



Halon Contamination/Replacement

Remi DELETAIN
EASA Certification
Directorate
Powerplant Installation &
Fuel Systems

Peter CHITTENDEN
EASA Certification
Directorate
Cabin Safety



Contaminated Halon

→ Background

- ✦ “Whistleblower” informed, mid 2009, that UK based company had delivered polluted Halon (H1211 / H1301)
- ✦ 17 Customers identified
- ✦ EASA / CAA UK approached individually each company involved in Aviation either as Manufacturer or Part145 overhauler.
- ✦ Wide variety of applications: Handheld, Engine, APU, Cargo Bay, Helicopters & Large aeroplanes.




Contaminated Halon


Site Map

LyonTech Engineering Ltd

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Company
Founded in 1998 to effectively manage the phase-out of Halons, CFCs, HCFCs and HFC's. [Read More...](#)

Products
 We buy and sell Halon 1301, Halon 1211 Sale of Refrigerant 134A [Read More...](#)

Services
 LyonTech Engineering Ltd is a registered waste manager for Halon 1211 and Halon 1301. [Read More...](#)

Internet 100%



Contaminated Halon

Initial Concerns

- ➔ **Handheld/Lavatory extinguishers - Largest number of units affected by far (tens of thousands of units).**
- ➔ **Extinguishing performance????**
- ➔ **Handhelds also raised significant questions regarding toxicological effects.**
- ➔ **Engine/APU/Cargo applications, lesser concerns.**



