

**§ 35.36**

equivalent to twice the maximum centrifugal load to which the propeller would be subjected during operation at the maximum rated rotational speed.

(c) Components used with or attached to the propeller (for example, spinners, de-icing equipment, and blade erosion shields) must be subjected to a load equivalent to 159 percent of the maximum centrifugal load to which the component would be subjected during operation at the maximum rated rotational speed. This must be performed by either:

- (1) Testing at the required load for a period of 30 minutes; or
- (2) Analysis based on test.

[Amdt. No. 35-8, 73 FR 63348, Oct. 24, 2008]

**§ 35.36 Bird impact.**

The applicant must demonstrate, by tests or analysis based on tests or experience on similar designs, that the propeller can withstand the impact of a 4-pound bird at the critical location(s) and critical flight condition(s) of a typical installation without causing a major or hazardous propeller effect. This section does not apply to fixed-pitch wood propellers of conventional design.

[Amdt. No. 35-8, 73 FR 63348, Oct. 24, 2008]

**§ 35.37 Fatigue limits and evaluation.**

This section does not apply to fixed-pitch wood propellers of conventional design.

(a) Fatigue limits must be established by tests, or analysis based on tests, for propeller:

- (1) Hubs.
- (2) Blades.
- (3) Blade retention components.
- (4) Components which are affected by fatigue loads and which are shown under § 35.15 to have a fatigue failure mode leading to hazardous propeller effects.

(b) The fatigue limits must take into account:

- (1) All known and reasonably foreseeable vibration and cyclic load patterns that are expected in service; and
- (2) Expected service deterioration, variations in material properties, manufacturing variations, and environmental effects.

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(c) A fatigue evaluation of the propeller must be conducted to show that hazardous propeller effects due to fatigue will be avoided throughout the intended operational life of the propeller on either:

- (1) The intended airplane by complying with §§ 23.907 or 25.907 of this chapter, as applicable; or
- (2) A typical airplane.

[Amdt. No. 35-8, 73 FR 63348, Oct. 24, 2008]

**§ 35.38 Lightning strike.**

The applicant must demonstrate, by tests, analysis based on tests, or experience on similar designs, that the propeller can withstand a lightning strike without causing a major or hazardous propeller effect. The limit to which the propeller has been qualified must be documented in the appropriate manuals. This section does not apply to fixed-pitch wood propellers of conventional design.

[Amdt. No. 35-8, 73 FR 63348, Oct. 24, 2008]

**§ 35.39 Endurance test.**

Endurance tests on the propeller system must be made on a representative engine in accordance with paragraph (a) or (b) of this section, as applicable, without evidence of failure or malfunction.

(a) Fixed-pitch and ground adjustable-pitch propellers must be subjected to one of the following tests:

- (1) A 50-hour flight test in level flight or in climb. The propeller must be operated at takeoff power and rated rotational speed during at least five hours of this flight test, and at not less than 90 percent of the rated rotational speed for the remainder of the 50 hours.
- (2) A 50-hour ground test at takeoff power and rated rotational speed.

(b) Variable-pitch propellers must be subjected to one of the following tests:

- (1) A 110-hour endurance test that must include the following conditions:
  - (i) Five hours at takeoff power and rotational speed and thirty 10-minute cycles composed of:
    - (A) Acceleration from idle,
    - (B) Five minutes at takeoff power and rotational speed,
    - (C) Deceleration, and
    - (D) Five minutes at idle.