



EASA Safety Information Bulletin

SIB No.: 2010-17R4
Issued: 24 May 2011

Subject: Flight in Airspace with contamination of Volcanic Ash

Ref. Publications:

- Manual on Volcanic Ash, Radioactive Material and Toxic Chemical Clouds, ICAO Document 9691-AN/954 (ISBN 92-9194-888-8), second edition, 2007.
- ICAO Volcanic Ash Contingency Plan EUR and NAT Regions (EUR Doc 19)
- Guidance material preliminary issue - *Draft Version 3.1* - of 'Management of flight operations with known or forecast volcanic cloud contamination' (attached to this SIB) Note: Later published draft versions of the guidance material such as version 4.0 may be used
- [London VAAC NWP Volcanic Ash Concentration Charts.](#)

Revision 4: This SIB revises EASA SIB 2010-17R3 dated 23 May 2011 for the following reason(s):

- To add a note about the version of the guidance material for safety risk assessment that can be used,
- To delete reference to ash tolerance levels defined by aircraft and engine manufacturers
- To introduce the lowest ash concentration limit for the Low Contamination Zone.

Applicability: All aircraft operators, owners and maintenance organisations with aircraft operating into airspace that is known or suspected to be contaminated with volcanic ash.

Description: Flight in Airspace with a contamination of Volcanic Ash may be hazardous to aviation.

Flights even in airspace with a low contamination with volcanic ash where no imminent threat to the safety of the aircraft seems to exist – might have medium and long term consequences for the airworthiness of aircraft.

This Safety Information Bulletin introduces guidelines for aircraft operators and the relevant National Aviation Authorities to minimise the safety risk of flight operations in areas known or forecast to be affected by volcanic cloud.

A further refined safety risk assessment methodology approach – developed under the umbrella of the ICAO International Volcanic Ash Task Force – is introduced as guidance, to allow operators to show and convince their National Aviation Authorities that flights can be executed safely because the risks are controlled and mitigated.

Furthermore, this unique guidance for safety risk assessment has been evaluated and tested and is promoted to be used to evolve into a system where the operators demonstrate to the satisfaction of the National aviation Authority to be able to manage and control their risks.

With regard to flights in airspace with a contamination of volcanic ash, it is essential that priority be given to maintain the continuing airworthiness of aircraft in order to support the continuation of safe operations.

Aircraft and Engine TC-Holders are being requested by EASA to develop the instructions necessary for continued safe flight, such as specific pre- and post-flight inspections, and those for continued airworthiness, taking into account the effects of operation of aircraft in airspace with low contamination volcanic ash. Those instructions are also requested for aircraft parked in areas that may be contaminated by the fall out and settling of volcanic ash. Special emphasis is requested for those systems that are most sensitive to any exposure to volcanic ash.

The sensitive systems are known to be, but may not be limited to, engine compressors and turbines, engine oil systems, aircraft pitot- and air data systems, aircraft environmental control systems, and those aircraft systems that provide cooling air for computer systems installed on the aircraft.

The VAAC in London, in accordance with international regulations, produces volcanic ash concentration charts that predict and depict areas of contamination with volcanic ash. The charts show forecast ash concentration levels in 3 altitude bands and in 3 different zones. This information is produced for the purpose of facilitating the decisions to be taken by the national authorities with regards to their respective airspace.

The zones are identified as follows:

Definitions:

The following definitions of contamination, which correspond to those in the ICAO Volcanic Ash Contingency Plan EUR and NAT Regions (EUR Doc 019), are now valid:

- **Area of Low Contamination** (to be displayed in Cyan): an airspace of defined dimensions where volcanic ash may be encountered at concentrations greater than $0,2 \times 10E-03$ grams/m³, but less than or equal to $2 \times 10 E-03$ grams/m³

- **Area of Medium Contamination** (to be displayed in Grey): an airspace of defined dimensions where volcanic ash may be encountered at concentrations greater than 2×10^{-3} grams/m³, but less than 4×10^{-3} grams/m³
- **Area of High Contamination** (to be displayed in Red): an airspace of defined dimensions where volcanic ash may be encountered at concentrations equal to or greater than 4×10^{-3} grams/m³, where no ash concentration guidance is available.

These definitions replace the previously used terms Enhanced Procedure Zone (EPZ), Time Limited Zone (TLZ) and No-Fly Zone (NFZ).

Recommendations: When operating in an airspace or area of Low Contamination, the following should apply:

Unless specific pre- and post-flight inspections and ICA have been defined by the aircraft and engine TC holders, and until those instructions have been made available to the operators and owners,

(1) (a) Accomplish daily inspections when operating in an area of low volcanic ash contamination, to detect any erosion, accumulation of volcanic ash, or aircraft- and/or engine damage or system degradation:

- wing leading edges
- navigation and landing lights, radomes
- landing gear
- horizontal stabiliser
- all extruding structure
- pitot tubes and static ports
- windows and windshields
- engine inlets and nacelles
- engine compressors and turbines
- engine oil systems
- rotor blades

Based on the results of the above inspections, more detailed inspections may be necessary.