Contaminated Halon 1211

Handhelds

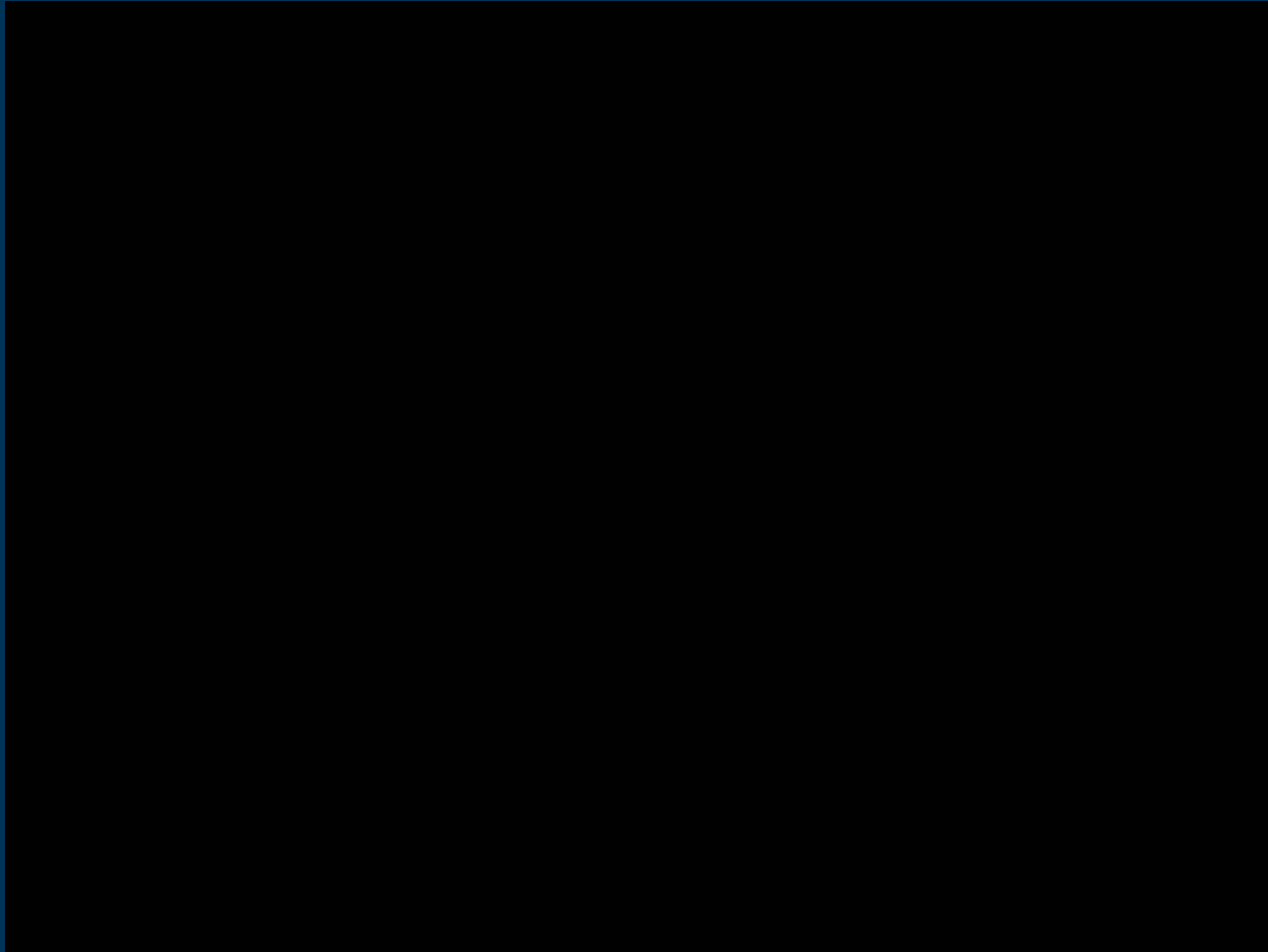
→ EASA global approach for Halon 1211

- ✦ **Analysis of returned in-service handheld extinguishers' contents.**
- ✦ **Identification of suspect batches (supplied tanks of H1211 each fill approx 300 extinguishers).**
- ✦ **According to the results (purity <90%) issuance of ADs with defined applicability (P/N, S/N).**
- ✦ **First round of FAA-TC Tests performed with 10% contaminants to assess firefighting and toxicological issues for 90%<purity <99% batches.**
- ✦ **Results - good**



