

UNITED STATES OF AMERICA
DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
KANSAS CITY, MISSOURI 64106

In the matter of the petition of
AIR TRACTOR INCORPORATED
for an exemption from § 23.49(b)(1)
of the Federal Aviation Regulations

*
*
*
*
*
*
*
*

Regulatory Docket No. 054CE

GRANT OF EXEMPTION

By letter dated January 25, 1988, Mr. Leland Snow, President of Air Tractor Incorporated, Post Office Box 485, Olney, Texas 76374, petitioned for an exemption from § 23.49(b)(1) of the Federal Aviation Regulations to permit certification of the Air Tractor Model AT-503 and AT-802 airplane with stall speeds (V_{SO}) greater than the 61 knots requirement. Mr. Snow provided additional supportive information by letter dated April 11, 1988.

Section of the FAR affected:

Section 23.49(b)(1) of the Federal Aviation Regulations (FAR) requires, in pertinent part, that the stalling speed (V_{SO}) of a single-engine airplane at maximum weight may not exceed 61 knots.

The Petitioner's supportive information is as follows:

The Petitioner states under this exemption the special purpose operation of the Air Tractor Model AT-503 airplane would be for drug eradication and the Air Tractor Model AT-802 would be for fire fighting. Since the certification issues of these airplanes are different, the Air Tractor Model AT-802 airplane is addressed in a separate exemption.

The United States Department of State has awarded a contract for 15 fixed-wing agricultural spray aircraft to a competing manufacturer to be used by the Department of State for eradication of narcotics crops overseas. The Petitioner states that the Model AT-503 airplane is also designed for drug eradication operations and desires to obtain similar contracts with the United States Department of State.

The Air Tractor Model AT-503 airplane was type certificated on October 2, 1986 at an 8,000 pound gross weight under the restricted category aircraft of Section 21.25 of Part 21 of the FAR. The airplane meets the 61 knot stall speed requirement at the originally certificated gross weight of 8,000 pounds.

The Petitioner has started a static test program to recertificate the Model AT-503 airplane to a gross weight of 10,900 pounds. The airplane at this weight has a stall speed (V_{SO}) of 83 mph (72 knots). The airplane has a hopper gate box that can jettison the entire contents of the hopper in seven seconds. After the hopper is dumped, the airplane is then below 8,000 pounds and it can meet the stall speed requirement.

The Petitioner has calculated that in order for an airplane to meet the stall speed requirement, a much larger airplane would have to be built and such airplane would be slower. The Department of State stated that the speed was an important performance feature. A slower airplane would be more vulnerable to ground fire from narcotic crop harvesters.

The Petitioner states additional compensating crashworthiness design features that this airplane employs are as follows:

1. The airplane does not have significant items of mass located behind the cockpit, as the hopper is forward of the cockpit. The top longeron in the cockpit area is of 1 3/8 X .058 4130 N tubing having a compression allowable of 14,400 pounds per side, 28,800 pounds total. When considering pilot weights of 340 pounds, and aft structure and tail weight of 200 pounds along the top longeron, the top longerons will withstand over 53 g's of compressive load.
2. Massive overturn structure prevents occupant injury in case of overturns. The structure incorporates member sizes of 1 3/8 X .083 4130 N tubing with a combined allowable load (both cockpits) exceeding 48,000 pounds down (6 g's at 8,000 lbs.), and forward/side load exceeding 24,000 pounds.
3. The airplane employs the American Safety part number 443220 seat belt and part number 500702 shoulder harness. This is a 5,000 pound restraint system consisting of a 3-inch military style over-center steel latch seat belt and a 2-inch shoulder harness which meets TSO-C-22e. The airplane also has an Air Tractor part number 10529-1 seat structure, which the Petitioner states is a copy of the Spinks Industries part number AL-1021-1 bucket seat, except the wall thickness of the primary structural tubes has been increased for greater strength. The Spinks Industries seat is designed for high vertical crash loads, such as in military helicopter application. A proof of crashworthiness of the seat design was demonstrated in an accident with high vertical impact.
4. In accordance with § 23.967(e)(1) of the FAR, the fuel tanks must be designed, located, and installed so as to retain the fuel under the forward inertia forces of 9 g. The integral fuel tanks have been tested without failure to 60 psi pressure, which is the equivalent to 80 g forward and 195 g vertical inertia forces with jet fuel.
5. All fuel lines are constructed of high pressure flexible hose with fixed-end fittings (Stratoflex part number 11417-12D) to allow fuselage distortion after impact without fuel line rupture. There is a physical separation of fuel lines and electrical cables of

approximately 54 inches. All the electrical cables are routed down the right side of the airplane and the fuel lines are routed on the left side. Electrical cables which might stretch or fall short during fuselage distortion are separated by the maximum distance from the source of fuel. Past accidents of Air Tractor airplanes showed they seldom burn unless a collision with powerlines is involved.

