameters, in order that the flight may be made with reasonable assurance that a safe minimum performance for that flight will be achieved.
- 2.2.1.2. The performance scheduled for the aeroplane shall not require exceptional skill or alertness on the part of the pilot.
- 2.2.1.3. The scheduled performance of the aeroplane shall be consistent with compliance with 1.3.1 and with the operation in logical combinations of those of the aeroplane's systems and equipment the operation of which may affect performance.

**2.2.2. Minimum performance**

At the maximum mass scheduled (see 2.2.3) for take-off and for landing as functions of the aerodrome elevation or pressure-altitude either in the standard atmosphere or in specified still air atmospheric conditions, and, for seaplanes, in specified conditions of smooth water, the aeroplane shall be capable of accomplishing the minimum performances specified in 2.2.2.1 and 2.2.2.2 respectively, not considering obstacles, or runway or water run length.

**2.2.2.1. Take-off**

- (a) The aeroplane shall be capable of taking off assuming the critical power-unit to fail (see 2.2.3), the remaining power-units being operated within their take-off power limitations.
- (b) After the end of the period during which the take-off power may be used, the aeroplane shall be capable of continuing to climb, with the critical power-unit inoperative and the remaining power-units operated within their maximum continuous power limitations, up to a height that it can maintain and at which it can carry out a circuit of the aerodrome.
- (c) The minimum performance at all stages of take-off and climb shall be sufficient to ensure that under conditions of operation departing slightly from the idealized conditions for which data are scheduled (2.2.3), the departure from the scheduled values is not disproportionate.

**2.2.2.2. Landing**

- (a) Starting from the approach configuration and with the critical power-unit inoperative, the aeroplane shall be capable, in the event of a missed approach, of continuing the flight to a point from which a fresh approach can be made.
- (b) Starting from the landing configuration, the aeroplane shall be capable, in the event of a balked landing, of making a climb out, with all power-units operating.

### 2.2.3. Scheduling of performance

Performance data shall be determined and scheduled in the aeroplane flight manual so that their application by means of the operating rules to which the aeroplane is to be operated in accordance with 5.2 of Annex 6, Part I, will provide a safe relation between the performance of the aeroplane and the aerodromes and routes on which it is capable of being operated. Performance data shall be determined and scheduled for the following stages for the ranges of mass, altitude or pressure-altitude, wind velocity, gradient of the take-off and landing surface for landplanes, water surface conditions, density of water and strength of current for seaplanes, and for any other operational variables for which the aeroplane is to be certificated.

2.2.3.1. *Take-off.* The take-off performance data shall include the accelerate-stop distance and the take-off path.

2.2.3.1.1. *Accelerate-stop distance.* The accelerate stop distance shall be the distance required to accelerate and stop, or, for a seaplane to accelerate and come to a satisfactorily low speed, assuming the critical power-unit to fail suddenly at a point not nearer to the start of the take-off than that assumed when determining the take-off path (see 2.2.3.1.2).

2.2.3.1.2. *Take-off path.* The take-off path shall comprise the ground or water run, initial climb and climb out, assuming the critical power-unit to fail suddenly during the take-off (see 2.2.3.1.1). The take-off path shall be scheduled up to a height that the aeroplane can maintain and at which it can carry out a circuit of the aerodrome. The climb out shall be made at a speed not less than the take-off safety speed as determined in accordance with 2.3.1.3.

2.2.3.2. *En route.* The en-route climb performance shall be the climb (or descent) performance with the aeroplane in the en-route configuration with:

(a) the critical power-unit inoperative; and

(b) the critical two power-units inoperative in the case of aeroplanes having three or more power-units.

The operating engines shall not exceed maximum continuous power.

2.2.3.3. *Landing.* The landing distance shall be the horizontal distance traversed by the aeroplane from a point on the approach flight path at a selected height above the landing surface to the point on the landing surface at which the aeroplane comes to a complete stop or, for a seaplane, comes to a satisfactorily low speed. The selected height above the landing surface and the approach speed shall be appropriately related to operating practices. This distance may be supplemented by such distance margin as may be necessary; if so, the selected height above the landing surface, the approach speed and the distance margin shall be appropriately inter-related and shall make provision for both normal operating practices and reasonable variations therefrom.

### 2.3. Flying qualities

The aeroplane shall comply with the Standards of 2.3 at all altitudes up to the maximum anticipated altitude relevant to the particular requirement in all temperature conditions relevant to the altitude in question and for which the aeroplane is approved.

#### 2.3.1. Controllability

The aeroplane shall be controllable and manoeuvrable under all anticipated operating conditions and it shall be possible to make smooth transitions from one flight condition to another (e.g. turns, sideslips, changes of engine power, changes of aeroplane configurations) without requiring exceptional skill, alertness, or strength on the part of the pilot even in the event of failure of any power-unit. A technique for safely controlling the aeroplane shall be established for all stages of flight and aeroplane configurations for which performance is scheduled.

2.3.1.1. *Controllability on the ground (or water).* The aeroplane shall be controllable on the ground (or on the water) during taxiing, take-off, and landing under the anticipated operating conditions.

2.3.1.2. *Controllability during take-off.* The aeroplane shall be controllable in the event of sudden failure of the critical power-unit at any point in the take-off, when the aeroplane is handled in the manner associated with the scheduling of take-off paths and accelerate-stop distances.

2.3.1.3. *Take-off safety speed.* The take-off safety speeds assumed when the performance of the aeroplanes (after leaving the ground or water) during the take-off is determined shall provide an adequate margin above the stall and above the minimum speed at which the aeroplane remains controllable after sudden failure of the critical power-unit.

### 2.3.2. Trim

The aeroplane shall have such trim, and other characteristics as to ensure that the demand made on the pilot's attention and ability to maintain a desired flight condition are not excessive when account is taken of the stage of flight at which these demands occur and their duration. This shall apply both in normal operation and in the conditions associated with the failure of one or more power-units for which performance characteristics are established.

### 2.3.3. Stability

The aeroplane shall have such stability in relation to its other flight characteristics, performance, structural strength, and most probable operating conditions (e.g. aeroplane configurations and speed ranges) as to ensure that demands made on the pilot's powers of concentration are not excessive when the stage of flight at which these demands occur and their duration are taken into account. The stability of the airplane shall not, however, be such that excessive demands are made on the pilot's strength or that the safety of the aeroplane is prejudiced by lack of manoeuvrability in emergency conditions

### 2.3.4. Stalling

2.3.4.1. *Stall warning.* When the aeroplane is made to approach a stall both in straight and turning flight with all power-units operating and with one power-unit inoperative, clear and distinctive stall warning shall be apparent to the pilot with the aeroplane in all permissible configurations and powers, except those which are not considered to be essential for safe flying. The stall warning and other characteristics of the aeroplane shall be such as to enable the pilot to arrest the development of the stall after the warning begins and, without altering the engine power, to maintain full control of the aeroplane.

2.3.4.2. *Behaviour following a stall.* In any configuration and power in which it is considered that the ability to recover from a stall is essential the behaviour of the aeroplane following a stall shall not be so extreme as to make difficult a prompt recovery without exceeding the airspeed or strength limitations of the aeroplane. It shall be acceptable to throttle back the operating power-units during recovery from the stall.

2.3.4.3. *Stalling speed.* The stalling speeds or minimum steady flight speeds in configurations appropriate for each stage of flight (e.g. take-off, en route, landing) shall be established. One of the values of the power used in establishing the stalling speeds shall be not more than that necessary to give zero thrust at a speed just above the stall.

