

**DEPARTMENT OF TRANSPORTATION****Federal Aviation Administration****14 CFR Part 25**

[Docket No. FAA-2002-11271; Notice No. 02-01]

RIN 2120-AH39

**Miscellaneous Flight Requirements**

**AGENCY:** Federal Aviation Administration (FAA), DOT.

**ACTION:** Notice of proposed rulemaking.

**SUMMARY:** The Federal Aviation Administration proposes to amend the airworthiness standards for transport category airplanes concerning miscellaneous flight requirements. Adopting this proposal would eliminate regulatory differences between the airworthiness standards of the U.S. and the Joint Aviation Requirements of Europe, without affecting current industry design practices.

**DATES:** Send your comments on or before March 15, 2002.

**ADDRESSES:** Address your comments to Dockets Management System, U.S. Department of Transportation Dockets, Room Plaza 401, 400 Seventh Street SW., Washington, DC 20590-0001. You must identify the docket number *FAA-2002-11271*, at the beginning of your comments, and you should submit two copies of your comments. If you wish to receive confirmation that the FAA has received your comments, please include a self-addressed, stamped postcard on which the following statement is made: "Comments to Docket No. *FAA-2002-11271*." We will date-stamp the postcard and mail it back to you. You also may submit comments electronically to the following Internet address: <http://dms.dot.gov>.

You may review the public docket containing comments to this proposed regulation at the Department of Transportation (DOT) Dockets Office, located on the plaza level of the Nassif Building at the above address. You may review the public docket in person at this address between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays. Also, you may review the public dockets on the Internet at <http://dms.dot.gov>.

**FOR FURTHER INFORMATION CONTACT:** Don Stimson, FAA, Airplane & Flight Crew Interface Branch, ANM-111, Transport Airplane Directorate, Aircraft Certification Service, 1601 Lind Avenue SW., Renton, WA 98055-4056; telephone 425-227-1129; facsimile 425-227-1320, e-mail [don.stimson@faa.gov](mailto:don.stimson@faa.gov).

**SUPPLEMENTARY INFORMATION:****How Do I Submit Comments to This NPRM?**

Interested persons are invited to participate in the making of the proposed action by submitting such written data, views, or arguments, as they may desire. Comments relating to the environmental, energy, federalism, or economic impact that might result from adopting the proposals in this document are also invited. Substantive comments should be accompanied by cost estimates. Comments must identify the regulatory docket number and be submitted in duplicate to the DOT Rules Docket address specified above.

All comments received, as well as a report summarizing each substantive public contact with FAA personnel concerning this proposed rulemaking, will be filed in the docket. The docket is available for public inspection before and after the comment closing date.

We will consider all comments received on or before the closing date before taking action on this proposed rulemaking. Comments filed late will be considered as far as possible without incurring expense or delay. The proposals in this document may be changed in light of the comments received.

**How Can I Obtain a Copy of This NPRM?**

You may download an electronic copy of this document using a modem and suitable communications software from the FAA regulations section of the Fedworld electronic bulletin board service (telephone: 703-321-3339); the Government Printing Office (GPO)'s electronic bulletin board service (telephone: 202-512-1661); or, if applicable, the FAA's Aviation Rulemaking Advisory Committee bulletin board service (telephone: 800-322-2722 or 202-267-5948).

Internet users may access recently published rulemaking documents at the FAA's Web page at <http://www.faa.gov/avr/arm/nprm/nprm.htm> or the GPO's Web page at <http://www.access.gpo.gov/nara>.

You may obtain a copy of this document by submitting a request to the Federal Aviation Administration, Office of Rulemaking, ARM-1, 800 Independence Avenue, SW., Washington, DC 20591; or by calling 202-267-9680. Communications must identify the docket number of this NPRM.

Any person interested in being placed on the mailing list for future rulemaking documents should request from the above office a copy of Advisory Circular

11-2A, "Notice of Proposed Rulemaking Distribution System," which describes the application procedure.

**Background***What Are the Relevant Airworthiness Standards in the United States?*

In the United States, the airworthiness standards for type certification of transport category airplanes are contained in Title 14, Code of Federal Regulations (CFR) part 25.

Manufacturers of transport category airplanes must show that each airplane they produce of a different type design complies with the appropriate part 25 standards. These standards apply to:

- Airplanes manufactured within the U.S. for use by U.S.-registered operators, and
- Airplanes manufactured in other countries and imported to the U.S. under a bilateral airworthiness agreement.

*What Are the Relevant Airworthiness Standards in Europe?*

In Europe, the airworthiness standards for type certification of transport category airplanes are contained in Joint Aviation Requirements (JAR)-25, which are based on part 25. These were developed by the Joint Aviation Authorities (JAA) of Europe to provide a common set of airworthiness standards within the European aviation community. Twenty-three European countries accept airplanes type certificated to the JAR-25 standards, including airplanes manufactured in the U.S. that are type certificated to JAR-25 standards for export to Europe.

**What Is "Harmonization" and How Did It Start?**

Although part 25 and JAR-25 are very similar, they are not identical in every respect. When airplanes are type certificated to both sets of standards, the differences between part 25 and JAR-25 can result in substantial additional costs to manufacturers and operators. These additional costs, however, frequently do not bring about an increase in safety. In many cases, part 25 and JAR-25 may contain different requirements to accomplish the same safety intent. Consequently, manufacturers are usually burdened with meeting the requirements of both sets of standards, although the level of safety is not increased correspondingly.

Recognizing that a common set of standards would not only benefit the aviation industry economically, but also maintain the necessary high level of safety, the FAA and the JAA began an

effort in 1988 to “harmonize” their respective aviation standards. The goal of the harmonization effort is to ensure that:

- Where possible, standards do not require domestic and foreign parties to manufacture or operate to different standards for each country involved; and
- The standards adopted are mutually acceptable to the FAA and the foreign aviation authorities.

The FAA and JAA have identified a number of significant regulatory differences (SRD) between the wording of part 25 and JAR-25. Both the FAA and the JAA consider “harmonization” of the two sets of standards a high priority.

#### *What Is ARAC and What Role Does It Play in Harmonization?*

After initiating the first steps towards harmonization, the FAA and JAA soon realized that traditional methods of rulemaking and accommodating different administrative procedures was neither sufficient nor adequate to make appreciable progress towards fulfilling the goal of harmonization. The FAA then identified the Aviation Rulemaking Advisory Committee (ARAC) as an ideal vehicle for assisting in resolving harmonization issues, and, in 1992, the FAA tasked ARAC to undertake the entire harmonization effort.

