Compliance Checklist		
Legend: A-analysis, C-comparison, D-design, T-test		
FAR Amdt.	**Compliance Method**	**Description**
27.51 Amdt. 0	C, T	Takeoff. (a) The takeoff, with takeoff power and r.p.m., and with the extreme forward center of gravity-- (1) May not require exceptional piloting skill or exceptionally favorable conditions; and (2) Must be made in such a manner that a landing can be made safely at any point along the flight path if an engine fails. (b) Paragraph (a) of this section must be met throughout the ranges of-- (1) Altitude, from standard sea level conditions to the maximum altitude capability of the rotorcraft, or 7,000 feet, whichever is less; and (2) Weight, from the maximum weight (at sea level) to each lesser weight selected by the applicant for each altitude covered by subparagraph (1) of this paragraph.
27.65 Amdt. 27-33	C, T	Climb: All engines operating. (a) For rotorcraft other than helicopters-- (1) The steady rate of climb, at V_Y, must be determined-- (i) With maximum continuous power on each engine; (ii) With the landing gear retracted; and (iii) For the weights, altitudes, and temperatures for which certification is requested; and (2) **[**The climb gradient, at the rate of climb determined in accordance with paragraph (a)(1) of this section, must be either--**]** (i) At least 1:10 if the horizontal distance required to take off and climb over a 50-foot obstacle is determined for each weight, altitude, and temperature within the range for which certification is requested; or (ii) **[**At least 1:6 under standard sea level conditions.**]** (b) Each helicopter must meet the following requirements: (1) V_Y must be determined-- (i) For standard sea level conditions; (ii) At maximum weight; and (iii) With maximum continuous power on each engine. (2) **[**The steady rate of climb must be determined-- (i) At the climb speed selected by the applicant at or below V_{NE}; (ii) Within the range from sea level up to the maximum altitude for which certification is requested; (iii) For the weights and temperatures that correspond to the altitude range set forth in paragraph (b)(2)(ii) of this section and for which certification is requested; and (iv) With maximum continuous power on each engine.**]**
27.71 Amdt. 27-21	C, T	**[**Glide performance.**]** **[**For single-engine helicopters and multiengine helicopters that do not meet the Category A engine isolation requirements of Part 29 of this chapter, the minimum rate of descent airspeed and the best angle-of-glide airspeed must be determined in autorotation at-- (a) Maximum weight; and (b) Rotor speed(s) selected by the applicant.**]**

27.73 Amdt. 0	C, T	Performance at minimum operating speed. (a) For helicopters-- (1) The hovering ceiling must be determined over the ranges of weight, altitude, and temperature for which certification is requested, with-- (i) Takeoff power; (ii) The landing gear extended; and (iii) The helicopter in ground effect at a height consistent with normal takeoff procedures; and (2) The hovering ceiling determined under subparagraph (1) of this paragraph must be at least-- (i) For reciprocating engine powered helicopters, 4,000 feet at maximum weight with a standard atmosphere; or (ii) For turbine engine powered helicopters, 2,500 feet pressure altitude at maximum weight at a temperature of standard +40 degrees F. (b) For rotorcraft other than helicopters, the steady rate of climb at the minimum operating speed must be determined, over the ranges of weight, altitude, and temperature for which certification is requested, with-- (1) Takeoff power; and (2) The landing gear extended.
27.75 Amdt. 27-14	C, T	Landing. (a) The rotorcraft must be able to be landed with no excessive vertical acceleration, no tendency to bounce, nose over, ground loop, porpoise, or water loop, and without exceptional piloting skills or exceptionally favorable conditions, with-- (1) Approach or glide speeds appropriate to the type of rotorcraft and selected by the applicant; (2) The approach and landing made with-- (i) Power off, for single-engine rotorcraft; and **[**(ii) For multiengine rotorcraft, one engine inoperative and with each operating engine within approved operating limitations; and**]** (3) The approach and landing entered from steady autorotation. (b) Multiengine rotorcraft must be able to be landed safely after complete power failure under normal operating conditions.
