

**Proposed Special Conditions and Guidance Material for:
Additional flight time after detection of fire or smoke in the cargo / baggage compartment.**

Applicable to Large Rotorcraft when fitted with a cargo / baggage compartment.

Introductory note:

The hereby presented Special Condition has been classified as an important Special Condition and as such shall be subject to public consultation, in accordance with EASA Management Board decision 12/2007 dated 11 September 2007, Article 3 (2.) of which states:

"2. Deviations from the applicable airworthiness codes, environmental protection certification specifications and/or acceptable means of compliance with Part 21, as well as important special conditions and equivalent safety findings, shall be submitted to the panel of experts and be subject to a public consultation of at least 3 weeks, except if they have been previously agreed and published in the Official Publication of the Agency. The final decision shall be published in the Official Publication of the Agency."

Statement of issue:

CS 29.853 is imposing fire protection requirements for compartment used by the crew or passengers. Provision of handheld fire extinguishers are imposed by CS 29.853(e)(f). However, CS 29.855, that requires fire protection means for cargo and baggage compartments, does not necessitate the provision for a fire extinguishing system. CS 29.851 that provides rules for fire extinguishing system (handheld and built-in) confirms that the built-in fire extinguishing requirement apply in case such a system is intended to be installed or required.

CS 29.855 requirements are based on the principle that in case of a fire, the rotorcraft cargo / baggage compartment should be able to contain a fire until it is detected and extinguished or until a safe landing and evacuation are accomplished.

Materials used for the design of cargo compartments must be at least fire resistant (AC 29-2C). In combination with CS 29.853 the cargo / baggage compartment design and materials will provide a minimum protection time (fire containment).

It is expected that this minimum protection time will allow a recognition of the fire situation (for inaccessible cargo / baggage compartments a fire detection system is required. Detection time is max 60 seconds) and provide sufficient time (the design will be tested to a severe fire for minimum 5 minutes. This will in a real fire scenario provide more than 5 minutes for the safe landing) for either controlling the fire or to complete a safe landing – similar principle as for CS 29.861. The correct time interval to consider for Category A or B rotorcraft may be derived from AC 29.861, § 29.861 (refers AC 29.855).

Following smoke detection, it is expected that the remaining flight time, in case of cargo / baggage compartment fire, is more than 5 minutes.

For this reason, in the current RFMs, the required action for cargo / baggage compartment fire is land as soon as possible and not immediately.

Note: CS 29.855 does not prescribe formally a set of requirements in relation to the category.

The applicant is intending to improve safety, in particular for operations over hostile environment where finding a safe landing zone in case of emergency like cargo / baggage compartment fire could require more time.

Therefore, EASA deems necessary to supplement the CS-29 with Special Conditions allowing additional flight time after a fire is detected in the cargo / baggage compartment by either further preventing and/or further protecting the aircraft, crew and passengers against a cargo / baggage compartment fire.

Proposed Special Conditions

Additional flight time after detection of fire or smoke in the cargo / baggage compartment

To allow additional flight time after detection of fire or smoke in the cargo / baggage compartment, the following apply:

- A. A built-in fire extinguishing system must be installed for the inaccessible cargo / baggage compartment of the rotorcraft. This fire extinguishing system shall comply with CS 29.851 (b)(1) and (b)(2) at Amdt 3.
- B. A distinct system must be installed to monitor temperatures in the inaccessible cargo / baggage compartment of the rotorcraft. This system shall provide warning to the flight crew if the temperature in the compartment is reaching any critical value.
- C. The applicant shall establish associated Rotorcraft Flight Manual procedures for cargo / baggage compartment fire or smoke detection and temperature warnings to:
 - indicate to the flight crew the level of landing urgency required,
 - and, if flight is maintained, specify the subsequent emergency conditions under which flight shall be discontinued and the rotorcraft landed/ditched.

Means of Compliance and Guidance Material for Special Conditions

Additional flight time after detection of fire or smoke in the cargo / baggage compartment

- A The built-in fire extinguishing system installed should contain an accepted extinguishing agent.
If the system uses Halon agent, in order to demonstrate that this system is capable to extinguish a fire likely to occur in the cargo / baggage compartment, it should be shown an initial Halon concentration not less than 5% for at least one minute.
- Alternatively, a fire extinguishing test should be performed. For this test the fire load must be defined in such a way that it could create a catastrophic fire if no action to extinguish the fire is taken. The fire can be considered as extinguished if within 30 minutes after discharge of the extinguishing agent, the temperature in the cargo / baggage compartment has continuously decreased and the fire did not reignite.
- B No excessive leakage after discharge of the extinguishing agent into the cargo / baggage compartment should be demonstrated by test.
For that purpose, it should be recorded the duration for the Halon concentration to drop below 3%.
- C Absence of hazards to occupants due to extinguishing agent entering personnel compartments should be demonstrated in the same conditions as for CS 29.855 (d).
- D It should be demonstrated that the monitoring of temperatures in the cargo / baggage compartment allows a detection of a resuming fire in a timely manner, allowing the flight crew to perform, upon fire warning, the emergency procedure resulting in a landing and safe evacuation.
Acceptable maximum temperatures in the cargo / baggage compartment to allow flight after activating the fire extinguishing system should be defined.
Such maximum temperatures should ensure the level of structural integrity of the cargo / baggage compartment and the rotorcraft necessary for safe flight and landing.
In addition any other temperature limits of adjacent systems and installations required for safe flight and landing need to be considered when defining the maximum temperatures in the cargo / baggage compartment (considering heat flux and duration).
- E The Rotorcraft Flight Manual should not only contain the firefighting procedure but also establish procedures that would allow for the additional flight time, but also ensure in time reaction of the flight crew to land the rotorcraft in case of unacceptable temperature is reached inside the cargo / baggage compartment.