



[4910-13]

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 25

Docket No. FAA-2014-1080; Special Conditions No. 25-582-SC

Special Conditions: Airbus Model A319-151n/171n, A320-251n/271n, and A321-251n/271n

(SAneo) Series Airplanes; Transient Engine-Failure Loads

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final special conditions; request for comments.

SUMMARY: These special conditions are issued for Airbus Model A319-151n/171n, A320-251n/271n, and A321-251n/271n (collectively known as Single Aisle new engine option (SAneo)) series airplanes. These airplanes will have a novel or unusual design feature when compared to the state of technology envisioned in the airworthiness standards for transport-category airplanes. This design feature is a new generation of high-bypass engines, and the potential loads resulting from extreme engine-failure conditions.

The applicable airworthiness regulations do not contain adequate or appropriate safety standards for this design feature. These 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.

DATES: This action is effective on Airbus on **[Insert date of publication in the Federal Register]**. We must receive your comments by **[Insert date 45 days after date of publication in the Federal Register]**.

ADDRESSES: Send comments identified by docket number FAA-2014-1080 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, DC, 20590-0001.
- *Hand Delivery or Courier:* Take comments to Docket Operations in Room W12-140 of the West Building Ground Floor at 1200 New Jersey Avenue, SE., Washington, DC, between 9 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://www.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 Docket Operations in Room W12-140 of the West Building Ground Floor at 1200 New Jersey Avenue, SE., Washington, DC, between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays.

FOR FURTHER INFORMATION CONTACT: Todd Martin, FAA, ANM-115, Transport Airplane Directorate, Aircraft Certification Service, 1601 Lind Avenue SW., Renton, Washington, 98057-3356; telephone 425-227-1178; facsimile 425-227-1320.

SUPPLEMENTARY INFORMATION:

The FAA has determined that notice of, and opportunity for prior public comment on, these special conditions is unnecessary.

The substance of these special conditions has been subject to the public comment process in several prior instances with no substantive comments received. The FAA therefore finds that good cause exists for making these special conditions effective upon publication in the Federal Register.

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 by the closing date for comments. We may change these special conditions based on the comments we receive.

Background

On February 29, 2012, Airbus applied for amended type certificate no. A28NM for their new Model SAneo series airplanes. Later, Airbus requested, and the FAA approved, an extension to the application date for FAA type certification to June 30, 2012.

The Airbus Model SAneo series airplanes are derivatives of the A319-100, A320-200, and A321-200 series airplanes equipped with Sharklets™ (large winglets). The changes include installation of new CFM™ LEAP™ A engines on the A319-151n, A320-251n, and A321-251n series airplanes, and installation of new Pratt & Whitney PW-1100G engines on the A319-171n, A320-271n, and A321-271n series airplanes with larger fan diameters and reduced fuel consumption as compared to the current engines. The changes also include new nacelles, new pylons, new engine mounts, new bleed-air systems, structural reinforcements, software changes for the bleed-air system, an auto-flight system, an indicating and recording system, flight-warning and flight-control computers, and small changes to certified weights.

The existing regulations are inadequate because the new high-bypass fan engines of the Airbus Model SAneo series airplanes can cause more damage in a failure event than could the previous engines.

Type Certification Basis

The certification basis for the SAneo series airplanes is the certification basis for the A319-100, A320-200 and A321-200 series airplanes with Sharklets, as defined in type-certificate data sheet A28NM for components or areas not affected by the SAneo change; and sections of 14 CFR part 25 as amended by Amendments 25-1 through 25-136 (i.e., the amendment in effect on the date of the new reference date of application, June 30, 2012) applied to the components and areas affected by the SAneo change. Under the provisions of § 21.101, these regulations will be incorporated into type certificate no. A28NM after type certification approval of the Airbus Model SAneo series airplanes.

In addition, the certification basis includes certain special conditions, exemptions, or later amended sections of the applicable part that are not relevant to these special conditions.

If the Administrator finds that the applicable airworthiness regulations (i.e., 14 CFR part 25) do not contain adequate or appropriate safety standards for the Airbus Model SAneo series airplane because of a novel or unusual design feature, special conditions are prescribed under § 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 novel or unusual design feature, these special conditions would also apply to the other model under § 21.101.

In addition to the applicable airworthiness regulations and special conditions, the Airbus Model SAneo series airplanes 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.

