

EASA	COMMENT RESPONSE DOCUMENT
	EASA PAD No. 13-067 [Published on 24 May 2013 and officially closed for comments on 21 June 2013]

Commenter 1: SNECMA – Hubert Estour – 18/06/2013

Comment # 1

Please find below CFM comments for the PAD in object

Type/Model designation(s) (page 1/2)

CFM56-5 and CFM56-5A engines

→ CFM proposes to refer to CFM56-5 engines only (cancel CFM56-5A), consistently with EASA Type Certificate.

Paragraph “Reason:” (page 1/2)

DERN068...

→ CFM proposes to clarify between DERN068 or DER-N068 ? (is there a missing dash "-", check consistency between page 1 and page 2 of this PAD)

For the reasons described above, this AD requires the identification and removal from service of the affected components...

→ CFM proposes to clarify if “affected components” refer to the “affected parts” in the previous paragraph

Paragraph “Remarks:” (page 2/2)

...please contact Chromalloy...

→ CFM proposes to add contact (email address and Telephone number) from Chromalloy

EASA response: Accepted

Commenter 2: Chromalloy – John Riggs – 20/06/2013

Comment # 2

Please revise the Chromalloy contact information supplied in the "Remarks" section as follows:

For any question concerning the technical content of the requirements in this PAD, please contact Chromalloy, 3999 RCA Blvd, Palm Beach Gardens, Florida 33410; telephone +1 561 935 9820; fax +1 561 578 5521; E-mail: product_support@chromalloy.com.

EASA response: Accepted

Contact Information will be incorporated

Commenter 3: Chromalloy – John Riggs – 21/06/2013

Comment # 3

Chromalloy Comments EASA PAD 13-067 June 20, 2013.

After a thorough and all-encompassing investigation over the past four years by all interested parties, including the regulatory agencies, Chromalloy, the operator and the Original Equipment Manufacturer, no root cause has been established for the 2009 contained failure of a CFM56-5A engine, LPT Stage 1 Disk. An extensive and open technical investigation was undertaken by Chromalloy to support the in-depth FAA and EASA joint investigation of the N068 repair and evaluate potential effects on the secondary cooling air supply to the disk cavity. No supporting evidence was ever found to establish a direct causal connection between the N068 repaired vanes and the disk overtemperature event. Nonetheless, working cooperatively with the FAA and EASA, Chromalloy voluntarily agreed to cease shipment of N068 vanes and work with operators to remove parts from service. This was agreed to as a conservative action to allow closure of the investigation as it seemed unlikely that root cause for the failure would ever be determined.

In that cooperative spirit, the FAA determined to issue a Special Airworthiness Information Bulletin (SAIB) to close the issue. Chromalloy believes the appropriate EASA action in this regard is a Safety Information Bulletin (SIB). We do not believe issuance of PAD 13-067 by EASA is appropriate for the following reasons:

1. FAA reviewed all data and did not find evidence supporting existence of an unsafe condition directly attributable to the N068 repair. FAA issued SAIB NE 13-33 as a way to publicize and authorize our voluntary withdrawal program (CGT SB 72-047) and help assure participation by operators.
2. The Risk Analysis produced by Chromalloy and reviewed/accepted by the FAA was based on the most conservative fleet assumptions. These assumptions include a simplistic random probability of failure, which a Weibull plot of the data shows to be significantly overstated. The Weibull plot clearly shows the incident engine was an infant mortality event, which supports our position that something unusual happened with the incident engine unrelated to the Chromalloy repair.
3. Chromalloy voluntarily agreed with the FAA to cease shipment of additional N068 repaired vanes as part of the Risk Analysis process as only removal from service can reduce the “risk” in the fleet. Given that in this case the risk numbers were so low, the removals could be accomplished by an attrition program with no proactive fleet actions mandating removal. To be clear, Chromalloy’s voluntary decision to cease shipment was made in the spirit of good faith cooperation with the FAA and EASA but in no way changes our position that the N068 repair does not adversely impact the secondary cooling air system.
4. As part of the investigation to seek a root cause for the disk failure, eleven engines with N068 repaired vanes installed have undergone overhaul at normal operating intervals with a close observation on the LPT conditions. The lack of any other fleet event, and the absence of any heat distress whatsoever on disassembled and inspected engines, further supports our position that the N068 repair did not cause the disk failure, but was simply installed in an engine that failed 15 cycles and 21 hours after overhaul.
5. Approximately 30% of the CFM56-5A series engines ever built with N068 repaired vanes have been disassembled and inspected with no evidence of heat

distress or any unusual hardware conditions observed. If disk overtemperature had resulted from operation with N068 repaired vanes, we believe it is highly likely -- if not a certainty -- that some evidence would have been observed in these disassembled engines.

