 European Union Aviation Safety Agency	Consultation paper Deviation from CS 22 requirements related to flutter and Vd	Doc. No. : DEV-B22.335-01 Issue : 1 Date : 17-July-2020 Proposed <input checked="" type="checkbox"/> Final <input type="checkbox"/> Deadline for comments: 7-August-2020
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SUBJECT : Deviation from CS 22 requirements related to flutter and Vd
REQUIREMENTS incl. Amdt. : CS 22.73, 22.335(f), 22.221, 22.223 and 22.629
ASSOCIATED IM/MoC : Yes / No
ADVISORY MATERIAL : N/A

INTRODUCTORY NOTE:

Deviations shall be subject to public consultation in accordance with EASA Management Board decision 12/2007 dated 11 September 2007, Article 3 (2.) which states:

"2. Deviations from the applicable airworthiness codes, environmental protection certification specifications and/or acceptable means of compliance with Part 21, as well as important special conditions and equivalent safety findings, shall be submitted to the panel of experts and be subject to a public consultation of at least 3 weeks, except if they have been previously agreed and published in the Official Publication of the Agency. The final decision shall be published in the Official Publication of the Agency."

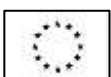
IDENTIFICATION OF ISSUE:


An applicant has applied for a Type Certificate (TC) for a sailplane. The compliance demonstration is well advanced, however due to limited availability of suppliers performing a ground vibration test and its analysis, the flight test campaign cannot be completed in due time. Experience shows that the limited availability of these suppliers can cause delays of up to 2 years in the certification process. In the past this time has been bridged by issuing approved Flight Conditions (FC) for a Permit to Fly (PtF) for the purpose of competition flights and the training thereof. This FC have been issued with operational limitations that ensure a safe operation and free of flutter within a given envelope.

The intent of this deviation is to allow flexibility regarding the free of flutter demonstration and to mitigate the risk by operational limitations. This would allow to achieve the same level of safety as previously with FC and PtF but by means of a TC, issued with a certification basis including a deviation.

This deviation mitigates through operational limitations the non-compliance to the CS-22 requirements related to the design maximum speed, flutter and in particular due to non-complete ground vibration test.

Note: The applicant intends to remove the deviation from the certification basis through a major change done as a post TC action.



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Appendix A

Deviation from CS 22 requirements related to flutter and Vd

1. APPLICABILITY

Sailplanes and powered sailplanes under type certification for the initial Type Certificate (or new model to be added to an existing TC).

1.1 AFFECTED CS

Compliance with the following CS does not need to be demonstrated if mitigated as described.

Overview only (details are in section 3):

CS-22	Requirement	Deviation	Background	Mitigation
22.335(f)	Design air speeds (V _D)	Definition instead of calculation	V _D must be fitted to reduced V _{NE}	See 3.1, 3.2, 3.3, 3.4
22.629	Flutter	No (full) ground vibration test but analysis.	Delays in availability due to lack of suppliers No successfully completed 'free of flutter' flight test up to V _{DF} implies for the flight test deviations below	See 3.1
22.73	Descent, high speed	not demonstrated	Due to reduced V _{NE} demonstration is not possible	See 3.2, 3.3, 3.4
22.221	Spinning	not demonstrated	During spin recovering there is a high risk to speed up above the limited V _{NE} .	See 3.2, 3.3, 3.4
22.223	Spiral Dive	not demonstrated	During spiral dive recovering there is a high risk to speed up above the limited V _{NE} .	See 3.2, 3.3, 3.4

1.2 PRE-CONDITIONS FOR APPLICATION OF THE DEVIATION

Sailplane for aerobatics, cloud flying, or night operation are excluded from this deviation.

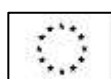
2. APPLICABLE ESSENTIAL REQUIREMENTS OF REGULATION (EU) 2018/1139 TO BE COMPLIED WITH Annex II (Essential requirements for airworthiness)


1.1. Structures and materials

1.1.3. *The aircraft must be free from any aero elastic instability and excessive vibration.*

2.1. *The following must be shown to have been addressed to ensure safety for those on board or on the ground during the operation of the product:*

(g) *the characteristics of the aircraft and its systems must allow a safe return from extremes of the flight envelope that may be encountered.*



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3. MITIGATING FACTORS

3.1 According to CS 22.629 and CS-22 Subpart B and G the design maximum speed V_D may be chosen deviating from CS 22.335 (f)

- as $1.2 V_A$ when (deviating from CS 22.629(b)) compliance with CS 22.629(a) is demonstrated without ground vibration test, or
- not less than $1.2 V_A$ and not higher than 0.85 times the speed calculated in accordance with the formula for sailplanes of category U in CS 22.335(f) when compliance to 22.629(a) is demonstrated in accordance with CS 22.629(b).
- The never exceed speed V_{NE} shall be defined in accordance with CS 22.1505 and shall not exceed 0.90 times the maximum speed demonstrated in flight tests (V_{DF}) and V_{DF} shall not be less than 0.9 times the V_D chosen above.
- For the affected CS in subpart C of CS-22, the design maximum speed V_D shall be chosen in accordance with CS 22.335(f).

3.2 Aircraft life time of 500 FH to be part of the ALS.

3.3 External installation (e.g. action cameras) excluded by ALS.

3.4 The following operational limitations have to be applied to the sailplane by the AFM and placards.

- 3.4.1 Maximum flight altitude limited to 3000/4000 m MSL¹
- 3.4.2 Training of pilots not permitted on this aircraft (licensed pilots only)
- 3.4.3 No spins permitted
- 3.4.4 No aerobatic manoeuvres permitted
- 3.4.5 No cloud flying permitted
- 3.4.6 No night operation permitted

¹ 4000 m in case 22.629 is fully complied with, otherwise 3000 m.