27.79 Amdt. 27-21	C, T	Limiting height--speed envelope. (a) If there is any combination of height and forward speed (including hover) under which a safe landing cannot be made under the applicable power failure condition in paragraph (b) of this section, a limiting height-speed envelope must be established (including all pertinent information) for that condition, throughout the ranges of-- (1) Altitude, from standard sea level conditions to the maximum altitude capability of the rotorcraft, or 7,000 feet, whichever is less; and **[**(2) Weight, from the maximum weight (at sea level) to the lesser weight selected by the applicant for each altitude covered by paragraph (a)(1) of this section. For helicopters, the weight at altitudes above sea level may not be less than the maximum weight or the highest weight allowing hovering out of ground effect, which is lower.**]** (b) The applicable power failure conditions are-- (1) For single-engine helicopters, full autorotation; (2) For multiengine helicopters, one engine inoperative (where engine isolation features ensure continued operation of the remaining engines); and the remaining engines at the greatest power for which certification is requested; and (3) For other rotorcraft, conditions appropriate to the type.

27.141 Amdt. 27-21	T	General. The rotorcraft must-- **[**(a) Except as specifically required in the applicable section meet the flight characteristics requirements of this subpart-- (1) At the altitudes and temperatures expected in operation;**]** (2) Under any critical loading condition within the range of weights and centers of gravity for which certification is requested; (3) For power-on operations, under any condition of speed, power, and rotor r.p.m. for which certification is requested; and (4) For power-off operations, under any condition of speed and rotor r.p.m. for which certification is requested that is attainable with the controls rigged in accordance with the approved rigging instructions and tolerances; (b) Be able to maintain any required flight condition and make a smooth transition from any flight condition to any other flight condition without exceptional piloting skill, alertness, or strength, and without danger of exceeding the limit load factor under any operating condition probable for the type, including-- (1) Sudden failure of one engine, for multiengine rotorcraft meeting Transport Category A engine isolation requirements of Part 29 of this chapter; and (2) Sudden, complete power failure, for other rotorcraft; and (3) Sudden, complete control system failures specified in Sec. 27.695 of this Part; and (c) Have any additional characteristic required for night or instrument operation, if certification for those kinds of operation is requested. Requirements for helicopter instrument flight are contained in Appendix B of this Part.
27.143 Amdt. 27-21	T	Controllability and maneuverability. (a) The rotorcraft must be safely controllable and maneuverable-- (1) During steady flight; and (2) During any maneuver appropriate to the type, including-- (i) Takeoff; (ii) Climb; (iii) Level flight; (iv) Turning flight; (v) Glide; (vi) Landing (power on and power off); and (vii) Recovery to power-on flight from a balked autorotative approach. (b) The margin of cyclic control must allow satisfactory roll and pitch control at V_{NE} with-- (1) Critical weight; (2) Critical center of gravity; (3) Critical rotor r.p.m.; and (4) Power off (except for helicopters demonstrating compliance with paragraph (e) of this section) and power on. (c) A wind velocity of not less than 17 knots must be established in which the rotorcraft can be operated without loss of control on or near the ground in any maneuver appropriate to the type (such as crosswind takeoffs, sideward flight, and rearward flight), with-- (1) Critical weight; **[**(2) Critical center of gravity; (3) Critical rotor r.p.m.; and (4) Altitude, from standard sea level conditions to the maximum altitude capability of the rotorcraft or 7,000 feet, whichever is less.**]** (d) The rotorcraft, after (1) failure of one engine in the case of multiengine rotorcraft

		that meet Transport Category A engine isolation requirements, or (2) complete engine failure in the case of other rotorcraft, must be controllable over the range of speeds and altitudes for which certification is requested when such power failure occurs with maximum continuous power and critical weight. No corrective action time delay for any condition following power failure may be less than-- (i) For the cruise condition, one second, or normal pilot reaction time (whichever is greater); and (ii) For any other condition, normal pilot reaction time. (e) For helicopters for which a V_{NE} (power-off) is established under Sec. 27.1505(c), compliance must be demonstrated with the following requirements with critical weight, critical center of gravity, and critical rotor r.p.m.: (1) The helicopter must be safely slowed to V_{NE} (power-off), without exceptional pilot skill, after the last operating engine is made inoperative at power-on V_{NE}. (2) At a speed of 1.1 V_{NE} (power-off), the margin of cyclic control must allow satisfactory roll and pitch control with power off.
27.171 Amdt. 0	T	Stability: general. The rotorcraft must be able to be flown, without undue pilot fatigue or strain, in any normal maneuver for a period of time as long as that expected in normal operation. At least three landings and takeoffs must be made during this demonstration.
27.177 Amdt. 27-21	T	**[**Static directional stability.**]** **[**Static directional stability must be positive with throttle and collective controls held constant at the trim conditions specified in Sec. 27.175 (a) and (b). This must be shown by steadily increasing directional control deflection for sideslip angles up to $\pm$ 10° from trim. Sufficient cues must accompany sideslip to alert the pilot when approaching sideslip limits.**]**
27.251 Amdt. 0	T	Vibration. Each part of the rotorcraft must be free from excessive vibration under each appropriate speed and power condition.