The FAA had formally established ARAC in 1991 (56 FR 2190, January 22, 1991), to provide advice and recommendations concerning the full range of the FAA’s safety-related rulemaking activity. The FAA sought this advice to develop better rules in less overall time and using fewer FAA resources than previously needed. The committee provides the FAA firsthand information and insight from interested parties regarding potential new rules or revisions of existing rules.

There are 64 member organizations on the committee, representing a wide range of interests within the aviation community. Meetings of the committee are open to the public, except as authorized by section 10(d) of the Federal Advisory Committee Act.

The ARAC establishes working groups to develop recommendations for resolving specific airworthiness issues. Tasks assigned to working groups are published in the **Federal Register**. Although working group meetings are not generally open to the public, the FAA solicits participation in working groups from interested members of the public who possess knowledge or experience in the task areas. Working groups report directly to the ARAC, and the ARAC must accept a working group

proposal before ARAC presents the proposal to the FAA as an advisory committee recommendation.

The activities of the ARAC will not, however, circumvent the public rulemaking procedures; nor is the FAA limited to the rule language “recommended” by ARAC. If the FAA accepts an ARAC recommendation, the agency proceeds with the normal public rulemaking procedures. Any ARAC participation in a rulemaking package is fully disclosed in the public docket.

#### *What Is the Status of the Harmonization Effort Today?*

Despite the work that ARAC has undertaken to address harmonization, there remain a large number of regulatory differences between part 25 and JAR-25. The current harmonization process is extremely costly and time-consuming for industry, the FAA, and the JAA. Industry has expressed a strong desire to conclude the harmonization program as quickly as possible to alleviate the drain on their resources and to finally establish one acceptable set of standards.

Recently, representatives of the aviation industry [including Aerospace Industries Association of America, Inc. (AIA), General Aviation Manufacturers Association (GAMA), and European Association of Aerospace Industries (AECMA)] proposed an accelerated process to reach harmonization.

#### *What Is the “Fast Track Harmonization Program”?*

In light of a general agreement among the affected industries and authorities to expedite the harmonization program, the FAA and JAA in March 1999 agreed upon a method to achieve these goals. This method, which the FAA has titled “The Fast Track Harmonization Program,” is aimed at expediting the rulemaking process for harmonizing not only the 42 standards that are currently tasked to ARAC for harmonization, but approximately 80 additional standards for part 25 airplanes.

The FAA initiated the Fast Track program on November 26, 1999 (64 FR 66522). This program involves grouping all of the standards needing harmonization into three categories:

*Category 1: Envelope*—For these standards, parallel part 25 and JAR-25 standards would be compared, and harmonization would be reached by accepting the more stringent of the two standards. Thus, the more stringent requirement of one standard would be “enveloped” into the other standard. In some cases, it may be necessary to incorporate parts of both the part 25 and JAR standard to achieve the final, more

stringent standard. (This may necessitate that each authority revises its current standard to incorporate more stringent provisions of the other.)

*Category 2: Completed or near complete*—For these standards, ARAC has reached, or has nearly reached, technical agreement or consensus on the new wording of the proposed harmonized standards.

*Category 3: Harmonize*—For these standards, ARAC is not near technical agreement on harmonization, and the parallel part 25 and JAR-25 standards cannot be “enveloped” (as described under Category 1) for reasons of safety or unacceptability. A standard developed under Category 3 would be mutually acceptable to the FAA and JAA, with a consistent means of compliance.

Further details on the Fast Track Program can be found in the tasking statement (64 FR 66522, November 26, 1999) and the first NPRM published under this program, Fire Protection Requirements for Powerplant Installations on Transport Category Airplanes (65 FR 36978, June 12, 2000).

Under this program, the FAA provides ARAC with an opportunity to review, discuss, and comment on the FAA’s draft NPRM. In the case of this rulemaking, ARAC accepted the draft NPRM as proposed.

#### **Discussion of the Proposal**

##### *How Does This Proposed Regulation Relate to “Fast Track”?*

This proposed regulation results from the recommendations of ARAC submitted under the FAA’s Fast Track Harmonization Program. In this notice, the FAA proposes to amend five sections of the regulations concerning transport category airplane miscellaneous flight requirements to harmonize the associated standards with those of JAR-25. The standards addressed in this proposal are all classified as Category 1 under the fast track harmonization program. Since the FAA agrees with the recommendations received from ARAC, this proposal is consistent with the ARAC recommendations. The five proposed changes are described separately below.

#### **Change 1: Section 25.111(c)(4), “Takeoff Path”**

##### *What Is the Underlying Safety Issue Addressed by the Current Standards?*

This requirement only allows certain routine crew actions to be made before the airplane reaches a height of 400 feet above the takeoff surface. Simulation studies and accident investigations have shown that during periods of high

workload, such as after an engine failure during takeoff, the crew might not take actions necessary to maintain the safe flight of the airplane. This revision would require that certain actions be automatic before the airplane reaches a height of 400 feet in order to receive credit for the effect of the action on the flight path.

#### *What Are the Current 14 CFR and JAR Standards?*

- The current text of 14 CFR Section 25.111(c)(4) is:

#### *Section 25.111 Takeoff path.*

\* \* \* (c)(4) Except for gear retraction and propeller feathering, the airplane configuration may not be changed, and no change in power or thrust that requires action by the pilot may be made, until the airplane is 400 feet above the takeoff surface.

- The current text of JAR–25.111(c)(4), Change 15, Amendment 25/96/1, is:

#### **JAR–25.111 Take-Off Path**

\* \* \* (c)(4) Except for gear retraction and automatic propeller feathering, the aeroplane configuration may not be changed, and no change in power or thrust that requires action by the pilot may be made, until the aeroplane is 400 ft above the takeoff surface.

#### *What Are the Differences In the Standards and What Do Those Differences Result In?*

Although both part 25 and the JAR address the effect of propeller feathering on the flight path before the airplane is 400 feet above the takeoff surface, the JAR standard does not allow manual propeller feathering until the airplane is at least 400 feet above the takeoff surface. Although current FAA policy has been in accordance with the JAR standard, the rule language was not clear. Only automatic propeller feathering has been accepted as complying with the intent of § 25.111(c)(4).

#### *What, If Any, Are the Differences In the Means of Compliance?*

There are no differences between part 25 and JAR–25 in the means of compliance.

