



# EASA

European Aviation Safety Agency

# Product Certification and Design Organisation Approval Workshop

## 22<sup>nd</sup> – 23<sup>rd</sup> November 2017

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An agency of the European Union 

TE.GEN.00409-001



# EASA

European Aviation Safety Agency

# CS23 Amdt 5: Latest developments on AMC

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- CS 23 amdt 5 published – March 2017
  
- Effectivity starting from Aug 15<sup>th</sup> 2017
  
- AMC not yet published
  - Reason for delay:
    - Availability of Consensus Standards
    - Harmonization with FAA



# Starting Point

## STARTING POINT

CS-VLA Amdt 1 – March 2009	CS-23 Amdt 4 – July 2015
Single combustion engine	Normal, utility, aerobatic
< 2 seats, MTOM < 750 kg	< 9 PAX, MTOM < 5670 kg (12 500 lb)
Stall speed < 83 km/h (45 kts)	Commuter (Propeller driven, twin engine)
Day VFR	< 19 PAX, MTOM < 8618 kg ( 19 000 lb)

**Annex II**  
**2 seats 450 kg**

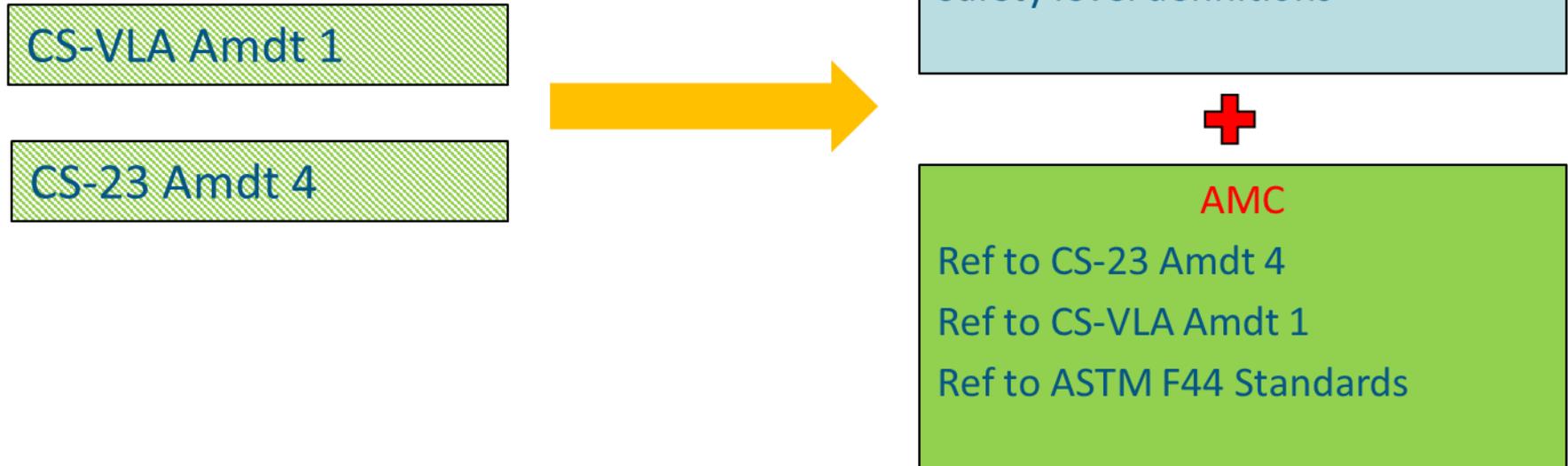
**750 kg**

**5670 kg**

**8618 kg**



# Reorganisation





# Airworthiness Levels

## CS 23.2005 Certification of normal-category aeroplanes

(a) Certification in the normal category applies to aeroplanes with a passenger seating configuration of 19 or less and a maximum certified take-off mass of 8618 kg (19 000 pounds) or less.

(b) Aeroplane certification levels are:

- (1) Level 1 — for aeroplanes with a max seat config of 0 to 1 pax;
- (2) Level 2 — for aeroplanes with a max seat config of 2 to 6 pax;
- (3) Level 3 — for aeroplanes with a max seat config of 7 to 9 pax; and
- (4) Level 4 — for aeroplanes with a max seat config of 10 to 19 pax

(c) Aeroplane performance levels are:

- (1) Low speed — for aeroplanes with a VNO or VMO  $\leq$  250 knots (KCAS) or a MMO  $\leq$  0.6; and
- (2) High speed — for aeroplanes with a VNO or VMO  $>$  250 KCAS or an MMO  $>$  0.6.

(d) Aeroplanes not certified for aerobatics may be used to perform any manoeuvre incident to normal flying, including:

- (1) stalls (except whip stalls); and
- (2) lazy eights, chandelles, and steep turns, in which the angle of bank is not more than 60 degrees.

(e) Aeroplanes certified for aerobatics may be used to perform maneuvers without limitations, other than those limitations established under Subpart G.



