Federal Aviation Administration, DOT

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The Instructions for Continued Airworthiness must contain the following manuals or sections, as appropriate, and information:

(a) Rotorcraft maintenance manual or section.
(b) A description of the rotorcraft and its systems and installations including its engines, rotors, and appliances.
(c) Basic control and operation information describing how the rotorcraft components and systems are controlled and how they operate, including any special procedures and limitations that apply.
(d) Servicing information that covers details regarding servicing points, capacities of tanks, reservoirs, types of fluids to be used, pressures applicable to the various systems, location of access panels for inspection and servicing, locations of lubrication points, the lubricants to be used, equipment required for servicing, tow instructions and limitations, mooring, jacking, and leveling information.
(e) Maintenance instructions. (1) Scheduling information for each part of the rotorcraft and its engines, auxiliary power units, rotors, accessories, instruments and equipment that provides the recommended periods at which they should be cleaned, inspected, adjusted, tested, and lubricated, and the degree of inspection, the applicable wear tolerances, and work recommended at these periods.
(f) Troubleshooting information describing problem malfunctions, how to recognize those malfunctions, and the remedial action for those malfunctions.
(g) Information describing the order and method of removing and replacing products and parts with any necessary precautions to be taken.
(h) Other general procedural instructions including procedures for system testing during ground running, symmetry checks, weighing and determining the center of gravity, lifting and shoring, and storage limitations.
(i) Diagrams of structural access plates and information needed to gain access for inspections when access plates are not provided.
(j) Details for the application of special inspection techniques including radiographic and ultrasonic testing where such processes are specified.
(k) Information needed to apply protective treatments to the structure after inspection.
(l) All data relative to structural fasteners such as identification, discarded recommendations, and torque values.
(m) A list of special tools needed.

APPENDIX B TO PART 27—AIRWORTHINESS LIMITATIONS SECTION.

The Instructions for Continued Airworthiness must contain a section, titled Airworthiness Limitations that is segregated and clearly distinguishable from the rest of the document. This section must set forth each mandatory replacement time, structural inspection interval, and related structural inspection procedure required for type certification. If the Instructions for Continued Airworthiness consist of multiple documents, the section required by this paragraph must be included in the principal manual. This section must contain a legible statement in a prominent location that reads: “The Airworthiness Limitations section is FAA approved and specifies inspections and other maintenance required under §§43.16 and 91.403 of the Federal Aviation Regulations unless an alternative program has been FAA approved.”

APPENDIX B TO PART 27—AIRWORTHINESS CRITERIA FOR HELICOPTER INSTRUMENT FLIGHT

I. General. A normal category helicopter may not be type certificated for operation under the instrument flight rules (IFR) of this chapter unless it meets the design and installation requirements contained in this appendix.

II. Definitions. (a) $V_{YI}$ means instrument climb speed, utilized instead of $V_S$ for compliance with the climb requirements for instrument flight.
(b) $V_{MAX}$ means instrument flight never exceed speed, utilized instead of $V_{NE}$ for compliance with maximum limit speed requirements for instrument flight.
(c) $V_{MIN}$ means instrument flight minimum speed, utilized in complying with minimum limit speed requirements for instrument flight.

III. Trim. It must be possible to trim the cyclic, collective, and directional control forces to zero at all approved IFR airspeeds, power settings, and configurations appropriate to the type.

IV. Static longitudinal stability. (a) General. The helicopter must possess positive static longitudinal control force stability at critical combinations of weight and center of gravity.
gravity at the conditions specified in paragraph IV(b) or (c) of this appendix, as appropriate. The stick force must vary with speed so that any substantial speed change results in a stick force clearly perceptible to the pilot. For single-pilot approval, the airspeed must return to within 10 percent of the trim speed when the control force is slowly released for each trim condition specified in paragraph IV(b) of this appendix.

(b) For single-pilot approval:
(i) Climb. Stability must be shown in climb throughout the speed range 20 knots either side of trim with—
   (i) The helicopter trimmed at \( V_{NH} \);
   (ii) Landing gear retracted (if retractable); and
   (iii) Power required for limit climb rate (at least 1,000 fpm) at \( V_{NH} \) or maximum continuous power, whichever is less.

(ii) Cruise. Stability must be shown throughout the speed range from 0.7 to 1.1 \( V_{NH} \) or \( V_{SNL} \), whichever is lower, to not exceed ±20 knots from trim with—
   (i) The helicopter trimmed and power adjusted for level flight at 0.9 \( V_{NH} \) or 0.9 \( V_{SNL} \), whichever is lower; and
   (ii) Landing gear retracted (if retractable).

(iii) Power required for limit climb rate (at least 1,000 fpm) at \( V_{NH} \) or \( V_{SNL} \) or 0.9 \( V_{SNL} \) to 1.3 \( V_{SNL} \) or 20 knots above trim speed, whichever is greater, with—
   (i) the helicopter trimmed and power adjusted for level flight at 1.1 \( V_{SNL} \); and
   (ii) Landing gear retracted (if retractable).