6. In 2012, a CFM56-7B engine, which has a similar secondary cooling system design, experienced a disk event that we believe provides insight into expected behavior of the LPT Stage 1 Disk when subject to overtemperature. This engine contained TCH vanes. An LPT Stage 1 Blade liberated from the disk due to overheating when the Stationary Seal cooling holes became blocked by foreign debris (plasma chips). This event illustrates that, even with complete blockage of the cooling holes the nature of the disk failure, rim softening and blade liberation is not the same as experienced in the 2009 engine failure. The 2009 CFM56-5A LPT Stage1 Disk failure event must be due to another cause, such as an existing defect in the disk at build or an assembly mistake creating a stress riser.
7. All major customers utilizing the N068 repair have been contacted and have committed to comply with Chromalloy Service Bulletin CGT SB 72-047 regarding the time frame established for withdrawal.
8. Several customers have expressed their intent to comply more rapidly than the SB requirement assuming sufficient parts are available to support the engine builds.
9. The FAA SAIB process requires Chromalloy continue fleet monitoring as part of our Continued Operation Safety (COS) responsibilities. Chromalloy and FAA will both remain engaged as part of the FAA Monitor Safety/Analyze Data (MSAD) process.
10. There is no legal or technical basis for the issuance of an Airworthiness Directive as the lack of root cause determination for the incident engine failure does not provide supporting evidence that the N068 repair constitutes an "unsafe condition."
11. The FAA and EASA positions on this issue are inconsistent, contradictory and not in the best interest of aviation safety. The global aviation community expects agreement between the two lead aviation authorities on items involving "potential" flight safety. The PAD clearly conflicts with the FAA position and sends an inconsistent message.

We strongly urge EASA to withdraw this PAD and instead issue a Safety information Bulletin (SIB) referencing the FAA SAIB and Chromalloy SB. The FAA MSAD process provides assurance that the N068 removal plan will be successful.

EASA response: Disagree

EASA has acknowledged the Chromalloy strategy to remove the N068 repair as laid down in Service Bulletin CGT SB 72-047 and is in agreement with the associated risk assessment as well as the removal schedule provided by Chromalloy. EASA appreciated the activities already undertaken by Chromalloy to inform the affected operators and to agree on individual removal schedules. However, it also should be noted that the legal environment the FAA and EASA are working in, is different. While Chromalloy is under the direct jurisdiction of the FAA and the FAA having direct responsibility on the aircraft operated under US register, the situation is different for EASA. EASA does not have direct responsibility for the oversight of the European fleet. The only way for EASA to mandate an action on in-service aircraft is through an airworthiness directive (AD). The EASA AD will not change any Chromalloy proposed tasks or schedules as defined in Service Bulletin CGT SB 72-047 but instead of leaving the decision to follow or not to follow the Chromalloy recommendations to the operators, they will be mandatory for the EU registered aircraft. In light of this, the EASA approach does not conflict with the FAA one. In addition, the EASA AD could be withdrawn when Chromalloy demonstrates that all N068 repairs have been withdrawn from service. With regard to comment #6, please refer to EASA response to commenter #4.

Commenter 4: Air France Industries – Laurent Mahe – 21/06/2013

Comment # 4

We received your PAD 13-067 on 27th May 2013.

Context :

We received FAA SAIB N-13-33 and SB 72-0047 before your document.

We are using CGT DER-N068 repaired parts since 2004 and have not observed any defect or indirect consequences on LLP.

We have 19 5A engines fitted with DER-N068 repaired parts.

Our decision :

We are going to perform the CGT SB72-0047 in accordance with the CGT recommendation :

if a 5A engine is entering our shop for SV with LPT removal, we will discard the N068 repaired parts installed on the engine if any.

Our comments :

1) We do not understand why EASA is preparing an AD for CGT SB72-0047 when FAA has covered this SB with a SAIB.

2) We do not understand why EASA is preparing an AD for CGT SB72-0047 when FAA has written in an official document (paragraph introduction of SAIB N-13-33): "The airworthiness concern is not an unsafe condition that would warrant airworthiness directive action under title 14 of the code of Federal regulations (14 CFR) part 39."

3) Worldwide 5A engines fleet is coming to the end of its life. Air France is involved in a massive 5A fitted aircraft phase out program. It will be very difficult to phase out engines with an AD opened. It will compel AF to perform premature shop visits with excessive economical penalty (more than 3 000 000 USD).

4) We are concerned regarding near term part availability to support engine builds in the event of an AD issuance as operators may accelerate replacement of N068 vanes and create shortages that would not exist if the program is not AD mandated. Has EASA considered availability of spares to support the N068 repair removal program?

5) We are enhancing our inspection procedure for LLP during disassembling of engines fitted with DER-N068 parts. We have disassembled many engines during routine shop visits after operation with N068 repaired vanes.

We have never observed any unusual distress in the LPT module of these engines.

