European Aviation Safety Agency

Comment-Response Document 2014-26

Halon — Update of Part-26 to comply with ICAO Standards

CRD TO NPA 2014-26 — RMT.0560 — 29.7.2016

Related Opinion No 08/2016

EXECUTIVE SUMMARY

The aim of rulemaking task RMT.0560 is to address an environmental issue related to the replacement of halon in lavatory waste receptacles and portable handheld fire extinguishers for use in cabins and crew compartments. It applies to large aeroplanes (CS-25) and large rotorcraft (CS-29).

In the related Notice of Proposed Amendment (NPA) 2014-26, it was proposed, within the new framework established by Annex I (Part-26) to Regulation (EU) 2015/640 to introduce additional airworthiness requirements for operations in order to remove halon from cabins (lavatory waste receptacles, cabins and crew compartments) of newly produced large aircraft of already approved types.

This Comment-Response Document (CRD) contains the comments received on NPA 2014-26 and the responses, or a summary thereof, provided thereto by the European Aviation Safety Agency (EASA).

Based on the comments and responses thereto, the forward fit dates were confirmed and the relevant Opinion No 08/2016 was developed.

For information, the related draft certification specifications (CS) and guidance material (GM) (draft EASA Decision for CS-26) are presented in this CRD. The proposed amendments to Regulation (EU) 2015/640 are contained in the related Opinion No 08/2016 published concurrently with this CRD.

Applicability		**Process map**	
Affected regulations and decisions:	— Annex I (Part-26) to Regulation (EU) 2015/640; — ED Decision 2015/013/R (CS-26)	Terms of reference (ToR), Issue 2:	18.09.2014
		Concept paper (CP):	No
		Rulemaking group (RMG):	Yes
Affected stakeholders:	Large aircraft operators and manufacturers	Regulatory impact assessment (RIA) type:	Light
		Technical consultation during notice of proposed amendment (NPA) drafting:	No
Driver/origin:	Environment/legal requirements	NPA publication date:	18.11.2014
		NPA consultation duration:	3 months
Reference:	— ICAO State Letter AN 11/1.3.24-11/44 (Amendment 35 to Annex 6, Part I); — ICAO State Letter AN 11/6.3.24-11/45 (Amendment 30 to Annex 6, Part II); — ICAO State Letter AN 11/32.3.8-11/46 (Amendment 16 to Annex 6, Part III)	Review group (RG):	Yes
		Focused consultation:	No
		Decision expected publication in:	2017/Q3

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1. Procedural information

1.1. The rule development procedure

EASA (hereinafter referred to as the 'Agency') developed this Comment-Response Document (CRD) in line with Regulation (EC) No 216/2008[1] (hereinafter referred to as the 'Basic Regulation') and the Rulemaking Procedure[2].

This rulemaking activity is included in the Agency's 5-year Rulemaking Programme, under RMT.0560. The scope and timescales of the task were defined in the related ToR.

The draft Regulation, CS and GM have been developed by the Agency, based on the input of RMG RMT.0560. All interested parties were consulted through NPA 2014-26[3]. 15 comments were received from interested parties, including industry, national aviation authorities (NAAs) and social partners.

The text of this CRD has been developed by the Agency based on the input of RG RMT.0560.

The process map on the title page contains the major milestones of this rulemaking activity.

1.2. The structure of this CRD and related documents

This CRD provides a summary of comments and responses as well as the full set of individual comments (and responses thereto) received on NPA 2014-26. The resulting draft rule text (draft EASA Decision) is provided in Chapter 3 of this CRD.

1.3. The next steps in the procedure

The Agency has published this CRD[4] concurrently with Opinion No 082016[5], which contains proposed amendments to European Union (EU) Regulations. It is addressed to the European Commission to be used as a technical basis in order to prepare a legislative proposal.

The Decision containing the related CS and GM will be published by the Agency when the related Regulation is adopted by the European Commission.

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1 Regulation (EC) No 216/2008 of the European Parliament and of the Council of 20 February 2008 on common rules in the field of civil aviation and establishing a European Aviation Safety Agency, and repealing Council Directive 91/670/EEC, Regulation (EC) No 1592/2002 and Directive 2004/36/EC (OJ L 79, 19.3.2008, p. 1).

