

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

* * * * *
*
In the matter of the petition of *
*
RYSON AVIATION CORPORATION *
*
for an exemption from *
Sections 23.1323(b)(1) and (b)(2) *
of the Federal Aviation Regulations *
*
* * * * *

Regulatory Docket No. 22829

GRANT OF EXEMPTION

By letters dated February 2, 1982, and April 20, 1982, Mr. Hillyer Prentice, Jr., Ryson Aviation Corporation, 548 San Fernando Street, San Diego, California 92106, petitioned on behalf of Ryson Aviation Corporation for an exemption from a portion of Part 23 of the Federal Aviation Regulations (FAR) to permit the type certification of their Model ST-100 airplanes with an airspeed indicating system whose system accuracy does not meet requirements of the FAR.

Sections(s) of the FAR affected:

Section 23.1323(b), which provides, in pertinent part, that airspeed system error may not exceed three percent of calibrated airspeed or five knots, whichever is greater, throughout the following speed ranges:

1. $1.3 V_{S1}$ to V_{NE} with flaps retracted.
2. $1.3 V_{S1}$ to V_{FE} with flaps extended.

The petitioners supportive information is as follows:

The airspeed system presently installed in the ST-100 is the result of an extensive flight test program in which four pitot-static configurations were evaluated and the best one was selected.

At the time of flight testing in the fall of 1977, compliance was shown with Section 23.1323 requirements in effect at that time (Amendment 23-7 to the FAR). The speed ranges at this time were:

1. $1.3 V_{S1}$ to V_C with flaps retracted, and
2. $1.3 V_{S1}$ with flaps extended.

To date, indications are that the airplane will comply with all the applicable FARs with the exception of Sections 23.1323(b)(1) and (b)(2) of (Amendment 20), Airspeed Indicating System. The airplane, although demonstrating compliance with the original FAR 23.1323 (Amendment 7), cannot now meet the more stringent requirements of Amendment 20. Specifically:

1. At flaps up -12° the error is +7 kt. at V_{NE} .
2. At flaps neutral the error is +9 kt. at V_{NE} .
3. At flaps down $+60^\circ$ the error is +20 kt. at V_{FE} .

An evaluation of the presently installed airspeed system from the standpoint of safety reveals the following:

1. The airplane has a satisfactory airspeed system for all cruise conditions (flaps at 0° and -12°).
2. At V_{NE} the airspeed error is conservative since it reads 7 to 9 knots higher than the calibrated speed. Consequently it would be more unlikely for a pilot to inadvertently exceed V_{NE} while in a high speed descent.
3. The airplane has a satisfactory airspeed system at all landing flap positions at the normal approach speed of $1.3 V_{SO}$.
4. At V_{FE} (108 kt.) with 60° full down flaps the airspeed error is again conservative (20 kt.) thus making it highly unlikely that V_{FE} will ever be exceeded. The flaps are used as a speed brake/drag device in the speed regime of 80-108 kt. which adds greatly to the airplanes versatility and overall capability. Therefore, it is not desirable to reduce V_{FE} in order to comply with requirements of FAR 23.1323. It is noteworthy that the concerns regarding exceeding V_{FE} which gave rise to Amendment 20 are indeed satisfied by the conservative position error in the system.

Development time and money to redesign flap system at this time would be inhibitive. During initial development independent spoilers could probably have been developed to alleviate airspeed system inaccuracy.

The petitioner desires to retain the present airspeed system and believes that the system demonstrates adequacy in all the most usable or meaningful ranges of speed and flap configurations.

This exemption would be in the public interest since upon United States Type Certification as a small aircraft and powered glider the manufacturer will provide employment to the depressed general aviation industry.

The Ryson ST-100 Cloudster will provide on the market a product superior to its foreign counterparts certificated in other countries. Its higher performance, certificated engine (Teledyne Continental O-200),

and metal airframe construction will enhance its competitiveness in the aircraft powered glider market and thereby help U.S. balance of payments.

The indicated airspeeds at the high end of each flap setting (including neutral) are reading higher than calibrated airspeeds (Ref. a). Therefore, the actual design red line speeds are never reached during operation of the aircraft.

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

The FAA has carefully reviewed the information contained in the petitioners request for exemption.

The FAA recognizes that Ryson expended considerable effort in selecting the optimum pitot-static configuration for showing compliance with airspeed indicating system requirements and if a program delay had not resulted in change of certification basis that included FAR 23.1323 Amendment 20, the aircraft would have been certificated with its present airspeed system.