### 2.3.5. Flutter and vibration

It shall be demonstrated by suitable tests that all parts of the aeroplane are free from flutter and excessive vibration in all aeroplane configurations under all speed conditions within the operating limitations of the aeroplane (see 1.3.2). There shall be no buffeting severe enough to interfere with control of the aeroplane, to cause structural damage or to cause excessive fatigue to the flight crew.

## CHAPTER 3 — STRUCTURES

### 3.1. General

The Standards of Chapter 3 apply to the aeroplane structure consisting of all portions of the aeroplane, the failure of which would seriously endanger the aeroplane.

#### 3.1.1. Mass and mass distribution

Unless otherwise stated, all structural Standards shall be complied with when the mass is varied over the applicable range and is distributed in the most adverse manner, within the operating limitations on the basis of which certification is sought.

#### 3.1.2. Limit loads

Except as might be otherwise qualified, the external loads and the corresponding inertia loads, or resisting loads obtained for the various loading conditions prescribed in 3.3, 3.4 and 3.5 shall be considered as limit loads.

### 3.1.3. Strength and deformation

In the various loading conditions prescribed in 3.3, 3.4 and 3.5 no part of the aeroplane structure shall sustain detrimental deformation at any load up to and including the limit load, and the aeroplane structure shall be capable of supporting the ultimate load.

## 3.2. Design airspeeds

### 3.2.1. Design airspeeds

Design airspeeds shall be established for which the aeroplane structure is designed to withstand the corresponding manoeuvring and gust loads in accordance with 3.3. In establishing the design airspeeds, consideration shall be given to the following speeds:

- (a)  $V_A$ , the design manoeuvring speed;
- (b)  $V_B$ , the speed at which the maximum vertical gust velocity assumed in accordance with 3.3.2 can be withstood;
- (c)  $V_C$ , a speed not expected to be exceeded in normal cruising flight taking into account possible effects of upsets when flying in turbulent conditions;
- (d)  $V_D$ , maximum dive speed, sufficiently greater than the speed in (c), to make it unlikely that such a design speed would be exceeded as a result of inadvertent speed increases in the anticipated operating conditions, taking into account the flying qualities and other characteristics of the aeroplane;
- (e)  $V_{E1}$ , to  $V_{E2}$ , maximum speeds at which flaps and landing gears may be extended or other configuration changes be made.

The speeds  $V_A$ ,  $V_B$ ,  $V_C$  to  $V_E$  in (a), (b), (c) and (e) shall be sufficiently greater than the stalling speed of the aeroplane to safeguard against loss of control in turbulent air.

### 3.2.2. Limiting airspeeds

Limiting airspeeds, based on the corresponding design airspeeds with safety margins, where appropriate, in accordance with 1.3.1 shall be included in the aeroplane flight manual as part of the operating limitations (see 9.2.2).

## 3.3. Flight loads

The flight loading conditions of 3.3.1, 3.3.2 and 3.5 shall be considered for the range of mass and mass distributions prescribed in 3.1.1 and at airspeeds established in accordance with 3.2.1. Asymmetrical as well as symmetrical loading shall be taken into account. The air, inertia, and other loads resulting from the specified loading conditions shall be distributed so as to approximate actual conditions closely or to represent them conservatively.

### 3.3.1. Manoeuvring loads

Manoeuvring loads shall be computed on the basis of manoeuvring load factors appropriate to the manoeuvres permitted by the operating limitations. They shall not be less than values which experience indicates will be adequate for the anticipated operating conditions.

### 3.3.2. Gust loads

Gust loads shall be computed for vertical and horizontal gust velocities and gradients which statistics or other evidence indicate will be adequate for the anticipated operating conditions.

## 3.4. Ground and water loads

The structure shall be able to withstand all the loads due to the reactions of the ground and water surface which are likely to arise during taxiing, take-off and landing.

#### 3.4.1. Landing conditions

The landing conditions at the design take-off mass and at the design landing mass shall include such symmetrical and asymmetrical attitudes of the aeroplane at ground or water contact, such velocities of descent and such other factors, affecting the loads imposed upon the structure as might be present in the anticipated operating conditions.

#### 3.5. Miscellaneous loads

In addition to or in conjunction with the manoeuvring and gust loads and with the ground and water loads, consideration shall be given to all other loads (flight control loads, cabin pressures, effects of engine operation, loads due to changes of configuration, etc.) which are likely to occur in the anticipated operating conditions.

#### 3.6. Flutter, divergence and vibration

The aeroplane structure shall be designed to be free from flutter, structural divergence (i.e. unstable structural distortion due to aerodynamic loading), and loss of control due to structural deformation, at speeds within and sufficiently beyond the operating limitations to comply with 1.3.1. Adequate strength shall be provided to withstand the vibration and buffeting that might occur in the anticipated operating conditions.

#### 3.7. Fatigue strength

The strength and fabrication of the aeroplane shall be such as to ensure that the probability of disastrous fatigue failure of the aeroplane's structure under repeated loads and vibratory loads in the anticipated operating conditions is extremely remote.

### CHAPTER 4 — DESIGN AND CONSTRUCTION

#### 4.1. General

Details of design and construction shall be such as to give reasonable assurance that all aeroplane parts will function effectively and reliably in the anticipated operating conditions. They shall be based upon practices which experience has proven to be satisfactory or which are substantiated by special tests or by other appropriate investigations or both.

##### 4.1.1. Substantiating tests

The functioning of all moving parts essential to the safe operation of the aeroplane shall be demonstrated by suitable tests in order to ensure that they will function correctly under all operating conditions for such parts.

##### 4.1.2. Materials

All materials used in parts of the aeroplane essential for its safe operation shall conform to approved specifications. The approved specifications shall be such that materials accepted as complying with the specifications will have the essential properties assumed in the design.

##### 4.1.3. Fabrication methods

The methods of fabrication and assembly shall be such as to produce a consistently sound structure which shall be reliable with respect to maintenance of strength in service.

##### 4.1.4. Protection

The structure shall be protected against deterioration or loss of strength in service due to weathering, corrosion, abrasion, or other causes, which could pass unnoticed, taking into account the maintenance the aeroplane will receive.

##### 4.1.5. Inspection provisions

Adequate provision shall be made to permit any necessary examination, replacement, or reconditioning of parts of the aeroplane which require such attention, either periodically or after unusually severe operations.

#### 4.1.6. Design features

Special consideration shall be given to design features which affect the ability of the flight crew to maintain controlled flight. This shall include at least the following:

- (a) *Controls and control systems.* The design of the controls and control systems shall be, such as to minimise the possibility of jamming, inadvertent operations, and unintentional engagement of control surface locking devices.
- (b) *System survivability.* As of 12 March 2000, aeroplane systems shall be designed, arranged and physically separated to maximise the potential for continued safe flight and landing after any event resulting in damage to the aeroplane structure or systems.
- (c) *Crew environment.* The design of the flight crew compartment shall be such as to minimise the possibility of incorrect or restricted operation of the controls by the crew, due to fatigue, confusion or interference. Consideration shall be given at least to the following: layout and identification of controls and instruments, rapid identification of emergency situations, sense of controls, ventilation, heating and noise.
- (d) *Pilot vision.* The arrangement of the pilot compartment shall be such as to afford a sufficiently extensive, clear and undistorted field of vision for the safe operation of the aeroplane, and to prevent glare and reflections which would interfere with the pilot's vision. The design features of the pilot windshield shall permit under precipitation conditions sufficient vision for the normal conduct of flight and for the execution of approaches and landing.
- (e) *Provision for emergencies.* Means shall be provided which shall either automatically prevent or shall enable the flight crew to deal with emergencies resulting from foreseeable failures of equipment and systems the failure of which would endanger the aeroplane. Reasonable provisions shall be made for continuation of essential services following power-unit or system(s) failure(s) to the extent that such failures are catered for in performance and operating limitations Standards in this Annex and in Annex 6, Parts I and II.
- (f) *Fire precautions.* The design of the aeroplane and the materials used in its manufacture including cabin interior furnishing materials replaced during major refurbishing shall be such as to minimise the possibility of in-flight and ground fires and also to minimise the production of smoke and toxic gases in the event of a fire. Means shall be provided to contain or to detect and extinguish such fires as might occur in such a way that no additional danger to the aeroplane is caused.
- (g) *Fire suppression.* As of 12 March 2000, cargo compartment fire suppression systems, including their extinguishing agents, shall be designed so as to take into account a sudden and extensive fire such as could be caused by an explosive or incendiary device.
- (h) *Incapacitation of occupants.* Design precautions shall be taken to protect against possible instances of cabin depressurisation and against the presence of smoke or other toxic gases, including, as of 12 March 2000, those caused by explosive or incendiary devices, which could incapacitate the occupants of the aeroplane.
- (i) *Protection of the flight crew compartment from smoke and fumes.* As of 12 March 2000, means shall be provided to minimise entry into the flight crew compartment of smoke, fumes and noxious vapours generated by an explosion or fire on the aeroplane.