2 The Agency is bound to follow a structured rulemaking process as required by Article 52(1) of the Basic Regulation. Such a process has been adopted by the Agency's Management Board (MB) and is referred to as the 'Rulemaking Procedure'. See MB Decision No 18-2015 of 15 December 2015 replacing Decision 01/2012 concerning the procedure to be applied by the Agency for the issuing of opinions, certification specifications and guidance material.

3 In accordance with Article 52 of the Basic Regulation and Articles 6(3) and 7 of the Rulemaking Procedure.

4 https://www.easa.europa.eu/document-library/comment-response-documents

5 http://easa.europa.eu/document-library/opinions

2. Summary of comments

15 comments in total were received on NPA 2014-26 from 3 EU NAAs, 4 aircraft and engine manufacturers, and 2 professional organisations.

One comment received a negative response (*Not accepted*). This comment was however due to a misinterpretation of the meaning of a safety risk assessment in the frame of a RIA.

All other comments have been either noted (7), partially accepted (3), or accepted (4).

The 3 responding EU NAAs expressed no concern about the requirement and transition period proposed by the Agency.

3. Draft rules

3.1. Draft Regulation (draft EASA Opinion)

See Opinion 08/2016, published concurrently with this CRD.

3.2. Draft CS (draft EASA Decision)

3.2.1 Draft amendment to CS-26 'Additional airworthiness specifications for operations' — Book 1

SUBPART B — LARGE AEROPLANES

(…)

CS 26.170 Fire extinguishers

Compliance with 26.170 is demonstrated by complying with the following (see also GM1 26.170(b)):

(a) any agent used in a built-in fire extinguisher for each lavatory waste receptacle and any extinguishing agent used in a portable fire extinguisher for cabins and crew compartments is not listed in Annex A — Group II: Halons (halon 1211, halon 1301, and halon 2402) of 'The Montreal Protocol on Substances that Deplete the Ozone Layer', 8th Edition, 2009;

(b) the agent in any fire extinguisher is accepted and of a kind and quantity appropriate for the kinds of fire likely to occur in the compartment where the extinguisher is intended to be used;

(c) any agent used in a personnel compartment or likely to enter in a personnel compartment is designed to minimise the hazard of toxic gas concentration; and

(d) no discharge of the extinguisher can cause structural damage.

(…)

SUBPART C — LARGE ROTORCRAFT

CS 26.400 Fire extinguishers

Compliance with 26.400 is demonstrated by complying with the following (see also GM1 26.400(b)):

(a) any agent used in a built-in fire extinguisher for each lavatory waste receptacle and any extinguishing agent used in a portable fire extinguisher for cabins and crew compartments is not listed in Annex A — Group II: Halons (halon 1211, halon 1301, and halon 2402) of 'The Montreal Protocol on Substances that Deplete the Ozone Layer', 8th Edition, 2009;

(b) the agent in any fire extinguisher is accepted and of a kind and quantity appropriate for the kinds of fire likely to occur where used;

(c) any agent used in a personnel compartment or likely to enter in a personnel compartment is designed to minimise the hazard of toxic gas concentration; and

(d) no discharge of the extinguisher can cause structural damage.

3.2.2 Draft amendment to CS-26 'Additional airworthiness specifications for operations' — Book 2

SUBPART B — LARGE AEROPLANES

(…)

GM1 26.170(b) Fire extinguishers

(a) LAVATORY FIRE EXTINGUISHERS

Appendix D to Report DOT/FAA/AR-96/122 'Development of a Minimum Performance Standard for Lavatory Trash Receptacle Automatic Fire Extinguishers' of February 1997 may be used when showing compliance with CS 26.170(b).

General guidance on the alternative extinguishing agents considered acceptable is found in AMC 25.851(c).

(b) HANDHELD FIRE EXTINGUISHERS

Society of Automotive Engineers (SAE) Aerospace Standard (AS) 6271 'Halocarbon Clean Agent Hand-Held Fire Extinguisher' or European Technical Standard Order (ETSO) 2C515 'Aircraft Halocarbon Clean Agent — Handheld Fire Extinguisher' may be used when showing compliance with CS 26.170(b).

General guidance on the alternative extinguishing agents considered acceptable is found in AMC 25.851(c).

SUBPART C — LARGE ROTORCRAFT

GM1 26.400(b) Fire extinguishers

(a) LAVATORY FIRE EXTINGUISHERS

Appendix D to Report DOT/FAA/AR-96/122 'Development of a Minimum Performance Standard for Lavatory Trash Receptacle Automatic Fire Extinguishers' of February 1997 may be used when showing compliance with CS 26.400(b).