Unless specific instructions have already been provided by aircraft and engine TC holders to be applied after encountering a volcanic ash, the above inspections should also be performed after each flight, whenever the following phenomena are observed or detected or experienced during flight

- Acrid odours similar to electrical smoke
- Rapid onset of engine problems
- St. Elmo's fire
- Bright white/orange glow appearing at the engine inlets
- Dust in the cockpit or cabin

- Sudden (unexpected) outside darkness
- Airspeed fluctuations
- Landings lights casting sharp, distinctly visible beam

(1) b) Protect and cover aircraft that are parked in areas that may be contaminated by the fall out or settling of volcanic ash in accordance with the Aircraft and Engine TC holders advice where possible. Any volcanic ash residues must be removed prior to operations and following the TC Holder's recommendations where available.

(2) Report any encounter with volcanic ash, or any other relevant findings, to the engine- and aircraft TC holders, the National State of Registry of the aircraft and to the National Authority of the State through which flight was conducted.

In addition, operators should report to EASA for EASA to produce a synthesis of findings and trends resulting from these inspections so that improvements could be brought to the procedures recommended by this SIB.

(3) In addition to the above, to enable flight in airspace or areas with Medium or High Contamination, the following recommendations are provided, subject to approval of the Competent Authority of the EU Member State or associated country. Two approaches (A or B) are recommended:

(A) Operators may be authorised to resume flight operations in areas or airspace with a Medium or High Contamination, by presenting to their National Competent Authority an acceptable safety case. The safety case should contain, but is not limited to, the following

- (i) An assessment of the risks for flight operations, per aircraft type, in the area or airspace with a Medium or High Contamination prior to the planned operations (A description of recommended safety risk assessment methodology can be found in guidance material preliminary issue - *Draft Version 3.1* - of 'Management of flight operations with known or forecast volcanic cloud contamination' as attached to this SIB)
- (ii) Data from the engine and aircraft manufacturers that support flight operations, per aircraft type, in this zone, and when applicable, the limitations that may apply.
- (iii) Additional (health monitoring) inspections are carried out that have been determined by the aircraft and engine manufacturers to ensure continued safe flight.

(B) The National Competent Authority of the Member State or associated country may decide to allow all flights within the area or airspace with a Medium Contamination, with or without limitations (e.g. geographic area, limitation in duration), following reconnaissance/clearance flights performed to support and justify that safe operations in the area or airspace with Medium Contamination can continue.

This airspace, based on reconnaissance/clearance flights, should then be re-classified as an area or airspace with a Low Contamination.

The data and analysis from the reconnaissance/clearance flight(s) together with the subsequent decision to allow flights in the airspace in full or in part should be reported without delay to the Volcanic Ash Advisory Centres, Eurocontrol and EASA.

(4) In both cases (A) and (B) flights in areas or airspace with Low, Medium and High Contamination may only then be carried out at the operators discretion provided flight into visible ash is avoided.

(5) In both cases (A) and (B) above any necessary enhanced operational procedures should be developed and implemented by the operator, preferably based on the guidance material for safety risk assessment (SRA) Preliminary Issue draft version 3.1 as attached to this Safety Information Bulletin. Such enhanced operational procedures should include at least as a minimum:

- a briefing to pilots on the concept of flights in the area or airspace of Medium Contamination,
- additional fuel as a contingency to allow re-routing once airborne due to the changing environmental conditions, as applicable.
- the selection of en-route and/or destination alternates and/or ETOPS requirements considering special circumstances, and
- consideration to engine-out service ceiling and decompression before overflying areas containing volcanic ash

(6) Operations in airspace with any contamination of volcanic ash may result in degradation of aircraft and engine components or systems which is higher than normal. Piston engine aircraft and gliders may be less susceptible to volcanic ash.

(7) EASA requests the feedback from EU Member States and associated countries, the airspace management organisations and operators for improvement of this SIB and the Agency would like to be informed of any difficulties that are being experienced on implementing the safety recommendations contained in this SIB. The SIB will be revised as necessary.

Contacts: For further information contact the Airworthiness Directives, Safety Management & Research Section, Certification Directorate, EASA; E-mail: ADs@easa.europa.eu.

Reports can be submitted to EASA by E-mail: volcano@easa.europa.eu.

To obtain a copy of the ICAO Document 9691-AN/954, contact the ICAO Customer Services Unit, telephone +1 514-954-8022, facsimile +1 514-954-6769, or by e-mail request to sales@icao.int.