

§ 29.921

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(2) For single-engine rotorcraft, each rotor drive system must be so arranged that each rotor necessary for control in autorotation will continue to be driven by the main rotors after disengagement of the engine from the main and auxiliary rotors.

(3) Each rotor drive system must incorporate a unit for each engine to automatically disengage that engine from the main and auxiliary rotors if that engine fails.

(4) If a torque limiting device is used in the rotor drive system, it must be located so as to allow continued control of the rotorcraft when the device is operating.

(5) If the rotors must be phased for intermeshing, each system must provide constant and positive phase relationship under any operating condition.

(6) If a rotor dephasing device is incorporated, there must be means to keep the rotors locked in proper phase before operation.

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§ 29.921 Rotor brake.

If there is a means to control the rotation of the rotor drive system independently of the engine, any limitations on the use of that means must be specified, and the control for that means must be guarded to prevent inadvertent operation.

§ 29.923 Rotor drive system and control mechanism tests.

(a) *Endurance tests, general.* Each rotor drive system and rotor control mechanism must be tested, as prescribed in paragraphs (b) through (n) and (p) of this section, for at least 200 hours plus the time required to meet the requirements of paragraphs (b)(2), (b)(3), and (k) of this section. These tests must be conducted as follows:

(1) Ten-hour test cycles must be used, except that the test cycle must be extended to include the OEI test of paragraphs (b)(2) and (k), of this section if OEI ratings are requested.

(2) The tests must be conducted on the rotorcraft.

(3) The test torque and rotational speed must be—

(i) Determined by the powerplant limitations; and

(ii) Absorbed by the rotors to be approved for the rotorcraft.

(b) *Endurance tests; takeoff run.* The takeoff run must be conducted as follows:

(1) Except as prescribed in paragraphs (b)(2) and (b)(3) of this section, the takeoff torque run must consist of 1 hour of alternate runs of 5 minutes at takeoff torque and the maximum speed for use with takeoff torque, and 5 minutes at as low an engine idle speed as practicable. The engine must be de-clutched from the rotor drive system, and the rotor brake, if furnished and so intended, must be applied during the first minute of the idle run. During the remaining 4 minutes of the idle run, the clutch must be engaged so that the engine drives the rotors at the minimum practical r.p.m. The engine and the rotor drive system must be accelerated at the maximum rate. When de-clutching the engine, it must be decelerated rapidly enough to allow the operation of the overrunning clutch.

(2) For helicopters for which the use of a 2½-minute OEI rating is requested, the takeoff run must be conducted as prescribed in paragraph (b)(1) of this section, except for the third and sixth runs for which the takeoff torque and the maximum speed for use with takeoff torque are prescribed in that paragraph. For these runs, the following apply:

(i) Each run must consist of at least one period of 2½ minutes with takeoff torque and the maximum speed for use with takeoff torque on all engines.

(ii) Each run must consist of at least one period, for each engine in sequence, during which that engine simulates a power failure and the remaining engines are run at the 2½-minute OEI torque and the maximum speed for use with 2½-minute OEI torque for 2½ minutes.

(3) For multiengine, turbine-powered rotorcraft for which the use of 30-second/2-minute OEI power is requested, the takeoff run must be conducted as prescribed in paragraph (b)(1) of this section except for the following:

(i) Immediately following any one 5-minute power-on run required by paragraph (b)(1) of this section, simulate a