



## COMMENT RESPONSE DOCUMENT

EASA SC-VLA.901-01 is.1 for CS-VLA Aeroplanes with propeller drive shaft.

[Published on the 18-07-2016 and officially closed for comments on the 12-08-2016]

**Commenter 1 : CAA NL (Mr. Eelco Bakker) – date 20-07-2016**

### Comment # 1

**Paragraph No:** AMC to SC-VLA.901-01-6

**Comment:** Modify text

**Justification:** -

**Proposed Text (if applicable):** The limit RPM of the transmission must be more than 1.5 the maximum RPM.

### ***EASA response: Partially Accepted***

We understand that the intent of the comment is to clarify that 1.5 defines a minimum safety margin. Nevertheless this is an Acceptable Means of Compliance and we could accept a lower margin if well supported by the applicant proposal. A “should” will be used in place of may/must.

The following text will be used

“The limit RPM of the transmission should be not less than 1.5 the maximum RPM.”

**Commenter 2 : LBA (Mr. Helmut Fendt) – date 09-08-2016****Comment # 2****Paragraph No:** Fire protection

SC-VLA.901-01- 7 Parts of the drive shaft located in a designated fire zone shall be made of fire proof material, ...

**Comment:** The requirement for a drive shaft made from fire proof material excludes the use of a fibre reinforced drive shaft for reinforced plastics are not fire proof or fire resistant. The requirement should be re-formulated or offer alternative solutions.

**Justification:** -

**Proposed Text (if applicable):** -

**EASA response: Not accepted**

The aim is not to exclude certain type of material for the shaft, rather to make sure that adequate fire protection is provided, in line also with other CS VLA requirements for fire protection that require the use of fire proof material in designated fire zone (e.g. CS VLA-865). The intent of the requirement may be met by use of a fire proof protection or by the use of a fire resistant material if it can be demonstrated that a safe landing can be achieved with a damaged shaft by fire.–

**Commenter 3 : FAA (Mr. Doug Rudolph) – date 09-08-2016****Comment # 3****Paragraph No:** SC-VLA.901-01

**Comment:** We would suggest close coordination with rotorcraft specialists with respect to shaft loads and vibration along with consideration for gyroscopic and other loads on the propeller mount assembly. Even though pusher propeller types have been certificated for many years, the use of driveshafts has not to our knowledge, not been certificated.

**Justification:** -**Proposed Text (if applicable):** -**EASA response: Noted**

EASA Transmission experts have been consulted, and in particular the requirement of CS-VLR regarding rotor drive. Furthermore, other regulatory material has been consulted: a special conditions raised for a motorglider featuring a driveshaft and a special condition that was raised by the FAA for a European part 23 project (Grob GF200). In particular:

Shaft loads and vibration are assessed in this special condition, while the effects of gyroscopic loads are addressed in special condition SC-VLA.901-02 for CS-VLA Aeroplanes with embedded aft engines and aft propeller.

**Comment # 4****Paragraph No:** SC-VLA.901-01

**Comment:** As far as driveshafts, they should see 14 CFR parts 27.931 and 27.935. As stated previously, Part 23 has seldom dealt with machinery like this, except for the Learfan project. There was a special condition that was issued for this project - 23-ACE-1 – that has a lot of driveshaft requirements in it that they could be reviewed. We did not note any requirements for surviving a “shaft burst” i.e. flailing driveshaft which might be relevant, but that would have to be decided. Not sure we would require all these for CS-VLA, but the items should at least be considered for review.

**Justification:** -**Proposed Text (if applicable):** -

***EASA response: Noted and partially accepted.***

Regarding requirements 14 CFR parts 27.931 and 27.935, CS-VLR has been consulted (Very light rotorcraft), including CS VLR.931 and CS VLR.935 which are the same as CS 27.931 and CS 27.935. Regarding FAA special condition 23-ACE-1, a similar FAA special condition, raised for project the Grob GF200 (Issue Paper P-2) has been consulted. The design of the GF200 is more similar in principle to a CS-VLA design, with respect to the design of the Learfan. Nevertheless it is noted that the two FAA special conditions are similar, with respect to the issues addressed. Regarding the flailing test, it has been decided to include this test in AMC to SC-VLA.901-01- 5. This means that the simplified approach of AMC to SC-VLA.901-01- 5 (low stress levels), is accepted only if combined with a flailing test. In case the applicant elect not to follow the AMC to SC-VLA.901-01- 5 (and a full fatigue evaluation is performed), then the flailing test is not necessary.