

Lärmschutz – was ist das

Kapitel 6

Kapitel 10

Erhöht

Keiner

Bis 2009

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- *Annex 19: Safety Management* – Flugsicherheitsmanagement

ICAO-Abkommen

Annex (Anhang) 16: Umweltschutz

(Volume) Band I: Fluglärm

(Band II: Emissionen durch Luftfahrtantriebe)

International Standards and
Recommended Practices



Annex 16
to the Convention on
International Civil Aviation

Environmental Protection

Volume I
Aircraft Noise

This edition incorporates all amendments adopted by the Council prior to 5 March 2011 and supersedes, on 17 November 2011, all previous editions of Annex 16, Volume I.

For information regarding the applicability of the Standards and Recommended Practices, see Foreword.

Sixth Edition
July 2011

International Civil Aviation Organization

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**CHAPTER 6. PROPELLER-DRIVEN AEROPLANES
NOT EXCEEDING 8 618 kg — Application for Type Certificate
submitted before 17 November 1988**

6.1 Applicability

Note 1.— See also Chapter 1, 1.10, 1.11, 1.12 and 1.13.

Note 2.— See Attachment E for guidance on interpretation of these applicability provisions.

The Standards of this chapter shall be applicable to all propeller-driven aeroplanes, except those aeroplanes specifically designed and used for aerobatic, agricultural or fire fighting purposes, having a maximum certificated take-off mass not exceeding 8 618 kg for which either:

- a) the application for the Type Certificate was submitted on or after 1 January 1975 and before 17 November 1988, except for derived versions for which the application for certification of the change in type design was submitted on or after 17 November 1988, in which case the Standards of Chapter 10 apply; or
- b) a certificate of airworthiness for the individual aeroplane was first issued on or after 1 January 1980.

6.2 Noise evaluation measure

The noise evaluation measure shall be a weighted overall sound pressure level as defined in International Electrotechnical Commission (IEC) Publication No. 179.¹ The weighting applied to each sinusoidal component of the sound pressure shall be given as a function of frequency by the standard reference curve called "A".

6.3 Maximum noise levels

For aeroplanes specified in 6.1 a) and b), the maximum noise levels, when determined in accordance with the noise evaluation method of Appendix 3, shall not exceed the following:

- a 68 dB(A) constant limit up to an aeroplane mass of 600 kg, varying linearly with mass from that point to 1 500 kg, after which the limit is constant at 80 dB(A) up to 8 618 kg.

Note.— Where an aeroplane comes within the provisions of Chapter 10, 10.1.2, the limit of 80 dB(A) applies up to 8 618 kg.

1. As amended. Available from the Central Office of the International Electrotechnical Commission, 3 rue de Varembeé, Geneva, Switzerland.

6.4 Noise certification reference procedures

The reference procedure shall be calculated under the following reference atmospheric conditions:

- a) sea level atmospheric pressure of 1 013.25 hPa;
- b) ambient air temperature of 25°C, i.e. ISA + 10°C.

6.5 Test procedures

6.5.1 Either the test procedures described in 6.5.2 and 6.5.3 or equivalent test procedures approved by the certifying authority shall be used.

6.5.2 Tests to demonstrate compliance with the maximum noise levels of 6.3 shall consist of a series of level flights overhead the measuring station at a height of

$$300 \begin{matrix} +10 \\ -30 \end{matrix} \text{ m (985 } \begin{matrix} +30 \\ -100 \end{matrix} \text{ ft)}$$

The aeroplane shall pass over the measuring point within $\pm 10^\circ$ from the vertical.

6.5.3 Overflight shall be performed at the highest power in the normal operating range,² stabilized airspeed and with the aeroplane in the cruise configuration.

Note.— Guidance material on the use of equivalent procedures is provided in the Environmental Technical Manual (Doc 9501), Volume I — Procedures for the Noise Certification of Aircraft.

2. This is normally indicated in the aeroplane flight manual and on the flight instruments.

6.1 Applicability

The Standards of this chapter shall be applicable to all propeller-driven aeroplanes, except those aeroplanes specifically designed and used for aerobatic, agricultural or fire fighting purposes, having a maximum certificated take-off mass not exceeding 8 618 kg for which either:

- a) the application for the Type Certificate was submitted on or after 1 January 1975 and before 17 November 1988, except for derived versions for which the application for certification of the change in type design was submitted on or after 17 November 1988, in which case the Standards of Chapter 10 apply; or
- b) a certificate of airworthiness for the individual aeroplane was first issued on or after 1 January 1980.