#### *What Is the Proposed Action?*

The FAA proposes to harmonize the regulations by revising part 25 to adopt the text of JAR–25.111(c)(4) as new § 25.111(c)(4). The proposed action would codify current FAA policy by incorporating the text of the JAR standard.

#### *How Does This Proposed Standard Address the Underlying Safety Issue?*

The proposed standard would continue to address the underlying

safety issue in the same manner by codifying current FAA policy to the JAR.

#### *What Is the Effect of the Proposed Standard Relative to the Current Regulations?*

The proposed standard would maintain the same level of safety relative to the current regulations, considering the application of FAA policy concerning propeller feathering below a height of 400 feet.

#### *What Is the Effect of the Proposed Standard Relative to Current Industry Practice?*

The proposed standard would maintain the same level of safety relative to the current industry practice.

#### *What Other Options Have Been Considered and Why Were They Not Selected?*

The FAA has not considered another option. The FAA considers the proposed enveloping action to be the most appropriate way to maintain safety.

#### *Who Would Be Affected by the Proposed Change?*

Manufacturers and operators of transport category airplanes could be affected by the proposed change. The proposed change, however, would not have an effect because it codifies current practices and policy.

#### *Is Existing FAA Advisory Material Adequate?*

The FAA plans to issue a revision to Advisory Circular (AC) 25–7A, “Flight Test Guide for Certification of Transport Category Airplanes.” The proposed revision would add the means of compliance currently accepted by the JAA as an acceptable means of showing compliance with § 25.111(c)(4). Public comments concerning the proposed revision to AC 25–7A are invited by separate notice, following this NPRM.

#### **Change 2: Section 25.147(c)(2), “Directional and Lateral Control”**

#### *What Is the Underlying Safety Issue Addressed by the Current Standards?*

This requirement addresses controllability in the one-engine-inoperative condition. It requires that transport category airplanes be controllable and maneuverable with the critical engine inoperative.

#### *What Are the Current 14 CFR and JAR Standards?*

- There is no comparable part 25 section.

- The current text of JAR–25.147(c)(2), Change 15, Amendment 25/96/1, is:

#### **JAR–25.147 Directional and Lateral Control**

\* \* \* (c)(2) With the critical engine inoperative, roll response must allow normal manoeuvres. Lateral control must be sufficient, at the speeds likely to be used with one engine inoperative for climb, cruise, descent and landing approach, to provide a peak roll rate necessary for safety without excessive control forces or travel. (See ACJ 25.147(c)(2).)

#### *What Are the Differences in the Standards and What Do Those Differences Result In?*

Section 25.147 of part 25 does not address roll rate response. The JAR 25.147(c)(2), however, addresses roll rate response. Additional flight testing is needed to show compliance with the JAR requirement. Since industry practice is to comply with both standards, it is difficult to determine whether there are any resulting design differences. It is not known if the differences in the standards would have resulted in any design differences had current industry practice not been to comply with both standards.

#### *What, If Any, Are the Differences in the Means of Compliance?*

Section 25.147 of part 25 does not prescribe any roll rate requirements. Any evaluation of roll rate would be only of a general qualitative nature relative to the ease of performing the banked turns required by § 25.147(c). Also, the part 25 evaluation is only performed at 1.4 Vs.

#### *What Is the Proposed Action?*

The proposed action would add the additional JAR–25 requirement to part 25 as a new § 25.147(d). However, the word “peak,” as used in JAR 25.147(c)(2), would not be included in this proposal in reference to the roll rate that must be available. The FAA considers the use of the word “peak” too constraining and unclear. For example, demonstrating an “average” roll rate capability may not be acceptable for showing compliance with a requirement for a “peak” roll rate. Also, it is difficult to determine if a peak roll rate is the maximum sustainable roll rate, or is merely a short transient condition that could result from unique or unusual piloting techniques.

Also, the reference to the climb, cruise, descent, and landing approach flight phases currently contained in JAR 25.147(c)(2) would be removed. The FAA considers this proposed requirement applicable to all flight

phases with one engine inoperative, including takeoff and initial climb, which are not referenced in the current JAR 25.147(c)(2). By removing the reference to specific flight phases, the proposed requirement would be applicable to all flight phases with one engine inoperative.

Additionally, § 25.147(d) and (e) would be redesignated as § 25.147(e) and (f), respectively. The JAA plans to harmonize the JAR accordingly to correspond to these proposals.

#### *How Does This Proposed Standard Address the Underlying Safety Issue?*

The proposed standard would continue to address the underlying safety issue for all phases of flight with one engine inoperative in the same manner, but would add a requirement specifically addressing roll rate response.

#### *What Is the Effect of the Proposed Standard Relative to the Current Regulations?*

The proposed standard would increase the level of safety since it adds a requirement that is not currently in § 25.147.

#### *What Is the Effect of the Proposed Standard Relative to Current Industry Practice?*

The proposed standard would maintain the same level of safety since current industry practice is to comply with both standards.

#### *What Other Options Have Been Considered and Why Were They Not Selected?*

The FAA has not considered another option. The FAA considers the proposed enveloping action to be the most appropriate way to maintain safety.

#### *Who Would Be Affected by the Proposed Change?*

The proposed standard would affect manufacturers of transport category airplanes. This change would not affect operators since it would have no effect on the operating limitations or procedures.

#### *Is Existing FAA Advisory Material Adequate?*

The FAA considers that adding the existing JAA ACJ material to AC 25-7A would be necessary to address the means of compliance for the proposed addition to part 25. The FAA plans to issue a revision to AC 25-7A to add this material. Public comments concerning this proposed revision are invited by separate notice, following this NPRM.

### **Change 3: Section 25.161(c)(2), "Trim (Longitudinal)"**

#### *What Is the Underlying Safety Issue Addressed by the Current Standards?*

Transport category airplanes are required to maintain longitudinal, lateral, and directional trim under certain conditions of flight. This requirement specifies conditions under which longitudinal trim must be maintained. The capability to trim out control forces is both a pilot workload and a flight path precision issue. An out-of-trim airplane can be fatiguing to fly and can make maintaining the desired flight path more difficult.

