

[4910-13]

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 23

[Docket No.FAA-2011-1387; Notice No. 23-11-02-SC]

Special Conditions: XtremeAir GmbH, XA42; Acrobatic Category Aerodynamic Stability.

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Notice of proposed special conditions.

SUMMARY: This action proposes special conditions for the XtremeAir GmbH XA42 airplane.

The XA42 airplane has a novel or unusual design feature associated with its static stability.

This airplane can perform at the highest level of aerobatic competition. To be competitive, the

aircraft was designed with positive and, at some points, neutral stability within its flight

envelope. Its lateral and directional axes are also decoupled from each other providing more

precise maneuvering. The applicable airworthiness regulations do not contain adequate or

appropriate safety standards for these design features. These proposed special conditions contain

the additional safety standards that the Administrator considers necessary to establish a level of

safety equivalent to that established by the existing airworthiness standards. These special

conditions are only applicable to aircraft certified solely in the acrobatic category.

DATES: Send your comments on or before **[INSERT A DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**.

ADDRESSES: Send comments identified by docket number FAA-2011-1387 using any of the following methods:

- Federal eRegulations Portal: Go to <http://www.regulations.gov> and follow the online instructions for sending your comments electronically.
- Mail: Send comments to Docket Operations, M-30, U.S. Department of Transportation (DOT), 1200 New Jersey Avenue, SE., Room W12-140, West Building Ground Floor, Washington, D.C., 20590-0001.
- Hand Delivery of Courier: Take comments to Docket Operations in Room W12-140 of the West Building Ground Floor at 1200 New Jersey Avenue, S.E., Washington, D.C., between 8 a.m., and 5 p.m., Monday through Friday, except Federal holidays.
- Fax: Fax comments to Docket Operations at 202-493-2251.

Privacy: The FAA will post all comments it receives, without change, to <http://regulations.gov>, including any personal information the commenter provides. Using the search function of the docket web site, anyone can find and read the electronic form of all comments received into any FAA docket, including the name of the individual sending the comment (or signing the comment for an association, business, labor union, etc.). DOT's complete Privacy Act Statement can be found in the Federal Register published on April 11, 2000 (65 FR 19477-19478), as well as at <http://DocketsInfo.dot.gov>.

Docket: Background documents or comments received may be read at <http://www.regulations.gov> at any time. Follow the online instructions for accessing the docket or go to the Docket Operations in Room W12-140 of the West Building Ground Floor at 1200 New Jersey Avenue, SE., Washington, D.C., between 9 a.m., and 5 p.m., Monday through Friday, except Federal holidays.

FOR FURTHER INFORMATION CONTACT: Mr. Ross Schaller, Federal Aviation Administration, Small Airplane Directorate, Aircraft Certification Service, 901 Locust, Room 301, Kansas City, Missouri 64106; telephone (816) 329-4162; facsimile (816) 329-4090.

SUPPLEMENTARY INFORMATION:

Comments Invited

We invite interested people to take part in this rulemaking by sending written comments, data, or views. The most helpful comments reference a specific portion of the special conditions, explain the reason for any recommended change, and include supporting data.

We will consider all comments we receive on or before the closing date for comments. We will consider comments filed late if it is possible to do so without incurring expense or delay. We may change these special conditions based on the comments we receive.

Background

On May 3, 2011, XtremeAir GmbH applied for a type certificate for their new XA42. The XA42 is certified under EASA authority as a dual category (acrobatic/utility) airplane. It has a two-place tandem canopy cockpit, and a single-engine. It also features a conventional landing gear, conventional low-wing planform and is of composite construction. The engine is a Lycoming AEIO-580-B1A with a rated power of 315 Hp at 2,700 rpm. The airplane is proposed to be approved for Day-VFR operations with no icing approval.

The maximum takeoff weight is 2,200 pounds in utility category, 1,874 pounds in acrobatic category. V_{NE} is 225 knots, V_{NO} is 185 knots and V_A is 174 knots, indicated airspeed. Maximum altitude is 15,000 feet.

Acrobatic airplanes previously type certificated by the FAA did comply with the stability provisions of Subpart B of 14 CFR part 23. However, airplanes like the XA42 are considered as “unlimited” acrobatic aircraft because they can perform at the highest level of acrobatic competition and can perform any of the maneuvers listed in the Aresti Catalog. Generally, the evolution of the “unlimited” types of acrobatic airplanes, with very low mass, exceptional roll rates and very high G capabilities, in addition to power to mass ratios that are unique to this type of airplane, have led to airplanes that cannot comply with the stability provisions of the regulations. These airplanes can still be type-certificated, but in the acrobatic category only and with an appropriate set of special conditions and associated limitations.

