



U.S. Department
of Transportation

**Federal Aviation
Administration**

Memorandum

Subject: ACTION: Equivalent Level of Safety of
Induction System Icing Protection;
Finding No. ACE-93-1

Date: DEC 7 1992

From: Manager, Airplane Certification Office,
ASW-150

Reply to
Attn. of:

To: Manager, Small Airplane Directorate,
Aircraft Certification Service, ACE-100

Background:

Mr. Leland Snow, the president of Air Tractor Corporation, has current application for Type Certificate in process with the Airplane Certification Office for two Restricted Category Airplanes Model AT-802 and Model AT-802A. In accordance with Federal Aviation Regulation (FAR) 21.25(a)(1), the certification basis for these airplanes is FAR 23, as amended by Amendment 42 with those requirements that are inappropriate for the special purpose for which these restricted category airplanes are intended excepted. The special purposes for which the applicant intends these airplanes are Agricultural per FAR 21.25 (b)(1), Forestry Conservation (Fire Fighting) per FAR 21.25(b)(2), and Drug Eradication per FAR 21.25(b)(7). The Small Airplane Directorate has indicated that in lieu of excepting compliance with FAR 23.1093(b) Induction System Icing Protection, Turbine Engines a finding of equivalent safety by the imposition of a certain "hard" limitation on the airplane would be appropriate. This operational limitation on the airplanes is: "No operation in visible moisture below +40°F".

Applicable Regulations:

The applicable Federal Aviation Regulation (FAR) paragraph states:

23.1093(b) Induction System icing protection, Turbine Engines

(b) Turbine engines

(1) Each turbine engine and its air inlet system must operate throughout the flight power range of the engine (including idling), within the limitations established for the airplane, without the accumulation of ice on engine or inlet system components that would adversely affect engine operation or cause a serious loss of power or thrust -

(i) Under the icing conditions specified in Appendix C of Part 25 of this chapter; and

(ii) In snow, both falling and blowing.

(2) Each turbine engine must idle for 30 minutes on the ground, with the air bleed available for engine icing protection at its critical condition, without adverse effect, in an atmosphere that is at a temperature between 15° and 30°F (between -9° and -1°C) and has a liquid water content not less than 0.3 grams per cubic meter in the form of drops having a mean effective diameter not less than 20 microns, followed by momentary operation at takeoff power or thrust. During the 30 minutes of idle operation, the engine may be run up periodically to a moderate power or thrust setting in a manner acceptable to the Administrator.

Applicant's Position:

The applicant believes that the Restricted Category special use single engine airplane should not be required to meet this regulation with the limitations set forth of no operation near thunderstorms or in rainfall or operation in visible moisture below +40°F. The applicant requires a functional OAT gage to be installed to determine the temperature limitation.

The applicant contends that agricultural airplanes are generally operated in warm VFR conditions. Forestry operations are also considered to be prevalent in very hot dry situations where the induction system icing conditions would not prevail.

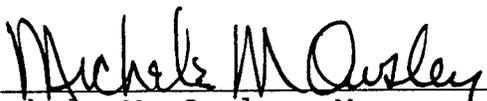
FAA's Position:

The FAA does not agree with the applicant's position and has required him to provide the Airplane Certification Office with data to substantiate that at a temperature, chosen by the applicant, there is no likelihood of hazardous induction system icing. The Airplane Certification Office, ASW-150 propulsion specialist and test pilot have evaluated the applicant's analysis of the engine installation and engine performance characteristics and have found that when operating in accordance with the limitation set forth in this memorandum there is no likelihood of a safety hazard resulting from induction system icing.

Recommendation:

Based on the applicant's substantiating data it is recommended that this limitation on the operation of the AT-802 and AT-802A Restricted Category Airplanes provides an equivalent level of safety as envisioned in the regulation FAR 23.1093(b) and should be acceptable in lieu of compliance with this FAR section.

Concurred by:



Michele M. Owsley, Manager
Airplane Certification Office, ASW-150

Dec 7, 1992
Date



John Colony, Manager
Standards Office, ACE-110

12/16/92
Date



Barry D. Clements, Manager
Small Airplane Directorate, ACE-100

12/16/92
Date