FAA reviewed the regulatory docket associated with Amendment 23-20 and discovered the following:

1. In the notice, the proposed changes to Section 23.1323 were justified on the basis of ensuring uniformity with proposed changes to Section 23.1545. (Require markings at indicated instead of calibrated airspeeds.) The explanation went on to state that the airspeed range for calibration as set forth in proposed Section 23.1323 would encompass the airspeed limitations in proposed Section 23.1545.
2. One commenter (GAMA) questioned the tightening of accuracy requirements by extending the airspeed ranges and stated that this might be unnecessarily severe, especially with the markings based on indicated airspeed.
3. In the preamble to the final rule, FAA stated that the airspeed ranges in Sections 23.1323(b)(1) and (b)(2) are needed to encompass the airspeed limitations in proposed Section 23.1545. FAA also stated that as a practical matter, the accuracy requirements in proposed Section 23.1323 are not significantly more restrictive than current requirements. While the proposed changes to Section 23.1545 were not adopted as a final rule until Amendment 23-23, and the proposed limitations only applied to multi-engined airplanes at V_Y and V_{MC} , the proposed changes to Section 23.1323 which extended the accuracy range to V_{NE} and V_{FE} were adopted with Amendment 23-20.

In light of the fact that the notice for Amendment 23-20 did not provide justification for extending the airspeed ranges in proposed Section 23.1323 and FAA's intent as stated in the preamble to the final rule was not to make the requirements "significantly more restrictive than current requirements," the rule should be reevaluated to determine if the accuracy requirements at higher airspeeds are unduly restrictive. FAA plans to include this item in an overall review of Part 23 of the FAR which is scheduled to start in FY 83.

As cited in the petition, the aircraft does meet airspeed indicating system requirements for all cruise conditions and the errors at V_{NE} and V_{FE} are conservative in that the readings are higher than calibrated airspeeds and thus unlikely to be exceeded. While conservatism, as cited, is in itself, not sufficient justification for granting a finding of equivalent safety, an exemption would not usurp the intent of the current Section 23.1323.

FAA is cognizant of the effort it would take to improve airspeed system accuracy and agrees that the system demonstrates adequacy in all of the most usable or meaningful ranges of airspeed and flap position.

FAA also agrees that the exemption would be in the public interest inasmuch as:

1. The applicant complied with the certification basis as established at the time of application.
2. Such certification basis was changed only as the result of a program delay, unrelated to the rule of concern, that caused the certification program to exceed the regulatory requirement for completing a project within three years from date of application.
3. Redesign of the airplane to achieve compliance with Amendment 20 rather than Amendment 7 of the rule of concern would place a prohibitive economic burden on the applicant.
4. The airplane with this exemption to the applicable rules will meet the level of safety intended by the rules.

The FAA has determined that the proposed exemption will not have an adverse effect on safety under the conditions imposed by this exemption.

In consideration of the foregoing, I find that a grant of exemption is in the public interest. Therefore, pursuant to the authority contained in Sections 313(a) and 601(c) of the Federal Aviation Act of 1958 (the Act), delegated to me by the Administrator (14 CFR 11.53), and Section 603 of the Act, Ryson Aviation Corporation is granted an exemption from Sections 23.1323(b)(1) and (b)(2) to the extent necessary to allow the type certification of the Ryson Model ST-100 aircraft with an airspeed indicating system that does not meet the accuracy requirements of the FAR for: (1) flaps retracted from 111 knots CAS to V_{NE} and (2) flaps extended from 57 knots (CAS) to V_{FE} . This exemption is subject to the following conditions and limitations:

1. It is valid only for airspeed indicating system errors greater than allowable which result in an airspeed reading higher than that indicated.
2. It is valid only for inaccuracies shown in the flight test program for the present pitot-static configuration with the pitot under the wing outboard of the main landing gear and the static port on the side of the tailcone. The airspeed indicating errors must not exceed the following:

- a. For flaps up (-12°), 7 knots between V_C and V_{NE} .
 - b. For flaps at 0° , 9 knots between V_{FE} and V_{NE} .
 - c. For flaps down 36° , 10 knots between 70 knots and V_{FE} .
 - d. For flaps down 60° , 20 knots between 55 knots and V_{FE} .
3. If any changes are made to the external shape of the airplane, the airspeed indicating system must be flight tested to verify that the airspeed system errors do not exceed those listed in conditions a. through d. of limitation 2.

The petition for exemption was filed on February 2, 1982, and because the procedures for handling exemptions had not been established between Washington FAA Headquarters and the Aircraft Certification Directorate, processing of the exemption was delayed and the petition was not published in the Federal Register. Inasmuch as the petitioner acted in a timely manner in filing the petition and a delay would be detrimental to him, FAA has determined, pursuant to Section 11.27(j)(3) of the FAR, that good cause exists for not delaying action on the petition by the publication and comment procedures.

Issued in Kansas City, Missouri, on **JUN 28 1982**

Original signed by
Murray E. Smith