Federal Aviation Administration, DOT

§ 23.951 General.
(a) Each fuel system must be constructed and arranged to ensure fuel flow at a rate and pressure established for proper engine and auxiliary power unit functioning under each likely operating condition, including any maneuver for which certification is requested and during which the engine or auxiliary power unit is permitted to be in operation.
(b) Each fuel system must be arranged so that—
(1) No fuel pump can draw fuel from more than one tank at a time; or
(2) There are means to prevent introducing air into the system.
(c) Each fuel system for a turbine engine must be capable of sustained operation throughout its flow and pressure range with fuel initially saturated with water at 80°F and having 0.75cc of free water per gallon added and cooled to the most critical condition for icing likely to be encountered in operation.
(d) Each fuel system for a turbine engine powered airplane must meet the applicable fuel venting requirements of part 34 of this chapter.

§ 23.953 Fuel system independence.
(a) Each fuel system for a multiengine airplane must be arranged so that, in at least one system configuration, the failure of any one component (other than a fuel tank) will not result in the loss of power of more than one engine or require immediate action by the pilot to prevent the loss of power of more than one engine.
(b) If a single fuel tank (or series of fuel tanks interconnected to function as a single fuel tank) is used on a multiengine airplane, the following must be provided:
(1) Independent tank outlets for each engine, each incorporating a shut-off valve at the tank. This shutoff valve may also serve as the fire wall shutoff valve required if the line between the valve and the engine compartment does not contain more than one quart of fuel (or any greater amount shown to be safe) that can escape into the engine compartment.
(2) At least two vents arranged to minimize the probability of both vents becoming obstructed simultaneously.
(3) Filler caps designed to minimize the probability of incorrect installation or inflight loss.
(4) A fuel system in which those parts of the system from each tank outlet to any engine are independent of each part of the system supplying fuel to any other engine.

§ 23.954 Fuel system lightning protection.
The fuel system must be designed and arranged to prevent the ignition of fuel vapor within the system by—
(a) Direct lightning strikes to areas having a high probability of stroke attachment;
(b) Swept lightning strokes on areas where swept strokes are highly probable; and
(c) Corona or streamering at fuel vent outlets.

§ 23.955 Fuel flow.
(a) General. The ability of the fuel system to provide fuel at the rates specified in this section and at a pressure sufficient for proper engine operation must be shown in the attitude that is most critical with respect to fuel feed and quantity of unusable fuel. These conditions may be simulated in a suitable mockup. In addition—
(1) The quantity of fuel in the tank may not exceed the amount established as the unusable fuel supply for that tank under §23.959(a) plus that quantity necessary to show compliance with this section.
(2) If there is a fuel flowmeter, it must be blocked during the flow test and the fuel must flow through the meter or its bypass.
(3) If there is a flowmeter without a bypass, it must not have any probable failure mode that would restrict fuel flow below the level required for this fuel demonstration.
(4) The fuel flow must include that flow necessary for vapor return flow,
§ 23.957 Flow between interconnected tanks.

(a) It must be impossible, in a gravity feed system with interconnected tank outlets, for enough fuel to flow between the tanks to cause an overflow of fuel from any tank vent under the naturally aspirated power is regained within 10 seconds; or

(3) 20 seconds for multiengine airplanes.

(f) Turbine engine fuel systems. Each turbine engine fuel system must provide at least 100 percent of the fuel flow required by the engine under each intended operation condition and maneuver. The conditions may be simulated in a suitable mockup. This flow must—

(1) Be shown with the airplane in the most adverse fuel feed condition (with respect to altitudes, attitudes, and other conditions) that is expected in operation; and

(2) For multiengine airplanes, notwithstanding the lower flow rate allowed by paragraph (d) of this section, be automatically uninterrupted with respect to any engine until all the fuel scheduled for use by that engine has been consumed. In addition—

(i) For the purposes of this section, "fuel scheduled for use by that engine" means all fuel in any tank intended for use by a specific engine.

(ii) The fuel system design must clearly indicate the engine for which fuel in any tank is scheduled.

(iii) Compliance with this paragraph must require no pilot action after completion of the engine starting phase of operations.

(3) For single-engine airplanes, require no pilot action after completion of the engine starting phase of operations unless means are provided that unmistakably alert the pilot to take any needed action at least five minutes prior to the needed action; such pilot action must not cause any change in engine operation; and such pilot action must not distract pilot attention from essential flight duties during any phase of operations for which the airplane is approved.