European Aviation Safety Agency

FAA Testing 100% Halon 1211

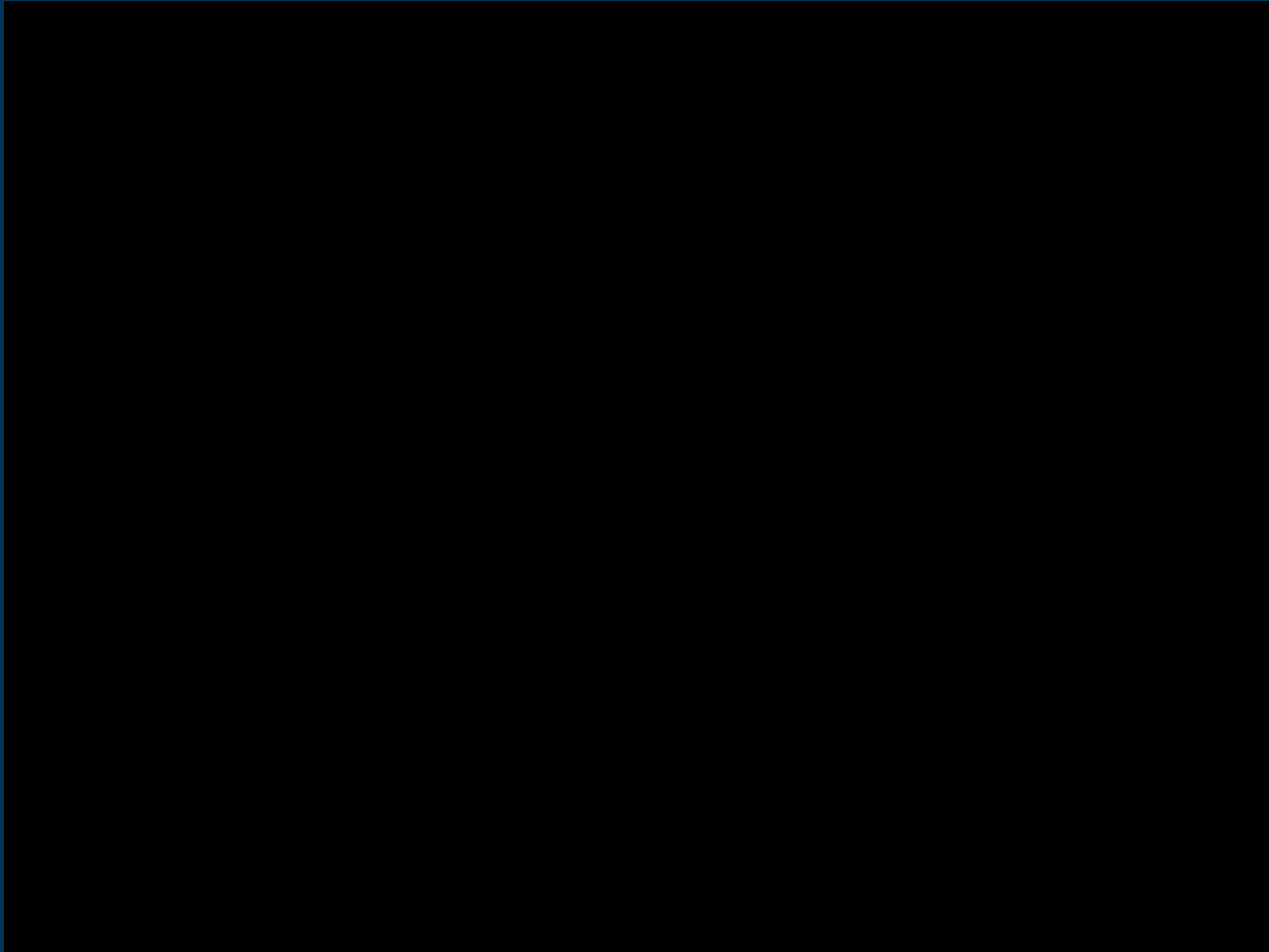




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FAA Testing

90% Halon 1211/10% R12





Contaminated Halon 1211

Handhelds - Airworthiness Directives

- ➔ As of today, EASA has issued 8 ADs covering:
 - ✦ **Handheld extinguishers FFE**
Total number of FE: around 5000 (equipment level approval).
 - ✦ **Handheld extinguishers Sicli H1-10 AIR (formerly General Incendie MAIP)**
Total number of FE: around 1400 FE (equipment level approval)
 - ✦ **Handheld extinguishers L'hotellier**
Total number of FE: around 1800 (for ATR, Eurocopter and Socata)
- ➔ ADs were issued where test results showed <90% purity or no results available.
- ➔ FAA AD also issued, but covering all LyonTech Halon filled units.



Contaminated Halon 1211

Next Steps - Handhelds

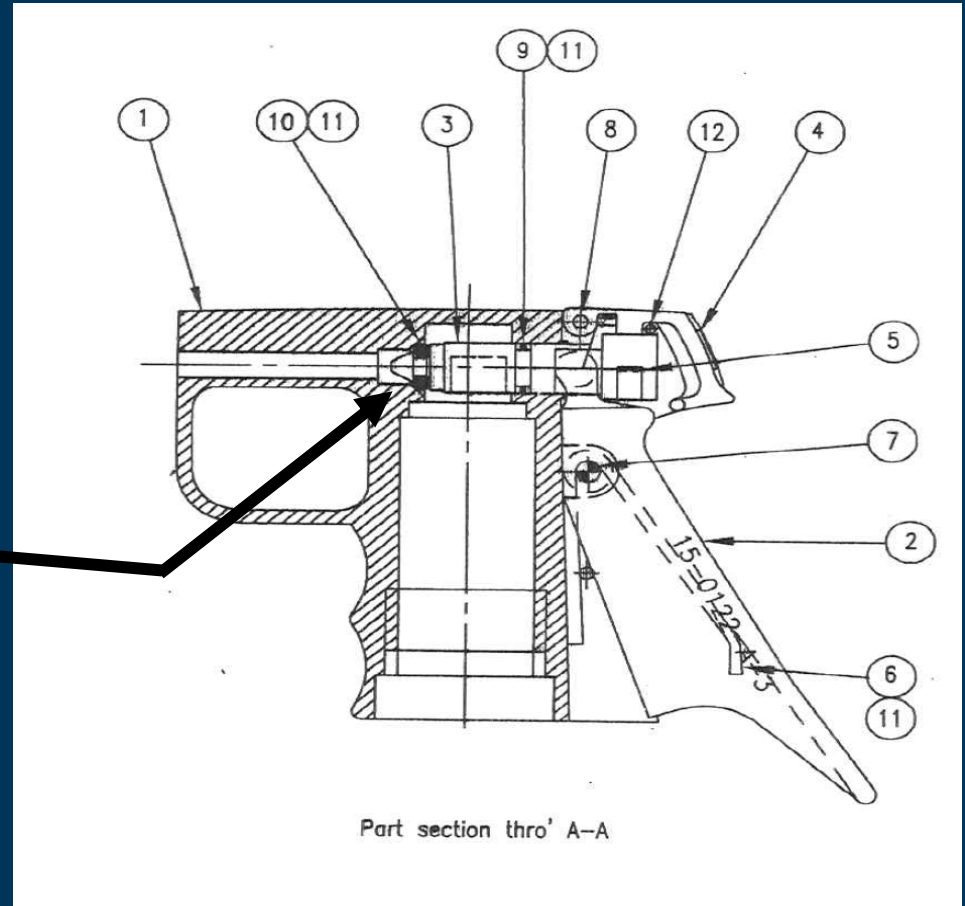
- **Assessment of need for further ADs for lower levels of contamination (i.e. >90% 1211 but still "out-of-specification").**
- **Out of Spec. Parameters included;**
 - **Solid Contaminants**
 - **Water**
 - **Refrigerants etc.**
- **Extinguishers have "Hard Time" Phase out.**
- **Halon stratification effects?????**
- **Overall remaining risk still under review.**
- **Tentative conclusion – No More ADs.**