#### *What Are the Current 14 CFR and JAR Standards?*

- The current text of 14 CFR Section 25.161(c)(2) is:

#### *Section 25.161 Trim.*

(c) Longitudinal trim. The airplane must maintain longitudinal trim during—

\* \* \* \* \*

\* \* \* (c)(2) A glide with power off at a speed not more than 1.4  $V_{S1}$ , with the landing gear extended, the wing flaps (i) retracted and (ii) extended, the most unfavorable center of gravity position approved for landing with the maximum landing weight, and with the most unfavorable center of gravity position approved for landing regardless of weight; and \* \* \*

- The current text of JAR 25.161(c)(2), Change 14, is:

#### *JAR-25.161 Trim*

(c) Longitudinal trim. The aeroplane must maintain longitudinal trim during—

\* \* \* \* \*

\* \* \* (c)(2) Either a glide with power off at a speed not more than 1.4  $V_{S1}$ , or an approach within the normal range of approach speeds appropriate to the weight and configuration with power settings corresponding to a 3° glidepath, whichever is the most severe, with the landing gear extended, the wing flaps (i) retracted and (ii) extended, the most unfavourable centre of gravity position approved for landing with the maximum landing weight, and the most unfavourable centre of gravity position approved for landing regardless of weight; and \* \* \*

#### *What Are the Differences in the Standards and What Do Those Differences Result In?*

In addition to the power-off glide condition specified by part 25, the JAR requires longitudinal trim to be maintained at speeds and power settings appropriate to an approach on a 3-degree glidepath. For airplanes where this condition is more stringent than the power-off glide condition, a design difference may result. Also, additional

flight testing must be performed to demonstrate compliance with the JAR.

#### *What, If Any, Are the Differences in the Means of Compliance?*

Although the explicit standards are different, there are no differences in the means of compliance.

#### *What Is the Proposed Action?*

The proposed action would revise § 25.161(c)(2) to adopt the more stringent JAR standard. The requirement to demonstrate compliance at "the most unfavorable center of gravity position approved for landing with the maximum landing weight, and with the most unfavorable center of gravity position approved for landing regardless of weight" would be simplified to refer to "the most unfavorable combination of center of gravity position and weight approved for landing." This proposed change would not affect the safety intent of the requirement. The longitudinal trim requirement would continue to apply to the most critical combination of landing weight and center of gravity position. If, due to the characteristics of the approved center of gravity envelope, the most critical combination of landing weight and center of gravity position does not coincide with the maximum landing weight, there would not be any need to demonstrate compliance at the maximum landing weight condition.

#### *How Does This Proposed Standard Address the Underlying Safety Issue?*

The proposed standard would continue to address the underlying safety issue in the same manner, but would add a requirement to ensure that transport category airplanes maintain longitudinal trim in a power-on approach condition.

#### *What Is the Effect of the Proposed Standard Relative to the Current Regulations?*

The proposed standard would increase the level of safety for those transport category airplanes for which the power-on approach condition is more critical for maintaining longitudinal trim than the power-off glide condition.

#### *What Is the Effect of the Proposed Standard Relative to Current Industry Practice?*

The proposed standard would maintain the current level of safety since industry practice is to comply with both part 25 and JAR-25.

*What Other Options Have Been Considered and Why Were They Not Selected?*

The FAA has not considered another option. The FAA considers the proposed action to be the most appropriate way to fulfill harmonization goals while maintaining safety and without affecting current industry practice.

*Who Would Be Affected by the Proposed Change?*

The proposed change would affect manufacturers and operators of transport category airplanes. However, since the proposed change does not result in any practical changes in requirements or practice, there would not be any significant effect.

*Is Existing FAA Advisory Material Adequate?*

There is no specific advisory material for either part 25 or the JAR. The FAA considers developing new advisory material to be unnecessary.

**Change 4: Section § 25.161(e), “Trim (Four or More Engines)”**

*What Is the Underlying Safety Issue Addressed by the Current Standards?*

Transport category airplanes are required to maintain longitudinal, lateral, and directional trim under certain conditions of flight. This requirement specifies additional conditions applicable to airplanes with four or more engines under which longitudinal, directional, and lateral trim must be maintained. The capability to trim out control forces is both a pilot workload and capability to maintain a desired flight path issue. An out-of-trim airplane can be fatiguing to fly and can make maintaining the desired flight path more difficult.

*What Are the Current 14 CFR and JAR Standards?*

- The current text of 14 CFR 25.161(e) is:

*Section 25.161 Trim.*

\* \* \* (e) Airplanes with four or more engines. Each airplane with four or more engines must maintain trim in rectilinear flight—

(1) At the climb speed, configuration, and power required by § 25.123(a) for the purpose of establishing the rate of climb;

(2) With the most unfavorable center of gravity position; and

(3) At the weight at which the two-engine-inoperative climb is equal to at least 0.013  $V_{SO2}$  at an altitude of 5,000 feet.

- The current text of JAR–25.161(e), Change 15, Amendment 25/96/1, is:

**JAR–25.161 Trim**

\* \* \*(e) Aeroplanes with four or more engines. Each aeroplane with four or more engines must maintain trim in rectilinear flight—

(1) At the climb speed, configuration, and power required by JAR 25.123(a) for the purpose of establishing gradient of climb; and

(2) With the most unfavourable centre of gravity position.

(3) Not required for JAR–25.

*What Are the Differences in the Standards and What Do Those Differences Result in?*

Part 25 specifies a single weight at which a transport category airplane with four or more engines must maintain trim in rectilinear flight. The JAR–25 standard, which does not contain this provision, applies at all weights. Therefore, the JAR–25 standard is more stringent.

The weight requirement in part 25 originated in the U.S. Civil Air Regulations (CAR) part 4b, which specified climb rates proportional to the square of the stall speed. Climb rates were specified in this manner because it was assumed that the level of safety associated with an emergency landing would depend on the kinetic energy of the airplane, which in turn is proportional to the mass times the velocity squared. For equivalent safety, it was reasoned that excess power, expressed in terms of rate of climb, should be proportional to the stall speed squared. Since the climb requirements of part 25 are now expressed in terms of climb gradient rather than rates of climb, the manner in which the weight for compliance is defined in § 25.161(e)(3) is an historical artifact and out of step with the rest of part 25.

*What, if Any, Are the Differences in the Means of Compliance?*

Although the explicit standards are different, there are no differences in the means of compliance.