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

Novel or Unusual Design Features

The Airbus Model SAneo series airplanes will incorporate the following novel or unusual design feature:

Engines with large, high-bypass fans capable of producing much higher failure loads than previous engine designs.

The Airbus Model SAneo series airplanes therefore require additional dynamic-load analyses to assess the most severe engine-failure events. The loads resulting from these conditions would be considered as ultimate loads, with an additional safety factor applied to the airframe-supporting structure.

Discussion

The size, configuration, and failure modes of jet engines has changed considerably from those envisioned in § 25.361(b), when the engine-seizure requirement was first adopted. Engines have become larger and are now designed with large, high-bypass fans capable of producing much higher failure loads. Relative to the engine configurations that existed when the rule was developed in 1957, the present generation of engines are sufficiently different and novel to justify special conditions for Model SAneo series airplanes and related future airplane models. Service history has shown that the engine-failure events that tend to cause the most severe loads are fan-blade failures, and these events occur much less frequently than the typical “limit” load condition.

To maintain the level of safety envisioned by § 25.361(b), more comprehensive criteria are required for the new generation of high-bypass engines. These special conditions would distinguish between the more-common engine-failure event and those rare events resulting from structural failures. The more-common events would continue to be treated as static torque limit-load conditions. The more-severe events resulting from extreme engine-failure conditions (such as loss of a full fan blade at redline speed) would be treated as full dynamic-load conditions. These would be considered ultimate loads and include all transient loads associated with the event. An additional safety factor would be applied to the more-critical airframe supporting structure.

The regulatory authorities and industry developed a standardized requirement in the Aviation Rulemaking Advisory Committee (ARAC) forum. The technical aspects of this requirement have been agreed upon, and have been accepted by, the ARAC Loads and Dynamics Harmonization Working Group. These special conditions reflect the ARAC recommendation and

are essentially harmonized with the corresponding EASA Certification Specifications (CS) 25. In addition, the ARAC recommendation includes corresponding advisory material that is incorporated into CS-25. This advisory material is considered an acceptable means of compliance to the special conditions.

These 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.

Applicability

As discussed above, these special conditions apply to the Airbus Model SAneo series airplanes. Should Airbus apply later for a change to the type certificate to include another model incorporating the same novel or unusual design feature, these special conditions would apply to that model as well.

Conclusion

This action affects only certain novel or unusual design features on the Airbus Model SAneo series airplanes. It is not a rule of general applicability.

List of Subjects in 14 CFR Part 25

Aircraft, Aviation safety, Reporting and recordkeeping requirements.

The authority citation for these special conditions is as follows:

Authority: 49 U.S.C. 106(g), 40113, 44701, 44702, 44704.

The Special Conditions

Accordingly, pursuant to the authority delegated to me by the Administrator, the following special conditions are issued as part of the type certification basis for Airbus Model SAneo series airplanes.

In lieu of § 25.361(b), the following special conditions apply:

1. For turbine engine installations, the engine mounts, pylons, and adjacent supporting airframe structure must be designed to withstand 1g level flight loads acting simultaneously with the maximum torque limit loads imposed by each of the following:
 - a. sudden engine deceleration due to a malfunction that could result in a temporary loss of power or thrust; and
 - b. the maximum acceleration of the engine.
2. For auxiliary power-unit installations, the power-unit mounts and adjacent supporting airframe structure must be designed to withstand 1g level flight loads acting simultaneously with the maximum torque limit loads imposed by each of the following:
 - a. sudden auxiliary power-unit deceleration due to malfunction or structural failure; and
 - b. the maximum acceleration of the power unit.
3. For engine supporting structure, an ultimate loading condition must be considered that combines 1g flight loads with the transient dynamic loads resulting from:
 - a. the loss of any fan, compressor, or turbine blade; and separately,
 - b. where applicable to a specific engine design, any other engine structural failure that results in higher loads.
4. The ultimate loads developed from the conditions specified in Special Conditions 3.a. and 3.b., above, are to be multiplied by a factor of 1.0 when applied to engine

mounts and pylons; and multiplied by a factor of 1.25 when applied to adjacent supporting airframe structure.

5. The airplane must be capable of continued safe flight considering the aerodynamic effects on controllability due to any permanent deformation that results from the conditions specified in Special Condition 3, above.

Issued in Renton, Washington, on April 19, 2015.

Victor Wicklund
Acting Manager, Transport Airplane Directorate
Aircraft Certification Service
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