



European Aviation  
Safety Agency

## Certification Review Item

Diamond Aircraft Industries

DA 20, DV 20

Maximum Take Off Mass 800 kg

Doc. No. : CRI A-07

Nature : SCN

Release : xx

Revision : 4

Date : 30.7.2010

Status : open

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**SUBJECT** : **Maximum Take Off Mass 800 kg**  
**REQUIREMENTS** : VLA 1  
**ADVISORY / GUIDANCE MATERIAL** : Rulemaking Programm task VLA.005  
**POLICY REFERENCE** : CS VLA  
**PRIMARY GROUP / PANEL** : PCM  
**SECONDARY GROUPE / PANEL** : 1 – Flight, 3 – Structure  
**CRI CLOSURE TARGET** : Pre Change Approval  
  
**NEXT ACTION BY** : EASA approval

### STATEMENT OF ISSUE

JAR/CS-VLA is applicable for a maximum certified Take –off mass of 750 kg. Extension for a higher mass was requested by the industry some years ago and is currently planned as a long term task within the EASA Rulemaking programme (ref. task VLA.005) for a maximum take off mass of 890kg.

Equivalent VLA airplanes in USA and Canada are already certified for a higher takeoff mass.

This CRI is establishing a Special condition for an increase in the maximum take off mass from 750 kg to 800 kg in accordance with 21A.16B.

### BACKGROUND

The Diamond – Austria DV20, EASA TC A.439 was one of the first airplanes certified in 1993 regarding the JAR-VLA. At that time JAR-VLA opens a new category of airplanes. The DA20 is an very similar product developed by Diamond Canada using the DV20 as a basis , EASA TC A.223. The JAR-VLA has been adopted in Canada by AWM 523-VLA.

Currently the Micro light Industry has been grown up and a new Category of airplanes, The LSA-Light Sport airplanes with an maximum Take Off Mass of 600 kg has been established. Due to this situation, there is a urgent request of the existing VLA industry to extend the scope of the already certified products, to be attractive on the marked.


Diamond Aircraft Industries – Austria is developing the DV20E, a variant of the DV20, EASA Project 02793.

Diamond Aircraft Industries – Canada has already certified the DA20-C1 in Canada with a maximum takeoff mass of 800kg. Transport Canada has approved an exemption to 523-VLA.3 for the increased take off weight. This weight increase has been requested by EASA for approval, EASA project 0010003947-001.

### DISCUSSION

#### **EASA Position**

The change of the take off mass from to 800kg is lower than 10% of the already certified 750kg and lower than the proposed 890kg of the CS-VLA change.

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Technically the team believes that this is not a significant change in accordance to 21A101 and the airplane clearly is within the CS-VLA concept, administratively without this Special Condition a CS 23 certification would be required.

CS-VLA is not significantly changed since JAR-VLA initial Issue in April 1990.

The most important Issue that should be addressed is the higher energy in the Emergency Landing condition.

The team proposes to accept a maximum take of mass of 800kg if the following additional requirement can be complied with:

- Demonstration of compliance with all paragraphs of Type Certification Basis JAR-VLA (CRI A-01) must be demonstrated for the maximum take off mass of 800kg .

*Note: Important Items in compliance demonstration are the stalling speed of 45 knot (CAS) in JAR-VLA 49 and the current EASA noise requirements.*

- It must be demonstrated by analysis that the Emergency Landing Requirements of JAR-VLA 561 are also met with 800 kg. Data from the structural identical airplanes (Katana) may be acceptable as supporting data.  
The analysis shall use accident and incident data in a general statistical way, as well as detailed analysis of accidents.

Design related Items for an amended Occupant Protection resulting from this analysis must be included in the Type Design. The latest amendments of CS-VLA should be taken in consideration.

*Note: Service experience should be used as a supporting documentation in the compliance demonstration. Currently CS-VLA contains relevant safety aspects regarding the exits, this should be elected.*

EASA feels that a take off mass extension lower than 10% does not require a full analysis of Dynamic landing conditions as required in CS 23.562. The DV20/DA20 has a very long service experience since 1993, with real accident conditions. This is applicable for a practical approach of demonstrating dynamic capabilities at emergency landings.

### **Applicant Position**

#### Diamond Canada (DA20-C1)

DAI agrees to the CRI A-07.

With the compliance report CR-DA20-C1-009 and the supporting data, DAI provides substantiation that the DA2-C1 meets the certification basis at 800Kg. Only Subparts affected by the increase in gross weight are addressed. Aircraft flight Manual DA202-C1, Supplement S4, covers operation at up to 800. Transport Canada issued an exemption to grant DAI an approval to certify the DA20-C1 at a maximum approval takeoff Weight of not more than 800kg.

