

§ 33.72

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there must be means to indicate contamination before it reaches the capacity established in accordance with paragraph (b)(3) of this section.

(5) Any filter bypass must be designed and constructed so that the release of collected contaminants is minimized by appropriate location of the bypass to ensure that the collected contaminants are not in the bypass flow path.

(6) Each strainer or filter required by this paragraph that has no bypass, except the strainer or filter at an oil tank outlet or for a scavenge pump, must have provisions for connection with a warning means to warn the pilot of the occurrence of contamination of the screen before it reaches the capacity established in accordance with paragraph (b)(3) of this section.

(7) Each strainer or filter required by this paragraph must be accessible for draining and cleaning.

(c) *Oil tanks.* (1) Each oil tank must have an expansion space of not less than 10 percent of the tank capacity.

(2) It must be impossible to inadvertently fill the oil tank expansion space.

(3) Each recessed oil tank filler connection that can retain any appreciable quantity of oil must have provision for fitting a drain.

(4) Each oil tank cap must provide an oil-tight seal. For an applicant seeking eligibility for an engine to be installed on an airplane approved for ETOPS, the oil tank must be designed to prevent a hazardous loss of oil due to an incorrectly installed oil tank cap.

(5) Each oil tank filler must be marked with the word “oil.”

(6) Each oil tank must be vented from the top part of the expansion space, with the vent so arranged that condensed water vapor that might freeze and obstruct the line cannot accumulate at any point.

(7) There must be means to prevent entrance into the oil tank or into any oil tank outlet, of any object that might obstruct the flow of oil through the system.

(8) There must be a shutoff valve at the outlet of each oil tank, unless the external portion of the oil system (including oil tank supports) is fireproof.

(9) Each unpressurized oil tank may not leak when subjected to a maximum

operating temperature and an internal pressure of 5 p.s.i., and each pressurized oil tank must meet the requirements of § 33.64.

(10) Leaked or spilled oil may not accumulate between the tank and the remainder of the engine.

(11) Each oil tank must have an oil quantity indicator or provisions for one.

(12) If the propeller feathering system depends on engine oil—

(i) There must be means to trap an amount of oil in the tank if the supply becomes depleted due to failure of any part of the lubricating system other than the tank itself;

(ii) The amount of trapped oil must be enough to accomplish the feathering operation and must be available only to the feathering pump; and

(iii) Provision must be made to prevent sludge or other foreign matter from affecting the safe operation of the propeller feathering system.

(d) *Oil drains.* A drain (or drains) must be provided to allow safe drainage of the oil system. Each drain must—

(1) Be accessible; and

(2) Have manual or automatic means for positive locking in the closed position.

(e) *Oil radiators.* Each oil radiator must withstand, without failure, any vibration, inertia, and oil pressure load to which it is subjected during the block tests.

[Amdt. 33-6, 39 FR 35466, Oct. 1, 1974, as amended by Amdt. 33-10, 49 FR 6852, Feb. 23, 1984; Amdt. 33-21, 72 FR 1877, Jan. 16, 2007; Amdt. 33-27, 73 FR 55437, Sept. 25, 2008; Amdt. 33-27, 73 FR 57235, Oct. 2, 2008]

§ 33.72 Hydraulic actuating systems.

Each hydraulic actuating system must function properly under all conditions in which the engine is expected to operate. Each filter or screen must be accessible for servicing and each tank must meet the design criteria of § 33.71.

[Amdt. 33-6, 39 FR 35467, Oct. 1, 1974]

§ 33.73 Power or thrust response.

The design and construction of the engine must enable an increase—

(a) From minimum to rated takeoff power or thrust with the maximum bleed air and power extraction to be