## AMC CS-23.2010 ACCEPTED MEANS OF COMPLIANCE

- The AMC illustrates means, but not the only means, by which a requirement contained in the CS-23 can be met.
- Satisfactory demonstration of compliance using a published AMC shall provide for presumption of compliance with the related requirement. ➔ facilitation of certification tasks.
- The use of this AMC requires review by the authority in case the design includes new technology or application of technology in a way that has not been considered or not (yet) included in the published AMC.



# AMC No 1 – Consensus Standards

- ▶ List of consensus standards and their specific revision reviewed by EASA and accepted as AMC to CS-23
- ▶ Cross reference table identifying which consensus standard contains an accepted demonstration of compliance to the requirement
- ▶ Building-block flexibility:
  - ▶ When the scope and content of the referenced consensus standard differs from the overall scope of CS-23 or the objectives of the requirement, the applicant can identify what is applicable within that consensus standard and seeks agreement with the authority for agreement of the selected consensus standard and applied paragraphs.
- ▶ When EASA has established that there is the need for deviations to a referenced consensus standards, this will be reflected in the AMC to CS-23.



## **F3264-17 - Standard Specification for Normal Category Aeroplanes Certification**

### *Applicability:*

This specification identifies the industry standards which have been determined by consensus to demonstrate compliance to the requirements (“the Rules”) for Level 1, 2, 3, 4 Normal Category Aeroplanes

It includes only standards that are considered mature enough for general application to certification projects and have been found acceptable by committee consensus to propose to the CAAs for acceptance as a Means of Compliance to their Rules.



# Top Level Specification

## TLS

## CS 23

### 5. Flight

#### 5.1 *Weight/Mass and Centre of Gravity:*

5.1.1 **F3082/F3082M** – 16 Standard Specification for Flight for General Aviation Aeroplanes

#### 5.2 *Performance Data:*

5.2.1 **F3179/F3179M** – 16 Standard Specification for Performance of Aeroplanes

#### 5.3 *Stall Speed:*

5.3.1 **F3179/F3179M** – 16 Standard Specification for Performance of Aeroplanes

#### 5.4 *Takeoff Performance:*

5.4.1 **F3179/F3179M** – 16 Standard Specification for Performance of Aeroplanes

#### 5.5 *Climb Requirements:*

5.5.1 **F3179/F3179M** – 16 Standard Specification for Performance of Aeroplanes

#### 5.6 *Climb Information:*

5.6.1 **F3179/F3179M** – 16 Standard Specification for Performance of Aeroplanes

#### 5.7 *Landing:*

5.7.1 **F3179/F3179M** – 16 Standard Specification for Performance of Aeroplanes

### SUBPART B — FLIGHT

**CS 23.2100** Mass and centre of gravity

**CS 23.2105** Performance data

**CS 23.2110** Stall speed

**CS 23.2115** Take-off performance

**CS 23.2120** Climb requirements

**CS 23.2125** Climb information

**CS 23.2130** Landing



# AMC no. 1 Table layout

CS-23 amd 5	AMC No 1 (Ref ASTM F3264-17)	Remarks
<b>SUBPART B - Flight</b>		
<b>23.2100</b> <i>Mass and centre of gravity</i>	Para. 5.1 <i>Weight/Mass and Centre of Gravity:</i> Para. 5.1.1 <a href="#">F3082/F3082M-16</a> Standard Specification for Flight for General Aviation Aeroplanes	
<b>23.2105</b> <i>Performance data</i>	Para. 5.2 <i>Performance Data:</i> Para. 5.2.1 <a href="#">F3179/F3179M-16</a> Standard Specification for Performance of Aeroplane	
<b>23.2110</b> <i>Stall speed</i>	Para. 5.3 <i>Stall Speed:</i> Para. 5.3.1 <a href="#">F3179/F3179M-16</a> Standard Specification for Performance of Aeroplane	
<b>23.2115</b> <i>Take-off performance</i>	Para. 5.4 <i>Takeoff Performance:</i> Para. 5.4.1 <a href="#">F3179/F3179M-16</a> Standard Specification for Performance of Aeroplane	
<b>23.2120</b> <i>Climb requirements</i>	Para. 5.5 <i>Climb Requirements:</i> Para. 5.5.1 <a href="#">F3179/F3179M-16</a> Standard Specification for Performance of Aeroplane	
<b>23.2125</b> <i>Climb information</i>	Para. 5.6 <i>Climb Information:</i> Para. 5.6.1 <a href="#">F3179/F3179M-16</a> Standard Specification for Performance of Aeroplane	
<b>23.2130</b> <i>Landing</i>	Para. 5.7 <i>Landing:</i> Para. 5.7.1 <a href="#">F3179/F3179M-16</a> Standard Specification for Performance of Aeroplane	
<b>23.2135</b> <i>Controllability</i>	Para. 5.8 <i>Controllability:</i> Para. 5.8.1 <a href="#">F3173/F3173M-15</a> Standard Specification for Handling Characteristics of Aeroplanes	
<b>23.2140</b> <i>Trim</i>	Para. 5.9 <i>Trim:</i> Para. 5.9.1 <a href="#">F3173/F3173M-15</a> Standard Specification for Handling Characteristics of Aeroplanes	
<b>23.2145</b> <i>Stability</i>	Para. 5.10 <i>Stability:</i> Para. 5.10.1 <a href="#">F3173/F3173M-15</a> Standard Specification for Handling Characteristics of Aeroplanes	
<b>23.2150</b> <i>Stall characteristics, stall warning, and spins</i>	Para. 5.11 <i>Stall Characteristics, Stall Warning, and Spins—:</i> Para. 5.11.1 <a href="#">F3180/F3180M-16</a> Standard Specification for Low-Speed Flight Characteristics of Aeroplanes	
<b>23.2155</b> <i>Ground and water handling characteristics</i>	Para. 5.12 <i>Ground and Water Handling Characteristics:</i> Para. 5.12.1 <a href="#">F3173/F3173M-15</a> Standard Specification for Handling Characteristics of Aeroplanes	
<b>23.2160</b> <i>Vibration, buffeting, and high-speed characteristics</i>	Para. 5.13 <i>Vibration, Buffeting, and High-Speed Characteristics:</i> Para. 5.13.1 <a href="#">F3173/F3173M-15</a> Standard Specification for Handling Characteristics of Aeroplanes	
<b>23.2165</b> <i>Performance and flight characteristics requirements for flight in icing conditions</i>	Para. 5.14 <i>Performance and Flight Characteristics Requirements for Flight in Icing Conditions:</i> Para. 5.14.1 <a href="#">F3120/F3120M-15</a> Standard Specification for Ice Protection for General Aviation Aircraft	
<b>23.2170</b> <i>Operating limitations</i>	Para. 5.15 <i>Operating Limitations:</i> Para. 5.15.1 <a href="#">F3174/F3174M-15</a> Standard Specification for Establishing Operating Limitations and Information for Aeroplanes	