#### Diamond Austria (DV20)

DAI agrees to the CRI A-07, Issue 1, dated 9.3.2006, per e-mail dated 20.11.2006



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DAI will show compliance to the applicable paragraphs either by review of the DA 20-C1 compliance documents, by flight test or if necessary by further investigation  
DAI will provide the requested analysis regarding emergency landing requirements.

**NAA Position**

TCCA:

Transport Canada Exemption No. 123-2005-NCR/RCN, RDIMS#:1260578



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**CONCLUSION**

<Summary of result>

<p>Signed PCM</p> <p><i>Andreas Winkler</i></p> <p>PCM for DV20 and DA20</p>  	<p>Date</p> <p>30. JULI 2010</p>
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**CHANGE RECORD**

Revision	Date	Changes
Draft 1		Initial Issue by PCM
Issue 1		Team review
Issue 2		Diamond -- Austria Position
Issue 3		Editorial Change
Issue 4	30.7.2010	New EASA Format, inclusion of the DA20C-1 by Diamond Canada, corrections based on the EASA CM comments

**This Letter describes the responses and actions taken by the PCM regarding the EASA CRI A-07 "MTOM 800 kg) Issue 3 and Issue 4 related to the EASA comments by Richard Minter dated 2.Feb 2007 for the Types DV20E and DA20C-1.**

1. The way I read the CRI the Team are indeed correctly asking for demonstration of compliance to all the relevant requirements, (even if they highlight only the stall speed and noise requirements) and the applicants position starts well although "reviewing the DA 20-C1 documents" is not an MoC in itself!

Agree,

a review of the documents alone is not an compliance against the requirements and it was not the intent of the Diamond – Austria to act that way. DAI fully agree to the content, that is important, a detailed MOC has not been set up and agreed for the DV20E. The comment of DAI.A is more related to the fact that the DV20E using a number of components from the Canadian DA20-C1. The DAI-A comment refers to the DA20 !

Diamond Canada has already certified the DA20-C1 in Canada for 800 kg. All compliance documents have been provided and I can confirm that all paragraphs have been addressed. A significant number of tests have been repeated for 800kg.

I recommend the CRI is revised to say simply that "Demonstration of compliance with all paragraphs is required." DAI might also be persuaded to limit their response to this to "DAI will show compliance"

Text has been amended, the stall speed and noise Issue has been identified as important in the compliance demonstration, therefore it has been added into an note.

2. The second bullet point requires that:

" \* It must be demonstrated by analysis based on the long term service experience with the DV20 that the Emergency Landing Requirements of JAR-VLA 561 are also met with 800 kg."

The structural aspects of 561 requirements (such as occupant retention) are met by analysis and/or test. Furthermore, the influence of the weight change on protection cannot easily be demonstrated by the service experience unless the aircraft were operating overweight when they crashed.

I do however support the idea of a review of service experience to implement design changes in support of the general requirement for occupant protection under paragraphs JAR-VLA 561.

Some minor revision to the wording is therefore recommended to clarify the intent of the Team's request.

Agree,

The wording could be misleading in some aspects, the wording has been corrected.

It was not the intent to demonstrate the compliance by experience alone.

I fully support that occupant protection is a relevant item. In the meantime, CS-VLA Amdt. 1 has been issued, there is only one change, regarding the exit situation, which is affected for the DA20 and DV20, I added this into the CRI.

3. Compliance with the drop test requirement may be an issue. CS/JAR- VLA 723 allows analysis to address weight changes, but some caution would be appropriate here. I recommend that the Team check the aircraft weight approved for which a drop test was last performed. It would not be unreasonable in this category to request a further test if the original weight was 666kg or less (i.e. for approximately a 20% increase).

Agree,


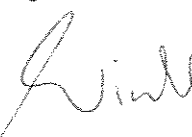
this will be addressed in the MOC, Diamond has a long experience with the DV20/DA20 spring type landing gears. There are different modifications available, aluminium and steel. The original landing gear was from the HK36 powered sailplane. Initial test has been carried out for 750 kg, there was not further extension by analysis.

Project No. P-EASA.02793 (DV20E) and EASA Project 0010003947-001 (DA20-C1)

DAI-C already granted approval by TCCA using analysis only, this will be reviewed.

4. For an increase beyond 800kg I believe we would need to do more research into the potential safety issues.

Agree, this was not applied for. The CRI is limited to 800 kg.



**Andreas Winkler**

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