General guidance on the alternative extinguishing agents considered acceptable is found in AMC 29.1197.

(b) HANDHELD FIRE EXTINGUISHERS

Society of Automotive Engineers (SAE) Aerospace Standard (AS) 6271 'Halocarbon Clean Agent Hand-Held Fire Extinguisher' or European Technical Standard Order (ETSO) 2C515 'Aircraft Halocarbon Clean Agent — Handheld Fire Extinguisher' may be used when showing compliance with CS 26.400(b).

General guidance on the alternative extinguishing agents considered acceptable is found in AMC 29.1197.

4. Individual comments and responses

In responding to comments, a standard terminology has been applied to attest the Agency's position. This terminology is as follows:

(a) **Accepted** — The Agency agrees with the comment and any proposed amendment is wholly transferred to the revised text.

(b) **Partially accepted** — The Agency either agrees partially with the comment, or agrees with it but the proposed amendment is only partially transferred to the revised text.

(c) **Noted** — The Agency acknowledges the comment but no change to the existing text is considered necessary.

(d) **Not accepted** — The comment or proposed amendment is not shared by the Agency.

(General Comments)

comment	*5* comment by: *UK CAA* Thank you for the opportunity to comment on NPA 2014-26, Halon - Update of Part-26 to comply with ICAO Standards. Please be advised that there are no comments from the UK CAA.
response	*Noted*

comment	*7* comment by: *Luftfahrt-Bundesamt* The LBA has no comments on NPA 2014-26.
response	*Noted*

comment	*8* comment by: *European Cockpit Association* **ECA's comments:** The replacement of Halon for fixed and portable fire extinguishers aboard commercial aircraft is of paramount importance for the future of European Aviation. Thus, we consider that the opinion of European airline pilots should be taken in consideration, as first-line actors whenever events aboard aircraft imply the use of such devices. In our mind, pilots union shall also be consulted as affected stakeholders of this NPA due to the following outcomes: - fire-fighting recurrent training procedures involving the handling of portable fire extinguishers - emergency procedures related to fire and smoke in the cabin / cockpit / cargo

hold - short and long-terms health effects of the chemicals used in such devices used in a confined space for its human occupants (Halon has proved to trigger various neurological and respiratory problems, leading to many crew incapacitations and/or licence withdrawal due to medical unfit)

Due to the very limited environmental impact of Halon's emergency use - the emphasis should be put on the quality/health effects, effectiveness and operational/training consequences of the substitute. In other words, no replacement until these criteria will be met.

We support the concern of the Agency about Global Warming issues related to the potential substitutes to Halon, and the ozone layer depletion effect due to Halon is also a worrying aspect in this matter. Nonetheless, we deeply deplore that ICAO requirements concerning the forward-fit of efficient Halon substitute have not been anticipated (while issued in 2011).

The decision "to do nothing" about APU and Engine Nacelles fixed fire extinguishers does not look sustainable in the long-term. Indeed, the expectable decrease of Halon quantities around Europe will turn this agent into a rare and expensive material, meanwhile not addressing the environmental issue.

The decision to reduce the scope of the NPA to the newly delivered aircraft is also somehow worrying, as it may induce standards discrepancies among the operators' fleets (and thus leading to potential maintenance or crew mishandling, especially if the agent behaves differently to Halon).

We also consider that funds should be rapidly raised to promote research for the implementation of an efficient substitute for Halon 1301, used as cargo-hold fixed fire extinguisher. In addition to the environmental issues, FAA test proved indeed that this type of Halon has turned to be inefficient on new type of fires (eg: those caused by the ignition of lithium-metal batteries and some lithium-ion batteries, as Halon does not prevent their thermal runaway within the hold). We hence urge the Agency to take adequate measures to address this specific issue, not covered by this NPA.

Although we believe that a faster schedule could have been achieved, a mandatory deadline as of December 2015 for lavatories extinguishers and 2018 for portable fire extinguishers seems reasonable, considering the economical aspects. It is obvious for us that -in addition to the certification tests- a proper risk assessment must be conducted and published before these deadlines taking into consideration all the relevant parameters (including training issues, procedures enforcement, and medical aspects).

