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## AIC B 14/11. Requirements and guidelines for flight operations in areas where Volcanic Ash may be present

(Replaces AIC B 27/10 and AIC B 28/10)

### 1. Applicability

- All operators with EU-OPS AOC with turbine powered airplanes and JAR-OPS 3 AOC with turbine powered helicopters.
- All Danish registered turbine powered airplanes and helicopters.

### 2. General

The purpose of this AIC is to provide operators holding a Danish AOC and operators of Danish registered aircraft, with information and recommendations on operations when volcanic ash may be present, including requirements and guidelines for documentation required when requesting acceptance for operations when Volcanic Ash may be present. As the present situation can change at short notice, this procedure may be subject to changes. If a change occurs a revised AIC will then be issued.

It is emphasized that a volcanic ash encounter is potentially extremely hazardous and areas of known contamination shall generally be avoided. Volcanic ash may extend for several hundred miles and the contaminated airspace may not be visible.

#### Warning

**This AIC must under no circumstances be considered to be a permit to conduct normal flight operations in volcanic ash conditions.**

Operations in a Volcanic Ash Grey and Blue Zone requires an acceptance by the Danish Transport Authority.

Operators which have their procedures already approved by the Danish Transport Authority

for operation in the former Zone 2 do not need to reapply for acceptance to operate in the current Low/Blue Zone.

The decision to carry out a flight in a Medium/Grey and Low/Blue area will be at the sole risk of the operator.

Areas affected by volcanic ash will be notified by SIGMET (Low/Blue areas) and the associated airspace restrictions/warnings by NOTAM (Medium/Grey + High/Red areas).

### 3. Background

This AIC has been issued on the basis of EUROCONTROL's proposal for new procedures for use of European airspace in connection with volcanic activity. With reference to ICAO EUR DOC 019 Volcanic Ash Contingency Plan – EUR Region and the Volcanic Ash Advisory Centre (VAAC) it has been decided to differentiate between three (3) different volcanic ash contamination zones:

High/Red	An area with High Contamination of Volcanic Ash (>4000 micrograms per cubic metre). This area includes the main area/core of the volcanic fallout. The area is established on the basis of meteorological conditions where wind direction, humidity etc. will result in a high Contamination of particles. <u>Associated airspace restrictions/warnings will be notified by NOTAM+SIGMET.</u> Intentional flight in Area of High Contamination is prohibited
Medium/Grey	An area with Medium Contamination of Volcanic Ash (2000 - 4000 microgram per cubic metre). This area is outside the Red Zone, flying can be conducted when actual conditions, risk assessment and test(s) can be established, that flights can be conducted at an acceptable level of safety and requires prior acceptance from the operators Authority. <u>Areas affected by volcanic ash will be notified by NOTAM+SIGMET.</u> Prerequisites and requirements for flying in this area are given below.
Low/Blue	An area with Low Contamination of Volcanic Ash (200 - 2000 microgram per cubic metre). This area is outside the Red and Grey Zone, flying can be conducted when actual conditions, risk assessment and test(s) can establish, that flights can be conducted at an acceptable level of safety and requires prior acceptance from the operators Authority. Areas affected by volcanic ash will be notified by SIGMET. Prerequisites and requirements for flying in this area are given below.

Previous	Contamination	Colour	Concentration	Info
1	High	Red	$> 4 \times 10^{-3} \text{ g/m}^3$	NOTAM/SIGMET
1	Medium	Grey	$2 - 4 \times 10^{-3} \text{ g/m}^3$	NOTAM/SIGMET
2	Low	Blue	$< 2 \times 10^{-3} \text{ g/m}^3$	SIGMET
3	Clear	N/A	0	N/A

High, Medium and Low areas of Contamination are established by Volcanic Ash Advisory Centre (VAAC) on the link below. These charts are for information only. Official information to be followed by aviation users are promulgated in NOTAM/SIGMET.

<http://www.metoffice.gov.uk/volcano/public/natlantic.html>

It should be noted that defined dimensions refers to horizontal and vertical limits.

