§ 121.419 Pilots and flight engineers: Initial, transition, and upgrade ground training.

(a) Initial, transition, and upgrade ground training for pilots and flight engineers must include instruction in at least the following as applicable to their assigned duties:

1. General subjects—
   (i) The certificate holder’s dispatch or flight release procedures;
   (ii) Principles and methods for determining weight and balance, and runway limitations for takeoff and landing;
   (iii) Enough meteorology to insure a practical knowledge of weather phenomena, including the principles of frontal systems, icing, fog, thunderstorms, and high altitude weather situations;
   (iv) Air traffic control systems, procedures, and phraseology;
   (v) Navigation and the use of navigation aids, including instrument approach procedures;
   (vi) Normal and emergency communication procedures;
   (vii) Visual cues prior to and during descent below DA/DH or MDA;
   (viii) Fuel consumption and cruise control;
   (ix) Flight planning;
   (x) Each normal and emergency procedure; and

2. For each airplane type—
   (i) A general description;
   (ii) Performance characteristics;
   (iii) Engines and propellers;
   (iv) Major components;
   (v) Air traffic control systems, procedures, and phraseology;
   (vi) Navigation and the use of navigation aids, including instrument approach procedures;
   (vii) Visual cues prior to and during descent below DA/DH or MDA;
   (viii) Approved crew resource management initial training; and
   (ix) Other instructions as necessary to ensure his competence.

(b) Initial ground training for pilots and flight engineers must consist of at least the following programmed hours of instruction in the required subjects specified in paragraph (a) of this section and in § 121.415(a) unless reduced under § 121.405:

1. Group I airplanes—
   (i) Reciprocating powered, 64 hours; and
   (ii) Turbopropeller powered, 80 hours.

2. Group II airplanes, 120 hours.


§ 121.420 Flight navigators: Initial and transition ground training.

(a) Initial and transition ground training for flight navigators must include instruction in the subjects specified in § 121.419(a) as appropriate to his assigned duties and responsibilities and in the following with respect to the particular type airplane:

1. Limitations on climb, cruise, and descent speeds.

2. Each item of navigational equipment installed including appropriate radio, radar, and other electronic equipment.


4. Airspeed, temperature, and pressure indicating instruments or systems.

5. Compass limitations and methods of compensation.

6. Cruise control charts and data, including fuel consumption rates.

7. Any other instruction as necessary to ensure his competence.

(b) Initial ground training for flight navigators must consist of at least the following programmed hours of instruction in the subjects specified in paragraph (a) of this section and in § 121.415(a) unless reduced under § 121.405:

1. Group I airplanes—
   (i) Reciprocating powered, 16 hours; and