As a conclusion, here are our opinions about the proposed agents for Halon replacement:

The HFC236 and 227 (chosen for lavatories extinguishers) present major inconvenience for the environment, which lead us to think they can only be considered as short or middle-term solutions. In addition, their behaviour being different of Halon (foaming effect when pressurised) we consider that the Agency underestimates the crew additional training to be delivered. Moreover, we are pessimistic about the long-term health effects of such chemicals, as some related components already proved their toxicity. However, as they already meet the MPS and are fitted on some newly delivered aircraft, and even adopted by

	a major European airline, we support their choice as "least bad" solution to the problem, providing that EASA drafts significant provisions to address the previously mentioned side-effects to Halon replacement. Concerning the choice of 2-BTP for portable fire extinguisher devices, we are skeptical on its chance to meet the same requirements as Halon, especially on lithium battery fires involving PEDs or EFBs (until further demonstration). Moreover, the choice of such agent, although lighter and less environmentally hazardous than Halon, heavily relies on the forecasted availability of the supply chain and the positive outcome of the certification process. Hence, we can't share EASA's optimistic opinion about the 2-BTP release scheme. Yet, the most worrying aspect to us is the toxicity of this chemical for the aircraft occupants, lethal with a 5.1% concentration during an exposure time of 4 hours (according to a FAA survey). The choice of this product can't be accepted by the pilot community until EASA has demonstrated both its efficiency on all fire classes expected in the cabin and its neutral effect on crew medical fitness, including long-term aspects.
response	*Partially accepted* The Agency acknowledges that industry has been working for several years to find acceptable alternative agents to halon. Some alternatives are already approved and available, others are candidates for approval. The Agency agrees that the properties for firefighting and the handling of extinguishers with the existing approved alternative agents may be different from today's standards for Halon 1211 fire extinguishers. The Agency, therefore, acknowledges that those existing alternatives could have some impact on cockpit/cabin design, crew procedures and training. However, the Agency considers that there would be no adverse impact on safety provided that the changes in crew procedures and training are properly considered and managed. With regard to the firefighting agents HFC 236 and 227, the Agency concurs with ALPAs comment that they could be considered as interim solutions only. In any case, Regulation (EU) No 517/2014 of 16 April 2014 imposes the phase-down of hydrofluorocarbons (HFCs). The RIA of NPA 2014-26 demonstrated that for cargo and engine/APU compartments, the most appropriate option at the moment is to 'do nothing', i.e. no rulemaking action is necessary to mandate neither forward fit nor retrofit. This does not mean that no effort is being made to address the issue. The International Civil Aviation Organization (ICAO) and Regulation (EU) No 744/2010 have set 2014 as the date after which new aircraft shall be designed without halon in the their engine/APU compartments. Said RIA also concluded that it was not necessary to mandate retroactive replacement of the halon handheld fire extinguishers and fire extinguishing systems located in cabins of large aircraft. However, said Regulation has set 2020 and 2025 (for handheld and lavatories, respectively) as dates after which the use of halon would no longer be permitted. The operators can retrofit their fleet at their discretion prior to these dates. Extinguishing systems located in the normally unoccupied cargo compartments are out of

	the scope of this RMT. The Agency acknowledges the current difficulties to have a solution in this area. The Agency is committed to support the industry in searching for alternative solutions that will at the same time both maintain European aviation safety and respect environmental rules. Regarding fires caused by Lithium batteries in portable electronic devices (PEDs), the Agency has published GM for handling fires caused by PEDs in the aircraft cabin (please refer to Safety Information Bulletin (SIB) 2009-22R1). The halon replacement agents that will be authorised by the Agency are required to be approved under Regulation (EU) No 1907/2006 ('REACH') and by the US Environmental Protection Agency (EPA). This implies extensive tests to ensure a safe use of the agent. Part of this testing concerns long-term repeated exposure although such exposure is most likely to occur in the facilities of the agent or fire extinguisher manufacturer, rather than with the end user (cabin crew). Therefore, the Agency sees no ground to question if agents which are REACH-approved and – and EPA-authorised meet at least the same requirements as halon.
comment	*12* comment by: *Boeing* GENERAL COMMENT: Boeing supports this NPA that proposes to adopt the latest amendments of ICAO Annex 6, laying out the framework for the replacement of halon in lavatories and in handheld fire extinguishers on newly produced aircraft. We appreciate that EASA sponsored a multi-stakeholder rulemaking team that allowed us to provide input as the proposed rule was drafted. The collective result is a rule that is reasonable and consistent with ICAO's international standards.
response	*Noted*
comment	*14* comment by: *DGAC France* DGAC France is highly in favour of NPA 2014-26.
response	*Noted*
comment	*15* comment by: *DGAC France* CS-23/27 aircraft are concerned in international flights to a certain extent. These aircraft are mostly concerned by the handheld extinguishers (only very few CS-23/27 aircraft are equipped with lavatories). In order to progressively achieve a 'halon-free' aviation, DGAC France feels like a specific study should be set up, in order to define if certain requirements of NPA 2014-26 should also be needed for CS-23/27 aircraft.

response *Accepted*

The Agency has invited the small aircraft manufacturers/operators to participate in a working group on the subject. The community, however, has expressed little interest in participating in such activity.

