



P3

**CERTIFICATION OF A
HALON-FREE PORTABLE
FIRE EXTINGUISHER
FOR AVIATION USE**

+ add an extra
to the ordinary

HAFEX

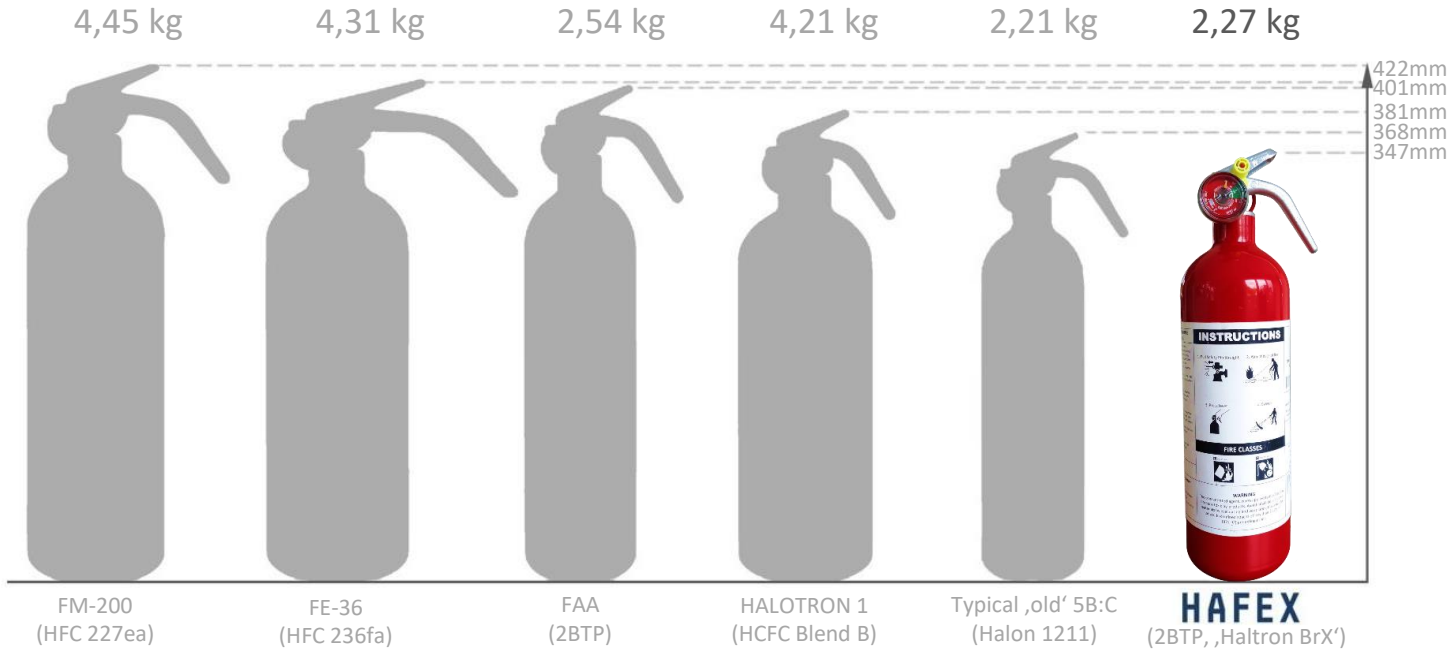
HALON ALTERNATIVE
FIRE EXTINGUISHER

AGENDA

- + 1. INTRODUCTION
- + 2. OVERVIEW
- + 3. DEVELOPMENT MILESTONES
- + 4. DIFFERENCES BETWEEN STANDARDS/ REQUIREMENTS
- + 5. RECOMMENDATIONS
- + CONTACT

1. INTRODUCTION

SMALLEST AND LIGHTEST UL- APPROVED HALON- ALTERNATIVE PORTABLE FIRE EXTINGUISHER IN THE WORLD



Ref. for other fire extinguisher dimensions: Presentation of Mike Madden during FAA Systems Meeting in Köln, Germany, May 11-12, 2011: „Halon Replacement for Airplane Portable Fire Extinguishers - Progress Report“, File: Madden-0511-BTP.pdf

1. INTRODUCTION

	P3APP003010D
Extinguishing agent	Halotron BrX
Fire fighting performance	UL 711 5B:C
Qualification standards	UL 2129 DOT/FAA/AR-01/37 RTCA DO-160 CS/FAR 23/25/27/29
Dimensions (HxWxD)	345x112.7x89 mm
Max. weight	2.27 kg
Operating temperature	-40°C to +70°C



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2. OVERVIEW

EASA APPROVAL

CRI: D-GEN-O2

ETSO 2C515

SAE AS 6271

DOT/FAA/AR-01/37

**HIDDEN FIRE TEST
SEAT FIRE/ TOXICITY TEST**

UL 2129

**AGENT LISTED UNDER EPA SNAP
AGENT REGISTERED UNDER REACH**

FAA APPROVAL

IP:

AC 20-42D

DOT/FAA/AR-01/37

**HIDDEN FIRE TEST
SEAT FIRE/ TOXICITY TEST**

UL 2129

AGENT LISTED UNDER EPA SNAP

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3. DEVELOPMENT MILESTONES

Development milestones EN-extinguisher:

- Development started in 2015 on base of EN 4649 and DOT/FAR/AR-01/37.
- Construction and performance requirements of UL 711 and UL 2129 were also respected, but not focused.
- EASA released ETSO 2C515 in August 2016.
- EASA certification achieved in October 2016.
- ANAC certification achieved in March 2018.



P3APP003010A



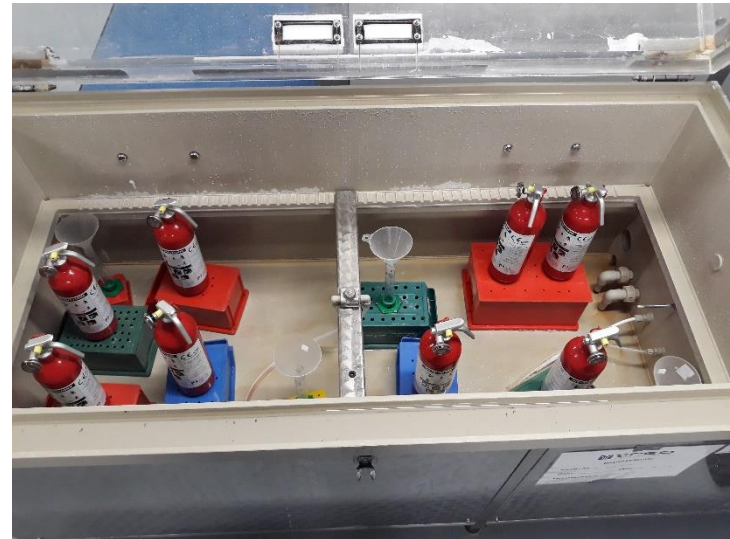
3. DEVELOPMENT MILESTONES

Development milestones UL-extinguisher:

- As the ETSO 2C515 refers to SAE AS 6271 which again refers to UL 2129, P3 started to develop an UL- compliant extinguisher.
- Development started in 2016.
- First salt spray testing done in Nov. 2017
- UL approval was achieved in March 2019.
- EASA certification was achieved in April 2019.
- FAA certification ongoing.



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4. DIFFERENCES BETWEEN STANDARDS/ REQUIREMENTS

Main differences between UL 2129 and ETSO 2C515:

- UL 2129 is a standard for all industries → no special aviation requirements
- ETSO 2C515 refers to SAE AS 6271, which includes more aviaional requirements, but adds some own requirements on top (mainly: static loads, survival temperature range).
- UL 2129 approves for temperature range of -40°C to $+49^{\circ}\text{C}$ <-> ETSO defines survival temperature range of -40°C to $+70^{\circ}\text{C}$.

4. DIFFERENCES BETWEEN STANDARDS/ REQUIREMENTS

Additional topics:

- UL 2129 requires an UL approved bracket to be packed with every extinguisher → additional waste and not wanted by customers.
- Throw range: AC20-42D requires minimum throw range, but defines no pressure levels → authorities request performance tests at cabin pressure and below.
- Toxicity: Calculation in UL 2129 does not include ventilation and stratification → high value for 5B- extinguisher → irritates customers with small cabins/ cockpits.
- Usability of extinguisher on burning PED with Li-Ion batteries: No test, requirement or recommendation in any document.
- NFPA 10 recommends annual weighing → Aviation industry prefers no weighing at all.
- Portable fire extinguishers shall be able to extinguish fires likely to occur (25.851(a)(7)), which would be class A fires, but no requirements defined → UL 1A-fire is too big for typical 5B:C- extinguisher, but could be reduced to small crib or EN3- standard A fires.

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5. RECOMMENDATIONS

P3 recommends the following actions:

1. Aviation industry (preferably FAA and/ or Boeing) to get involved into UL decision board to
 - a. change bracket requirement.
 - b. change toxicity warning to include PBE/ ventilation.
2. Change MRBR recommendation for annual weighing to be in line with NFPA10.
3. FAA to update AC20-42 to:
 - a. include new agents.
 - b. define performance requirements at different pressure levels.
 - c. Add reference to DOT/FAA/TC-14/50 (stratification and localization).
4. FAA to publish official document showing 2-BTP passed Seat Fire Toxicity Test.
5. FAA should include small scale class A fire test into MPS.
6. Aviation industry to align on standard test for class B-extinguishers showing usability against Li-Ion- fires (not dedicated Li-Ion fire extinguishers).

CONTACT

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