

§ 29.975

(1) Each filler must be marked as prescribed in § 29.1557(c)(1);

(2) Each recessed filler connection that can retain any appreciable quantity of fuel must have a drain that discharges clear of the entire rotorcraft; and

(3) Each filler cap must provide a fuel-tight seal under the fluid pressure expected in normal operation and in a survivable impact.

(b) Each filler cap or filler cap cover must warn when the cap is not fully locked or seated on the filler connection.

[Doc. No. 26352, 59 FR 50388, Oct. 3, 1994]

§ 29.975 Fuel tank vents and carburetor vapor vents.

(a) *Fuel tank vents.* Each fuel tank must be vented from the top part of the expansion space so that venting is effective under normal flight conditions. In addition—

(1) The vents must be arranged to avoid stoppage by dirt or ice formation;

(2) The vent arrangement must prevent siphoning of fuel during normal operation;

(3) The venting capacity and vent pressure levels must maintain acceptable differences of pressure between the interior and exterior of the tank, during—

(i) Normal flight operation;

(ii) Maximum rate of ascent and descent; and

(iii) Refueling and defueling (where applicable);

(4) Airspaces of tanks with interconnected outlets must be interconnected;

(5) There may be no point in any vent line where moisture can accumulate with the rotorcraft in the ground attitude or the level flight attitude, unless drainage is provided;

(6) No vent or drainage provision may end at any point—

(i) Where the discharge of fuel from the vent outlet would constitute a fire hazard; or

(ii) From which fumes could enter personnel compartments; and

(7) The venting system must be designed to minimize spillage of fuel through the vents to an ignition source in the event of a rollover during land-

14 CFR Ch. I (1-1-08 Edition)

ing, ground operations, or a survivable impact.

(b) *Carburetor vapor vents.* Each carburetor with vapor elimination connections must have a vent line to lead vapors back to one of the fuel tanks. In addition—

(1) Each vent system must have means to avoid stoppage by ice; and

(2) If there is more than one fuel tank, and it is necessary to use the tanks in a definite sequence, each vapor vent return line must lead back to the fuel tank used for takeoff and landing.

[Doc. No. 5084, 29 FR 16150, Dec. 3, 1964, as amended by Amdt. 29-26, 53 FR 34217, Sept. 2, 1988; Amdt. 29-35, 59 FR 50388, Oct. 3, 1994; Amdt. 29-42, 63 FR 43285, Aug. 12, 1998]

§ 29.977 Fuel tank outlet.

(a) There must be a fuel strainer for the fuel tank outlet or for the booster pump. This strainer must—

(1) For reciprocating engine powered airplanes, have 8 to 16 meshes per inch; and

(2) For turbine engine powered airplanes, prevent the passage of any object that could restrict fuel flow or damage any fuel system component.

(b) The clear area of each fuel tank outlet strainer must be at least five times the area of the outlet line.

(c) The diameter of each strainer must be at least that of the fuel tank outlet.

(d) Each finger strainer must be accessible for inspection and cleaning.

[Amdt. 29-12, 41 FR 55473, Dec. 20, 1976]

§ 29.979 Pressure refueling and fueling provisions below fuel level.

(a) Each fueling connection below the fuel level in each tank must have means to prevent the escape of hazardous quantities of fuel from that tank in case of malfunction of the fuel entry valve.

(b) For systems intended for pressure refueling, a means in addition to the normal means for limiting the tank content must be installed to prevent damage to the tank in case of failure of the normal means.

(c) The rotorcraft pressure fueling system (not fuel tanks and fuel tank vents) must withstand an ultimate load that is 2.0 times the load arising

from the maximum pressure, including surge, that is likely to occur during fueling. The maximum surge pressure must be established with any combination of tank valves being either intentionally or inadvertently closed.

(d) The rotorcraft defueling system (not including fuel tanks and fuel tank vents) must withstand an ultimate load that is 2.0 times the load arising from the maximum permissible defueling pressure (positive or negative) at the rotorcraft fueling connection.

[Doc. No. 5084, 29 FR 16150, Dec. 3, 1964, as amended by Amdt. 29-12, 41 FR 55473, Dec. 20, 1976]

FUEL SYSTEM COMPONENTS

§ 29.991 Fuel pumps.

(a) Compliance with § 29.955 must not be jeopardized by failure of—

(1) Any one pump except pumps that are approved and installed as parts of a type certificated engine; or

(2) Any component required for pump operation except the engine served by that pump.

(b) The following fuel pump installation requirements apply:

(1) When necessary to maintain the proper fuel pressure—

(i) A connection must be provided to transmit the carburetor air intake static pressure to the proper fuel pump relief valve connection; and

(ii) The gauge balance lines must be independently connected to the carburetor inlet pressure to avoid incorrect fuel pressure readings.

(2) The installation of fuel pumps having seals or diaphragms that may leak must have means for draining leaking fuel.

(3) Each drain line must discharge where it will not create a fire hazard.

[Amdt. 29-26, 53 FR 34217, Sept. 2, 1988]

§ 29.993 Fuel system lines and fittings.

(a) Each fuel line must be installed and supported to prevent excessive vibration and to withstand loads due to fuel pressure, valve actuation, and accelerated flight conditions.

(b) Each fuel line connected to components of the rotorcraft between which relative motion could exist must have provisions for flexibility.

(c) Each flexible connection in fuel lines that may be under pressure or subjected to axial loading must use flexible hose assemblies.

(d) Flexible hose must be approved.

(e) No flexible hose that might be adversely affected by high temperatures may be used where excessive temperatures will exist during operation or after engine shutdown.

§ 29.995 Fuel valves.

In addition to meeting the requirements of § 29.1189, each fuel valve must—

(a) [Reserved]

(b) Be supported so that no loads resulting from their operation or from accelerated flight conditions are transmitted to the lines attached to the valve.

(Secs. 313(a), 601, and 603, 72 Stat. 759, 775, 49 U.S.C. 1354(a), 1421, and 1423; sec. 6(c), 49 U.S.C. 1655 (c))

[Doc. No. 5084, 29 FR 16150, Dec. 3, 1964, as amended by Amdt. 29-13, 42 FR 15046, Mar. 17, 1977]

§ 29.997 Fuel strainer or filter.

There must be a fuel strainer or filter between the fuel tank outlet and the inlet of the first fuel system component which is susceptible to fuel contamination, including but not limited to the fuel metering device or an engine positive displacement pump, whichever is nearer the fuel tank outlet. This fuel strainer or filter must—

(a) Be accessible for draining and cleaning and must incorporate a screen or element which is easily removable;

(b) Have a sediment trap and drain, except that it need not have a drain if the strainer or filter is easily removable for drain purposes;

(c) Be mounted so that its weight is not supported by the connecting lines or by the inlet or outlet connections of the strainer or filter itself, unless adequate strength margins under all loading conditions are provided in the lines and connections; and

(d) Provide a means to remove from the fuel any contaminant which would jeopardize the flow of fuel through