Handheld - Halon 1211 Contaminants

Solids and Water

- Halon reported as being contaminated with solids and water, relative to standard.
- However;
 - Orifice is large (5mm)
 - Blockage from solid contaminant or ice plug therefore hard to believe.





Handheld -Halon 1211 Contaminants

Refrigerants etc.

→ Reported contaminants;

- ✦ R11, R12, R22, R124, R125, R134a, R152a, R600a, CCl₄, C₆H₁₀, Halon 1301 and 2402
- ✦ Varying toxic effects.

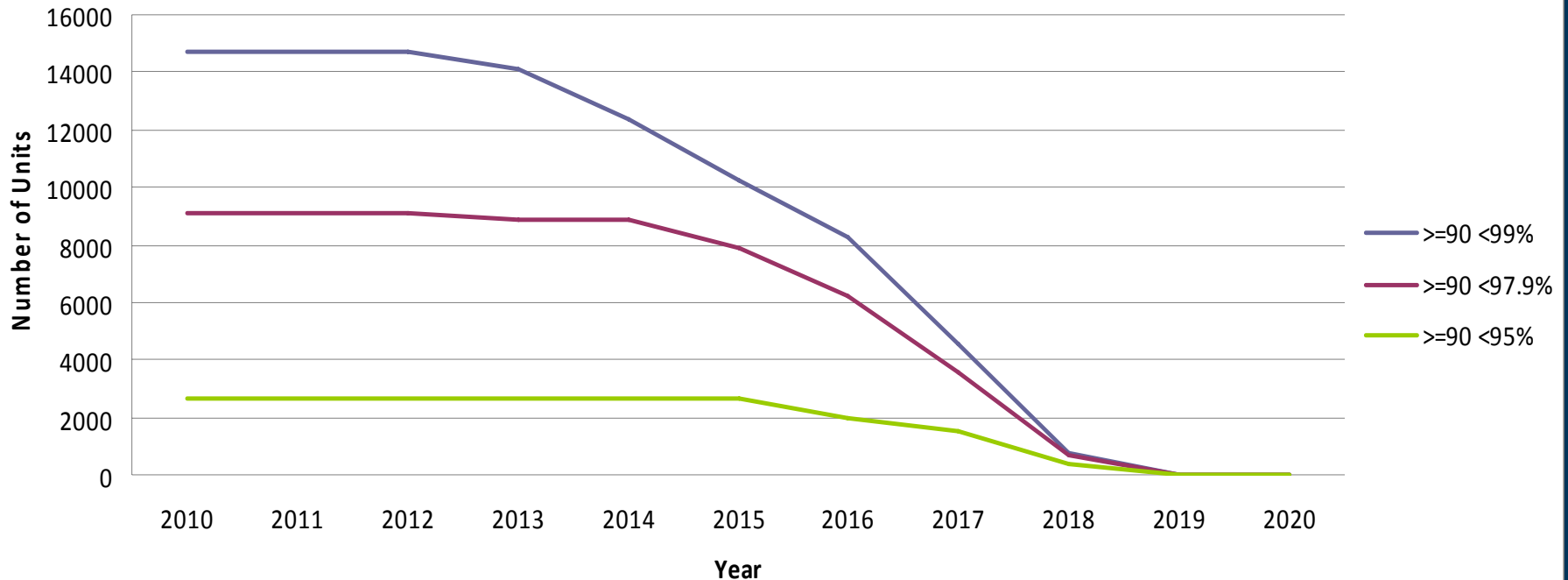
→ However;

- ✦ Some of these substances have known fire fighting capabilities, others probably have performance but not quantified.
- ✦ FAA testing has shown no fire fighting or toxicological problems with contaminants up to 25% (Second Round Testing).



Handheld Halon 1211 Contaminants Phase Out Due to Hard Time Limit

LTE Halon Extinguishers in Service



Three curves cover various assumptions for “out of spec”.



Contaminated Halon 1211

Engine Applications

➔ Halon 1211 is used also on engine fire extinguishing

✦ Fixed extinguishers L'Hotellier

Total number of FE: around 120

➔ Risk under EASA assessment for Dassault

➔ Correctives actions in place for Eurocopter



Contaminated Halon 1301

- ➔ Less affected in terms of specification deviations.