27.301 Amdt. 0	A, D	Loads. (a) Strength requirements are specified in terms of limit loads (the maximum loads to be expected in service) and ultimate loads (limit loads multiplied by prescribed factors of safety). Unless otherwise provided, prescribed loads are limit loads. (b) Unless otherwise provided, the specified air, ground, and water loads must be placed in equilibrium with inertia forces, considering each item of mass in the rotorcraft. These loads must be distributed to closely approximate or conservatively represent actual conditions. (c) If deflections under load would significantly change the distribution of external or internal loads, this redistribution must be taken into account.
27.303 Amdt. 0	A, D	Factor of safety. Unless otherwise provided, a factor of safety of 1.5 must be used. This factor applies to external and inertia loads unless its application to the resulting internal stresses is more conservative.

27.305 Amdt. 0	A, D	Strength and deformation. (a) The structure must be able to support limit loads without detrimental or permanent deformation. At any load up to limit loads, the deformation may not interfere with safe operation. (b) The structure must be able to support ultimate loads without failure. This must be shown by-- (1) Applying ultimate loads to the structure in a static test for at least three seconds; or (2) Dynamic tests simulating actual load application.
27.307 Amdt. 27-26	A, D, T	Proof of structure. (a) **[**Compliance with the strength and deformation requirements of this subpart must be shown for each critical loading condition accounting for the environment to which the structure will be exposed in operation. Structural analysis (static or fatigue) may be used only if the structure conforms to those structures for which experience has shown this method to be reliable. In other cases, substantiating load tests must be made.**]** (b) Proof of compliance with the strength requirements of this subpart must include-- (1) Dynamic and endurance tests of rotors, rotor drives, and rotor controls; (2) Limit load tests of the control system, including control surfaces; (3) Operation tests of the control system; (4) Flight stress measurement tests; (5) Landing gear drop tests; and (6) Any additional test required for new or unusual design features.
27.309 Amdt. 0	T	Design limitations. The following values and limitations must be established to show compliance with the structural requirements of this subpart: (a) The design maximum weight. (b) The main rotor r.p.m. ranges, power on and power off. (c) The maximum forward speeds for each main rotor r.p.m. within the ranges determined under paragraph (b) of this section. (d) The maximum rearward and sideward flight speeds. (e) The center of gravity limits corresponding to the limitations determined under paragraphs (b), (c), and (d) of this section. (f) The rotational speed ratios between each powerplant and each connected rotating component. (g) The positive and negative limit maneuvering load factors.
27.321 Amdt. 27-11	T	General. **[**(a) The flight load factor must be assumed to act normal to the longitudinal axis of the rotorcraft, and to be equal in magnitude and opposite in direction to the rotorcraft inertia load factor at the center of gravity.**]** (b) Compliance with the flight load requirements of this subpart must be shown-- (1) At each weight from the design minimum weight to the design maximum weight; and (2) With any practical distribution of disposable load within the operating limitations in the Rotorcraft Flight Manual.
27.341 Amdt. 0	T	Gust loads. The rotorcraft must be designed to withstand, at each critical airspeed including hovering, the loads resulting from a vertical gust of 30 feet per second.

27.351 Amdt. 27-34	T	Yawing conditions. (a) Each rotorcraft must be designed for the loads resulting from the maneuvers specified in paragraphs (b) and (c) of this section with-- (1) Unbalanced aerodynamic moments about the center of gravity which the aircraft reacts to in a rational or conservative manner considering the principal masses furnishing the reacting inertia forces; and (2) Maximum main rotor speed. (b) To produce the load required in paragraph (a) of this section, in unaccelerated flight with zero yaw, at forward speeds from zero up to 0.6 V_{NE}-- (1) Displace the cockpit directional control suddenly to the maximum deflection limited by the control stops or by the **[**maximum pilot force specified in Sec. 27.397(a);**]** (2) Attain a resulting sideslip angle or 90°, whichever is less; and (3) Return the directional control suddenly to neutral. (c) To produce the load required in paragraph (a) of this section, in unaccelerated flight with zero yaw, at forward speeds from 0.6 V_{NE} up to V_{NE} or V_H, whichever is less-- (1) Displace the cockpit directional control suddenly to the maximum deflection limited by the control stops or by the **[**maximum pilot force specified in Sec. 27.397(a);**]** (2) Attain a resulting sideslip angle or 15°, whichever is less, at the lesser speed of V_{NE} or V_H; (3) Vary the sideslip angles of paragraphs (b)(2) and (c)(2) of this section directly with speed; and (4) Return the directional control suddenly to neutral.