#### 4.1.7. Emergency landing provisions

4.1.7.1. Provisions shall be made in the design of the aeroplane to protect the occupants, in the event of an emergency landing, from fire and from the direct effects of deceleration forces as well as from injuries arising from the effect of deceleration forces on the aeroplane's interior equipment.

4.1.7.2. Facilities shall be provided for the rapid evacuation of the aeroplane in conditions likely to occur following an emergency landing. Such facilities shall be related to the passenger and crew capacity of the aeroplane.

- 4.1.7.3. The interior layout of the cabin and the position and number of emergency exits, including the means of locating and illuminating the escape paths and exits, shall be such as to facilitate rapid evacuation of the aeroplane in conditions likely to occur following an emergency landing.
- 4.1.7.4. On aeroplanes certificated for ditching conditions, provisions shall be made in the design to give maximum practicable assurance that safe evacuation from the aeroplane of passengers and crew can be executed in case of ditching.
- 4.1.8. **G r o u n d h a n d l i n g**
- Adequate provisions shall be made in the design to minimise the risk that ground handling operations (e.g. towing, jacking) may cause damage, which could pass unnoticed, to the parts of the aeroplane essential for its safe operation. The protection which any limitations and instructions for such operations might provide may be taken into account.

## CHAPTER 5 — ENGINES

### 5.1. **Scope**

The Standards of Chapter 5 shall apply to engines of all types which are used on the aeroplane as primary propulsion units.

### 5.2. **Design, construction and functioning**

The engine complete with accessories shall be designed and constructed so as to function reliably within its operating limitations under the anticipated operating conditions when properly installed in the aeroplane in accordance with Chapter 7 and, if applicable, fitted with a suitable propeller.

### 5.3. **Declared ratings, conditions and limitations**

The power ratings and the conditions of the atmosphere upon which they are based and all operating conditions and limitations, which are intended to govern the operation of the engine, shall be declared.

### 5.4. **Tests**

An engine of the type shall complete satisfactorily such tests as are necessary to verify the validity of the declared ratings conditions and limitations and to ensure that it will operate satisfactorily and reliably. The tests shall include at least the following:

- (a) *Power calibration.* Tests shall be conducted to establish the power or thrust characteristics of the engine when new and also after the tests in (b) and (c). There shall be no excessive decrease in power at the conclusion of all the tests specified.
- (b) *Operation.* Tests shall be conducted to ensure that starting, idling, acceleration, vibration, overspeeding and other characteristics are satisfactory and to demonstrate adequate margins of freedom from detonation, surge, or other detrimental conditions as may be appropriate to the particular type engine.
- (c) *Endurance.* Tests of sufficient duration shall be conducted at such powers, thrust, speeds and other operating conditions as are necessary to demonstrate reliability and durability of the engine. They shall also include operation under conditions in excess of the declared limits to the extent that such limitations might be exceeded in actual service.

## CHAPTER 6 — PROPELLERS

### 6.1. **Scope**

The Standards of Chapter 6 shall apply to propellers of all types.

### 6.2. **Design, construction and functioning**

The propeller assembly complete with accessories shall be designed and constructed so as to function reliably within its operating limitations under the anticipated operating conditions when properly fitted to the engine and installed in the aeroplane in accordance with Chapter 7.



**6.3. Declared ratings, conditions and limitations**

The power ratings and all operating conditions and limitations, which are intended to govern the operation of the propeller, shall be declared.

**6.4. Tests**

A propeller of the type shall complete satisfactorily such tests as are necessary to ensure that it will operate satisfactorily and reliably within the declared ratings, conditions and limitations. The tests shall include at least the following:

- (a) *Operation.* Tests shall be conducted to ensure that strength vibration and overspeeding characteristics are satisfactory and to demonstrate proper and reliable functioning of pitch changing and control mechanisms.
- (b) *Endurance.* Tests of sufficient duration shall be conducted at such powers, speeds and other operating conditions as are necessary to demonstrate reliability and durability of the propeller.

**CHAPTER 7 — POWERPLANT INSTALLATION****7.1. General****7.1.1. Applicable Standards**

The powerplant installation shall comply with the Standards of Chapter 4 and with the Standards of this Chapter.

**7.1.2. Compliance with engine and propeller limitations**

The powerplant installation shall be so designed that the engines and propellers (if applicable) are capable of being used in the anticipated operating conditions. In conditions established in the aeroplane flight manual the aeroplane shall be capable of being operated without exceeding the limitations established for the engines and propellers in accordance with Chapters 5, 6 and 7.

**7.1.3. Control of engine rotation**

In those installations where continued rotation of an engine which had failed would increase the hazard of fire or of a serious structural failure, means shall be provided for the crew to stop the rotation of the engine in flight, or to reduce it to a safe level.

**7.1.4. Engine restarting**

Means shall be provided for restarting an engine at altitudes up to a declared maximum altitude.

**7.2. Arrangement and functioning****7.2.1. Independence of power-units**

The powerplant shall be arranged and installed so that each power-unit together with its associated systems is capable of being controlled and operated independently from the others and so that there is at least one arrangement of the powerplant and systems in which any failure, unless the probability of its occurrence is extremely remote, cannot result in a loss of more power than that resulting from complete failure of the critical power-unit.

**7.2.2. Propeller vibration**

The propeller vibration stresses shall be determined and shall not exceed values which have been found safe for operation within the operating limitations established for the aeroplane.

**7.2.3. Cooling**

The cooling system shall be capable of maintaining powerplant temperatures within the established limits (see 7.1.2) at ambient air temperatures up to the maximum air temperature appropriate to intended operation of the aeroplane. The maximum and, if necessary, minimum air temperature for which the powerplant has been established to be suitable shall be scheduled in the aeroplane flight manual.

#### 7.2.4. Associated systems

The fuel, oil, air induction, and other systems associated with the powerplant, shall be capable of supplying each engine in accordance with its established requirements, under all conditions affecting the functioning of the systems (e.g. engine power, aeroplane attitudes and accelerations, atmospheric conditions, fluid temperatures) within the anticipated operating conditions.

#### 7.2.5. Fire protection

For regions of the powerplant where the potential fire hazards are particularly serious because of the proximity of ignition sources to combustible materials, the following shall apply in addition to the general Standard of 4.1.6 (c).