- ➔ **Assessment guidelines**
 - ✦ Less toxicity impact for engines and APU
 - ✦ Purity % vs Fire suppression capability to be assessed on a case-by-case basis
 - ✦ Compliance with applicable engine fire suppression specifications

- ➔ **Decision on way forward to be taken, especially for long term exposure.**



EC – Halon replacement

- ➔ EC Regulation 1005/2009 was issued on 16 September 2009 on substances that deplete the ozone layer.
- ➔ Annex VI of the Regulation gives the list of critical uses of Halon that are still allowed to be used as per article 13 onboard aircraft:
 - ✦ Halon 1301 (crew compartments, engine nacelles, cargo bays and dry bays, and fuel tank inerting)
 - ✦ Halon 1211 (hand held FE and fixed FE equipment for engines)
 - ✦ Halon 1211 (in aircraft for the protection of crew compartments, engine nacelles, cargo bays and dry bays)
 - ✦ Halon 2042 in the Czech Republic, Estonia, Cyprus, Latvia, Lithuania, Hungary, Malta, Poland, Slovenia and Slovakia (crew compartments, engine nacelles, cargo bays and dry bays and fuel tank inerting, in hand-held FE and fixed FE equipment for engines)
 - ✦ Halon 2402 in Bulgaria (crew compartments, engine nacelles, cargo bays and dry bays, and fuel tank inerting)
- ➔ **No cut-off date, nor end dates are given.**



EC – Halon replacement

- ➔ On 18 August 2010, EC Regulation 1005/2009 Annex VI has been amended by regulation (EU) 744/2010 to include cut-off dates and end dates
- ➔ Regulation is in force since 08 september 2010
- ➔ Cut-off dates and End dates are as follow:



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Purpose	Type of extinguisher	Type of halon	Cut-off date * (application for new TC)	End date * (Halon decomissioned)
Protection of normally unoccupied cargo compartments	Fixed system	1301 1211	2018	2040
Protection of cabin and crew compartments	Portable Fire Extinguishers	1211 2402	2014	2025
Protection of engine nacelles and APU	Fixed system	1301 1211 2402	2014	2040
Inerting of fuel tanks	Fixed system	1301	2011	2040
Protection of lavatory waste receptacles	Fixed system	1301 1211	2011	2020
Protection of dry bays	Fixed system	1301 1211 2402	2011	2040

***31st dec of the stated year**



ICAO – Halon replacement

- ➔ **Draft ICAO resolution 33/1 adopted during the September 2010 (Resolution 37/XX).**

- ➔ **Measures on halons phase-out.**
 - ✦ In lavatory firex systems used in A/C produced after a specified date in the 2011 timeframe;

 - ✦ In hand-held firex used in A/C produced after a specified date in the 2016 timeframe; and

 - ✦ In engine and auxiliary power unit firex systems used in A/C for which application for type certification will be submitted after a specified date in the 2014 timeframe;



ICAO – Halon replacement

➔ Measures on contaminated halons

- ✦ effective testing or certification of halons within possession of manufacturers, operators and maintenance organisations.
- ✦ quality systems of operators, maintenance organisations provide a means for requesting from halons suppliers certification documentation attesting the quality of halons.



ICAO vs EC

Purpose	Type of extinguisher	Type of halon	End of Production date*	Cut-off date (application for new TC)	End date: retrofit and production
Normally unoccupied cargo compartments	Fixed system	1301 1211		2018	2040
Cabin and crew compartments	Portable FE	1211 2402	2016*	2014	2025
Engine nacelles and APU	Fixed system	1301 1211 2402		2014 2014*	2040
Inerting of fuel tanks	Fixed system	1301		2011	2040
Lavatory waste receptacles	Fixed system	1301 1211	2011*	2011	2020
Protection of dry bays	Fixed system	1301 1211 2402		2011	2040

ICAO dates - EC dates



EASA – Halon replacement

➔ Future EASA rulemaking activity planned (MDM 071) upon EC Regulation 1005/2009 Annex VI revision

- ✦ Guidance material concerning control of halons to ensure compliance with international standards by organisations (manufacturers and maintenance organisations)
- ✦ Up-date of requirements (CSs, including future 'CS/IR 26 (airworthiness specifications for operation-regulatory framework not defined yet)' in order to reflect the ICAO requirements that are not covered by EC ones (forward fit in 2011 for lavatories, in 2016 for cabin and crew compartments).



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Thank you