# AMC no. 2 – CS 23 amdt 4

- AMC No 2 refers to the previous amendment 4 of CS-23 for the (administrative) convenience of the applicant and EASA when using an existing certification basis.
- A table is provided identifying which CS-23 amendment 4 requirements contains an accepted demonstration of compliance to the requirement.
- AMC No 2 is applicable for fixed wing aeroplanes with a passenger-seating configuration of 19 or less and a maximum certificated take-off mass of 8 618 kg (19 000 pounds) or less.
- CS-23 often required complementing Special Conditions (Refer to Part-21 21.A.16B) when the certification specification did not contain adequate or appropriate safety standards for the product. These Special Conditions can be applied in complement to the AMC No 2 when required.



# AMC no. 3 – CS VLA amdt 1

- AMC No 3 refers to the previous amendment 1 of CS-VLA for the (administrative) convenience of the applicant and EASA when using an existing certification basis
- A table is provided identifies which CS-VLA amendment 1 requirements contains an accepted demonstration of compliance to the requirement
- Refer to CS-VLA.1 for the applicability
- CS-VLA often required complementing Special Conditions (Refer to Part-21 21.A.16B) when the certification specification did not contain adequate or appropriate safety standards for the product. These Special Conditions can be applied in complement to the AMC No 3 when required.





# Some exceptions / items of interest

- CS 23.2150 Stall Characteristics, Stall Warning, and Spin
  - AMC no. 1 provides adequate means while AMC no. 2 and 3 are incomplete
  
- CS 23.2205 Interaction of Systems and Structure
  - No AMC available yet – an adapted Appendix K of CS 25 in development
  
- Old requirements not covered by Consensus Standards
  - 659, 677 (d), 773(b), 775(e)
  - Amphibian requirements (751, 753, 755, 757)
  
- Exception to Consensus Standards
  - ASTM F3232 less stringent than CS 23 amdt 4 → CS 23.677 (b) as AMC



# Compliance Check List Layout

CS 23 section	AMC ref.	AMC ref. section	MOC	Method or additional specifications	Compliance Document	Remarks / Comments / Statement
<b>23.2215 Flight load conditions</b>						
(a)(1) (a)(2) (a)(3)	F3116-15	4.2 Flight loads - General 4.3 Symmetrical Flight Conditions 4.9 Unsymmetrical Flight Conditions 4.10 Rolling conditions 4.11 Yawing conditions	2		EASA-Flight loads	Requirements for aerobatics not applicable (4.9.2, 4.10.1.2).
(b)	F3114-15	4.5 Vibration and buffeting	2,4,6			
(c)	F3116-15	4.12 Pressurized Cabin Loads 4.13 Unsymmetrical Loads Due to Engine Failure				Not pressurized. Single engine.
<b>23.2220 Ground and water load conditions</b>						
(a)	F3116-15	8.2 Ground load conditions and Assumptions 8.3 Landing gear arrangement 8.4 to 8.6 8.7 Side load conditions 8.8 Braked roll conditions 8.10 Supplementary conditions for nose wheels	2	F3116-15 Appendix X5	EASA-Ground Loads	Aircraft certified for grass and concrete runway. Conventional main and nose gear arrangement. Tail-wheel type requirements are not applicable.
<b>23.2225 Component loading conditions</b>						
(a)(1)			0			Interaction of systems and structures is taken into account when determining component loading conditions in flight and on ground.
(a)(2)			0			Structural design loads have been taken into account when determining component loading



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**Thank you**

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