- (a) *Isolation.* Such regions shall be isolated by fire resisting material from other regions of the aeroplane where the presence of fire would jeopardise continued flight, taking into account the probable points of origin and paths of propagation of fire.
- (b) *Flammable fluids.* Flammable fluid system components located in such regions shall be capable of containing the fluid when exposed to fire conditions. Means shall be provided for the crew to shut off the flow of flammable fluids into such regions if a fire occurs.
- (c) *Fire protection.* There shall be provided a sufficient number of fire detectors so located as to ensure rapid detection of any fire which might occur in such regions.
- (d) *Fire extinguishment.* Such regions shall be provided with a fire extinguisher system capable of extinguishing any fire likely to occur therein, unless the degree of isolation, quantity of combustibles, fire resistance of the structure, and other factors, is such that any fire likely to occur in the region would not jeopardise the safety of the aeroplane.

## CHAPTER 8 — INSTRUMENTS AND EQUIPMENT

### 8.1. Required instruments and equipment

The aeroplane shall be provided with approved instruments and equipment necessary for the safe operation of the aeroplane in the anticipated operating conditions. These shall include the instruments and equipment necessary to enable the crew to operate the aeroplane within its operating limitations.

### 8.2. Installation

Instrument and equipment installations shall comply with the Standards of Chapter 4.

### 8.3. Safety and survival equipment

Prescribed safety and survival equipment which the crew or passengers are expected to use or operate at the time of an emergency shall be reliable, readily accessible and easily identified, and its method of operation shall be plainly marked.

### 8.4. Navigation lights and anti-collision lights <sup>(1)</sup>

8.4.1. The lights required by Annex 2 to be displayed by aeroplanes in flight or operating on the movement area of an aerodrome shall have intensities, colours, fields of coverage and other characteristics such that they furnish the pilot of another aircraft or personnel on the ground with as much time as possible for interpretation and for subsequent manoeuvre necessary to avoid a collision. In the design of such lights due account shall be taken of the conditions under which they may reasonably be expected to perform these functions.

8.4.2. Lights shall be installed in aeroplanes so as to minimise the possibility that they will:

- (a) adversely affect the satisfactory performance of the flight crews' duties; or
- (b) subject an outside observer to harmful dazzle.

<sup>(1)</sup> Please refer to 1.1.2 of this Part.

**CHAPTER 9 — OPERATING LIMITATIONS AND INFORMATION****9.1. General**

The operating limitations within which compliance with the Standards of this Annex is determined, together with any other information necessary to the safe operation of the aeroplane, shall be made available by means of an aeroplane flight manual, markings and placards, and such other means as may effectively accomplish the purpose. The limitations and information shall include at least those prescribed in 9.2, 9.3 and 9.4.

**9.2. Operating limitations**

Limitations which there is a risk of exceeding in flight and which are defined quantitatively shall be expressed in suitable units and corrected if necessary for errors in measurements so that the flight crew can, by reference to the instruments available to them, readily determine when the limitations are reached.

**9.2.1. Loading limitations**

The loading limitations shall include all limiting mass, centres of gravity position, mass distributions, and floor loadings (see 1.3.2).

**9.2.2. Airspeed limitations**

The airspeed limitations shall include all speeds (see 3.2) which are limiting from the standpoint of structural integrity or flying qualities of the aeroplane, or from other considerations. These speeds shall be identified with respect to the appropriate aeroplane configurations and other pertinent factors.

**9.2.3. Powerplant limitations**

The powerplant limitations shall include all those established for the various powerplant components as installed in the aeroplane (see 7.1.2 and 7.2.3).

**9.2.4. Limitations on equipment and systems**

The limitations on equipment and systems shall include all those established for the various equipment and systems as installed in the aeroplane.

**9.2.5. Miscellaneous limitations**

Any necessary limitations with respect to conditions found to be prejudicial to the safety of the aeroplane (see 1.3.1).

**9.2.6. Flight crew limitations**

The flight crew limitations shall include the minimum number of flight crew personnel necessary to operate the aeroplane, having regard among other things to the accessibility to the appropriate crew members of all necessary controls and instruments and to the execution of the established emergency procedures.

**9.2.7. Flying time limitation after system or power-unit failure**

The systems limitations shall include the maximum flying time for which system reliability has been established in relation to the approval of operations by aeroplanes with two turbine power-units beyond the threshold time established in accordance with 4.7 of Annex 6, Part I.

**9.3. Operating information and procedures****9.3.1. Types of eligible operations**

There shall be listed the particular types of operations, as may be defined in Annex 6, Parts I and II, to the Convention or be generally recognised, for which the aeroplane has been shown to be eligible by virtue of compliance with the appropriate airworthiness requirements.

### 9.3.2. Loading information

The loading information shall include the empty mass of the aeroplane, together with a definition of the condition of the aeroplane at the time of weighing, the corresponding centre of gravity position, and the reference point(s) and datum line(s) to which the centre of gravity limits are related.

### 9.3.3. Operating procedures

A description shall be given of normal and emergency operating procedures which are peculiar to the particular aeroplane and necessary for its safe operation. These shall include procedures to be followed in the event of failure of one or more power-units.

### 9.3.4. Handling information

Sufficient information shall be given on any significant or unusual features of the aeroplane characteristics. Those stalling speeds or minimum steady flight speeds required to be established by 2.3.4.3 shall be scheduled.

### 9.3.5. Least-risk bomb location

A least-risk location on the aeroplane shall be identified where a bomb or other explosive device may be placed to minimise the effects on the aeroplane in the case of detonation.

## 9.4. Performance information

The performance of the aeroplane shall be scheduled in accordance with 2.2. There shall be included information regarding the various aeroplane configurations and powers involved and the relevant speeds, together with information which would assist the flight crew in attaining the performance as scheduled.

## 9.5. Aeroplane flight manual

An aeroplane flight manual shall be made available. It shall identify clearly the specific aeroplane or series of aeroplanes with which it is related. The aeroplane flight manual shall include at least the limitations, information and procedures specified in this chapter.

## 9.6. Markings and placards

9.6.1. Markings and placards on instruments, equipment, controls, etc., shall include such limitations or information as necessary for the direct attention of the flight crew during flight.

9.6.2. Markings and placards, or instructions, shall be provided to give any information which is essential to the ground crew in order to preclude the possibility of mistakes in ground servicing (e.g. towing, refuelling) which could pass unnoticed and which could jeopardise the safety of the aeroplane in subsequent flights.

## CHAPTER 10 — CONTINUING AIRWORTHINESS — MAINTENANCE INFORMATION

### 10.1. General

Information for use in developing procedures for maintaining the aeroplane in an airworthy condition shall be made available. The information shall include that described in 10.2, 10.3 and 10.4.

### 10.2. Maintenance information

Maintenance information shall include a description of the aeroplane and recommended methods for the accomplishment of maintenance tasks. Such information shall include guidance on defect diagnosis.

### 10.3. Maintenance programme information

Maintenance programme information shall include the maintenance tasks and the recommended intervals at which these tasks are to be performed.

**10.4. Maintenance information resulting from the type design approval**

Maintenance tasks and frequencies that have been specified as mandatory by the State of Design in approval of the type design shall be identified as such.

**CHAPTER 11 — SECURITY****11.1. Least risk bomb location**

As of 12 March 2000, consideration shall be given during the design of the aeroplane to the provision of a least-risk bomb location.

**11.2. Protection of the flight crew compartment**

As of 12 March 2000, in all aeroplanes which are equipped with a flight crew compartment door, this door and the flight crew compartment bulkhead shall be designed to minimise penetration by small arms fire and grenade shrapnel.

**11.3. Interior design**

As of 12 March 2000, consideration shall be given to design features which will deter the easy concealment of weapons, explosives or other dangerous objects on board aircraft and which will facilitate search procedures for such objects.