The Agency will review internally the possible options to address CS-23/CS-27 aircraft in that respect and may propose an NPA dedicated to small aircraft.

comment *17* comment by: *Poonam Richardet*

Please find Textron Aviation's collective (Cessna and Beechcraft) response to the proposed, "Halon: Update of Part-26 to comply with ICAO Standards**."**

Thank you for giving us the opportunity to respond to this NPA.

Textron Aviation contends that the derogation approval authority should be delegated to the European Aviation Safety Agency (EASA) as the central European aviation oversight organization. Additionally, we are confident that EASA has the expertise and insight to responsibly determine when an appropriate extinguishing agent is available for Halon replacement in lavatories and handheld extinguishers.

Additionally, we believe delegation to EASA relieves a burdensome situation for operators that otherwise must obtain a derogation for each and every state where the owner/operator is active. The cost and resources required for such an application effort would make the derogation process unreasonable and unachievable, and the individual national responses to the application could easily be inconsistent and frustrate operations by the European aviation community.

response *Noted*

The Agency is not competent to handle the derogation process related to Regulation (EU) No 744/2010.

However, the Agency is willing to provide the European Commission and Member States (MSs) with the necessary technical assistance to deal with those derogations.

Applicability & Process map p. 1

comment *6* comment by: *ECOGAS/SVFB/SAMA*

ECOGAS representing mainly but not only **SME** in maintenance leaves detailed comments

to this NPA to the affected organisations, as per introduction mainly manufacturers.

Therefore we support the feedbacks from GAMA.

As a general comment the NPA takes in account

by it's very nature the different potential risks

associated with mass transport vs not mass transport

in a correct way.

response *Noted*

The Agency has not received comments from GAMA on NPA 2014-26.

3. Proposed amendments p. 10

comment *9* comment by: *Airbus Helicopters*

The proposed CS 26.170(b) and CS 26.400(b) refer to Guidance Materials for the indication of MPS (Minimum Performance Standards).

The proposed GM1 26.170 and GM1 26.400 reference MPS for lavatory fire extinguishers and handheld extinguishers and indicate that acceptable alternative extinguishing agents can be found in AMC 25.851(c) or AMC 29.1197.

This suggests that the referenced documents are not performance specifications, but prescriptions of extinguishing agents, and that alternative prescriptions are acceptable.

Consequently, we suggest the following:

- The text (both in CS 26 book 1 and book 2) should not use the wording "Minimum Performance Specifications",
- CS 26 book 1 should include one or more objective based requirements, like the ones found in CS 25 or CS 29 (e.g. "*The kinds and quantities of each extinguishing agent used must be appropriate to the kinds of fires likely to occur where that agent is used*",
- GMs should be changed to AMCs.

response *Partially accepted*

CS-26 has been modified to include more objective-based requirements.

The related GM has been modified accordingly.

comment *16* comment by: *SNPL FRANCE ALPA*

SNPL France ALPA comments on NPA 2014-26 : Halon (update of Part 26 to comply with ICAO standards)

As the representative association of French airline pilots, SNPL believes that the replacement of Halon for fixed and portable fire extinguishers aboard commercial aircraft is of paramount importance for the future of European Aviation. Thus, we consider that the opinion of

European airline pilots should be taken in consideration, as first-line actors whenever events aboard aircraft imply the use of such devices. In our mind, pilots union shall also be consulted as affected stakeholders of this NPA due to the following outcomes:

— Fire-fighting recurrent training procedures involving the handling of portable fire extinguishers

— Emergency procedures related to fire and smoke in the cabin / cockpit /cargo hold

— short and long-terms health effects of the chemicals used in such devices used in a confined space for its human occupants (Halon has proved to trigger various neurological and respiratory problems, leading to many crew incapacitations and/or licence withdrawal due to medical unfit)

We support the concern of the Agency about Global Warming issues related to the potential substitutes to Halon, and the ozone layer depletion effect due to Halon is also a worrying aspect in this matter. Nonetheless, we deeply deplore that ICAO requirements concerning the forward-fit of efficient Halon substitute have not been anticipated (while issued in 2011).