Flights may be conducted at flight levels above any area with ash Contaminations in accordance with the considerations stated below.

After the VAAC has issued the +6, +12, +18 hrs forecasts of contaminated areas, SIGMETs and NOTAMs based on the VAAC forecast will be issued by DMI and Naviair respectively.

#### 4. Prerequisites and requirements for flying in areas with Low or Medium Volcanic Ash Contamination

##### 4.1 Operational concerns

- Operators can expect deviations to requested routes.
- Selection of en-route and/or destination alternates and/or ETOPS requirements must be observed considering the special circumstances.
- Consideration to engine-out service ceiling must be given before flying over Area of High Contamination, or if flying over any contaminated area, for which no acceptance has been obtained from The Authority.
- The operator shall establish and maintain a system for registration of fit. hrs in Area of Low and/or Medium Contamination.

##### 4.2 Conduct of Flight

Airborne weather radar systems are not designed to detect volcanic ash clouds and extra precautions should be taken during flight, particularly during hours of darkness and in Instrument Meteorological Conditions (IMC) when volcanic ash may be present in the atmosphere. The following are signs that volcanic ash may be present during flight:

- Smoke or dust in the cockpit.
- An acrid or sulphurous odour.
- St Elmo's Fire and static discharges around the windshield.
- A bright white or orange glow in the engine inlets.
- Sharp, distinct beams from the landing lights.
- Any abnormal indications in airspeed and engine parameters.

Standard procedures for "Encountering volcanic ash" should be considered if any of these signs are observed.

If volcanic ash is encountered the procedures provided in the Operations Manual should be followed. General advice is to execute a 180-degree turn to leave the ash cloud. If possible, the engine thrust should be reduced to flight idle to minimise the build-up of deposits in the engines.

A precautionary landing should be made at the nearest suitable airport if it is suspected that the engines have been adversely affected or there is aircraft damage.

##### 4.3 Reporting of Volcanic Ash activity during flight

If volcanic ash activity is identified during a flight the following information shall be transmitted to the nearest ATS unit:

1. Call Sign
2. Position
3. Time
4. Flight Level
5. Position, bearing, distance to volcanic activity, level of contamination experienced
6. Vertical and lateral extent of ash cloud, rate, growth etc
7. Air temperature
8. Wind.

The report shall only be transmitted when the commander of the aircraft deems it safe to do so.

#### 4.4 After operations in an area of Low Contamination

There are 2 alternatives for the Follow up inspection in the operational approval.

If the aircraft and engine TC holders have defined specific pre- and post-flight inspections and ICA (Instructions for Continuing Airworthiness) for operation in an area of Low Contamination, these shall be followed.

If the NTO has **no** defined pre- and post-flight inspections and ICA by the aircraft and engine TC

Holders, then flight in an area of Low Contamination may be planned and operated for a maximum time of three (3) accumulated flight hours together with the following requirements.

An inspection shall be carried out after landing at home-base, or any other base where approved maintenance facilities are available to carry out the inspection. The inspection shall as a minimum include the following:

- Wing leading edges.
- Navigation and landing lights, radomes
- Landing gear
- Stabilizer
- All extruding structure
- Pitot tubes & Static ports
- Windows and windshields
- Engine inlet and nacelles
- Boroscope inspection of Compressors and Turbines
  - One (1) engine is enough if no indication of damage
  - Next time an inspection is necessary, select another engine
- Engine oil filters
- Analysis of engine oil (SOAP)
- Rotor blades
- Inspection report shall be accomplished at the end of inspection.

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

After take-off, a flight which experiences any delay which may cause the flight to exceed three (3) accumulated flight hours may continue to the planned destination.

#### 4.5 After operations in an area of Medium Contamination

The TC holders defined aircraft and engine specific pre- and post-flight inspections and ICA (Instructions for Continuing Airworthiness) for operation in an area of medium Contamination shall be followed.

#### 5. Requirements and guidelines for documentation when requesting acceptance for operations in areas of Low or Medium Volcanic Ash Contaminations

In order to commence the acceptance process any request sent by an operator must contain all the required documentation.