27.571 Amdt. 27-26	T	Fatigue evaluation of flight structure. (a) **[***General.* Each portion of the flight structure (the flight structure includes rotors, rotor drive systems between the engines and the rotor hubs, controls, fuselage, landing gear, and their related primary attachments), the failure of which could be catastrophic, must be identified and must be evaluated under paragraph (b), (c), (d), or (e) of this section. The following apply to each fatigue evaluation:**]** (1) The procedure for the evaluation must be approved. (2) The locations of probable failure must be determined. (3) Inflight measurement must be included in determining the following: (i) Loads or stresses in all critical conditions throughout the range of limitations in Sec. 27.309, except that maneuvering load factors need not exceed the maximum values expected in operation. (ii) The effect of altitude upon these loads or stresses. (4) **[**The loading spectra must be as severe as those expected in operation including, but not limited to, external cargo operations, if applicable, and ground-air-ground cycles. The loading spectra must be based on loads or stresses determined under paragraph (a)(3) of this section.**]** (b) *Fatigue tolerance evaluation.* It must be shown that the fatigue tolerance of the structure ensures that the probability of catastrophic fatigue failure is extremely remote without establishing replacement times, inspection intervals or other procedures under Sec. A27.4 of Appendix A. (c) *Replacement time evaluation.* It must be shown that the probability of catastrophic fatigue failure is extremely remote within a replacement time furnished under Sec. A27.4 of Appendix A. (d) *Failsafe evaluation.* The following apply to failsafe evaluation: (1) It must be shown that all partial failures will become readily detectable under

		inspection procedures furnished under A27.4 of Appendix A. (2) The interval between the time when any partial failure becomes readily detectable under paragraph (d)(1) of this section, and the time when any such failure is expected to reduce the remaining strength of the structure to limit or maximum attainable loads (whichever is less), must be determined. (3) It must be shown that the interval determined under paragraph (d)(2) of this section is long enough, in relation to the inspection intervals and related procedures furnished under A27.4 of Appendix A, to provide a probability of detection great enough to ensure that the probability of catastrophic failure is extremely remote. (e) *Combination of replacement time and failsafe evaluations.* A component may be evaluated under a combination of paragraphs (c) and (d) of this section. For such component it must be shown that the probability of catastrophic failure is extremely remote with an approved combination of replacement time, inspection intervals, and related procedures furnished under A27.4 of Appendix A.
27.601 Amdt. 0	D	Design. (a) The rotorcraft may have no design features or details that experience has shown to be hazardous or unreliable. (b) The suitability of each questionable design detail and part must be established by tests.
27.603 Amdt. 27-16	D	Materials. The suitability and durability of materials used for parts, the failure of which could adversely affect safety, must-- **[**(a) Be established on the basis of experience or tests; (b) Meet approved specifications that ensure their having the strength and other properties assumed in the design data; and (c) Take into account the effects of environmental conditions, such as temperature and humidity, expected in service.**]**
27.605 Amdt. 27-16	D	Fabrication methods. **[**(a)**]** The methods of fabrication used must produce consistently sound structures. If a fabrication process (such as gluing, spot welding, or heat-treating) requires close control to reach this objective, the process must be performed according to an approved process specification. **[**(b) Each new aircraft fabrication method must be substantiated by a test program.**]**
27.609 Amdt. 0	D	Protection of structure. Each part of the structure must-- (a) Be suitably protected against deterioration or loss of strength in service due to any cause, including-- (1) Weathering; (2) Corrosion; and (3) Abrasion; and (b) Have provisions for ventilation and drainage where necessary to prevent the accumulation of corrosive, flammable, or noxious fluids.
27.610 Amdt. 27-37	D	**[**Lightning and static electricity protection.**]** (a) The rotorcraft must be protected against catastrophic effects from lightning.