The FAA will only consider certifying the XA42 in the acrobatic category. XtremeAir GmbH will not be able to offer a utility category operating envelope to accommodate the increased fuel load designed for cross-country operations. The FAA does recognize that fuel exhaustion is one of the top accident causes associated with this class of aircraft. For this reason, the FAA proposes to allow XtremeAir to seek certification of a limited acrobatic envelope at a higher weight that will still meet the minimum load requirements of +6/-3 g associated with 14 CFR, part 23, § 23.337. The XA42 airplane would be approved for unlimited maneuvers at or below its designed unlimited acrobatic weight. The airplane would also be approved, at some higher weight (for fuel), that would still meet the requirements of § 23.337 for acrobatic category and may have restrictions on the maneuvers allowed.

Type Certification Basis

Under the provisions of 14 CFR, part 21, § 21.17, XtremeAir GmbH must show that the XA42 meets the applicable provisions of part 23, as amended by Amendments 23-1 through 23-59 thereto.

Part 36 of Title 14 of the Code of Federal Regulations, effective December 1, 1969, as amended by Amendments 36-1 through 36-28.

Not approved for ditching; compliance with provisions for ditching equipment in accordance with 14 CFR § 23.1415(a)(b) has not been demonstrated.

Approved for VFR-day only. Flight in known icing prohibited.

If the Administrator finds that the applicable airworthiness regulations (i.e., 14 CFR part 23) do not contain adequate or appropriate safety standards for the XA42 because of a novel or unusual design feature, special conditions are prescribed under the provisions of § 21.16.

Special conditions are initially applicable to the model for which they are issued. Should the type certificate for that model be amended later to include any other model that incorporates the same or a similar novel or unusual design feature, the special conditions would also apply to the other model under § 21.101.

In addition to the applicable airworthiness regulations and special conditions, the XA42 must comply with the fuel vent and exhaust emission requirements of 14 CFR part 34 and the noise certification requirements of 14 CFR part 36 and the FAA must issue a finding of regulatory adequacy under § 611 of Public Law 92-574, the "Noise Control Act of 1972."

The FAA issues special conditions, as defined in 14 CFR, part 11, § 11.19, in accordance with § 11.38, and they become part of the type-certification basis under § 21.17(a)(2).

Novel or Unusual Design Features

The XtremeAir GmbH XA42 will incorporate the following novel or unusual design features:

For acrobatic category airplanes with unlimited acrobatic capability:

Neutral longitudinal and lateral static stability characteristics

Discussion

The Code of Federal Regulations states static stability criteria for longitudinal, lateral, and directional axes of an airplane. However, none of these criteria are adequate to address the specific issues raised in the flight characteristics of an unlimited aerobatic airplane. Therefore, the FAA has determined after a flight test evaluation that, in addition to the requirements of part 21 and part 23, special conditions are needed to address these static stability characteristics.

Accordingly, these special conditions are for the XtremeAir GmbH XA42 static stability characteristics to be certified solely as an acrobatic category airplane. Other conditions may be developed, as needed, based on further FAA review and discussions with the manufacturer and civil aviation authorities.

Applicability

As discussed above, these special conditions are applicable to the XA42. Should XtremeAir GmbH apply at a later date for a change to the type certificate to include another model incorporating the same novel or unusual design feature, the special conditions would apply to that model as well.

Conclusion

This action affects only certain novel or unusual design features on one model of airplanes. It is not a rule of general applicability and affects only the applicant who applied to the FAA for approval of these flight characteristics on the airplane.

List of Subjects in 14 CFR Part 23

Aircraft, Aviation safety, Signs and symbols.

Citation

The authority citation for these special conditions is as follows:

Authority: 49 U.S.C. 106(g), 40113, and 44701; 14 CFR 21.16 and 21.17; and 14 CFR 11.38 and 11.19.

The Proposed Special Conditions

Accordingly, the Federal Aviation Administration (FAA) proposes the following special conditions as part of the type certification basis for XtremeAir GmbH XA42 airplanes.