**PART IV — HELICOPTERS****CHAPTER 1 — GENERAL****1.1. Applicability**

1.1.1. The Standards of Part IV are applicable in respect of all helicopters designated in 1.1.2, that are of types of which the prototype is submitted to the appropriate national authorities for certification on or after 22 March 1991.

1.1.2. The Standards of Part IV shall apply to helicopters intended for the carriage of passengers or cargo or mail in international air navigation.

1.1.3. The level of airworthiness defined by the appropriate parts of the comprehensive and detailed national code for the helicopters designated in 1.1.2 shall be at least substantially equivalent to the over-all level intended by the broad Standards of Part IV.

1.1.4. Unless otherwise stated, the Standards apply to the complete helicopter including power-units, systems and equipment.

**1.2. Limitations**

1.2.1. Limiting conditions shall be established for the helicopter, its power-unit(s) and its equipment (see 9.2). Compliance with the Standards of Part IV shall be established assuming that the helicopter is operated within the limitations specified. The limitations shall be sufficiently removed from any condition(s) prejudicial to the safety of the helicopter to render the likelihood of accidents arising therefrom extremely remote.

1.2.2. Limiting ranges of mass, centre of gravity location, load distribution, speeds and ambient conditions shall be established within which compliance with all the pertinent Standards in Part IV is shown, except that combinations of conditions which are fundamentally impossible to achieve need not be considered.

**1.3. Unsafe features and characteristics**

The helicopter shall not possess any feature or characteristic which renders it unsafe under the anticipated operating conditions.

**1.4. Proof of compliance**

- 1.4.1. Compliance with the appropriate airworthiness requirements shall be based on evidence either from tests, calculations, calculations based on tests, or other methods provided that in each case the accuracy achieved will ensure a level of airworthiness equal to that which would be achieved were direct tests conducted.
- 1.4.2. The tests of 1.4.1 shall be such as to provide reasonable assurance that the helicopter, its components and equipment are reliable and function correctly under the anticipated operating conditions.

**CHAPTER 2 — FLIGHT****2.1. General**

- 2.1.1. Compliance with the Standards prescribed in Chapter 2 shall be established by flight or other tests conducted upon a helicopter or helicopters of the type for which a Certificate of Airworthiness is sought, or by calculations (or other methods) based on such tests, provided that the results obtained by calculations (or other methods) are equal in accuracy to, or conservatively represent, the results of direct testing.
- 2.1.2. Compliance with each Standard shall be established for all applicable combinations of helicopter mass and centre of gravity position, within the range of loading conditions for which certification is sought.
- 2.1.3. Where necessary, appropriate helicopter configurations shall be established for the determination of performance in the various stages of flight and for the investigation of the helicopter's flying qualities.

**2.2. Performance****2.2.1. General**

- 2.2.1.1. Sufficient data on the performance of the helicopter shall be determined and scheduled in the helicopter flight manual to provide operators with the necessary information for the purpose of determining the total mass of the helicopter on the basis of the values, peculiar to the proposed flight, of the relevant operational parameters, in order that the flight may be made with reasonable assurance that a safe minimum performance for that flight will be achieved.
- 2.2.1.2. The performance scheduled for the helicopter shall not require exceptional skill or alertness on the part of the pilot.
- 2.2.1.3. The scheduled performance of the helicopter shall be consistent with compliance with 1.2.1 and with the operation in logical combinations of those of the helicopter's systems and equipment the operation of which may affect performance.

**2.2.2. Minimum performance**

At the maximum mass scheduled (see 2.2.3) for take-off and for landing as functions of the take-off or landing site elevation or pressure-altitude either in the standard atmosphere or in specified still air atmospheric conditions, and, for water operations, in specified conditions of smooth water, the helicopter shall be capable of accomplishing the minimum performances specified in 2.2.2.1 and 2.2.2.2 respectively, not considering obstacles, or final approach and take-off area length.

**2.2.2.1. Take-off**

- (a) In the event of critical power-unit failure, at or after the take-off decision point (for performance Class 1) or the defined point after take-off (for performance Class 2), performance Classes 1 and 2 helicopters shall be capable of continuing safe flight, the remaining power-unit(s) being operated within the approved limitations.
- (b) The minimum performance at all stages of take-off and climb shall be sufficient to ensure that under conditions of operation departing slightly from the idealised conditions for which data are scheduled (2.2.3), the departure from the scheduled values is not disproportionate.

### 2.2.2.2. Landing

- (a) Starting from the approach configuration, in the event of critical power-unit failure at or before the landing decision point (performance Class 1) or the defined A point before landing (performance Class 2), the helicopter shall be capable of continuing safe flight, the remaining power-unit(s) being operated within the approved limitations.
- (b) Starting from the landing configuration, the helicopter shall be capable, in the event of a balked landing, of making a climb out, with all power-units operating.

### 2.2.3. Scheduling of performance

Performance data shall be determined and scheduled in the helicopter flight manual so that their application by means of the operating rules to which the helicopter is to be operated in accordance with 5.1.2 of Annex 6, Part III, will provide a safe relation between the performance of the helicopter and the aerodromes, heliports and routes on which it is capable of being operated. Performance data shall be determined and scheduled for the following stages for the ranges of mass, altitude or pressure-altitude, wind velocity, and other ambient conditions and any other operational variables for which the helicopter is to be certificated, and additionally for amphibians, water surface conditions and strength of current.

2.2.3.1. *Take-off.* The take-off performance data shall include the take-off distance required and the take-off path. For performance Class 1 helicopters, it shall also include the rejected take-off distance required.

2.2.3.1.1. *Take-off decision point.* (For performance Class 1 helicopters only) The take-off decision point shall be the point in the take-off phase used in determining take-off performance and from which either a rejected take-off may be made or a take-off safely continued, with the critical power-unit inoperative.

2.2.3.1.2. *Take-off distance required.* (For performance Class 1 helicopters only) The take-off distance required shall be the horizontal distance required from the start of the take-off to the point at which VTOSS, a selected height above the take-off surface, and a positive climb gradient are achieved, following failure of the critical power-unit at the take-off decision point, the remaining power-unit(s) operating within approved operating limits.

2.2.3.1.3. *Rejected take-off distance required.* (For performance Class 1 helicopters only) The rejected take-off distance required shall be the horizontal distance required from the start of the take-off to the point where the helicopter comes to a complete stop following a power unit failure and rejection of the take-off at the take-off decision point.

2.2.3.1.4. *Take-off distance required.* (For performance Class 2 and 3 helicopters only) The take-off distance required shall be the horizontal distance required from the start of take-off to the point where the best rate of climb speed ( $V_y$ ) or the best angle of climb speed ( $V_x$ ) or a selected intermediate speed (provided this speed does not involve flight within the avoid areas of the height-velocity diagrams) and a selected height above the take-off surface are achieved, all engines operating at approved take-off power.

2.2.3.2. *En route.* The en-route performance shall the climb, cruise, or descent performance with:

- (a) the critical power-unit inoperative;
- (b) the critical two power-units inoperative in the case of helicopters having three or more power-units; and
- (c) the operating engine(s) not exceeding the power for which they are certificated.

2.2.3.3. *Landing.* The landing performance data shall include the landing distance required and, for performance Class 1 helicopters, the landing decision point.

2.2.3.3.1. *Landing decision point.* (For performance Class 1 helicopters only) The landing decision point shall be the latest point in the approach phase from which either a landing may be made or a rejected landing (go-around) safely initiated, with the critical power-unit inoperative.

- 2.2.3.3.2. *Landing distance required.* Landing distance required shall be the horizontal distance required to land and come to a complete stop from a point on the approach flight path at a selected height above the landing surface.