The decision "to do nothing" about APU and Engine Nacelles fixed fire extinguishers does not look sustainable in the long-term according to our perspective. Indeed, the expectable decrease of Halon quantities around Europe will turn this agent into a rare and expensive material, meanwhile not addressing the environmental issue.

The decision to reduce the scope of the NPA to the newly delivered aircraft is also somehow worrying, as it may induce standards discrepancies among the operators' fleets (and thus leading to potential maintenance or crew mishandling, especially if the agent behaves differently to Halon).

We also consider that funds should be rapidly raised to promote research for the implementation of an efficient substitute for Halon 1301, used as cargo-hold fixed fire extinguisher. In addition to the environmental issues,

FAA test proved indeed that this type of Halon has turned to be inefficient on new type of fires (eg: those caused by the ignition of lithium-metal batteries and some lithium-ion batteries, as Halon does not prevent their thermal runaway within the hold).

We hence urge the Agency to take adequate measures to address this specific issue, not covered by this NPA.

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As a conclusion, here are our opinions about the proposed agents for Halon replacement:

The HFC236 and 227 (chosen for lavatories extinguishers) present major inconvenience for the environment, which lead us to think they can only be considered as short or middle-term

	solutions. In addition, their behavior being different of Halon (foaming effect when pressurised) we consider that the Agency underestimates the crew additional training to be delivered. Moreover, we are pessimistic about the long-term health effects of such chemicals, as some related components already proved their toxicity. However, as they already meet the MPS and are fitted on some newly delivered aircraft, and even adopted by a major European airline, we support their choice as "least bad" solution to the problem, providing that EASA drafts significant provisions to address the previously mentioned side-effects to Halon replacement. Concerning the choice of 2-BTP for portable fire extinguisher devices, we are sceptical on its chance to meet the same requirements as Halon, especially on lithium battery fires involving PEDs or EFBs (until further demonstration). Moreover, the choice of such agent -though lighter and less environmentally hazardous than Halon- heavily relies on the forecasted availability of the supply chain and the positive outcome of the certification process. Hence, we can't share EASA's optimistic opinion about the 2-BTP release scheme. Yet, the most worrying aspect to us is the toxicity of this chemical for the aircraft occupants, lethal with a 5.1% concentration during an exposure time of 4 hours (according to a FAA survey). The choice of this product can't be accepted by the pilot community until EASA has demonstrated both its efficiency on all fire classes expected in the cabin and its neutral effect on crew medical fitness, including long-term aspects.
response	*Partially accepted* The Agency acknowledges that industry has been working for several years to find acceptable alternative agents to halon. Some alternatives are already approved and available, others are candidates for approval. The Agency agrees that the properties for firefighting and the handling of extinguishers with the existing approved alternative agents may be different from today’s standards for Halon 1211 fire extinguishers. The Agency, therefore, acknowledges that those existing alternatives could have some impact on cockpit/cabin design, crew procedures and training. However, the Agency considers that there would be no adverse impact on safety provided that the changes in crew procedures and training are properly considered and managed. With regard to the firefighting agents HFC 236 and 227, the Agency concurs with ALPAs comment that they could be considered as interim solutions only. In any case, Regulation (EU) No 517/2014 of 16 April 2014 imposes the phase-down of hydrofluorocarbons (HFCs). The RIA demonstrated that for cargo and engine/APU compartments, the most appropriate option at the moment is to ‘do nothing’, i.e. no rulemaking action is necessary to mandate neither forward fit nor retrofit. This does not mean that no effort is being made to address the issue. ICAO and Regulation (EU) No 744/2010 have set 2014 as the date after which new aircraft shall be designed without halon in the their engine/APU compartments. Said RIA also concluded that it was not necessary to mandate retroactive replacement of the halon

handheld fire extinguishers and fire extinguishing systems located in cabins of large aircraft. However, said Regulation has set 2020 and 2025 (for handheld and lavatories, respectively) as dates after which the use of halon would no longer be permitted. The operators can retrofit their fleet at their discretion prior to these dates.

