(d) All parts of the fuel system up to
the tank which are subjected to fueling
pressures must have a proof pressure of
1.33 times, and an ultimate pressure of
at least 2.0 times, the surge pressure
likely to occur during fueling.

[F]uel System Components

§ 23.991 Fuel pumps.

(a) Main pumps. For main pumps, the
following apply:

(1) For reciprocating engine installa-
tions having fuel pumps to supply fuel
to the engine, at least one pump for
each engine must be directly driven by
the engine and must meet §23.955. This
pump is a main pump.

(2) For turbine engine installations,
each fuel pump required for proper en-
gine operation, or required to meet the
fuel system requirements of this sub-
part (other than those in paragraph (b)
of this section), is a main pump. In ad-
dition—

(i) There must be at least one main
pump for each turbine engine;

(ii) The power supply for the main
pump for each engine must be inde-
pendent of the power supply for each
main pump for any other engine; and

(iii) For each main pump, provision
must be made to allow the bypass of
each positive displacement fuel pump
other than a fuel injection pump ap-
proved as part of the engine.

(b) Emergency pumps. There must be
an emergency pump immediately avail-
able to supply fuel to the engine if any
main pump (other than a fuel injection
pump approved as part of an engine) fails. The power supply for each emer-
gency pump must be independent of the
power supply for each corresponding
main pump.

(c) Warning means. If both the main
pump and emergency pump operate
continuously, there must be a means to
indicate to the appropriate flight crew-
members a malfunction of either pump.

(d) Operation of any fuel pump may
not affect engine operation so as to
create a hazard, regardless of the en-
gine power or thrust setting or the
functional status of any other fuel
pump.

§ 23.993 Fuel system lines and fittings.

(a) Each fuel line must be installed
and supported to prevent excessive vi-
bilation and to withstand loads due to
fuel pressure and accelerated flight
conditions.

(b) Each fuel line connected to com-
ponents of the airplane between which
relative motion could exist must have
provisions for flexibility.

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

(d) Each flexible hose must be shown
to be suitable for the particular appli-
cation.

(e) No flexible hose that might be ad-
versely affected by exposure to high
temperatures may be used where exces-
sive temperatures will exist during op-
eration or after engine shutdown.

§ 23.994 Fuel system components.

Fuel system components in an engine
nacelle or in the fuselage must be pro-
tected from damage which could result
in spillage of enough fuel to constitute
a fire hazard as a result of a wheels-up
landing on a paved runway.

§ 23.995 Fuel valves and controls.

(a) There must be a means to allow
appropriate flight crew members to
rapidly shut off, in flight, the fuel to
each engine individually.

(b) No shutoff valve may be on the
engine side of any firewall. In addition,
there must be means to—

(1) Guard against inadvertent oper-
ation of each shutoff valve; and

(2) Allow appropriate flight crew
members to reopen each valve rapidly
after it has been closed.