*What Is the Proposed Action?*

The proposed action would reformat this section into one paragraph with no sub-paragraphs. The wording currently in § 25.161(e)(1) and JAR 25.161(e)(1) would be moved to § 25.161(e) and updated to reflect current industry practice in reference to the en route flight path configurations of § 25.123(a) and JAR 25.123(a). The part 25 wording originated in CAR part 4b when the equivalent requirement to § 25.123(a) for two-engine-inoperative climb performance specified a minimum rate of climb that an airplane must be capable of achieving. In the current part

25 and JAR–25 standards, § 25.123(a) and JAR 25.123(a) require the determination of the en route flight paths, rather than a minimum rate of climb or climb gradient. To be consistent with the current § 25.123(a) and JAR 25.123(a), the proposed § 25.161(e) would refer to en route flight paths rather than either rate of climb (as in current part 25) or gradient of climb (as in current JAR–25).

In addition, the word “also” has been added to the lead-in sentence of the proposed standard to clarify that this is an additional requirement for airplanes with four or more engines. The requirements of § 25.161(d) and JAR 25.161(d) remain applicable for these airplanes.

The wording of § 25.161(e)(2) would be incorporated into the proposed § 25.161(e). Section 25.161(e)(3) would be removed. Its removal would result in the proposed § 25.161(e) requirements being applicable at all weights as in the current JAR 25.161(e).

*How Does This Proposed Standard Address the Underlying Safety Issue?*

This proposed standard would continue to address the underlying safety issue in the same manner. However, it also would expand the conditions under which airplanes with four or more engines must be able to maintain longitudinal, lateral, and directional trim by making the current standard applicable at all relevant gross weight conditions.

*What Is the Effect of the Proposed Standard Relative to the Current Regulations?*

The proposed standard would increase the level of safety relative to the current part 25. It expands the conditions under which an airplane with four or more engines must be able to maintain longitudinal, lateral, and directional trim.

*What Is the Effect of the Proposed Standard Relative to Current Industry Practice?*

The proposed standard would maintain the current level of safety since industry practice is to comply with both part 25 and JAR–25.

*What Other Options Have Been Considered and Why Were They Not Selected?*

The FAA has not considered another option. The FAA considers the proposed action to be the most appropriate way to fulfill harmonization goals while maintaining safety and without affecting current industry practice.

*Who Would Be Affected by the Proposed Change?*

The proposed change would affect manufacturers and operators of transport category airplanes. However, since the proposed change does not result in any practical changes in requirements or practice, there would not be any significant effect.

*Is Existing FAA Advisory Material Adequate?*

There is no specific advisory material for either part 25 or JAR-25. The FAA considers developing new advisory material unnecessary.

**Change 5: Section 25.175(d), "Static Longitudinal Stability"***What Is the Underlying Safety Issue Addressed by the Current Standards?*

Section 25.175 and JAR 25.175 contain the conditions under which static longitudinal stability must be demonstrated for transport category airplanes. Static longitudinal stability is required by part 25 for the following reasons:

1. To provide additional speed change cues to the pilot through control force changes.
2. To ensure that short periods of unattended operation do not result in any significant changes in attitude, airspeed, or load factor.
3. To provide predictable pitch response.
4. To provide acceptable level of pilot attention (workload) to attain and maintain trim speed and altitude.
5. To provide gust stability.

*What Are the Current 14 CFR and JAR Standards?*

- The current text of 14 CFR 25.175(d) is:

*Section 25.175 Demonstration of Static Longitudinal Stability.*

\* \* \* (d) Landing. The stick force curve must have a stable slope, and the stick force may not exceed 80 pounds, at speeds between 1.1 V<sub>SO</sub> and 1.8 V<sub>SO</sub> with—

- (1) Wing flaps in the landing position;
- (2) Landing gear extended;
- (3) Maximum landing weight;
- (4) Power or thrust off on the engines; and
- (5) The airplane trimmed at 1.4 V<sub>SO</sub> with power or thrust off.

- The current text of JAR-25.175(d), Change 14, is:

**JAR 25.175 Demonstration of Static Longitudinal stability**

\* \* \* (d) Landing. The stick force curve must have a stable slope and the stick force may not exceed 80 pounds at speeds between 1.1 V<sub>SO</sub> and 1.8 V<sub>SO</sub> with—

- (1) Wing flaps in the landing position;

- (2) Landing gear extended;
- (3) Maximum landing weight;
- (4) The aeroplane trimmed at 1.4 V<sub>SO</sub> with
  - (i) Power or thrust off, and
  - (ii) Power or thrust for level flight.

*What Are the Differences in the Standards and What Do Those Differences Result in?*

In addition to the part 25 condition of power—or thrust-off, JAR-25 requires the stick force criteria to be met at the power or thrust for level flight. This additional condition requires additional flight test demonstrations to show compliance, and may influence the design of airplanes for which the application of power has a significant destabilizing effect.

*What, If Any, Are the Differences in the Means of Compliance?*

Except for the additional power-on condition required by the JAR, there are no differences in the means of compliance for part 25 and JAR-25.

*What Is the Proposed Action?*

The proposed action would revise part 25 by adopting the more stringent text of JAR 25.175(d).

*How Does This Proposed Standard Address the Underlying Safety Issue?*

The proposed standard would continue to address the underlying safety issue in the same manner, but would add a requirement to ensure that transport category airplanes have adequate static longitudinal stability in a power-on approach condition.

*What Is the Effect of the Proposed Standard Relative to the Current Regulations?*

The proposed standard would increase the level of safety for those transport category airplanes for which the power-on condition is more critical in terms of static longitudinal stability than the power-off condition.

*What Is the Effect of the Proposed Standard Relative to Current Industry Practice?*

The proposed standard would maintain the current level of safety since industry practice is to comply with both part 25 and the JAR-25.

*What Other Options Have Been Considered and Why Were They Not Selected?*

The FAA considers the proposed action to be the most appropriate way to fulfill harmonization goals while maintaining safety and without affecting current industry practices. Using the less stringent part 25 standard was also

considered; however, there are normally occurring situations for which level flight in the landing configuration may be relevant. These situations include stepdown fixes on nonprecision approaches and extending the flaps and landing gear to the landing configuration when the glide slope becomes active on a precision approach, but before the glide slope intercept point.

*Who Would Be Affected by the Proposed Change?*

The proposed change would affect manufacturers and operators of transport category airplanes. However, since the proposed change does not result in any practical changes in requirements or practice, there would not be any significant effect.

*Is Existing FAA Advisory Material Adequate?*

The FAA has not considered another option. The FAA considers that current advisory material is adequate.