6) We met Chromalloy who presented us the analysis performed. The very long analysis performed on 2009 event did not show direct link between the disk failure and the slight airflow reduction in the LPT stg 1 nozzle. If it had shown such a link, FAA would have produced an AD.

Moreover, the effect on the HPT disk temperature generated by potential airflow reduction in the LPT stg 1 nozzle is not comparable with the effect that would have airflow reduction in the LPT cooling air tubes or surrounding static air seals. Did EASA make the demonstration that the slight airflow reduction is the root cause of the disk failure?

EASA response: Disagree

Please see response to commenter #3.

It is true that the 2009 analysis was not able to show a direct link between the failed part and the changes in the cooling flow and flow field but the FAA in its SAIB refers to the "likelihood of an unsafe condition developing in the affected engines" and that "incorporating the Service Bulletin will [...] soon will decrease the likelihood of shortfalls in the service life of turbine parts". This is supporting information for EASA to promulgate an AD in line with para. 21.A.3B of Commission Regulation No. 748/2012.

Furthermore, EASA is somewhat concerned that Air France Industries seems to assume that engines with the N068 repairs could be resold to third parties without the N068 repair being replaced. Such an approach leaves EASA in doubt that the voluntary approach might not be fully sufficient to ensure the full application of the Chromalloy Service Bulletin and confirms its opinion that an AD is appropriate.

Commenter 5: Lufthansa Technik AG – Thilo Seitz – 24/06/2013**Comment # 5**

Please find enclosed our comments with regard to [EASA PAD 13-067] and the FAA SAIB N-13-33.

Status of DLH engines:

Lufthansa Technik and its customers used the Chromalloy CFM56-5A Stg 1 LPT Nozzle Repair with repair code DER-N068 for approx. 10 years. Several engines were equipped with these parts with different number of vanes installed.

Presently, 5ea DLH engines are still equipped with these parts, whereas 4ea of these 5ea engines will have a schedule shop visit in 2013.

The numbers of vanes with DER-N058 installed are: ESN 731263 (1ea), ESN 731563 (11ea), ESN 731888 (7ea) and 731946 (15ea).

The fifth engines (ESN 731543) is equipped with 7ea of such vanes but there is no Shop visit currently scheduled in 2013.

Our comments:

1) The FAA covered the CGT SB with a SAIB which recommends to remove such vanes. The EASA is presently preparing an EAD which requires to remove these parts out of service.

However, the SAIB N-13-33 outlines: "The airworthiness concern is not an unsafe condition that would warrant airworthiness directive action under title 14 of the code of Federal regulations (14 CFR) part 39."

The removal policy of FAA and EASA should be the same, because the majority of all our customers located in the EU want to allow operation of the engines in either N- or EU-registration. In case of EASA issued a EAD, we have to remove the parts out of all engines whereas N-registered operators are allowed to continue to operate the vanes in the engines.

We would appreciate if EASA and FAA would act in the same manner and would harmonize their decision.

2) Until today, a root cause of the Stg 1 LPT disk failure has not yet determined. The deviations in airflow is obviously too small to explain such failure which was outlined in the failure analysis reports resulting in the a.m. statement of SAIB "... is not an unsafe condition".

From LHT Point of view there is no safety risk or other reason to deviate from the FAA issued/proposed handling of the issue.

EASA response: Disagree

Please refer to responses to commenter #3 and #4. EASA is somewhat concerned that Lufthansa seems to assume that non-EU operators will not follow the Recommendations of the Chromalloy SB simply because there is no AD behind. This would be in conflict to all the assumptions and agreements between the FAA and Chromalloy to rely on a voluntary approach. Such an approach leaves EASA in doubt that the voluntary approach might not be fully sufficient to ensure the full application of the Chromalloy Service Bulletin and confirms its opinion that an AD is appropriate.

Commenter 6: Etihad Airways – Michael Downey – 27/06/2013

Comment # 6

I have an enquiry regarding the compliance on EASA PAD 13-067 in relation to replacement of affected CFM56-5A LPT Stage 1 Nozzles repaired at Chromalloy. Chromalloy SB 72-047 states that LPT Stage 1 Nozzles repaired per Chromalloy Nevada DER-N068 (04-CNV-068-0) are affected and should be removed at next engine shop visit. Etihad Airways have a CFM56-5A engine (ESN 731697) which has LPT Stage 1 Nozzles repaired at Chromalloy per DER 06-CNV-080-0. See attached pages 11 to 27.

Note this DER 06-CNV-080-0 on ESN 731697 is different than the DER-N068 (04-CNV-068-0) referenced in EASA PAD 13-067 and Chromalloy SB 72-047.

Therefore my question is; are LPT Stage 1 Nozzles repaired per DER 06-CNV-080-0 also affected and require replacement at shop visit ?

Unfortunately I have no direct contact at Chromalloy. I would appreciate if you could clarify the above.

EASA response: Acknowledged

DER 06-CNV-08-0 repair is not subject of this AD.