a29.2 Format
(a) The Instructions for Continued Airworthiness must be in the form of a manual or manuals as appropriate for the quantity of data to be provided.
(b) The format of the manual or manuals must provide for a practical arrangement.

a29.3 Content
The contents of the manual or manuals must be prepared in the English language. The Instructions for Continued Airworthiness must contain the following manuals and sections, as appropriate, and information:

1. 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.
2. A description of the rotorcraft and its systems and installations including its engines, rotors, and appliances.
3. An explanation of the rotorcraft’s features and installation requirements contained in this chapter unless it meets the design and installation requirements contained in this appendix.
4. Troubleshooting information describing probable malfunctions, how to recognize those malfunctions, and the remedial action for those malfunctions.
5. Information describing the order and method of removing and replacing products and parts with any necessary precautions to be taken.
6. 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.
7. Diagrams of structural access plates and information needed to gain access for inspections when access plates are not provided.
8. Details for the application of special inspection techniques including radiographic and ultrasonic testing where such processes are specified.
9. Information needed to apply protective treatments to the structure after inspection.
10. All data relative to structural fasteners such as identification, discard recommendations, and torque values.
11. A list of special tools needed.

a29.4 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 approved under §29.571. 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 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 29—AIRWORTHINESS CRITERIA FOR HELICOPTER INSTRUMENT FLIGHT

I. General. A transport 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) $V_{NI}$ means instrument climb speed, utilized instead of $V_{Y}$ for compliance with the climb requirements for instrument flight.

(b) $V_{NE}$ means instrument flight never exceed speed, utilized instead of $V_{NE}$ for compliance with maximum limit speed requirements for instrument flight.
Federal Aviation Administration, DOT

(c) $V_{WINS}$ 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 at the conditions specified in paragraphs IV (b) through (f) of this appendix. The stick force must vary with speed so that any substantial speed change results in a stick force clearly perceptible to the pilot. 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 paragraphs IV (b) through (f) of this appendix.

(b) Climb. Stability must be shown in climb throughout the speed range 20 knots either side of trim with—

1. The helicopter trimmed at $V_{TH}$;
2. Landing gear retracted (if retractable); and
3. Power required for limit climb rate (at least 1,000 fpm) at $V_{TH}$ or maximum continuous power, whichever is lower.

(c) Cruise. Stability must be shown throughout the speed range from 0.7 to 1.1 $V_{TH}$ or $V_{SRSN}$, whichever is lower, not to exceed $\pm 20$ degrees 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 increase without discontinuity with the angle of sideslip. It must be possible to maintain balanced flight without exceptional pilot skill or alertness.

(d) Any aperiodic response may not achieve double amplitude in less than 5 seconds.

(e) Any oscillation having a period of 5 seconds or more but less than 10 seconds must damp to 1/2 amplitude in not more than one cycle.

(f) Any oscillation having a period of 10 seconds or more but less than 20 seconds must damp to 1/2 amplitude in not more than two cycles.

(g) Any oscillation having a period of 20 seconds or more may not achieve double amplitude in less than 9 seconds.

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 $\pm 10^\circ$ 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 $\pm 10^\circ$ 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) Any oscillation having a period of less than 5 seconds must damp to 1/2 amplitude in not more than one cycle.

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

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

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

(e) Any aperiodic response may not achieve double amplitude in less than 9 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 altitude 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—

1. The controllability and maneuverability requirements in Subpart B must be met throughout a practical flight envelope;
(ii) The flight control, trim, and dynamic stability characteristics must not be impaired below a level needed to allow continued safe flight and landing;

(ii) For Category A helicopters, the dynamic stability requirements of Subpart B must also be met throughout a practical flight envelope; and

(iv) The static longitudinal and static directional stability requirements of Subpart B must be met throughout a practical flight envelope.

(b) The SAS must be designed so that it cannot create a hazardous deviation in flight path or produce hazardous loads on the helicopter during normal operation or in the event of malfunction or failure, assuming corrective action begins within an appropriate period of time. Where multiple systems are installed, subsequent malfunction conditions must be considered in sequence unless their occurrence is shown to be improbable.

VIII. Equipment, systems, and installation.

The basic equipment and installation must comply with Subpart F of Part 29 through Amendment 29–14, with the following exceptions and additions:

(a) Flight and navigation instruments. (1) A magnetic gyro-stabilized direction indicator instead of the gyroscopic direction indicator required by §29.1303(h); and

(2) A standby attitude indicator which meets the requirements of §§29.1303(g)(1) through (7), instead of a rate-of-turn indicator required by §29.1303(g). If standby batteries are provided, they may be charged from the aircraft electrical system if adequate isolation is incorporated. The system must be designed so that the standby batteries may not be used for engine starting.

(b) Miscellaneous requirements. (1) Instrument systems and other systems essential for IFR flight that could be adversely affected by icing must be provided with adequate ice protection whether or not the rotorcraft is certificated for operation in icing conditions.

(2) There must be means in the generating system to automatically de-energize and disconnect from the main bus any power source developing hazardous overvoltage.

(3) Each required flight instrument using a power supply (electric, vacuum, etc.) must have a visual means integral with the instrument to indicate the adequacy of the power being supplied.

(4) When multiple systems performing like functions are required, each system must be grouped, routed, and spaced so that physical separation between systems is provided to ensure that a single malfunction will not adversely affect more than one system.

(5) For systems that operate the required flight instruments at each pilot’s station—

(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 installations 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 crew-member 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.

(6) In determining compliance with the requirements of §29.1351(d)(2), the supply of electrical power to all systems necessary for flight under IFR must be included in the evaluation.

(c) Thunderstorm lights. In addition to the instrument lights required by §29.1381(a), thunderstorm lights which provide high intensity white flood lighting to the basic flight instruments must be provided. The thunderstorm lights must be installed to meet the requirements of §29.1381(b).

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 $V_{V}$, climb performance at $V_{SI}$ and with maximum continuous power throughout the ranges of weight, altitude, and temperature for which approval is requested.