*What Regulatory Analyses and Assessments Has the FAA Conducted?**Regulatory Evaluation Summary*

Proposed changes to Federal regulations must undergo several economic analyses. First, Executive Order 12866 directs that each Federal agency shall propose or adopt a regulation only upon a reasoned determination that the benefits of the intended regulation justify its costs. Second, the Regulatory Flexibility Act of 1980 requires agencies to analyze the economic effect of regulatory changes on small entities. Third, the Trade Agreements Act (19 U.S.C. section 2531-2533) prohibits agencies from setting standards that create unnecessary obstacles to the foreign commerce of the United States. In developing U.S. standards, this Trade Act also requires the consideration of international standards and, where appropriate, that they be the basis of U.S. standards. And fourth, the Unfunded Mandates Reform Act of 1995 requires agencies to prepare a written assessment of the costs, benefits, and other effects of proposed or final rules that include a Federal mandate likely to result in the expenditure by State, local, or tribal governments, in the aggregate, or by the private sector of \$100 million or more annually (adjusted for inflation).

In conducting these analyses, the FAA has determined that this proposal has benefits, but no substantial costs, and that it is not "a significant regulatory action" as defined in Executive Order

12866, nor "significant" as defined in DOT's Regulatory Policies and Procedures. Further, this proposed rule would not have a significant economic impact on a substantial number of small entities, would reduce barriers to international trade, and would not impose an Unfunded Mandate on State, local, or tribal governments, or on the private sector.

The DOT Order 2100.5 prescribes policies and procedures for simplification, analysis, and review of regulations. If it is determined that the expected impact is so minimal that the proposed rule does not warrant a full evaluation, a statement to that effect and the basis for it is included in the proposed regulation. Accordingly, the FAA has determined that the expected impact of this proposed rule is so minimal that the proposed rule does not warrant a full evaluation. The FAA provides the basis for this minimal impact determination below.

Currently, airplane manufacturers must satisfy both part 25 and the European JAR-25 standards to certificate transport category aircraft in both the United States and Europe. Meeting two sets of certification requirements raises the cost of developing a new transport category airplane, often with no increase in safety. In the interest of fostering international trade, lowering the cost of aircraft development, and making the certification process more efficient, the FAA, JAA, and aircraft manufacturers have been working to create, to the maximum possible extent, a single set of certification requirements accepted in both the United States and Europe. As explained in detail previously, these efforts are referred to as "harmonization."

Change 1: Section 25.111(c)(4), "Takeoff Path":

Current industry practice covering aircraft crew actions concerning the takeoff path already complies with the more stringent JAR requirements. The JAR 25.111(c)(4) requirement allows only certain routine crew actions to be made before the airplane reaches a height 400 feet above the takeoff surface.

This proposal would revise the FAA requirements for propeller feathering before the airplane is at least 400 feet above the takeoff surface by adding the following "more stringent" requirements of the JAR standards to include:

*Section 25.111 Take-off path.*

\* \* \* (c)(4) Except for gear retraction and automatic propeller feathering, the airplane configuration may not be changed, and no change in power or thrust that requires action

by the pilot may be made, until the airplane is 400 feet above the takeoff surface.

Concerning the impact of complying with the proposed standard, the ARAC working group states there is no additional cost associated with complying with the proposed standard as it represents current practices and policy.

Manufacturers are expected to receive certification cost-savings with a single FAA/JAA certification requirement for new aircraft. The FAA, however, has not attempted to quantify the cost savings for this specific proposal, beyond noting that, while they may be minimal, they contribute to a large potential harmonization savings.

The agency concludes that, since there is consensus among potentially affected airplane manufacturers that the benefits of harmonization exceed the cost, further analysis is not required.

The FAA requests comments with supporting documentation in regard to the conclusions contained in this section.

Change 2: Section 25.147(c)(2), "Directional and Lateral Control":

Current industry practice covering pilot techniques concerning controllability in the one-engine inoperative condition already complies with the more stringent JAR requirements. The JAR 25.147(c)(2) standard is more stringent than § 25.147(c)(2) since part 25 does not prescribe any roll rate requirements when one engine is inoperative.

This proposal would harmonize part 25 to the JAR by adding an additional requirement to § 25.147(c)(2). The new § 25.147(c)(2) would require roll rate response to be evaluated and found adequate for all speeds likely to be used with one engine inoperative. The word "peak," as used in JAR 25.147(c)(2), would not be included in this proposal in reference to the roll rate since the FAA considers its use too constraining and unclear. The ARAC working group recommends the words "for climb, cruise, descent and landing approach" be removed so that this requirement would apply to all flight conditions. The ARAC working group states the proposed change will have no increase to manufacturing costs to applicants already conducting JAA certifications. The ARAC has informed the FAA that for future certifications, part 25 manufacturers intend to conform to JAA standards. Therefore, the FAA considers that for current and future part 25 aircraft certifications all manufacturers will meet JAA certification and this rule would result in no additional costs to manufacturers.

Manufacturers are expected to receive certification cost-savings with a single FAA/JAA certification requirement for new aircraft. The FAA, however, has not attempted to quantify the cost savings for this specific proposal, beyond noting that, while they may be minimal, they contribute to a large potential harmonization savings.

The agency concludes that, since there is consensus among potentially affected airplane manufacturers that the benefits of harmonization exceed the cost, further analysis is not required.

The FAA requests comments with supporting documentation in regard to the conclusions contained in this section.

Change 3: Section 25.161(c)(2), "Trim (Longitudinal)":

Current industry practice covering pilot techniques concerning conditions under which longitudinal trim must be maintained already complies with the more stringent JAR requirements. The JAR 25.161(c)(2) standard is more stringent than § 25.161(c)(2) since part 25 does not require longitudinal trim to be maintained at speeds and power settings appropriate to an approach on a 3-degree glidepath.

This proposal would harmonize part 25 to the JAR by adding an additional requirement to § 25.161(c)(2). The new § 25.161(c)(2) would require longitudinal trim to be maintained at speeds and power settings appropriate to an approach on a 3-degree glidepath. In addition, the requirement to demonstrate compliance at "the most unfavorable center of gravity position approved for landing with the maximum landing weight, and with the most unfavorable center of gravity position approved for landing regardless of weight" would be simplified to refer to "the most unfavorable combination of center of gravity position and weight approved for landing." The ARAC working group states the proposed change will have no increase to manufacturing costs to applicants already conducting JAA certifications. The ARAC has informed the FAA that for future certifications, part 25 manufacturers intend to conform to JAA standards. Therefore, the FAA considers that for current and future part 25 aircraft certifications all manufacturers will meet JAA certification and this rule would result in no additional costs to manufacturers.