(iv) Descent. Stability must be shown throughout the speed range 20 knots either side of trim with—
   (i) The helicopter trimmed at 0.8 \( V_{NH} \) or 0.8 \( V_{SNL} \) (or 0.8 \( V_{NH} \) for the landing gear extended case), whichever is lower;
   (ii) Power required for 1,000 fpm descent at trim speed; and
   (iii) Landing gear extended and retracted, if applicable.

(5) Approach. Stability must be shown throughout the speed range from 0.7 times the minimum recommended approach speed to 20 knots above the maximum recommended approach speed with—
   (i) The helicopter trimmed at the recommended approach speed or speeds;
   (ii) Landing gear extended and retracted, if applicable; and
   (iii) Power required to maintain a 3° glide path and power required to maintain the steepest approach gradient for which approval is requested.

(c) Helicopters approved for a minimum crew of two pilots must comply with the provisions of paragraphs IV(b)(2) and IV(b)(5) of this appendix.

V. Static Lateral Directional Stability. (a) Static directional stability must be positive throughout the approved ranges of airspeed, power, and vertical speed. In straight and steady sideslips up to ±10° from trim, directional control position must increase without discontinuity with the angle of sideslip, except for a small range of sideslip angles around trim. At greater angles up to the maximum sideslip angle appropriate to the type, increased directional control position must produce an increased angle of sideslip. It must be possible to maintain balanced flight without exceptional pilot skill or alertness.

(b) During sideslips up to ±10° from trim throughout the approved ranges of airspeed, power, and vertical speed, there must be no negative dihedral stability perceptible to the pilot through lateral control motion or force. Longitudinal cyclic movement with sideslip must not be excessive.

VI. Dynamic stability. (a) For single-pilot approval—

(1) Any oscillation having a period of less than 5 seconds must damp to \( \frac{1}{2} \) amplitude in not more than one cycle.

(2) Any oscillation having a period of 5 seconds or more but less than 10 seconds must damp to \( \frac{1}{2} \) amplitude in not more than two cycles.

(b) For helicopters approved with a minimum crew of two pilots—

(1) Any oscillation having a period of 20 seconds or more may not achieve double amplitude in less than 20 seconds.

(2) Any oscillation having a period of 10 seconds or more but less than 20 seconds must be damped.

(3) Any oscillation having a period of 10 seconds or more but less than 20 seconds may not achieve double amplitude in less than 6 seconds.

(b) For helicopters approved with a minimum crew of two pilots—

(1) Any oscillation having a period of less than 5 seconds must damp to \( \frac{1}{2} \) amplitude in not more than two cycles.

(2) Any oscillation having a period of 5 seconds or more but less than 10 seconds must be damped.

(3) Any oscillation having a period of 10 seconds or more may not achieve double amplitude in less than 10 seconds.

VII. Stability Augmentation System (SAS).

(a) If a SAS is used, the reliability of the SAS must be related to the effects of its failure. Any SAS failure condition that would prevent continued safe flight and landing must be extremely improbable. It must be shown that, for any failure condition of the SAS that is not shown to be extremely improbable—

(1) The helicopter is safely controllable when the failure or malfunction occurs at any speed or attitude within the approved IFR operating limitations; and

(2) The overall flight characteristics of the helicopter allow for prolonged instrument flight without undue pilot effort. Additional unrelated probable failures affecting the control system must be considered. In addition—

(i) The controllability and maneuverability requirements in Subpart B of this
Abbreviations

C27.1 General.

A small multiengine rotorcraft may not be type certificated for Category A operation unless it meets the design installation and performance requirements contained in this appendix in addition to the requirements of this part.

C27.2 Applicable part 29 sections. The following sections of part 29 of this chapter must be met in addition to the requirements of this part:

(i) Only the required flight instruments for the first pilot may be connected to that operating system;

(ii) Additional instruments, systems, or equipment may not be connected to an operating system for a second pilot unless provisions are made to ensure the continued normal functioning of the required instruments in the event of any malfunction of the additional instruments, systems, or equipment which is not shown to be extremely improbable;

(iii) The equipment, systems, and installation must be designed so that one display of the information essential to the safety of flight which is provided by the instruments will remain available to a pilot, without additional crewmember action, after any single failure or combination of failures that is not shown to be extremely improbable; and

(iv) For single-pilot configurations, instruments which require a static source must be provided with a means of selecting an alternate source and that source must be calibrated.

IX. Rotorcraft Flight Manual. A Rotorcraft Flight Manual or Rotorcraft Flight Manual IFR Supplement must be provided and must contain—

(a) Limitations. The approved IFR flight envelope, the IFR flightcrew composition, the revised kinds of operation, and the steepest IFR precision approach gradient for which the helicopter is approved;

(b) Procedures. Required information for proper operation of IFR systems and the recommended procedures in the event of stability augmentation or electrical system failures; and

(c) Performance. If \( V_{SI} \) differs from \( V_{S} \), climb performance at \( V_{SI} \) and with maximum continuous power throughout the ranges of weight, altitude, and temperature for which approval is requested.

X. Electrical and electronic system lightning protection. For regulations concerning lightning protection for electrical and electronic systems, see §27.1316.


APPENDIX C TO PART 27—CRITERIA FOR CATEGORY A