1. Unlimited Acrobatic-Only Category Static Stability Requirements

For unlimited, acrobatic-only category aircraft, the FAA proposes that the XtremeAir GmbH XA42 comply with the following stability special conditions in lieu of the existing §§ 23.171, 23.173, 23.175, and 23.177:

(A) In place of 14 CFR part 23, § 23.171 Flight - General (stability) requirement, comply with the following:

SC23.171 Flight – General: The airplane must be neutrally or positively stable in the longitudinal, directional, and lateral axes under sections SC23.173 through SC23.181. In

addition, the airplane must show suitable stability and control "feel" (static stability) in any condition normally encountered in service, if flight tests show it is necessary for safe operation.

(B) In place of 14 CFR part 23, § 23.173, Static longitudinal stability requirement, comply with the following:

SC23.173 Static longitudinal stability: Under the conditions specified in SC23.175 and with the airplane trimmed as indicated, the characteristics of the elevator control forces and the friction within the control system must be as follows:

(a) A pull must be required to obtain and maintain speeds below the specified trim speed and a push required to obtain and maintain speeds above the specified trim speed. This must be shown at any speed that can be obtained, except that speeds requiring a control force in excess of 40 pounds or speeds above the maximum allowable speed or below the minimum speed for steady unstalled flight need not be considered.

(b) The stick force or position must vary with speed so that any substantial speed change results in a stick force or position clearly perceptible to the pilot.

(C) In place of 14 CFR part 23, § 23.175, Demonstration of static longitudinal stability requirement, comply with the following:

SC23.175 Demonstration of static longitudinal stability:

(a) Climb. The stick force curve must have, at a minimum, a neutrally stable to stable slope at speeds between 85 and 115 percent of the trim speed, with—

(1) Maximum continuous power; and

(2) The airplane trimmed at the speed used in determining the climb performance required by section 23.69(a).

(b) Cruise. With the airplane in trim with power for level flight at representative cruising speeds at high and low altitudes, including speeds up to V_{NO} , except that the speed need not exceed V_{H-}

(1) The stick force curve must, at a minimum, have a neutrally stable to stable slope at all speeds within a range that is the greater of 15 percent of the trim speed plus the resulting free return speed range, or 40 knots plus the resulting free return speed range, above and below the trim speed, except that the slope need not be stable—

(i) At speeds less than $1.3 V_{S1}$; or

(ii) For airplanes with V_{NE} established under section 23.1505(a), at speeds greater than V_{NE} .

(c) Landing. The stick force curve must, at a minimum, have a neutrally stable to stable slope at speeds between $1.1 V_{S1}$ and $1.8 V_{S1}$ with—

(1) Landing gear extended; and

(2) The airplane trimmed at—

(i) V_{REF} , or the minimum trim speed if higher, with power off; and

(ii) V_{REF} with enough power to maintain a 3 degree angle of descent.

(D) In place of 14 CFR part 23, § 23.177, Static directional and lateral stability requirement, comply with the following:

SC23.177 Static directional and lateral stability:

(a) The static directional stability, as shown by the tendency to recover from a wings level sideslip with the rudder free, must be positive for any landing gear and flap position appropriate to the takeoff, climb, cruise, approach, and landing configurations. This must be

shown with symmetrical power up to maximum continuous power, and at speeds from $1.2 V_{S1}$ up to the maximum allowable speed for the condition being investigated. The angle of sideslip for these tests must be appropriate to the type of airplane. At larger angles of sideslip, up to that at which full rudder is used or a control force limit in section 23.143 is reached, whichever occurs first, and at speeds from $1.2 V_{S1}$ to V_O , the rudder pedal force must not reverse.

(b) In straight, steady slips at $1.2 V_{S1}$ for any landing gear and flap positions, and for any symmetrical power conditions up to 50 percent of maximum continuous power, the rudder control movements and forces must increase steadily, but not necessarily in constant proportion, as the angle of sideslip is increased up to the maximum appropriate to the type of airplane. The aileron control movements and forces may increase steadily, but not necessarily in constant proportion, as the angle of sideslip is increased up to the maximum appropriate to the type of airplane. At larger slip angles, up to the angle at which the full rudder or aileron control is used or a control force limit contained in section 23.143 is reached, the aileron and rudder control movements and forces must not reverse as the angle of sideslip is increased. Rapid entry into, and recovery from, a maximum sideslip considered appropriate for the airplane must not result in uncontrollable flight characteristics.

Issued in Kansas City, Missouri, on December 16, 2011.

s/

Earl Lawrence
Manager, Small Airplane Directorate
Aircraft Certification Service