Manufacturers are expected to receive certification cost-savings with a single FAA/JAA certification requirement for new aircraft. The FAA, however, has not attempted to quantify the cost savings for this specific proposal, beyond noting that, while they may be minimal, they

contribute to a large potential harmonization savings.

The agency concludes that, since there is consensus among potentially affected airplane manufacturers that the benefits of harmonization exceed the cost, further analysis is not required.

The FAA requests comments with supporting documentation in regard to the conclusions contained in this section.

*Change 4: Section 25.161(e), "Trim (Four or More Engines)":*

Current industry practice covering pilot techniques concerning conditions under which longitudinal, directional, and lateral trim on airplanes with four or more engines must be maintained is already complying with the more stringent JAR requirements. The § 25.161(c)(2) standard specifies a single weight at which a transport category airplane with four or more engines must maintain trim in rectilinear flight. The JAR 25.161(c)(2) standard, which does not contain this provision, applies at all weights.

This proposal would harmonize part 25 to the JAR by adding an additional requirement to § 25.161(e). The new § 25.161(e) would apply to all weights at which a transport category airplane with four or more engines must maintain trim in rectilinear flight. In addition, the ARAC working group states that to be consistent with § 25.123(a) and JAR 25.123(a), the proposed harmonized § 25.161(e)(1) and JAR 25.161(e)(1) should refer to en route flight paths rather than either rate of climb (as in the current part 25) or gradient of climb (as in the current JAR). The ARAC and FAA consider that since the climb requirements of part 25 are now expressed in terms of climb gradient rather than rates of climb, the manner in which the weight for compliance is defined in § 25.161(e)(3) is an historical artifact and out of step with the rest of part 25. Lastly, ARAC finds that the word "also" should be added to the lead-in sentence of the proposed standard to clarify that this is an additional requirement for airplanes with four or more engines.

Concerning the impact of complying with the proposed standard, the ARAC working group states the cost of complying with the proposed standard is none as it codifies current practices and policy.

Manufacturers are expected to receive certification cost-savings with a single FAA/JAA certification requirement for new aircraft. The FAA, however, has not attempted to quantify the cost savings for this specific proposal, beyond noting that, while they may be minimal, they

contribute to a large potential harmonization savings.

The agency concludes that, since there is consensus among potentially affected airplane manufacturers that the benefits of harmonization exceed the cost, further analysis is not required.

The FAA requests comments with supporting documentation in regard to the conclusions contained in this section.

*Change 5: Section 25.175(d), "Static Longitudinal Stability":*

Current industry practice covering pilot techniques concerning conditions under which static longitudinal stability must be demonstrated for transport category airplanes already complies with the more stringent JAR requirements. The JAR 25.175(d) would require the stick force criteria to be met at the power or thrust for level flight in addition to the part 25 condition of power or thrust off.

This proposal would harmonize part 25 to the JAR by adding an additional requirement to § 25.175(d). The new § 25.175(d) would add a requirement to ensure that transport category airplanes have adequate static longitudinal stability in a power-on approach condition. The ARAC working group states the proposed change will have no increase to manufacturing costs to applicants already conducting JAA certifications. The ARAC has informed the FAA that for future certifications, part 25 manufacturers intend to conform to JAA standards. Therefore, the FAA considers that for current and future part 25 aircraft certifications all manufacturers will meet JAA certification and this rule would result in no additional costs to manufacturers.

Manufacturers are expected to receive certification cost-savings with a single FAA/JAA certification requirement for new aircraft. The FAA, however, has not attempted to quantify the cost savings for this specific proposal, beyond noting that, while they may be minimal, they contribute to a large potential harmonization savings.

The agency concludes that, since there is consensus among potentially affected airplane manufacturers that the benefits of harmonization exceed the cost, further analysis is not required.

The FAA requests comments with supporting documentation in regard to the conclusions contained in this section.

#### Initial Regulatory Flexibility Determination

The Regulatory Flexibility Act (RFA) of 1980, 50 U.S.C. 601–612, as amended, establishes "as a principle of regulatory issuance that agencies shall endeavor,

consistent with the objective of the rule and of applicable statutes, to fit regulatory and informational requirements to the sale of the business, organizations, and governmental jurisdictions subject to regulation." To achieve that principle, the RFA requires agencies to solicit and consider flexible regulatory proposals and to explain the rationale for their actions.

Agencies must perform a review to determine whether a proposed or final rule will have a significant impact on a substantial number of small entities. If the determination is that the rule will, the Agency must prepare a regulatory flexibility analysis as described in the RFA.

However, if an agency determines that a proposed or final rule is not expected to have a significant economic impact on a substantial number of small entities, section 605(b) of the RFA provides that the head of the agency may so certify and a regulatory flexibility analysis is not required. The certification must include a statement providing the factual basis for this determination, and the reasoning should be clear.

The FAA considers that this proposed rule would not have a significant impact on a substantial number of small entities for two reasons:

First, the net effect of the proposed rule is minimum regulatory cost relief. The proposed rule would require that new transport category aircraft manufacturers meet just the "more stringent" European certification requirement, rather than both the United States and European standards. Airplane manufacturers already meet or expect to meet this standard as well as the existing 14 CFR part 25 requirement.

Second, all U.S. transport-aircraft category manufacturers exceed the Small Business Administration small-entity criteria of 1,500 employees for aircraft manufacturers. The current U.S. part 25 airplane manufacturers include: Boeing, Cessna Aircraft, Gulfstream Aerospace, Learjet (owned by Bombardier), Lockheed Martin, McDonnell Douglas (a wholly-owned subsidiary of The Boeing Company), Raytheon Aircraft, and Sabreliner Corporation.

Given that this proposed rule is minimally cost-relieving and that there are no small entity manufacturers of part 25 airplanes, the FAA certifies that this proposed rule would not have a significant impact on a substantial number of small entities.

#### International Trade Impact Assessment

The Trade Agreement Act of 1979 prohibits Federal agencies from



engaging in any standards or related activities that create unnecessary obstacles to the foreign commerce of the United States. Legitimate domestic objectives, such as safety, are not considered unnecessary obstacles. The statute also requires consideration of international standards and, where appropriate, that they be the basis for U.S. standards. In addition, consistent with the Administration's belief in the general superiority and desirability of free trade, it is the policy of the Administration to remove or diminish to the extent feasible, barriers to international trade, including both barriers affecting the export of American goods and services to foreign countries and barriers affecting the import of foreign goods and services into the United States.