Operators requesting acceptance to operate in areas where volcanic ash may be present shall as a minimum provide the following documentation:

##### 5.1 NTO

- A "No technical Objection" (NTO) or equivalent document, stating maintenance requirements for regular operation in areas defined as "Area of Medium Contamination" and/or "Area of Low Contamination", must be obtained from the relevant aircraft and engine Type Certificate (TC) holder and all requirements related to the NTO or equivalent document, must be complied with.
- Shall cover airframe and Engines as a minimum.
- NTO conditions shall be implemented in the current approved Maintenance program.
- Any operational requirements shall be complied with.

##### 5.2 Hostile Environment

- If applicable, Hostile Environment Maintenance program shall be complied with.
- Supplementary Part M procedures shall be complied with.

### 5.3 Risk assessment

Prior to any flight in Area of Low or Medium Contamination, an operator shall carry out a risk assessment, based on the NTO, above, including any operational and maintenance restrictions required by the relevant aircraft and engine Type Certificate (TC) holder. The risk assessment shall include procedures to assess current and forecast areas of volcanic ash contamination zones and the associated risk involved in carrying out flight within Area of Medium Contamination area and subsequent actions by crew members if an area of volcanic ash is entered unintentionally.

As a minimum the Risk Assessment shall be conducted at the level enclosed in the guidance material found in A-NPA 2011-06 regarding consultation "Consultation on ICAO IVATF paper about the management of flight operations with known of forecast volcanic cloud contamination"

<http://www.easa.eu.int/rulemaking/docs/npa/2011/A-NPA%202011-06.pdf>

### 5.4 Technical follow-up

- An operator shall establish and maintain a system for technical follow-up after flight operation in "Low/Blue" areas and "Medium/Grey" areas.
- Procedures for compliance with this paragraph shall be established and documented (Follow-up inspection report).
- The operator shall establish and maintain a system for registration and monitoring of flight hours in "Low/Blue" areas and "Medium/Grey" areas.

### 5.5 Crew briefing

- INFO & Briefing about AIC B 14/11 shall be sent to crew.
- Spec OPS
- New Procedures
  - o Areas High, Medium and Low and SIGMET NOTAMS (Log Medium and/or Low.)
  - o PFI after Medium and/or Low
  - o Other countries rules

### 5.6 Applicable Part M supplementary procedures.

- Any other applicable Part M supplementary procedures must be documented and complied with.

### 5.7 Document checklist

With respect to the documentation mentioned in 5.1-5.6 the following abbreviated checklist can be used to ensure that the required documentation has been forwarded to DTA:

- NTO
- Risk Assessment (ref. NPA 2011-06)
- Procedures for technical follow-up
- Any other applicable Part M supplementary procedures
- Info & briefing to flight crew

The documentation requested above should be sent either by e-mail to:

dcaa@slv.dk

or

Trafikstyrelsen  
Ellebjergrvej 50  
DK-2450 Copenhagen SV  
Att.: "TOO"

As soon as the documentation has been sent to DTA, flights into the area applied for, can begin. Formal acceptance will be provided retrospectively by DTA.

### 6. Further information

Further information is available from the following sources:

<http://www.slv.dk/>

ICAO Document 9766 - 'Handbook on the International Airways Volcano Watch (IAVW): Operational Procedures and Contact List'

ICAO EUR Doc 019 - 'Volcanic Ash Contingency Plan – EUR Region'

Airbus Flight Operations Briefing Note - "Volcanic Ash Awareness"

<http://www.metoffice.gov.uk/volcano/public/natlantic.html>

<http://www.naviair.dk/>

EUR Doc 19 VOLCANIC ASH CONTINGENCY PLAN:

[http://www.paris.icao.int/documents\\_open/show\\_file.php?id=334](http://www.paris.icao.int/documents_open/show_file.php?id=334) ,

A-NPA 2011-06 regarding consultation "Consultation on ICAO IVATF paper about the management of flight operations with known of forecast volcanic cloud contamination"

<http://www.easa.eu.int/rulemaking/docs/npa/2011/A-NPA%202011-06.pdf>

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