### 2.3. **Flying qualities**

The helicopter shall comply with the Standards of 2.3 at all altitudes up to the maximum the altitude in question and for which the helicopter is approved.

#### 2.3.1. **Controllability**

The helicopter shall be controllable and manoeuvrable under all anticipated operating conditions and it shall be possible to make smooth transitions from one flight condition to another (e.g. turns, sideslips, changes of engine power, changes of helicopter configurations) without requiring exceptional skill, alertness, or strength on the part of the pilot even in the event of failure of any power-unit. A technique for safely controlling the helicopter shall be established for all stages of flight and helicopter configurations for which performance is scheduled.

- 2.3.1.1. *Controllability on the ground (or water).* The helicopter shall be controllable on the ground (or on the water) during taxiing, take-off, and landing under the anticipated operating conditions.

- 2.3.1.2. *Controllability during take-off.* The helicopter shall be controllable in the event of sudden failure of the critical power-unit at any point in the take-off, when the helicopter is handled in the manner associated with the scheduling of take-off data.

#### 2.3.2. **Characteristics of flight controls**

The helicopter shall have such trim, and handling capabilities as to ensure that the demands made on the pilot's attention and ability to maintain a desired flight condition are not excessive when account is taken of the stage of flight at which these demands occur and their duration. In the event of a malfunction of the systems associated with the flight controls, there must not be any significant deterioration of the handling characteristics.

#### 2.3.3. **Stability**

The helicopter shall have such stability in relation to its other flight characteristics, performance, structural strength, and most probable operating conditions (e.g. helicopter configurations and speed ranges) as to ensure that demands made on the pilot's powers of concentration are not excessive when the stage of the flight at which these demands occur and their duration are taken into account. The stability of the helicopter shall not, however, be such that excessive demands are made on the pilot's strength or that the safety of the helicopter is prejudiced by lack of manoeuvrability in emergency conditions.

#### 2.3.4. **Aut rotation**

- 2.3.4.1. *Rotor speed control.* The autorotation characteristics of the helicopter shall be such as to enable the pilot to control the rotor speed within prescribed limits, and to maintain full control of the helicopter.

- 2.3.4.2. *Behaviour following a power loss.* The behaviour of the helicopter following a power loss shall not be so extreme as to make difficult a prompt recovery of rotor speed without exceeding the airspeed or strength limitations of the helicopter.

- 2.3.4.3. *Autorotation airspeeds.* The autorotation airspeeds recommended for maximum range and minimum rate of descent shall be established.

#### 2.3.5. **Flutter and vibration**

It shall be demonstrated by suitable tests that all parts of the helicopter are free from flutter and excessive vibration in all helicopter configurations under all speed conditions within the operating limitations of the helicopter (see 1.2.2). There shall be no vibration severe enough to interfere with control of the helicopter, to cause structural damage or to cause excessive fatigue to the flight crew



**CHAPTER 3 — STRUCTURES****3.1. General**

The Standards of Chapter 3 apply to the helicopter structure consisting of all portions of the helicopter, the failure of which would seriously endanger the helicopter.

**3.1.1. Mass and mass distribution**

Unless otherwise stated, all structural Standards shall be complied with when the mass is varied over the applicable range and is distributed in the most adverse manner, within the operating limitations on the basis of which certification is sought.

**3.1.2. Limit loads**

Except as might be otherwise qualified, the external loads and the corresponding inertia loads, or resisting loads obtained for the various loading conditions prescribed in 3.4, 3.5 and 3.6 shall be considered as limit loads.

**3.1.3. Strength and deformation**

In the various loading conditions prescribed in 3.4, 3.5 and 3.6 no part of the helicopter structure shall sustain detrimental deformation at any load up to and including the limit load, and the helicopter structure shall be capable of supporting the ultimate load.

**3.2. Airspeeds****3.2.1. Design airspeeds**

Design airspeeds shall be established for which the helicopter structure is designed to withstand the corresponding manoeuvring and gust loads in accordance with 3.4.

**3.2.2. Limiting airspeeds**

Limiting airspeeds, based on the corresponding design airspeeds with safety margins, where appropriate, in accordance with 1.2.1 shall be included in the helicopter flight manual as part of the operating limitations (see 9.2.2). When airspeed limitations are a function of mass, mass distribution, altitude, rotor speed, power or other factors, airspeed limitations based on the critical combination of these factors shall be established.

**3.3. Main rotor(s) rotational speed limits**

A range of main rotor(s) speeds shall be established that:

- (a) with power on, provides adequate margin to accommodate the variations in rotor speed occurring in any appropriate manoeuvre, and is consistent with the kind of governor or synchroniser used; and
- (b) with power off, allows each appropriate autorotative manoeuvre to be performed throughout the ranges of airspeed and mass for which certification is requested

**3.4. Flight loads**

The flight loading conditions of 3.4.1, 3.4.2 and 3.6 shall be considered for the range of mass and mass distributions prescribed in 3.1.1 and at airspeeds established in accordance with 3.2.1. Asymmetrical as well as symmetrical loading shall be taken into account. The air, inertia, and other loads resulting from the specified loading conditions shall be distributed so as to approximate actual conditions closely or to represent them conservatively.

**3.4.1. Manoeuvring loads**

Manoeuvring loads shall be computed on the basis of manoeuvring load factors appropriate to the manoeuvres permitted by the operating limitations. They shall not be less than values which experience indicates will be adequate for the anticipated operating conditions.

### 3.4.2. Gust loads

Gust loads shall be computed for vertical and horizontal gust velocities which statistics or other evidence indicate will be adequate for the anticipated operating conditions.

### 3.5. **Ground and water loads**

The structure shall be able to withstand all the loads due to the reactions of the ground or water surface, as applicable, which are likely to arise during start-up, ground and water taxiing, lift-off, touchdown and rotor braking.

#### 3.5.1. Landing conditions

The landing conditions at the design take-off mass and at the design landing mass shall include such symmetrical and asymmetrical attitudes of the helicopter at ground or water contact, such velocities of descent and such other factors affecting the loads imposed upon the structure as might be present in the anticipated operating conditions.

### 3.6. **Miscellaneous loads**

In addition to or in conjunction with the manoeuvring and gust loads and with the ground and water loads, consideration shall be given to all other loads (flight control loads, cabin pressures, effects of engine operation, loads due to changes of configuration, loads due to external mass, etc.) which are likely to occur in the anticipated operating conditions.

### 3.7. **Flutter, divergence and vibration**

Each part of the helicopter structure shall be free from excessive vibration or oscillation (ground resonance, flutter, etc.) under each appropriate speed and power condition.

### 3.8. **Fatigue strength**

The strength and fabrication of the helicopter shall be such as to ensure that the probability of disastrous fatigue failure of the helicopter's structure under repeated loads and vibratory loads in the anticipated operating conditions is extremely remote.

## CHAPTER 4 — DESIGN AND CONSTRUCTION

### 4.1. **General**

Details of design and construction shall be such as to give reasonable assurance that all helicopter parts will function effectively and reliably in the anticipated operating conditions. They shall be based upon practices which experience has proven to be satisfactory or which are substantiated by special tests or by other appropriate investigations or both.

#### 4.1.1. Substantiating tests

The functioning of all moving parts essential to the safe operation of the helicopter shall be demonstrated by suitable tests in order to ensure that they will function correctly under all operating conditions for such parts.

#### 4.1.2. Materials

All materials used in parts of the helicopter essential for its safe operation shall conform to approved specifications. The approved specifications shall be such that materials accepted as complying with the specifications will have the essential properties assumed in the design.