In accordance with the above statute and policy, the FAA has assessed the potential effect of the proposed rule and has determined that it supports the Administration's free trade policy because this rule would use European international standards as the basis for U.S. standards.

Unfunded Mandates Reform Act

Title II of the Unfunded Mandates Reform Act of 1995 (the Act), codified in 2 U.S.C. 1532-1538, enacted as Public Law 104-4 on March 22, 1995, requires each Federal agency, to the extent permitted by law, to prepare a written assessment of the effects of any Federal mandate in a proposed or final agency rule that may result in the expenditure by State, local, and tribal governments, in the aggregate, or by the private sector, of \$100 million or more (adjusted annually for inflation) in any one year. This proposed rule does not contain a Federal intergovernmental or private sector mandate that exceeds \$100 million in any year; therefore, the requirements of the Act do not apply.

What Other Assessments Has the FAA Conducted?

Executive Order 13132, Federalism

The FAA has analyzed this proposed rule and the principles and criteria of Executive Order 13132, Federalism. The FAA has determined that this action would not have a substantial direct effect on the States, on the relationship between the national Government and the States, or on the distribution of power and responsibilities among the various levels of government. Therefore, the FAA has determined that this notice of proposed rulemaking would not have federalism implications.

Paperwork Reduction Act

In accordance with the Paperwork Reduction Act of 1995 [44 U.S.C. 3507(d)], the FAA has determined there are no requirements for information collection associated with this proposed rule.

International Compatibility

In keeping with U.S. obligations under the Convention on International Civil Aviation, it is FAA policy to comply with International Civil Aviation Organization (ICAO) Standards and Recommended Practices to the maximum extent practicable. The FAA has determined that there are no ICAO Standards and Recommended Practices that correspond to this proposed regulation.

Environmental Analysis

FAA Order 1050.1D defines FAA actions that may be categorically excluded from preparation of a National Environmental Policy Act (NEPA) environmental assessment or environmental impact statement. In accordance with FAA Order 1050.1D, appendix 4, paragraph 4(j), this rulemaking qualifies for a categorical exclusion.

Energy Impact

The energy impact of the proposed rule has been assessed in accordance with the Energy Policy and Conservation Act (EPCA) and Public Law 94-163, as amended (43 U.S.C. 6362), and FAA Order 1053.1. It has been determined that it is not a major regulatory action under the provisions of the EPCA.

Regulations Affecting Intrastate Aviation in Alaska

Section 1205 of the FAA Reauthorization Act of 1996 (110 Stat. 3213) requires the Administrator, when modifying regulations in Title 14 of the CFR in a manner affecting intrastate aviation in Alaska, to consider the extent to which Alaska is not served by transportation modes other than aviation, and to establish such regulatory distinctions as he or she considers appropriate. Because this proposed rule would apply to the certification of future designs of transport category airplanes and their subsequent operation, it could, if adopted, affect intrastate aviation in Alaska. The FAA therefore specifically requests comments on whether there is justification for applying the proposed rule differently to intrastate operations in Alaska.

Plain Language

In response to the June 1, 1998, Presidential memorandum regarding the issue of plain language, the FAA re-examined the writing style currently used in the development of regulations. The memorandum requires Federal agencies to communicate clearly with the public. We are interested in your comments on whether the style of this document is clear, and in any other suggestions you might have to improve the clarity of FAA communications that affect you. You can get more information about the Presidential memorandum and the plain language initiative at <http://www.plainlanguage.gov>.

List of Subjects in 14 CFR Part 25

Aircraft, Aviation safety, Reporting and recordkeeping requirements.

The Proposed Amendment

In consideration of the foregoing, the Federal Aviation Administration proposes to amend part 25 of Title 14, Code of Federal Regulations, as follows:

PART 25—AIRWORTHINESS STANDARDS: TRANSPORT CATEGORY AIRPLANES

1. The authority citation for Part 25 continues to read as follows:

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

2. Amend § 25.111 by revising paragraph (c)(4) to read as follows:

§ 25.111 Takeoff path.

\* \* \* \* \*

(c) \* \* \*

(4) Except for gear retraction and automatic propeller feathering, the airplane configuration may not be changed, and no change in power or thrust that requires action by the pilot may be made, until the airplane is 400 feet above the takeoff surface.

\* \* \* \* \*

3. Amend § 25.147 by redesignating paragraphs (d) and (e) as paragraphs (e) and (f), and by adding new paragraph (d) to read as follows:

§ 25.147 Directional and lateral control.

\* \* \* \* \*

(d) Lateral control; roll capability. With the critical engine inoperative, roll response must allow normal maneuvers. Lateral control must be sufficient, at the speeds likely to be used with one engine inoperative, to provide a roll rate necessary for safety without excessive control forces or travel.

\* \* \* \* \*

4. Amend § 25.161 by revising paragraph (c)(2), and by revising paragraph (e) as follows:

**§ 25.161 Trim.**

\* \* \* \* \*

(c) \* \* \*  
(2) Either a glide with power off at a speed not more than 1.4V<sub>S1</sub>, or an approach within the normal range of approach speeds appropriate to the weight and configuration with power settings corresponding to a 3 degree glidepath, whichever is the most severe, with the landing gear extended, the wing flaps retracted and extended, and with the most unfavorable combination

of center of gravity position and weight approved for landing; and

\* \* \* \* \*

(e) *Airplanes with four or more engines.* Each airplane with four or more engines must also maintain trim in rectilinear flight with the most unfavorable center of gravity and at the climb speed, configuration, and power required by § 25.123(a) for the purpose of establishing the en route flight paths with two engines inoperative.

5. Amend § 25.175 by revising the text of paragraph (d)(4) to read as follows:

**§ 25.175 Demonstration of static longitudinal stability.**

\* \* \* \* \*

(d) \* \* \*

(4) The airplane trimmed at 1.4V<sub>SO</sub> with—

- (i) Power or thrust off, and
- (ii) Power or thrust for level flight.

\* \* \* \* \*

Issued in Renton, Washington, on December 18, 2001.

**Vi Lipski,**

*Manager, Transport Airplane Directorate, Aircraft Certification.*

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