

GR No. 25 Aerobatic Smoke Systems

I Applicability

The following requirements apply to smoke systems fitted to aircraft defined in Regulation (EU) 2018/1139, Article 2 as State/Public Service aircraft or aircraft listed in Annex I to that Regulation. These aircraft are known collectively as 'non-EASA' aircraft.

2 Requirements

2.1 Weight

The definition of empty weight for the aircraft shall include the weight of the smoke system but exclude that of the fluid. The aircraft must remain within the existing weight and centre of gravity limits.

2.2 Strength

The smoke system shall be stressed to withstand the same load cases to which the aircraft was designed, including the manoeuvre, gust and emergency alighting cases.

Guidance Material: The stressing submission need only cover additionally installed parts associated with the smoke system. Conservative load factor stressing assumptions may be made which may obviate the need to establish specific load factors.

2.3 Cockpit

The cockpit controls shall be located such that the pilot, when seated, strapped in and in full flying kit, has full and unrestricted movement of each control. The cockpit shall have adequate ventilation.

Guidance Material: A CAA pilot may carry out a cockpit assessment to assess qualitatively the air quality in the cockpit.

2.4 Smoke Fluid Tank Design and Installation

Each tank shall withstand without failure the vibration, inertia, fluid and structural loads that it may be subjected to in operation. Each conventional metal tank shall be pressure tested to 3.5 psi.

The smoke fluid tank filler connection shall be electrically bonded to the aircraft structure. Any vent system shall be vented to the exterior of the aircraft.

2.5 Lines fittings and components

The lines, fittings and components shall conform to good engineering practice and be compatible with the fluids to be used.

2.6 Smoke fluid

The smoke fluid specifications are to be established for the system. The system shall be configured in such a way that the possibility of accidental filling with AVGAS or any other inappropriate fuel is unlikely.

Guidance Material: The filler neck may be fitted with a restrictor to ensure that a normal AVGAS refuelling nozzle cannot be inserted. A suitable placard may be accepted in lieu of an undersized filler neck.

2.7 **Miscellaneous markings and placards**

The smoke tank filler connection shall be placarded with the approved smoke fluid specification and the usable capacity of the tank. System controls should be appropriately placarded, this placard also conveying any operating limitations.

2.8 **Fire Safety**

Particular attention must be given to the requirements of CS 23.1121(b) with respect to the smoke fluid line that introduces the smoke fluid into the exhaust system.

In order to minimise the probability of an unsafe operation, it must be demonstrated that under the critical operating conditions, there is no risk of uncontrolled ignition of the injected smoke fluid either within or external to the exhaust system.

Unless it can be shown that there is no possibility of a fire under normal or failure conditions, it must be shown that the flow of smoke fluid can be stopped to prevent further smoke fluid reaching the exhaust system.

2.9 **Flight Manual Supplement**

The Applicant shall provide a Supplement, prepared in accordance with BCAR Section K Chapter K7-5, Appendix 5. (Contact Certification Department for copies if required.)

A copy of the supplement must be inserted at the back of the specific approved flight manual applicable to the modified aircraft.

Where no flight manual exists for the aircraft a limitation requiring the use of the supplement must be added to the Conditions on either the Certificate of Airworthiness or Permit to Fly.