#### 4.1.3. Fabrication methods

The methods of fabrication and assembly shall be such as to produce a consistently sound structure which shall be reliable with respect to maintenance of strength in service.

#### 4.1.4. Protection

The structure shall be protected against deterioration or loss of strength in service due to weathering, corrosion, abrasion, or other causes, which could pass unnoticed, taking into account the maintenance the helicopter will receive.

#### 4.1.5. Inspection provisions

Adequate provision shall be made to permit any necessary examination, replacement, or reconditioning of parts of the helicopter which require such attention, either periodically or after unusually severe operations.

#### 4.1.6. Design features

Special consideration shall be given to design features which affect the ability of the flight crew to maintain controlled flight. This shall include at least the following:

- (a) *Controls and control systems.* The design of the controls and control systems shall be such as to minimise the possibility of jamming, inadvertent operations, and unintentional engagement of control surface locking devices.
  - (i) Each control and control system shall operate with the ease, smoothness and positiveness appropriate to its function; and
  - (ii) Each element of each flight control system shall be designed to minimise the probability of any incorrect assembly that could result in the malfunction of the system.
- (b) *Crew environment.* The design of the flight crew compartment shall be such as to minimise the possibility of incorrect or restricted operation of the controls by the crew, due to fatigue, confusion or interference. Consideration shall be given at least to the following: lay-out and identification of controls and instruments, rapid identification of emergency situations, sense of controls, ventilation, heating and noise.
- (c) *Pilot vision.* The arrangement of the pilot compartment shall be such as to afford a sufficiently extensive, clear and undistorted field of vision for the safe operation of the helicopter, and to prevent glare and reflections which would interfere with the pilot's vision. The design features of the pilot windshield shall permit under precipitation conditions sufficient vision for the normal conduct of flight and for the execution of approaches and landing.
- (d) *Provision for emergencies.* Means shall be provided which shall either automatically prevent or shall enable the flight crew to deal with emergencies resulting from foreseeable failures of equipment and systems the failure of which would endanger the helicopter. Reasonable provisions shall be made for continuation of essential services following power-unit or system(s) failure(s) to the extent that such failure(s) are catered for in performance and operating limitations Standards in this Annex and in Annex 6, Part III.
- (e) *Fire precautions.* The design of the helicopter and the materials used in its manufacture including cabin interior furnishing materials replaced during major refurbishing shall be such as to minimise the possibility of in-flight and ground fires and also to minimise the production of smoke and toxic gases in the event of a fire. Means shall be provided to contain or to detect and extinguish, wherever possible, all accessible fires as might occur in such a way that no additional danger to the helicopter is caused.
- (f) *Incapacitation of occupants.* Design precautions shall be taken to protect against possible instances of cabin depressurisation and against the presence of smoke or other toxic gases which could incapacitate the occupants of the helicopter.

#### 4.1.7. Emergency landing provisions

Provisions shall be made in the design of the helicopter to protect the occupants from fire and effects of deceleration in the event of an emergency landing. Facilities shall be provided for rapid evacuation of the helicopter in conditions likely to occur following an emergency landing and such facilities shall be related to the passenger and crew capacity of the helicopter. On helicopters certificated for ditching condition, provisions shall also be made in the design to give maximum practicable assurance that safe evacuation from the helicopter of passengers and crew can be executed in case of ditching.

#### 4.1.8. Ground handling

Adequate provisions shall be made in the design to minimise the risk that ground handling operations (e.g. towing, jacking) may cause damage, which could pass unnoticed, to the parts of the helicopter essential for its safe operation. The protection which any limitations and instructions for such operations might provide may be taken into account.

### CHAPTER 5 — ENGINES

#### 5.1. Scope

The Standards of Chapter 5 shall apply to engines of all types which are used on the helicopter as primary propulsion units.

#### 5.2. Design, construction and functioning

The engine complete with accessories shall be designed and constructed so as to function reliably within its operating limitations under the anticipated operating conditions when properly installed in the helicopter in accordance with Chapter 6 and with the suitable rotor and power transmission installed.

#### 5.3. Declared ratings, conditions and limitations

The power ratings and the conditions of the atmosphere upon which they are based and all operating conditions and limitations, which are intended to govern the operation of the engine, shall be declared.

#### 5.4. Tests

An engine of the type shall complete satisfactorily such tests as are necessary to verify the validity of the declared ratings, conditions and limitations and to ensure that it will operate satisfactorily and reliably. The tests shall include at least the following:

- (a) *Power calibration.* Tests shall be conducted to establish the power characteristics of the engine when new and also after the tests in (b) and (c). There shall be no excessive decrease in power at the conclusion of all the tests specified.
- (b) *Operation.* Tests shall be conducted to ensure that starting, idling, acceleration, vibration, overspeeding and other characteristics are satisfactory and to demonstrate adequate margins of freedom from detonation, surge, or other detrimental conditions as may be appropriate to the particular type engine.
- (c) *Endurance.* Tests of sufficient duration shall be conducted at such powers, engine and rotor speeds and other operating conditions as are necessary to demonstrate reliability and durability of the engine. They shall also include operation under conditions in excess of the declared limits to the extent that such limitations might be exceeded in actual service.

### CHAPTER 6 — ROTOR AND POWER TRANSMISSION SYSTEMS AND POWERPLANT INSTALLATION

#### 6.1. General

The powerplant installation, including rotor and power transmission system, shall comply with the Standards of Chapter 4 and with the Standards of this chapter.

#### 6.2. Design, construction and functioning

The rotor and power transmission systems assembly complete with accessories shall be designed and constructed so as to function reliably within its operating limitations under the anticipated operating conditions when properly fitted to the engine and installed in the helicopter in accordance with this chapter.

#### 6.3. Declared ratings, conditions and limitations

The power ratings and all operating conditions and limitations, which are intended to govern the operation of the rotor and power transmission systems, shall be declared.

6.3.1. Maximum and minimum rotor rotational speed limitations

Maximum and minimum speeds for the rotors in both power-on and power-off conditions shall be established. Any operating conditions (e.g. airspeed) which affect such maxima or minima shall be declared.

6.3.2. Rotor underspeed and overspeed warnings

When the helicopter is made to approach a rotor rotational speed limit, with or without power-units inoperative, clear and distinctive warnings shall be apparent to the pilot. The warnings and initial characteristics of the condition shall be such as to enable the pilot to arrest the development of the condition after the warning begins, and to recover the rotor rotational speed to within prescribed normal limits and to maintain full control of the helicopter.

6.4. Tests

Rotor and power transmission systems shall complete satisfactorily such tests as are necessary to ensure that they will operate satisfactorily and reliably within the declared ratings, conditions and limitations. The tests shall include at least the following:

- (a) *Operation.* Tests shall be conducted to ensure that strength vibration and overspeeding characteristics are satisfactory and to demonstrate proper and reliable functioning of pitch changing and control mechanisms and free wheel mechanisms.
- (b) *Endurance.* Tests of sufficient duration shall be conducted at such powers, engine and rotor speeds and other operating conditions as are necessary to demonstrate reliability and durability of the rotor and power transmission systems.

6.5. Compliance with engine and rotor and power transmission systems limitations

The powerplant installation shall be so designed that the engines and rotor and power transmission systems are capable of being used in the anticipated operating conditions. In conditions established in the helicopter flight manual the helicopter shall be capable of being operated without exceeding the limitations established for the engines and rotor and power transmission systems in accordance with Chapters 5 and 6.

6.6. Control of engine rotation

In those installations where continued rotation of an engine which had failed would increase the hazard of fire or of a serious structural failure, means shall be provided for the crew to stop the rotation of the engine in flight, or to reduce it to a safe level.

