§ 121.643 Fuel supply: Nonturbine and
turbo-propeller-powered airplanes:
Supplemental operations.

(a) Except as provided in paragraph
(b) of this section, no person may re-
lease for flight or takeoff a nonturbine
or turbo-propeller-powered airplane un-
less, considering the wind and other
weather conditions expected, it has
enough fuel—

(1) To fly to and land at the airport
to which it is released;
(2) Thereafter, to fly to and land at
the most distant alternate airport
specified in the flight release; and
(3) Thereafter, to fly for 45 minutes
at normal cruising fuel consumption
or, for certificate holders who are au-
thorized to conduct day VFR oper-
tations in their operations specifi-
cations and who are operating non-
transport category airplanes type cer-
tificated after December 31, 1964, to fly
for 30 minutes at normal cruising fuel
consumption for day VFR operations.

(b) If the airplane is released for any
flight other than from one point in the
contiguous United States to another
point in the contiguous United States,
it must carry enough fuel to meet the
requirements of paragraphs (a) (1) and
(2) of this section and thereafter fly for
30 minutes plus 15 percent of the total
time required to fly at normal cruising
fuel consumption to the airports speci-
fied in paragraphs (a) (1) and (2) of this
section, or to fly for 90 minutes at nor-
mal cruising fuel consumption, which-
ever is less.

(c) No person may release a nontur-
bine or turbo-propeller-powered air-
plane to an airport for which an alter-
nate is not specified under §121.623(b),
unless it has enough fuel, considering
wind and other weather conditions ex-
pected, to fly to that airport and there-
after to fly for three hours at normal
cruising fuel consumption.

§ 121.645 Fuel supply: Turbine-engine
powered airplanes, other than
turbo propeller: Flag and supple-
mental operations.

(a) Any flag operation within the 48
contiguous United States and the Dis-
trict of Columbia may use the fuel re-
quirements of §121.639.

(b) For any certificate holder con-
ducting flag or supplemental oper-
tations outside the 48 contiguous United
States and the District of Columbia,
unless authorized by the Administrator
in the operations specifications, no per-
son may release for flight or takeoff a
turbine-engine powered airplane (other
than a turbo-propeller powered air-
plane) unless, considering wind and
other weather conditions expected, it
has enough fuel—

(1) To fly to and land at the airport
to which it is released;
(2) After that, to fly for a period of 10
percent of the total time required to
fly from the airport of departure to,
and land at, the airport to which it was
released;
(3) After that, to fly to and land at
the most distant alternate airport
specified in the flight release, if an al-
ternate is required; and
(4) After that, to fly for 30 minutes at
holding speed at 1,500 feet above the al-
ternate airport (or the destination air-
port if no alternate is required) under
standard temperature conditions.

(c) No person may release a turbine-
engine powered airplane (other than a
turbo-propeller airplane) to an airport
for which an alternate is not specified un-
der §121.621(a)(2) or §121.623(b) unless
it has enough fuel, considering wind
and other weather conditions expected,
to fly to that airport and thereafter to
fly for at least two hours at normal
cruising fuel consumption.

(d) The Administrator may amend
the operations specifications of a cer-
tificate holder conducting flag or sup-
plemental operations to require more
fuel than any of the minimums stated
in paragraph (a) or (b) of this section if
he finds that additional fuel is nec-
essary on a particular route in the in-
terest of safety.

(e) For a supplemental operation
within the 48 contiguous States and
the District of Columbia with a turbine
§ 121.646 En-route fuel supply: flag and supplemental operations.

(a) No person may dispatch or release for flight a turbine-engine powered airplane with more than two engines for a flight more than 90 minutes (with all engines operating at cruise power) from an Adequate Airport unless the following fuel supply requirements are met:

(1) The airplane has enough fuel to meet the requirements of §121.645(b);

(2) The airplane has enough fuel to fly to the Adequate Airport—

(i) Assuming a rapid decompression at the most critical point;

(ii) Assuming a descent to a safe altitude in compliance with the oxygen supply requirements of §121.333; and

(iii) Considering expected wind and other weather conditions.

(3) The airplane has enough fuel to hold for 15 minutes at 1500 feet above field elevation and conduct a normal approach and landing.

(b) No person may dispatch or release for flight an ETOPS flight unless, considering wind and other weather conditions expected, it has the fuel otherwise required by this part and enough fuel to satisfy each of the following requirements:

(1) Fuel to fly to an ETOPS Alternate Airport.

(i) Fuel to account for rapid decompression and engine failure. The airplane must carry the greater of the following amounts of fuel:

(A) Fuel sufficient to fly to an ETOPS Alternate Airport assuming a rapid decompression at the most critical point followed by descent to a safe altitude in compliance with the oxygen supply requirements of §121.333 of this chapter;

(B) Fuel sufficient to fly to an ETOPS Alternate Airport (at the one engine inoperative cruise speed) assuming an engine failure at the most critical point followed by descent to the one engine inoperative cruise altitude.

(ii) Fuel to account for errors in wind forecasting. In calculating the amount of fuel required by paragraph (b)(1)(i) of this section, the certificate holder must increase the actual forecast wind speed by 5% (resulting in an increase in headwind or a decrease in tailwind) to account for any potential errors in wind forecasting. If a certificate holder is not using the actual forecast wind based on a wind model accepted by the FAA, the airplane must carry additional fuel equal to 5% of the fuel required for paragraph (b)(1)(i) of this section, as reserve fuel to allow for errors in wind data.

(iii) Fuel to account for icing. In calculating the amount of fuel required by paragraph (b)(1)(i) of this section (after completing the wind calculation in paragraph (b)(1)(ii) of this section), the certificate holder must ensure that the airplane carries the greater of the following amounts of fuel in anticipation of possible icing during the diversion:

(A) Fuel that would be burned as a result of airframe icing during 10 percent of the time icing is forecast (including the fuel used by engine and wing anti-ice during this period);

(B) Fuel that would be used for engine anti-ice, and if appropriate wing anti-ice, for the entire time during which icing is forecast.

(iv) Fuel to account for engine deterioration. In calculating the amount of fuel required by paragraph (b)(1)(i) of this section (after completing the wind calculation in paragraph (b)(1)(ii) of this section), the airplane also carries fuel equal to 5% of the fuel specified above, to account for deterioration in cruise fuel burn performance unless the certificate holder has a program to monitor airplane in-service deterioration to cruise fuel burn performance.

(2) Fuel to account for holding, approach, and landing. In addition to the fuel required by paragraph (b)(1) of this section, the airplane must carry fuel sufficient to hold at 1500 feet above