6.3 Maximum noise levels

For aeroplanes specified in 6.1 a) and b), the maximum noise levels, when determined in accordance with the noise evaluation method of Appendix 3, shall not exceed the following:

— a 68 dB(A) constant limit up to an aeroplane mass of 600 kg, varying linearly with mass from that point to 1 500 kg, after which the limit is constant at 80 dB(A) up to 8 618 kg.

6.4 Noise certification reference procedures

The reference procedure shall be calculated under the following reference atmospheric conditions:

- a) sea level atmospheric pressure of 1 013.25 hPa;
- b) ambient air temperature of 25°C, i.e. ISA + 10°C.

6.5 Test procedures

6.5.2 Tests to demonstrate compliance with the maximum noise levels of 6.3 shall consist of a series of **level flights overhead the measuring station at a height of 300 +10 m (985 +30 –30 –100 ft)**

The aeroplane shall pass over the measuring point within $\pm 10^\circ$ from the vertical.

6.5.3 Overflight shall be performed at the highest power in the normal operating range,² stabilized airspeed and with the aeroplane in the cruise configuration.

Kapitel 10

- Propellergetriebene Flugzeuge mit Antrag auf Typzulassung nach dem 17.11.88
- Außer: Kunstflugzeuge, Landwirtschaft, Feuerlösch und selbststartende Segelflugzeuge

Kapitel 10

- 600kg 76 dB(A) – 1400kg 88 dB(A)
- Bei Antrag auf Typzulassung nach dem 4.11.99:
- 570kg 70 dB(A) – 1500kg 85 dB(A)

10.5 Noise certification reference procedures

10.5.1 General conditions

10.5.1.1 The calculations of reference procedures and flight paths shall be approved by the certifying authority.

10.5.1.2 Except in conditions specified in 10.5.1.3, the take-off reference procedure shall be that defined in 10.5.2.

10.5.1.3 When it is shown by the applicant that the design characteristics of the aeroplane would prevent flights being

conducted in accordance with 10.5.2, the reference procedures shall:

- a) depart from the reference procedures defined only to the extent demanded by those design characteristics which make compliance with the procedures impossible; and
- b) be approved by the certifying authority.

10.5.1.4 The reference procedures shall be calculated under the following atmospheric conditions:

- a) sea level atmospheric pressure of 1 013.25 hPa;
- b) ambient air temperature of 15°C, i.e. ISA;
- c) relative humidity of 70 per cent; and
- d) zero wind.

10.5.2 Take-off reference procedure

The take-off flight path shall be calculated taking into account the following two phases.

First phase

- a) take-off power shall be used from the brake release point to the point at which the height of 15 m (50 ft) above the runway is reached;
- b) a constant take-off configuration selected by the applicant shall be maintained throughout this first phase;
- c) the mass of the aeroplane at the brake release shall be the maximum take-off mass at which the noise certification is requested; and
- d) the length of this first phase shall correspond to the length given in the airworthiness data for a take-off on a level paved runway.

Second phase

- a) the beginning of the second phase corresponds to the end of the first phase;
- b) the aeroplane shall be in the climb configuration with landing gear up, if retractable, and flap setting corresponding to normal climb throughout this second phase;
- c) the speed shall be the best rate of climb speed, V_y ; and
- d) take-off power and, for aeroplanes equipped with variable pitch or constant speed propellers, rpm shall be maintained throughout the second phase. If airworthiness limitations do not permit the application of take-off power and rpm up to the reference point, then take-off power and rpm shall be maintained for as long as is permitted by such limitations and thereafter at maximum continuous power and rpm. Limiting of time for which take-off power and rpm shall be used in order to comply with this chapter shall not be permitted. The reference height shall be calculated assuming climb gradients appropriate to each power setting used.

Deutschland spezial:

- Landeplatz-LärmschutzV vom 05.01.1999

§ 1 Zeitliche Einschränkung

(1) Zum Schutz der Bevölkerung vor Fluglärm an Landeplätzen >15.000 Flugbewegungen sind Starts und Landungen von propellergetriebenen Flugzeugen und Motorseglern bis zu 9.000 kg höchstzulässiger Startmasse untersagt:

1. montags bis freitags vor 7.00 Uhr, zwischen 13.00 und 15.00 Uhr Ortszeit und nach Sonnenuntergang,
2. samstags, sonntags und an Feiertagen vor 9.00 Uhr und nach 13.00 Uhr Ortszeit

(2) Überlandflüge sind ...zulässig, wenn für das ... Flugzeug ... **ein Lärmzeugnis ... erteilt ist**. Im Falle eines Starts gilt dies nur, wenn das Luftfahrzeug nicht vor Ablauf von 60 Minuten zum Startflugplatz zurückkehrt; diese Einschränkung gilt nicht, wenn das Luftfahrzeug aus Gründen der sicheren Flugdurchführung vorzeitig zurückkehren muß.