6.7. Engine restarting

Means shall be provided for restarting an engine at altitudes up to a declared maximum altitude.

6.8. Arrangement and functioning

6.8.1. Independence of power-units

For performance Class 1 and 2 helicopters, the powerplant shall be arranged and installed so that each power-unit together with its associated systems is capable of being controlled and operated independently from the others and so that there is at least one arrangement of the powerplant and systems in which any failure, unless the probability of its occurrence is extremely remote, cannot result in a loss of more power than that resulting from complete failure of the critical power-unit.

6.8.2. Rotor and power transmission systems vibration

The vibration stresses for the rotor and power transmission systems shall be determined and shall not exceed values which have been found safe for operation within the operating limitations established for the helicopter.

### 6.8.3. Cooling

The cooling system shall be capable of maintaining powerplant and power transmission systems temperatures within the established limits (see 6.5) at all ambient temperatures approved for operation of the helicopter. The maximum and minimum air temperatures for which the powerplant and power transmission systems have been established to be suitable shall be scheduled in the helicopter flight manual.

### 6.8.4. Associated systems

The fuel, oil, air induction, and other systems associated with each power-unit, each power transmission unit and each rotor, shall be capable of supplying the appropriate unit in accordance with its established requirements, under all conditions affecting the functioning of the systems (e.g. engine power setting, helicopter attitudes and accelerations, atmospheric conditions, fluid temperatures) within the anticipated operating conditions.

### 6.8.5. Fire protection

For designated fire zones where the potential fire hazards are particularly serious because of the proximity of ignition sources to combustible materials, the following shall apply in addition to the general Standard of 4.1.6 (e).

- (a) *Isolation.* Such zones shall be isolated by fire resisting material from other zones of the helicopter where the presence of fire would jeopardise continued flight, taking into account the probable points of origin and paths of propagation of fire.
- (b) *Flammable fluids.* Flammable fluid system components located in such zones shall be capable of containing the fluid when exposed to fire conditions. Means shall be provided for the crew to shut off the flow of hazardous quantities of flammable fluids into such zones if a fire occurs.
- (c) *Fire protection.* There shall be provided a sufficient number of fire detectors so located as to ensure rapid detection of any fire which might occur in such zones.
- (d) *Fire extinguishment.* Such zones shall be provided with a fire extinguisher system capable of extinguishing any fire likely to occur therein, unless the degree of isolation, quantity of combustibles, fire resistance of the structure, and other factors, are such that any fire likely to occur in the zone would not jeopardise the safety of the helicopter.

## CHAPTER 7 — INSTRUMENTS AND EQUIPMENT

### 7.1. Required instruments and equipment

The helicopter shall be provided with approved instruments and equipment necessary for the safe operation of the helicopter in the anticipated operating conditions. These shall include the instruments and equipment necessary to enable the crew to operate the helicopter within its operating limitations.

### 7.2. Installation

Instrument and equipment installations shall comply with the Standards of Chapter 4.

### 7.3. Safety and survival equipment

Prescribed safety and survival equipment which the crew or passengers are expected to use or operate at the time of an emergency shall be reliable, readily accessible and easily identified, and its method of operation shall be plainly marked.

### 7.4. Navigation lights and anti-collision lights

- 7.4.1. The lights required by Annex 2 to be displayed by helicopters in flight or operating on the movement area of an aerodrome or a heliport shall have intensities, colours, fields of coverage and other characteristics such that they furnish the pilot of another aircraft or personnel on the ground with as much time as possible for interpretation and for subsequent manoeuvre necessary to avoid a collision. In the design of such lights due account shall be taken of the conditions under which they may reasonably be expected to perform these functions.

7.4.2. Lights shall be installed in helicopters so as to minimise the possibility that they will:

- (a) adversely affect the satisfactory performance of the flight crews' duties; or
- (b) subject an outside observer to harmful dazzle.

## CHAPTER 8 — ELECTRICAL SYSTEMS

The electrical system shall be so designed and installed as to ensure that it will perform its intended function under any foreseeable operating conditions.

## CHAPTER 9 — OPERATING LIMITATIONS AND INFORMATION

### 9.1. General

The operating limitations within which compliance with the Standards of this Annex is determined, together with any other information necessary to the safe operation of the helicopter, shall be made available by means of a helicopter flight manual, markings and placards, and such other means as may effectively accomplish the purpose. The limitations and information shall include at least those prescribed in 9.2, 9.3 and 9.4.

### 9.2. Operating limitations

Limitations which there is a risk of exceeding in flight and which are defined quantitatively shall be expressed in suitable units and corrected if necessary for errors in measurements so that the flight crew can, by reference to the instruments available to them, readily determine when the limitations are reached.

#### 9.2.1. Loading limitations

The loading limitations shall include all limiting mass, centres of gravity positions, mass distributions, and floor loadings (see 1.2.2).

#### 9.2.2. Airspeed limitations

The airspeed limitations shall include all speeds (see 3.2) which are limiting from the standpoint of structural integrity or flying qualities of the helicopter, or from other considerations. These speeds shall be identified with respect to the appropriate helicopter configurations and other pertinent factors.

#### 9.2.3. Powerplant and power transmission limitations

The powerplant limitations shall include all those established for the various powerplant and transmission components as installed in the helicopter.

#### 9.2.4. Rotor limitations

Limitations on rotor speeds shall include maximum and minimum rotor speeds for power-off (autorotation) and power-on conditions.

#### 9.2.5. Limitations on equipment and systems

The limitations on equipment and systems shall include all those established for the various equipment and systems as installed in the helicopter.

#### 9.2.6. Miscellaneous limitations

Any necessary limitations with respect to conditions found to be prejudicial to the safety of the helicopter (see 1.2.1).

#### 9.2.7. Flight crew limitations

The flight crew limitations shall include the minimum number of flight crew personnel necessary to operate the helicopter, having regard among other things to the accessibility to the appropriate crew members of all necessary controls and instruments and to the execution of the established emergency procedures.

9.3. **Operating information and procedures**

9.3.1. **Types of eligible operations**

There shall be listed the particular types of operations, as may be defined in Annex 6, Part III, to the Convention or be generally recognised, for which the helicopter has been shown to be eligible by virtue of compliance with the appropriate airworthiness requirements.

9.3.2. **Loading information**

The loading information shall include the empty mass of the helicopter, together with a definition of the condition of the helicopter at the time of weighing, the responding centre of gravity position, and the reference point(s) and datum line(s) to which the centre of gravity limits are related.

9.3.3. **Operating procedures**

A description shall be given of normal and emergency operating procedures which are peculiar to the particular helicopter and necessary for its safe operation. These shall include procedures to be followed in the event of failure of one or more power-units.

9.3.4. **Handling information**

Sufficient information shall be given on any significant or unusual features of the helicopter characteristics.

9.4. **Performance information**

The performance of the helicopter shall be scheduled in accordance with 2.2. There shall be included information regarding the various helicopter configurations and powers involved and the relevant speeds, together with information which would assist the flight crew in attaining the performance as scheduled.

9.5. **Helicopter flight manual**

A helicopter flight manual shall be made available. It shall identify clearly the specific helicopter or series of helicopters with which it is related. The helicopter flight manual shall include at least the limitations, information and procedures specified in this chapter.

9.6. **Markings and placards**

9.6.1. Markings and placards on instruments, equipment, controls, etc., shall include such limitations or information as necessary, for the direct attention of the flight crew during flight.

9.6.2. Markings and placards, or instructions, shall be provided to give any information which is essential to the ground crew in order to preclude the possibility of mistakes in ground servicing (e.g. towing, refuelling, etc.) which could pass unnoticed and which could jeopardise the safety of the helicopter in subsequent flights.

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