6. Spring steel type landing gear are used to absorb crash energy. There is no bottoming out of the spring at the end of the stroke as in oleo type or other fixed-stroke shock absorbers in landing gears. The spring steel type landing gear will continue to flex and absorb energy until the fuselage attach bolts fail.

Comments to published petition summary:

A summary of this petition was published in the FEDERAL REGISTER for public comment on March 21, 1988 (53 FR 9169). The comment period closed April 11, 1988. No comments were received.

The Federal Aviation Administration's (FAA) analysis is as follows:

To obtain the exemption, the Petitioner must show, as required by § 11.25(b)(5) of the Federal Aviation Regulations, that: (1) granting the request is in the public interest; and (2) the grant of the exemption would not adversely affect safety, or that a level of safety will be provided which is equal to that provided by the rule from which the exemption is sought.

The FAA has carefully reviewed all of the information contained in the Petitioner's request for exemption, current FAA policy related to restricted category certification for agricultural purposes, and the intended mission of this airplane for operation by the Department of State.

The Air Tractor Model AT-503 was type certificated on October 2, 1986 at an 8,000 pound gross weight under the restricted category aircraft of Section 21.25 of Part 21 of the FAR. Section 21.25 requires, in pertinent part, that an airplane may be type certificated in the restricted category for special purposes, such as agricultural operations, if there is no feature or characteristic of the airplane which makes it unsafe when it is operated under the limitations prescribed for its intended use and that the airplane meets the airworthiness requirements for an aircraft category except those requirements that the Administrator finds inappropriate for the special purpose for which the airplane is to be used. FAA has determined that the stalling speed airworthiness requirement was appropriate for agricultural airplanes and similar special purpose aircraft in the restricted category.

Advisory Circular, AC No. 20-33B, dated May 1, 1975, states that Civil Aeronautics Manual (CAM) 8, Aircraft Airworthiness - Restricted Category, may be used in conjunction with Sections 21.25, 21.185, and 21.187 for restricted category certification of small agricultural airplanes. Appendix B of CAM 8, Airworthiness Criteria for Agricultural and Similar

Special Purpose Aircraft, was issued as a guide in selecting and showing compliance with the appropriate airworthiness requirements.

Paragraph 121 of Appendix B states, "Stalling Speed Limit. The stalling speed at maximum weight in the configuration used during normal operation should not exceed 70 m.p.h." Note: 70 m.p.h. is equivalent to 61 knots.

The FAA agrees that the proposed exemption would be in the public interest provided operations are limited to those described in the petition. As noted by the Petitioner, these airplanes will be operated by the United States Department of State for the purpose of drug eradication programs overseas. The FAA considers drug eradication programs on behalf of the Department of State to include operations by contractors or by other governments and that such operations should include crew training in the specific configuration.

Section 137.53 of Part 137, Agricultural Aircraft Operations, requires in pertinent part that for operation over congested areas the airplane must be equipped with a device capable of jettisoning at least one-half of the aircraft's maximum authorized load of agricultural material within 45 seconds. The FAA recognizes that the demonstrated ability to jettison 100 percent of the agricultural hopper weight within 7 seconds far exceeds the requirement for operation over congested areas. In addition, the FAA recognizes that the airplane complies with the 61 knot maximum stall speed limit with an empty hopper. The FAA agrees that the ability to dump the hopper in the short time discussed, the massive overturn structure, the pilot restraint system, and the additional crashworthiness design features provide some compensation for the reduction in the level of safety caused by the increased stall speed.

In consideration of the foregoing, I find that a grant of exemption is in the public interest. Pursuant to the authority contained in Sections 313(a) and 601(c) of the Federal Aviation Act of 1958, as amended, delegated to me by the Administrator (14 CFR 11.53), Air Tractor Incorporated is hereby granted an exemption from Section 23.49(b)(1) of the Federal Aviation Regulations (FAR) to the extent required to permit certification of the Model AT-503 airplane having a stall speed (V_{SO}) greater than the 61 knots requirement. This exemption is subject to the following conditions and limitations:

1. The type certificate must contain a limitation specifying that the affected airplane is to be operated at gross weights in excess of 8,000 pounds only by, or on behalf of, the United States Department of State for the purpose of drug eradication. In this regard, operations on behalf of the United States Department of State are considered to include drug eradication by contractors or by other governments and are considered to include incidental operations, such as crewmember training, as well as the actual drug eradication operation.
2. Each crewmember must be provided with a pilot restraint system consisting of an Air Tractor design pilot seat, part number 10529-1 and an American Safety (Flight Systems, Inc.) seat belt, part number 443220, and shoulder harness system, part number 500702.

3. It must be demonstrated that the pilot can jettison the entire contents of the agricultural hopper within seven seconds.
4. The airplane must comply with § 23.49(b)(1) of the Federal Aviation Regulations at weights less than 8,000 pounds.

Issued in Kansas City, Missouri on September 29, 1988.


Earsa L. Tankesley, Acting Manager
Small Airplane Directorate
Aircraft Certification Service