Extinguishing systems located in the normally unoccupied cargo compartments are out of the scope of this RMT. The Agency acknowledges the current difficulties to have a solution in this area. The Agency is committed to support the industry in searching for alternative solutions that will at the same time both maintain European aviation safety and respect environmental rules.

Regarding fires caused by Lithium batteries in PEDs, the Agency has published GM for handling fires caused by PEDs in the aircraft cabin (please refer to SIB 2009-22R1).

The halon replacement agents that will be authorised by the Agency are required to be approved under Regulation (EU) No 1907/2006 ('REACH') and by the US EPA. This implies extensive tests to ensure a safe use of the agent. Part of this testing concerns long-term repeated exposure although such exposure is most likely to occur in the facilities of the agent or fire extinguisher manufacturer, rather than with the end user (cabin crew).

Therefore, the Agency sees no ground to question if agents which are EPA-approved and EU-authorised (REACH) meet at least the same requirements as Halon.

SUBPART C — LARGE ROTORCRAFT p. 13

comment *10* comment by: *Airbus Helicopters*

In CS 26.400, the reference to GM1 26.170(b) is incorrect: it should be GM1 26.400(b).

response *Accepted*

The reference will be corrected.

SUBPART C — LARGE ROTORCRAFT p. 14

comment *11* comment by: *Airbus Helicopters*

In GM1 26.400(b) subsection 2, the reference to CS 26.100(b) is incorrect: it should be CS 26.400(b).

response *Accepted*

The reference will be corrected.

4.1.7. Safety risk assessment p. 22

comment	*4* comment by: *Rolls-Royce Deutschland Ltd & Co KG* The safety risk assessment would mean that a non-functioning or not effective fire extinguishing system should be considered as catastrophic. A fire extinguishing system is not the only means in firefighting to prevent even a hazardous condition. If a fire extinguishing system could be considered effective in any fire condition then there would be no need to require 15 minutes fire containment and no need for some components to resist a fire for 15 minutes. Moreover there is an indication based on incident reports that fire extinguishing was not effective during some fire events. Therefore it is assumed that a non-functioning fire extinguishing system should be considered as hazardous.
response	*Not accepted* The safety risk assessment is to be understood here as part of the RIA of this RMT. It considers the worst-case scenario of a non-extinguished in-flight fire. It does not constitute guidance on performing a system safety assessment during aircraft certification.

4.5. Analysis of impacts — Handheld (portable) fire extinguishers, 4.5.1. Halon alternatives for portable fire extinguishers p. 26-27

comment	*18* comment by: *AMPAC* American Pacific (AMPAC), based in Nevada, USA, is the current manufacturer of 2-BTP and has worked on its development going back to its origins in the Advanced Agent Working Group, participating as early as 2001. Considerable effort has been expended to conduct all the testing required for physical and toxicological properties in order to submit the agent for regulatory approval. This section states that commercialization in the best case scenario is "from end of 2014 onwards." As noted in other sections, the EU REACH approval is complete and US EPA TSCA and SNAP approvals are pending. We are the applicant for both the EU REACH and US EPA filings. Based on the best information we have, the best case scenario for commercialization would be the fourth quarter of 2015. This timing is based on EPA action by mid-2015 on our application and is an estimate. EPA time tables are beyond our control, however, such that it may take more time. We are dedicated to bringing this agent to the market once both EU and US regulatory approvals are in place.
response	*Accepted*

4.5.3. Summary of the 'best-case scenario' p. 28-29

comment	*13* comment by: *Boeing* Page:28 of 68 Paragraph: *4.5.3, Summary of the "best-case scenario"*

	<u>The proposed text states</u>: *"Even if the application to EPA has been submitted, approval before end 2014 is not 100 % sure. …"* **Boeing response:** We are not requesting any change to be made to the NPA, but we do provide the following update on the status of the 2-BTP extinguishing agent development: The U.S. Environmental Protection Agency (EPA) still has not completed its review and approval of 2-BTP, and has not provided a completion date. 2-BTP still holds promise as the best Halon replacement for aircraft due to its high firefighting performance and near zero ozone depletion potential/global warming potential (ODP/GWP). The other Halon replacements have high GWPs, so 2-BTP provides the better environmental solution. The use of this information is left to the discretion of EASA.
response	*Noted* The Agency understands that Boeing considers 2-BTP as the most promising halon replacement agent.

5. Appendices

5.1. Appendix A — Attachments

Attachment #1 to Comment #17

1449 Response Halon —Update of Part26 to comply with ICAO Standards.pdf