		(b) For metallic components, compliance with paragraph (a) of this section may be shown by-- (1) Electrically bonding the components properly to the airframe; or (2) Designing the components so that a strike will not endanger the rotorcraft. (c) For nonmetallic components, compliance with paragraph (a) of this section may be shown by-- (1) Designing the components to minimize the effect of a strike; or (2) Incorporating acceptable means of diverting the resulting electrical current so as not to endanger the rotorcraft. **[**(d) The electrical bonding and protection against lightning and static electricity must- (1) Minimize the accumulation of electrostatic charge; (2) Minimize the risk of electric shock to crew, passengers, and service and maintenance personnel using normal precautions; (3) Provide an electrical return path, under both normal and fault conditions, on rotorcraft having grounded electrical systems; and (4) Reduce to an acceptable level the effects of lightning and static electricity on the functioning of essential electrical and electronic equipment. **]**
27.613 Amdt. 27-26	D, T	Material strength properties and design values. (a) Material strength properties must be based on enough tests of material meeting specifications to establish design values on a statistical basis. **[**(b) Design values must be chosen to minimize the probability of structural failure due to material variability. Except as provided in paragraphs (d) and (e) of this section, compliance with this paragraph must be shown by selecting design values that assure material strength with the following probability-- (1) Where applied loads are eventually distributed through a single member within an assembly, the failure of which would result in loss of structural integrity of the component, 90 percent probability with 95 percent confidence; and (2) For redundant structure, those in which the failure of individual elements would result in applied loads being safely distributed to other load-carrying members, 90 percent probability with 95 percent confidence.**]** (c) The strength, detail design, and fabrication of the structure must minimize the probability of disastrous fatigue failure, particularly at points of stress concentration. **[**(d) Design values may be those contained in the following publications (available from the Naval Publications and Forms Center, 5301 Tabor Avenue, Philadelphia, Pennsylvania 19120) or other values approved by the Administrator:**]** (1) MIL-HDBK-5, "Metallic Materials and Elements for Flight Vehicle Structure". (2) MIL-HDBK-17, "Plastics for Flight Vehicles". (3) ANC-18, "Design of Wood Aircraft Structures". (4) MIL-HDBK-23, "Composite Construction for Flight Vehicles". **[**(e) Other design values may be used if a selection of the material is made in which a specimen of each individual item is tested before use and it is determined that the actual strength properties of that particular item will equal or exceed those used in design.**]**
27.629 Amdt. 27-26	D, T	Flutter. Each **[**aerodynamic surface**]** of the rotorcraft must be free from flutter under each appropriate speed and power condition.
27.653 Amdt. 27-2	D	Pressure venting and drainage of rotor blades.

		[(a) For each rotor blade-- (1) There must be means for venting the internal pressure of the blade; (2) Drainage holes must be provided for the blade; and (3) The blade must be designed to prevent water from becoming trapped in it. (b) Paragraphs (a)(1) and (2) of this section do not apply to sealed rotor blades capable of withstanding the maximum pressure differentials expected in service.**]**
27.659 Amdt. 27-2	D	Mass balance. **[**(a) The rotors and blades must be mass balanced as necessary to-- (1) Prevent excessive vibration; and (2) Prevent flutter at any speed up to the maximum forward speed. (b) The structural integrity of the mass balance installation must be substantiated.**]**
27.1529 Amdt. 27-18	D	**[**Instructions for Continued Airworthiness.**]** **[**The applicant must prepare Instructions for Continued Airworthiness in accordance with Appendix A to this Part that are acceptable to the Administrator. The instructions may be incomplete at type certification if a program exists to ensure their completion prior to delivery of the first rotorcraft or issuance of a standard certificate of airworthiness, whichever occurs later.**]**
27.1565 Amdt. 27-2	D	Tail rotor. **[**Each tail rotor must be marked so that its disc is conspicuous under normal daylight ground conditions.**]**
27.1581 Amdt. 27-14	C, T	General. **[**(a) *Furnishing information.* A Rotorcraft Flight Manual must be furnished with each rotorcraft, and it must contain the following: (1) Information required by Secs. 27.1583 through 27.1589. (2) Other information that is necessary for safe operation because of design, operating, or handling characteristics. (b) *Approved information.* Each part of the manual listed in Secs. 27.1583 through 27.1589, that is appropriate to the rotorcraft, must be furnished, verified, and approved, and must be segregated, identified, and clearly distinguished from each unapproved part of that manual. (c) [Reserved.] (d) *Table of contents.* Each Rotorcraft Flight Manual must include a table of contents if the complexity of the manual indicates a need for it.**]**
B27.5 Amdt. 27-19	C, T	**[**V. Static lateral-directional stability.**]** **[**(a) Static directional stability must be positive throughout the approved ranges of airspeed, power, and vertical speed. In straight, steady sideslips up to ±10° from trim, directional control position must increase in approximately constant proportion to angle of sideslip. At greater angles up to the maximum sideslip angle appropriate to the type, increased directional control position must produce increased angle of sideslip. (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.**]**