§ 4 Erhöhte Schallschutzanforderungen

- (1) Die zeitlichen Einschränkungen nach § 1 gelten nicht für propellergetriebene Flugzeuge und Motorsegler, die erhöhten Schallschutzanforderungen entsprechen.

- (2) Propellergetriebene Flugzeuge und Motorsegler, die vor dem 1. Januar 2000 gebaut wurden, entsprechen bis zum 31. Dezember 2009 erhöhten Schallschutzanforderungen, wenn sie die in Anlage 2 festgelegten Lärmgrenzwerte bei Kapitel 6 - Flugzeugen um mindestens 4 dB(A) und bei Kapitel 10 - Flugzeugen um mindestens 5 dB(A) unterschreiten.

- (3) Propellergetriebene Flugzeuge und Motorsegler mit einem Baujahr ab 2000 entsprechen erhöhten Schallschutzanforderungen, wenn sie die in Anlage 2 festgelegten Lärmgrenzwerte bei Kapitel 6 - Flugzeugen um mindestens 6 dB(A) und bei Kapitel 10 - Flugzeugen um mindestens 7 dB(A) unterschreiten.

Anlage 1 (Flugzeuge nicht im Inland zugelassen)

Kapitel	6	10
<hr/>		
< 500 kg	-	-
< 600 kg	68	76
>1500 kg	80	-
>1400 kg	-	88

Anlage 2 (Referenz erhöhter Schallschutz) und

§2 Behörden können den Flugbetrieb von im Inland zum Verkehr zugelassenen propellergetriebenen Flugzeugen und Motorseglern auf diejenigen Luftfahrzeuge beschränken, für die ein Lärmzeugnis erteilt worden ist, aus dem die Einhaltung der Lärmgrenzwerte nach Anlage 2 ersichtlich ist.

Kapitel	6	10	ICAO
< 500 kg	-	68	-
< 570 kg	-	(69,2)	70
< 600 kg	64	-	-
>1500 kg	76	-	-
>1500 kg	-	85	85

§ 4 Erhöhte Schallschutzanforderungen

- (1) Die zeitlichen Einschränkungen nach § 1 gelten nicht für propellergetriebene Flugzeuge und Motorsegler, die erhöhten Schallschutzanforderungen entsprechen.

- (2) Propellergetriebene Flugzeuge und Motorsegler, die vor dem 1. Januar 2000 gebaut wurden, entsprechen bis zum 31. Dezember 2009 erhöhten Schallschutzanforderungen, wenn sie die in Anlage 2 festgelegten Lärmgrenzwerte bei Kapitel 6 - Flugzeugen um mindestens 4 dB(A) und bei Kapitel 10 - Flugzeugen um mindestens 5 dB(A) unterschreiten.

- (3) Propellergetriebene Flugzeuge und Motorsegler mit einem Baujahr ab 2000 entsprechen erhöhten Schallschutzanforderungen, wenn sie die in Anlage 2 festgelegten Lärmgrenzwerte bei Kapitel 6 - Flugzeugen um mindestens 6 dB(A) und bei Kapitel 10 - Flugzeugen um mindestens 7 dB(A) unterschreiten.

Erhöhter Schallschutz

Kapitel	6	10	ICAO
Ab 2009	<u>-6</u>	<u>-7</u>	
< 500 kg	-	68	-
< 570 kg	-	(69,2)	70
< 600 kg	64	-	-
>1500 kg	76	-	-
>1500 kg	-	85	85

- Kapitel 6/10 bezieht sich auf ICAO Annex 16 Buch 1
- Unterschiede:
 - Typzulassung beantragt 1.1.75 bis 17.11.88 oder danach.
 - Messung im Überflug bzw. im Startsteigflug
 - Kapitel 10 Werte deshalb nominal höher/lauter!

- Landeplatz-LärmschutzV deutsche Umsetzung und Sonderweg:
 - bezieht sich eigentlich nur auf Plätze >15.000 Ldg
 - Es geht eigentlich um Starterlaubnis dort früh, spät, Mittags , Samstag und Sonntag

Lärmschutz – was ist das

Kapitel 6

Kapitel 10

Erhöht

Keiner

Bis 2009